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A multidimensional analysis of poverty in Poland under Sen's capability approach - an application of a MIMIC model

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Summary of doctoral thesis
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The main goal of the doctoral dissertation submitted in this conferral procedure was to apply Sen's capability approach in a multidimensional analysis of the risk of poverty in Poland in 2018, conducted at the national level, across macroregions (NUTS 1), for different classes of the place of residence and for different socio-economic groups and types of poor households. This approach enabled the author to analyse the phenomenon of poverty more comprehensively than would be possible with unidimensional and multidimensional methods used to date. The second objective of the dissertation was to identify poor persons and to measure their risk of poverty.

Although there are studies by foreign and Polish authors devoted to multidimensional analysis of poverty, the multidimensional approaches to poverty measurement applied so far do not account for the fact that persons (households including poor persons) with the same financial resources may satisfy their needs in different ways. By applying the capability approach in the multidimensional analysis of poverty, in addition to measuring it one can also account for actual behaviours undertaken by poor households (persons) to satisfy their basic needs, taking into consideration not only their financial resources but also their characteristics and social environment and their personal preferences in this respect. A multidimensional analysis based on the capability approach makes it possible to correctly assess whether financial resources available to households with poor members are sufficient to satisfy their basic needs, as the approach takes into account not only their current income (spending) but also savings. When one only considers household current income or expenditures, as is the case in the unidimensional approach, one ignores the fact that households with low current income can use their savings from previous periods to meet their basic needs in a given month. Similarly, households may have some cash left over from the previous month or savings from previous months but may choose not to spend it when there is no such need.

As can be seen, analyses of poverty based on current income or expenditures run the risk of incorrectly identifying as poor those households that have enough money to meet their basic needs at an acceptable level.

Literature review

The phenomenon of poverty has been around for centuries, which is why the study of poverty is still relevant today. As G. Baczewski (2007) points out, poverty is one of the key social policy issues around the world and one of the most embarrassing at that. Poverty experienced by individuals is not only their personal problem but also poses a social challenge for the whole country, as it inhibits its economic growth and social development (Panek, 2011a). For this reason it is very important to take measures aimed at reducing the extent of poverty in the future and providing assistance to persons (households) affected by poverty. The fight against poverty is one of the basic goals of social policy in the EU and its member states. As part of the Lisbon strategy, launched in 2000, the EU "created a monitoring and coordination mechanism consisting of objective setting, poverty measurement based on a set of indicators and benchmarks, guidelines for the Member States and national action plans against poverty" (European Parliament, 2017). One of the headline targets formulated by the EU in 2010, as part of the Europe 2020 strategy was to reduce the number of Europeans living below the national poverty lines by 25%, lifting over 20 million people out of poverty (European Commission, 2010a, p.

9). All member states, including Poland, agreed to develop policies aimed at reducing poverty and social exclusion. Similarly, in the 2030 Agenda for Sustainable Development, adopted by the General Assembly of the United Nations on 25 September 2015, and unanimously approved by all member states, including Poland, the first of the 17 goals is to "end poverty in all its forms everywhere" by 2030 (UN, 2015; European Commission, 2019).

The extent of poverty is measured by a number of international organisations, research centres and individual researchers. The importance of this research has also been recognised by the Royal Swedish Academy of Sciences, which awarded the Nobel Prize in Economics in 1998 to Amartya Sen "for his contributions to welfare economics", in 2015 to Angus Deaton "for his analysis of consumption, poverty, and welfare", and in 2019 to Michael Kremer, Abhijit Banerjee and Esther Duflo "for their experimental approach to alleviating global poverty".

Most poverty studies conducted in the 1970s involved the unidimensional approach, based on monetary measures, which focused on the concept of material well-being (Marshall, 1920). Under this approach, the degree to which a unit's needs are satisfied was assessed exclusively on the basis of their current income or spending, expressed in monetary terms. Gradually, more and more researchers recognised that poverty is a multidimensional phenomenon, which means that cases of poverty should be identified not only by looking at current income (expenditures), expressed in monetary terms, but also by considering the unit's (household's) ability to satisfy its needs using savings and non-monetary material resources.

The need to make more frequent use of the multidimensional approach to poverty measurement was postulated by many authors, including P. Townsend (1979), M. Desai, A. Shah (1988), T. Panek, J. Podgórski, A. Szulc (1999), Kanbur (2002), E. Thorbecke (2005), S. Fukuda- Parr (2006), S. Alkire, J. Foster (2008), T. Panek (2009, 2011a), S. Alkire, J. Foster (2011). The problem of multidimensional poverty was also highlighted by T. Atkinson, B. Cantilon B, E. Marier , B. Nolan (2002) in their report presented at a conference held at Antwerp in 2001, which contained recommendations for the EU concerning basic indicators for the measurement of poverty/social exclusion. In December 2001, during the meeting of the European Council in Laeken, a set of 18 indicators (hence known as Laeken Indicators) was agreed on to measure poverty and social exclusion in EU countries. The set includes indicators enabling poverty mapping based on current household income (monetary indicators) and on material deprivation items (non-monetary indicators). Accordingly, Eurostat, in addition to using indicators of monetary poverty, measures the material deprivation rate (non-monetary poverty), which represents the percentage of households that cannot afford "some items considered by most people to be desirable or even necessary to lead an adequate life" (Eurostat, 2021).

There is no single, commonly accepted way of measuring poverty in the multidimensional approach. Some of the methods that can be found in the literature include the use of a distance function (Lovell, Richardson, Travers, Wood, 1994), an axiomatic approach (Tsui, 2002), an approach involving the social welfare function (Atkinson, 2003), the 'dual cutoff' method (Alkire and Foster, 2008), and an approach based on fuzzy set theory (Lemmi, Betti, 2006), which is one of the most commonly used in practice: it has also been applied in multidimensional studies of poverty conducted by Polish researchers (Błaszczak Przybycińska, 1991; Panek, 1998).

The above multidimensional approaches to poverty measurement do not account for the fact that persons (households) with the same financial resources can meet their needs in different ways. They fail to recognise differences in their individual capabilities and preferences in this respect, which may be the result of the development stage and customs of societies in which they live, their individual personality traits and their ability to use resources they have.

All these factors are taken into account in the capability approach developed by A. Sen (1979, 1985, 1992) to measure well-being (life quality). The capability perspective is based on the assumption that well-being depends on what people can be and can do, rather than simply on what they have, i.e. goods themselves do not play a crucial role in ensuring a high quality of life; what really matters are characteristics of these goods enabling individuals to achieve desirable lifestyles (functionings) (Alkire, 2008; Zheng, Walsham, 2008; Robeyns, 2017). Individual lifestyles and activities can vary and involve things such as proper nourishment, rest, healthy living, decent housing, the ability to participate in social life, the ability to vote or the sense of self-respect (Robeyns, 2003, 2017; Alkire, 2005, 2008). The set of functionings and the capability to achieve these functionings creates the initial space for potential ways in which individuals can function, enabling them to choose their preferred lifestyle (Sen, 1992; Alkire, 2005; Panek, 2014; Robeyns, 2017). In other words, functionings represent a person's actual social status, such as e.g. being healthy or being educated, while capabilities represent their possibilities of achieving a given status, i.e. the possibility of living a healthy life or their ability to achieve a certain level of education (Alkire, Black, 1997; De Rosa, 2017).

Aim and research hypotheses

The main objective of this doctoral dissertation was to apply Sen's capability approach in a multidimensional analysis of the risk of poverty in Poland in 2018, conducted at the national level, across macroregions (NUTS 1), for different classes of the place of residence and by socio-economic household type.

The main objective was achieved by accomplishing the following specific objectives:

1. assess the risk of poverty on the basis of monetary and nonmonetary measures, separately and in combination, taking into account all financial resources that households with poor persons can use to satisfy their basic needs, i.e. current income and savings;
2. measure to what extent different determinants of poverty (affecting poor households' ability to satisfy their basic needs) increase or decrease the risk of poverty;
3. analyse to what extent material deprivation items reflect the risk of monetary and nonmonetary poverty, separately and in combination, in order to identify those items that are the strongest indicators of the risk of poverty and those that are the weakest;
4. compare estimates of the risk of poverty obtained by applying the multi- and unidimensional approach in order to demonstrate that poverty mapping involving the unidimensional approach tends to produce incorrect estimates, which are not consistent with the multidimensional approach.

The following hypothesis were put forward at the start of the investigation presented in the dissertation:

1. The use of Sen's capability approach in a multidimensional analysis of the risk of poverty in Poland, at the national and macroregional level, for different classes of the place of residence, for socio-economic categories and types of poor households improves the quality of poverty measurement by enabling a more comprehensive analysis than what can be achieved by applying the unidimensional approach or other multidimensional approaches.
2. Studies relying on the unidimensional approach to poverty measurement tend to incorrectly identify poor persons and incorrectly assess their risk of poverty, producing results that are inconsistent with the multidimensional approach.

Taking into account the main hypotheses, the following additional hypotheses were formulated:

1. It is necessary to apply a multidimensional approach when assessing the risk of poverty because poverty mapping studies based only on current income or spending may incorrectly identify deprived persons and, as a result, undermine the effectiveness of poverty reduction measures.
2. The unidimensional approach produces unreliable results regarding the identification of poor persons, which is reflected by discrepancies between rankings of the risk of poverty obtained for different territorial units and types of poor households as a result of applying the multi- and unidimensional approach.
3. A decline in a person's economic activity and older age are two main predictors of the risk of poverty.
4. A higher level of education has the biggest impact on decreasing the risk of poverty.

To achieve the objectives of the study and verify the research hypotheses, the author conducted a multidimensional analysis of poverty involving Sen's capability approach, focusing on actual behaviours of poor units (households with poor persons) aimed at satisfying their basic needs, where account is taken not only of their financial resources but also of their preferred functionings and their personal characteristics.

Research procedure and methods used in the study

The measurement of poverty under Sen's capability approach was operationalised by applying a special case of structural equation modelling (SEM), namely a Multiple Indicator Multiple Causes model (Bollen 1989; Muthen 1989; Muthen, Siek-Toon Khoo, Goff, 1994; Gallo, Anthony, Muthen,1994; Muthen, Satorra, 1995; Konarski, 2014). The MIMIC model was proposed by M. Hauser and A. S. Goldberger (1971) and popularised by K. G. Jöreskog and A. S. Goldberger (1975), who gave it the present name and formulated detailed assumptions as a special case of structural equation modelling.

The proposed operationalisation involving a structural MIMIC model makes it possible to measure the risk of poverty by accounting for real, deprived functionings of surveyed respondents, which reflect their deprived capabilities. Moreover, the model can be used to assess how external determinants of poverty affect respondents' capabilities, by increasing or decreasing the risk of poverty and to identify which symptoms (deprivation items) are the strongest predictors of the risk of poverty.

The study was conducted in a number of steps. In the first step, two categories of poverty were distinguished: monetary and non-monetary poverty (material deprivation), which was the starting point for constructing the MIMIC model. In the second step, a set of symptoms and determinants of poverty were assigned to each category of poverty. In the case of monetary poverty, following the recommendations set out in the EU's Europe 2020 strategy, two basic indicators of poverty were selected: poverty status and the poverty gap (Panek, Zwierzchowski, 2013; GUS, 2015b; Eurostat, 2020). With regard to non-monetary poverty (material deprivation), the author relied on the solution used by the European Union, which involves 9 non-monetary indicators representing symptoms (items) of material deprivation (European Commission, 2011; GUS, 2017b; Eurostat, 2018). The third step consisted in estimating, for each category of poverty, parameters of the MIMIC model, which represented relationships between deprived capabilities of surveyed respondents (latent variables measuring the risk of poverty) and observable determinants and symptoms of poverty. The fourth step involved estimating the value of the latent variable representing deprived capabilities of each household member in the survey, separately for monetary and non-monetary poverty, taking into account the impact of factors that increase or decrease the risk of poverty (stimulants and destimulants). In the fifth step, values of deprived capabilities of household members were used to calculate the risk-of-poverty index, separately for monetary and non-monetary poverty. The last step consisted in estimating the combined risk of monetary and non-monetary poverty by aggregating the risk-of-poverty indices into one synthetic indicator. This was achieved by estimating parameters of the MIMIC model for both categories of poverty combined, taking into account the same determinants that were used in the models of the risk of poverty constructed for each category of poverty separately. The risk-of-poverty indices (for monetary and non-monetary poverty) were used as symptoms of poverty. The risk of multidimensional poverty was estimated for household members, macroregions, classes of the place of residence, socio-economic groups and types of poor households. Estimates of the risk of poverty obtained in the multidimensional approach were also compared with those obtained in the unidimensional approach.

The empirical analyses of poverty in Poland were based on data from the EU-SILC survey conducted by Statistics Poland in 2018. The main goal of the EU-SILC survey is "to collect timely and comparable cross-sectional and longitudinal data on income, poverty, social exclusion and living conditions" (Eurostat, 2021a), which can be used to compile statistics for all EU Member States (GUS, 2018c, 2019b; Eurostat, 2018).

Results

As a result of the empirical study, the author was able to confirm the research hypotheses and formulated the following conclusions about the risk of poverty in Poland:

- the highest risk of multidimensional poverty was observed for the eastern macroregion, which includes the following provinces: LUBELSKIE, PODKARPACKIE, PODLASKIE. This macroregion is also characterised by the highest risk of unidimensional poverty. However, lower in the ranking of macroregions, there are differences in the risk of poverty depending on the approach. The

biggest discrepancy can be observed for the north-western macroregion, including the provinces of LUBUSKIE, WIELKOPOLSKIE, ZACHODNIOPOMORSKIE, which was found to be the third most at risk of poverty (out of a total of 7 macroregions) according to the multidimensional approach. However, when measured under the unidimensional approach, it turned out to have the lowest percentage of households with poor members;

- rural areas, as a class of the place of residence, were found to be at the highest risk of multidimensional and monetary poverty. The synthetic indicator of the risk of poverty was found to decrease with the growing number of inhabitants in a given class of the place of residence. This pattern was not observed for monetary poverty, where the percentage of poor people was higher in medium-sized cities with populations of 100-200 thousand than in towns with 20-100 thousand inhabitants;

- taking into account sources of income, the highest risk of poverty, regardless of the approach, was observed for households depending exclusively or largely on invalidity pensions, followed by those living on unearned income. In the case of other socio-economic groups, i.e. households of employed persons, self-employed persons and retirees, there were discrepancies in the estimated risk of poverty between the multi- and unidimensional (monetary) approach;

- the highest combined risk of monetary and non-monetary poverty by family type was observed for respondents from multi-person non-family households; according to the unidimensional approach, the highest percentage of poor respondents was observed in one-person non-family households;

- the level of education was found to be significantly correlated with a lower risk of multidimensional poverty: the higher the level of education, the better the chances of finding a well-paid job and earning higher income, which means a significantly lower risk of poverty. Perceived health status was found to be another significant predictor of a lower risk of poverty: the higher it is, the more economically active a person is and, consequently, less likely to be at risk of poverty;

- conversely, the risk of poverty is significantly increased in the case of people who are less economically active. The risk of poverty is also significantly correlated with age: the older a person is, the less economically active they are and, as a result, earns lower wages, which increases their risk of poverty. The third determinant of a higher risk of poverty is the class of the place of residence: the fewer inhabitants a person's place of residence has, which usually means fewer opportunities of finding a well-paid job, the higher their risk of poverty.

Contribution to the literature

Methodological solutions proposed in the dissertation and empirical results obtained in the study are the author's contribution to the study of the risk of poverty. The most important elements of this contribution include:

- the application of A. Sen's capability approach to the multidimensional analysis of the risk of poverty in Poland, which enables a more comprehensive measurement of the phenomenon than what can be achieved by applying the unidimensional approach or multidimensional approaches used so far. The proposed approach provides more reliable estimates, which can help to organise a more effective distribution of social assistance to combat poverty;

- the inclusion of factors (characteristics of persons and households) that increase and decrease the risk of poverty in the multidimensional approach;

- the proposed method of estimating the risk-of-poverty index, which can be used to compare different results regarding the risk of poverty across territorial units (macroregions), for different types of poor households and over time;

- demonstrating that poverty mapping involving the unidimensional approach tends to incorrectly identify poor persons and incorrectly assess their risk of poverty by comparing estimates of the risk of poverty obtained in the uni- and multidimensional approach;

- providing new information about the risk of poverty in Poland, at the national and macroregional level and for different socio-demographic groups of households with poor persons.

Final conclusions

The method of measuring the risk of poverty, proposed in the dissertation, in addition to providing an additional methodological solution for statistical agencies and researchers who investigate this phenomenon, can facilitate institutions implementing social policy aimed at combating poverty. The results of the study are a valuable source of information for social policy aimed at combating poverty, which, according to the 2030 Agenda for Sustainable Development, should be ended in all its forms everywhere by 2030.

Further research work should focus on studying the risk of poverty at lower levels of spatial aggregations (districts, communes) in those macroregions where the risk of poverty is the highest. Further studies should also investigate people whose participation in the labour market is limited, recipients of invalidity pension and unemployed people, who face the highest risk of poverty. Such studies will make it possible not only to identify deprived persons who need financial assistance to satisfy their basic needs but also those whose characteristics increase their risk of poverty. It is also necessary to continue research on older persons, since increasing age is strongly correlated with the growing risk of poverty. Older people in Poland account for an increasing percentage of the population (as a result of population aging), and once they retire, they have less income to satisfy their basic needs. Analyses of the degree to which older people participate in the labour market are essential to inform social policy decisions aimed at increasing the level of this participation. Further studies should also focus on inhabitants of smaller localities, who have the most difficult finding stable employment.

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