

Assessing Housing Structure Similarities Across The EU Countries

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Abstract: *This paper compares housing in the European Union countries. The right to housing has been established by a range of international human rights institutions and is regularly monitored by the United Nations and the European Commission. Subsidised housing must, therefore, be accessible to broad levels of the population. Given the need for the development of the social housing sector, it is necessary to analyse divergences in necessities and provisions of affordable social housing in the EU countries. The wide diversity of national housing concepts and policies, as well as a variety of implemented approaches across the EU countries, in terms of tenures, providers, beneficiaries and funding arrangements are briefly described. Presented are the results of the similarity of structures by housing type in the EU countries. Particularly, the enormous differences in structures of housing in regard to the tenure status, e.g. owner or tenant, were quantified. We used data from the European Union Statistics on Income and Living Conditions (EU-SILC), available for all EU countries and provide a relatively high degree of comparability.*

Keywords: dwelling; EU-SILC; European Union; measure of structure similarity; national housing concepts; social housing

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1. Introduction

According to fundamental international documents in the area of housing, such as Manifestos of the United Nations Organisation, Vancouver Declaration 1976, Global Housing Strategy 1988, Istanbul Habitat Agenda 1996, Ministerial Declaration on Social and Economic Challenges in Distressed Urban Areas (2006) of the United Nations Economic Commission for Europe, Strategy for Sustainable Housing and Land Management in the ECE region for the period 2014-2020, as well as strategic aims formulated at

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the level of the European Union (EU), housing is one of the basic human needs which shall be satisfied at a level corresponding to the overall level of socio-economic development of society.

The former head of the European Commission, Jean-Claude Juncker, stated at his recent 'State of the Union' speech: "...this growth is leaving many behind and our societies are increasingly unequal. Similarly, the recent 'recovery' in housing markets is far from benefitting everyone and the state of housing in the European Union today remains critical. Growing needs of homeless and people in need for affordable housing...".

Housing affordability represents a challenge everyone faces when covering the costs of their current or potential housing and costs unrelated to their housing within the limits of their income (Stone, 2006). One of the first definitions of housing affordability is provided by Howenstine (1983, p. 20) as "The ability of the household to acquire decent accommodation by the payment of a reasonable amount of its income on shelter". The terms "decent accommodation" and "reasonable amount of its income" are specified further within this definition. MacLennan & Williams (1990, p. 9) clarify the meaning of a reasonable amount of income. In their frequently cited definition of housing affordability, 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. Wong et al. (2010, p. 4) and Sendi (2011, p. 8) consider the lack of affordability in a definition of the term "unreasonable burden". However, an explanation of the last term in the definition of "to be a detriment" is necessary for more accurate measuring.

Housing is not one of the areas harmonised by the EU legislation; however, regulations in different areas directly influence the formation of housing policy. A brief summary of different approaches in EU states on the topic can be found, for example, on the official website of the organisation CECODHAS Housing Europe. Housing Europe is the European Federation of Public, Cooperative & Social Housing established in 1988. It is a network of 45 national & regional federations. The country profile of "social housing" on the official website of Housing Europe¹ provides an overview of facts about what social housing is, who provides social housing, how social housing is financed and who can access social housing.

There is a growing need to unify the understanding of the concept of "social housing" in the EU countries and to seek a common approach to solve the problems regarding "decent housing, at an affordable price, in a safe environment as a fundamental need and right", and "how far this need is met to alleviate poverty and social exclusion" in the EU countries.

The most common tenure in Europe is owner-occupation, with an average 69.2% of the population living in owner-occupied housing (26.6% homeowners with mortgage or loan and 42.7% no outstanding mortgage or

housing loan), compared to 30.8% tenants (19.8% paying rent at market price and 10.9% paying rent at a reduced price). The shares of owner and tenant households vary widely across the EU countries.

Most former socialist countries of Central and Eastern Europe have a very high share of homeowners without a mortgage (between 95.1% in Romania and 58.8% in the Czech Republic, in 2016) besides low proportion of tenants paying a market price (between 1.3% in Lithuania and 16.0% in the Czech Republic, in 2016) (Table 1).

Table 1: The share of the population living in a dwelling, with a reduced price rent, living in owner-occupied dwellings, without mortgage or loan in former communist countries

GEO/TIME	Owner, without mortgage or loan			Tenant, rent at market price		
	2007	2010	2016	2007	2010	2016
Bulgaria	85.1	85.2	79.7	2.3	2.1	2.9
Czechia	63.2	61.3	58.8	4.8	5.0	16.0
Estonia	70.9	68.9	62.0	4.4	2.6	4.1
Croatia	:	82.2	84.3	:	2.9	1.6
Latvia	82.7	77.0	71.1	5.1	6.5	8.7
Lithuania	83.5	86.5	80.1	1.2	1.1	1.3
Hungary	73.6	65.8	70.0	2.7	2.4	4.3
Poland	59.7	74.5	71.8	2.6	2.5	4.5
Romania	95.0	96.9	95.1	1.1	0.9	1.5
Slovenia	77.0	70.5	64.5	5.5	5.0	5.3
Slovakia	84.2	82.4	77.8	9.2	8.4	8.9

Source: Eurostat (online data code: ilc_lvho02), own processing

In most English-speaking and Nordic countries, Belgium and the Netherlands owners with outstanding mortgages and tenants at market price are the most common tenure type (Table 2).

The paper quantifies differences between selected EU countries using statistical measures of similarity of structures. We use data from the European Union Statistics on Income and Living Conditions (EU-SILC). The dataset contains data on the distribution of the population by tenure status (owner, with mortgage or loan, owner, no outstanding mortgage or housing loan; tenant, rent at market price and tenant, rent at a reduced price or free).

Table 2: The proportion of owners with mortgage or loan, the proportion of tenants at market price in BE, DK, LU, NL, FI, SE, UK

GEO/TIME	Owner, with mortgage or loan			Tenant, rent at market price		
	2007	2010	2016	2007	2010	2016
Belgium	39.4	41.7	41.1	18.6	19.6	20.0
Denmark	52.3	52.7	47.4	32.9	33.3	38.3
Luxembourg	43.2	39.4	43.3	19.7	27.6	21.5
Netherlands	58.1	59.5	61.0	33.1	32.5	30.3
Finland	41.8	42.0	42.0	9.8	10.1	13.0
Sweden	54.4	64.4	54.8	28.5	32.2	34.0
United Kingdom	46.9	43.9	35.5	8.3	11.9	18.0

Source: Eurostat (online data code: ilc_lvho02), own processing

This paper is organised as follows. Section 2 reviews literature related to this topic, while Section 3 reviews the methodology used to evaluate differences between distributions of the population by tenure status of the individual EU countries and briefly explains the source of the data – EU statistics on income and living conditions (EU-SILC). Section 4 presents the empirical results using the coefficient of similarity of structures. The last section summarises and concludes the study of the paper. Besides the explanation of the research limitations, suggestions for future studies are presented in the conclusion.

2. Information Sources and Literature Review

Housing quality and affordability are often perceived as the living standard evaluation indicators of society and are the critical components of quality of life. Socio-economic importance of housing lies in creating conditions for the development of human potential, creative abilities and social activities of man (Hills, 2001; Hills, 2008).

Given the need for the development of the housing sector, it is necessary to analyse divergences in necessities and provisions of affordable housing in the EU countries. Key trends in the field of housing at EU level are identified and analysed in a variety of Eurofond publications and presented on the official EU webpages. The publication Quality of Life in EU according to the 2016 survey provides interesting information about housing. Results of analysis of quality of life in the EU region based of the Survey 2016 were published by Eurofond in the brochure Quality of Life in the EU in December 2017. Its electronic version² allows for the production of maps visualising data across Europe, and some of the key indicators are presented through the use of interactive charts.

A valuable source of opinions, facts and summaries about resolutions and trends in the theme of “affordable housing for all” are publications and documents from conferences (the latest in Tirana, Albania in September 2017), of the European Network for Housing Research (ENHR) and are presented on its official webpage. The European Social Housing Observatory³ is the research department of the international not-for-profit organisation CECODHAS Housing Europe that brings data about the sector, information of national housing statistics and facts about market trends per country, research briefings and publications.

The findings of the report “2012 Housing Europe Review” by Pittini and Laino (2011) are summarised in the article by Pittini (2012) with an exploration of the social housing sector from different perspectives: the diversity of definitions at the national level and common characteristics across Europe.

Using up-to-date international comparisons of social housing policy and practice in the CECODHAS Housing Europe publication “Social Housing in Europe” (Scanlon, Whitehead & Arrigoitia, 2014) further clarifies the major trends in the way social housing is provided across European countries, with support of relevant statistics. There are also European trends in the sector and opportunities for innovation and improvement.

Christine Whitehead in her chapter “Developments in the Role of Social Housing in Europe” (Jones, White and Dunse, eds., 2012) looks at the development of social housing especially since the 1970s and identifies significant trends and their potential impact on social housing. In addition to trends identification, an analysis of how the social housing system works in each EU country, supported by relevant statistics, together with opportunities for innovation and improvement are presented by editors Scanlon, Whitehead, Arrigoitia (2014), as well as Lunde and Whitehead (2016).

Poggio & Whitehead (2017) contribute to the understanding of social housing in two specific ways. The first is to investigate the role of social housing in European countries that are less represented in the international literature. The second is to update the understanding of how social housing has fared across Europe since the global financial crisis and the subsequent recession, which in some countries is still unresolved.

They are three types of EU countries: the first, “Western European countries are with varying emphasis on providing for poorer more vulnerable households through social renting: Finland with 10% social housing; Ireland with 14% and France with 17%; than three smaller transition economies, Albania, Romania and Slovakia all of which have long experience of state-owned housing but now have very small proportions of social renting; and last the Southern European countries of Greece and Cyprus neither of which have a tradition of social housing and indeed do not distinguish social housing in their official statistics. “The data at European level show that most

residents live in their own homes, and that rental tends to be a secondary option; homeowners have medium or high salaries, whereas renters tend to be those with fewer resources.”

“The 2007 financial crisis widened social inequalities. There is a clear delay in certain European states that have not known how to keep a significant part of housing out of the speculative market” (Tusell, 2017). The past two decades of post-transition social housing policy developments in Central and Eastern Europe was studied by Lux (2013), Tsenkova (2017) or Balchin (2013).

The common feature of social housing is that the purpose of it is the general interest, the increase of affordable housing supply, and that concrete social housing objectives are based on the socio-economic status and risk factors. At the EU level, a common definition of social housing is absent, and definitions and explanations of the concept of social housing vary from one EU country to another. However, as for state aid, the European Commission adheres to a restrictive definition of social housing, according to which this type of housing is reserved for disadvantaged groups.

The individual EU countries differ in the distribution of the population by tenure status. In most publications, this difference is only mentioned as a fact. We quantified these differences between selected EU countries using measures of similarity of structures.

3. Methodology and Data

A similarity or distance measure can be defined as a tool to quantify the similarity or dissimilarity between the object or known as a function that can compute the degree of similarity or dissimilarity between a pair of objects. Numerous similarity measures and distance measures have been used widely in various fields. For example, in social network, text similarity, document similarity, triangle inequality, image retrieval handwritten character, in biology and chemistry (Bero et al., 2017).

From the mathematical point of view, the measure of distance is used to define how far two objects are from each other (Cha, 2007). From the metric point of view, distance is also known as dissimilarity, yet the concept is still the same. It is used to find the distance between two objects. In terms of distance coefficients, the distance is used to quantify the degree of difference between two objects. The smaller value of distance, the larger the degree of similarity and vice versa (Bero et al., 2017).

The majority of the similarity measures are grouped under statistics known as Correlation and Non-Correlation, for example, the Tanimoto coefficient, Dice Coefficient, Cosine Coefficient, Euclidean Distance and Hamming Distance.

For the quantitative comparison of the distribution of the population by tenure status, measures of similarity of structures were used. The question may arise as to what method measure of similarities of structures was implemented in the applied approach or how the cosine coefficient of similarity was used for measuring similarity structures of housing in the EU countries according to the indicators from EU statistics on income and living conditions, e.g. EU-SILC variables in our database.

To characterise the similarity of a pair of structures $\mathbf{p}_1 = (p_{11}, p_{12}, \dots, p_{1m})$ and $\mathbf{p}_2 = (p_{21}, p_{22}, \dots, p_{2m})$, we used coefficient constructed on the principle of measuring the distance of two vectors \mathbf{p}_1 and \mathbf{p}_2 . Cosine coefficient of structure similarity is the cosine of an angle φ , $0 \leq \varphi \leq \frac{\pi}{2}$, which is formed by a pair of nonnegative vectors \mathbf{p}_1 and \mathbf{p}_2 . Cosine of this angle is given by formula (Bartošová & Bína, 2010):

$$k(p_1, p_2) = \frac{\sum_{k=1}^m p_{1k} p_{2k}}{\sqrt{\sum_{k=1}^m p_{1k}^2 \sum_{k=1}^m p_{2k}^2}} \quad (1)$$

where p_{1k} is the proportion of k -th component on the total of the first structure, p_{2k} is the proportion of k -th component on the total of the second structure, m is the number of components of the structure. The values of the cosine coefficient lay in the interval $(0,1)$. Its upper values signalise a higher similarity of structures when the structures are identical $k(p_1, p_2) = 1$ and in case of their complete difference $k(p_1, p_2) = 0$.

The data used in this article are primarily derived from microdata from EU-SILC⁴ 2007 – 2016. The reference population is all private households and their current members residing in the territory of an EU member state at the time of data collection. EU-SILC is the EU reference source for comparative statistics on income distribution, living conditions and social exclusion at European level, particularly in the context of the Open Method of Coordination (OMCs) on social inclusion, pensions and health care.

The variable *Tenure status* (TENSTA_2, online data code: ilc_lvho02) is analysed Housing tenure refers to “the arrangements under which the household occupies all or part of a housing unit”. Different types of housing tenure can be distinguished, and the categorisation is mainly determined by whether the dwelling is owned by the household who occupies it or not⁵. We used the following classification for the housing tenure status in EU-SILC datasets: *Total* (TOTAL), *Owner, with mortgage or loan*: OWN_L (the household owns the dwelling but is currently paying off the mortgage), *Owner, no outstanding mortgage or housing loan*: OWN_NL (the household owns the dwelling and has no outstanding mortgage related to the dwelling), *Tenant, rent at market price*: RENT_MKT (the household rents the dwelling at market prices on the private rental market), *Tenant, rent at a reduced price*

or free: RENT_FR (the household rents the dwelling at reduced market prices, e.g. employer-subsidised housing and accommodations where rent is fixed by law, includes accommodation provided for free too). These are basic categories which can be identified across countries and are therefore useful for international comparison. Nevertheless, countries often use different or additional categories of housing tenures. For instance, social rental housing in most countries is included under subsidised rent, but in some cases, it is classified as private rent⁶.

The relative size of the social housing sector is in this paper calculated as a proportion of the population living in a dwelling with a reduced-price rent or occupying a “*dwelling free of charge*”.

Also, a methodology known as Cluster Analysis with use of distance measures is often applied in statistical practice to compare structures, but in our application could not be considered as appropriate for original EU-SILC variables, because the initial conditions and assumptions of its application were not met in this case. The input variables, drawn from EU-SILC, were significantly correlated with each other, and also their replacement by suitable composite variables not offered good, properly interpretable results.

4. Results and Discussion

We will, at this point, deal with the results of our research and our contribution to research for social housing in 28 EU member countries.

4.1 Social housing in the European Union

There is no common definition of the term indicating social housing, e.g., affordable housing across Europe. Different definitions are related to a different level of public intervention in this sector. The common feature is the fact that the purpose of social housing is the general interest, the increase of affordable housing supply and that concrete social housing objectives are based on the socio-economic status and risk factors present. As for state aid, the European Commission adheres to a restrictive definition of social housing, according to which this type of housing is reserved for disadvantaged groups⁷.

In many countries, there is no definition for “social housing” (e.g. Estonia, Cyprus, Croatia, Germany), no official definition (e.g. Austria, Netherlands, Poland, Czech Republic, Ireland, Hungary) or no definition that is unanimously accepted (e.g. France). There is no social housing in Cyprus and Greece (Braga & Palvarini, 2013).

In countries where legislation exists, definitions of social housing refer to different aspects of the tenure. Social housing provision in Belgium is meant to offer adequate housing, i.e., qualitatively suitable to ensure hygienic standards and living conditions, but still affordable and with certain security of tenure for households on a low income. Social housing in Bulgaria consists of municipally owned dwellings let to particularly needy people. In Finland, the right to housing is established by the Constitution, and the purpose of social housing is to facilitate access to secure and high-quality housing for all. In Denmark, social housing or, more specifically, not-for-profit housing consists of housing for rent provided at cost prices by not-for-profit housing associations. Social housing in Latvia consists of “social houses” and “social apartments” rented by municipalities at affordable rents to vulnerable households. Municipal apartments let at a rent fixed by the state represent social housing in Lithuania. Social housing in Malta refers to the provision of housing and housing assistance to households that are in particularly severe need, usually on a rental basis. In Portugal, legal concept based on 1983’ legislation defined social housing as housing built and bought with the financial support of the state. In Romania, the term social housing (or “social houses”) is officially defined as “public dwellings with subsidised lease, allocated to individuals or families whose financial position would not otherwise allow them access to tenements leased on the market”. In Slovenia, social housing is officially defined as non-profit rented dwellings, and it is addressed to people on low to middle income. Social housing in the United Kingdom is low-cost housing allocated on the basis of need. In Sweden, the term “social housing” is not used. The corresponding sector is called “*allmännyttig*”, which literally means “public utility” or “for the benefit of everybody”. Social housing in Italy consists mainly of dwellings rented on a permanent basis; also, to be considered as social housing are dwellings built or rehabilitated through public and private contribution or the use of public funding, rented for at least eight years and also sold at affordable prices, to achieve a social mix (Pittini & Laino, 2011).

It is difficult to compare social rental housing across countries. The household surveys distinguish between outright owners, owners paying off a mortgage and tenants. Yet the distinction between tenants paying a market-rate rent and tenants paying a subsidised, reduced rate is less clear. Subsidised rental should thus include not only social housing but also employer-subsidised housing and dwellings where rent is fixed by law. In many countries, the share of households benefitting from subsidised rents according to survey data is thus larger than the social housing sector. In some countries, the opposite holds due to data limitations. In Denmark and the

Netherlands, all tenants are attributed to the market rent. The size of the social rental sector is larger than the reported share of subsidised rent in Austria and France⁸.

It is not sufficient to compare the structure of housing, especially with regard to the availability of housing for the general public. The reason was already mentioned. It is inconsistent understanding or defining social housing - affordable housing in EU countries.

Comparing the structure of housing, especially in terms of availability of housing for the general public, is not sufficient according to the results of the state statistics of EU countries. Varying understanding and inconsistent definition of affordable housing – social housing in the EU countries are the reasons. Therefore, the data from the harmonised European Union Statistics on Income and Living Conditions (EU-SILC) from the year 2016 were used for our analyses and comparisons.

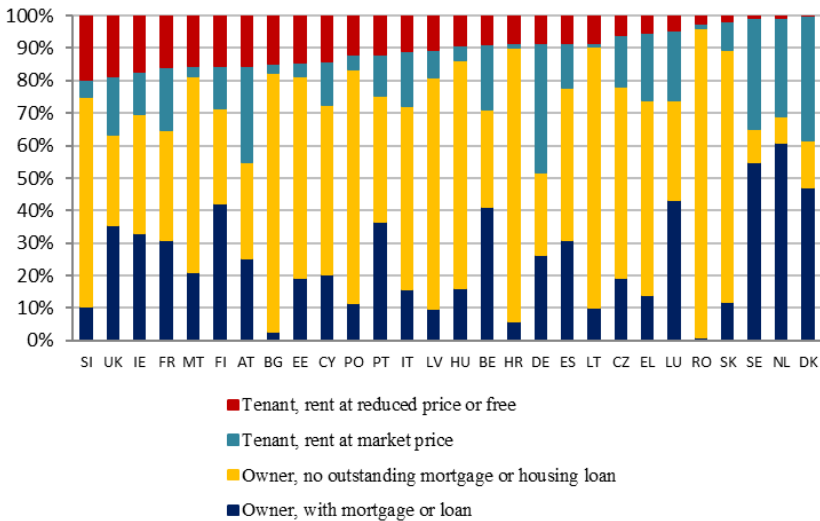
4.2 Empirical Results

On the basis of data from the European Union Statistics on Income and Living Conditions (EU-SILC) in 2016, seven out of every ten (69.2%) persons in the EU-28 lived in owner-occupied dwellings, while 19.9% were tenants with a market price rent, and 10.9% were tenants in reduced-rent or free accommodation. The share of the population living in a dwelling with a reduced-price rent or occupying a dwelling free of charge was less than 20.0% in all of the EU member states.

The proportion of people living in a dwelling with a reduced-price rent or occupying a dwelling free of charge was highest, among the EU Member States, in Slovenia (19.6%), the UK (18.6%) and Ireland (17.1%). The lowest proportion was registered in Sweden (0.8%), the Netherlands (0.7%) and Denmark (0.1%) – see Figure 1.

The most common tenure in Slovakia in 2016 was owner-occupation, with 89.5% of the population living in owner-occupied housing against 10.5% tenants. The share of persons living in rented dwellings with a market price rent in 2016 was less than 9.0%, and the share of the population living in a dwelling with a reduced-price rent or occupying a dwelling free of charge was 1.6%.

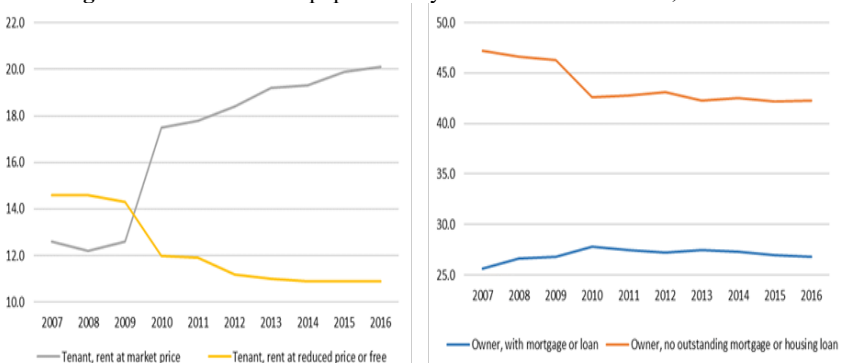
Figure 1: Distribution of population by tenure status (% of the population), 2016



Source: Eurostat (online data code: ilc_lvho02), own processing

Social housing in EU-28 has been decreasing over the last ten years. The proportion of people living in a dwelling with a reduced-price rent or occupying a dwelling free of charge in the EU-28 has been decreasing from a peak of 14.6% in 2007 to 10.9% in the year 2016 ($\bar{k} = 0.968$). In contrast, the share of persons living in rented dwellings with a market price rent has increased ($\bar{k} = 1.053$) from around 7.5 pp. (Figure 2).

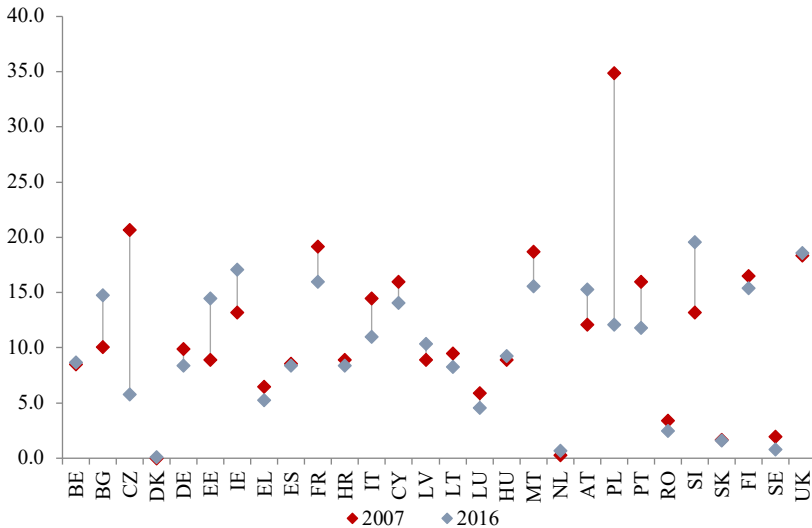
Figure 2: Distribution of population by tenure status in EU-28⁹, 2007-2016



Source: Eurostat (online data code: ilc_lvho02), own processing

Between 2007 and 2016, the share of people who lived in subsidised rental accommodation (Figure 3) remained more or less stable in many countries (BE, DK, ES, HR, HU, NL, SK, UK)¹⁰.

Figure 3: Change in share of population living in a dwelling with a reduced price rent or occupying a dwelling free of charge (2007 – 2016, % of the population)



Source: Eurostat (online data code: ilc_lvho02), own processing

The share of people living in a dwelling with a reduced price rent or occupying a dwelling free of charge fell in Poland (from 34.9% in 2007 to 12.1% in 2016), in the Czech Republic (from 20.7% to 5.8%), in Portugal (from 16.0% to 11.8%), in France (from 19.2% to 16.0%), in Malta (from 18.7% to 15.6%) and in Italy (from 14.5% to 11.0%). By contrast, in Estonia, Ireland, Austria and Slovenia, the share of people who lived in subsidised rental accommodation has risen.

Differences between distributions of the population by tenure status of the individual EU countries were quantified using a coefficient of similarity of structures. For requirements to find similarities we have quantified cosine coefficient of structures similarity based on the structure composed of four categories (*Owner, with mortgage or loan, Owner, no outstanding mortgage or housing loan, Tenant, rent at market price, Tenant, rent at a reduced price or free*). We compared the distribution of the population by tenure status in the Slovak Republic with other EU countries.

Table 3: Cosine coefficient of similarity in 2016 (Slovakia and other countries)

LV	LT	HU	HR	PO	RO	BG	CZ	EL
0.9924	0.9917	0.9898	0.9892	0.9883	0.9854	0.9770	0.9743	0.9729
EE	IT	SI	MT	CY	ES	PT	IE	FR
0.9678	0.9665	0.9632	0.9574	0.9455	0.8966	0.8041	0.7959	0.7717
AT	BE	LU	UK	FI	DE	DK	SE	NL
0.7140	0.6890	0.6799	0.6744	0.6706	0.6138	0.4065	0.3403	0.2971

Source: Own calculation

The cosine coefficient of similarity takes the values signalling high level of similarity of the structure of the population by tenure status of Slovakia and Latvia (LV; 0.9924), Lithuania (LT; 0.9917), Hungary (HU; 0.9898), Croatia (HR; 0.9892), Poland (PO; 0.9883), Romania (RO; 0.9854) and Bulgaria (BG; 0.9770), see Table 3 (the values are in decreasing order).

In the group of countries with the largest share of social housing (SI, UK, IE, FR, MT, FI, AT), the following countries had the most similar population structure by tenure status: Ireland and France (cosine coefficient of similarity in 2016 is 0.9916), the UK and France (0.9884), the UK and Finland (0.9876), Slovenia and Malta (0.9842), see Table 4.

Table 4: Cosine coefficient of similarity in 2016 (the highest share of social housing)

	SI	UK	IE	FR	MT	FI	AT
SI	1.0000	0.7399	0.8480	0.8179	0.9842	0.7196	0.7526
UK	-	1.0000	0.9808	0.9884	0.8101	0.9876	0.9519
IE	-	-	1.0000	0.9916	0.9077	0.9766	0.9318
FR	-	-	-	1.0000	0.8723	0.9703	0.9703
MT	-	-	-	-	1.0000	0.8106	0.7855
FI	-	-	-	-	-	1.0000	0.9031

Source: Own calculation

For the results in the group of countries with the smallest share of social housing (CZ, EL, LU, RO, SK, SE, NL, DK), the most similar population structure by tenure status was had by Sweden and Netherlands (0.9947), the Czech Republic and Greece (0.9936), Sweden and Denmark (0.9907) (see Table 5).

Table 5: Cosine coefficient of similarity in 2016 (the smallest share of social housing)

	CZ	EL	LU	RO	SK	SE	NL	DK
CZ	1.0000	0.9936	0.8166	0.9244	0.9743	0.5300	0.4865	0.5921
EL	-	1.0000	0.7772	0.9286	0.9729	0.4922	0.4386	0.5675
LU	-	-	1.0000	0.5480	0.6799	0.9136	0.8995	0.9242
RO	-	-	-	1.0000	0.9854	0.1756	0.1322	0.2470
SK	-	-	-	-	1.0000	0.3403	0.2971	0.4080
SE	-	-	-	-	-	1.0000	0.9947	0.9907
NL	-	-	-	-	-	-	1.0000	0.9718

Source: Own calculation

5. Conclusion

The article provides a brief summary of information sources and the availability of current data on a given topic, the results from a descriptive statistical analysis of the latest available EU-SILC data, and conclusions about dissimilarities of structures of housing by the tenure status in the EU member countries.

There are approached diverse ideas of the concept of affordable housing – social housing across the EU countries, in the first part of the article. Diversity implies vast differences in the levels of social housing present in each country. More than half of the population in each EU member country lived in owner-occupied dwellings in 2016, ranging from 51.7% in Germany up to 96% in Romania. The share of the population living in a dwelling with a reduced-price rent or occupying a dwelling free of charge (social housing) was less than 20.0% in all of the EU member states (from 0.1% in Denmark to 19.6% in Slovenia) and less than 10.0% in 14 member states.

The second part presented the results of the distribution of population analysis by tenure status in the EU member countries. We were mainly interested in the part of the population living in a dwelling with a reduced-price rent or occupying a dwelling free of charge (social housing).

Data from EU-SILC (*Tenure status*) were used. The relative size of the social housing was calculated as a proportion of the population living in a dwelling with a reduced-price rent or occupying a dwelling free of charge. These differences in the volume of social housing between Slovakia and selected EU countries in 2016 were quantified using measures of similarity of structures. The cosine coefficient of similarity signalises a high level of similarity of the structure of the population by tenure status of Slovakia and

Latvia (0.9924), Lithuania (0.9917), Hungary (0.9898), Croatia (0.9892), Poland (0.9883) and Romania (0.9854).

Between 2007 and 2016, the share of people who lived in subsidised rental accommodation remained more or less stable in many EU countries. The proportion of people living in a dwelling with a reduced-price rent or occupying a dwelling free of charge was highest, among the EU Member States, in Slovenia, United Kingdom and Ireland, and the lowest proportion was registered in Sweden, Netherlands and Denmark. The cosine coefficient of similarity signalises a high level of similarity of the structure of the population by tenure status of Slovakia and Latvia, Lithuania, Hungary, Croatia, Poland and Romania. A very low level of similarity of structures was found between Slovakia and the UK, Finland, Germany, Denmark, Sweden and Netherlands. The countries are in order from highest to lowest.

However, the research results are in line with the used definition of social housing in the EU member countries based on the variables of harmonised EU-SILC data. There are limitations of nonexistence harmonised data in the area of social housing's study, but in particular in comparison of the structure of housing in terms of its availability for the general public. The analogous study is not sufficient according to the results of the state statistics of EU countries.

It is also important to know that over 70% of young Slovaks are living with their parents. More than one out of four of the EU young people (age from 15 to 29, 17.7% of the population) live in an overcrowded household. While house prices are growing faster than income in the most EU member states, inequality and housing exclusion are mutually reinforcing. The political response to Europe's housing challenge remains inadequate and has resulted in increasing level of homelessness. Therefore, we strongly emphasise addressing other problems which highlight the importance of analyses regarding the subject of "social housing of poor people or members of socially vulnerable groups in the EU". Such problems include substandard and inadequate housing for a diverse young population, housing as the highest expenditure for Europeans, an adequate and affordable housing in places where job opportunities exist, affordable housing and the challenge of an ageing population – increasing needs of older people in the field of social housing, social housing of immigrants, and non-profit social services versus social entrepreneurship, to name a few.

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Notes

1. Retrieved from <http://www.housingeurope.eu/section-14/research?topic=&type=country-profile&order=datedesc>
2. Retrieved from <https://www.eurofound.europa.eu/publications/report/2017/fourth-european-quality-of-life-survey-overview-report> or <https://www.eurofound.europa.eu/surveys/european-quality-of-life-surveys/european-quality-of-life-survey-2016>
3. Retrieved from <http://www.housingeurope.eu/page-91/the-observatory>
4. EU SILC methodology – concepts and contents are available at: <http://ec.europa.eu/eurostat/statistics-explained/pdfscache/35201.pdf> [Accessed 14 June 18].
5. HM1.3 Housing Tenures. Retrieved from <https://www.oecd.org/els/family/HM1-3-Housing-tenures.pdf>
6. HM1.3 Housing Tenures. Retrieved from <https://www.oecd.org/els/family/HM1-3-Housing-tenures.pdf>
7. State Housing Policy Concept to 2020 of Ministry of Transport, Construction and Regional Development of the Slovak Republic (3.3, p. 21). English version available at: <https://www.mindop.sk/ministerstvo-1/vystavba-5/bytova-politika/dokumenty/koncepcie>
8. HM1.3 Housing Tenures. Retrieved from <https://www.oecd.org/els/family/HM1-3-Housing-tenures.pdf>

9. In 2007 – 2009 before the accession of Croatia, in 2010 – 2016 current composition.
10. Member States of the European Union (EU) and other countries have been assigned a two-letter country code, always written in capital letters, and often used as an abbreviation in statistical analyses, tables, figures or maps. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Country_codes

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