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Detailed Description on the Three Dimensions of Deprivation

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ABSZTRAKT: This study introduces a method for measuring standard of living, based on a three-dimensional model. The authors argue that their proposed indicators (and items) can more realistically capture people's inability to afford an adequate way of living than the ones Eurostat uses and recommends. The commonly used deprivation measuring method has a unidimensional perspective and provides only a general overview of those living in deprivation. The authors' multidimensional approach, however, considers not only the well-known aspects of human life but also others, giving a more extensive view of individuals' needs. The calculations are based on the European Union Statistics on Income and Living Conditions database provided by Eurostat and the relevant Turkish database from the Turkish Statistical Office. The decomposite method introduced in the study measures standard of living using three dimensions, economic strain, living conditions, and housing and environmental conditions.

KEYWORDS: poverty, deprivation, multidimensional deprivation

JEL Codes: C40, I32

Introduction

Deprivation is a broader concept than poverty because it includes monetary, social exclusion and living condition aspects that prevent people from pursuing a desired way of living. It is the outcome of an enforced lack of monetary and non-monetary resources. Conceptualizing deprivation is a challenge that all scientists and policymakers face. Deprivation indicators differ from country to country because of the variations in po-

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litical and social environments within and outside the EU (European Union). Contemporary social scientists and researchers approach this topic using 'broader lens', focusing not only on economic but also on living, housing, and environmental conditions. According to the literature, a single deprivation index does not provide enough information on those who lack basic living conditions. By following a multidimensional approach, undoubtedly more deprived people would be identified in the EU. At the European level, the main source for statistical data to measure material deprivation is EU-SILC (Statistics on Income and Living Conditions). The indicators of deprivation for the EU signify the inability to afford some goods considered to be essential to living a decent life. This study introduces a method involving three dimensions and identifies its essential indicators (items) that are based on Sen's (1985) capability approach in which freedom to achieve well-being is critical to ensure a good standard of living, regardless of people's preferences and their capacity to meet living standards. This new improvement of the deprivation definition will hopefully facilitate the conducting of comparability studies internationally. Our work focuses on 11 countries' population and households which cannot meet their basic needs. It includes specific deprivation items rather than just general deprivation measures and additionally provides a brief cross-country comparative analysis using EU-SILC (Eurostat, 2018) and TUIK (Turkish Statistical Office) (2018) datasets.

Review of literature

One of the first historical studies of poverty was written by Booth (1887). He invented the idea of 'poverty line' and divided people of London into those who live 'in poverty' and 'in comfort'. His idea has become a fundamental concept of social sciences, and shed light on poverty measurement. It has also influenced many scientists such as Rowntree (1922) who estimated minimum necessary expenditures and defined the poverty line based on the income required to meet minimum nutritional requirements. Poverty thresholds were developed in the US by Orshanskyin in 1963 and later they were adopted by the Office of Economic Opportunity and other US agencies. In other countries, for example in India, no attempts were made to measure poverty until the late 1970s when the government tried to identify the poor for the first time. The Indian poverty line was drawn based on per capita expenditure required for the minimum daily calorie

intake: 2,400 and 2,100 calories for urban and rural areas, respectively. According to Dantwala (1973), there is no single norm of poverty because households or individuals are deemed to be poor if their income or expenditure is below a specific level. In 2009, the Planning Commission of the Indian government chose the 1973/1974 consumption patterns to define the poverty line. Pradhan and Ravallion (2000) also proposed a consumption-based approach that defines the subjective poverty line without the customary minimum-income factor. It offers a wide range of applications in developing countries where income-related measures are more challenging.

The multidimensional poverty measurements started in the early 1980s when the first studies that analysed poverty and social exclusion using non-financial indicators, were published (Townsend (1979), Mack–Lansley (1985), Callan–Nolan–Whelan (1993).

Townsend (1979) created a multidimensional deprivation index using 60 indicators that reflect on the living conditions and provide information on food, clothing, health, entertainment, household goods, and consumer durables. Of these 60 indicators, he randomly chose 12 and a cut-off point of five out of these 12 to identify deprived people. His index is a simple breakdown of goods and services indicators. Townsend's aim was to identify the income level where deprivation increased enormously or, in other words, where the living conditions were severely constrained. This income level was labelled as the poverty threshold. His study has inspired further research on poverty and social exclusion in Europe. Mack and Lansley (1985) constructed another multidimensional poverty indicator. They differentiated between compulsory and voluntary scarcity and held that deprivation is only present when there is a lack of basic goods or services (compulsory scarcity), while in the other case (voluntary scarcity) the products or services lacking are not essential to an individual or a family. The authors used 35 indicators, selecting 18 to create a deprivation index. They measured deprivation directly, identifying those deprived British people who lacked the goods and services that were included in the 18 indicators.

Callan, Nolan and Whelan's (1993) study aims to deepen the link between income and material living conditions and measure living conditions directly. Starting from a list of 24 non-monetary indicators, the authors used factor analysis to examine the clustering of different conditions,

goods and services, and defined the possible dimensions of material deprivation. According to their multidimensional deprivation criteria, a person can be regarded poor when s/he is deprived of essential goods, services, or living conditions. This method, however, was criticised for not including actual needs and including needs whose specific factors were not associated with the general material deprivation definition. Callan, Nolan and Whelan compared the characteristics of the 'poor' defined by their method with those described by monetary poverty. They found that many individuals who were not classified as financially poor were materially deprived and some who were considered financially poor were not deprived.

Later, the research efforts focused on developing a European multidimensional deprivation index. Building upon the prior work of social scientists and researchers, and using the Social Assistance Council's subgroup of indicators, Eurostat has developed a methodology for creating non-monetary indicators of deprivation. Although these indicators are not intended to cover all areas of social exclusion, they provide information that supplements knowledge acquired through other social exclusion indicators.

Eurostat published two reports on multidimensional material deprivation in 2002 and 2003 and used them as a basis for its present official methodology. Currently, Eurostat publishes material deprivation and severe deprivation statistics based on EU-SILC. Guio's (2005) material deprivation study describes households' poor living conditions, the unavailability of durable goods, delays in payments, and the inability to meet basic material needs as elements of deprivation. Guio et al. (2017) set a new indicator based on 13 items where seven relate to the household and six to the individual. Individual items are collected at the adult level for all persons in a household aged 16 or above to allow for gender- and age-based measurement. The authors used economic difficulties, durable goods, and dwelling as indicator dimensions. Economic difficulties was defined as making ends meet with difficulties, i.e. being unable to pay for a one-week annual holiday away from home; delays in mortgage, rent, water and electricity payments; paying for shopping in instalments; being unable to afford meat, chicken or fish (or the vegetarian equivalent) at least every other day and being unable to maintain the dwelling at an adequate temperature during cold months. Durable goods stands for the ability to possess the following durable items: a colour TV, telephone and a

car/van for personal use. Their dwelling dimension refers to poor amenities and indicates the existence of leaks; damp walls, floors, ceilings or foundations; rotten floors, window or door frames; shortage of natural light in a room, bathroom or shower in the dwelling, toilet with running water inside the dwelling for the household's exclusive use.

Later, Guio's methodology was criticized by researchers. According to Bruder (2014), additional indices should also be used in the measurement of material deprivation. She argued that some items of Eurostat (such as 'having a mobile phone' that should not be considered a sign of deprivation because almost all people have a cell phone in Europe) should be replaced. Boarini and d'Ercole (2006) studied data from OECD (Organisation for Economic Co-operation and Development) countries to draw up suitable survey questions to be used in comparative analyses. The paper proposes a classification of the broad notion of deprivation into its objective and subjective dimensions. The authors suggest that the scope of deprivation should be determined based on survey questionnaires to identify those who need targeted social policies.

Bruder, Obádovics and Ünal (2019) conducted further analyses for non-European countries. They studied Turkish poverty to find potential causes of deprivation because Turkey has one of the highest rates of material deprivation (28.7%) based on 2017 European measures. The authors used household socioeconomic factors in their logistic regression analyses. In 2007, Hungarian scientist Hajdu created a statistical multidimensional measurement method to estimate the relations between poverty, deprivation, and social exclusion without differentiating between society's poor and non-poor.

In recent literature, researchers have been discussing existing poverty measures. Goedemé et al. (2017) pointed out that some of those who were not identified as poor by the relative income poverty method (60% of the median income), still faced multidimensional deprivation. Moreover, there are conceptual problems regarding data-driven designs. Deprivation items are generally constructed based on the 'available data technique'. Consequently, there are significant limitations in measuring scarcity. The existing methods are unidimensional and do not evaluate the different types of deprivation (Bedük, 2018). Therefore, one of the advantages of the measures proposed in this study is that they identify deprived people multidimensionally.

The multidimensional poverty index continues to be adopted by many scientists. Alkire et al. (2015) created an MPI (multidimensional poverty index) to study African countries based on three dimensions, education, health, and basic needs. Their MPI was adopted by the United Nations for use in reporting multidimensional poverty.

To conclude, the definition of deprivation must extend beyond income-related indicators (Saunders, 2011). The well-being of a population cannot be determined simply from monetary indicators. Non-monetary conditions such as access to material needs and literacy also contribute to it (Bourguignon–Chakravarty, 2009). Using discrete datasets, several well-known scholars have proposed new multidimensional poverty indicators to compare them with the existing material deprivation index of the EU.

The general concern of these researchers is that deprivation cannot be categorized by using only one measure (Saunders–Wong–Wong, 2014), Nolan–Whelan (2010). In 2013, Bossert, Chakravarty and D'Ambrosio launched a study to compare income poverty and material deprivation in the EU. They found that income poverty results did not reflect the actual standard of living, both income poverty and material deprivation indicators should be adopted to define poverty.

The indicators that are commonly used in the EU allow international comparisons of various periods. Such comparisons do not require that basic indicators should be the same in all countries. It is enough that the aggregate key indicators (even if they are different in the various countries) provide the same information. However, if we want to use harmonized data across Europe, the solution would be to have the same key indicators in all countries.

Data and methods

This section details the methods used to define standard of living and specify its dimensions. A 'critical lens' is applied to the current standard processes in Europe which are considered normative in academic and social policy settings. After reviewing the literature, first we examine three deprivation dimensions and their indicators (items) to develop our methodology. Then, we add further items to them and make calculations for 11 countries, based on our deprivation definition. Finally, we compare the results.

The study is based on two datasets that are derived from EU-SILC and cover the years 2005 to 2017. The first one is provided by Eurostat and the second (Turkish dataset) comes from TUIK. Due to space limitation and the fact that the yearly cross-country comparisons would facilitate more the understanding of deprivation, only four years (2005, 2009, 2013, 2017) were chosen to be studied. The aim of this study is to present measurement instead of an in-depth trend analysis. At the time of writing this paper, the latest available data were for 2017. We selected 10 Eastern-European countries to study based on their economic and social development: they all have a similar integration path and joined the EU in 2004 or later. Despite its negotiations for accession to the EU have been terminated, Turkey was also selected since these negotiations did begin the harmonization of the European datasets, which resulted in the availability of the EU-SILC database in Turkey. Another reason for including these 11 countries in the study is the large gap between their yearly deprivation figures. Eurostat has two deprivation indexes; first is material deprivation index is defined as an individual who cannot afford at least three items out of nine. And second is severe material deprivation index is defined as an individual who cannot afford more than three items out of nine. However, our deprivation calculation is based on three dimensions: economic strain, living conditions, and housing and environmental conditions. In the following subsections, each dimension is described based on the main concepts, methodology and interpretation of deprivation.

Economic Strain

In general, there are large cross-country differences based on economic-strain-related items. This dimension is comprised of four indicators. They refer to the percentage of people in the total population who are in the state of inability 1. to pay for a week's annual holiday away from home; 2. to afford a meal with meat, chicken, or fish (or the vegetarian equivalent) every two days; 3. to face unexpected financial expenses, or 4. to pay their debts (mortgages or leases, invoices or lease purchases, and utilities). The value of this last indicator is calculated on the basis of the following question of the EU-SILC: 'Has your household been in arrears in the last 12 months, i.e. has been unable to pay rent for accommodation, mortgage payments, utility bills (such as for heating, electricity, gas, water, etc.), hire purchase instalments, or other loan payments)?' An additional item

(Answer 2) was added to the EU-SILC answers to capture the subtle difference between the inability to pay a debt for only one month or for more than one month:

1. Yes (once);
2. Yes (twice or more);
3. No;
4. There is no such payment.

In this example, those respondents can be considered deprived who choose the second option (Yes (twice, or more)). This answer was selected because those who were unable to pay their rent for accommodation, mortgage payments, utility bills, etc. only once in the 12 months preceding the survey, would not be considered deprived. For instance; an individual might have considerable excuses to skip just one-month purchased instalments, rent and other loan payments. Continuity of inability to pay is the matter of deprivation. Regarding the other three dimensions, the worst-case scenario was considered, too.

These four indicators refer to the lack of the minimally acceptable financial stability. The items in this dimension are relatively similar. Our economic strain formula is based on that of the Eurostat, where they defined a person deprived, if he/she is living in a household where they face one third (33%), i.e. three out of the nine listed financial difficulties (items),

$$D_{Eco}\,(d_{holiday} + d_{meat} + d_{unexpected} + d_{mortgage}) > 2,$$

where $d_{holiday}$ is the inability to pay for a one-week annual holiday away from home, d_{meat} is the unaffordability a meal with meat, chicken, fish (or the vegetarian equivalent) every second day, $d_{unexpected}$ is the inability to face unexpected financial expenses, and $d_{mortgage}$ is being in arrears on mortgage or rental payments, utility bills, and other loan payments. Table 1 shows the deprivation rate for economic strain in 11 countries, and its change over time.

Table 1 **Percentage of the population facing economic strain in the selected countries**

Country	2005	2009	2013	2017
BG	–	71.5	79.2	70.0
CZ	56.5	50.3	52.7	35.5
EE	70.0	56.8	59.6	45.8
HU	77.1	82.5	82.4	52.6
LT	80.5	62.1	66.0	59.7
LV	86.4	81.2	78.4	67.8
PL	79.3	68.9	68.7	51.3
RO	–	79.7	78.8	73.8
SL	53.8	52.4	56.4	46.0
SK	77.2	64.0	59.7	53.3
TR	92.3	99.4	81.1	63.9

Note: BG: Bulgaria; CZ: Czech Republic; EE: Estonia; HU: Hungary; LT: Lithuania; LV: Latvia; PL: Poland; RO: Romania; SL: Slovenia; SK: Slovakia; TR: Turkey; all data are weighted percentages; those with missing data in any year are excluded.

Source: SILC (Eurostat) and TUIK data

From 2005 to 2017, one of the most significant changes in people's economic conditions was seen in Turkey, where economic deprivation decreased from 92.3% to 63.9%. In 2017, the highest share of the population faced financial instability in Romania (73.8%) and Bulgaria (70.0%), where individuals could not afford at least two examined items out of the four. Surprisingly, 99.4% of the Turkish population had to cope with financial difficulties in 2009. As well as due to the high number of demands for real estate services affected relatively increase in real estate rental prices. Additionally, the livestock market faced decreasing in cattle numbers, sheep, and goat while growth in domestic meat demand. This is ended up with meat crisis in the beginning of 2009. Meat prices increased 50% in 2009 compared to 2008 (USDA). As a result, percentage of the population who cannot afford every second day meat, chicken and fish were significantly high.

Table 2 presents the 2017 deprivation rate for economic strain by item in the 11 countries.

Table 2 **Percentage of the population facing economic strain in the selected countries, by item, 2017**

Country	dholiday	dmeat	dunexpected	dmortgage
BG	53.4	32.3	53.9	32.5
CZ	25.1	7.4	27.4	2.8
EE	28.6	5.5	36.2	6.9
HU	47.8	16.3	30.3	14.3
LT	42.7	16.6	50.9	7.9
LV	39.1	13.6	59.9	13.2
PL	39.6	7.1	35.4	10.5
RO	65.2	19.3	52.0	16.9
SL	24.9	6.9	37.5	14.3
SK	42.9	14.8	34.1	6.9
TR	59.1	32.8	30.4	25.7

Note: BG: Bulgaria; CZ: Czech Republic; EE: Estonia; HU: Hungary; LT: Lithuania; LV: Latvia; PL: Poland; RO: Romania; SL: Slovenia; SK: Slovakia; TR: Turkey; all data are weighted percentages; those with missing data in any year are excluded.

Source: SILC (Eurostat) and TUIK data

In each selected country, at least a quarter of the population was unable to spend a one-week annual holiday away from home; the highest rates were observed in Romania (65.2%) and Turkey (59.1%), just as for those (in Turkey 32.8%, in Bulgaria 32.3%) who could not bear the costs of eating meat, chicken, or fish (or the vegetarian equivalent) every other day. The share of people who could not afford unexpected payments was highest in Latvia (59.9%) and Bulgaria (53.9%), which means that more than half of the population in these countries did not have enough savings to meet unexpected bills. The percentage of individuals who could not pay their mortgages, rents, utility bills, and other payments during the 12 months preceding the survey was highest in Bulgaria (32.5%) and Turkey (25.7%) in 2017.

Living Conditions

Living conditions can be measured in a variety of ways through either money metric or basic needs methods. The basic needs method considers whether an individual's expenditure falls below a 'minimum' or 'cannot afford' level, as shown below. Living-condition-related deprivation refers to the lack of goods and amenities needed to live a comfortable life. This

can be translated to an estimate of the amount of money required to maintain a minimum standard of living, although we do not entertain this idea in this study.

In terms of this dimension, the satisfaction of basic needs refers to the ability to keep one's home warm and the capacity to afford basic goods (having a washing machine and other home necessities) that are – while not essential for physical survival – critical for enjoying a decent quality of life. The availability of consumer durables (a car or a computer) is essential to perform everyday life activities. Living conditions also relate to the interior characteristics of the dwelling (availability of an indoor flushing toilet or a shower/bathtub).

The EU-SILC with its standardised questions across countries allows researchers and scientists to make international comparisons. However, determining who is deprived depends on the year from which the dataset being analysed is taken. For example, the 2005 EU-SILC dataset includes data based on the Yes/No answers given to the questions about living conditions (dwelling problems or having a car, a washing machine, a shower/bathtub in the dwelling), which has limitations when measuring real deprivation. This is particularly important because those who answered 'No' in 2005 were not provided with other options. The survey questionnaire was improved in later EU-SILCs and in consequence the number of those who were categorized as deprived has decreased. In 2017, the following answers could be given, for example, to the question 'Is there a shower unit or a bathtub in your dwelling?':

1. Yes, for sole use of the household;
2. Yes, shared;
3. No.

Those were considered at the bottom end who chose the second or the third option (i.e. they did not have a shower unit/bathtub, or they had one but it was shared).

This dimension has been the subject of criticism because the EU-SILC questions do not provide information on the availability of the dwelling or whether it is shared with other individuals who are not household member in the apartment complex.

Our living conditions formula is based on the Eurostat method (one third of nine items (33%)) and includes the following items:

$$D_{Living}\,(d_{warm} + d_{comp} + d_{car} + d_{tv} + d_{washing} + d_{bath} + d_{toilet}) > 2,$$

where d_{warm} is to keep the household's home adequately warm, d_{comp} is having a computer, d_{car} is having a car, $d_{washing}$ is having a washing machine, d_{bath} is having a shower unit or a bathtub in the dwelling, d_{toilet} is having an indoor flushing toilet for the sole use of the household, and d_{tv} is having a colour TV. Those who cannot afford at least two out of the seven items are considered deprived. (*See Table 3.*)

Table 3 **Percentage of the population facing poor living conditions in the selected countries**

Country	2005	2009	2013	2017
BG	–	49.1	38.7	33.7
CZ	11.0	6.1	4.8	3.1
EE	31.1	15.8	11.7	8.9
HU	19.0	–	14.6	9.8
LT	42.4	27.7	23.1	–
LV	47.9	29.5	27.4	17.9
PL	29.8	14.4	8.8	6.4
RO	–	53.4	42.7	33.8
SL	3.6	3.1	3.0	2.9
SK	20.0	8.9	6.7	5.5
TR	53.3	44.8	33.1	20.0

Note: BG: Bulgaria; CZ: Czech Republic; EE: Estonia; HU: Hungary; LT: Lithuania; LV: Latvia; PL: Poland; RO: Romania; SL: Slovenia; SK: Slovakia; TR: Turkey; all data are weighted percentages; those with missing data in any year are excluded.

Source: SILC (Eurostat) and TUIK data

According to *Table* 3, living condition problems have decreased over time in the 11 countries. However, there are countries, such as Romania, Bulgaria, and Turkey that have not made sufficient progress in this respect as 33.8%, 33.7% and 20.0% of their populations had inadequate living conditions in 2017, respectively. Meanwhile, other countries have shown notable improvements. For example, 29.8% of the Polish population was deprived for this dimension in 2005 but the figure has remarkably fallen (6.4 %) by 2017. Decrease in deprivation was also detected in several other countries including Latvia (from 47.9% to 17.9%), Estonia (from 31.1% to 8.9%), and Slovakia (from 20.0% to 5.5%). Table 4 presents the proportion of people in the countries' total populations that were at risk of being deprived of various living conditions items in 2017.

Table 4 **Percentage of the population facing poor living conditions in the selected countries, by item, 2017**

Country	d_{warm}	d_{tv}	$d_{washing}$	d_{car}	d_{bath}	d_{toilet}	$d_{computer}$
BG	37.1	1.6	8.1	20.2	20.1	26.6	13.7
CZ	3.3	0.1	0.2	7.3	0.6	0.7	2.7
EE	3.2	0.3	1.1	11.0	9.1	7.4	3.2
HU	6.8	0.6	0.7	19.1	3.5	3.9	8.1
LT	29.4	–	–	10.2	13.0	13.5	6.2
LV	9.9	0.9	3.6	18.5	13.4	12.5	7.8
PL	6.5	0.4	0.5	7.3	4.3	3.7	3.1
RO	11.3	0.9	7.8	28.9	27.6	29.5	14.0
SL	4.2	0.4	0.2	4.0	0.6	0.6	3.6
SK	4.1	0.2	0.6	10.9	1.9	2.7	4.5
TR	19.4	13.7	0.4	0.4	0.9	1.3	4.3

Note: BG: Bulgaria; CZ: Czech Republic; EE: Estonia; HU: Hungary; LT: Lithuania; LV: Latvia; PL: Poland; RO: Romania; SL: Slovenia; SK: Slovakia; TR: Turkey; all data are weighted percentages; those with missing data in any year are excluded.

Source: SILC (Eurostat) and TUIK data

Among the Baltic countries, the best living conditions were seen in Estonia, regarding all items except for d_{car}. In 2017, the highest rates of those who could not keep their homes adequately warm, characterized Bulgaria (37.1%), Lithuania (29.4%), and Turkey (19.4%). Of the selected countries, Bulgaria was in the worst position in terms of ability to afford basic items: 20.2% of its population could not afford a car for personal use, 20.1% did not have a shower or a bathtub in their homes, and 26.6% did not have a toilet.

Housing and environmental conditions

The housing and environmental conditions dimension aims to measure 'quality and affordability' of individuals' housing. Items such as having a leaking roof, damp walls, floors and foundations, rot in the window frames or floor, as well as problems with the dwelling (having rooms which are too dark or do not have enough light) show an overall picture of housing conditions and the problems households have to cope with. This dimension also focuses on the 'quality of life' of households with respect to environmental conditions such as crime, noise, and pollution in the neighbourhood. Crime refers to the percentage of the population who perceived crime, violence or vandalism in the area where they live. Noise

and pollution refer to the percentage of the respondents declaring too much noise and pollution in their dwelling from neighbourhood businesses and industries or other environmental problems caused by traffic or industry.

In the EU-SILC questionnaire, respondents may choose from two answers regarding housing and environmental items. A Yes/No answer can be given, for example, to the following question: 'Do you have any of the following problems related to the place where you live: pollution, grime or other environmental problems in the local area such as smoke, dust, unpleasant smells or polluted water?'

In this study, housing and environmental deprivation is determined by five indicators (items) included in the following formula. The formula is based on the Eurostat methodology (one third of nine items (33%)), according to which an individual is considered deprived when s/he faces difficulties in two out of the five items:

$$D_{Housing}\,(d_{dark} + d_{poll} + d_{leak} + d_{crime} + d_{noise}) > 2,$$

where d_{dark} denotes that the dwelling is too dark or does not have enough light, d_{poll} refers to pollution, grime, or other environment problems, d_{leak} means leaking roof, damp walls, floors and foundation, or rot in window frames or floor, d_{crime} stands for crime, violence or vandalism in the area, and d_{noise} is noise in the dwelling from neighbourhood businesses and industries. *Table 5* presents the percentage of the population deprived of decent housing and environmental conditions in the countries studied.

A significant change (improving housing and environmental conditions) was seen in most countries from 2005 to 2017. In 2005, the biggest problems were reported in Turkey (49.1%) and Latvia (37.3%) but the proportion of the population living in poor housing and environmental conditions in these two countries has decreased by 2017 (to 28.0% in the former country and to 19.8% in the latter). (The Hungarian figures have changed from 26.3% in 2005 to 16.6% in 2017.)

Table 5 **Percentage of the population facing poor housing and environmental conditions in the selected countries**

Country	2005	2009	2013	2017
BG	–	26.4	17.8	17.9
CZ	24.1	20.9	15.6	11.7
EE	27.4	17.9	12.8	10.1
HU	26.3	15.8	20.6	16.6
LT	23.7	18.1	16.0	14.6
LV	37.3	32.6	22.5	19.8
PL	25.9	16.3	12.5	12.0
RO	–	31.7	23.2	16.7
SL	21.8	25.8	17.3	16.1
SK	18.2	20.4	12.9	10.2
TR	49.1	38.3	32.0	28.0

Note: BG: Bulgaria; CZ: Czech Republic; EE: Estonia; HU: Hungary; LT: Lithuania; LV: Latvia; PL: Poland; RO: Romania; SL: Slovenia; SK: Slovakia; TR: Turkey; all data are weighted percentages; those with missing data in any year are excluded.

Source: Here and in the following tables, SILC (Eurostat) and TUIK data

Table 6 **Percentage of the population facing poor housing and environmental conditions in the selected countries, by item, 2017**

Country	d_{dark}	d_{poll}	$d_{leaking}$	d_{crime}	d_{noise}
BG	6.4	14.4	12.3	24.0	9.7
CZ	3.0	11.4	7.7	9.1	13.7
EE	4.3	8.6	14.0	7.3	8.3
HU	7.9	12.3	23.9	6.8	10.8
LT	5.9	14.7	15.2	8.0	12.7
LV	8.8	18.5	22.9	7.9	14.4
PL	4.6	12.6	12.0	5.6	12.8
RO	4.3	14.1	10.5	10.8	18.9
SL	4.5	16.8	22.5	8.0	13.7
SK	2.8	10.5	6.5	6.1	12.7
TR	18.4	22.3	35.7	11.0	15.3

Note: BG: Bulgaria; CZ: Czech Republic; EE: Estonia; HU: Hungary; LT: Lithuania; LV: Latvia; PL: Poland; RO: Romania; SL: Slovenia; SK: Slovakia; TR: Turkey; all data are weighted percentages; those with missing data in any year are excluded.

Source: SILC (Eurostat) and TUIK data

According to Table 6, in 2017 18.4% of people in Turkey lived in dwellings that were too dark or did not have enough light, and 15.3% perceived noise in their homes from neighbourhood businesses and industries. Surprisingly, 35.7% lived in dwellings having problems with leaking, which is the highest rate among the selected countries. Additionally, Turkey is the most polluted country among the selected countries.

Conclusions

In this study, a multidimensional approach was followed to measure deprivation based on proportions of people reported various forms of deprivation. We have increased the number of deprivation dimensions from one to three (economic strain, living conditions, and housing and environmental conditions) and examined 11 countries' EU-SILC data by dimension. One of them is economic strain that was faced by many in the study period. The results of our international comparison indicate that in the 10 selected European countries and Turkey the most problematic economic strain indicator was 'going on a one-week annual holiday away from home'. Whether unaffordability to go on a one-week annual holiday is a sign of deprivation or not is still under debate. Nevertheless, the official Eurostat material deprivation measure does consider it as an indicator of deprivation. In terms of living conditions, deprivation is defined as a lack of basic goods and amenities required to have an acceptable standard of living. According to the results shown above, in 2005 a tragic share of the countries' population was considered deprived in this regard; the figures, however, have improved significantly over the years. Yet, even today, there are people who lack basic amenities or do not have the capacity to keep their homes warm and their proportion in each country depends on the country's development. Thus, for example, the percentage of those who do not have a bath in their home is still high in Romania, Bulgaria, Latvia, and Lithuania. We considered also the dimension of housing and environmental conditions as a fundamental life-standard factor. Conceptually, this third dimension includes only housing conditions but we have also some crime- and pollution-related environmental factors (i.e. the external characteristics of people's dwellings) taken into account. In most countries, it was found that housing and environmental conditions were less important for people than the other two dimensions, because a smaller

proportion of the population reported being deprived in this respect. However, the opposite was true for Turkey, where people had significant housing and environmental problems in the years examined.

This study provides evidence on deprivation and has implications for both methodology and policy. It attempts to broaden the scope of deprivation by identifying survey questions that may serve as a base for a cross-country comparative assessment. However, our analysis has limitations in several aspects. Although it is based on micro-level statistics, it did not deal with the multiple overlaps between financial and non-financial deprivation. We found that each deprivation item showed remarkable changes in the countries, and the relations between the dimensions were country-specific. Those who are deprived in terms of one dimension, are likely to be deprived for the second or third dimension, too. Thus, for example, Bulgaria and Turkey had a high proportion of people who could not afford to go on a one-week annual holiday away from home and also had many who were unable to keep their homes adequately heated and had leaking roofs in the study period. This draws attention to the fundamental importance of links between dimensions.

Although our method facilitates cross-country comparisons and the deeper understanding of deprivation, the multidimensional approach of this complex problem remains limited. In future research, we intend to use multivariate statistical models such as cluster analysis to compare the selected European countries with Turkey in terms of the three deprivation dimensions. In addition to the multidimensional model, we are also planning the use of a binary logistic regression model to observe the potential causes of deprivation, focusing on Turkey. Various statistical tools and methods are available for measuring deprivation, but owing to its versatility and country-specificity it is an extremely difficult task. A multidimensional measure may assist in overcoming the measurement difficulties arising from the differences in social problems between various countries.

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References

Alkire, S. – Foster, J. – Seth, S. – Santos, M. E. – Roche, J. M. – Ballon, P. (2015): Multidimensional Poverty Measurement and Analysis. Oxford University Press, Oxford.

Bedük, S. (2018): Understanding material deprivation for 25 EU countries: risk and level perspectives, and distinctiveness of zeros, European Sociological Review, Vol. 34. No. 2, pp. 121–137. https://doi.org/10.1093/esr/jcx089

Boarini, R. – d'Ercole, M. M. (2006): Measures of Material Deprivation in OECD Countries, OECD Social, Employment and Migration Working Papers. No. 37, OECD Publishing, Paris.

Booth, C. (1892): Pauperism; a Picture and the Endowment of Old Age – An Argument, Macmillan, London.

Bourguignon, F. – Chakravarty, S. R. (2009): Multidimensional poverty orderings: theory and applications. In: Basu, K. – Kanbur, R. (eds.), Arguments for a Better World: Essays in Honor of Amartya Sen. Ethics, Welfare, and Measurement. Vol. I. Oxford University Press. pp. 337–362, Oxford

Bossert, W. – Chakravarty, S. R. – D'Ambrosio, C. (2013): Multidimensional poverty and material deprivation with discrete data. Review of Income and Wealth, Vol. 59. No. 1, pp. 29–43. https://doi.org/10.1111/j.1475-4991.2012.00519.x

Bruder, E. (2014): Kik a szegények Európában? A szegénység mérésének alternatívája. Területi Statisztika, Vol. 54. No. 2. pp. 152–171.

Bruder, E. – Obádovics, Cs. – Ünal H. (2019): Determinants of deprivation in Turkey, a logistic regression analysis. Studia Mundi – Economica, Vol. 6. No. 2. pp. 102–112.

Callan, T. – Nolan, B. – Whelan, C. (1993): Deprivation and the measurement of poverty. Journal of Social Policy, Vol. 22. No. 2. pp. 141–172.

Dantwala, M. L. (1973): Poverty in India: Then and Now: 1870–1970. Macmillan. Delhi.

Goedemé, T. – Penne, T. – Hufkens, T. – Karakitsios, A. – Bernát, A. – Simonovits, B. – Carrillo, E. – Kanavitsa, E. – Cussó-Parcerisas, I. – Romaní, J. – Mäkinen, L. – Matsaganis, M. – Arlotti, M. – Kopasz, M. – Szivós, P. – Ritakallio, V.-M. – Kazepov, Y. – Van den, B. – Berenice, K. – Berenice, S. (2017): What Does It Mean to Live on the Poverty Threshold? Lessons from Reference Budgets. Working Paper. No. 17.07, University of Antwerp, Herman Deleeck Centre for Social Policy, Antwerp.

Guio, A.-C. (2005): Material deprivation in the EU, Statistics in Focus, No. 21, Office for Official Publications of the European Communities. Luxembourg.

Guio, A.-C. – Gordon, D. – Najera, H. – Pomati, M. (2017): Revising the EU Material Deprivation Variables, Publications Office of the European Union, Luxembourg. https://ec.europa.eu/eurostat/documents/3888793/8309969/KS-TC-17-002-EN-N.pdf/da1887c3-a6b1-462e-bafb-e4f0b3fd3ab8

Eurostat (2018): European Union Statistics on Income and Living Conditions Survey.

Eurostat (2002): European Social Statistics. Income, Poverty and Social Exclusion: 2nd report.

Eurostat (2003): European Commission. Joint Report on Social Inclusion. Brussels

Hajdu, O. (2007): Poverty, deprivation, exclusion: a structural equation modelling approach. Hungarian Statistical Review, Vol. 87. Special number 13. pp. 90–102.

Mack, J. – Lansley, S. (1985): Poor Britain. George Allen & Unwin. London.

Nolan, B. – Whelan, C. T. (2010): Using non-monetary deprivation indicators to analyze poverty and social exclusion: lessons from Europe?. Journal of Policy Analysis and Management, Vol. 29. No. 2. pp. 305–325. https://doi.org/10.1002/pam.20493

Orshansky, M. (1963): Children of the poor. Social Security Bulletin, Vol. 26. No, 7. pp. 3–13.

Pradhan, P. – Ravallion, M. (2000): Measuring poverty using qualitative perceptions of consumption adequacy. The Review of Economics and Statistics. Vol. 82. No. 3. pp. 462–471. https://doi.org/10.1162/003465300558821

Rowntree, B. S. (1922): Poverty: A Study of Town Life. Longmans, Green and Co, London.

Saunders, P. (2011): Down and Out: Poverty and Exclusion in Australia. Policy Press, Bristol.

Saunders, P. Wong, H. Wong, W. P. (2014): Deprivation and poverty in Hong Kong. Social Policy & Administration. Vol. 48. No. 5. pp. 556-575. https://doi.org/10.1111/spol.12042

Sen, A. (1985): Commodities and Capabilities, North-Holland, Amsterdam.

Townsend, P. (1979): Poverty in the United Kingdom, 'Penguin', Harmondsworth.

Turkish Statistical Office (2018): Income and Living Conditions Survey Micro Data Set.

Us Foreign Agricultural Service (2010): Turkey Livestock Products Report, Turkey, Anakara.