CrossMark

Subjective perception versus objective indicators of overcrowding and housing affordability

Petr Sunega[1] · **Martin Lux**[1]

Abstract This article seeks to evaluate indicators of overcrowding and housing affordability used by Eurostat and to propose alternatives that may better reflect the specific contexts of individual EU states while preserving the possibility of valuable international comparison. The alternatives are assessed on the basis of the distance between the results produced by objective measures and the subjective evaluations of the problem reported by households, using one and the same data source: EU-SILC. The results show that alternative threshold definitions may decrease the current discrepancy between subjective perceptions and objective indicators of housing affordability and overcrowding. They also have the potential to lead to more effective targeting of public subsidies so that they are directed towards housing programmes that not only have an objective goal but also a subjectively identified legitimacy.

Keywords Housing · Indicators · Overcrowding · Housing affordability

1 Introduction

This article seeks to make an evaluation of the indicators of housing affordability and overcrowding used by Eurostat, and to propose alternatives that might better reflect the specific contexts of individual EU Member States while ensuring their objective international comparability. Our attempt to formulate more contextual methodology for calculating housing indicators is based on a comparison of the subjective perception of selected housing issues and their objective measurement. There has long been a gap between the

✉ Petr Sunega
petr.sunega@soc.cas.cz

Martin Lux
martin.lux@soc.cas.cz

1 Institute of Sociology, Czech Academy of Sciences, Jilska 1, 110 00 Prague 1, Czech Republic

subjective perception of overcrowding and housing affordability in different EU Member States and their objective measurement by Eurostat indicators.

Overcrowding is commonly measured as the number of rooms in relation to household size. One of the most commonly cited definitions of housing affordability is the following: 'Affordability is concerned with securing some given standard of housing (or different standards) at a price or rent which does not impose, in the eyes of some third party (usually government), an unreasonable burden on household incomes' (Maclennan and Williams 1990, p. 9). There are different methodological approaches that can be used to calculate objective indicators of housing affordability. Garnett (2000), for example, defines the indicator and the residual method. The indicator method measures the housing expenses to income ratio, which means the share of household income that goes to housing expenditures. The residual method is based on calculating residual income, which is total household income minus expenditures on housing. Abeysinghe and Gu (2011, p. 1875) distinguished between long-term and short-term affordability: 'Households with long-term affordability problems are those who, in their lifetime, are unlikely to have sufficient income to pay for a house. Short-term affordability problems concern households who may have lifetime incomes sufficient for a house purchase, but face short-term restrictions in financing it.' Haffner and Heylen (2011, p. 607) argue that these 'two concepts of affordability should be used together in order to outline a more comprehensive picture of affordability.' Despite of large literature on objective measuring of housing affordability published during the last decade, there are, however, almost no studies comparing objective and subjective affordability measures (partial exception being Li 2014).

For objective indicators, normative thresholds are used to identify households that may be at risk of housing unaffordability and overcrowding—for example, the maximum housing expenses ratio, minimal residual income, or maximum number of members per given dwelling size. This article aims to show that the thresholds that Eurostat uses do not adequately reflect cultural and institutional differences between countries: the resulting country rankings in international comparisons are inconsistent with rankings of the same countries made according to the subjective evaluations of housing affordability and overcrowding that citizens give themselves.

This article therefore compares the appropriateness of current thresholds with alternative versions. The method for calculating indicators of housing affordability and overcrowding remain the same, and only the way the thresholds are determined is altered. The criterion for evaluating the appropriateness of alternatives is the difference between the objectively measured results and the subjective perception of the problem by respondent households, while using one and the same data source: EU-SILC. A methodological difference to Eurostat is that households instead of individuals are used as the units of analysis (see below).

OECD (2013, p. 36) states that 'measures of subjective well-being can bring additional information not captured by standard objective measures; can help better understand the drivers of subjective well-being; can support policy evaluation and cost-benefit analysis; and can help in identifying potential policy problems'. Significant disparities between objective and subjective indicators that cannot be explained by the money illusion or human psychology may result in the ineffective allocation of public resources and in some countries (e.g. the UK) weakening trust in official statistics (Stiglitz et al. 2009). Constructing objective indicators to take into account the subjective perception of housing problems may provide a more accurate way of measuring housing needs in a way that reflects different institutional contexts between countries and may enable the more

effective targeting of public resources, including ERDF allocations, for use in programmes that not only have an objective goal but also a subjectively identified legitimacy.

The next section contains a brief discussion of current arguments in scientific discourse on the relationship between subjective and objective indicators. This is followed by a section describing the methods and data used in this analysis and how the alternative thresholds are formulated. The fourth section presents findings from an analysis of housing affordability and overcrowding. The conclusions discuss our main findings.

2 Review of previous research

Objective social indicators are statistics which describe 'the environments within which people live and work', subjective social indicators are 'intended to describe the ways people perceive and evaluate conditions existing around them' (Lee and Marans 1978, p. 47). Stiglitz et al. (2009, p. 16) have highlighted the relevance of both objective and subjective indicators of well-being: 'Research has shown that it is possible to collect meaningful and reliable data on subjective as well as objective well-being.' Governments in some countries (France, the UK, Germany) and international organisations (OECD, UN) are thus increasingly turning their attention to concepts that measure 'living conditions' or 'quality of life' using subjective indicators (e.g. Randall et al. 2014; OECD 2013). There was a boom in empirical research on subjective well-being that responded to the so-called Easterlin paradox, which refers to the finding that within one country wealthier people have a better sense of well-being than poorer people, but this is not true of the difference between wealthier and poorer countries (Easterlin 1995). Although this paradox has since been challenged by a number of empirical studies (e.g. Di Tella et al. 2003; Stevenson and Wolfers 2008; Helliwell 2003; Alesina et al. 2004), it served as an important catalyser for research on the relationship between objective and subjective factors of 'quality of life'.

Hayo and Seifert (2003) studied the trend in subjective economic well-being in selected Eastern European countries between 1991 and 1995 and they argue that 'policy makers should note, especially in times of economic turbulence, that objective and subjective evaluations of economic well-being can differ considerably, and it is prudent to look at both before making a decision' (Hayo and Seifert 2003, p. 346). Kahneman and Krueger (2006) note that a subjective evaluation of well-being is an important supplement to traditional welfare analysis: for example they argue that this combined approach itself suggests that those who seek to maximise social well-being ought to focus on policies designed to increase social contacts rather than policies directed at increasing consumption opportunities.

Liao (2009) cites two theories relevant for development of indicators: the needs theory and the comparison theory. The needs theory, based on Maslow's hierarchy of basic human needs, presumes that the greater the degree to which basic human needs are satisfied in a given society, the better the subjective evaluation of quality of life will be in that society. This theory fails to explain why the subjective evaluation of quality of life in less economically advanced societies is not necessarily lower than in economically more advanced societies (Lewis and Lyo 1986; Schuessler and Fisher 1985). By contrast, the comparison theory assumes that people evaluate their quality of life 'relatively', in relation to some reference group or historical experience, and the degree to which basic needs are satisfied only indirectly influences the subjective evaluation of quality of life. The current method used to measure overcrowding and housing affordability by Eurostat corresponds to the

needs theory; consequently, to propose alternative thresholds for indicators measuring overcrowding and housing affordability we take our inspiration from the comparison theory. This theory is moreover already implicitly present in social indicators used in other areas—for instance, in measures of poverty, where relative rather than universal thresholds are used.

Allardt ([1976](#)) notes some of the reasons why objective indicators are favoured over subjective ones in current research. The main reason, in his view, is the generally shared belief that political decisions cannot be founded solely on the wishes and opinions of the population. Another reason is that subjective indicators are relatively unsteady over time. However, the instability of subjective perception of housing problems has not been subjected to any empirical long-term testing. Večerník ([2012](#)) also indicates that objective and subjective indicators are incompatible with respect to population coverage. Subjective indicators are drawn from studies that are limited in terms of their frequency and sample size. This limitation is also apparent in housing: while objective indicators are surveyed in population censuses or large-scale representative studies, often narrower, quota-based studies of a smaller sample of the population are used to survey subjective evaluations of housing satisfaction. The exception now, however, is the EU-SILC survey, in which subjective opinions on current housing are examined together with objective indicators on a large and representative sample of households. The existence of this unique survey offers an opportunity to at least partly compensate for the aforementioned methodological limitations.

In housing research subjective indicators are occasionally used to supplement objective indicators (Dewilde and De Decker [2014](#)) or as predictors influencing real estate prices (Chasco and Le Gallo [2012](#)). Given that research in other areas of well-being have clearly demonstrated the utility of subjective indicators in international comparisons and policy formation, it is remarkable that housing research has only devoted a marginal amount of attention to formulating an alternative measures of housing affordability and overcrowding that would better correspond to subjective perceptions of the problems.

3 Data and methods

This analysis employs data from the EU-SILC surveys. The objective of this survey is to obtain representative data on income distribution, quality and affordability of housing, the durable goods the household is equipped with, and on the employment, material, and health conditions of adult persons living in the household in 32 European countries (in 2011). The EU-SILC is a representative sample survey (households and individuals were slected using a several-stage random sampling method). In our analysis, we employ cross-sectional data for 2005, 2007, 2009 and 2011.[1]

The housing cost overburden rate is defined by Eurostat as 'the percentage of the population living in households where the total housing costs (net of housing allowances) represent more than 40 % of disposable income (net of housing allowances)'[2] (Eurostat [2014a](#)). For homeowners, total housing costs include: mortgage interest payments (net of

---

[1] We used the following datasets: EUSILC UDB 2005—version 5 of August 2009, EUSILC UDB 2007—version 5 of March 2011, EUSILC UDB 2009—version 6 of March 2014 and EUSILC UDB 2011—version 4 of August 2014. The EU-SILC datasets were made available on the basis of contract no. EU-SILC/2007/16 between the European Commission, Eurostat, and the Institute of Sociology, Czech Academy of Sciences.

[2] 'Net of housing allowance' means that the amount of housing allowance is deducted from both housing cost and disposable household income.

any tax relief), structural insurance, mandatory services and charges (sewage removal, refuse removal, etc.), regular maintenance and repairs, taxes, and the cost of utilities (water, electricity, gas and heating), net of housing allowance.[3] For tenants, they include: rent payments, structural insurance (if paid by the tenants), services and charges (sewage removal, refuse removal, etc., if paid by tenants), taxes on dwelling (if applicable), regular maintenance and repairs and the cost of utilities (water, electricity, gas and heating), net of housing allowance. Disposable income is defined as after tax disposable household income.

Unlike the official Eurostat definition we chose the household as the unit of analysis rather than individual persons. The reason for this is that members of a household share the housing expense burden and decide jointly about their level of housing consumption. Moreover, the well-being of individual household members is significantly affected by shared household characteristics (e.g. marital status, number of household members, presence of dependent children in the households, etc.). The subjective perception of housing affordability and overcrowding are also reported for households, and not for individuals.

Eurostat defines the threshold for the housing expense overburden globally for all countries at 40 % housing expense ratio. Despite of the fact that the differences in housing expense ratio reflect also income inequalities traditionally measured and compared using relative thresholds, Eurostat applies a flat threshold of 40 % of housing expense ratio for assessment of housing affordability. There is also the question of whether a global threshold is not too rigid considering that the average housing expense ratio varies significantly between countries. While the average housing expense ratio in 2011 was just 12 % in Malta, in Denmark it was 36 %. Logically, the share of households with a housing expense ratio above the 40 % threshold will be greater in Denmark than in Malta.

In reference to the comparison theory mentioned in the Introduction (which has already been reflected in indicators of income inequality and poverty), we set the alternative threshold at 167 % of the median[4] housing expense ratio in a given country. This threshold level was inspired by the method used in the EU to define the threshold of income poverty. According to the Eurostat definition, a person is defined as poor if their income is less than 60 % of the median equivalised (converted to a consumption unit) income in the given country. While in the case of the poverty the aim is to identify individuals or households that fall below a certain income threshold, in the case of the housing affordability the objective is by contrast to identify individuals or households whose housing expense ratio is greater than this threshold. Unlike the poverty threshold it was not set below the median but as a certain multiple of the median housing expense ratio. If the poverty threshold is 60 % of the median equivalised income, the threshold for the housing expense ratio is set at the level of inverse value of 60 %, i.e. at 167 % of the median housing expense ratio in the given country. On top of this we tested an alternative setting for a global flat threshold at 35 %. Formally, the housing expense ratio was computed as follows:

---

[3] According to the description of EU-SILC variables the housing allowances are included in total housing cost of homeowners only since 2010. For the preceding years reported in following analysis were therefore housing allowances added to the total housing cost of homeowners, who received housing allowances.

[4] The median rather than the average housing cost ratio was chosen because medians are generally less sensitive to the existence of extreme values. While the median housing cost ratio remained basically unchanged by the methodological adjustment taking households with a negative ratio or a ratio above 100 % into account (see the section devoted to methodology and data), the averages for the housing cost ratio differed significantly before and after the adjustment.

$$HCR = (12 \times HC - HA)/(Y - HA),$$

where HCR is the housing expense ratio, i.e. the share of total housing expenses out of household disposable income in %; HC is total monthly housing expenses; Y is total disposable household income in the income reference year; and HA is housing allowance received by the household in the same period.

From a methodological perspective it was necessary to provide for situations where the housing expense ratio was negative or greater than 100 %. In conformity with Özdemir and Ward (2009) the housing expense ratio was adjusted as follows:

$$HCR = 100 \quad \text{if } (12 \times HC - HA) \geq Y - HA$$
$$HCR = \text{missing} \quad \text{if } Y - HA \leq 0 \quad \text{and} \quad (12 \times HC - HA) > 0$$
$$HCR = 0 \quad \text{if } (12 \times HC - HA) \leq 0$$
$$HCR = \text{missing} \quad \text{if } HC = \text{missing or } Y = \text{missing or } HA = \text{missing}$$

The overcrowding rate is defined by Eurostat as the percentage of the population living in an overcrowded household. A person is considered as living in an overcrowded household if the household does not have at its disposal a minimum number of rooms[5] equal to: one room for the household; one room per couple in the household; one room for each single person aged 18 or more; one room per pair of single people of the same gender between 12 and 17 years of age; one room for each single person between 12 and 17 years of age and not included in the previous category; one room per pair of children under 12 years of age (Eurostat 2014b). As we decided to use a household as a unit of analysis instead of an individual, the overcrowding rate was re-defined as the percentage of households living in an overcrowded dwelling.

As with the housing expense ratio, for the overcrowding threshold we formulated two alternative definitions to the one used by Eurostat. The first (hereinafter the 'simple definition') is a universal one, like the current Eurostat definition, but is much simpler: it deems that a household should have as many rooms as there are members of the household. The second definition (hereinafter the 'national definition') sets the overcrowding threshold relative to the average level of housing usage intensity in individual countries: if the number of persons per room in a given household is greater than 1.5 times the average of this indicator in the given country, the household lives in an overcrowded dwelling.

Both the current and the alternative definitions of thresholds are normative. None of them can be simply considered inappropriate. It would be possible to create dozens of other alternative thresholds. Therefore, the question is: how can we determine which definition is superior to other(s) for the purpose of international comparison? One possible answer is to let people determine the definition by themselves.

Since 2005, respondents of the EU-SILC survey are regularly asked the following question: 'Please think about your total housing costs including mortgage repayment

---

[5] A room is defined as a space in a housing unit that is at least 4 square metres in size, and includes normal bedrooms, dining rooms, living rooms and habitable cellars and attics with a ceiling height of over 2 metres and accessible from inside the unit. Kitchens are not counted unless the cooking facilities are in a room used for other purposes; only exclude it if the space is used only for cooking. Thus, for example, a kitchen-cum-dining room is included as one room in the count of rooms. The following space does not count as rooms: bathrooms, toilets, corridors, utility rooms and lobbies. Verandas, lounges and conservatories count only if they are used year-round. A room used solely for business use is excluded, but is included if shared between private and business use. If the dwelling is shared by more than one household all rooms are counted as belonging to the owner/tenant except those exclusively used by the other households.

(instalment and interest) or rent, insurance and service charges (sewage removal, refuse removal, regular maintenance, repairs and other charges). To what extent are these costs a financial burden to you?' The possible answers are: (a) a heavy burden, (b) a slight burden, and (c) no burden at all. Similarly, in the 2007 EU-SILC respondents were asked about whether they felt they had a shortage of space.

We evaluate to what extent the respondent's subjective perception conforms to objective measurement using both existing and new thresholds. The assumption is that the closer the objective rate is to its subjective assessment, while following logic, purpose and theory of measurement of objective rate, the more appropriate the definition is. The distance between objective and subjective indicators will be measured as a Euclidian distance between the percentage of the population at risk of housing expense overburden (or living in an overcrowded dwelling, respectively) and the percentage of the population perceiving total housing costs (space respectively) to be a problem for the household. Formally:

$$\text{Distance} = \sqrt{\sum_{i=1}^{n} w_i \times (h_1 - h_2)^2},$$

where Distance is Euclidian distance between measures; n is number of countries; w_i are weights for individual countries (i) based on the population size; h_1 is share of households above the threshold for housing expense ratio (or, respectively, living in overcrowded housing) according to the selected definition; and h_2 is share of households perceiving that total housing costs (dwelling space respectively) is a problem for the household.

4 Findings

Figure 1 compares the shares of households that perceive housing costs as a heavy burden (i.e. a subjective indicator) and the shares of households with a housing expense ratio above 40 % (i.e. an objective indicator with Eurostat threshold) in selected European countries in 2011.

The countries in Fig. 1 were selected with a view to the volatility of the median housing expense ratio and to the volatility of the share of households with a ratio above 40 % in 2005, 2007, 2009 and 2011. In other words, the housing expense ratio and the shares of households with a ratio greater than 40 % were examined for all 4 years and the figures were compared for individual countries over time. We then excluded those countries in which there were significant year to year fluctuations in the median ratio and/or share of households with a ratio greater than 40 %. Instability over time was likely caused by a methodological problem in data collection rather than being a reflection of reality.[6] Another reason could be a change in the regulations attached to the housing allowance in the given country or changes in the methodology of the EU-SILC survey. Özdemir and

---

[6] The following countries were excluded from the analysis: Bulgaria (the median housing cost ratio in 2007 was nine percentages point above the ratio in 2009 and the share of households with ratio above the 40 % threshold was almost three times higher in 2007 than in 2009), Germany (the median ratio in 2007 and 2009 was approximately five percentage points higher than in 2005 and 2011, and the share of household with ratio above the 40 % threshold was more 10 percentage points higher in the same years), Croatia (joined the survey in 2011, so nothing can be inferred about the volatility of its ratio), Lithuania (the median ratio in 2007 and 2009 was approximately five percentage points lower in 2005 and 2009 than in the other years, and the same applied for the share of households with ratio above the 40 % threshold), Norway (the median ratio in 2005 was half what it was in the years after that), Romania (the median ratio in 2011 was less than half what it was in 2007 and 2009) and Slovakia (in 2007 the median ratio was seven percentage points higher than in 2011).
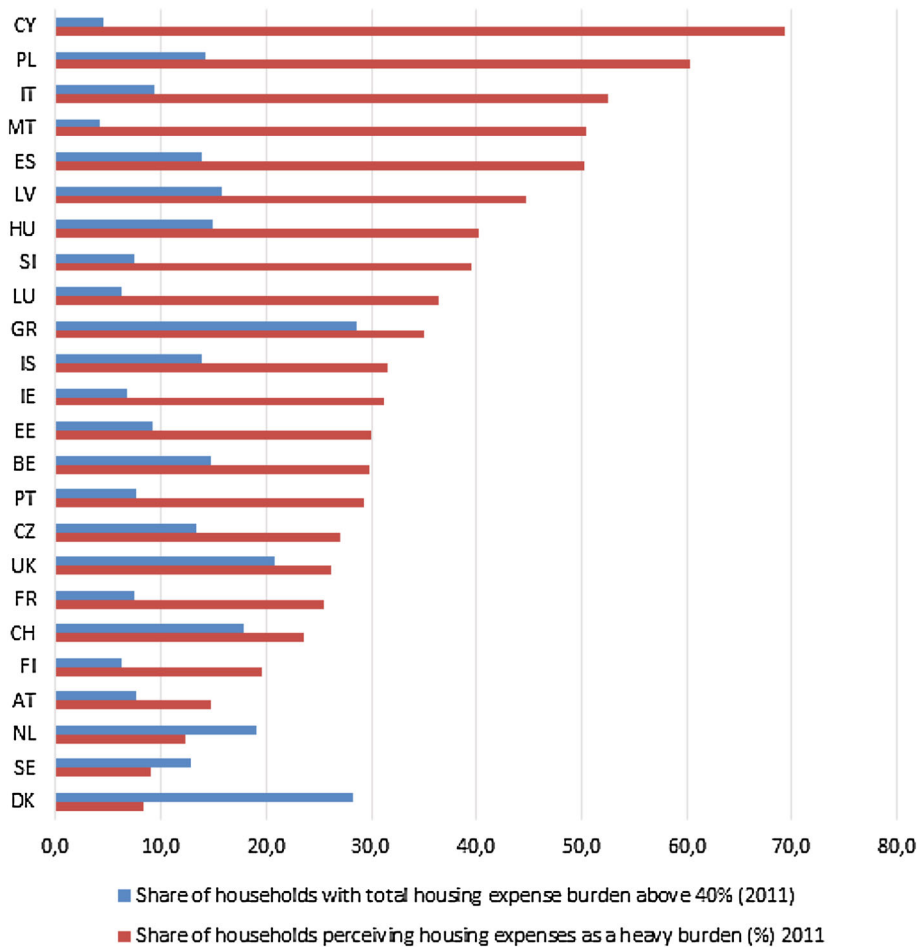
Fig. 1 Percentage of households that perceive housing costs as a heavy burden and percentage of households with a total housing expense ratio above 40 %. *Source*: EUSILC UDB 2011—version 4 of August 2014, authors' calculations

Ward (2009) noted the problem of changes to regulations governing the housing allowance in Germany (for 2007), where the housing allowances began especially to be part of minimum income payments. As a consequence, the housing expense ratio for Germany was considerably overvalued and the authors excluded the country from their international comparison.

In most of the countries listed in Fig. 1, the share of households that perceive their total housing costs as a heavy burden is greater than the share of households with a total housing expense ratio above 40 %, i.e. in most countries the housing cost burden is perceived rather more negatively than what would correspond to the objective housing expense ratio threshold. There are only a few countries (Denmark, Sweden and the Netherlands) where the opposite is true. The biggest difference between the subjective and objective indicators was observed among post-socialist and South-European countries.

In reference to comparison theory, it is likely that the greater the inequality in the housing expense ratio in society (country), the greater is the share of households that perceive housing costs as a heavy burden. In order to test this hypothesis, we calculated the coefficient of variation of the housing expense ratio for each of the countries studied and then the correlation between it and the share of households that considered their housing costs as a heavy burden. The correlation coefficient (Pearson cor. = 0.46)[7] confirmed that the share of households that feel their housing costs to be a heavy burden correlates positively and significantly with the coefficient of variation of the housing expense ratio.

It would also be possible to expect there would be a large share of households that perceive their housing burden as heavy in countries where there was a significant increase in the housing expense ratio over the observed period (2005–2011)—given the instability of the average ratio in some countries over time, however, it was not possible to reliably test this hypothesis. Finally, it is likely that the greater the inequality in the income distribution in society (country), the greater is the share of households that perceive housing expenses as a heavy burden. The correlation coefficient (Pearson cor. = 0.53)[8] confirmed that the share of households that feel their housing expenses to be a heavy burden correlates positively and significantly with the income decile ratio.[9] Gan and Hill (2009) pointed out that focusing on single quantile (e.g. median value) may provide biased estimates of affordability of the whole population since it does not reflect differences in housing affordability for different income quantiles. In this paper, however, we follow official Eurostat median statistics and try to incorporate inequalities into single figure indicator.

The shares of households with a ratio above the alternative thresholds and the share of households that perceive their housing costs as a heavy burden are depicted in Fig. 2. A comparison of Figs. 1 and 2 clearly shows that in the case of both alternatives the share of households above the threshold is closer to the share of households that subjectively perceive their housing costs as a heavy burden than what the Eurostat threshold results in.

The visual comparison in Fig. 2 is accompanied by a comparison of the Euclidian distances between subjective and objective rates (Table 1). The last four columns in Table 1 show the Euclidian distance (after weighting by population size) between the share of households with a housing expense ratio above 40 % (Eurostat threshold) and the subjective overburden rate (Distance 1), between the share of households with a housing expense ratio above 35 % and the subjective overburden rate (Distance 2), and between the share of households with a housing expense ratio above 167 % of the country median and the subjective overburden rate (Distance 3). The values in parentheses for Distance 2 and Distance 3 are marginal differences from Distance 1. Since the results for countries do not necessarily follow the same pattern, weighted country-specific distances were summed up for all the countries (last row of Table 1). Given the lower value of the total distance, the alternative thresholds are 'on average' closer to the subjective perception than the Eurostat threshold is. The definition based on the median housing expense ratio proved to be much closer to the subjective housing expense overburden rate than any globally fixed ratio. The distances between the subjective and objective rates for the years 2005, 2007 and 2009 are

---

[7] Correlation is significant at the 0.05 level (2-tailed).

[8] Correlation is significant at the 0.01 level (2-tailed).

[9] The correlation between the share of households that feel their housing costs to be a heavy burden and income quintile ratio was somewhat weaker (0.40), but still significant at the 0.05 level. The correlation between the share of households that feel their housing costs to be a heavy burden and coefficient of variation in incomes was close to zero (0.032) and thus it was not statistically significant.
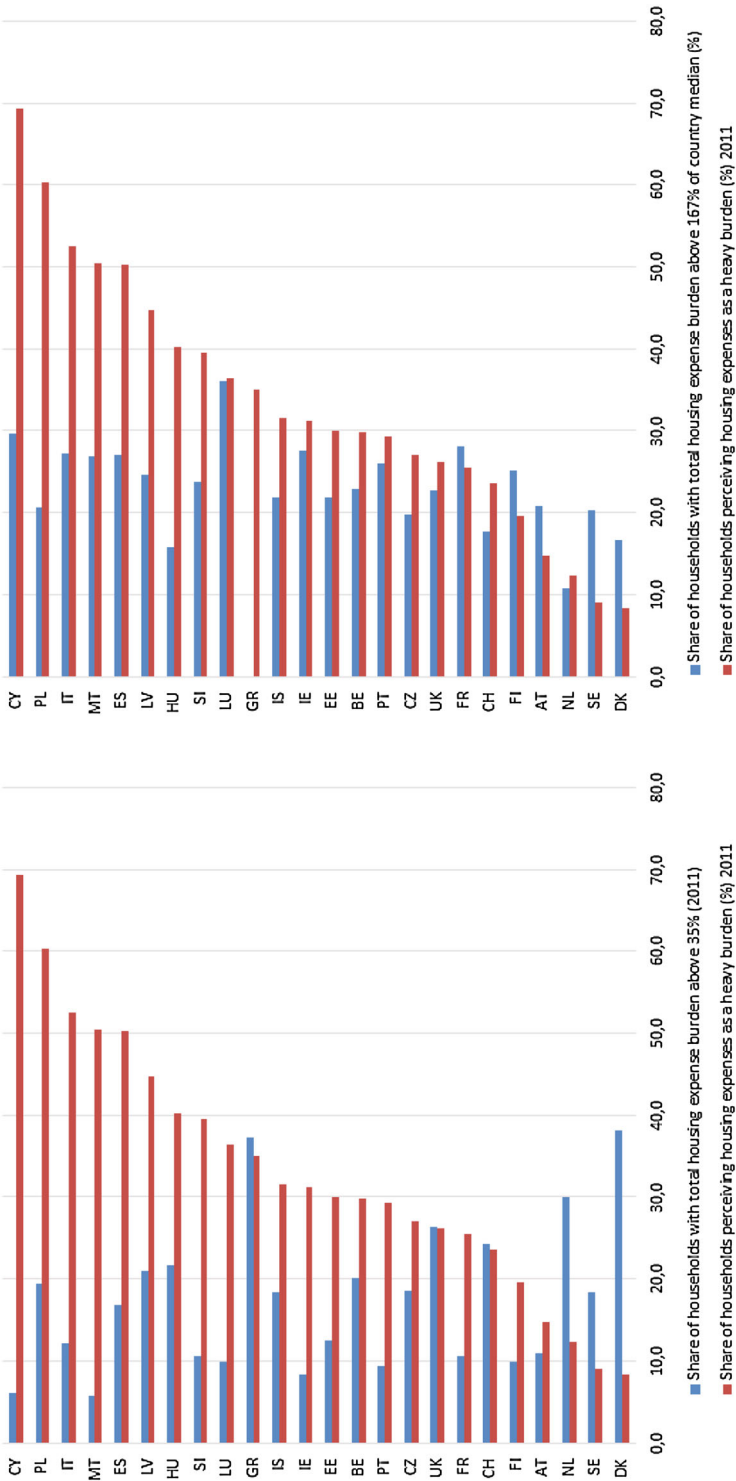
Fig. 2 Percentage of households that perceive housing cost as a heavy burden and percentage of households with a total housing expense ratio above 35 % and above 167 % of country median ratio. *Source*: EUSILC UDB 2011—version 4, of August 2014, authors' calculations

Table 1 Euclidian distances between objective and subjective overburden rates (EU-SILC 2011)

Country	Share of households perceiving housing costs as a heavy burden (%)	Share of households with a housing expense ratio above 40 %	Share of households with a housing expense ratio above 35 %	Share of households with a housing expense ratio above 167 % of the country median (%)	Population	Weights	Distance 1	Distance 2	Distance 3
AT	14.8	7.6	10.9	20.8	8,375,164	0.0220	1.1	0.3 (−0.7)	0.8 (−0.3)
BE	29.8	14.8	20.1	22.9	11,000,638	0.0290	6.5	2.7 (−3.8)	1.4 (−5.1)
CY	69.3	4.5	6.0	29.7	839,751	0.0022	9.3	8.9 (−0.4)	3.5 (−5.8)
CZ	27.0	13.3	18.6	19.7	10,486,731	0.0276	5.2	1.9 (−3.3)	1.5 (−3.7)
DK	8.3	28.3	38.2	16.6	5,560,628	0.0146	5.9	13.1 (7.2)	1.0 (−4.8)
EE	29.9	9.2	12.5	21.9	1,329,660	0.0035	1.5	1.1 (−0.4)	0.2 (−1.3)
ES	50.3	13.8	16.8	27.1	46,667,174	0.1228	163.6	137.8 (−25.8)	66.1 (−97.5)
FI	19.6	6.3	9.9	25.1	5,375,276	0.0141	2.5	1.3 (−1.2)	0.4 (−2.1)
FR	25.4	7.5	10.6	28.1	64,978,721	0.1710	54.8	37.5 (−17.3)	1.2 (−53.5)
HU	40.2	15.0	21.6	15.8	9,985,722	0.0263	16.7	9.1 (−7.6)	15.6 (−1.0)
CH	23.5	17.8	24.3	17.7	7,870,134	0.0207	0.7	0.0 (−0.7)	0.7 (0.0)
IE	31.2	6.7	8.4	27.6	4,570,881	0.0120	7.2	6.3 (−0.9)	0.2 (−7.0)
IS	31.6	13.9	18.4	21.9	318,452	0.0008	0.3	0.1 (−0.2)	0.1 (−0.2)
IT	52.5	9.4	12.2	27.3	59,364,690	0.1562	290.2	253.7 (−36.5)	99.2 (−191.0)
LU	36.4	6.2	9.9	36.1	511,840	0.0013	1.2	0.9 (−0.3)	0.0 (−1.2)
LV	44.7	15.8	21.0	24.6	2,074,605	0.0055	4.6	3.1 (−1.5)	2.2 (−2.4)
MT	50.4	4.2	5.7	26.9	414,989	0.0011	2.3	2.2 (−0.1)	0.6 (−1.7)
NL	12.3	19.0	30.0	10.8	16,655,799	0.0438	2.0	13.7 (11.7)	0.1 (−1.9)
PL	60.3	14.3	19.4	20.7	38,529,866	0.1014	214.6	169.6 (−45.0)	159.0 (−55.6)
PT	29.3	7.6	9.4	26.0	10,572,721	0.0278	13.1	11.0 (−2.1)	0.3 (−12.8)
SE	9.1	12.8	18.3	20.3	9,415,570	0.0248	0.3	2.1 (1.8)	3.1 (2.8)
SI	39.5	7.4	10.5	23.8	2,050,189	0.0054	5.6	4.5 (−1.1)	1.3 (−4.2)

Table 1 continued

Country	Share of households perceiving housing costs as a heavy burden (%)	Share of households with a housing expense ratio above 40 %	Share of households with a housing expense ratio above 35 %	Share of households with a housing expense ratio above 167 % of the country median (%)	Population	Weights	Distance 1	Distance 2	Distance 3
UK	26.2	20.8	26.3	22.7	63,022,532	0.1659	4.8	0.0 (−4.8)	2.0 (−2.8)
Total					**379,971,733**	**1.0**	**28.5**	**26.1 (−2.4)**	**19.0 (−9.5)**

Distance 1 = weighted distance between the share of households with a total housing expense ratio above 40 % ('objective' overburden rate based on the Eurostat definition) and the share of households perceiving housing costs as a heavy burden (i.e. 'subjective' overburden rate)

Distance 2 = weighted distance between the share of households with a total housing expense ratio above 35 % and the 'subjective' overburden rate

Distance 3 = weighted distance between the share of households with a total housing expense ratio above 167 % of the country median and the 'subjective' overburden rate

Source: EUSILC UDB 2011—version 4 of August 2014, authors' calculations

not reported here due to limited space, but they show the same patterns as for the year 2011.

Analyses of housing affordability often take into account housing overconsumption (Thalmann 1999; Lux and Sunega 2006), i.e. the fact that many households live in dwellings that are 'too large' for them. 'Some households deliberately spend a large part of their income for the enjoyment of residential comfort. … Conversely, the conventional affordability index does not detect households in difficulty, who spend less than the limit share of their income on rent.' (Thalmann 1999, p. 1933)

So in order to more accurately determine the share of households at risk of housing unaffordability, we attempted to take into account the rate of overcrowding. For the purposes of this paper we chose a simple approach using one coefficient, through which there was an increase in the share of households exceeding the housing expense ratio threshold in countries with a high overcrowding rate and conversely a decrease in the share of households exceeding the housing expense ratio threshold in countries with a high under-occupation rate. We used the Eurostat threshold for overcrowding that is described in the methodological section.

For all countries we determined the ratio of number of over-consuming households to number of under-consuming households, and standardised these ratios on a scale from zero to one. Countries with a ratio close to zero typically had a small share of housing over-consumption, while countries with a ratio close to one typically had a large share of housing overconsumption. Given the fact that for countries with a smaller share of households over-consuming than under-consuming housing, the ratio ranged from zero to one, while for countries with a higher share of housing over-consumption than under-consumption the ratio was much higher (in double rather than single digits), standardisation was conducted separately for the two groups of countries. The resulting overcrowding coefficient was set as the difference between the value of one and the value of the standardised ratio for countries with a larger share of over-consuming than under-consuming households, and as a sum of one and the value of the standardised coefficient for countries with a larger share of under-consuming than over-consuming households. The share of households in a given country with a housing expense ratio above thresholds was adjusted by the value of this coefficient. Formally:

$$k = 1 - p \quad \text{if } p > 1$$
$$k = 1 + p \quad \text{if } p \leq 1$$
$$p = (x_i - x_{min})/(x_{max} - x_{min}) \quad \text{for } x_i > 1$$
$$p = 1 - [(x_i - x_{min1})/(x_{max1} - x_{min1})] \quad \text{for } x_i \leq 1$$

where k is housing consumption adjustment coefficient; p is standardised ratio of the share of households over-consuming housing to the share of households under-consuming housing; x_i is ratio of the share of households over-consuming housing to the share of households under-consuming housing in country i; x_{min} is minimum of the ratio of the share of households over-consuming housing to under-consuming housing in countries with a larger share of over-consumption than under-consumption (i.e. $x_i > 1$); x_{max} is maximum of the ratio of the share of households over-consuming housing to under-consuming housing in countries with a larger share of over-consumption than under-consumption (i.e. $x_i > 1$); x_{min1} is minimum of the ratio the share of households over-consuming housing to under-consuming housing in countries with a larger share of under-consumption than over-consumption (i.e. $x_i \leq 1$); x_{max1} is maximum of the ratio of the

Table 2 Euclidian distances of objective and subjective overburden rates after adjustment for housing consumption (EU-SILC 2011)

Country	Share of households perceiving housing costs as a heavy burden (%)	Share of households with a housing expense ratio above 40%	Share of households with a housing expense ratio above 35%	Share of households with a housing expense ratio above 167% of the country median (%)	Population	Weights	Distance 1 (Table 1)	Distance 1 (adjusted)	Distance 2 (adjusted)	Distance 3 (adjusted)
AT	14.8	7.1	10.2	19.5	8,375,164	0.0220	1.1	1.3 (0.2)	0.5 (−0.6)	0.5 (−0.6)
BE	29.8	2.8	3.8	4.3	11,000,638	0.0290	6.5	21.2 (14.7)	19.6 (13.1)	18.8 (12.3)
CY	69.3	1.6	2.1	10.5	839,751	0.0022	9.3	10.1 (0.8)	10.0 (0.7)	7.6 (−1.7)
CZ	27.0	13.2	18.5	19.6	10,486,731	0.0276	5.2	5.2 (0.0)	2.0 (−3.2)	1.5 (−3.7)
DK	8.3	25.1	33.9	14.7	5,560,628	0.0146	5.9	4.1 (−1.8)	9.6 (3.7)	0.6 (−5.3)
EE	29.9	8.6	11.7	20.4	1,329,660	0.0035	1.5	1.6 (0.1)	1.2 (−0.3)	0.3 (−1.2)
ES	50.3	8.8	10.7	17.3	46,667,174	0.1228	163.6	211.5 (47.9)	192.5 (28.9)	133.9 (−29.7)
FI	19.6	5.7	8.9	22.6	5,375,276	0.0141	2.5	2.7 (0.2)	1.6 (−0.9)	0.1 (−2.4)
FR	25.4	6.6	9.3	24.5	64,978,721	0.1710	54.8	60.8 (6.0)	44.6 (−10.2)	0.1 (−54.7)
HU	40.2	30.0	43.2	31.6	9,985,722	0.0263	16.7	2.7 (−14.0)	0.2 (−16.5)	1.9 (−14.8)
CH	23.5	13.5	18.4	13.4	7,870,134	0.0207	0.7	2.1 (1.4)	0.5 (−0.2)	2.1 (1.4)
IE	31.2	0.0	0.0	0.0	4,570,881	0.0120	7.2	11.7 (4.5)	11.7 (4.5)	11.7 (4.5)
IS	31.6	12.5	16.5	19.7	318,452	0.0008	0.3	0.3 (0.0)	0.2 (−0.1)	0.1 (−0.2)
IT	52.5	9.4	12.2	27.3	59,364,690	0.1562	290.2	290.2 (0.0)	253.7 (−36.5)	99.2 (−191.0)
LU	36.4	5.2	8.4	30.5	511,840	0.0013	1.2	1.3 (0.1)	1.1 (−0.1)	0.0 (−1.2)
LV	44.7	15.8	21.0	24.6	2,074,605	0.0055	4.6	4.6 (0.0)	3.1 (−1.5)	2.2 (−2.4)
MT	50.4	1.3	1.8	8.3	414,989	0.0011	2.3	2.6 (0.3)	2.6 (0.3)	1.9 (−0.4)
NL	12.3	1.9	3.0	1.1	16,655,799	0.0438	2.0	4.7 (2.7)	3.8 (1.8)	5.5 (3.5)
PL	60.3	28.4	38.5	41.1	38,529,866	0.1014	214.6	103.2 (−111.4)	48.0 (−166.6)	37.3 (−177.3)
PT	29.3	6.5	8.0	22.3	10,572,721	0.0278	13.1	14.5 (1.4)	12.6 (−0.5)	1.4 (−11.7)
SE	9.1	12.3	17.6	19.5	9,415,570	0.0248	0.3	0.3 (0.0)	1.8 (1.5)	2.7 (2.4)

Table 2 continued

Country	Share of households perceiving housing costs as a heavy burden (%)	Share of households with a housing expense ratio above 40 %	Share of households with a housing expense ratio above 35 %	Share of households with a housing expense ratio above 167 % of the country median (%)	Population	Weights	Distance 1 (Table 1)	Distance 1 (adjusted)	Distance 2 (adjusted)	Distance 3 (adjusted)
SI	39.5	7.2	10.2	23.1	2,050,189	0.0054	5.6	5.6 (0.0)	4.6 (−1.0)	1.4 (−4.2)
UK	26.2	14.2	18.0	15.5	63,022,532	0.1659	4.8	23.8 (19.0)	11.2 (6.4)	18.9 (14.1)
Total					**379,971,733**	**1.0**	**28.5**	**25.1 (−3.4)**	**25.2 (−3.3)**	**18.7 (−9.8)**

Distance 1 = weighted distance between the share of households with a total housing expense ratio above 40 % ('objective' overburden rate based on the Eurostat definition) and the share of households perceiving housing costs as a heavy burden (i.e. 'subjective' overburden rate) after adjustment for housing consumption

Distance 2 = weighted distance between the share of households with a total housing expense ratio above 35 % and the 'subjective' overburden rate after adjustment for housing consumption

Distance 3 = weighted distance between the share of households with a total housing expense ratio above 167 % of the country median and the 'subjective' overburden rate after adjustment for housing consumption

*Source*: EUSILC UDB 2011—version 4 of August 2014, authors' calculations

share of households over-consuming housing to under-consuming housing in countries with a larger share of under-consumption than over-consumption (i.e. $x_i \leq 1$).

Table 2 presents a comparison of the Euclidian distances of the overburden rates after their adjustment for housing over-consumption and under-consumption. Although adjusting the share of households above affordability thresholds to reflect overcrowding is theoretically justified, the results of the comparison with the subjectively perceived burden did not produce any substantial decrease in distances when compared to the results in the preceding case, where this adjustment was not made (with the exception of Distance 3, where there was a very small decrease in the marginal difference between the objective and the subjective burden). The reason may be the fact that the adjustment was too globally and roughly applied. The distances between the subjective and objective overburden rates for the years 2005, 2007 and 2009 are not reported here due to limited space, but they show the same patterns as for the year 2011.

Like the analyses made for housing affordability, the high overcrowding rate based on the current threshold used by Eurostat may not correspond to the subjective perception of
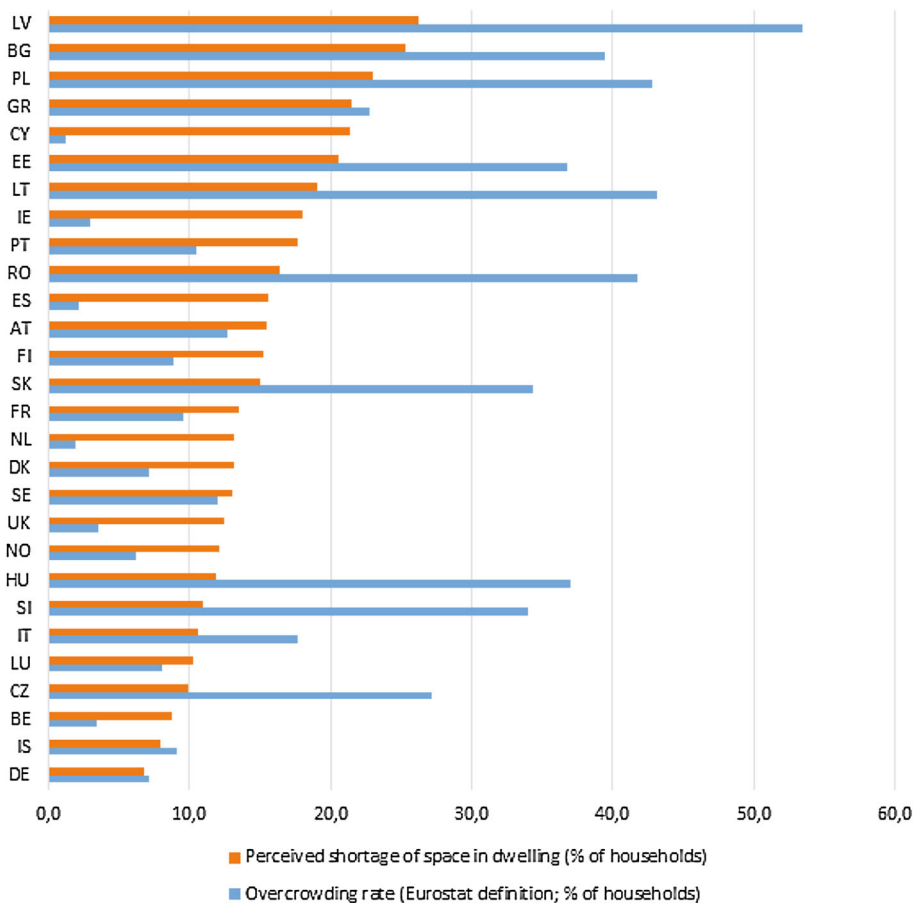
Fig. 3 Percentage of households perceiving dwelling space as a problem and percentage of households living in overcrowded housing according to Eurostat definition. *Source*: EUSILC UDB 2007—version 5 of March 2011, authors' calculations
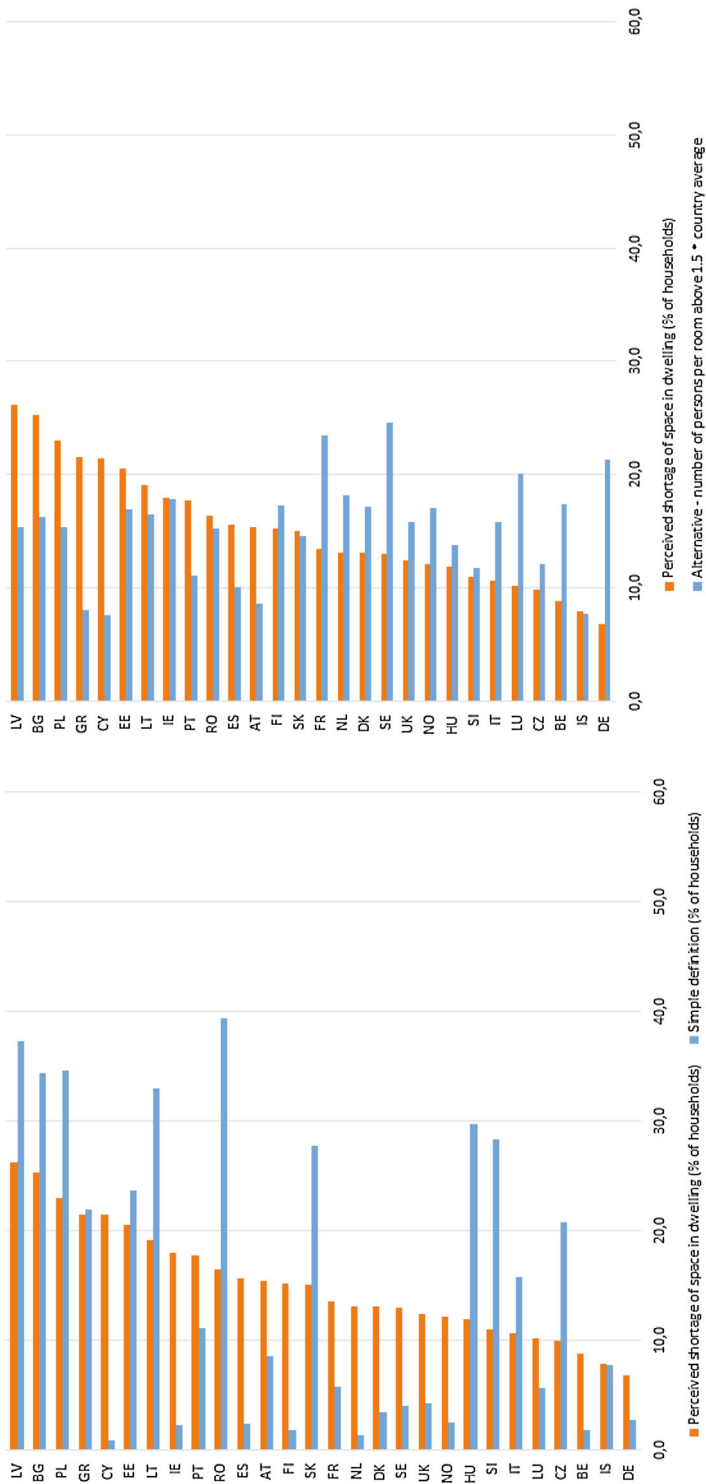
Fig. 4 Percentage of households perceiving dwelling space as a problem and percentage of households living in overcrowded dwellings according to the simple definition and the national definition. *Source:* EUSILC UDB 2007—version 5 of March 2011, authors' calculations

Table 3 Euclidian distances of objective and subjective overcrowding rates (EU-SILC 2007)

Country	Share of households that perceive a shortage of dwelling space (%)	Overcrowding rate according to the Eurostat definition (% of households)	Overcrowding rate according to the 'simple' definition (% of households)	Overcrowding rate according to the 'national' definition (% of households)	Population	Weights	Distance 1	Distance 2	Distance 3
AT	15.4	12.7	8.6	8.6	8,282,984	0.0166	0.1	0.8 (0.7)	0.8 (0.7)
BE	8.8	3.4	1.8	17.4	10,584,534	0.0212	0.6	1.0 (0.4)	1.6 (1.0)
BG	25.3	39.4	34.3	16.3	7,572,673	0.0152	3.0	1.2 (−1.8)	1.2 (−1.8)
CY	21.4	1.2	0.9	7.6	757,916	0.0015	0.6	0.6 (0.0)	0.3 (−0.3)
CZ	9.9	27.1	20.8	12.1	10,254,233	0.0206	6.1	2.4 (−3.7)	0.1 (−6.0)
DE	6.8	7.1	2.7	21.3	82,314,906	0.1651	0.0	2.8 (2.8)	34.7 (34.7)
DK	13.1	7.1	3.4	17.2	5,447,084	0.0109	0.4	1.0 (0.6)	0.2 (−0.2)
EE	20.5	36.8	23.7	16.9	1,342,920	0.0027	0.7	0.0 (−0.7)	0.0 (−0.7)
ES	15.6	2.2	2.4	10.1	44,784,666	0.0898	16.1	15.6 (−0.5)	2.7 (−13.4)
FI	15.2	8.9	1.8	17.3	5,276,955	0.0106	0.4	1.9 (1.5)	0.0 (−0.4)
FR	13.5	9.5	5.8	23.5	63,645,065	0.1276	2.0	7.6 (5.5)	12.8 (10.8)
GR	21.5	22.8	21.9	8.1	11,143,780	0.0223	0.0	0.0 (0.0)	4.0 (4.0)
HU	11.9	37.0	29.7	13.8	10,066,158	0.0202	12.7	6.4 (−6.3)	0.1 (−12.6)
IE	18.0	2.9	2.3	17.8	4,340,118	0.0087	2.0	2.1 (0.1)	0.0 (−2.0)
IS	7.9	9.1	7.7	7.7	307,672	0.0006	0.0	0.0 (0.0)	0.0 (0.0)
IT	10.6	17.6	15.8	15.8	58,223,744	0.1168	5.7	3.2 (−2.5)	3.2 (−2.5)
LT	19.1	43.1	32.9	16.5	3,249,983	0.0065	3.8	1.2 (−2.6)	0.0 (−3.8)
LU	10.2	8.0	5.6	20.1	476,187	0.0010	0.0	0.0 (0.0)	0.1 (0.1)
LV	26.2	53.4	37.2	15.4	2,208,840	0.0044	3.3	0.5 (−2.8)	0.5 (−2.8)
NL	13.1	1.9	1.3	18.2	16,357,992	0.0328	4.1	4.6 (0.5)	0.9 (−3.2)
NO	12.1	6.2	2.5	17.0	4,681,134	0.0094	0.3	0.9 (0.6)	0.2 (−0.1)
PL	23.0	42.8	34.6	15.4	38,125,479	0.0765	30.0	10.3 (−19.7)	4.4 (−25.6)

Table 3 continued

Country	Share of households that perceive a shortage of dwelling space (%)	Overcrowding rate according to the Eurostat definition (% of households)	Overcrowding rate according to the 'simple' definition (% of households)	Overcrowding rate according to the 'national' definition (% of households)	Population	Weights	Distance 1	Distance 2	Distance 3
PT	17.7	10.5	11.1	11.1	10,532,588	0.0211	1.1	0.9 (−0.2)	0.9 (−0.2)
RO	16.4	41.7	39.3	15.2	21,130,503	0.0424	27.1	22.2 (−4.9)	0.1 (−27.0)
SE	13.0	12.0	4.0	24.6	9,113,257	0.0183	0.0	1.5 (1.5)	2.5 (2.5)
SI	11.0	34.0	28.3	11.8	2,010,377	0.0040	2.1	1.2 (−0.9)	0.0 (−2.1)
SK	15.0	34.3	27.7	14.6	5,373,180	0.0108	4.0	1.7 (−2.3)	0.0 (−4.0)
UK	12.4	3.5	4.3	15.8	61,073,279	0.1225	9.7	8.0 (−1.7)	1.4 (−8.3)
Total					**498,678,207**	**1**	**11.7**	**10.0 (−1.7)**	**8.5 (−3.2)**

Distance 1 = weighted distance between the overcrowding rate, as defined by Eurostat, and a subjective sense of a shortage of space in dwellings

Distance 2 = weighted distance between the overcrowding rate, based on the assumption that the number of rooms available to the household should equal the household size, and a subjective sense of a shortage of space in dwellings

Distance 3 = weighted distance between the overcrowding rate, based on the assumption that household is living in an overcrowded dwelling if the number of households member per room exceeds 1.5 multiple of the country average, and a subjective sense of a shortage of space in dwellings

Source: EUSILC UDB 2007—version 5 of March 2011, authors' computations

overcrowding expressed by households themselves. Figure 3 shows the percentage of households living in overcrowded housing for countries in the EU-SILC 2007 dataset according to the Eurostat threshold and, at the same time, the percentage of households who perceive dwelling space to be a problem in 2007.

The new EU Member States have a higher average overcrowding rate than more advanced EU countries: the reason may have to do with specific demographic and family structures in these countries (Iacovou and Skew 2011). While in more advanced countries (with the exception of Greece and Italy) the percentage of households that consider (dwelling) space to be a problem is significantly higher than the percentage of households above the Eurostat threshold, in post-socialist countries the opposite is true.

Figure 4 compares the shares of households that perceive they have a problem with a lack of dwelling space (subjective indicator) with the shares of households living in overcrowded flats according to both alternative definitions of thresholds for overcrowding. The figure shows that both alternative thresholds are closer to the subjective overcrowding rate (in particular the alternative definition based on 1.5 times the average number of persons per residential room in individual countries) than the current Eurostat threshold.

Table 3 presents a comparison of the Euclidian distances of alternative definitions of overcrowding rates. The last three columns in Table 3 show the Euclidian distance (after weighting by population size) between the overcrowding rate based on the Eurostat definition and the subjective overcrowding rate (Distance 1), between the overcrowding rate based on the 'simple definition' and the subjective overcrowding rate (Distance 2), and between the overcrowding rate based on the 'national definition' and the subjective overcrowding rate (Distance 3). The values in parentheses for Distance 2 and Distance 3 refer to the differences in relation to Distance 1. The results clearly show that the 'simple definition' of overcrowding is a closer approximation of the subjectively perceived lack of dwelling space only in post-socialist countries, Southern European countries (Italy, Portugal) and the UK. The 'national definition' (Distance 3) is closer to the subjective overcrowding rate also in some other western European countries (Denmark, Finland, Ireland, the Netherlands, Norway).

The weighted country-specific distances were summed to arrive at a total distance. Given that a total distance for alternative thresholds on overcrowding is lower than distance for Eurostat threshold, the alternative thresholds are 'on average' closer to the subjective overcrowding rate than the Eurostat threshold. However, differences are significantly smaller than in case of the alternative thresholds for housing expense ratio.

5 Conclusion

This article provides empirical evidence that the housing cost overburden and overcrowding rates presented in official statistics of Eurostat significantly differ from subjective evaluations EU citizens make of their housing affordability and overcrowding. This gap may be caused by the fact that thresholds for housing expense ratio and overcrowding used by Eurostat do not adequately reflect cultural and institutional differences between individual countries. The goal of this article was therefore to propose alternatives that might better reflect the specific contexts of individual EU Member States while ensuring their objective international comparability. We compared the thresholds used by Eurostat with two alternatives, one of which in conformity with the needs theory reflects a different absolute level at which housing needs are met (irrespective of the 'standard' in the given

country), and the second of which, in reference to the comparison theory, establishes a relative level at which these needs are met in reference to the 'standard' in the given country. The utility of these alternatives was evaluated according to the objective results they produced and the subjective evaluations given by households. For the purpose of comparison the analysis used cross-sectional data from the international EU-SILC for 2005, 2007, 2009 and 2011.

A comparison of the three different definitions of the threshold for the housing expense ratio revealed that a relative threshold at 167 % of the median housing expense ratio in a given country produces a picture of housing affordability that much more closely resembles the subjective perception of housing affordability than the recent Eurostat threshold. The better performance of the relative indicator is probably due to the close inter-relation between the housing expense ratio and income/poverty; and relative thresholds have already long been applied as more appropriate to poverty measurement than using any globally set universal threshold. We also tested a simple method for adjusting the ratio by housing over(under)consumption but the results did not lead to any further significant reduction of the distance between objective and subjective measurements.

The comparison of objective and subjective rates of overcrowding produced interesting findings. In more advanced countries (with the exception of Greece and Italy) the percentage of the population that considers dwelling space to be a problem is significantly higher than the percentage of the population that actually live in overcrowded dwellings according to the Eurostat threshold, while in post-socialist countries the opposite is true. A rough threshold set externally and with no relation to the particular context of a country may thus create artificial problems that in fact may not be felt by the population living in that context.

A comparison of the three different measures of overcrowding revealed that both the 'simple' method of calculating the overcrowding rate (based on the assumption that the adjusted household size should equal the number of rooms) and the 'national' method (based on the assumption that a household is living in an overcrowded dwelling if the number of household members per rooms in the household is more than 1.5 times the country average) on average correspond better to subjective perceptions of overcrowding than the recent Eurostat threshold. However, the results these thresholds produced were much less convincing than those produced for housing affordability measures.

The most common criticism levelled against the use of subjective indicators to measure well-being is the reference to the fact that subjective indicators can fluctuate over time more than objective measures. However, the data show rather the opposite pattern (at least for the countries covered by the EU-SILC survey in the selected years)—the volatility of the subjective perception of the housing expense burden seems to be 'on average' lower than the volatility of the objective housing expense ratio (it is not possible to carry out a similar analysis for the overcrowding rate since the subjective perception of overcrowding was surveyed only in 2007).

In an attempt to make objective indicators more context-specific and closer to the perceptions of the households we linked the objective indicators to the subjective perception of the problem. It would be very useful to analyse the differences between the objective and the subjective indicators in detail (for example, for different types of households), but such an analysis is beyond the scope of this article.

Supplementing the current thresholds used by Eurostat, especially in the field of housing affordability, by alternatives could have important consequences for housing policy. The more the objective measures express the subjective perception of reality, the more they may represent a legitimate data source for policy interventions. In this article, we did not

attempt to substitute objective measures with subjective ones; instead, we tried to offer new alternatives to objective measurement that would better reflect aggregate subjective perceptions of EU households. In this way, the possibility to make objective international comparisons is preserved.

References

Abeysinghe, T., & Gu, J. (2011). Lifetime income and housing affordability in Singapore. *Urban Studies, 48*(9), 1875–1891.

Alesina, A., Di Tella, R., & MacCulloch, R. (2004). Inequality and happiness: Are Europeans and Americans different? *Journal of Public Economics, 88*(9–10), 2009–2042.

Allardt, E. (1976). Dimensions of welfare in a comparative Scandinavian study. *Acta Sociologica, 19*(3), 227–239.

Chasco, C., & Le Gallo, J. (2012). The impact of objective and subjective measures of air quality and noise on house prices: A multilevel approach for downtown Madrid. *Economic Geography, 89*(2), 127–148.

Dewilde, C., & De Decker, P. (2014). *Trends in housing inequalities in Europe: What has happened and why does it matter?* HOWCOME Working Paper 4.

Di Tella, R., MacCulloch, R., & Oswald, A. (2003). The macroeconomics of happiness. *The Review of Economics and Statistics, 85*(4), 809–827.

Easterlin, R. (1995). Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior & Organization, 27*(1), 35–47.

Eurostat. (2014a). *Statistics explained* (http://ec.europa.eu/eurostat/statistics-explained/). Accessed on 21.12.2014. http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Housing_cost_overburden_rate.

Eurostat. (2014b). *Statistics explained* (http://ec.europa.eu/eurostat/statistics-explained/). Accessed on 21.12.2014. http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Overcrowding_rate.

Gan, Q., & Hill, R. J. (2009). Measuring housing affordability: Looking beyond the median. *Journal of Housing Economics, 18*, 115–125.

Garnett, D. (2000). *Housing finance*. Coventry: Chartered Institute of Housing.

Haffner, M., & Heylen, K. (2011). User costs and housing expenses. Towards a more comprehensive approach to affordability. *Housing Studies, 26*(4), 593–614.

Hayo, B., & Seifert, W. (2003). Subjective economic well-being in Eastern Europe. *Journal of Economic Psychology, 24*, 329–348.

Helliwell, J. (2003). How's life? Combining individual and national variables to explain subjective well-being. *Economic Modelling, 20*(2), 331–360.

Iacovou, M., & Skew, A. (2011). Household composition across the new Europe: Where do the new Member States fit in? *Demographic Research, 25*(14), 465–490.

Kahneman, D., & Krueger, A. (2006). Developments in the measurement of subjective well-being. *Journal of Economic Perspectives, 20*(1), 3–24.

Lee, T., & Marans, W. (1978). Objective and subjective indicators: Effects of scale discordance on interrelationships. *Social Indicators Research, 8*, 47–64.

Lewis, S., & Lyo, L. (1986). The quality of community and the quality of life. *Sociological Spectrum, 6*, 397–410.

Li, J. (2014). *Recent trends on housing affordability research: Where we are up to?* Urban Research Group—CityU on Cities Working Paper Series, No. 5/2014. https://www.google.cz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CDUQFjACahUKEwjq9fD8mo3IAhXLWSwKHXQWD8g&url=http%3A%2F%2Fwww.cityu.edu.hk%2Fcityuoncities%2Fupload%2Ffile%2Foriginal%2F705520150126143516.pdf&usg=AFQjCNFV557DWBQul8EM-FbHV9mlmYo43Q&cad=rja.

Liao, Pei-shan. (2009). Parallels between objective indicators and subjective perceptions of quality of life: A study of metropolitan and county areas in Taiwan. *Social Indicators Research, 91*(1), 99–114.

Lux, M., & Sunega, P. (2006). Vývoj finanční dostupnosti nájemního a vlastnického bydlení v průběhu hospodářské transformace v České republice (1991–2003) (Housing affordability of rental and owner-

occupied housing over the course of the economic transformation in the Czech Republic 1991–2003). *Sociologický časopis/Czech Sociological Review, 42*(5), 851–881.

Maclennan, D., & Williams, R. (1990). *Affordable housing in Europe*. York: Joseph Rowntree Foundation.

OECD. (2013). How's life? At a glance. In *How's life? 2013: Measuring well-being*. OECD Publishing. http://www.keepeek.com/Digital-Asset-Management/oecd/economics/how-s-life-2013/how-s-life-at-a-glance_how_life-2013-6-en#page1.

Özdemir, E., & Ward, T. (2009). *Housing and social inclusion*. European Commission. http://www.google.cz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCUQFjAA&url=http%3A%2F%2Fec.europa.eu%2Fsocial%2FBlobServlet%3FdocId%3D4828%26langId%3Den&ei=7OSHVIigBYT1UIe1ghA&usg=AFQjCNFX_YMfxI99p6JXo9Lpnbe7nReIRw&bvm=bv.81456516,d.d24.

Randall, C., Corp, A., & Self, A. (2014). *Measuring national well-being: Life in the UK, 2014*. Newport: Office for National Statistics. http://www.ons.gov.uk/ons/rel/wellbeing/measuring-national-well-being/life-in-the-uk–2014/art-mnwb–life-in-the-uk–2014.html.

Schuessler, K. F., & Fisher, G. A. (1985). Quality of life research and sociology. *Annual Review of Sociology, 11*, 129–149.

Stevenson, B., & Wolfers, J. (2008). *Economic growth and subjective well-being: Reassessing the Easterlin paradox*. NBER Working Paper No. 14282, August 2008. http://www.nber.org/papers/w14282.

Stiglitz, J., Sen, A., & Fitoussi, J. (2009). *Report by the commission on the measurement of economic performance and social progress*. http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf.

Thalmann, P. (1999). Identifying households which need housing assistance. *Urban Studies, 36*(11), 1933–1947.

Večerník, J. (2012). Subjektivní indikátory měření blahobytu: přístupy měření a data (Subjective indicators of well-being: Approaches, measurements and data). *Politická ekonomie, 3*, 291–308.