

BASIC NEEDS AND ABSOLUTE POVERTY IN LITHUANIA: METHOD AND ESTIMATION

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Abstract. We propose a methodology for estimating the cost of the basic needs and applying it on the data for Lithuania in a decade after the EU accession (2006-2016). The basic food costs account for the minimal nutrition requirements, while the cost of other needs is estimated in relative terms, taking actual consumption patterns in the population into account. A reduction in the cost of the basic needs for additional members of the household is accounted for by a specially constructed consumption-based equivalence scale estimated on the HBS data. We show that the cost of the basic needs in Lithuania is close to the relative at-risk-of-poverty line (at 60% of the median equivalized disposable income) for a single adult but exceeds it for larger households. The share of people with income below the basic needs' cost was above the relative at-risk-of-poverty levels in the EU-SILC data for all years, except of 2016. Albeit, the actual level might be lower due to the under-reporting of shadow income in the EU-SILC. Ability to meet basic needs and related absolute poverty indicators shows anti-cyclical dynamics in times of the economic growth and recession. Children are consistently the most deprived group of the Lithuanian population when it comes to meeting the basic needs. The official absolute poverty indicator used in Lithuania under-estimates the cost of the basic needs for households with more than one member.

Keywords: basic needs, absolute poverty, Lithuania, equivalence scale, HBS, SILC

1. Introduction

The topic of basic needs is important on the political and academic agendas both in Lithuania and the EU. The cost of the basic needs can be used to assess the adequacy of the national social assistance systems. It can also serve as an absolute poverty line, and is one of the main approaches for its estimation. A condition characterized by deprivation of basic human needs has a long-standing tradition of being referred to as absolute poverty (e.g. see UN (1995) or Zbarauskaitė (2008) for an overview for Lithuania). Furthermore, discussions and experiments on introduction of basic income, which should cover basic needs, are gaining momentum. Nevertheless, despite of the recent attempts (Goedeme et al., 2015), there is no agreed methodology for estimating the cost of the basic needs across the EU. Neither there is one for estimating absolute poverty.¹

Instead, the notions of the relative at-risk-of-poverty, social exclusion or material deprivation are seen as sufficient and more appropriate for analysing poverty in highly developed countries. Nevertheless, in this paper, we focus our attention on the concepts of the basic needs and absolute poverty. These are not seen as an opposition to the relative poverty measurement. In fact, the methodology of the calculation of the basic needs' costs proposed in the paper also contains a relative element. Rather, the aim is to contribute to the basic needs and basic income debate.

Hence, the aim of this paper is to propose a methodology for estimating the cost of the basic needs and test it on the data for Lithuania in a decade after the EU accession (2006-2016). We also propose corrections to the way the cost of the basic needs is used to estimate absolute poverty line and level in Lithuania.

There were several attempts to make estimations of the basic needs or absolute poverty for Lithuania (e.g. Zbarauskaitė, 2008; Šileika & Zbarauskaitė, 2009; Goedeme et al., 2015; Navickė, 2016). These estimates differ in their

¹ An international poverty line of \$1.90 per day in 2011 prices by the World Bank (Ferreira et al. 2015) is supposed to capture severe manifestations of deprivation of basic needs, i.e. extreme poverty. This line is defined using a sample of the national poverty lines for some of the world's poorest countries. Hence, it is neither constructed, nor used to reflect the basic needs or absolute poverty in the EU.

methods and amounts. The latter methodology by Navickė (2016) combines an estimation of the minimum food basket and other expenses. The other expenses are estimated using an Engel coefficient based on the consumption patterns recorded in the Household Budget Survey (HBS) data. The method was approved by the Lithuanian national law in 2017.

While originally intended for assessing the adequacy of the social assistance system, it has been also used for estimating absolute poverty line and level in Lithuania. The latter soon became a subject of vivid discussions both in political and academic fields. One of the critical points is the application of the modified OECD equivalence scale on the basic needs' amount to estimate the absolute poverty line. While the latter scale is commonly used for estimating relative poverty risk in the EU, it can be argued to assume too high reduction of basic needs' cost with an additional household member (Zabarauskaitė 2008). It is also not in line with recommendations made in the original methodology for estimating basic needs for Lithuania (Navicke, 2016) and is much stricter compared to the equivalence scale used in the national system of social assistance. Nevertheless, the modified OECD equivalence scale has been used in Lithuania for estimating both a relative line and an absolute poverty line to maintain consistency of poverty indicators. In the paper, we test the appropriateness of the latter scale in the context of estimating basic needs.

The structure of the paper is as following. First, we present the method for estimating the cost of the basic consumption needs by Navickė (2016), discuss its critics and application. In the second section, we discuss a method for construction of an equivalence scale, which should be suitable for application in the context of basic needs and absolute poverty measurement. The equivalence scale is constructed using regression techniques and information on expenditure recorded in the HBS. Finally, in the third section, we test the proposed methodology on the data from the Survey of Income and Living Conditions (SILC) for the period of 2006-2016, and compare it to the dynamics and levels of the official poverty statistics.

2. Estimation of the cost of basic needs

There are many ways to calculate basic personal (family) needs (Zabarauskaitė, 2008). In order to calculate basic needs, which would include both food and non-food (other goods and services) components, two main methods could be named: budget standards and cost of basic needs (*ibid.*).

In line with the methodology of estimating budget standards, basic needs are determined based on the minimum cost of goods and services (both food and non-food), which sums up the so-called "reference budgets". Reference budgets are the baskets of essential goods and services that ensure an acceptable standard of living for a household in a given country, region or city. Reference budgets can be used for assessment of eligibility for benefits, poverty measurement, benefit indexation, in advice on saving and borrowing, etc. The main disadvantage of this method is that it is not easy to decide which goods and services should be included in the reference budget (Zabarauskaitė, 2008).

Nevertheless, the European Commission has proposed the member states to use reference budgets method, to determine effective and appropriate monetary support and/or to monitor the adequacy of minimum income guarantees (Goedeme et al. 2015, Storms et al. 2014, for Lithuania – see Europos Komisija, 2015). However, the latter estimations for Lithuania included only food costs, i.e. costs of food, its preparation and also social function of food, such as eating outside home. The composition of the reference budgets for several types of families was based on an expert judgement. The proposed methodology is complex, includes a number of assumptions and is based on assessment made by the focus groups. The latter is inevitable when deciding on the goods and services that need to be included into the reference budget, which is dependent on the habits, traditions and standards of living of the underlying population. It is maybe for these reasons that the methodology did not receive much attention in Lithuania.

According to the cost of the basic needs' method, the basic needs also include food and non-food components. Food needs are calculated by setting a minimum food basket, which is usually compiled by nutritionists. To estimate the monetary value of non-food needs, the amount needed to purchase a minimum food basket is proportionally increased, based on the actual analysis of the household consumption structure. In this way, the researcher subjectivity about the necessity of certain non-food items is avoided (Ravallion & Bidani 1994). Not surprisingly, this method is more common. It was used by such scientists as: M. Ravallion, B. Bidani, Deaton, Friel, P. Glewwe, S. Pradhan and others (for a review see Zabarauskaitė (2008)). Methodology proposed in this paper is based on methodology similar to the one used by Zabarauskaitė (2008) for Lithuania. It included both food and non-food parts, and accounted for optimal rather than minimal nutrition needs for children. The non-food part of the basic needs was estimated in relative terms based on the Engel coefficient. We follow the approach in this paper.

Different to the proposed methodology, the method used by Zabarauskaitė (2008) accounted for regional differences in food prices and consumption patterns. This resulted in estimation of the regional poverty lines, rather than a single national poverty line. While might be an advantage for analytical purposes, regional differentiation might not be practical for policy purposes, i.e. for defining amounts of social assistance. In a small country like Lithuania, different social assistance amounts may further boost regional disparities, overall inequality level and stimulate unintended consequences with regards to internal migration. Moreover, it can be argued that the major differences exist mostly in the sphere of the costs of housing and transportation. These might be covered by targeted assistance bonuses based on individual situation, instead of trying to account for it within the average cost of the basic needs.

As already mentioned, the cost of the basic needs can also be interpreted as an absolute poverty line. Absolute poverty was defined by the United Nations as a condition characterized by severe deprivation of basic human needs,

including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services (UN 1995). It should be noted, that the concept of the basic needs used in this paper is somewhat broader, also to include clothing, transportation, culture and leisure (see Subsection 2.2). The access and costs of services is also accounted for both explicitly, by including the costs of services reported in the HBS, and implicitly – as the costs of services recorded in the HBS survey do account for any forms of subsidized or free service provision, if there are any.

In addition to the consumption-based methods described above, an absolute poverty line can be defined by an expert judgement, political or subjective methods. An expert judgement often includes focus groups' discussions or other forms of expert surveys, while a political method takes into account the financial capacities of the state. A subjective poverty line can be defined through a general survey on the amount needed to 'make ends meet'. Neither of these methods necessarily ensure that the basic needs are met (Atkinson et al., 2002, cited in Šileika & Zabarauskaitė, 2009). As noted by Šileika and Zabarauskaitė (2009, p. 20): "After analyzing the different methods of calculating an absolute poverty line, it can be stated that the basic needs' cost method is the most suitable for calculation of the absolute poverty threshold in Lithuania (...)". Based on the above arguments, we use the basic needs' cost method for estimating the cost of the basic needs and absolute poverty threshold in this paper

2.1. Basic food costs

The minimum amount needed to cover food costs can also be referred to as the food poverty line. This is the amount of consumption expenditure required to satisfy minimum nutrition needs per person per month (Zabarauskaitė, 2008). As already mentioned, it is common that the minimum food basket is calculated based on the recommendations of nutritionists and the specific peculiarities of local eating culture (Storms et al., 2014; Lin & Bernstein, 2008). In addition, food production costs and the social food function may be taken into account (Europos Komisija, 2015). Alternatively, the cooking costs (e.g. kitchen equipment, gas, etc.) and the social food function (e.g. eating outside home) can be included into non-food costs. In order to avoid duplication of these costs in the food and non-food parts of the basket, the calculation of food part proposed in our methodology only includes food costs and excludes food preparation and social food function.

The composition of the minimum food basket used in the paper is based on the Order of the Minister of Health of the Republic of Lithuania (TAR, 2016) on the approved structure of the minimum food basket. The approved food basket includes 12 food categories, such as grain and leguminous products, vegetables, potatoes, fruit, meat, dairy products, eggs, fish, sugar, margarine and oil, etc. (for more info, see methodology by Navickė (2016)). It is important to mention that these do not include drinks, except for milk and other dairy products. Nevertheless, drinkable tap water is included into the total basic needs through the expenditure on utilities. Alcoholic drinks are excluded from the minimum needs' basket. When calculating the cost of the food basket, average retail prices are used as estimated by Statistics Lithuania. Every category is estimated in accordance with annual average prices of its components.

The critique of this method for estimating minimum food costs states that the estimated food basket may underestimate actual minimum costs as food products have inedible parts. Moreover, a fraction of food tends not to be consumed and is thrown away. On the other hand, the components of the basket were criticized to include such items as beef or salmon fish, which, supposedly, should not be included in the minimum food basket, inflate its cost and should be replaced with cheaper alternatives. Moreover, average retail prices may overestimate the actual cost of food consumed by those living in poverty, choosing the cheapest products. Hence, there are arguments for the food basket to be both under- and over-priced. As there are no empirical estimates for the scope of the mentioned effects, we assume them to cancel each other out. Hence, no corrections are made either to structure, cost or amounts of the estimated food basket.

Finally, prices in different regions of the country may vary considerably, thus it is proposed to differentiate the prices of food and non-food parts based on the place of residence (e.g. Zabarauskaitė 2008). However, this is both hard-to-implement and a politically controversial recommendation. In practice, this would mean a different amount of minimum needs and different absolute poverty lines in different regions in Lithuania. Politically, a lower poverty threshold in the region might discriminate its residents by providing for a lower standard of living through social assistance. Technically, the proposal is not feasible with the available data due to the lack of data and small sample problem, especially regarding the non-food part calculation methodology discussed below. Hence, we estimate a single average cost of the basic needs and absolute poverty line for Lithuania. The issue of calculating food costs for adults and for children is addressed when constructing an equivalence scale to account for household size and composition in Section 2 of this paper.

2.2. Basic non-food costs

The minimum non-food costs can be called a non-food poverty threshold. The non-food poverty threshold covers expenditures required to satisfy minimum individual needs other than nutrition (i.e. housing, clothing, transport services, etc.) (Zabarauskaitė, 2008). As already mentioned, the sum needed for non-food needs is defined based on the basic cost method, i.e. by proportionally increasing the basic food cost in accordance with the actual structure of household consumption. In this way, a detailed list of goods and services, needed to meet basic non-food needs, is avoided.

We base the calculation of the non-food poverty threshold on the Engel coefficient (EC), which represents the share of household's spending on food in the total consumption expenditure. The coefficient is calculated based on the HBS, where the total consumption expenditure includes ten broad categories of monetary expenses, such as food and non-alcoholic beverages, clothing and footwear, housing and utilities, furniture and other household equipment, healthcare,

transportation, communication, leisure and culture, education, various other goods and services. Two categories of consumption expenditures are excluded from estimation as these are assumed to be outside of the basic needs, i.e. alcohol beverages and tobacco, as well as restaurants and hotels.

When calculating the coefficient EC , only the population, whose expenditure on food and non-alcoholic drinks ($ahe01$) is within 15% margin of the estimated cost of the basic food basket, is taken into account. We limit the sample following recommendation by Zabarauskaitė (2008) to exclude those, who both over- and under-spend of food. Those with very low expenditure on food may not ensure appropriate nutrition and non-food needs, while those with very high expenditures may consume goods which exceed their basic needs. Hence, it is assumed that if household's spending on food is close to the cost of the basic food needs, the non-food part of expenditure should also consist of goods necessary to ensure the household's basic needs (Zabarauskaitė, 2008). The margin of 15% used for calculations also helps to maintain a sufficient sample and avoid fluctuations of the Engel coefficient across years.

If the cost of the basic needs for food is CBN_f , the Engel coefficient is EC and the cost of basic non-food needs CBN_n is unknown, we have the following formula:

$$CBN_n = CBN_f/EC - CBN_f \quad (1)$$

It should be noted that previous research by Vos and Mejia (1999) showed that if the Engel coefficient exceeds 50% of the household's total expenditure, the household is considered to be poor. Hence, the EC in (1) should not exceed this threshold. The average Engel coefficient (EC) within the sub-sample of population described above is estimated to be at an average of 38.4% based on the HBS data for the period of 2005-2016 for Lithuania (see Subsection 4.2).

2.3. Total costs of basic needs

In order to estimate the cost of the total basic needs, we sum the basic food and non-food costs estimated using the methodology described in Sections 1.1 and 1.2. Alternatively, the same amount can be obtained using the following formula:

$$CBN = CBN_f/EC, \quad (2)$$

where CBN is the total cost of the basic needs, CBN_f is the cost of the basic needs for food and EC is the Engel coefficient.

3. Equivalence scale to account for differences in the household composition

The question of how to compare economic well-being of households of different size or composition is crucial for drawing conclusions from the analysis related to income. One of the easiest methods to make such comparison is to assume the basic needs' costs are equal for every member of the household. Literature suggests that in some cases this method is the most suitable for economically developing countries (Šileika & Zabarauskaitė, 2009). However, it is widely acknowledged that the cost of the basic needs does not increase in proportion to the number of persons in the household and may depend on characteristics of the household members. Therefore, equivalence scales are usually used to compare income and consumption of different households. These are also often used when estimating income poverty lines.

The equivalence scale indicates living expenses of a household of a given size and/or demographic composition, relative to the cost of living of a reference household attaining an equivalent standard of living (Lewbel & Pendakur, 2006). On the one hand, equivalence scales capture the decrease of cost per capita as the household size increases. On the other hand, equivalence scales might be based on the heterogeneous consumption needs, e.g. children have lower nutritional needs than adults (Lanjouw et al., 1998). The former aspect can be referred to as a utility effect, while the latter – as a demographic effect (Zabarauskaitė, 2008, p. 42). An equivalence scale can reflect one or both effects.

One of the most common equivalence scales is the OECD modified scale, which encompasses both utility and demographic effects. This scale is used for estimating relative at-risk-of-poverty threshold in the EU. Using this scale, a value of 1 is assigned to the first adult member of the household, a value of 0.5 – to each subsequent adult member of the household and 0.3 – to each child (under 14). Another example is the scale used in the system of cash social assistance in Lithuania. The latter only reflects the utility effect, i.e. the coefficient assigned to the first household member is 1, to the second member of the household – 0.8, and to the third and every subsequent member – 0.7. The latter scale is based on an expert judgement and budgetary constraints, rather than empirical estimations.

This brings us to the different ways of estimating equivalence scales, which can be summed up to the main three methods, namely: expert-based, consumption-based and subjective (Bishop et al., 2013; Dudek & Chrzanowska, 2018). The first method is based on the needs defined by experts. There are several ways of how to derive an expert-based scale, ranging from focus group discussions to expert judgements, e.g. as in the case of the Lithuanian social assistance scale mentioned above. The consumption-based scale is calculated using data on household expenditures and encompasses actual patterns of food and non-food consumption. Finally, the idea of subjective method is based on asking households of different size and composition, how much money per person they need to meet their basic needs (Bishop et al., 2013).

All the above methods of constructing equivalence scales have their strengths and limitations. The main weakness of the expert-based method is the lack of empirical evidence to support it, making it vulnerable for manipulation or

critique. The expenditure data reveals different consumption preferences and indifference curves for households, but there is no way for observing which indifference curves yield same level of utility (Lewlel & Pendakur, 2006). The subjective judgement may be subject to an adaptation bias, which may cause an overestimation of the basic needs among people with high income and underestimation among people with low income. Therefore, analysis is more meaningful if it is based on observations, whose disposable income is close to their declared amount needed to meet the basic needs (Grodner & Salas, 2014).

Unsurprisingly, the equivalence scales developed based on different methods produce different results. For example, an expert-based scale used in Lithuania is more generous compared to the OECD modified scale, i.e. it assumes lower decrease of the living costs per capita as the household size increases. On the other hand, the equivalence scale estimated using a subjective method for the Visegrad countries (Dudek & Chrzanowska, 2018) is stricter compared to the OECD modified scale, i.e. it implies a higher decrease of the living cost per capita as the household size increases.

The challenge is to identify the equivalence scale, which yields the same level of utility for different household types. As utility is not directly observed, identification of the equivalence scales requires strong assumptions, which need to be transparently stated. One of such assumptions is based on the Engel's method (Lewlel & Pendakur, 2006). The method states that a fraction of total expenditures on food is monotonically declining in utility. Hence, the Engel coefficient can be taken as an indicator of well-being, with a coefficient of 0.5 and above, indicating poverty (Vos & Mejia, 1999). If this holds for the different household types, then expenditure levels, which equate the same food share across household types, are the equivalent-expenditure functions, whose ratios give the equivalence scale (Lewlel & Pendakur, 2006). We use this identification strategy in the paper.

In order to identify an equivalence scale, which is suitable in the context of basic needs and absolute poverty, we use the household expenditure data recorded in the HBS. The linear regressions are run on the sample limited to the household with the Engel coefficient within a 15% margin of 0.5. We also exclude from the sample those with 10% lowest and highest expenditures and those in the highest income quintile. Similar to Section 1.2, this is done to avoid those with very low and high income or expenditure (Šileika & Zabarauskaitė, 2009).

First, we estimate the equivalence scale for a non-food component of the total basic needs using the regression, which follows the method used by Bishop et al. (2013):

$$EXP_n = a_0 + a_1z_1 + a_2z_2 + a_3EC + \varepsilon, \quad (3)$$

where EXP_n represents expenditure on goods rather than food, a_3EC is a control for an Engel coefficient in the household, z_1 is a number of adults rather than the first, and z_2 represents a number of children in the household, ε is a classical error term. Hence, a_0 represents non-food expenditure for one adult household, a_1 – non-food expenditure for adults other than the first, and a_2 – that for children. The coefficients help capture both utility and demographic effects as described above. The equivalence scale is estimated for the value of the Engel coefficient $EC = 0.5$. This makes it suitable to reflect patterns of consumption of poor households.

As mentioned above, the cost of the basic needs for food is estimated based on the recommended daily food norms (see Section 1.1). We follow the recommendation by the Ministry of Health to keep the food norms for children above the age of seven equal to those of the adults (LR SAM 2016). We do not reduce the norm using the coefficients of 0.7 for children between 4-7 years old and of 0.6 for children between 0-3, as suggested in the document (ibid.). That follows Šileika & Zabarauskaitė (2009) to include optimal, not minimum, food norms for very young children to support their development needs. Hence, we do not assume the expenditure on food to reduce as the size of the household increases.

The final equivalence scale is estimated as a weighted average of the food and non-food components of the basic needs' costs. The average food share in the total cost of basic needs in Lithuania is estimated to be at 38.4% based on the HBS data for the period of 2005-2016 (see Subsection 4.2).

4. Results

4.1. Equivalence scale applicable in the context of basic needs

We start discussing the results with the equivalence scale we derive from the data on consumption for Lithuania. The scale will be used to account for household composition when estimating basic needs in the Subsections 4.2 and 4.3. We argue that the scale better reflects the decrease in the costs of the basic needs with additional household members in Lithuania compared to the OECD equivalence scale traditionally used for estimating relative at-risk-of-poverty line.

As described in Section 3, we derive the equivalence scale, which should be suitable in the context of minimum consumption based on the linear regression in (3). We first estimate a general model for the whole population, with total expenditure as a dependent variable and not controlling for the Engel coefficient (Model 1). We then repeat estimations on the restricted sample of those with minimum consumption, using non-food expenditure as a dependent variable and controlling for the Engel coefficient (Models 2 & 3). The regressions also differ according to child definitions. In Models 1 & 3, a child is defined in line with the definition used for calculation of the OECD equivalence scale, i.e. a child is a person up to the age of 14. In Model 2 children are persons up to the age of 18, i.e. in line with the child definition used

in the national law. To check the robustness of the regression results, we repeat all estimations on the two most recent waves of HBS from the years 2016 and 2012. It is important to mention that the sample of the 2012 HBS is around twice bigger compared to the 2016 survey due to a change in methodology. The results of the regressions are presented in Table 1.

Table 1. Regression coefficients and equivalence scale for Lithuania

	Model 1		Model 2		Model 3	
Model characteristics:						
Dependent variable (<i>EXP</i>)	Total expenditure		Non-food expenditure			
Sample	Full sample		Restricted sample			
Child definition	Up to age 14		Up to age 18		Up to age 14	
Control for Engel (<i>EC</i>)	No		Yes			
Year of HBS data	2016	2012	2016	2012	2016	2012
Model fit:						
Number of observations	3443	6931	544	1172	544	1172
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.2480	0.2396	0.676	0.6568	0.6751	0.6586
Adj R-squared	0.2476	0.2394	0.6742	0.6559	0.6733	0.6577
Regression coefficients: ***						
a_0	361.27	317.26	351.74	384.33	352.71	382.16
a_1	181.81	152.00	84.82	68.66	82.21	71.72
a_2	108.18	96.56	69.40	56.39	69.12	56.71
a_3EC , where $EC = 0.5$	-	-	-236.58	-280.19	-237.03	-278.80
Equivalence scale:						
First adult	1.00	1.00	1.00	1.00	1.00	1.00
Other adults	0.50	0.48	0.74	0.66	0.71	0.69
Children	0.30	0.30	0.60	0.54	0.60	0.55

*** All regression coefficients are statistically significant at 0.999 level.

Source: Own estimations based on the HBS.

Table 1 shows the results of the three models estimated on HBS 2012 and 2016 data. Model 1 is a general model, which gives an equivalence scale, which is almost identical to the modified OECD equivalence scale, i.e. with coefficients of 1 for the first adult in the household, 0.5 – for other adults and 0.3 – for children below 14 years of age. Hence, despite of the critique of a very high decrease of expenditure for the additional members and children in the household assumed by the modified OECD equivalence scale (for Lithuania, see e.g. Zabaraukaitė, 2008), it corresponds well to the pattern of consumption observed in the general population in Lithuania for both 2012 and 2016. Albeit, it is worth mentioning that Model 1 explains the consumption patterns only partially, with the adjusted R-squared of only around 0.25. Hence, only around a quarter of the total variation in household expenditure is explained by the model. This is not surprising as there may be several consumption patterns across the income and expenditure spectrum.

Models 2 & 3 only account for the non-food expenditure and restrict the sample to those with the minimum consumption, i.e. to households with the Engel coefficient within a 15% margin of 0.5. We also exclude from the sample those with 10% lowest and highest expenditures and those in the highest income quintile (see Section 2). This leaves us with about 16% of the total sample (543 observations for 2016 HBS and 1172 observations for 2012 HBS). We control the Engel coefficient in both models and estimate the equivalence scale assuming the Engel coefficient of 0.5. This lets us assume the resulting equivalence scale is reflecting the consumption pattern of those poor and allows for equivalent utility from consumption for households of different composition. There are two alternative child definitions and two datasets used, summing up to four regressions in total.

The results of Models 2 & 3 show that these models explain the pattern of non-food consumption for the selected sample much better, with an adjusted R-squared of around 0.66. This shows a more homogenous consumption for those with expenditure at around a basic needs' level as there is less space for variation. Furthermore, the model coefficients and the resulting equivalence scale show much lower degree of reduction of expenditure with every additional adult and child. The coefficient for every adult other than the first is between 0.66 and 0.74 depending on dataset and definition of the adult. The coefficient for the child, respectively, is between 0.54 and 0.60. The differences are marginal across the models with different child definitions and years. Averaging across the four model specifications, the regression gives an equivalence scale of 1 for the first adult, 0.70 for every other adult, and 0.57 for children. These coefficients are robust using different model specifications (see Annex 1). The scale is similar to the original OECD equivalence scale, which assumes the coefficients of 1, 0.7 and 0.5 respectively.

The final step in the estimation of the total equivalence scale is to estimate a weighted average equivalence scale of the food and non-food components of the basic needs' costs. The average food share in the total cost of basic needs in Lithuania is estimated to be on average at 38.4% based on the HBS data for the period of 2005-2016. Based on the recommendations provided by nutritionists and allowing for an optimal rather than minimal expenditure on food for

children below seven years of age, we assume no reduction in the food costs for additional members in the household. Hence, the resulting equivalence scale is as following (Table 2).

Table 2. Equivalence scale for the total expenditure on basic needs

	Food	Non-food	Total
Share, %	38.4	61.6	100
Coefficients of the equivalence scale:			
first adult	1	1	1
per other adult	1	0.70	0.82
per child	1	0.57	0.74

Source: Own estimations based on the HBS data.

Table 2 shows the equivalence scale that can be assumed for the total expenditure on basic needs, i.e. 1 for the first adult in the household, around 0.8, for every other adult, and around 0.7 for children. The latter is valid either the child is defined as a person below 14 or 18 years of age. It can be noted that this scale is substantially less strict (assumes less reduction in the expenditure with every additional household member) compared to the modified OECD equivalence scale traditionally used for the at-risk-of-poverty estimates. Hence, while the latter may be appropriate for the pattern of consumption observed in the general population (see Model 1), it may not be suitable in the context of basic consumption.

Moreover, the equivalence scale we estimate is very similar to the expert-based equivalence scale used in the system of social assistance in Lithuania, i.e. 1 for the first adult, 0.8 for the second member of the household, and 0.7 for every other member of the household (see Section 2). Hence, our scale can be claimed to be both internally and externally valid, i.e. having an advantage of being empirically estimated, but also valid from the political and expert-based points of view. As the two scales are highly similar, we apply the social assistance scale for estimating basic needs' cost for households of different composition in Lithuania.² The results are presented in Subsections 4.2 & 4.3.

4.2. Costs of the basic needs and other poverty thresholds

In this section we discuss the dynamics and levels of the estimated cost of the basic needs (CBN). The estimated amounts are compared to the officially used poverty lines: at-risk-of poverty (AROP) threshold and the absolute poverty line currently used in Lithuania. To remind, the latter is estimated by applying the modified OECD scale on the basic needs' amount. Please note that all the figures below present actual income reference year rather than survey year (t-1), which is reported in the official statistics.

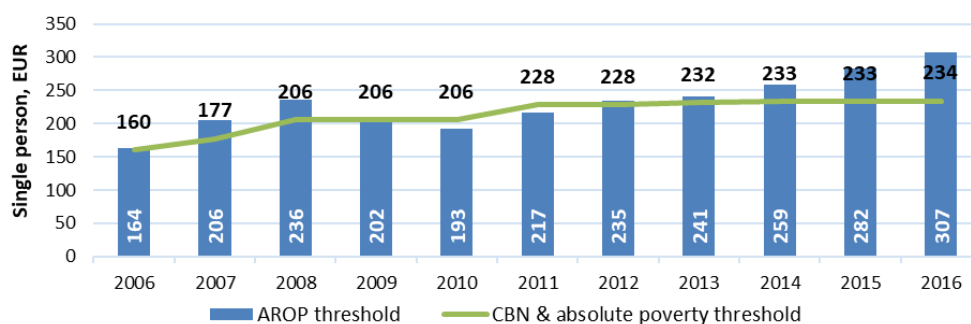


Figure 1. CBN, absolute poverty and AROP thresholds for single adult 2006-2016, EUR

Source: Eurostat and authors' calculations based on EU-SILC 2007-2017

Note: actual income reference period (EU-SILC survey year t-1), AROP at 60 % of median equivalized income.

The CBN and the official absolute poverty line of a single adult coincide as there is no need to apply an equivalence scale. Figure 1 shows the CBN, and the absolute poverty line for a single adult was at or below the at-risk-of-poverty line between 2006-2016. Albeit, in times of a rapid economic growth the relative threshold pools away from the CBN and the absolute poverty line. The deviation between the two lines was at an extent of around 5% or less, except for the rapid economic growth years of 2007-2008 and since 2014 when the gap amounted to 10% or more, reaching 24% in 2016. The relation between the lines indicate that the CBN and the absolute poverty level for singles should roughly be similar or below the relative at-risk-of-poverty for this type of household.

Talking about the dynamics, both CBN and AROP were increasing during the pre-crisis period of 2006-2008 because of the growth of the median income as well as prices, albeit the former increased to a lesser extent. Hence, the CBN started lagging behind the AROP threshold. During the economic recession period of 2009-2011, Figure 1 reflects different dynamics of these thresholds. In times of recession, AROP threshold went below its pre-crisis level of 2008. This is

² Application of the scale outlined in Table 2 gives statistically identical results.

a known property of the relative poverty lines, which tend to stagnate or even decline together with the income of the underlying population during the economic recession. This was not the case for the CBN. As shown in Figure 1, the CBN and, respectively, the absolute poverty line, increased rather than decreased in line with prices during the economic recession period of 2009-2011. Finally, during the economic growth period of 2012-2016, AROP threshold returned to the pre-crisis level and steadily increased, while the CBN and absolute poverty threshold remained almost at the same level.

Next, we present the CBN and other poverty thresholds for the household consisting of two adults and two children younger than 14 years (Figure 2). Following estimations and discussion in Section 3.1, we apply an equivalence scale used in the Lithuanian system of social assistance when estimating CBN for households with more than one member.

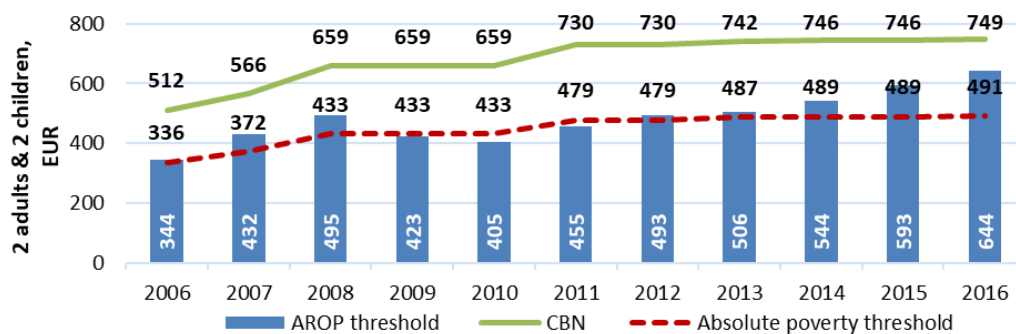


Figure 2. CBN, absolute poverty and AROP thresholds for 2 adults & 2 children (below 14 years) 2006-2016, EUR

Source: Eurostat and authors' calculations based on EU-SILC 2007-2017

Note: actual income reference period (EU-SILC survey year $t-1$), AROP at 60 % of median equivalized income.

It can be noticed that the CBN for two adults and two children is much higher than the officially used absolute and relative poverty thresholds for Lithuania. This is due to the fact that official thresholds apply the modified OECD equivalence scale, which is much stricter compared to a more generous scale estimated in Subsection 4.1. Hence, unlike in the case of single-adult households, the CBN for couples with two children, and for non-single households in general, should exceed the estimated absolute and relative poverty levels. The gap increases with every household member additional to the head of the household.

4.3. Share of population with income below the cost of basic needs and poverty rates

In this section we compare the levels and dynamics of the CBN, absolute poverty and AROP rates (Figure 3).

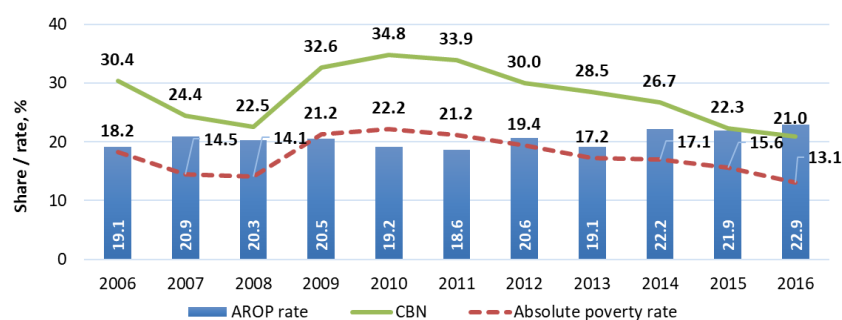


Figure 3. CBN, absolute poverty and AROP rates in Lithuania, 2006-2016

Source: Eurostat and authors' calculations based on EU-SILC 2007-2017.

Note: actual income reference period (EU-SILC survey year $t-1$), AROP at 60 % of median equivalized income.

Starting with the dynamics, the AROP rate shows a relatively flat and pro-cyclical profile over the 2006-2016 period. It fluctuated at around 20% during most of the period and was, in general, higher during the economic growth periods, while the lowest relative poverty levels were observed amid the crisis in 2010-2011. The latter was mostly due to the lower median income. Moreover, the effect was due to the situation when those relying on social protection benefits at the middle and lower parts of the income distribution were affected less by the economic crisis compared to those relying on the labor market incomes. For example, the lowest pensions were not subject to cuts during the crisis in Lithuania, while higher pensions were cut progressively. Hence, the relative situations of the pensioners at the lower part of the income distribution improved compared to the working-age population, dragging the AROP down (for more detail see Figure 4).

On the contrary, the dynamics of the CBN and absolute poverty rates is clearly anti-cyclical. The absolute poverty level goes down when the economy is growing, while the highest rates are observed in the height of the economic crisis of 2009-2011. Such results reflect the difficulties of the population to cover their basic needs in times of the economic recession. It also reflects that it becomes easier to provide for one's basic needs during the economic growth and lower unemployment periods. Hence, the absolute and relative measures reflect different concepts and dynamics of poverty not only conceptually, but also empirically.

Talking about the differences in levels, it is generally assumed that the relative poverty threshold should be more generous than the CBN or absolute poverty threshold. Hence, the AROP rate should exceed CBN and absolute poverty. This was in general the case for AROP and absolute poverty indicators, except for the period of the economic recession in 2009-2011, when the absolute poverty rate was above the AROP. The share of people whose income were below the CBN threshold was above the relative AROP levels in the EU-SILC data for all years except of 2016. The share of people who had not enough income to support their basic needs shown in Table 3 is very high, with the lowest estimate of 21% in 2016, and reaching around a quarter of the population during the economic crisis in 2009-2011.

Furthermore, the official absolute poverty rates, as officially estimated in Lithuania, are by around a third lower compared to our estimations of the basic needs. This is due to the under-estimation of basic needs for families with more than one member when applying the modified OECD equivalence scale on the cost of the basic needs.

A word of caution can be given here, as the share of informal economy and shadow wages in Lithuania is high compared to the EU standards. Hence, these incomes might not be reported in the survey data, driving up the share of people who can't meet their basic needs or those in absolute poverty. At the same time, under-reporting of shadow income might have different effect on the relative poverty line, depending on how far in the income distribution these unreported incomes are present. We do not correct the unreported income in this paper. Neither does the official statistics.

Next, it is worth looking into the CBN, absolute poverty and AROP rates between different age groups: children (aged 0-17), working-age persons (aged 18-64) and seniors (aged 65+). Figure 4 (see below) shows big differences in trends and levels of these indicators, which we further discuss.

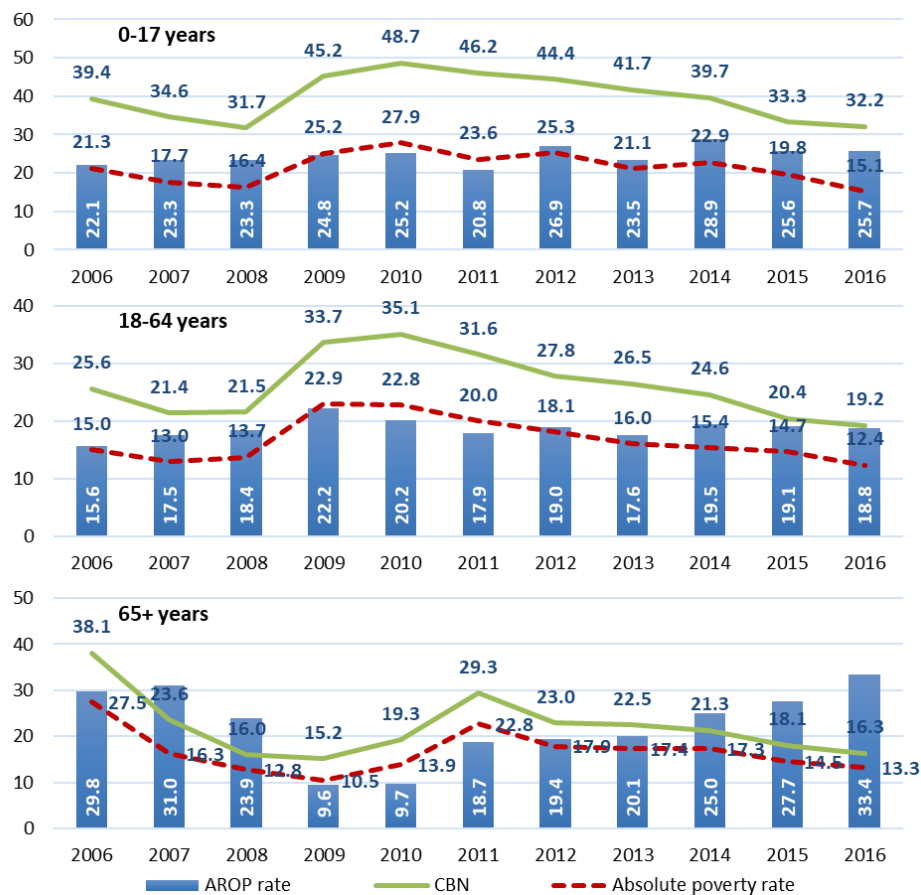


Figure 4. CBN, absolute poverty and AROP by age group in Lithuania, 2006-2016

Source: Eurostat and authors' calculations based on EU-SILC 2007-2017.

Note: actual income reference period (EU-SILC survey year $t-1$), AROP at 60 % of median equivalized income.

First, when it comes to meeting the basic needs, children are consistently the most deprived group of the Lithuanian population. While the relative at-risk-of-poverty rates for children are among the highest in the EU (averaging at 25% for Lithuania over the 2006-2016 period), the share of children whose families are below the CBN threshold is even higher (39% on average). The AROP rates give a different story of the elderly being worse-off during the economic growth periods compared to children.

Second, all age groups were subject to increased difficulties in meeting their basic needs during the economic crisis in Lithuania. The effect was immediate and quite dramatic in the population of the working-age adults and children. Both the CBN and the absolute poverty rates for these groups went up since the onset of the crisis in 2009 by more than 10 p.p. The AROP rate also increased for the working-age adults in Lithuania, but to a much lower extent (by around 4 p.p.). Almost no effect was observed for the AROP rates among children.

The effect of the crisis on the ability to meet one's basic needs and on absolute poverty among elderly population was somewhat delayed until 2010, and especially strong in 2011. This reflects the inertia of the pension system, absorbing the initial negative effects of the crisis. Indeed, the basic and average pension amounts were still on increase in 2009 compared to 2008 despite of the onset of the crisis, while the cuts on pensions were introduced only since 2010. Since 2012, the cuts on state insurance pensions have been cancelled, although recalculation rules are still applied to state pensions. Since 2014, the compensations for the cuts on pensions have started, and the growth of the basic and other amounts used for calculating pension amounts resumed. All these changes, both positive and negative, can be clearly traced through the dynamics of the CBN and absolute poverty rates among the elderly. The relative at-risk-of-poverty rates show a somewhat different story. That of the record-low poverty risk among the elderly in both 2009 and 2010 (despite of the cuts on pensions) and a continuous deterioration of the elderly situation compared to the general population since.

Finally, we compare all three indicators in terms of sex and regional disparities, i.e. CBN, absolute poverty rate and AROP among men and women, as well as by degree of urbanization (see Table 3).

Table 3. CBN, absolute poverty and AROP rates by sex and degree of urbanization in Lithuania, 2006-2016

BY SEX											
Men											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Absolute poverty rate	15.9	13.0	14.1	21.8	22.0	19.8	18.5	16.1	16.8	15.2	13.2
CBN	28.3	23.8	22.8	33.3	35.2	32.8	28.8	28.5	27.2	22.3	21.3
AROP rate	16.7	18.5	18.9	21.2	19.1	18.1	19.4	17.8	21.8	20.4	21.4
Women											
Absolute poverty rate	20.2	15.7	14.1	20.7	22.3	22.3	20.2	18.2	17.3	15.9	12.9
CBN	32.2	24.9	22.3	32.0	34.5	34.8	30.9	28.6	26.3	22.3	20.6
AROP rate	21.2	23.0	21.6	20.0	19.3	19.0	21.6	20.3	22.5	23.1	24.2
BY DEGREE OF URBANISATION											
High density area											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Absolute poverty rate	7.6	6.4	6.7	14.6	14.1	12.9	10.7	10.2	10.7	6.9	6.4
CBN	15.8	13.0	11.7	21.9	24.1	20.7	17.1	18.3	16.5	11.1	11.3
AROP rate	8.0	10.4	10.7	14.3	12.2	11.2	11.8	11.9	13.8	11.5	11.8
Middle/low density area											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Absolute poverty rate	25.8	20.3	19.5	26.0	28.0	27.2	25.9	22.5	21.8	22.1	18.1
CBN	40.8	32.7	30.5	40.4	42.6	43.6	39.5	36.2	34.4	30.8	28.2
AROP rate	27.1	27.0	27.4	25.0	24.3	24.0	27.1	24.5	28.6	29.8	31.2

Source: Eurostat and authors' calculations based on EU-SILC 2007-2017.

Note: actual income reference period (EU-SILC survey year $t-1$), AROP at 60% of median equivalized income.

The CBN and the absolute poverty outcome by sex could be described as anti-cyclical across the years of 2006-2016. AROP rate shows pro-cyclical dynamics. This is in line with the dynamics shown in the previous figures for the total population. The differences between men and women are relatively small for all three indicators. Still, the AROP rate was slightly lower for men compared to women for most of the observed years. The CBN and the absolute poverty rates show a more complex picture, i.e. women were slightly better-off towards the end of the observed period as well as at the onset of the economic crisis, but not in other periods. The most recent available year of 2016 shows that around one fifth of both men and women in Lithuania had not enough income to ensure their basic needs. This result is the best one during the period of 2006-2016. At the same time, the AROP rate was record high for men, but also for women in 2016.

High density areas in the EU-SILC data refer to areas with at least 1,500 inhabitants per km² and a minimum population of 50,000 (Eurostat 2018). In Lithuania, this corresponds to the population of the five major cities (Vilnius, Kaunas, Klaipėda, Šiauliai, Panevėžys) and Alytus. There are big differences in the prevalence of all three indicators between the latter densely populated areas and remaining territories. For the period of 2006-2016 AROP, CBN and absolute poverty

rates were on average around 2.5 times higher in the latter population compared to those living in high-density areas. The ratio was below two-fold only during the onset of the economic crisis in 2009 and 2010. It can be argued that these dynamics reflect the differences in the demographic composition of the underlying population, i.e. old-age pensioners make a higher share of population in the middle/low-density areas. Pensions were subject to less fluctuations and were not subject to cuts at the onset of the crisis and later for those receiving the lowest pensions. This explains why AROP rates decreased at the onset of the economic crisis in the middle/low-density areas, while the opposite was true for highly populated areas. Finally, both CBN and the absolute poverty rates show anti-cyclical profile both in high and middle/low-density areas. Similar to the dynamics by gender and in the total population, both indicators went up as the economic situation deteriorated and decreased as the economy started to improve. The most recent figures show that around 10% of the population in the high-density areas experienced poverty risk and had insufficient income to satisfy their basic needs in 2016 compared to around 30% for the middle and low-density areas. Hence, regional disparities are and remain high taking both relative and absolute poverty measures, as well as when accounting for the cost of the basic needs in Lithuania.

Conclusions

The ongoing work on estimating the costs of the basic needs has up to this moment not crystallized into a generally accepted method across the EU. In this paper we proposed a methodology for estimating the cost of the basic needs taking Lithuania as a case study. The basic food costs were estimated based on the national recommendations on the minimum nutrition requirements, while the cost of all other needs was estimated in relative terms, taking actual consumption patterns in the population into account. A degree of reduction in the cost of the basic needs for additional members of the household was accounted for by a specially constructed consumption-based equivalence scale estimated on the HBS data. We argue it to be better suited in the context of minimal consumption in Lithuania compared to the modified OECD equivalence scale, which is currently used for the purpose.

The empirical analysis for a decade after Lithuania entered the EU (2006-2016) showed the following results:

1. The consumption-based equivalence scale we estimate is very similar to the expert-based equivalence scale used in the system of social assistance in Lithuania, i.e. 1 for the first adult, 0.8 for the second member of the household and 0.7 for every other member of the household. We propose to use this scale when calculating basic needs' amount for households with more than one member in Lithuania. The modified OECD equivalence scale underestimates the cost of the basic needs in the context of estimating absolute poverty in Lithuania.
2. The cost of the basic needs is close to the relative at-risk-of-poverty line (set at 60% of the median equivalized disposable income of the population) for a single adult but exceeds it for larger households. This is due to the fact that AROP is estimated applying the modified OECD equivalence scale, which is much stricter compared to the scale we apply. In times of a rapid economic growth the cost of the basic needs gradually lags behind the relative at-risk-of-poverty line.
3. The official absolute poverty indicator used in Lithuania under-estimates basic needs for families with more than one member. The modified OECD equivalence scale is too strict when accounting for households' basic needs. Instead, the original recommendations to apply an equivalence scale used in the system of social assistance should be followed.
4. The share of people whose income are below the cost of the basic needs in the general population was above the relative at-risk-of-poverty levels for all years except of 2016. The share of people who have not enough income to support their basic needs is high, with the lowest estimate of 21% in 2016 and reaching around a quarter of the population during the economic recession in 2009-2011. Children are consistently the most deprived group of the Lithuanian population when it comes to meeting the basic needs.
5. We observe anti-cyclical dynamics of the share of people with income below the cost of the basic needs and those in absolute poverty in accordance to the methodology of Statistics Lithuania. Both levels go down when the economy is growing, while the highest rates are observed during the economic recession. This is in contrast with a relatively flat and pro-cyclical profile of the relative at-risk-of-poverty indicators. Hence, needs-based indicators add to the picture of poverty dynamics by reflecting changes in purchasing power rather than relative income changes in the population.
6. All age groups were subject to increased difficulties in meeting their basic needs during the economic crisis in Lithuania. The effect was immediate and dramatic in the population of the working-age adults and children. The negative effect of the crisis on covering basic needs and on the absolute poverty among the elderly was delayed, reflecting the capacity of the pension system in absorbing the initial negative effects of the crisis.
7. Regional disparities were and remain high taking both relative and absolute poverty measures, as well as when accounting for the cost of the basic needs in Lithuania. The differences between men and women are relatively small for all three indicators.

The share of people with income below the cost of basic needs might be driven up by under-reporting of the shadow income. The latter is known to be high in Lithuania, compared to the EU. At the same time, under-reporting of income might have different effect on the relative at-risk-of-poverty line, depending on how far in the income distribution these unreported incomes are present.

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**MINIMALIŲ VARTOJIMO POREIKIŲ DYDIS IR ABSOLIUTUS SKURDAS LIETUVOJE:
METODIKA IR PRITAIKYMAS****Jekaterina Navickė, Aušra Čižauskaitė, Ugnė Užgalė**

Santrauka. Šiame straipsnyje pristatoma minimalių vartojimo poreikių dydžio apskaičiavimo metodika. Ši yra pritaikoma Lietuvos duomenims, atspindintiems dešimtmetį po įstojimo į ES (2006-2016 m.). Pagrindinės maisto dalies išlaidos sudarytos pagal minimalius mitybos reikalavimus, o kitų poreikių išlaidos yra apskaičiuojamos santykiniais dydžiais, atsižvelgiant į faktinius gyventojų vartojimo įpročius. Išlaidų sumažėjimas papildomiems namų ūkio nariams remiasi ekvivalentine skale, apskaičiuota naudojantis NŪBT duomenimis. Tyrimas parodė, kad minimalių vartojimo poreikių dydis vienam asmeniui Lietuvoje yra artimas santykiniam skurdo rizikos lygiui (esant 60 proc. ekvivalentinių disponuojamų pajamų medianos ribai), tačiau yra didesnis didesniems namų ūkiams. Dalis žmonių, kurių pajamos nesiekia minimalių poreikių dydžio, buvo didesnė už santykinį skurdo rizikos lygį visais analizuotais metais, išskyrus 2016 m. Kita vertus, faktiškai šis lygis galimai yra mažesnis dėl to, kad PGS duomenyse nepakankamai atspindima informacija apie šešėlines pajamas. Minimalių vartojimo poreikių ir absoliutaus skurdo rodikliai rodo anticiklinę dinamiką ekonomikos augimo ir recesijos metu. Vaikai yra labiausiai stokojanti Lietuvos gyventojų grupė kas liečia minimalių vartojimo poreikių patenkinimą. Lietuvoje naudojamas oficialus absoliutaus skurdo rodiklis nepakankamai įvertina namų ūkių, turinčių daugiau nei vieną narį, minimalius vartojimo poreikius.

Reikšminiai žodžiai: minimalūs vartojimo poreikiai, absoliutus skurdas, Lietuva, ekvivalentinė skalė, NŪBT, PGS