
# Measuring Objective and Subjective Aspects of Poverty. Discussion of Different Approaches and Measurement Methods Based on the Polish EU-SILC Survey

Anna Szukielojc-Bienkunska
(Statistics Poland)
A.Bienkunska@stat.gov.pl

Tomasz Piasecki
(Statistics Poland)

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# *Measuring Objective and Subjective Aspects of Poverty. Discussion of Different Approaches and Measurement Methods Based on the Polish EU-SILC Survey*[1]

Anna Bienkunska, Statistics Poland
Tomasz Piasecki, Statistics Poland

## Introduction

Poverty is a complex phenomenon. As a concept, it is variously understood and defined. In general, definitions found in the literature define poverty as the fact that certain needs are not met at the desired level. Statistical measurement, however, requires clarification as to which needs should be taken into account and what level of unsatisfied needs should be considered as the poverty threshold.

The choice of a particular definition of poverty and the measurement method used determines the results of the assessment. Depending on the approach used, different population groups may be considered most at risk of poverty. This has implications for both the design and monitoring of the effectiveness of programmes, formulated by social policy, aimed at reducing this phenomenon.

The decision on how to measure poverty involves, among other things, the choice of considering poverty in an objective or subjective way. In general, in the case of the objective approach the definition of what we call poverty, the setting of poverty thresholds, is dealt with by experts, regardless of the opinions of the units under study (households, individuals). In contrast, the subjective approach takes into account the opinions of respondents.

Both objective and subjective poverty are further subdivided.

The measurement of so-called objective poverty considers, among others:

- a one-dimensional approach focused on a selected element and a multidimensional approach that takes into account the accumulation of different symptoms of poverty. In the case of one-dimensional poverty, the classical monetary approach is dominant. According to the classical approach, poverty is identified solely on the basis of household income or the level of household expenditure/consumption (taken as a measure of well-being)' ,
- absolute poverty and relative poverty. According to the absolute approach, the term 'poor' is used to describe households and individuals who do not have the ability to meet what are considered basic needs, regardless of the standard of living of richer parts of society. According to the relative approach, poverty is treated as a form of inequality, an excessive gap between the living standards of different groups of the population. Poor people, poor families are those whose standard of living is significantly lower than in case of the rest of society.

The main feature of the subjective approach to measuring poverty is that the threshold between poor and non-poor is set on the basis of people's perceptions of their own well-being. In some methods, the questions asked are not so much about people's assessment of their own situation, but about the general perception of well-being. However, it is always an opinion formulated by the respondent from the point of view of their own situation and their own needs.

The use of the so-called subjective approach does not eliminate the need for the researcher to make some arbitrary decisions. These decisions are made at different stages of the research and are of a different nature. This makes it difficult to clearly divide the methods used and the indicators obtained into subjective and objective measures. Among the methods of measuring subjective poverty described in the literature and used in research practice the following could be distinguished:

- the direct, strictly subjective measurement of poverty, in which people assess themselves as poor or not without reference to the definition of poverty formulated by researcher;
- indirect subjective poverty measurement, where questions asked to respondents do not directly refer to feelings of poverty, but concern subjective assessments of various aspects of living

[1] Preliminary version

standards (e.g. ability to "make ends meet", ability to satisfy various needs). In this approach, the respondent's subjective assessment of his or her own situation determines whether or not he or she is classified as experiencing poverty, although this is done with reference to the poverty criteria adopted by the researcher. For example, a household/person will be considered subjectively poor if, in a multi-level attitude question, they declare that they 'can make ends meet with great difficulty or with difficulty'.

- 'objectivised' measurement of subjective poverty, which includes an approach based on so-called subjective poverty lines (thresholds) assessed with the use of statistical methods. In this approach, only the respondents' opinions about their own situation are subjective in nature, and these opinions constitute the starting point for the determination of poverty lines. Poverty thresholds for populations with certain socio-demographic characteristics are estimated by statistical analysis (using more or less advanced statistical methods, including econometric models) of the declared subjective assessments. Poverty lines estimated in this way are called quasi-subjective. The most popular methods of estimating such thresholds include: The Leyden Poverty Line (LPL) method, the Subjective Poverty Line (SPL) method, the Centre for Social Policy Poverty Line (CSP) method and the method based on a consumption adequacy question (CAQ).

A different category of surveys in the area of poverty is public opinion surveys on the perception of poverty as a social phenomenon. This type of survey allows, for example, to answer the question of how widespread poverty is perceived by people in a given country, what are the causes of poverty according to the public, what should be the role of the state in the fight against poverty, what forms of support the poor need, etc[2].

**Poverty measures used**

The analysis includes both measures of poverty that are widely known and regularly used, as well as indicators proposed by the authors. The first group includes mainly indicators calculated for the purposes of international comparisons and the monitoring of poverty-focused policies adopted at EU level and implemented by individual Member States (these indicators were previously included in the *Europe 2020 Strategy* and are currently used in the *European Pillar of Social Rights Action Plan*). These indicators are: at risk of poverty or social exclusion rate (AROPE), at-risk-of-poverty rate (ARPR) and severe material and social deprivation rate (SMSD). These are included in the group of so-called objective indicators. Further objective measures included in the study are the 'extreme income poverty rate' and the 'income privation rate'.

There are no questions in the EU-SILC survey that directly measure the extent of subjective poverty (share of the population who considers themselves as poor). On the other hand, the variables included offer the possibility of using indirect (proxy) and so-called 'objectivised' methods to measure subjective poverty. The authors considered both approaches and calculated the following indicators: an indicator of subjective economic stress based on a question about the subjective assessment of the ability to make ends meet, an indicator of the extent of subjective income poverty using a question about the minimum income to make ends meet – the so-called MIQ poverty rate, and two indicators based on so-called objectivised subjective poverty lines. These are the poverty rate based on the SPL method and the poverty rate calculated on the basis of the so-called quasi Leyden Poverty Line (quasi LPL) developed by the authors.

For the definitions of all indicators used in the paper, see Table 1 (*Applied poverty measures*).
A synthetic description of the calculation of the quasi Leyden Poverty Line (which is an original proposal of the authors) is also provided in the next section.

[2] The classification of subjective poverty measurement methods described above was presented, inter alia, in the document summarising the results of in-depth review of subjective poverty measures conducted under the umbrella of the Conference of European Statisticians by Statistics Poland (ECE/CES/2022/9). https://unece.org/sites/default/files/2022-04/ECE_CES_2022_9-2204786E.pdf

Table.1. Applied poverty measures (based on EU-SILC)

| Indicators | Definition of indicators | Description/remarks |
|---|---|---|
| **So-called objective measures** | | |
| At-risk-of-poverty rate (ARPR) | Share of people with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income after social transfers. | A relative measure of monetary poverty based on income.<br><br>Disposable income 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<br><br>Equivalised disposable income is calculated using the modified OECD equivalence scale, defined as follows: 1 – for the first adult household member, 0.5 – for the second and each subsequent household member aged 14 and over, 0.3 – for every child in the household under 14. |
| Severe material and social deprivation rate (SMSD) | The proportion of the population experiencing an enforced lack of at least 7 out of 13 deprivation items (6 related to the individual and 7 related to the household). | An indicator that is treated as an absolute measure of non-monetary poverty. It shows an enforced lack of necessary and desirable items to lead an adequate life.<br><br>List of items at household level:<br>• Capacity to face unexpected expenses<br>• Capacity to afford paying for one week annual holiday away from home<br>• Capacity to being confronted with payment arrears (on mortgage or rental payments, utility bills, hire purchase instalments or other loan payments)<br>• Capacity to afford a meal with meat, chicken, fish or vegetarian equivalent every second day<br>• Ability to keep home adequately |

| | | |
|---|---|---|
| | | • Have access to a car/van for personal use<br>• Replacing worn-out furniture<br><br>List of items at individual level:<br>• Having internet connection<br>• Replacing worn-out clothes by some new ones<br>• Having two pairs of properly fitting shoes (including a pair of all-weather shoes)<br>• Spending a small amount of money each week on him/herself<br>• Having regular leisure activities<br>• Getting together with friends/family for a drink/meal at least once a month. |
| At risk of poverty or social exclusion rate (AROPE) | This indicator corresponds to the sum of persons who are: at risk of poverty after social transfers, severely materially and socially deprived or living in households with very low work intensity. Persons are counted only once even if they are affected by more than one of these phenomena. | A composite indicator that takes into account both relative and absolute sub-indicators (and on the other hand: both monetary and non-monetary components).<br><br>When interpreting the value of the composite AROPE indicator, certain limitations and difficulties must be remembered. Firstly, the calculation of this indicator takes into account two sub-indices that relate to the population as a whole (i.e. the relative poverty rate and the severe deprivation indicator) and one indicator which, for methodological reasons, refers only to the population aged 0-64 (the very low household work intensity indicator).<br>Secondly, the complex nature of the 'at risk of poverty or social exclusion' means that fluctuations in the value of the indicator over the years do not always have the same determinants, as each of the sub-indices relates to a different aspects. One should also not forget the different reference periods of the particular indicators. The relative poverty indicator is estimated on the basis of the disposable income from the year preceding the survey (t-1); the same reference period applies to the low work intensity indicator, while in the case of the severe material and social deprivation indicator the information refers to the year in which the survey is conducted (t). |

| | | |
|---|---|---|
| | | People living in households with very low work intensity are those aged 0-64 living in households where the adults (aged 18-59) work 20% or less of their total work potential during the past year.<br><br>AROPE is the main indicator to monitor the EU target on poverty and social exclusion both in the *Europe 2020 Strategy* and in the new strategy valid until 2030 – *The European Pillar of Social Rights* |
| Extreme income poverty rate | The percentage of people with disposable income (after social transfers) below the extreme poverty threshold which is estimated on the basis of the subsistence minimum. | Absolute measure of monetary poverty.<br><br>The basis for calculating the extreme poverty threshold is a level of the subsistence minimum estimated in Poland by the Institute of Labour and Social Studies (IPiSS). The category of subsistence minimum determines a very low level of satisfaction of needs. Consumption below this level makes it difficult to survive and constitutes a threat to human psychophysical development.<br><br>The starting point for estimating poverty lines was the subsistence minimum level for a one-person household. When calculating poverty thresholds for multi-person households, the so-called OECD original equivalence scale was applied which is defined as follows: 1 – for the first adult household member, 0.7 – for the second and each subsequent household member aged 14 and over, 0.5 – for every child in the household under 14. |
| Income privation rate | The percentage of people with disposable income (after social transfers) below the privation poverty threshold which is estimated on the basis of the social minimum. | Absolute monetary measure. Defines the extent of 'the low-income sphere'.<br><br>The privation threshold is based on the social minimum calculated by the IPiSS. The social minimum basket takes into account goods and services serving not only to satisfy existential needs, but also goods and services necessary for work, education, maintaining family ties and social contacts, and modest participation in culture and recreation. It is assumed that income at the social minimum level make it possible to lead a "minimally dignified life" and to realize the inclusive needs of a person. |

| | | |
|---|---|---|
| | | The starting point for estimating privation thresholds was the social minimum level for a one-person household. When calculating privation thresholds for multi-person households, the so-called OECD original equivalence scale was applied. |
| **So-called subjective measures** | | |
| Indicator of subjective economic stress –<br>difficulties to make ends meet | Percentage of people in households making ends meet with difficulty or great difficulty. | Indirect (proxy) measure of subjective poverty<br><br>Indicator based on a question about the subjective assessment of the ability to make ends meet – 'Deeleck question' - Can you make ends meet with the actual income of your household:<br>• with great difficulty,<br>• with difficulty,<br>• rather easily,<br>• easily,<br>• very easily?<br>We consider poor the households, which gives the first two answers |
| Subjective income poverty rate – so-called MINQ poverty rate | Percentage of people in households with a disposable income (after social transfers) lower than the declared minimum income to make ends meet. | Indirect (proxy) measure of subjective poverty<br><br>Based on the question on 'lowest monthly income to make ends meet' (so-called minimal income question, MINQ) : "In your opinion, what is the very lowest net monthly income that your household would have to have in order to make ends meet, that is to pay its usual necessary expenses?"<br>We consider poor the households, whose actual disposable income (after social transfers) is lower than the income declared in MINQ.<br><br>The reference period for the actual household income is the year preceding the survey, while the subjective assessment refers to the situation in the year in which the survey is conducted |

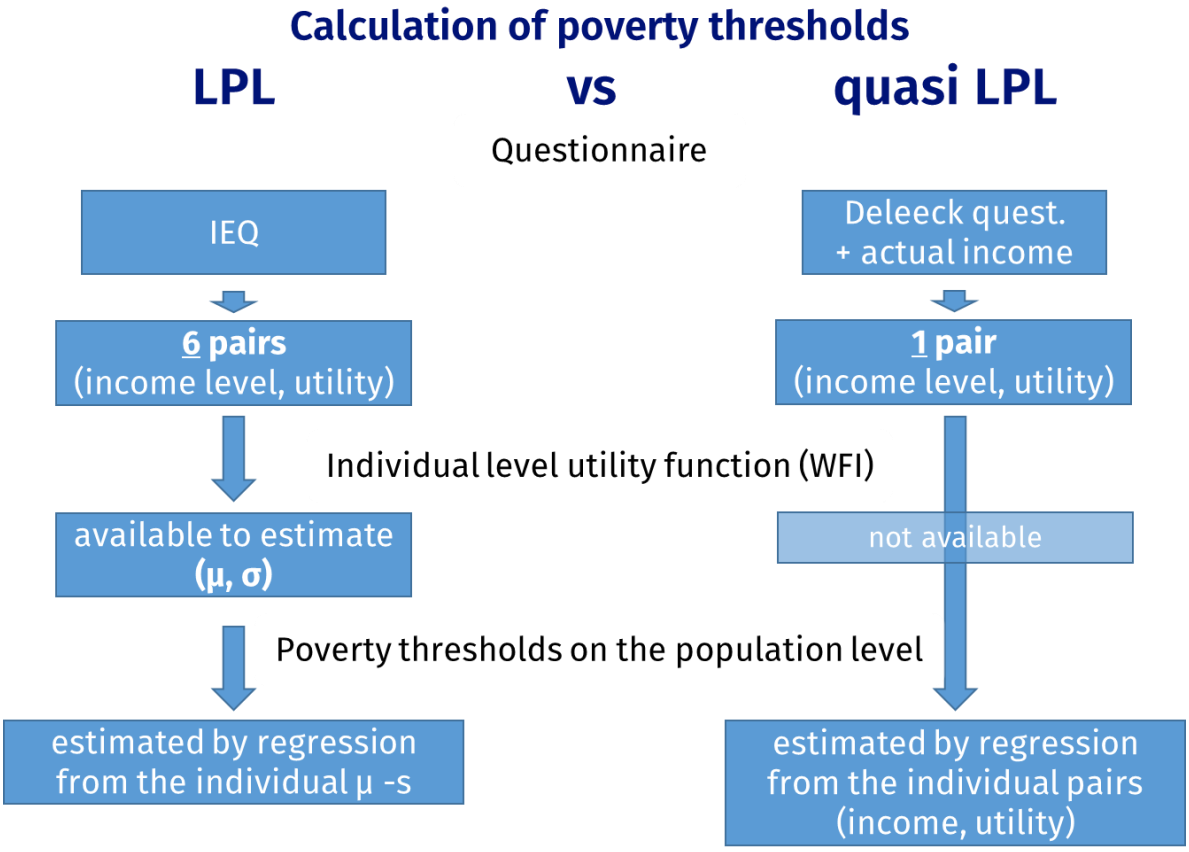
| | | |
|---|---|---|
| Poverty rate based on the SPL method | Percentage of people in households with disposable income (after social transfers) below the poverty line (threshold) calculated using the SPL method. | Measure of quasi-subjective poverty (‘objectivised’ approach).<br><br>Subjective assessments (answers to the question of the minimum income needed to make ends meet, MINQ) are only the starting point for estimating so-called objectivized poverty lines (poverty thresholds) assessed with the use of statistical methods (appropriately specified regression model).<br><br>Reference period for disposable income – the year before the survey, reference period for subjective assessments – the situation in the year in which the survey is carried out.<br><br>SPL – Subjective Poverty Line ( see:Goedhart et al., 1977, Kapteyn et al., 1985) |
| Poverty rate based on the quasi LPL method | Percentage of people in households with disposable income (after social transfers) below the poverty line ( threshold) calculated using the quasi LPL method . | Measure of quasi-subjective poverty (‘objectivized’ approach).<br><br>Subjective assessments (the ability to make ends meet based on ‘Deeleck question' ) are only the starting point for estimating so-called objectivized poverty lines (poverty thresholds) assessed with the use of statistical methods (appropriately specified regression model).<br><br>Reference period for disposable income – the year before the survey, reference period for subjective assessments – the situation in the year in which the survey is carried out.<br>Quasi Leyden Poverty Lines (quasi LPL) is a modification of the original Leyden Poverty Lines (LPL) (Goedhart et al., 1977, Flik and Van Praag, 1991). Description of the quasi LPL method – in the next section. |

**Brief description of the Quasi Leyden Poverty Lines method**

Quasi Leyden Poverty Lines (quasi LPL) is a modification of the original Leyden Poverty Lines (LPL) (Goedhart et al., 1977, Flik and Van Praag, 1991) proposed by authors of this paper and presented on the UNECE Expert Meeting on Measuring Poverty and Inequality in 2018.[3] The method is described with details in the referenced paper.

LPL belongs to the methods, which are commonly called 'subjective poverty lines'. In this paper they are classified as an objectivised subjective methods of measuring the poverty. These methods use subjective opinions of respondents to calculate poverty thresholds, which may be parametrised by household characteristics in many ways. The calculation may be quite complicated, it often requires the use of regression models. However, classification of each individual household as poor or not is not based on its opinion about its situation, but is only based on its income, which is compared with the previously calculated thresholds. This makes the assessment objectivised and is the reason of calling the approach by us 'objectivised subjective' or 'quasi subjective'.

Fig. 1. Comparison of the original LPL and quasi LPL calculation algorithms




The construction of the original LPL requires the estimation of parameters of the individual income utility function (WFI) at the level of each unit (household). This requires the information about respondents' answers to a special set of questions called IEQ (Income Evaluation Question). These questions concern the indication of household income levels that the respondent would describe as

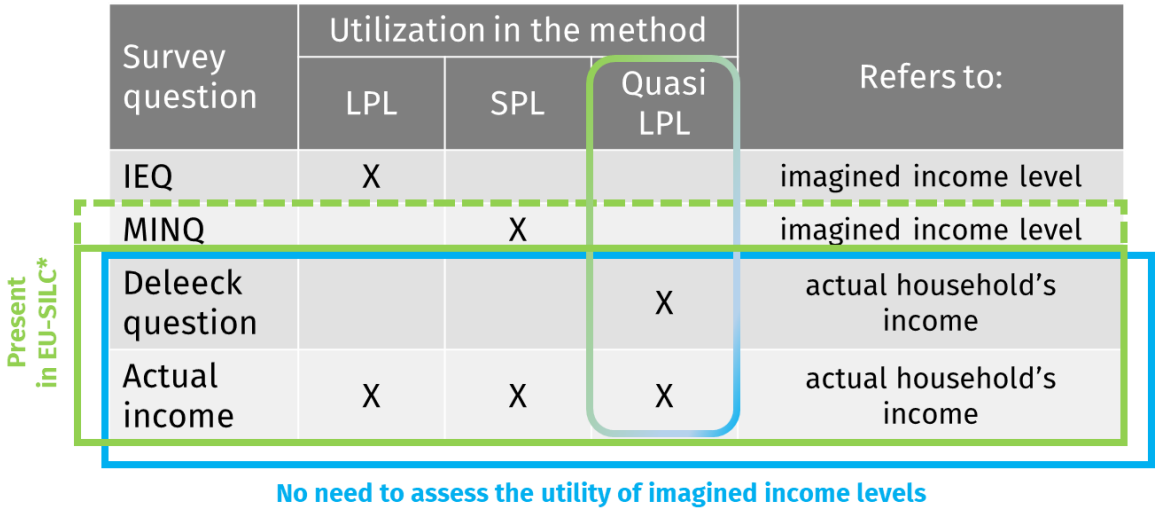
[3] *Subjective poverty lines based on the EU-SILC survey*, prepared by Tomasz Piasecki and Anna Bienkunska, UNECE working paper, https://unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.15/2018/mtg1/EmergingII._Statistics_Poland.pdf

“very bad”, “bad”, “insufficient”, “sufficient”, “good”, “very good” (the respondent gives 6 income levels). IEQ questions put a heavy burden on the respondent, also due to their speculative nature, and are asked in a few surveys carried regularly. In particular, they do not appear in the EU-SILC.

The idea of construction of quasi LPL was to deliver a method which would be similar or equivalent to LPL, but would not require answers to the IEQ questions from the survey. Achieving this makes it possible to use the method and calculate the LPL-like poverty using EU-SILC data.

The original LPL uses 6 pairs of information (income value, its utility) given by each responding household to estimate its individual income utility function. Individual utility functions are aggregated in subpopulations with the use of appropriately specified regression model. In the quasi LPL we use the actual income value and the question about ‘making ends meet’ (so-called Deleeck question) as an assessment of its utility, instead of IEQ. By this way we obtain only one pair (income, its utility) for each respondent (household). This is not sufficient to estimate an individual utility function of the household. However, estimation of the aggregated utility function (using regression model) for any subpopulation, from which we have many observations (respondents) is still possible. And this is the only thing we need to estimate the subjective poverty thresholds.

Fig. 2. Subjective poverty lines – comparison of data needs




* MINQ was present in EU-SILC until 2019, but is not from 2020.

The method is not fully equivalent to the original LPL or any other subjective poverty line method. The referenced paper describes sources of potential and empirically observed discrepancies between the results obtained and discuss them. Both methods, LPL and quasi LPL, are parametrised – we can fix poverty threshold at a given utility level α (the utility measure may take values in the interval (0, 1)). In the original LPL the commonly used α thresholds are 0.4 – 0.5. For quasi LPL we suggest values 0.25 – 0.3 (α = 0.25 is used in the analysis in this paper).

However, the proposed quasi LPL method have some advantages over the original LPL (and also SPL – another considered method belonging to the same group). The obvious are:

- it does not need the IEQ question, which is very extensive, burdensome and difficult to answer for the respondents
- it may be used with EU-SILC data, which does not include IEQ question (and, staring from 2020, also MINQ question, necessary for SPL).

Quite important is also that it does not force respondents to assess the utility of imagined income levels (what IEQ or MINQ do ), what is very speculative and it is very reasonable to ask if the respondent is even capable to give a reliable answer for such a question.

The figure 1 shows the comparison of LPL and quasi LPL calculation algorithms. The figure 2 gives the comparison of data neds for the considered subjective poverty lines methods and their consequences.

**Evolution of the EU-SILC based estimates of poverty in Poland in 2018-2020 obtained with the use of various methods and approaches**

The poverty assessment methods presented in the introductory part of the paper were used to assess the extent of poverty in Poland in 2018 -2020. To be more precise, an assessment of poverty using the methods considered was carried out based on the EU-SILC 2018 - 2020 data. This is not the same, as the income information in the EU-SILC survey refers to the previous year (*n*-1). In view of this, some of the assessments (those based solely on disposable income) assigned to year *n*, actually refer to the previous year. As the comparison involves a number of methods, some of which use only income information (relating to year *n*-1), some use only information (variables) relating to year *n*, and some combine both types of information (so that the result cannot be unambiguously linked to either year *n* or *n*-1), it was decided, in order to structure the analysis, to label the results with the year of the EU-SILC edition rather than the reference year of the data. Information on the association of a given measure with the year *n* or *n*-1 is provided in the footnotes to the presented results.

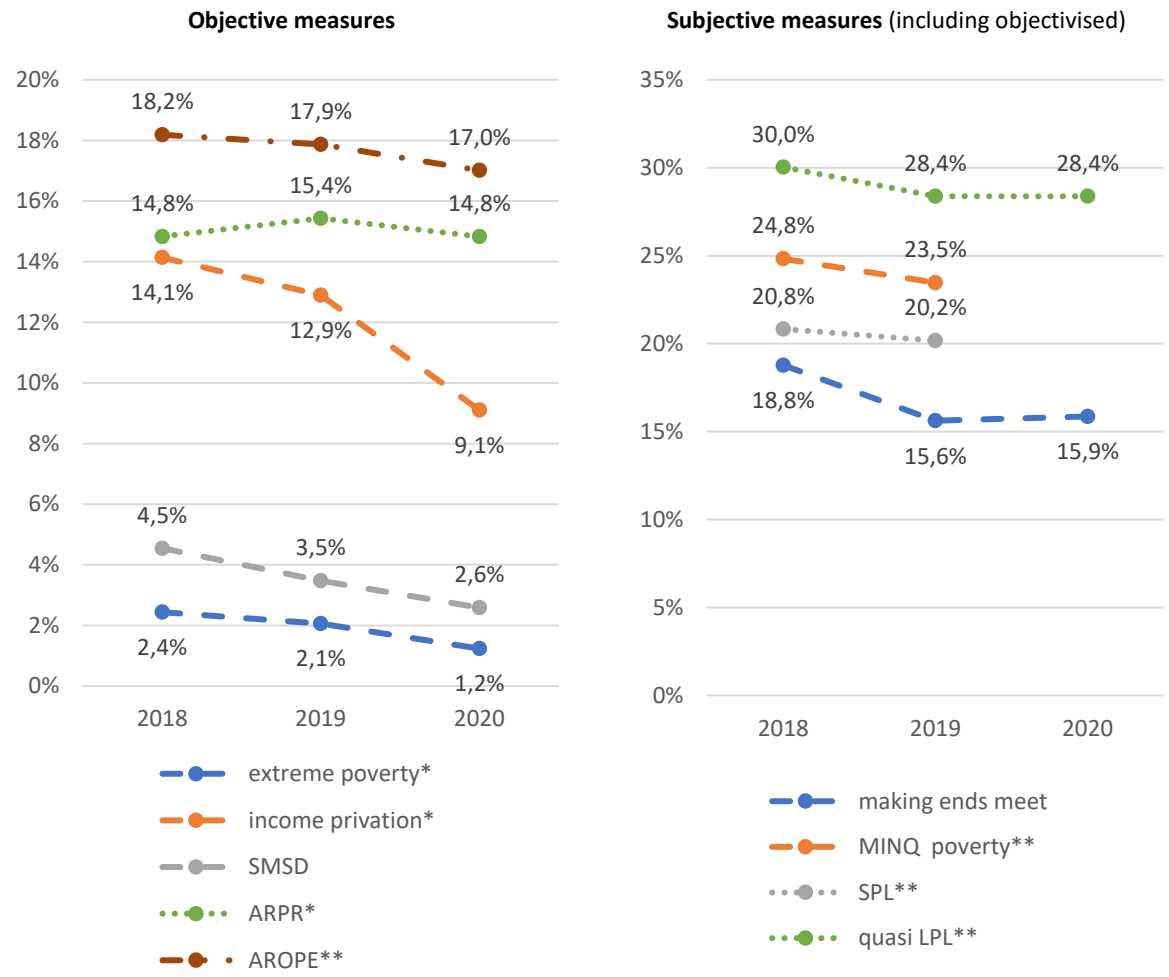
The measures used are characterised by different sensitivity. Some are designed to assess the proportion of people in extreme poverty, while others cover wider groups, including people/households with more moderate economic problems. A comparison of poverty incidence rates obtained by different methods is therefore less a diagnosis of the state of the phenomenon, than a study of empirical consequences of different definitions of the particular measures. However, the magnitude of the differences, as well as the values of the indicators, can have themselves a significant cognitive value.

The three-year period of observation makes it possible to notice some tendencies regarding the data presented. A comparison of the poverty assessments provided by the different methods, subjective and objective, has made it possible to draw some conclusions regarding the similarity or divergence of the diagnoses obtained using them.

The chart 1 shows the evolution of the assessments of the extent of poverty obtained by the different methods.

In addition to the fact that assessments of the extent of poverty are characterised by different levels (which is fully understandable due to the different operational definitions of poverty), different patterns of change over time can also be observed. Over the period analysed, absolute objective measures show a systematic decline. Counted absolutely, it was greatest in the case of 'income privation' (characterised by the highest estimates of coverage in this group), but counted relatively – in the case of extreme poverty. The Severe Material Deprivation and Social Deprivation Indicator (SMSD) and extreme poverty, covering the narrowest groups of people, are the closest to each other among the measures analysed in terms of the extent of poverty. These indicators also have similar dynamics of change over time – despite being defined in very different ways. The extreme poverty indicator is a measure based solely on disposable income, while the SMSD only takes into account objective symptoms of material and social deprivation. While objective poverty rates declined significantly over the period considered, relative poverty remained at a similar, relatively constant level.

Chart 1. Changes of poverty rates between 2018 and 2020



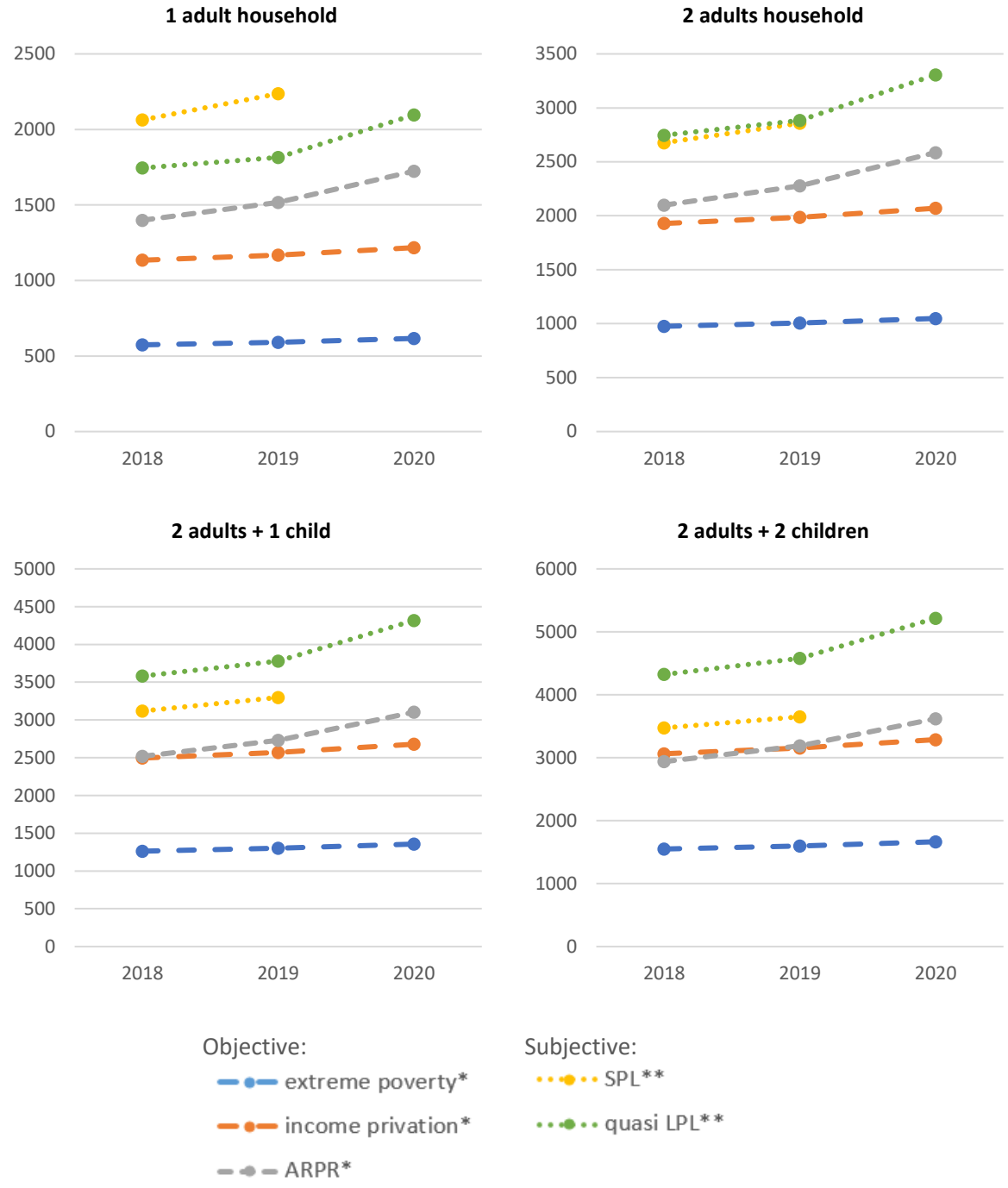

* the measure refers to income for the previous year *(n*-1)

** the measure is constructed using the information about current situation and income for the previous year (*n*-1)

Measures classified as subjective generally give higher estimates of the extent of poverty than objective ones and indicate lower dynamics of change over time. At the same time, in the case of subjective measures, an interesting observation is the convergence of the pattern of dynamics of the extent of so-called subjective poverty based on simple subjective indicators (taking into account respondents' subjective assessments of their household's current situation) and so-called objectivised (quasi-subjective) poverty. The objectivised indicators are calculated based on household income using statistical methods (modelling) in estimating poverty thresholds. The thresholds are determined independently for each year. Recall that in the case of objectified methods, 'only the starting point' for estimating poverty thresholds is subjective. The results of the empirical analyses show that this is sufficient to see the subjective aspect of these methods in case of comparisons in time.

In addition to poverty rates, for income-based methods, poverty thresholds determined for several of the most common types of household composition are presented. As these methods use different equivalence scales (in some the scale is included explicitly, in others it is determined by the model specification and the estimated parameter values), a universal comparison is not possible without taking into account household composition. The values of the income poverty thresholds for the years analysed are shown in chart 2.

Chart 2. Changes of poverty thresholds (in PLN) for monthly income between 2018 and 2020 for different objective and subjective poverty measures and selected household compositions




* the measure refers to income for the previous year (*n*-1)
** the measure is constructed using the information about current situation and income for the previous year (*n*-1)

The values of the poverty thresholds depend on the characteristics of the measurement methods adopted. Differences between the pictures (showing the relative positions of threshold used by different methods) obtained for different types of households result from the equivalence scales used (*a priori* or as a result of model fitting). For 1-person households, the highest value of the poverty line relates to the SPL method. For larger households, the highest poverty lines were obtained for the quasi LPL method. Regardless of household composition, the extreme poverty thresholds have the

lowest value. The thresholds of objective, income-based absolute poverty (this applies primarily to extreme poverty, but also to 'income privation') are characterised by the slowest changes. This is because both the consumption behaviour and the value of the baskets of goods and services constituting the subsistence and social minima on which these absolute thresholds are based change relatively slowly. Significant changes in this respect occur when we are faced with untypical conditions.

**Analysis of relations and associations between various forms of objective and subjective poverty, their overlapping and co-occurrence**

The analysis of relationships between poverty assessments obtained using different approaches was carried out on the basis of EU-SILC 2019 data. It consists in assessing the co-occurrence at the level of unit data[4] of assessments qualifying a given person or not to the group of poor people using different methods and approaches considered. Estimation weights were taken into account in all calculations. The 2019 data was used, which is not the latest among those analysed in this paper, because starting from 2020 the question about the minimum income (MINQ) was removed from the standardised EU-SILC survey, what in turn makes it impossible to determine two of the analysed types of poverty (MINQ poverty and SPL). Therefore, the analysis carried out on the basis of 2020 data would unfortunately be poorer in conclusions.

The first element of the analysis is the comparison of the qualifications of individual units to the population of the poor with the assessment of the occurrence of economic difficulties experienced by the household, expressed in the answer to the question about making ends meet. This is an element of verification to what extent the people identified as poor (using a given method) are actually people experiencing economic difficulties and being in a difficult economic situation (of course, according to their subjective assessment, which should be noted). In order to make such an assessment, for each of the considered methods the distribution of answers to the question about making ends meet has been presented, separately for people indicated as poor and not indicated as poor by a given method. The results are presented in the charts 3 and 4 concerning, respectively, objective and subjective methods of measuring poverty. The methodology of the comparison makes its result easy to predict for the ‘making ends meet poverty’, but this result was also shown as a kind of benchmark for comparisons with other methods.

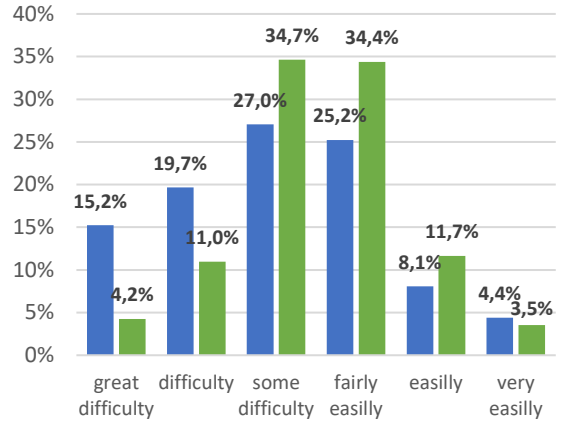
The images of the dependency for particular methods show some differences, although with two exceptions (one of which concerns the ‘benchmark’ method – making ends meet poverty ) the differences are rather moderate, however giving rise to inference. Interestingly, the differentiation weakly coincide with the basic classification of methods (objective absolute, objective relative, subjective, objectivised subjective) and sometimes there may be more similarities between methods belonging to different groups than within a group. It seems that the dependence on the use of information on actual income is of greater importance for the consistency of poverty assessments with economic difficulties (expressed by the assessment of ‘making ends meet’) than the basic classification of methods.

[4]referring to individuals. Most poverty assessments are determined at the household level, but the two newly introduced by Eurostat measures – SMSD and AROPE according to the new definition - are based on individual characteristics, which may differ for different members of the same household.

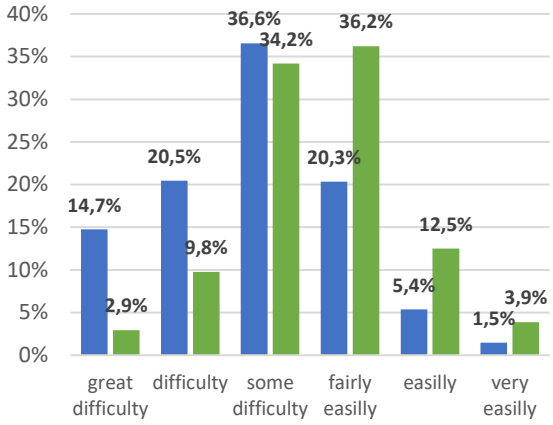
Chart 3. Comparison of the distribution of 'making ends meet' between people touched by poverty (*in poverty*) and not touched by poverty (*not in poverty*) for different **objective** poverty measures

***Absolute measures***

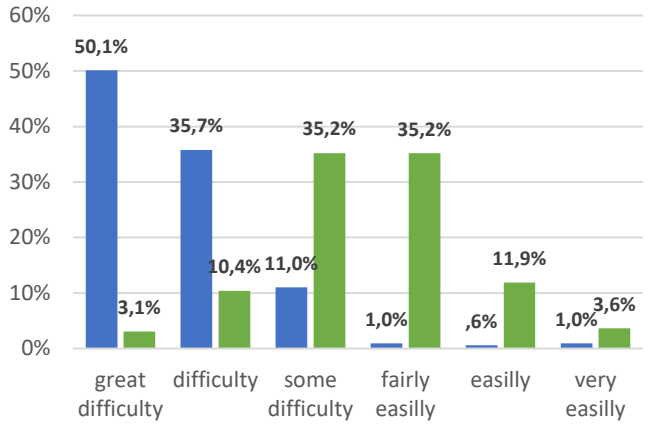
**Extreme poverty** [income based]




**Income privation** [income based]

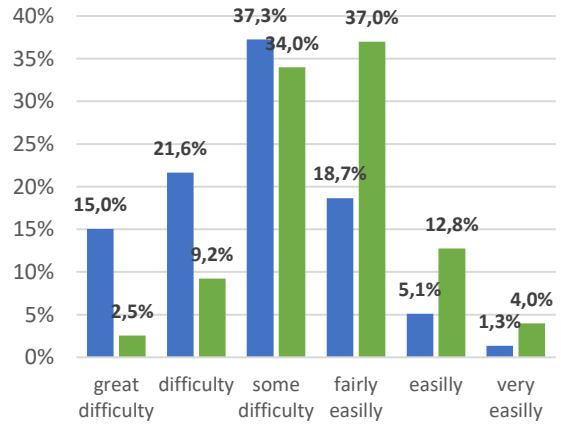



**Severe material or social deprivation (SMSD)** [not income based]



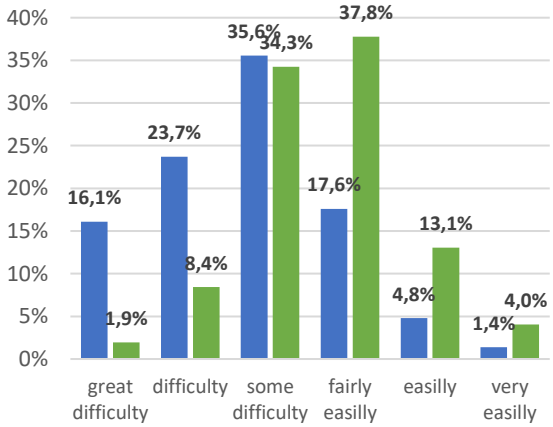

***Relative measure***

**At risk of poverty (ARPR)**
[income based]



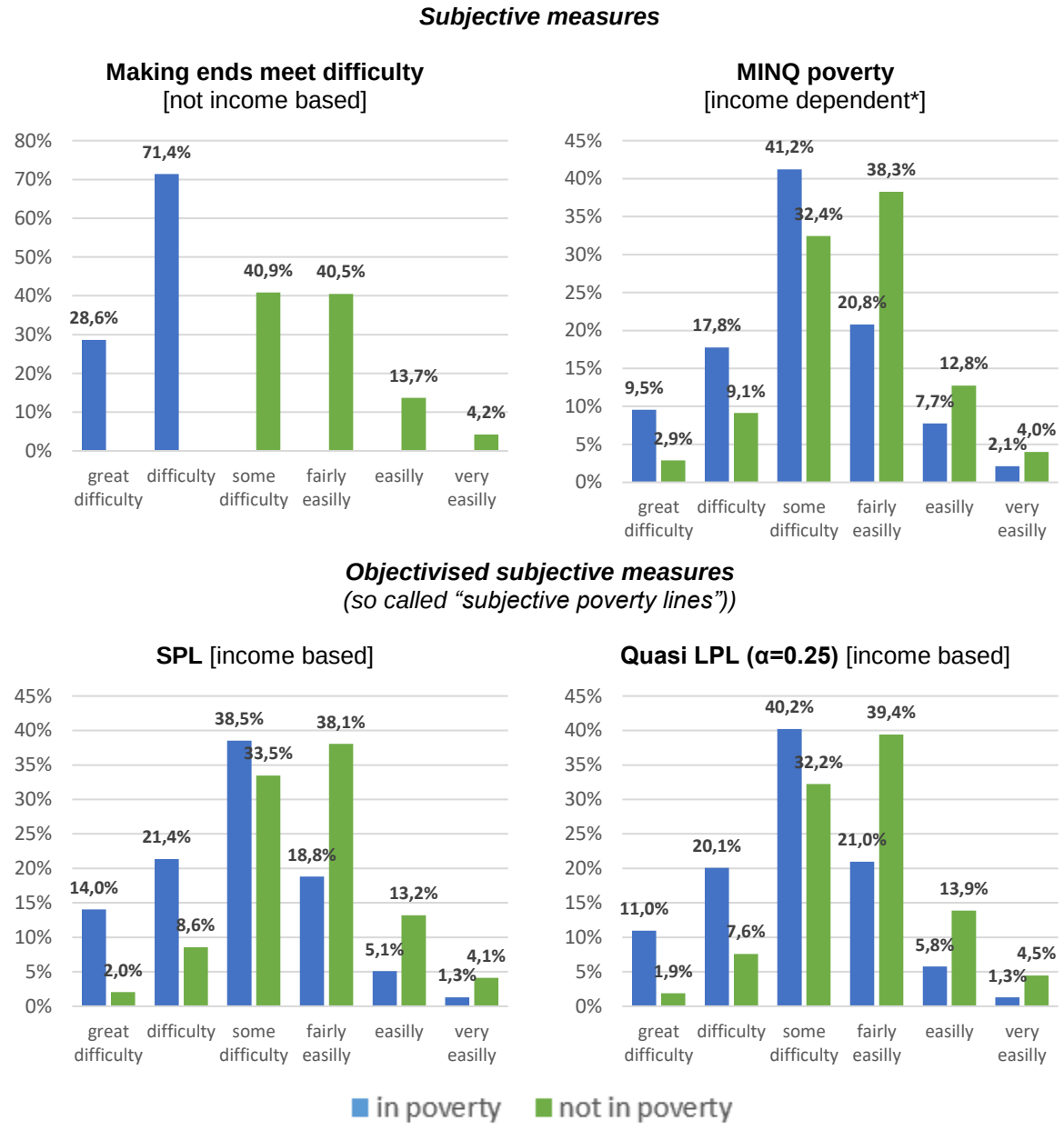

***Mixed (absolute and relative) measure***

**At risk of poverty or social exclusion (AROPE)**
[partially income based]




in poverty  not in poverty

Chart 4. Comparison of the distribution of 'making ends meet' between people touched by poverty (*in poverty*) and not touched by poverty (*not in poverty*) for different **subjective** poverty measures (including objectivised subjective measures)




* the actual income value is included in the construction of the measure, but there is no strict relation between actual income and considering the person/household poor

The most important conclusion of this analysis is the very high effectiveness in identifying people suffering from real economic difficulties of the poverty assessment method based on symptoms of material and social deprivation (SMSD). This method qualifies as poor practically only people who indicate at least 'some difficulty' in making ends meet, with the majority of people declaring 'difficulty' or 'high difficulty'. Among the poor indicated by this method, there are practically no people who do not experience economic difficulties, and the percentage of people experiencing difficulties and not indicated as poor is comparable to other methods. It is worth noting that such a high compliance was achieved even though the information about 'making ends meet' is not used in any way in the construction of the SMSD indicator. It is based solely on questions about the occurrence or not well defined objective deprivation symptoms, while the information about 'making ends meet' is a

subjective assessment. Information on 'making ends meet', on the other hand, is used in the process of poverty assessment using quasi-LPL method, but it does not shows higher compliance with the 'benchmark' than other methods for this reason. Also MINQ poverty , belonging to the same basic classification category as the 'benchmark' method, does not stand out in this respect.

The high quality of deprivation assessments as a poverty assessment method and their compliance with the actual perception of material difficulties, significantly affecting the lives of those affected, is also confirmed by other analyses performed by the authors, not quoted directly in this article. Analyses performed on the basis of data from the Social Cohesion Survey [5]confirm, for example, that indicators of material living conditions are a much more important determinant of various aspects of quality of life than the amount of income or indicators based on income. [6] Very similar conclusions we can also find for example in the study of the University of Essex Institute for Social and Economic Research: 'deprivation scores are needed because income surveys provide an imperfect measure of resources. (...) Deprivation indicators provide a more reliable measure than income'.[7]

The 'breadth' of the definition of poverty (whether it includes only cases of extreme poverty, or also moderate, and to what extent) has a certain importance for the obtained image of the analysed dependence. The compared methods differ greatly in terms of the obtained poverty rate (extent of poverty), which ranges from 2.1% to 28.4%. It is clear that the methods singling out a very narrow group of the poor are more likely to include only those experiencing great difficulties. On the other hand, in the case of methods with a broader definition (and a higher obtained poverty rates) it is natural that the group of poor may also include people experiencing moderate difficulties or not signalling them at all. Indeed, the SMSD method, which is positively distinguished by its effectiveness in identifying people in the most difficult situation, gives one of the lowest assessments of the poverty rate (2.8%). However, this is not a universal rule. The extreme poverty method is the opposite example. It gives the lowest poverty rate (lower than the SMSD), so it should indicate people who are really extremely poor, but in the group of people determined as poor by this method there is a significant percentage of people assessing their economic situation as fairly good or even good. The potential reason of standing out in this way from other methods, including these which are also based on the actual income, may be the fact that it uses a different equivalence scale.

A more comprehensive assessment of the consistency (in pairs) of indications obtained by all the considered methods was performed by calculating the Yule Φ coefficient for all pairs of methods. The coefficient Φ is numerically identical to the Pearson correlation coefficient for quantitative variables and illustrates the strength of the relationship between dichotomous variables. The values of the coefficients are presented in the form of a matrix in the table 2. The strongest associations are marked in bold in the table (this is not related to statistical significance).

The calculated coefficients show the strongest links between all methods in which the assessment of a person's poverty is directly dependent on the value of the income assigned to him/her (the household income to which he/she belongs). It does not matter whether the method belongs to the group of objective or subjective (objectivised subjective) methods. The income-based methods belonging to both groups are thus related to each other. The exception is the extreme poverty, where the estimate of the strength of the relationship with other income-based approaches is not as high. This is probably due to the fact that the poverty rate (extent of poverty) obtained by this method differs from other income-based methods (it is much lower). However, it can be noticed that also in the case of this

[5] Social Cohesion Survey – a multidimensional representative household survey allowing for a comprehensive assessment of material and no-material aspects of quality of life, including subjective and objective poverty. Cyclical survey. The last edition of the survey was carried out in 2018.
[6] For some of these analyses, the methodology and results of the Social Cohesion Survey 2018, see e.g.: *Quality of life and social capital in Poland. Results of the Social Cohesion Survey 2018*, Statistics Poland, Warsaw, 2020, https://stat.gov.pl/en/topics/living-conditions/living-conditions/quality-of-life-and-social-capital-in-poland-results-of-the-social-cohesion-survey-2018,13,3.html
[7] R. Berthoud, M. Bryan, *Deprivation indicators*, in: *Measuring Poverty: seven key issues*, Institute for Social and Economic Research, University of Essex, https://www.iser.essex.ac.uk/system/annual_reports/file_downloads/000/000/016/original/measuring-poverty.pdf

method, if we look only at the assessments referring to its associations with other methods, they are the highest in relation to the income-based methods.

Table 2. Yule Φ coefficients (mean square contingency coefficients) measuring the association between poverty determined on personal level with the use of different methods

| Poverty determining method (approach) | Association with | | | | |
|---|---|---|---|---|---|
| | EXTR | INCPRIV | SMSD | ARPR | AROPE |
| Extreme poverty (EXTR) | – | 0,377 | 0,101 | 0,339 | 0,311 |
| Income privation (INCPRIV) | 0,377 | – | 0,180 | **0,881** | **0,809** |
| SMSD | 0,101 | 0,180 | – | 0,201 | 0,371 |
| ARPR | 0,339 | **0,881** | 0,201 | – | **0,916** |
| AROPE | 0,311 | **0,809** | 0,371 | **0,916** | – |
| Making ends meet (MEM) | 0,077 | 0,208 | 0,335 | 0,248 | 0,311 |
| MINQ poverty | 0,196 | 0,359 | 0,123 | 0,395 | 0,382 |
| SPL | 0,289 | **0,645** | 0,199 | **0,737** | **0,701** |
| Quasi LPL α=0.25 (QLPL) | 0,230 | **0,611** | 0,173 | **0,679** | **0,669** |

| Poverty determining method (approach) | Association with | | | | Poverty rate |
|---|---|---|---|---|---|
| | MEM | MINQ | SPL | QLPL | |
| Extreme poverty (EXTR) | 0,077 | 0,196 | 0,289 | 0,230 | *2,1%* |
| Income privation (INCPRIV) | 0,208 | 0,359 | **0,645** | **0,611** | *12,9%* |
| SMSD | 0,335 | 0,123 | 0,199 | 0,173 | *3,5%* |
| ARPR | 0,248 | 0,395 | **0,737** | **0,679** | *15,4%* |
| AROPE | 0,311 | 0,382 | **0,701** | **0,669** | *17,9%* |
| Making ends meet (MEM) | – | 0,178 | 0,274 | 0,268 | *15,6%* |
| MINQ poverty | 0,178 | – | 0,436 | 0,411 | *23,5%* |
| SPL | 0,274 | 0,436 | – | **0,723** | *20,2%* |
| Quasi LPL α=0.25 (QLPL) | 0,268 | 0,411 | **0,723** | – | *28,4%* |

Values of coefficients higher than 0.6 marked in bold

The highest assessment of association strength refers to the pair: ARPR and AROPE. AROPE is a composite indicator and ARPR is its component. As this analysis shows, it is the component that has the greatest contribution to the qualification of individuals to the group of the poor. SMSD is also a component of this indicator, but the assessment of the relationship strength is much lower, which is also related to the fact that the poverty rate for SMSD is much lower than for AROPE. However, the affinity of these measures is indicated by the fact that SMSD is more strongly related to AROPE than to any other measure.

The previous analysis showed a very high compliance of poverty assessments obtained with the use of the SMSD measure and the declarations of the difficulty of making ends meet, which constitute the basis for the 'making ends meet poverty '. The Φ coefficient of 0.335 would not indicate such a strong relationship compared to other pairs. However, the lower value of the ratio results here from the large difference between the values of the poverty rates, which are 3.5% and 15.6%. It is worth noting, however, that in case of 'making ends meet poverty', SMSD is the most closely related measure between the all considered, while for SMSD 'making ends meet poverty' is the second most closely related measure (after AROPE, for which the Φ coefficient is just a bit higher).

As already noted several times before, the assessment of the strength of relationship using the Φ coefficient is significantly influenced by differences in the value of poverty rates (extent of poverty) for the compared methods. If they differ significantly, it is not possible to obtain a high value of the association coefficient, even if the measures are closely related. For example, if the percentage of people considered poor for measure A is much lower than for measure B, the value of the coefficient will not be high, even if all people considered poor by method A were also considered poor by method B (because there is a significant percentage of divergent indications regarding people classified as poor according to method B, but not classified as poor according to method A).

A specific assessment of the compliance with other methods, adjusted for this effect, was made for the objectivised subjective quasi LPL method, which was proposed by the authors. The approach used is possible due to the fact that the method is parameterised, i.e. the poverty can be determined by this method using different levels of utility α. The results presented in the paper refer to the 0.25 level. By using different values of α, different estimates of the poverty rate (extent of poverty) can be obtained. In particular, the level of α can be individually chosen to obtain poverty rate identical to any other method.

Using these property of the method, the association between the indications obtained using it and other methods was assessed in such a way that when comparing with each method, the value of α was chosen so that the poverty rates were identical. The values of the Yule 's coefficient obtained in this way are presented in the table 3.

Table 3. Yule Φ coefficients (mean square contingency coefficients) measuring the association between quasi LPL poverty with individually adjusted α level and the other types of poverty determined on personal level

| Poverty determining method (approach) | Yule Φ value |
|---|---|
| Extreme poverty | **0,923** |
| Income privation | **0,864** |
| Severe material or social deprivation (SMSD) | 0,127 |
| At risk of poverty (ARPR, relative income poverty) | **0,906** |
| At risk of poverty or social exclusion (AROPE) | **0,831** |
| Making ends meet poverty | 0,244 |
| MINQ poverty | 0,407 |
| SPL poverty | **0,777** |

Values of coefficients higher than 0.6 marked in bold

This analysis confirms that quasi LPL, as a method in which individual poverty assessment is directly determined on the basis of income, is most strongly associated with other methods with the same feature. However, the obtained assessments of the association strength are much higher than in the previous analysis, which did not take into account the adjustment for differences in the extent of poverty. Moreover, the strongest relationship concerns the extreme poverty, for which the original assessment was strongly underestimated due to the large difference in the poverty definition ‘breadth’. Interestingly, the relationship with a methodologically related, also based on income and belonging to the same group of 'objectivised subjective poverty lines', the SPL method turned out to be weaker than with the income-based methods classified as objective measures (both absolute and relative). This conclusion may be important when one wanted to assess the possibility of treating the quasi LPL as an alternative measure to the SPL after removing the question about the minimum income (MINQ) from the EU-SILC survey.

**Final remarks**

The analysis of the extent and dynamics of poverty (admittedly for a relatively short period of three years), as well as the associations and relations between poverty assessments obtained using different methods, allow us to draw conclusions concerning the empirical data analysed (description of the situation), as well as some conclusions of a general nature, concerning the observed properties of the methods and more universal patterns.

The presented empirical analysis shows how different assessments of the extent of poverty in a country can be, even when data from only one survey (in this case the EU-SILC survey) are used for measurement. This indicates a very strong dependence between the measurement methodology adopted and the results obtained. Depending on the method applied, in 2019 the percentage of poor people in Poland can be estimated either at ca. 2% (income extreme poverty) or at ca. 28% (extent of quasi-subjective income poverty), which, of course, does not exhaust the possibility of obtaining estimates with an even greater range.

As far as dynamics assessments are concerned, it is possible to observe – on the example of data for Poland from the EU-SILC survey – a fairly clear relationship between the basic classification of methods and the observed pattern of change over time. 'Absolute objective', 'relative objective' and subjective methods form three groups with distinct specificities from this point of view. An interesting observation is the lack of observed differentiation between methods based solely on subjective opinions and subjective objectivised methods. It seems that from the point of view of comparisons over time, the latter('objectivised' methods) show more features of a subjective approach than of an objective one.

The analysis of the co-occurrence of different forms of poverty and the associations between the qualification into the 'group of the poor' by different methods and the subjective perception of economic hardship at the level of individual data indicates that, from this point of view, whether a method uses income as a basis for assessing poverty is more important than the basic classification of methods and their individual properties. In general, income-based assessment methods are characterised by a high degree of coherence with each other, irrespective of other characteristics of these methods, which may vary (including that they may represent both objective and subjective approaches)

The most important and less predictable conclusion of this part of the analysis is the very high coherence of the assessments of material and social deprivation reflected by the Severe material and social deprivation rate (SMSD) with the subjective assessments of the difficulty of making ends meet expressed by respondents. SMSD indicator proved to be the poverty measure most effective in identifying those experiencing real economic hardship significantly affecting their lives. This observation is in line with both the authors' experience in other studies and with opinions found in the literature, that assessments of deprivation and non-income material living conditions often give a more reliable picture of the actual economic situation than information on income and are a better predictor of important aspects of quality of life.

To summarise the conclusions of the research work carried out and discussed in this paper, we will use the statement commonly accepted by poverty researchers that the complexity and multidimensionality of poverty means that there is no single universal measure of the phenomenon and that the statistical picture of poverty depends on the method used, on the 'operational' definition of particular measures and on the data source.

The various measures of poverty should be seen as complementary and used together to obtain a comprehensive picture of the phenomenon. In this context, a more widespread use of subjective poverty measures by official statistics seems justified. This includes a broader use of EU-SILC data for this purpose.

The subjective approach shows the problem of poverty from a completely different perspective than the objective one. The use of the subjective approach allows for a better understanding of what poverty is for people, as well as verifying that objective assessments of poverty are in line with social

perception of the phenomenon. Subjective measures also provide information about 'social mood', which can influence people's behaviour in both the economic, social and political spheres.

The aim of using different measures of poverty should be to enrich knowledge of the phenomenon and not to introduce 'noise information' in this regard. Each indicator has its own advantages and disadvantages and a different interpretation, which should be clearly communicated to the users of the data, including the general public. It is also very important to communicate the measurement methodology used, which determines the results obtained.

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