UNITED NATIONS
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS

Seminar on poverty measurement
5-6 May 2015, Geneva, Switzerland
Agenda item 4: Monetary poverty

Influence of the adopted methodological solutions on the assessments of the monetary poverty range. The case of Poland

Prepared by the Central Statistical Office of Poland[1]

Introduction

Since the 90's, Central Statistical Office of Poland has been systematically conducted methodological and analytical works on poverty measurement. Different aspects, such as adopting the so-called operational definition of poverty, choice of the particular poverty measurement methods as well as the data sources, have an influence on both, the number of people considered as poor as well as their socio-demographic characteristics. This paper presents how is the influence of the adopted welfare measures (income vs. expenditures), used equivalence scales and different data resources on the assessment of the monetary poverty. Focus on the adopted methodological solutions and consequences of using different data sources in poverty analyses, make easier the interpretation of data regarding this field by the data consumers who are not the specialists and they do not know specific theoretical aspects of this research area.

---

[1] Anna Bieńkuńska, Tomasz Piasecki, Karol Sobestjański, CSO of Poland.

I.   The equivalence scales

An equivalence scale is 'a measure of the cost of living of a household of a given size and demographic composition, relative to the cost of living of a reference household (usually a single adult, when both households attain the same level of utility or standard of living'[2]. In the analyses concerning poverty (except subjective poverty) CSO of Poland applies two scales – the original OECD equivalence scale (also known as the 'Oxford' scale) as well as the modified OECD equivalence scale. The original OECD scale has been mainly employed for the domestic use and the modified scale, according to the Eurostat requirements, for the analyses supposed to be comparable between the European Union member states.

The modified OECD equivalence scale is calculated as follows: value 1 is applied for the first adult household member, 0,5 – for each additional adult household member and 0,3 - for every child in the household at the age of 14 or less.

The original OECD equivalence scale differs from the modified one in that the second and each additional adult person in the household has a value of 0,7 and every child aged 14 or less – 0,5. Adopting for the domestic use the original scale rather than the modified one results from the lower standard of living and different structure of expenditures in Poland in comparison with most of the countries of Western Europe.

In addition to the assessments conducted on a basis of the original and modified OECD equivalence scales, the analyses presented in this paper consider the calculations based on the so-called square root scale. Applying this scale the square root of household size is treated as a number of the equivalent units. The square root scale is used in the analyses conducted i.e. by OECD.[3]

The analyses concerning the influence of different equivalence scales on poverty rates (head count ratio) which are presented in this paper, have been conducted on a basis of the results of Polish 2013 edition of EU-SILC survey. There was applied the definition of poverty adopted by Eurostat. According to this definition people are considered as poor if they live in the households falling below the poverty threshold (also known as *poverty line*) established at the level of 60% median equivalised disposable income of the total population. Results of the analyses refer to three above mentioned equivalence scales, i.e.: original OECD equivalence scale, modified OECD equivalence scale as well as square root scale. Furthermore, analyses include calculations of the relative poverty rate assessed on a basis of income per person in household – a simple measure which does not take into account the influence of the household demographic structure on its costs of living. The income per person can be treated as the equivalised income calculated with the 'special' equivalent scale which assumes value 1 for each person in a household.

Table 1. The relative poverty rates in Poland calculated with the use of different equivalence scales

Poverty threshold	Equivalence scale		Persons aged			
			Total	0-17	18-65	65 or more
			% of persons in households			
60% of median disposable income	**Original OECD equivalence scale**	*1-0.7-0.5*	18,0	26,3	17,5	9,5
	Modified OECD equivalence scale	*1-0.5-0.3*	17,3	23,2	16,7	12,3
	Square root scale	*sqrt(n)**	17,7	22,6	16,7	15,8
	Per person	*n**	20,1	33,2	19,2	7,7

*n – number of persons in a household

[2] A. Lewbel, K. Pendakur, Equivalence scales. Entry for The New Palgrave Dictionary of Economics, 2nd edition, Boston 2006, https://www2.bc.edu/~lewbel/palequiv.pdf
[3] *Growing Unequal ? Income Distribution and Poverty in OECD Countries*, Paris 2008, http://www.oecd.org/els/soc/growingunequalincomedistributionandpovertyinoecdcountries.htm

Results of the analysis indicate that in Poland, applying different equivalence scale does not have a significant impact on the assessments of poverty rates at the level of the whole population, however it does have the influence on the results broken down into different age groups. Taking into consideration the whole population, the lowest value of the relative poverty rate has been observed when the modified OECD equivalence scale was applied (approx. 17%). However, the assessments conducted with the use of both, original OECD scale as well as square root scale, indicate very similar poverty range (approx. 18%). The highest value of the relative poverty rate has been observed, when the effects of the household's structure were omitted. In this case, approx. 20% of the population can be recognized as poor.

As mentioned before, the effects of applying different equivalence scales are more apparent when the analysis was conducted at the level of different age groups rather than the whole population. Furthermore, generally it can be said that assigning the higher weight to each additional household member (in particular to children) results in increase of the poverty rate among the youngest persons and decrease of this rate among the oldest ones.

For example, in a group of persons aged 0-17, a value of the relative poverty indicator assessed with a use of the original OECD equivalence scale achieved approx. 26%, whereas this rate calculated on a basis of both, the modified OECD equivalence scale and the square root scale were by approx. 3 pp. lower. Moreover, the analysis regarding the range of relative poverty conducted with a use of per capita income in households indicates, that below the poverty line falls every third person aged 0-17.

When a group of persons aged 65 or more was analyzed, differences between the rates assessed with the use of various equivalence scales are also significant. When relative poverty rate was calculated on a basis of original OECD equivalence scale, approximately every tenth person in the oldest age group can be considered as at-risk-of-poverty. When applying the modified OECD equivalence scale, the rate for the group of persons aged 65 or more increases to 12% and in case of the square root scale it achieves almost 16%. However, the level of relative poverty assessed for this age group on a basis of per capita income is considerably lower, being at the level of approx. 8%.

II.   Measures of the economic welfare

The levels of income or consumption/expenditures are the most common synthetic measures of welfare in the standard analyses of economic poverty. Choice between these two measures is mainly conditioned by availability and quality of data. If systematic, special surveys on households' income are conducted then the disposable income is the most convenient measure of economic well-being. On the other hand, if the analyses are based on the household budget surveys then the level of consumption/expenditures is the most common measure of welfare. However, it is important to remember that the choice of each measure requires a different interpretation.

As mentioned before, the analyses of economic poverty have been conducted by CSO of Poland since more than twenty years. The basis for them have been the results of the household budget survey. The synthetic indicator of the households economic wellbeing which has been adopted in these analyses is the level of expenditures. It was assumed that data on expenditures (including the value of natural consumption) derived from the household budget surveys are considerably more reliable than data on income from this survey. In a context of the long-term analyses, expenditures more closely reflect a permanent income as well as an opportunity to benefit from savings and loans.

Below, there are presented the results of the analysis which show how the change of the adopted economic welfare measure from expenditures to disposable income influences on the poverty indicators. Analysis is based on the results of the household budget surveys conducted in 2012 and 2013.

The analysis considering different welfare measures presented in this part was carried out with the use of two poverty thresholds: relative poverty line and extreme poverty line. Since 90's both poverty lines have been applied in CSO's official statistics on poverty in Poland. The approach to the measurement of relative poverty applied in this part differs from the one presented in a previous section, where official Eurostat approach was applied when discussing the influence of equivalence scales on poverty rates. In this part, according to the Polish domestic methodology, the relative poverty line is

(depending on the welfare measure adopted) defined as 50% of mean expenditures of households or 50% of mean disposable income of households.

The extreme poverty threshold is an absolute measure. The basis for determining the extreme poverty line is so-called subsistence minimum calculated in Poland by the Institute of Labor and Social Studies. The subsistence minimum include only these needs which cannot be postponed by the households and the level of the satisfaction of needs below this threshold could cause the threat to the biological and psychophysical development of the human.

Basically, most of the analyses presented in this part refer to 2013, however the tables contain the information for 2012. When assessing the level of income and expenditures as well as poverty thresholds, the original OECD equivalence scale has been applied.

At the level of the whole population, extreme poverty rates assessed on a basis of expenditures are slightly higher than rates calculated with the use of income and they amounted to, respectively, 7,4% and 6,1%. However, the relative poverty rates are higher if they have been assessed on a basis on income. In this case poverty rates based on expenditures achieved 16,2% and based on income – 16,7%.

The wider divergences appear when the poverty rates in particular socio-economic groups (distinguished by the main source of household income) has been analyzed. Poverty rates assessed on a basis of expenditures indicate that approximately 13% of persons living in farmers' households are at risk of poverty. If expenditures were replaced by income, extreme poverty rate significantly increases, achieving approximately 24%. Similar situation is noticed if the relative poverty rate among farmers were taken into consideration. In this case, a value of this measure calculated on a basis of income achieves almost 36% and it is by 9 pp. higher than the level of poverty assessed with the use of expenditures.

Table 2. The extreme poverty rates in Poland in 2012-13 calculated on a basis of households' income and expenditures by socio-economic groups (main source of income)

| Socio-economic groups | % of persons at risk of extreme poverty | | | |
| | calculated on a basis of households' **expenditures** | | calculated on a basis of households' **income** | |
	2012	**2013**	**2012**	**2013**
Total population	**6,8**	**7,4**	**5,6**	**6,1**
Employees	6,2	6,4	3,0	3,5
Farmers	11,1	13,4	23,0	23,9
Self-employed	2,6	3,9	2,4	3,3
Retirees	4,3	4,8	2,8	2,3
Pensioners	12,1	13,2	10,7	12,0
Living off other, non-earned sources of income	22,6	21,5	29,4	26,8

Source: Own calculations on a basis of Household Budget Survey

Table 3. The relative poverty rates in Poland in 2012-13 calculated on a basis of households' income and expenditures by socio-economic groups (main source of income)

| Socio-economic groups | % of persons at risk of relative poverty | | | |
| | calculated on a basis of households' **expenditures** | | calculated on a basis of households' **income** | |
	2012	2013	2012	2013
Total population	**16,3**	**16,2**	**16,9**	**16,7**
Employees	15,3	14,9	14,1	13,7
Farmers	26,4	26,7	38,0	35,7
Self-employed	7,9	9,2	9,7	10,2
Retirees	11,9	11,4	9,8	8,8
Pensioners	25,8	26,3	31,0	31,5
Living off other, non-earned sources of income	41,5	39,0	56,8	55,2

Source: Own calculations on a basis of Household Budget Survey

Relatively serious discrepancies are also noticed among the households living off other, non-earned sources of income (mainly social benefits other than retirements or pensions). In this socio-economic group, the extreme poverty rate assessed on a basis of income is higher by over 5 pp. than the rate calculated with the consideration to expenditures. Furthermore, in case of the relative poverty, differences between the rate values in the group of persons living off other, non-earned sources of income amounted to approximately 16 pp.

It is very important to remember though, that the households income derived from the household budget survey refer to one month only. Households of farmers and households living off other, non-earned sources do not have stable, regular sources of income so these groups may have very low income or even not have it at all seasonally. However, it is worth noticing that among households which have the permanent sources of income, i.e. households living off hired work or pensions, there are observed different trends. In these groups, the level of extreme poverty rate assessed on a basis of income is considerably lower than the rate calculated with the use of expenditures. Furthermore, the relative poverty rate in the group of employees is slightly lower if assessed on a basis of income and in the group of pensioners – if assessed based on expenditures.

Table 4. The extreme poverty rates in Poland in 2012-13 calculated on a basis of households' income and expenditures by age

| Age | % of persons at risk of extreme poverty | | | |
| | calculated on a basis of households' **expenditures** | | calculated on a basis of households' **income** | |
	2012	2013	2012	2013
Total population	**6,8**	**7,4**	**5,6**	**6,1**
0 - 17 years old	9,8	10,1	7,6	8,2
18 - 64 years old	6,4	7,0	5,6	6,2
65 or more years old	3,8	4,4	2,3	2,1

Source: Own calculations on a basis of Household Budget Survey

Table 5. The relative poverty rates in Poland in 2012-13 calculated on a basis of households'

income and expenditures by age

Age	% of persons at risk of relative poverty			
	calculated on a basis of households' **expenditures**		calculated on a basis of households' **income**	
	2012	**2013**	**2012**	**2013**
Total population	**16,3**	**16,2**	**16,9**	**16,7**
0 - 17 years old	22,0	21,8	24,2	23,6
18 - 64 years old	15,5	16,5	16,3	16,3
65 or more years old	10,7	9,9	7,7	7,2

Source: Own calculations on a basis of Household Budget Survey

Influence of the adopted measure of welfare on the range of poverty in particular groups is also significant when the age of persons in the households was considered. Discrepancies between the values of the indicators assessed with the use of different measures are not important to such a large extent as in the case of the socio-economic groups.

Among the youngest persons, aged 0-17, the extreme poverty rate calculated on a basis of expenditures achieved in 2013 approximately 10%, when the relative poverty rate assessed with the use of this measure of welfare achieved ca. 22%. However, when the poverty range calculated with the use of disposable income has been analyzed, the level of extreme poverty in the group of persons aged 0-17 decreases to ca. 8%, and a value of relative poverty rate increases to approximately 24%.

Among persons aged 18-64 discrepancies between poverty rates assessed on a basis of income and expenditures were very slight and they did not exceed 1 pp. More significant differences were observed in the oldest group of persons aged 65 or more. In this case, percentage of persons at risk of extreme poverty measured with the use of expenditures was approximately twice as high as the rate calculated on a basis of households' income (poverty rate based on expenditures achieved 4,4% , the rate based on income - 2,1%). The analysis of relative poverty in this age group indicated similar trends, however in this case the rate values differed by ca. 3 pp (poverty rates achieved respectively 9,9% and 7,2%).

III. Data sources

Until 2005, when CSO of Poland implemented the EU-SILC survey (European Union Statistics on Income and Living Conditions) which is the source of data comparable between all European Union member states, the main data source on households income in Poland had been for years the household budget survey. However, methodology of income surveying applied in EU-SILC survey is not fully coherent with the methodology of the household budget survey. As the result, assessments concerning the level of poverty in Poland conducted on a basis of both above mentioned surveys not only differs from each other, but also require to be interpreted differently.

These methodological differences particularly refers to the way how respondents are interviewed about their income. In the EU-SILC survey the information on income is collected during the interview with a respondent who is asked many detailed questions about the level and sources of his or her household's income. In case of respondent's refusal to give the information on the income received, the data missed are imputed at the stage of a data development. On the other hand, information on income on a basis of the household budget survey is derived from the current household's notes, made in the so-called 'budgetary diary'. Furthermore, the surveys differs from each other when it comes to the period of reference of the data collected. In the EU-SILC survey information refers to the income received within the whole calendar year preceding the survey. In case of the household budget survey, the reference period is one month, what may have a significant influence on the assessments concerning income situation of the households receiving irregular income. Moreover, total disposable income calculated on a basis of the EU-SILC survey does not

include a value of natural consumption (i.e. consumer goods and services taken from individual farm or own economic activity to satisfy household's needs), while the assessments based on the household budget survey include this element as a part of the total household income.

For the use of this paper, there were calculated the extreme poverty rates on a basis of the EU-SILC survey and the household budget survey. Assessments have been made with the use of the original OECD equivalence scale. Data on income which were the basis for the calculations of poverty rates as well as the poverty threshold refer to the year 2012. Basically, at the level of both, the whole population and different age groups, extreme poverty rates according to the household budget survey[4] are by approximately 1 pp. higher than the indicator values derived from EU-SILC survey. Thus, discrepancies between the results assessed on a basis of both surveys does not seem to be large. However, it should be remembered that there are some differences between the surveys' methodologies, which refer to i.e. slightly different definitions of the disposable income. Furthermore, population of people at risk of extreme poverty is relatively small so proportionally difference of 1 pp. turns out to be quite significant. It especially concerns the group of the oldest persons, in which the poverty rate calculated on a basis of the household budget survey is approximately two times higher than the rate based on the EU-SILC.

Table 6. The extreme poverty rates in Poland in 2012 calculated on a basis of EU-SILC and Household Budget Survey by age

Age	% of persons in households at risk of extreme poverty	
	calculated on a basis of **EU-SILC**	calculated on a basis of **Household Budget Survey**
Total population	4,4	5,6
0 - 17 years old	6,7	7,6
18 - 64 years old	4,4	5,6
65 or more years old	0,9	2,3

Source: Own calculations on a basis of EU-SILC 2013 and Household Budget Survey 2012

The methodological differences noticed above cause that poverty rates assessed on a basis of data on income from the household budget survey cannot be simply compared or replaced by analogous rates calculated on a basis of the EU-SILC survey. It would lead to break of the timeliness and, in a result, make impossible the analyses of poverty in a context of its changes in time. Despite very close rates at the level of the whole population received on a basis of both surveys, assessing to what extent these data refer to the same social groups should be definitely preceded by very wide and detailed analysis regarding this field.

IV.   Conclusions

For years statistical information on poverty has been the subject of interest of the public, scientists and politicians. Variety of the methodological solutions aimed at the diagnosis of this social phenomena is such a wide, that the data users find many difficulties when they want to interpret unambiguously the results of the surveys conducted not only by the statistical offices, but also different international organizations as well as scientific communities.

Different operational definitions of poverty, various equivalence scales as well as data sources may make the correct interpretation of the results presented very difficult - especially to the statistical data users who are not the experts in the field of poverty. On the other hand, multiplicity of the applied methodological solutions enable to analyze poverty with regards to the different aspects of this phenomena as well as to adjust the methods of measurement to the socio-economic conditions and the data availability in different countries.
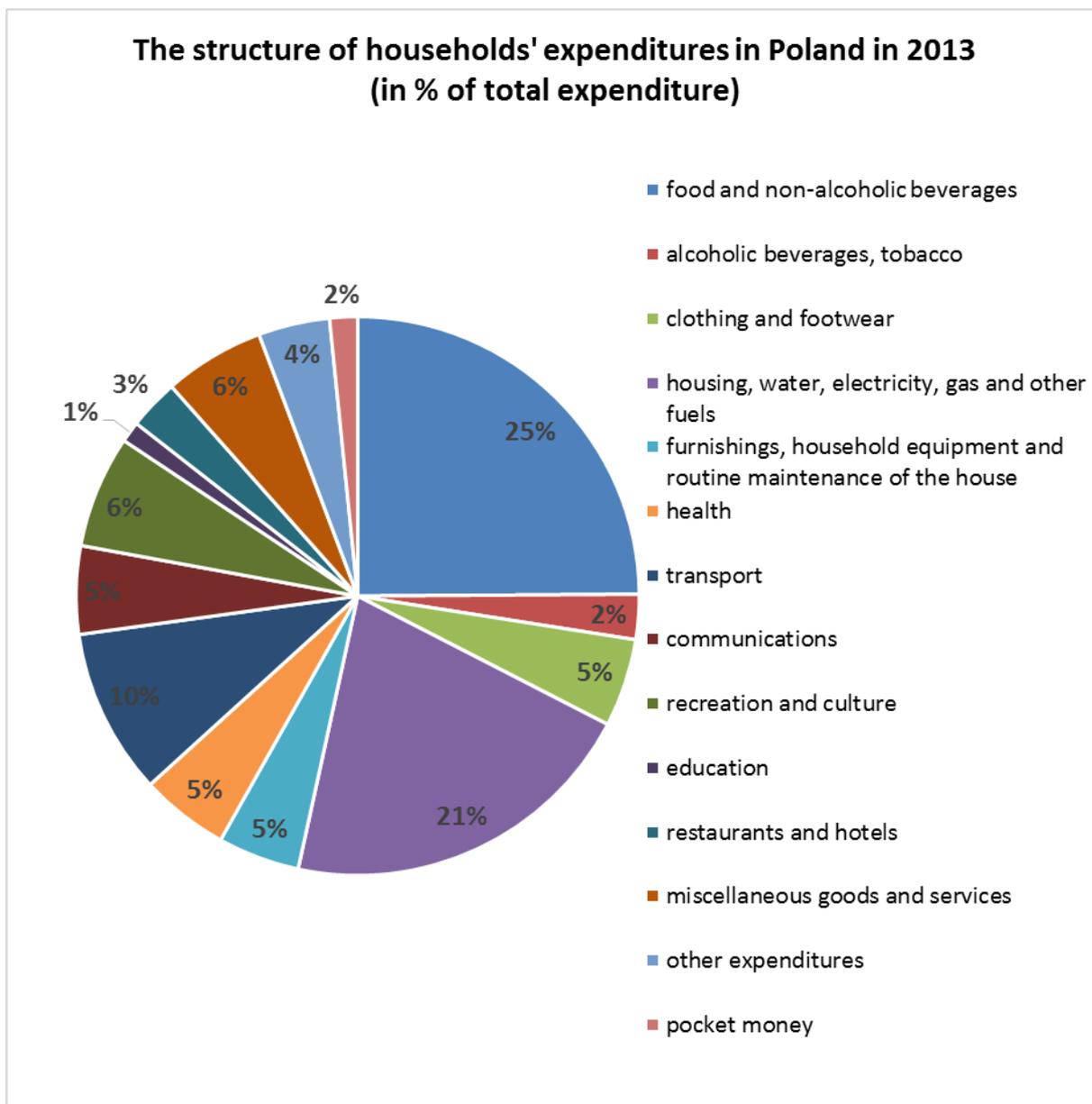
---

[4] It should be underlined that official data on poverty based on the household budget survey are calculated with the use of expenditures rather than income.

The results of the analyses presented in this paper which refer to the different methodological solutions applied in the measurement of monetary poverty indicate that the choice of particular methods and data sources more or less influences on the poverty rates. Thus, it has the impact on the correct diagnosis of the range of poverty as well as on the identification of the social groups which can be considered as the most at risk of poverty.

To minimalize the risk of misinterpretation of the information on this field, it is necessary to provide the high quality metadata to the statistical data users. Furthermore, it seems very important to consistently use the applied methodological solutions over the time. It is the only way to obtain valuable and comparable throughout the years statistical data, which will provide the reliable monitoring of poverty. It is very important in a context of planning and implementing the actions aimed at the fight against poverty which are undertaken by both, governmental and non-governmental institutions and organizations.

Annex

Chart 1.

The structure of households' expenditures in Poland in 2013
(in % of total expenditure)

25% — food and non-alcoholic beverages
2% — alcoholic beverages, tobacco
5% — clothing and footwear
21% — housing, water, electricity, gas and other fuels
5% — furnishings, household equipment and routine maintenance of the house
5% — health
10% — transport
5% — communications
6% — recreation and culture
1% — education
3% — restaurants and hotels
6% — miscellaneous goods and services
4% — other expenditures
2% — pocket money

Source: Household Budget Survey 2013

Box 1.

Main concepts and definitions

Expenditures comprise expenditures on consumer goods and services and other expenditures. Expenditures on consumer goods and services are allocated to satisfying household's needs. They include products purchased by cash, also using debt or credit card, on credit, received free of charge and natural consumption (consumer goods and services taken from individual farm or own economic activity to satisfy household's needs). Consumer goods comprise non-durable goods (e.g. food, beverages or medicines), semi-durable goods (e.g. clothes, books, toys) and durable goods (e.g. cars, washing machines, refrigerators, television sets). Other expenditures include: gifts donated to other households and non-commercial institutions; certain taxes, such as tax on legacy and donations, tax on real estates, fees for perpetual use of the land; prepayments of personal income tax and social security

contributions paid directly by the tax payer; other kinds of expenditures not allocated directly to consumption, including sums lost in gambling and lotteries, losses of cash and bails.[5]

Disposable income based the EU-SILC survey is defined as a sum of the net (after deduction of income tax prepayment, tax on income from property, social and health insurance contributions) annual monetary incomes (in case of hired employment taking into account also non-monetary profit from the use of the company car) gained by all the household members reduced by: property tax, inter-household cash transfers paid and balance of offsetting settlements with the Tax Office.[6] **Disposable income based on the household budget survey** differs from the one calculated on a basis of EU-SILC in that, in addition to a value of monetary income (in cash), it also covers the income in kind, including natural consumption (consumer goods and services taken from individual farm or own economic activity to satisfy household's needs) as well as goods and services received free of charge. Moreover, the reference period for the calculation of income on a basis of the household budget survey is one month.

Poverty rate is a percentage of persons living in households whose income/expenditures are lower than the adopted poverty threshold (poverty line).

----

[5] Household Budget Survey in 2013, http://stat.gov.pl/en/topics/living-conditions/living-conditions/household-budget-survey-in-2013,2,8.html
[6] Incomes and living conditions of the population in Poland (report from the EU-SILC survey of 2013), http://stat.gov.pl/en/topics/living-conditions/living-conditions/incomes-and-living-conditions-of-the-population-in-poland-report-from-the-eu-silc-survey-of-2013,1,6.html