HOUSEINC

Affordable, sustainable and inclusive housing for marginalised communities

D3.1 Report on Selection of Datasets and Indicators for Selected Countries

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About

The objective of HouseInc is to apply innovative methodology to deeply analyse interlinked dimensions of housing inequalities in the context of marginalized communities.

HouseInc will empirically examine economic, social and ecological drivers and assess impacts of various indicators on housing inequality to derive policy recommendations that foster the adoption of effective measures addressing housing inequality across Europe. With a transdisciplinary dialogue, the project develops innovative social, financial and digital solutions that can be up scaled and thus, contribute to a better socio-economic and sustainable integration of vulnerable groups in European societies.

HouseInc takes a systemic view and assesses interlinkages of housing inequalities - emphasizing energy and mobility poverty, digital dimensions, employment opportunities, family and socio-demographic conditions, energy-efficiency, and health - on a micro-, meso- and macro-level. The interdisciplinary HouseInc consortium - consisting of research institutes and universities, policy think tanks, NGOs, and practitioners on the ground - involves case studies to engage directly with members of four marginalized communities in or from Eastern Europe.

Besides a mix-method approach, including modelling and a GIS-based analysis depicting geographical and future housing inequality, we implement a multinational survey to better understand housing inequality in light of recent events such as COVID-19 and Russia's invasion in the Ukraine. The research results will be assessed, mapped, and scaled up using Living Labs and various stakeholder engagement activities to provide innovative solutions addressing housing inequalities and translating them into valid local, regional, national and EU policy recommendations impacting EU and national funding programs and providing a comprehensive overview and guidance for policymakers to mitigate housing inequalities.

Project partners

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Abbreviations

DO	Data Overview (MS Excel file with housing inequality indicators and possible explanatory factors)
CEE	Central and Eastern Europe
SEE	South East(ern) Europe
EU-SILC	European Union - Survey on Income and Living Conditions
IRQ	Interquartile range
GDP	Gross Domestic Product
OECD	Organization for Economic Cooperation and Development
UN	United Nations
EMF	European Mortgage Federation
LTV	Loan-to-value ratio
HFCS	Household Finance and Consumption Survey
P/I	Price-to-income ratio
R/I	Rent-to-income ratio
A/I	Annuity-to-income ratio
ESS	European Social Survey
EQLS	European Quality of Life Survey
WP	Work package
PAPI	Paper-and-pencil-interview
CAPI	Computer-assisted personal interview
WB	World Bank
CIA	Central Intelligence Agency
ILO	International Labour Organization
IMF	International Monetary Fund

EXECUTIVE SUMMARY

Overview of Objectives

Work Package 3 of the HouseInc project aims to analyse the drivers and consequences of financial levels of housing inequality, focusing on three dimensions: (1) housing affordability, (2) affordability of mortgage finance, and (3) housing wealth inequality. This report specifically addresses the identification of countries and datasets for analysis, defines indicators of housing inequality, and provides a foundation for further quantitative investigations of housing inequality. The overarching goal is to create actionable insights to inform housing policies and interventions that mitigate inequality and improve access to housing.

Country Selection for Analysis

We defined "core country group" where we are going to conduct major quantitative analyses, and for which all necessary data will be available. This group consists of eight countries—UK, Finland, Germany, Netherlands, Italy, Belgium, Czechia, and Estonia. Romania will also be included for specific Work Package 4 tasks due to its unique post-socialist characteristics. The selection criteria emphasized availability of secondary data and diversity of institutional, geographic, macroeconomic and demographic contexts. Institutional classifications, such as Kemeny's housing regimes, Esping-Andersen's welfare regimes, and Schwartz and Seabrooke's residential capitalism typologies, were applied to ensure representation of varied housing and welfare systems. This diversity provides a robust foundation for comparative analysis and highlights the heterogeneity of housing systems across Europe. For example, the Netherlands and Estonia represent distinct housing regimes, with the former emphasizing tenant protections and the latter reflecting post-socialist transitions. These distinctions underscore the importance of contextualizing housing inequality within broader socio-economic and institutional frameworks, acknowledging the interplay between historical, cultural, and economic factors. The selected countries also reflect diverse geographic and climatic conditions, ensuring that findings capture regional variations.

Indicators of Housing Inequality

Indicators for measurement of financial levels of housing inequality are set in this report in following different domains:

1. *Homeownership accessibility:* The share of households living in owner-occupied housing (homeownership rate) across the income distribution will be used as the main indicator.
2. *Housing affordability:* The main indicators include share of households with total housing cost-to-income ratio over certain thresholds, coefficient of variation of total housing cost-to-income ratio, share households with of rent-to-income ratio over certain thresholds, coefficient of variation of rent-to-income ratio, variation of residual income and price-to-income ratio across the household income distribution.
3. *Mortgage finance affordability:* Coefficient of variation of annuity-to-income ratio under standardized mortgage conditions is used to assess credit access disparities. It highlights an impact of rising interest rates and macroprudential policies on low- and middle-income households, offering insights into the barriers these households face in achieving homeownership.
4. *Housing wealth:* Indicators include the Gini coefficient, Atkinson index, and Theil index for net household housing wealth. The growing significance of housing as a form of wealth underscores its impact on intergenerational inequality and economic mobility.

5. *Housing precarity:* The main indicator is share of households having deficiencies in all or some of the four dimensions of housing precarity (housing affordability, housing security, housing quality, and quality of neighbourhood, see section 3.1.).

Next to "objective" indicators we also employ subjective measures of housing inequality, such as variation/distribution in perceptions of housing affordability, housing quality and overcrowding across different income groups. Inclusion of subjective measures reflects lived experiences and quality-of-life aspects not captured by purely objective metrics, acknowledging the role of perception in housing-related stress and decision-making. This dual approach captures both statistical trends and individual attitudes, enabling a nuanced understanding of inequality.

Key data adjustments connected with measurement of housing inequality indicators included:

- Equalizing household incomes (when inequality is assessed across the household income distribution) in order to account for household size and composition, ensuring comparability across diverse household structures and improving the accuracy of income-based measures.
- Exclusion of outliers using interquartile range thresholds for indicators like price-to-income ratio and annuity-to-income ratio, which enhances the reliability of findings and minimizes distortions caused by extreme values.

The unit of analysis was the household, emphasizing shared housing costs and economies of scale, as well as the interplay of household dynamics in determining housing conditions. This focus ensures that policy implications are grounded in real-world household decision-making processes, offering actionable insights that align with everyday challenges faced by residents.

Drivers of Housing Inequality

This report also briefly defines list of various (but still not all) potential factors that may influence levels and trends in housing inequality, both among and within selected countries, such as:

- *Macroeconomics:* GDP, unemployment, inflation rate, energy prices, interest rate, income inequality, public deficit, government expenditure, government debt, housing saving rate, current account balance, labour cost, labour productivity. These factors shape both the supply and demand sides of housing markets, influencing affordability and wealth disparities. Rising inflation and fluctuating interest rates, in particular, have heightened challenges for mortgage accessibility.
- *Demographics:* population size and structure, degree of urbanization, immigration, structure of households, society ageing, number of municipalities. For instance, increased urbanization drives up housing costs in major cities.
- *Geography and climate:* area, average sea level, average temperatures, population density, precipitation or air pollution.
- *Housing regime, policy and politics*: housing regime/policy, broader institutional context, politics, tenure structure, size of housing stock, level of housing construction, mortgage loan regulations.
- *A number of characteristics at individual and/or household level:* household income/wealth, size of household, type of household, number of dependent children, size of household residence, region of residence, household status (ISEI), sex / gender / age / nationality / education / (un)employment, housing and energy costs, housing tenure, housing type, housing size (overcrowding), heating,

way of acquiring residential property, intergenerational transfers (assistance), arrears or take-up of housing benefit (or other social benefits).

These drivers, as well as others not mentioned in this list, underline the complexity of housing inequality, necessitating multifaceted policy responses that address both structural and situational factors. Recognizing the interconnectedness of these domains is essential for developing comprehensive solutions.

Data Sources and Surveys, Data Collection

The report leverages several major secondary datasets that contain data on financial levels of housing inequality and its potential drivers:

1. *EU-SILC (European Union Statistics on Income and Living Conditions):* It offers both cross-sectional and longitudinal data on income, poverty, and living conditions. This dataset provides critical insights into housing affordability and precarity across different income groups, making it indispensable for comparative analysis.
2. *HFCS (Household Finance and Consumption Survey):* It provides detailed household-level data on wealth, income, and consumption, enabling analyses of housing wealth disparities. The depth of this dataset allows for nuanced examinations of financial inequalities.
3. *ESS (European Social Survey):* It explores social attitudes and behaviours, offering context for housing-related perceptions and decisions. This dataset helps connect individual experiences to broader societal trends.

These datasets enable comprehensive analyses of housing inequality and its drivers across diverse contexts. Their integration enhances the robustness of findings and provides a foundation for targeted policy interventions. Leveraging their combined strengths ensures a holistic approach to understanding housing challenges.

In addition to microdata from these large survey datasets, we also collected additional external data from international and country statistics, such as country housing stock characteristics (volume of housing stock, housing output, housing tenure structure, total outstanding residential loans, average interest rates on new residential loans, residential house price indices, price-to-income and rent-to-income indices), geography and climate characteristics (average sea level, temperatures, precipitation, air pollution), macroeconomics (GDP per capita, unemployment rate, inflation rate, government expenditure and debt, household savings rate, current account balance), demographics (e.g. population size, ageing ratio, urbanization, number of municipalities), and data on governmental regulations (e.g. rent control, homeownership taxation or marginal income tax rates). A range of sources were used for the purpose of data collection, including Eurostat, OECD, the World Bank, national statistical offices, the United Nations, the European Mortgage Federation, and the International Labour Organization, amongst others.

All secondary data (or their source and links to them) were summarized into specific *Data Overview* (DO). The DO is produced in MS Excel and represents a useful tool for following quantitative analyses of housing inequality – it contains both indicators of housing inequality and diverse variables that could potentially be tested as its drivers, including their values for some of them in time series. DO allows for selection of data/variables according to different criteria (country, source of data, time, indicators/drivers, etc.). In some cases, only variable names and sources/surveys where data can be drawn are listed, but for some crucial variables, time series are presented directly there (if available). DO is not a closed task; instead,

new variables and time series of indicators of housing inequality and their drivers (not known in time of writing this report) will continuously be added into database till the end of the HouseInc project.

Key Findings and Insights

The report in its final section highlights several very preliminary and illustrative trends in housing inequality measured by selected indicators outlined here. These results are not definite and serve only as gateway to deeper and more precise analysis of housing inequality and its drivers in the future.

- There are significant differences among the core group countries in terms of housing tenure. Romania is clearly the country with the highest share of households living in owner-occupied dwellings, followed by Estonia, the Czech Republic and Belgium, where the share of owner-occupiers tends to be above average. On the other hand, Finland, the Netherlands and especially Germany are among the countries with a rather low proportion of households living in owner-occupied dwellings. Unsurprisingly, the countries with the highest proportions of owner-occupiers are among those where owner-occupiers are relatively evenly spread across the income spectrum, i.e. where inequality in homeownership accessibility is low. On the contrary, the Netherlands, Germany and Finland are among the countries with the highest levels of inequality in this domain.
- The Netherlands, followed by Germany and, to a lesser extent, the Czech Republic and Belgium, had the highest share of households with a total housing cost-to-income ratio above 40%. Conversely, Italy had the lowest proportion of households threatened by housing unaffordability, while Finland also had a relatively low proportion. Romania and Estonia were just below the EU average on this indicator.
- Measuring inequalities in housing affordability with only one figure per country masks significant differences between the situation of tenants and homeowners. In all countries, the share of households with total housing costs-to-income ratio above 40% was significantly higher among tenants. Among the core group countries, the share of households living in rental housing with total housing costs-to-income ratio above 40% was highest in Romania, followed by Belgium, the Netherlands, the Czech Republic, Estonia and Italy. In Germany and Finland, the share of households living in rental housing with a total housing cost-to-income ratio above 40% was below the EU average. The highest variation in the value of the total housing cost-to-income ratio was observed in Italy, followed by Estonia and Romania (i.e. mainly in countries with a relatively high homeownership rate). On contrary, it was the lowest in the Czech Republic, the Netherlands and Finland (i.e. mainly in countries with a relatively high share of rental housing).
- Regarding inequalities in affordability of rental housing, the highest proportion of households with a rent-to-income ratio above 30% was found in Belgium, followed by Finland, Romania, Estonia and the Netherlands. The lowest proportions of households with rent-to-income ratios above 30% was found in the Czech Republic and Germany.
- We measured inequalities in the affordability of owner-occupied housing as the ratio between the average price-to-income (P/I) of the lowest-income households (1st quintile of equivalised net income) and the highest-income households (5th quintile of equivalised net income). Italy and the Czech Republic were among the countries with relatively high inequalities in access to owner-occupied housing. On the other hand, countries with low inequalities in access to owner-occupied housing include Finland, Germany and the Netherlands.

- As a representative of subjective indicators that can be compared with their objective counterparts, the proportion of households that reported that the total cost of housing was a heavy burden was chosen. For each country, this share was compared with the share of households with a total housing cost-to-income ratio above 40 per cent. The Netherlands was the only country (from the core countries group) for which the proportion of households with total housing cost-to-income above 40% was higher than the proportion of households that reported that total housing costs were a heavy burden for them. Besides that, the substantial disparities in the values of the two indicators were particularly evident for Italy and Romania. In contrast, the disparities were comparatively less pronounced in Estonia, Germany, the Czech Republic, the Netherlands, Finland and Belgium.
- We further compared the proportion of households reporting that lack of space in their dwelling was a problem with the proportion of households living in overcrowded dwellings as defined by Eurostat. In 11 out of 28 countries, the proportion of households actually living in overcrowded dwellings was higher than the proportion of households reporting problems with a shortage of space in their dwelling. In the remaining countries, the reverse was true.
- According to the EU-SILC 2023 data, the highest housing precarity level among the core countries was recorded in Romania, with almost 50 % of households having deficiencies in at least one of the three dimensions of housing precarity. In contrast, the country with the lowest level of housing precarity was Belgium, with less than a third of households having problems in at least one dimension. The overall levels of housing precarity does not differ substantially among countries (e.g. Czechia, Finland and Belgium have almost the same share of households in housing precarity). However, when we look at the individual dimensions of housing precarity, we see larger variance. For instance, in the case of housing cost overburden rate (i.e. total housing cost-to-income ratio), the Netherlands have highest share of households that spends over 40% of disposable income on housing costs which explains most of its housing precarity.
- Indicative housing wealth inequality comparison showed that Germany and Estonia were in 2021 the countries with the highest levels of wealth inequality, with the Czech Republic and Belgium at the other end of the ranking. In between were Finland, the Netherlands and Italy.

By combining robust data analysis with nuanced indicators, the HouseInc project seeks to inform policies that promote equitable housing access and address the multifaceted nature of housing inequality. The findings and methodologies outlined in this report serve as a step toward achieving these goals, providing a roadmap for future research and actionable policy solutions.

1. INTRODUCTION – THE GOAL OF WORK PACKAGE 3

As stated in *D2.1 State of the art literature report* (2024) of HouseInc project, "understanding the multiple dimensions of housing inequality is essential for developing effective policies and interventions aimed at promoting equitable access to housing and fostering inclusive societies." (p. 11). The Work Package 3 (WP3) focuses on the analysis of drivers and consequences of *financial* levels of housing inequality, namely inequality in (1) housing affordability; (2) affordability of mortgage finance; and (3) housing (residential) wealth. The financial dimension of housing inequality is most frequently analysed in existing housing studies, often in association with specific housing regimes/policies and recent housing financialisation process. By housing financialisation we understand a process by which housing becomes treated primarily as a financial and investment asset, rather than solely as a place to live (home).

Despite extensive research, however, some drivers of financial levels of housing inequality still remain hidden, and some others were analysed only in (1) specific local context (e.g. one country), and/or (2) using qualitative methodology of sociological research that has limited power for generalisation. The goal of WP 3 of HouseInc project is thus to contribute to search for drivers and consequences of financial levels of housing inequality by exploiting extensively (1) secondary data from large household EU/international comparative surveys, and (2) quantitative research methodology. Specifically, there are five tasks planned for WP3:

- identification of datasets and countries for quantitative data analyses;
- measure long-term trends in financial levels of housing inequality in selected countries;
- test an impact of selected economic and demographic factors on inequality trends;
- test an impact of selected policy tools on inequality trends;
- test how housing wealth (income) inequality affects the housing market.

This report relates to the first task, i.e. identifying selected countries that will be included into comparative data analysis, and providing overview of possible datasets and variables that could be used for quantitative analyses of financial levels of housing inequality. In doing so, the recommended indicators of financial levels of housing inequality (task 3.2) are also defined, and computed for countries selected for comparative data analysis.

This report is complemented by the *Data Overview* (DO) produced in MS Excel that represents a useful tool for following quantitative analyses of housing inequality – it contains indicators of housing inequality and diverse variables that could potentially be tested as its drivers, including their values for some of them, available from both international country statistics and international household surveys. DO allows for selection of data/variables according to different criteria (country, source of data, time, indicators/drivers, etc.). In some cases, only variable names and sources/surveys where data can be drawn are listed, but for some crucial variables, time series are presented directly there (if available). DO is not a closed task; instead, new variables and time series of indicators of housing inequality and their drivers (not known in time of writing this report) will continuously be added into database till the end of the HouseInc project.

This report is structured in following way. In the next section we provide information about selection of countries that were included into so called "core country group" intended for further detailed quantitative analysis. The fourth section inform about selection of main datasets for data analyses in these countries,

specifically selection of surveys and country statistics. The next section focus on variables/data themselves – it presents main indicators/variables of housing inequality and main variables/potential drivers of housing inequality. The final section summarizes main conclusions and recommendations.

2. SELECTION OF "CORE GROUP" COUNTRIES FOR DATA ANALYSES

The first task of WP 3 was to identify the countries that will form "core country group" where we are going to *conduct major quantitative analyses,* and for which *all necessary data will be available,* including data from selected international comparative surveys, partners (legislation, policies, institutional background, house and rent statistics), national statistical offices, Eurostat, OECD and multinational survey conducted specifically under HouseInc project, Work Package 4. Due to several reasons (including a limited budget for the multinational survey) we set maximum of eight countries to be selected to this group. However, for some research goals and hypotheses, if data were available, this group could be expanded and include also other EU countries. The following were the main criteria that were used for selection of countries for the "core group":

- participation of country in international comparative surveys (availability of data)
- diversity in housing regimes
- diversity in levels of housing affordability and amounts of total household residential wealth
- diversity in geography and climate
- diversity in macroeconomic performance (GDP per capita and inflation)
- diversity in demographic/migration trends – population size, society ageing, foreign immigration and urbanization

Additionally, we took into account an intention expressed in project application that we will focus more on region of (post-socialist) Central and Eastern Europe because it is less represented in major housing inequality studies. Based on all above mentioned criteria, we selected following countries to the "core group": UK, Finland, Germany, Netherlands / Romania, Italy, Belgium, Czechia, and Estonia. While the Netherlands has been included into the core group for WP 3 tasks (as it represents specific housing regime and secondary data from large comparative surveys are available), Romania has been included into the core group for Work Package 4 tasks (and the multinational survey) because it represents post-socialist South-East European region, also with its specific climate. However, Romania did not take part in several major international (EU) comparative surveys and thus is not suitable for secondary data analysis made by WP 3.

One of the most important criteria used for country selection was that countries represent different housing/welfare regimes/systems. Table 1 shows grouping of 26 European countries (very small countries were excluded) according to their institutional context, and it demonstrates that selected countries (marked in the Table) belong to different groups delineated according to combination of major institutional variables ; and they thus represent diverse regimes and institutional backgrounds. For country selection, we used three deep-rooted institutional typologies: typology of housing regimes (Kemeny 1995), typology of housing systems or residential capitalism (Schwartz and Seabrooke 2008) and typology of welfare regimes (Esping-Andersen 1990).

The housing regime classification has been taken from housing regime theory of Swedish theorist Jim Kemeny (e.g., Kemeny, 1995). Kemeny (1995) views the private and social housing sectors as a reflection of two separate and competing ideologies: privatism and collectivism. Based on this ideological cleavage, he distinguished housing policy models as being either dualist (stigmatizing tenancy and unilaterally supporting owner-occupancy) or unitary (tenure-neutral) in nature. The dualist model is strongly associated with policies that discourage social housing and develop it only as a safety net 'to take care of those who become the casualties of the workings of the profit market' (Kemeny, 1995: 9). Unitary models, in contrast, encourage social housing, thereby allowing the public rental sector and the owner-occupied sector to compete.

The welfare regime typology of Esping-Andersen (1990) is frequently used also outside of domain of housing research; it is based mainly on the relative roles of state, market and family in the provision of welfare – however, housing has not been included to welfare provision during formation of this typology. During the study of 18 countries, Esping-Andersen (1990) created distinctive clusters of welfare regimes, which he labels liberal, corporatist (or conservative) and social democratic. "Within these regimes different interplays between the state, market and households (families) create distinctive systems that possess attributes relating to decommodification and stratification" (Stephens 2016, p. 21).

Finally, Schwartz and Seabrooke (2008) argue that housing systems can be judged by the way in which they connect households to financial markets, i.e., by two dimensions: (1) the level of homeownership that reflects different roles of state, market and family in housing provision; and (2) the extent to which housing finance is 'constrained' or 'deregulated'. The authors apply variations from average levels of homeownership and levels of mortgage debt on GDP for the 19 OECD countries to establish categorisations of what they call "varieties of residential capitalism" (Schwartz and Seabrooke 2008).

These three typologies are based on three different theories, and thus each provide an independent and exclusive country classification. However, they are also partially overlapping, especially the classification of welfare regimes is somewhat associated with classification of housing regimes, as noted by Stephens et al. (2015) and Stephens (2016):

"Esping-Andersen's welfare regimes reflect underlying power structures that produce welfare systems with necessary distributional outcomes. Kemeny's housing typologies reflect the underlying societal ideologies of 'privatism' and 'collectivism' which produce policy frameworks from which (in the west) either 'dualist' ownership or 'unitary' rental societies emerge. Although they identify different causes of regimes, their typologies reveal a remarkable congruence (for example, Esping-Andersen's social democratic and corporatist countries tend to be Kemeny's unitary housing systems, while liberal welfare regimes always coincide with dualist housing systems)" (Stephens et al. 2015, p. 1212).

"Corporatist countries facilitate competition between cost rental systems for-profit landlords in order to create unitary rental regimes, which provide an attractive alternative to home-ownership. In contrast non-corporatist countries permit only residual public rental sectors that are reserved for the poor, and separate from the for profit rental sector. These "dualist" rental regimes are unattractive and governments seek to promote home-ownership as the norm." (Stephens 2016, p. 21).

Such socio-economic typologies have been increasingly popular in macro- (comparative) sociology. They are outcomes of primarily theoretical historical, policy, or institutional analyses. As such they can explain some of the historical and institutional causes of current social changes, or the fact that one and the same

public intervention can have varied impacts in different contexts. However, they also face many adaptations and critique. For example, typology of Schwartz and Seabrooke (2008) is based on only two dimensions – level of homeownership and access to housing finance. Therefore, these were the only two figures - homeownership rate and mortgage debt to GDP - that were employed to establish international categorisation of housing systems. Many contextual, spacious, social, and cultural details were omitted. For example, "clearly, there is a fundamental difference between low debt ownership where the family is the resource behind the tenure and where this role was fulfilled by the one-off policy of the state (via large-scale privatization)" (Stephens et al. 2015, p. 1213).

However, these simplifications and generalisations during regimes or systems categorization are understandable because they do not present a holistic view of reality but serve only as an useful methodological device for understanding certain variations in performance and rules. And as such useful methodological device, they were used for our selection of countries for the "core group" that will undergo more detailed analysis of housing inequalities under WP 3 of this project.

Table 1: European countries and housing-institutional context

Country	Housing regime	Welfare state regime	Residential capitalism
UK	Dualist	Liberal	Liberal-market
Ireland	Dualist	Liberal	-
Finland	Dualist (partly)	Social-democratic	Statist-developmentalist
Norway	Dualist (partly)	Social-democratic	Liberal-market
Germany	Unitary	Conservative	Corporatist-market
Austria	Unitary	Conservative	Statist-developmentalist
France	Unitary (partly)	Conservative	Statist-developmentalist
Netherlands	Unitary	Hybrid (SD&CONS)	Corporatists-market
Sweden	Unitary	Social-democratic	Corporatists-market
Denmark	Unitary	Social-democratic	Corporatists-market
Italy	*(Dualist)*	Conservative	Familial
Belgium	*(Dualist)*	*(Conservative)*	Familial
Portugal	*(Dualist)*	Rudimentary/familial	Familial
Spain	*(Dualist)*	Rudimentary/familial	Familial
Greece	*(Dualist)*	Rudimentary/familial	-
Czechia	*(Dualist)*	*(Post-socialist)*	Statist-developmentalist
Estonia	*(Dualist)*	*(Post-socialist)*	.
Romania	*(Dualist)*	*(Post-socialist)*	Familial
Slovakia	*(Dualist)*	*(Post-socialist)*	Familial
Hungary	*(Dualist)*	*(Post-socialist)*	Familial
Poland	*(Dualist)*	*(Post-socialist)*	Familial
Bulgaria	*(Dualist)*	*(Post-socialist)*	Familial
Slovenia	*(Dualist)*	*(Post-socialist)*	Familial
Croatia	*(Dualist)*	*(Post-socialist)*	-
Latvia	*(Dualist)*	*(Post-socialist)*	-
Lithuania	*(Dualist)*	*(Post-socialist)*	-

Note : Bracket means that the country has not been included in original typology made by Kemeny or Esping-Andersen but type of the regime has been estimated in some later theory extensions by different authors. Countries selected to the core group are highlighted.
Source : authors.

The Annex – criteria used for selection of countries presents remaining tables on distribution of (larger) EU (+UK) countries according to other relevant criteria that we used for selection, such as climate, geography, etc. These tables demonstrate that selected core group countries reflect diverse geography, climate, housing affordability levels, house price trends, macroeconomic performance, and other criteria.

3. MEASUREMENT OF FINANCIAL LEVELS OF HOUSING INEQUALITY

The WP 3 concentrates on financial levels of housing inequality, specifically inequality in housing affordability, affordability of mortgage finance and housing (residential) wealth. This section of the Report provides information on how indicators of financial levels of housing inequality are computed, as well as information about main potential factors (drivers) that may explain diverse inequality levels and trends.

3.1. INDICATORS OF HOUSING INEQUALITY

Housing affordability/deprivation is the most commonly researched axis of housing inequality. 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, Williams 1990: p. 9).

There are different methodological approaches that can be used to calculate indicators of housing affordability (Bramley 1994; Hallet 1993; Hulchanski 1995; Freeman et al. 1997). 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. 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." Abeysinghe and Gu 2011, p. 1875) distinguish additionally 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."

In sum, an indicator approach uses indicators measuring the burden of household expenditure on housing; such indicators usually take the form of the ratio of housing costs (rent, price, energy costs) to household income. The residual approach is based on the evaluation of the so-called of residual income, which is equal to the sum of the household's total net income less housing costs. According to Eurostat (2023), for homeowners total housing costs include mortgage interest payments (net of 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), gross of housing benefits. For tenants, they include rental 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), gross of housing

benefits. Housing allowance/benefit should be properly employed in computation because the fact whether housing allowance/benefit has been deducted from costs or, instead, has been added to household income, may produce very different final results on housing affordability ratio. Disposable income is defined as after-tax disposable household income.

However, neither the cost nor the residual approach is exempt from the need to normatively determine a certain limit, the crossing of which indicates the fact that the existing housing is already financially unaffordable for the given household - for example, the determination of the maximum cost-to-income ratio or the minimum residual income. Determining such limit is difficult to justify scientifically, just like any normative judgement. For example, 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)" (Eurostat 2024). Housing benefit formula in some countries (e.g. Czech Republic), however, count with lower normative maximum rate of burden, e.g. 30% instead of 40%; although it is logically applied on housing costs before benefit deduction. One rigid norm on overburden rate applied to all EU member states in international comparison, published by Eurostat, may not sufficiently reflect differences among countries in their institutional and economic contexts, such as GDP per capita, macroeconomic performance, local housing policies, tenure structure, housing stock quality and size, regulations, traditions and cultural patterns (such as multigenerational co-living or intergenerational resource transfers).[1] Therefore, we will keep some variability in setting the norms and will reflect more the differences in institutional contexts when defining thresholds for measurement of housing affordability or overcrowding.

Another obstacle during housing affordability measurement, and especially during its international comparison, concerns different outcomes when "objective" or "subjective" measures of housing affordability are used. Objective measures are computed by researchers themselves from household data on housing costs, incomes, size and other. Subjective measures are derived from survey responses in which heads of household share their personal opinions on topics such as housing costs and cost overburden, etc.

There is a lot of general expert discussion about mutual interrelation and relevance of objective and subjective indicators. 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).

[1] A similar problem concerns Eurostat's rigid norm concerning overcrowding, also applied uniformly to all EU-member state in EU statistics.

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 statistics produced by Eurostat corresponds especially to the needs theory while the comparison theory has been very weakly reflected. Moreover, this situation even worsened during last years because Eurostat stopped including the question on subjective measurement of overcrowding in major comparative survey EU-SILC (see details below).[2] This happened despite the fact that the comparison theory is implicitly present in social indicators used in other areas – for instance, in measures of poverty, where relative rather than universal thresholds are used. Moreover, this decision went against some expert appeals that, on the opposite, the subjective measures should be reflected more extensively in housing studies (e.g., Lux and Sunega 2016, Dewilde and De Decker 2014, Chasco and Le Gallo 2012). Given that also research in other areas of well-being have also demonstrated the utility of subjective indicators in international comparisons and policy formation, we will include subjective indicators of housing affordability (quality, overcrowding) to our housing inequality measurement.

Housing affordability often does not sufficiently control for household size and housing quality (such as overcrowding). In other words, housing affordability (cost-to-income ratio) for some specific household may be evaluated as good (under normative threshold of ratio) but this happens only because such a household lives in overcrowded dwelling. Housing affordability indicators may thus be criticized for their one-factor approach that ignores complexity of potential housing problems the households face in reality. Therefore, we will include also the *concept of housing precarity* (Beer et al. 2016, Clair et al. 2019, Waldron 2023, Debrunner et al. 2024) among our housing affordability measures. Clair et al. (2019) define housing precariousness as "a state of uncertainty which increases a person's real or perceived likelihood of experiencing an adverse event, caused (at least in part) by their relationship with their housing provider, the physical qualities, affordability, security of their home, and access to essential services" (Clair et al. 2019:16). We suggest four dimensions of housing precarity, based on the existing literature (Beer et al. 2016, Clair et al. 2019, Waldron 2023, Debrunner et al. 2024): *(1) housing affordability* (overburden), *(2)*

[2] Whereas previously respondents were asked about the subjective housing cost burden in each wave, this is now only once every three years.

housing security (arrears on rent/mortgage/utilities), *(3) housing quality* (overcrowding, inability to keep dwelling warm, leaks/ damp) and *(4) quality of neighbourhood* (crime, pollution, noise). Housing precarity is measured as the proportion of people who accumulate housing problems in its different areas (dimensions).

In conclusion, inequality in domain of housing affordability will be measured (for different housing tenures) through *level and variance (distribution)* of (a) housing cost-to-income ratios (rent-to-income, price-to-income), (b) residual income (income after housing costs), (c) overburden rate (share of households with cost-to-income above a threshold or share of households with residual income below a threshold, both computed for different levels of threshold), (d) housing precarity (combination of overburden, overcrowding and low housing quality and security) and (e) subjective affordability measures (for overburden, quality and overcrowding). Housing costs will be adjusted to control for possible social transfers (housing benefits) in order to guarantee relevant international comparison.

Macroprudential policies that regulate mortgage credit supply (applied in many EU countries between 2017 and 2019) and interest rate growth (caused by rise in inflation after 2022) could exclude many low- and middle-income households from possibility to get a mortgage and buy own housing. Therefore, we will also measure inequality that concerns affordability of mortgage finance, through *level and variance (distribution)* of annuity-to-income ratio under standardized/regulated mortgage loan conditions (i.e., standardized/regulated loan-to-value ratio and loan maturity). We are also going to measure household income distribution among different housing tenure types (homeowning vs. renting), something what we call homeownership accessibility. It should demonstrate distribution of households according to their income (quintiles) in different tenures, and especially in owner-occupied housing; and thus allow testing, how firmly housing tenure structure is associated with household income distribution.

Finally, housing wealth has gradually become the main form of wealth of European households (Doling and Ronald 2010; Rowlingson and McKay 2011; Piketty 2014) and homeownership an asset that households can potentially use to finance different forms of consumption and mitigate the risks they face over their lifetime (Dewilde and Ronald 2017). According to some social scientists, (residential) housing wealth has become the cornerstone of the new welfare state (Malpass 2008) - this may be due to the replacement of public welfare by homeownership, which is referred to as 'homeownership-based welfare' (Ronald et al. 2015). The distribution of housing wealth in society, which is mostly determined by private market forces, is however again far from equal; and it represent another axis of housing inequality that rise in its importance. Unlike income inequality, which has long been regularly monitored, inequality in household wealth and in housing wealth in particular only recently started to be more comprehensively tracked (for example, in the OECD's Wealth Distribution Database, the ECB's Household Finance and Consumption Survey (HFCS), and the Luxembourg Wealth Study).

Although there is a growing amount of international comparative wealth research (e.g., Skopek et al. 2014), only some studies focus specifically on housing wealth, and only a few of these include countries from Eastern Europe (examples being Wind et al. 2017; Cohen Raviv & Lewin-Epstein 2021; Pfeffer & Waitkus 2021). Recent studies demonstrated that wealth inequality is rising more steeply than income inequality (see overview in Lux et al. 2021). Therefore, in our analysis of housing inequality we will pay very significant attention to level and trends in housing/residential wealth inequality. We will measure housing wealth *level and distribution* through market values of dwellings self-estimated by respondents of surveys (EU-SILC, HFCS), verified by available national price dataset (house price statistics) and OECD price statistics.

3.2. STATISTICS FOR MEASUREMENT OF HOUSING INEQUALITY

Historically, inequalities in society have been studied mainly using data on income and later on wealth. Different statistics have been used to measure variation (distribution) and thus income (wealth) inequality (e.g. Barr 1993, 1998, Bourguignon 1979, Atkinson 1970, Dagum 1993). Examples of those most commonly used include the coefficient of variation, the income (wealth) inequality coefficient, the ratio of the average income (wealth) of the richest fifth to the average income (wealth) of the poorest fifth of households (S80/S20), the Gini coefficient, the Atkinson Inequality Index and the Generalized Entropy Index (Costa & Pérez-Duarte 2019). In addition to these, there are other measures of inequality, such as the Theil mismatch index, the Robin-Hood index, the Palma ratio, the Mean Log Deviation (MLD) and the Poverty Gap Index.

Coefficient of variation indicates the variability of the sample under study; it is the ratio between the standard deviation and the mean and is used either as a dimensionless indicator or as a percentage (multiplied by 100). It has the advantage of being simple and quick to calculate and relatively easy and clear to interpret, allowing comparisons between countries irrespective of the absolute level of the indicator under study. The disadvantage is especially the sensitivity to the presence of outliers in the data.

Income (wealth) inequality coefficient (also referred to as S80/S20) is the ratio of the amount of income (wealth) attributable to the 20% of households with the highest income (wealth) to the amount of income attributable to the 20% of households with the lowest income (wealth). It has the advantage of being easy to understand because it compares the aggregate income (assets) of the richest 20% of the population with the aggregate income (assets) of the poorest 20% of the population. The higher the value of the indicator, the higher the inequalities in the values of the indicator under consideration. It is a widely used and recognised indicator, which allows for easy international comparison. However, a disadvantage is that it only takes into account the situation at both ends of the spectrum and overlooks the distribution in the middle band of the income (wealth) distribution. Finally, it is again sensitive to the occurrence of outliers in the data.

Gini coefficient expresses the deviation of the curve of the actual income distribution (Lorenz curve) from the curve of perfectly equal income distribution; mathematically the value of the Gini coefficient (e.g. Karagiannis, Kovacevic 2000) can be expressed using the following formula $G = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n}|x_i - x_j|}{2 \times n^2 \times \bar{x}}$, where x_i, is the income of the *i-th* randomly selected individual, x_j is the income of the j-th randomly selected individual, n is the number of individuals, and $\bar{x}$ is the average income of the individual. The Gini coefficient takes values from zero to one. If everyone had the same income, its value would be zero (a situation of perfectly equal income distribution). If one person held all the incomes and the incomes of the other people were zero, the value of the Gini coefficient would be one (perfectly unequal income distribution). The advantage of the indicator is its relative clarity and ease of interpretation; it can be used in different fields (e.g. economics, sociology, demography), allowing comparisons of inequalities between different disciplines and countries. It allows a visual representation of inequality through the Lorenz curve. It considers differences in all parts of the income (wealth) distribution. Compared to other indicators (such as the coefficient of variation), it is less sensitive to changes at the ends of the income distribution (top or bottom) and is not well suited to measuring inequalities in small populations.

To calculate Atkinson Inequality Index (Atkinson 1970), it is necessary to first determine the so-called equitable average income, which is the income that, if distributed equally among beneficiaries, will

achieve the same level of social welfare as the current (unequal) income distribution. The equitable average income can be determined according to the formula $y_e = \left(\frac{1}{n} \times \sum_{i=1}^{n} y_i^{1-\varepsilon}\right)^{\frac{1}{1-\varepsilon}}$, where y_i is the equalized income of the i-th group, $\mathcal{E}$ is the inequality aversion parameter (it reflects the intensity of society's preference for equality, or the degree of social empathy, the higher the value of the parameter, the greater the emphasis on redistribution in favour of the income-poor) and n is the number of income groups. The Atkinson inequality index is calculated using the formula $I = 1 - \frac{y_e}{\mu}$, where y_e is the fair average income and μ is the current average income per group. The Atkinson inequality index takes values from zero to one. A value of zero would indicate a perfectly equal distribution of income, while a value of one would indicate a perfectly unequal distribution of income. The advantage is that the index can be adjusted for the level of inequality aversion (via the Ɛ coefficient mentioned above), so that it can be more sensitive to changes at the lower end of the income spectrum. It allows the results to be interpreted in terms of social welfare: it tells how much of total income could be sacrificed without reducing social welfare if incomes were equally distributed. The possibility of adjusting the parameter Ɛ allows flexibility to reflect different attitudes of society towards inequality. However, disadvantages are the complexity of the calculation, the sensitivity to the setting of the parameter Ɛ and the associated uncertainty about the choice of the value of this parameter (the choice of the parameter can be subjective and normative).

Generalized Entropy Index (GEI) can be calculated using the following formulas depending on the value of the parameter α:

$$GEI(\alpha) = \begin{cases} \frac{1}{N\alpha(\alpha-1)} \sum_{i=1}^{N} \left(\frac{y_i}{\bar{y}}\right)^{\alpha} - 1, \text{ pro } \alpha \neq 0,1 \\ \frac{1}{N} \sum_{i=1}^{N} \frac{y_i}{\bar{y}} \ln\left(\frac{y_i}{\bar{y}}\right), \text{pro } \alpha = 1 \\ -\frac{1}{N} \sum_{i=1}^{N} \ln\left(\frac{y_i}{\bar{y}}\right), \text{pro } \alpha = 0 \end{cases}$$

where

- N is the sample size (eg. number of households or individuals),
- y_i is the income for case i,
- $\bar{y}$ is the average income and
- α is a parameter that determines the sensitivity of the index to different segments of the income distribution.

The advantage is the flexibility given by the adjustability of the parameter α, where for higher values of the parameter the index is more sensitive to changes in the high-income segment, while for lower values of the parameter it is more sensitive to changes in the low-income segment. It allows for the analysis of inequalities in different subgroups of the population (within and between groups) as it is additively decomposable. It is widely used and accepted in economics and social sciences, allowing comparisons between countries and groups. However, relative complexity of the calculation and the more complicated interpretability, especially to the wider public, are mentioned among relative disadvantages of GEI. Moreover, the results vary depending on the choice of the parameter α, which is associated with the difficulty of setting the 'correct' value of the parameter.

Theil index is a special case of Generalized Entropy Index (GEI) described above. The index has two main forms, Theil T index and Theil L index. Theil T index is calculated using the formula:

$T_T = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\mu}\right)\ln\left(\frac{y_i}{\mu}\right)$, where

- N is the number of cases (e.g. households or individuals);
- y_i is the income for case i;
- μ is the average income.

Theil L index is calculated according to the formula:

$T_L = \frac{1}{N}\sum_{i=1}^{N}\ln\left(\frac{\mu}{y_i}\right)$, where

- N is the number of cases (e.g. households or individuals);
- y_i is the income for case i;
- μ is the average income.

Theil T index is more sensitive to changes at the top of the income distribution. This means that it is more affected by changes in the incomes of richer individuals or households (i.e. giving more weight to higher incomes). On contrary, Theil L index is more sensitive to changes at the lower end of the income distribution. That is, it is more affected by changes in the incomes of poorer individuals or households (i.e. giving more weight to lower incomes).

Both forms of Theil index can be used separately to measure inequalities, but they can be combined if a single resultant value is needed. One approach is to calculate the average of the two indices, thus obtaining a value that takes into account both aspects of inequality measured by Theil T and Theil L indices.

The index can take values from zero to infinity. A value of zero would mean that income (wealth) is distributed absolutely equally among all members of the population. Any value greater than zero implies the existence of inequality. The larger the value of Theil index, the greater the inequality in distribution. The value of the index can theoretically reach infinity, which would imply extreme inequality where all income (wealth) is concentrated in the hands of one individual.

The advantage of Theil index is that it allows for a decomposition of total inequality into within-group and between-group inequalities. It is sensitive to changes in both parts of the income (wealth) distribution and can be used for different types of data and for international comparisons. The disadvantages include again that it is complicated to calculate and less intuitive to interpret the results. The index is also sensitive to the occurrence of outliers in the data, which may bias the results.

Robin-Hood index (also the Hoover index or Schutz index) is calculated as the percentage of total income (wealth) that would have to be redistributed from richer to poorer to achieve perfect equality. It can be expressed mathematically as the maximum vertical distance between the Lorenz curve and the 45° curve of perfect equality:

$RH = \max\left(L(p) - p\right)$, where

- L(p) is a Lorenz curve that represents the cumulative share of total income held by the bottom (p) percent of the population;
- (p) is the percentage of the population.

The index can take values from zero to one. If the index takes the value zero, it means perfect equality, each individual (household) has the same income (wealth). If the index takes the value one, it means perfect inequality, where all income (wealth) is concentrated in the hands of one individual or household. The higher the value of the index, the greater the inequality in income (wealth) distribution. The index is relatively straightforward and easy to understand, which makes it accessible to policy makers and general public. It is independent of the scale of income, which makes it appropriate for international comparison.

Palma ratio is calculated as the ratio between the total income (wealth) of the richest 10% of the population and the total income (wealth) of the poorest 40% of the population. If it takes a value less than one, it means that the richest 10% of the population holds a smaller share of the total income (wealth) than the poorest 40%. This indicates a relatively low level of inequality. If the index value is equal to one, the richest 10% of the population holds the same share of total income (assets) as the poorest 40%. This indicates a medium level of inequality. Finally, a value greater than one means that the richest 10% of the population holds a larger share of total income (wealth) than the poorest 40%. This indicates a high level of inequality. The advantage of ratio is its simplicity and clarity to the broader public. The values of the indicator mainly reflect changes between the poorest and the richest part of the population, which highlights severe inequalities. However, a disadvantage may be that inequalities in the middle of the distribution are overlooked. In addition, it is sensitive to the occurrence of outliers in the data.

The overview of statistics used to measure variance (distribution) in income (wealth) that may be suitable also for measurement of different indicators of housing inequality (outlined in previous section) is far from being comprehensive; it is intended to present the most commonly used coefficients, to compare their advantages and disadvantages. It also shows that these coefficients are used on continuous variables with an absolute value of the indicator of interest (e.g. income or assets), but are less easily applicable to ratio indicators (e.g. cost-to-income ratio, price-to-income ratio) or dichotomous (binary) variables (e.g. ability to keep home adequately warm). In other words, their application to measure the distribution of certain indicators of housing inequality (e.g. residual income or residential wealth) is not problematic at all, and for some indicators (cost-to-income, rent-to-income) it is also possible, though only some statistics can be used (e.g. coefficient of variance). For remaining housing inequality indicators, we measured a distribution (variance) by modified S80/S20 statistics, which compares the average values for high-income and low-income households. Another example is the modified Palma ratio, which utilises the ratio of average values rather than cumulative values. We will also use the standard deviation within a population divided into n-tiles according to the amount of equivalized net household income: we will thus measure the deviation of the average value of a given indicator in the respective income n-tile from the average for the whole population.

3.2.1. UNIT OF ANALYSIS

Unlike the official statistics provided by Eurostat we chose a household as a unit of analysis, not an individual. The reason is obvious – the members of a household share housing cost and decide jointly about their level of housing consumption. There are also so-called economies of scale at the household level, where marginal costs decrease with each additional household member. Moreover, the well-being of individual housing member is significantly affected by household characteristics (e. g. marital status, number of household members, presence of dependent children in the households, number of economically (in)active members etc.). Finally, 'subjective' levels of housing affordability and overcrowding are reported only for households, not for individual household members.

3.2.2. MODIFICATIONS OF VARIABLES FOR CALCULATIONS

To calculate the housing inequality indicators, it was necessary to adjust some of the input variables. For example, for some calculations we had to recalculate household incomes to so-called equivalised (or per consumption unit) incomes. Equivalised income is the total net cash income of household converted into an income per consumption unit using the so-called equivalence scale. The adjustment of total net income to equivalised income is intended to ensure comparability of income between different types of households (in particular with regard to the number of members and their age structure). The adjustment of the income to the equivalised income also reflects the different levels of economies of scale achieved by households with different composition and number of members. As the number of persons in the household (especially the economically active ones) increases, total household income rises, and of course also varies with the number and age of children. Unless otherwise stated, the number of consumption units according to the modified OECD scale has been used. The number of consumption units of a household depends on the composition of the household (number of persons) and the age of the children. The first person in the household aged 14 and over is assigned a value of 1, each additional person in the household aged 14 and over is assigned a value of 0.5 and each child aged 0 to 13 is assigned a value of 0.3. The total number of consumption units within a given household is determined by aggregating the individual numbers of consumption units for each household member.

The above stated adjustments were applied not only to household income, but in some cases also to other variables (e.g. housing wealth). The conversion of total disposable household income to equivalised income per consumption unit has been applied in situations where it is deemed to be appropriate. For instance, in the case of the total housing cost-to-income ratio, the ratio was calculated as the total housing cost of a given household relative to its total (non-equivalized) disposable income. However, when distribution has been assessed, an equivalised income was used; for example, in order to divide all households into income quintiles (or income n-tiles in general).

In some cases, it was also necessary to deal with the fact that the values of the variables took on unexpected values - for example, total disposable household income in the EU-SILC data was negative for a (relatively small) proportion of households. In this case, these households were excluded from the calculations, i.e. the resulting values of housing inequality indicators for them were not reflected in the overall result. Extremely low or high values were also recorded for the current value of home that has been self-estimated by survey respondents, which was used, for example, to calculate price-to-income ratio, annuity-to-income ratio or residential wealth inequality. We therefore proceeded to adjust them. For each country, the interquartile range (IQR) was calculated and the thresholds for identifying outliers were determined as the lower quartile minus 1.5 * IQR and the upper quartile plus 1.5 * IQR. Values above and below these thresholds were excluded from the calculation of the indicator.

3.2.3. SPECIFIC INDICATORS FOR MEASURING THE FINANCIAL ASPECTS OF HOUSING INEQUALITY

While in the previous sections we focused on a theoretical overview of measures and statistics that is used for inequality measurement, in this section we will define concrete indicators that will be used for the analyses of housing inequality - both for presenting preliminary results in this report and for the purpose of further and deeper analyses of housing inequality and its drivers under WP3 of the Project. They include homeownership accessibility, housing cost-to-income ratio and its variance, rent-to-income and its

variance, residual income and its variance, price-to-income ratio, housing precarity measures, subjective housing availability indicators and housing wealth inequality indicator.

1. Homeownership accessibility

The indicator is modified S80/S20 ratio, and was constructed as the ratio of the share of households living in owner-occupied housing with equivalised income in the 5th quintile to the share of households living in owner-occupied housing with equivalised income in the 1st quintile. The higher the value of the indicator, the greater the disparity between the share of owners with the highest incomes to the share of owners with the lowest incomes, and the greater the housing tenure inequality. In addition to the modified S80/S20 ratio will employ also coefficient of variation and modified Palma ratio - these results are not presented in this report but may be available in DO. For all computations, we used EU-SILC data.

2. Share of households with housing cost-to-income ratio exceeding 30%, 35% and 40%

Formally, the housing cost-to-income ratio was computed as follows:

$HCR = \frac{12*HC-HA}{Y-HA}$, where

HCR - is the housing cost-to-income ratio; i.e. the share of total housing costs expenses out of household disposable income in %;

HC - is total monthly housing cost;

Y - is total disposable household income in the income reference year;

HA - is housing allowances received by the household in the same period.

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

$HCR = 100\ if\ (12 * HC - HA) \geq (Y - HA)$

$HCR = missing\ if\ (Y - HA) \leq 0\ \&\ (12 * HC - HA) > 0$

$HCR = 0\ if\ (12 * HC - HA) \leq 0$

$HCR = missing\ if\ HC = missing\ or\ Y = missing\ or\ HA = missing$

The higher the value of the indicator, the greater the proportion of households in a given country that are at risk of housing unaffordability, while we set three alternative thresholds to allow for more flexibility in results. The distribution of the share of households with total housing cost-to-income ratio above alternative thresholds could be measured by modified S80/S20 ratio, coefficient of variation, and modified Palma ratio - these results are not presented in this report but may be available in DO. For all computations, we used EU-SILC data.

3. Variation of the housing cost-to-income ratio

The basic indicator was calculated as the standard deviation of the cost-to-income ratio divided by the average cost-to-income ratio for the set of households. The higher the value of the coefficient, the higher

the variability in the cost-to-income ratio values and the higher the potential inequality in the indicator values. For computation, we used EU-SILC data.

4. Share of households living in rental housing with a rent-to-income (R/I) above 20%, 25% and 30%

Formally, the rent-to-income ratio was computed as follows:

$RI = \frac{(12*\mathrm{R}-\mathrm{HA})}{(Y-HA)}$, where

RI - is the rent-to-income ratio; i.e. the share of current rent related to the occupied dwelling out of household disposable income in %;

R - is total monthly rent currently paid for the main residence of the household paid for the use of an unfurnished dwelling including payments for the use of a garage to provide parking in connection with the dwelling;

Y - is total disposable household income in the income reference year;

HA - is housing allowances received by the household in the same period.

From a methodological perspective it was necessary to manage situations where the rent-to-income ratio was negative or greater than 100%. The rent-to-income ratio was adjusted as follows:

$$RI = 100 \; if \; (12 * R - HA) \geq (Y - HA)$$

$$RI = missing \; if \; (Y - HA) \leq 0 \; \& \; (12 * R - HA) > 0$$

$$RI = 0 \; if \; (12 * RI - HA) \leq 0$$

$$RI = missing \; if \; R = missing \; or \; Y = missing \; or \; HA = missing$$

The distribution of the share of households with rent-to-income ratio above alternative thresholds could be measured by modified S80/S20 ratio, coefficient of variation, and modified Palma ratio - these results are not presented in this report but may be available in DO. For all computations, we used EU-SILC data.

5. Variation of the rent-to-income ratio

The basic indicator was calculated as the standard deviation of the rent-to-income ratio divided by the average rent-to-income ratio for the set of households living in rental housing. The higher the value of the coefficient, the higher the variability in the rent-to-income ratio values and the higher the potential inequality in the indicator values. For computation, we used EU-SILC data.

6. Variance in residual income

Residual income was calculated as the difference between total disposable household income and total housing costs. The resulting amount of residual income is difficult to assess on its own - it is not clear when it is high enough and when it is low enough. Household income, after deducting housing costs, should logically be sufficient to cover at least the other basic necessities of life. It would therefore be appropriate to compare the residual income with the household's subsistence income or some multiple thereof. Households with a residual income lower than the normative threshold defined in this way could be considered vulnerable. Unfortunately, the EU-SILC data do not include the amount of the subsistence minimum. However, we measured its distribution by modified S80/S20 ratio - comparing average level of

residual income of income-rich households (households in the 5th quintile by income per consumption unit) and the average level of residual income of income-poor households (households in the 1st quintile by income per consumption unit). The higher the value of this ratio, the greater the income inequalities after considering the level of housing costs. Similarly, the distribution of residual income could be measured by other coefficients outlined above, such as coefficient of variation, Palma ratio or Gini coefficient: the results are not presented in this report but may be available in DO. For all computation, we used EU-SILC data.

7. Variation of the price-to-income ratio (P/I)

The price-to-income ratio is a frequently used indicator that is generally used to measure the affordability of owner-occupied housing. It is usually constructed as the ratio of the average (median) price of a dwelling (new and older) to the average (median) annual net household income. The indicator reflects the multiple of annual household income an average household needs to allocate to buy an average dwelling. The advantage of the indicator is that it is easily interpretable and understandable for the general public. However, absolute values of P/I are not available and international sources (e.g. OECD, see DO) report only P/I index (its change in time) but not its absolute values. As a basic indicator, we calculated the value of P/I with self-estimated value of main residence made by respondents in survey EU-SILC 2020 and total disposable household income reported by them in the same survey. However, different alternatives to this basic setting will be tested and then added to DO.

We are aware that P/I value calculated in this way may differ from those reported in other academic publications. This may be because, while we use the residential property prices of all households in the dataset to calculate P/I, in reality only a small subset of properties is traded, which may differ significantly in their characteristics and hence final price from the set of all residential properties. Second, the fact that we consider all types of residential property, i.e. flats and detached homes, for the calculation of P/I may also cause a bias. The resulting average P/I value for a given country may then be affected by a higher proportion of households living in detached houses (which are generally more expensive) than in apartments in this country, and vice versa.

The P/I value had also considerable variability within countries; in some cases, these values were extremely high or low, so it was necessary to filter out outliers as described above. For each country, the lower (upper) limit of acceptable P/I values was set as the lower (upper) quartile minus (plus) 1.5 times the IQR. Values below (above) these thresholds were not included in the calculation of the country average. We calculated the average P/I value for households in the 1st and 5th equivalized income quintiles (modified S80/S20 ratio) for each country and then compared these two values. The closer the two values were to each other (i.e., the closer the ratio value was to one), the less variation existed in the affordability of owner-occupied housing within the particular country. Distribution of P/I could be also measured by other coefficients outlined above - these results are not presented in this report but may be available in DO. For computation, we used EU-SILC data.

8. Housing precarity

According to our own definition, housing precarity consists of three dimensions related to housing (affordability, security and quality) and one additional dimension relating to its location. Using EU-SILC dataset (2012 – 2023), we identify households as being in housing precarity based on the following criteria:

- *housing affordability*: total housing costs represent more than 40 % of disposable income;

- *housing security*: in the past twelve months, the household has been in arrears, i.e. has been unable to pay on time rent or mortgage repayment for the main dwelling; utility bills (e.g. heating, electricity, gas, water, waste disposal etc.) for the main dwelling respectively;
- *housing quality*: living in overcrowded dwelling (according to the Eurostat definition) or inability to keep dwelling warm (respondents say that the dwelling's heating system and thermal insulation are not adequate to keep the dwelling comfortably warm during the winter) or living in low-quality dwelling (respondents say that their dwelling has either a leaking roof, or damp walls/floors/foundation, or rot in window frames or floor);
- *quality of neighbourhood*: respondents report crime, violence or vandalism or environmental problems or too much noise in their neighbourhood.

For computation of shares of households in housing precarity (in total and separately for each its dimension) and its distribution, we used EU-SILC data. Distribution could be measured by different statistics outlined above - the results are not presented in this report but may be available in DO.

9. Subjective measure (1): percentage of households for whom the total housing cost is a heavy burden

For the calculation of the first subjective indicator - percentage of households for whom the total housing cost is a heavy burden - we used the EU-SILC dataset for 2023, which contains households' responses to the question on the housing cost burden. It is particularly interesting to compare it with proportion of households at risk of housing affordability according to the Eurostat definition (i.e. with a share of total housing costs on disposable income above 40%). In other words, what is the intersection between households at risk of housing unaffordability according to the official definition and those who subjectively perceive total housing costs as a problem. The answer is provided in Table 2. It shows that of the households with total housing costs exceeding 40%, 44% simultaneously consider total housing costs to be a heavy burden (i.e. less than half), 40% consider them to be a slight burden and 16% do not consider them to be a burden at all. The values shown in Table 2 are for the sample of all households; the values for individual countries vary (see section 5.2 below). Future analysis should focus on explanation of this contradiction. In addition to the country averages, we also compared households in the 1st and 5th equivalized income quintiles for each country and then compared these two values (modified S80/S20 ratio). We used 2023 EU-SILC data in this report.

Table 2: Subjective and objective assessment of the burden on total housing expenditure

	To what extent are total housing costs a financial burden on you?		
	A heavy burden	A slight burden	No burden at all
Households with total housing cost-to-income ratio up to 40%	27.7%	46.6%	25.7%
Households with total housing cost-to-income ratio over 40%	43.9%	40.1%	16.0%

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

10. Subjective measure (2): percentage of households reporting a shortage of space in dwelling

In the overcrowding rate statistics for individual countries reported by Eurostat, it is evident that the Central and Eastern European (CEE) countries have a high overcrowding rate, however, subjectively, households in these countries experience the problem of space in their apartments only to a very limited extent. In contrast, while the overcrowding rate in Western European countries is relatively low based on objective indicators, a significant proportion of households subjectively report experiencing space issues in their apartments (see, e.g., Sunega, Lux 2016). Therefore, we included a subjective measure among housing inequality indicators in the form of the share of households that reported experiencing a shortage of space in their dwelling. We again compared households in the 1st and 5th equivalized income quintiles for each country and then compared these two values (modified S80/S20 ratio). In order to calculate this indicator, we used EU-SILC data from 2012, when the question was asked in the ad-hoc module for the last time.

11. Subjective measure (3): housing quality

The proportion of households that have an experience with low housing quality (as self-reported by respondents themselves) is also measured as one dimension of housing precarity (see above). It includes households that:

- are unable to keep dwelling warm (apart from their household's ability to afford heating costs, they consider that the dwelling's heating system and thermal insulation are not adequate to keep the dwelling comfortably warm during the winter);
- live in a dwelling with either a leaking roof, or damp walls/floors/foundation, or rot in window frames or floor.

We again compared households in the 1st and 5th equivalized income quintiles for each country and then compared these two values (modified S80/S20 ratio); and we used again EU-SILC data for this purpose.

12. Variation of the annuity-to-income ratio

Annuity-to-income ratio is one of the indicators used to assess the availability of credit financing. It is the ratio between the average annuity repayment on a mortgage loan and the average household net income. In order to calculate the annuity repayment of a mortgage loan, it is necessary to know the price of the residential property being purchased (more specifically, the principal amount of the loan), the interest rate of the mortgage loan, and the term of the loan. Regarding the price of the property, we again relied on EU-SILC data, where the current value of the main residence was self-estimated by respondents. We assumed, for simplicity, that the value of the mortgage loan covers 100% of the home value, although in reality it is less (we were not able to find statistics with the usual loan-to-value ratio (LTV) for individual EU countries). Average mortgage rate was obtained from data of the European Mortgage Federation (EMF), specifically the Hypostat publication (EMF 2022). For simplicity, we assumed that the interest rate was the same for all households in a given country. Similarly, we assumed uniform (standard) loan maturity, set at 20 years. Based on these data, we calculated the annuity of the loan according to the following formula:

$$annuity = value\ of\ the\ residence * \left(\frac{i}{1-\frac{1}{(1+i)^n}}\right)$$, where:

i – interest rate;
n – maturity of the loan in years.

The resulting values were cleaned of outliers and then the average A/I value was calculated for each country. A lower value of A/I indicates better availability of credit financing for residential properties; and vice versa. Then, similar to the P/I indicator, we calculated distribution by comparing average A/I for households in the 1st quintile and average A/I for households in the 5th quintile by equivalized household income (modified S80/S20 ratio). Distribution of A/I could be also measured by other coefficients outlined above - these results are not presented in this report but may be available in DO. For computation, we used EU-SILC data.

13. Variance in net wealth, housing wealth

Gini coefficient, Atkinson index and Theil-index presented in this report were calculated using the data from the Household Finance and Consumption Survey (HFCS) and were taken from the Austrian National Bank's web application (see https://oenb.shinyapps.io/HFCS_Keyfigures/). They are based on the net wealth concept, i.e. broader concept than the residential wealth. Net wealth is defined as the sum of real assets and financial assets minus debt. Real assets include e.g. real estate, land or vehicles, financial assets include e.g. sight accounts, savings accounts, stocks or bonds, and debt includes e.g. mortgages, overdraft debt or credit card debt.

However, for the purpose of further analysis of residential wealth inequality we will focus only on residential wealth that will be measured on self-estimated values of dwellings provided by respondents of EU-SILC and HFCS surveys, verified by national price statistics and OECD price data. We will measure variance by the coefficient of variation, GEI, S80/S20, Palma ratio in addition to the Gini coefficient, Atkinson index, and Theil-index. For computation of all indicators, we will use EU-SILC and HFCS data.

3.3. FACTORS – BRIEF OUTLINE OF POTENTIAL DRIVERS OF HOUSING INEQUALITY

The factors that may explain differences in housing inequality levels and trends among selected European countries ("drivers" of inequality), and that in the same time could be secured from international /country statistics, may be from following domains: (a) macroeconomic performance (GDP, unemployment, inflation rate, interest rate, wages, disposable household incomes, public deficit, government expenditure, government debt, housing saving rate, current account balance, labour cost, labour productivity etc.), (b) demographics (population size and structure, degree of urbanization, immigration, structure of households, society ageing, number of municipalities), (c) geography and climate (area, average sea level, average temperatures, population density, precipitation, air pollution etc.), and (d) housing, institutions and politics (housing regime/policy, institutional context, politics, tenure structure, housing stock, level of housing construction, outstanding residential loans, interest rates on new residential loans, housing wealth, house price trend, P/I and R/I trends and housing availability).

The factors that may explain differences in housing inequality levels and trends among selected European countries, and which can be derived from microdata in international (EU) comparative surveys, include household income/wealth, size of household, type of household, number of dependent children, size of household residence, region of residence, household status (ISEI), sex/gender /age/gender/nationality/education/(un)employment of household members, housing and energy costs,

housing tenure, housing type, housing size (overcrowding), heating, way of acquiring residential property, intergenerational transfers (assistance), arrears, take-up of housing benefit (or other social benefits), expectations about future incomes, price trends etc.

Following are examples of possible factors and their associations (between factors and housing inequality) that could be tested during data analyses:

1. *Household income and income inequality* - house price/rent trends generally coexist with trends in household income, and additionally, house prices/rents are determined by income of marginal and not average buyer/tenant (with the hypothesis that *rising household income/income inequality leads to rising housing inequality*);
2. *Intergenerational financial/wealth transfers within family* that are provided by parents or grandparents to their adult children for the purpose of buying a home - if these transfers were allocated mainly by high-income households, then they would increase income inequality and exclude low-income households from access to homeownership (with hypothesis that *size and distribution of transfers affect housing inequality)*;
3. *Inflation and interest/mortgage rates* - they affect an accessibility of mortgage finance (with the hypothesis that *rising inflation/mortgage rates lead to rising housing inequality*);
4. *Energy costs* - energy price increase is similar for all households and, thus, lower income households are affected the most (with the hypothesis that *rising energy prices lead to rising housing inequality*);
6. *Low elasticity of housing supply* - if housing supply (new housing development) is inelastic then house prices appreciate non-proportionally to household income (with the hypothesis that *lower elasticity of housing supply leads to rising housing inequality*);
7. *Demographic trends I - urbanization* - extensive immigration (domestic, foreign) to cities may lead to extensive rise in prices/rents in major urban centers (with the hypothesis that *urbanization leads to rising housing inequality, especially in urban centers*);
8. *Demographic trends II – changes in structure of households* - growing number of singles leads to the fact that housing costs/mortgage are not shared among more economically active household members (with the hypothesis that *reducing household size leads to rising housing inequality*);
9. *Demographic trends III – ageing of society* - growing number of elderly affects both house prices and household incomes (with hypothesis that *ageing of society affects housing inequality*);

4. SELECTION OF DATASETS FOR DATA ANALYSES

We selected international/EU surveys and international/national statistics that are relevant for the goals of Work Package 3 of the HouseInc project and thus enable the analysis of drivers and consequences of financial levels of housing inequality. Specifically, they include variables necessary for computation of indicators of housing inequality, and variables that may hypothetically be powerful drivers of this inequality, as they were outlined in previous section of this Report.

4.1. SELECTION OF SURVEYS

We selected the following international (EU) representative household surveys: (a) EU Statistics on Income and Living Conditions (EU-SILC); (b) Household Finance and Consumption Survey (HFCS) and (c) European Social Survey (ESS). The surveys were selected mainly with regard to the geographical coverage of a relatively wide range of countries and, furthermore, with regard to the topics they examine. The requirement was that they should cover a relatively wide range of fields relating to housing issues in general and to inequalities in housing (and possibly in other areas) in particular.

4.1.1. EU STATISTICS ON INCOME AND LIVING CONDITIONS (EU-SILC)

European Union – Statistics on Income and Living Conditions (EU-SILC) is a household survey that is conducted since 2004. A survey is launched in all 27 member states of the European Union, as well as in Great Britain, Norway, Switzerland, Macedonia, Serbia, Turkey and Iceland. Methodology in all countries where the survey is conducted is harmonized and therefore international comparison of social and living conditions of households is possible. The EU-SILC project was launched in 2003 on the basis of a 'gentlemen's agreement' in six EU Member States (Belgium, Denmark, Ireland, Greece, Luxembourg and Austria) and Norway. The EU-SILC instrument started in 2004 for the EU-15 (except Germany, the Netherlands and the United Kingdom) plus Estonia, Norway and Iceland. Bulgaria and Türkiye started fully implementing the EU-SILC instrument in 2006, while Romania and Switzerland began to implement it in 2007. North Macedonia and Croatia started in 2010, Montenegro and Serbia in 2013, Albania in 2017, Kosovo01 in 2018 and Bosnia and Herzegovina in 2022. The United Kingdom has left the EU on 31 January 2020. In absence of agreement on the transmission of statistical information the country has ceased to transmit data for EU-SILC. The latest data available for the United Kingdom is EU-SILC 2018.

The goal of the EU-SILC survey is to provide timely and comparable cross-sectional and longitudinal multidimensional microdata on income, poverty, social exclusion, and living conditions across European Union member states and several other participating countries. Nationally, the data from the survey could serve as a basis for social and family policy – both for its creating and checking its consequences in society. Information on social exclusion and housing conditions is collected primarily at the household level, while information on employment, education, and health is obtained from individuals aged 16 and over.

Cross-sectional data are the data related to a given time or a certain time period. The cross-sectional data may be extracted from a cross-sectional sample survey with a rotational sample. Such data may be combined with register data (data on persons, households or dwellings compiled from a unit-level administrative or statistical register). Longitudinal data are the data related to household- and individual-level changes over time, observed periodically over a certain period. The longitudinal data may come from a cross-sectional survey with a rotational sample where individuals once selected are followed up. It may be combined with register data as well.

The sampling unit is a dwelling. In the first wave all households and all the persons who have the dwelling as their usual place of residence are surveyed. During the waves 2–4 only those households that include a panel person (the one surveyed in the first wave) are surveyed.

The sample is obtained by applying a two-stage probability sampling scheme on each of the 14 administrative regions (NUTS3 regions) independently. The total number of dwellings selected in each region is proportional to the region's size. At the first sampling stage small geographical areas (CEUs –

census enumeration units) are selected by probability sampling. These CEUs serve as a basis for the second-stage selection (a sample of 10 dwellings is drawn from each CEU).

In the survey, a four-year rotational panel has been implemented, which means that the households are interviewed for four consecutive years. Every year approximately one fourth of the sample is newly introduced by replacing the households which were surveyed four times by new ones. To keep the sample size approximately the same, the number of new households is chosen to reflect the number of successfully interviewed households in the previous year.

The household definition is based on a declaration of the persons in a sampled dwelling that they live together and pool their income to cover expenditures catering for their needs.

The survey is conducted face to face. Respondents' answers are entered into the questionnaires right in the household. A part of the selected households is still interviewed using paper questionnaires (paper-and-pencil-interview - PAPI), while the rest is interviewed using an electronic one (computer-assisted personal interview - CAPI).

The content of the survey is divided into four questionnaires with different units of reference. The survey consists of three stable parts (dwelling, household and personal questionnaires) and a part that alters from year to year (module). The list of annual ad-hoc modules in the EU-SILC survey shows Table 3.

Table 3: List of annual ad-hoc modules in the EU-SILC survey

Year	Topic
2005	Intergenerational transmission of poverty
2006	Social participation
2007	Housing conditions
2008	Over-indebtedness and financial exclusion
2009	Material deprivation
2010	Intra-household sharing of resources
2011	Intergenerational transmission of disadvantages
2012	Housing conditions
2013	Well-being
2014	Material deprivation
2015	Social and cultural participation
2016	Access to services
2017	Health and children's health; Over-indebtedness of households
2018	Well-being
2019	Intergenerational transmission of poverty
2020	Over-indebtedness, consumption and wealth
2021	Health and access to health of the children, Children material deprivation, Living arrangements and conditions of children
2022	Health and quality of life
2023	Energy efficiency and Housing, Labour Market, Intergenerational transmission of advantages and disadvantages, housing difficulties

Source: https://csu.gov.cz/living-conditions-eu-silc-methodology

A big disadvantage of sample surveys in general is non-response, which influences results significantly. Unit non-response is the failure to obtain information from an eligible sample unit. It is a result of either being able to contact a selected sample unit, the unwillingness of the sample unit to respond to the survey or various other reasons, such as language barriers or inability to take part in the interview. Non-response is not random, it is characteristic for specific population groups. The highest non-response rate can be seen in the first wave in the EU-SILC. Total response rate is around 85 % in this survey.

4.1.2. HOUSEHOLD FINANCE AND CONSUMPTION SURVEY (HFCS)

The Household Finance and Consumption Survey (HFCS) is a collaborative initiative involving all national central banks within the Eurosystem, the central banks of two EU countries that have not yet adopted the euro, and several national statistical institutes. The HFCS offers comprehensive household-level data on various elements of household balance sheets and associated economic and demographic variables, such as income, private pensions, employment, and consumption metrics (ECB 2023).

The national central banks and/or national statistical institutes of the participating countries are responsible for conducting the survey. The ECB coordinates the whole project and ensures that common methodology is followed, checks the quality of the country datasets and disseminates the survey results and microdata. To date, four waves of the survey have been conducted; the representation of countries in each wave and the sample size are shown in Table 4.

Table 4 : Country participation in the waves of the HFCS survey and sample sizes

Wave	Participating countries	Sample size
2010	15 Euro area countries (Ireland and Estonia did not participate)	More than 62,000 households
2014	18 Euro area countries + Hungary and Poland	84,000 households
2017	19 Euro area countries + Croatia, Hungary and Poland	91,000 households
2021	19 Euro area countries + Croatia, Czech Republic and Hungary, Poland did not participate	83,000 households

Source: ECB 2023, https://www.ecb.europa.eu/stats/ecb_surveys/hfcs/html/index.en.html.

The survey covers private households that reside in the respective national territories, irrespective of the citizenship of their members, at the time the data are collected. Persons living in collective households and in institutions are excluded from the target population as well as homeless people. "Household" is defined as a person living alone or a group of people who live together in the same private dwelling and share expenditures, including the joint provision of living essentials.

In each country, household samples were designed to ensure representative results for both the euro area and the specific country involved. HFCS country surveys have a probabilistic sample design. This means that each household in the population has a non-zero probability of being part of the sample, which is

defined before drawing the sample. While all countries applied probability sampling in the fourth wave, the approaches adopted in their sampling designs differ. The methodologies are largely dependent on the external data (population registers, postal addresses, dwelling registers, etc.) available for building the sample. Units to be interviewed can be selected in one or multiple stages. In a multiple stage design, the first stage (or stages) involves a selection of geographical areas, from which individual households are then chosen during the final stage. Region and population size of regional units were the most frequently used stratification variables, and in several cases, regions were further divided by the degree of urbanisation. Lithuania, Luxembourg, and Finland were the only countries that did not use any geographic stratification. Other stratification criteria included personal or regional average income, labour status, personal taxable wealth and size or value of dwellings.

The response rate (calculated as a ratio between interviews achieved and eligible sample units) in the HFCS survey varied significantly among participating countries (it ranged from 10% in Germany and Luxembourg to 79% in the Czech Republic). In a majority of the countries, the main reason reported for unit non-response is refusal to participate. Eligibility rates indicate quality of the sampling frames and are above 90% in most countries and above 95% in more than half of the countries. Contact rates also have significant variation across countries but are around 90% or above in most cases (ECB 2023).

In the HFCS, observations for which no valid response was received from the households should be imputed. The set of variables that were fully imputed in the 2021 wave included all components of household income, consumption and wealth, so that the indicators on household balance sheets could be based on the observations of all households that participated in the survey. The multiple imputation approach and broad-conditioning approach is used in the HFCS data editing to handle with the problem of missing values. HFCS datasets include five implicates (imputed sets of values) for each missing observation. The variability across the five implicates accounts for the underlying level of uncertainty. The imputation technique has an iterative and sequential structure. The models follow a path in which all variables are filled in with a predefined sequence. The models are run iteratively several times, and imputed values from each of the previous rounds are treated as observed values in the subsequent iterations (ECB 2023).

Data on household sector wealth and liabilities are also available from national accounts and other macro sources. While it is useful to compare wealth data from micro and macro statistics, it should be noted that there are significant differences between the definitions and methodologies applied in the two statistics. Consequently, differences in the levels of wealth between the two data sources are expected to be observed, especially if one compares the concepts of aggregate wealth used in each source. The levels of financial wealth in survey data are generally lower than the levels produced by national accounts, and to a larger degree than in the case of real assets. Cross-country differences in the ratio between HFCS financial wealth and national accounts financial wealth can be observed. On the liabilities side of the households' balance sheets, there are minimal conceptual differences in the definitions between micro and macro statistics. The levels of debt produced by the survey are generally closer to the levels of macro data than the levels of adjusted financial wealth. The level, structure and distribution of household gross income resulting from the HFCS is coherent with the corresponding information produced by EU-SILC. (ECB 2023)

Notwithstanding the above shortcomings, the HFCS data remains the only comparative source providing detailed information on the structure and level of household assets, household liabilities and claims, and intergenerational financial and non-financial transfers. The disadvantage is the not-so-user-friendly

handling of the datasets, which is mainly caused by the method of imputation of missing values described above.

4.1.3. EUROPEAN SOCIAL SURVEY (ESS)

The survey measures the attitudes, beliefs, changing social beliefs and behaviour patterns of diverse populations in more than thirty nations. Sir Roger Jowell and Max Kaase began developing the case for a comparative European Social Survey at the European Science Foundation (ESF) in 1995. Under the leadership of Jowell and Kaase, committees were established to produce an ESS Blueprint. The ESF would eventually ask Jowell to assemble a core team and apply to the European Commission for central funding to be matched by the participating countries. In 2001, the ESS was established at the National Centre for Social Research (now NatCen Social Research) in London. Since 2003, the ESS Headquarters have been hosted by City St George's, University of London (UK). Following an application to the European Commission, which was submitted by the UK on behalf of 14 other countries, the ESS was awarded European Research Infrastructure Consortium (ERIC) status on 30 November 2013.

39 countries have participated in at least one round since 2002/03; 31 countries participated in ESS Round 10 (2020-22). There have been 11 rounds of the ESS so far, with the last one in 2023-2024. The list of countries participating in each ESS round are presented in Table 5. Unfortunately, the final sample size in each round as well as the corresponding response rate are not available.

Table 5: Country participation in the rounds of the ESS survey and sample sizes

Round	Participating countries
R1 (2002-20023)	AT, BE, CZ, DK, FI, FR, DE, GR, HU, IE, IL, IT, LU, NL, NO, PL, PT, SI, ES, SE, CH, UK
R2 (2004-2005)	AT, BE, CZ, DK, EE, FI, FR, DE, GR, HU, IS, IE, IT, LU, NL, NO, PL, PT, SK, SI, ES, SE, CH, TR, UA, UK
R3 (2006-2007)	AT, BE, BG, CY, DK, EE, FI, FR, DE, HU, IE, LV, NL, NO, PL, PT, RO, RU, SK, SI, ES, SE, CH, UA, UK
R4 (2008-2009)	AT, BE, BG, HR, CY, CZ, DK, EE, FI, FR, DE, GR, HU, IE, IL, LV, LT, NL, NO, PL, PT, RO, RU, SK, SI, ES, SE, CH, TR, UA, UK
R5 (2010-2011)	AT, BE, BG, HR, CY, CZ, DK, EE, FI, FR, DE, GR, HU, IE, IL, LT, NL, NO, PL, PT, RU, SK, SI, ES, SE, CH, UA, UK
R6 (2012-2013)	AL, BE, BG, CY, CZ, DK, EE, FI, FR, DE, HU, IS, IE, IL, IT, XK, LT, NL, NO, PL, PT, RU, SK, SI, ES, SE, CH, UA, UK
R7 (2014-2015)	AT, BE, CZ, DK, EE, FI, FR, DE, HU, IE, IL, LV, LT, NL, NO, PL, PT, SI, ES, SE, CH, UK
R8 (2016-2017)	AT, BE, CZ, EE, FI, FR, DE, HU, IS, IE, IL, IT, LT, NL, NO, PL, PT, RU, SI, ES, SE, CH, UK
R9 (2018-2019)	AT, BE, BG, HR, CY, CZ, DK, EE, FI, FR, DE, HU, IS, IE, IT, LV, LT, ME, NL, NO, PL, PT, RO, RS, SK, SI, ES, SE, CH, UK
R10 (2020-2022)	AT, BE, BG, HR, CY, CZ, EE, FI, FR, DE, GR, HU, IS, IE, IL, IT, LV, LT, ME, NL, MK, NO, PL, PT, RS, SK, SI, ES, SE, CH, UK
R11 (2023-2024)	AT, BE, BG, HR, CY, CZ, EE, FI, FR, DE, GR, HU, IS, IE, IL, IT, LV, LT, ME, NL, NO, PL, PT, RS, SK, SI, ES, SE, CH, UA, UK

Source: https://www.europeansocialsurvey.org/about/participating-countries

To ensure that the ESS data can be used to make inferences about the general population and to minimise the margin of error, each country must achieve a minimum effective sample size of 1500 (after discounting for design effects). For smaller countries (those with a population of less than 2 million), this number is reduced to 800. Countries must decide how many participants they will select from their sampling frame, i.e. their gross sample size, and predict how many completed interviews they will need to achieve (their net sample) to meet their effective sample size.

The target population of the ESS in round 11 was defined as: "All persons aged 15 and over (no upper age limit) who live in private dwellings in each country, regardless of their nationality, citizenship or language." People living in communal establishments such as nursing homes, army barracks and prisons are therefore excluded. Living in a dwelling unit means that this accommodation is currently the person's main residence. (ESS 2022). The basic principles for sampling in ESS are as follows (ESS 2022):

- Samples must be representative of all persons aged 15 and over (no upper age limit) resident within private households in each country, regardless of their nationality, citizenship or language.
- Individuals are selected by strict random probability methods.
- All countries must aim for a minimum 'effective achieved sample size' of 1,500 or 800 in countries with ESS populations of less than 2 million after discounting for design effects.
- Quota sampling is not permitted.
- Substitution of non-responding households or individuals (whether 'refusals', 'non-contacts' or 'ineligibles') is not permitted.

In the ESS, data has mainly been collected via face-to-face CAPI interviews in all participating countries. The ESS Specification is set to ensure accuracy of data in each country and to optimise comparability of data across countries. The standards on data collection include among others (https://www.europeansocialsurvey.org/methodology/ess-methodology/data-collection):

- Response rate target 70% (as a general target; actual target lower in some countries).
- Non-contact rate target of 3% maximum.

4.2. SELECTION OF COUNTRY STATISTICS

Besides microdata from large household surveys, we will also use and summarize in DO external data from different national and international (Eurostat, EMF, OECD, WB, CIA, ILO, UN) country statistics in following areas:

1. *Housing regimes and housing stock* - it includes, for example, following data:
    a. tenure structure, homeownership rate (in %);
    b. share of homeowners with mortgage or loan (%);
    c. volume of total housing stock;
    d. total volume of housing construction;
    e. total outstanding residential loans per capita;
    f. total outstanding residential loans to GDP ratio (%);
    g. total outstanding residential loans to disposable income of households ratio (%).

2. *Housing affordability* - it includes, for example, following data:
    a. nominal residential house price index based in 2015;

b. adjusted gross disposable household income per capita in PPS;
c. average annual wages in 2021 USD PPPs;
d. price-to-income ratio index based in 2015;
e. rent-to-income ratio index based in 2015.

3. *Geography and climate* - it includes, for example, following variables:
   a. area in km^2;
   b. average sea level;
   c. average temperature in summer from;
   d. average temperature in winter;
   e. population density;
   f. total precipitation;
   g. air pollution.

4. *Macroeconomic performance* - it includes, for example, following variables:
   a. GDP per capita in PPP;
   b. unemployment rate (%);
   c. real GDP growth rate (%);
   d. inflation measured by changes in consumer price index (CPI) (%);
   e. general government expenditure as a percentage of GDP;
   f. government debt consolidated as a percentage of GDP;
   g. gross household saving rate (%);
   h. current account balance as a percentage of GDP;
   i. nominal unit labour cost index based in 2015;
   j. nominal labour productivity;
   k. long-term interest rate (%).

5. *Demographics* - it includes, for example, following variables:
   a. population (mid-year mean of population);
   b. number of households;
   c. ratio of older dependents in % as a share of people older than 64 to the working-age population (those ages 15-64);
   d. urban population as a share of total population (%);
   e. municipalities per 100 000 inhabitants.

6. *Governmental regulations* - it includes, for example, following variables:
   a. intensity of rent control, index between 0 (no rent control) and 1 (very strong rent control);
   b. homeownership taxation indices;
   c. top marginal income tax rates.

4.3. SELECTED PRELIMINARY AND ILLUSTRATIVE RESULTS OF HOUSING INEQUALITY MEASUREMENT

In this section, we present preliminary, draft and illustrative results of measurement of housing inequality indicators, with particular emphasis on the ranking of individual countries (especially the "core group" countries). However, it is not the purpose of this activity to carry out any in-depth analysis of inequality or to test alternative settings and statistics (sensitivity tests) – these more detailed analyses will be conducted later during tests of particular hypotheses defined under WP3, and they will be thus presented in the future reports.

4.3.1. HOMEOWNERSHIP ACCESSIBILITY

Figure 1 gives an overview of the countries participating in the EU-SILC survey (with the exception of Norway, which is not part of the EU, and the United Kingdom, as data for the United Kingdom are only available up to 2018) in terms of the proportion of households in each category of housing tenure in 2023. Countries are ranked in Figure 1 in descending order of the proportion of households living in owner-occupied housing (regardless of whether with or without outstanding mortgage). It is clear from the graph that the Central and Eastern European (CEE) countries, together with the Southern European countries (EC, PT, IT), have the highest proportions of households living in owner-occupied housing. The reason for the high share of households living in owner-occupied housing in the CEE countries is, among others, the privatisation and restitution processes that took place in these countries during transition, especially in the 1990s. The lower share of households living in owner-occupied housing with outstanding mortgages in these countries (in comparison with Western European countries) is also evident and is related to the way in which owner-occupied households acquired their dwellings: those who acquired their dwellings through privatisation generally did not have to take out loans to do so. At the same time, the mortgage market only gradually developed in these countries from the 1990s.

It is clear that Romania is the country with the highest proportion of homeowners in the group of selected core countries (highlighted with asterisks). This is followed by Estonia, Italy and the Czech Republic. Belgium is also among the countries with a slightly above-average share of homeowners. On the other hand, Finland, the Netherlands and especially Germany are among the countries with a rather below average share of households living in their own dwelling.

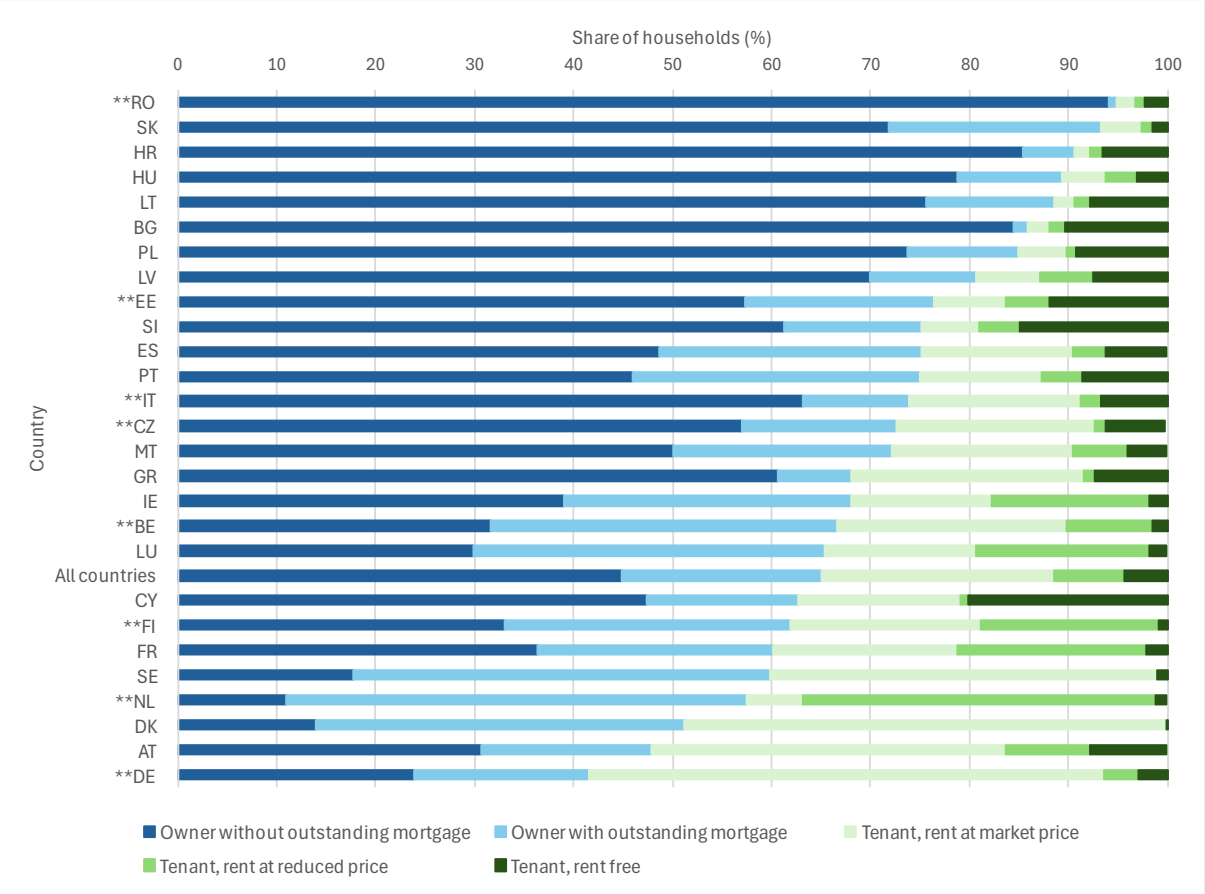

Figure 1: Housing tenure by country in 2023

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

Figure 2 shows the ranking of countries according to the modified S80/S20 ratio, which was calculated as the ratio of the share of households of homeowners in the 5th income quintile to the share of households of homeowners in the 1st income quintile in 2023. The household equivalised total net income was used to determine the income quintiles. Households with an income in the 1st quintile are those with the lowest income, while households with an income in the 5th quintile are among those with the highest income.

The figure shows that countries with the highest share of owner-occupied housing (households of homeowners) are among those with the lowest levels of housing tenure inequality, and vice versa. This is a fairly logical conclusion in view of the fact that, for example, 95% of households in Romania are owner-occupiers. Rather than being concentrated in the highest income households, these households must necessarily be found across the income spectrum. When it comes to the core countries, the Netherlands, Germany and Finland are among those with the highest degree of inequality in terms of housing tenure.

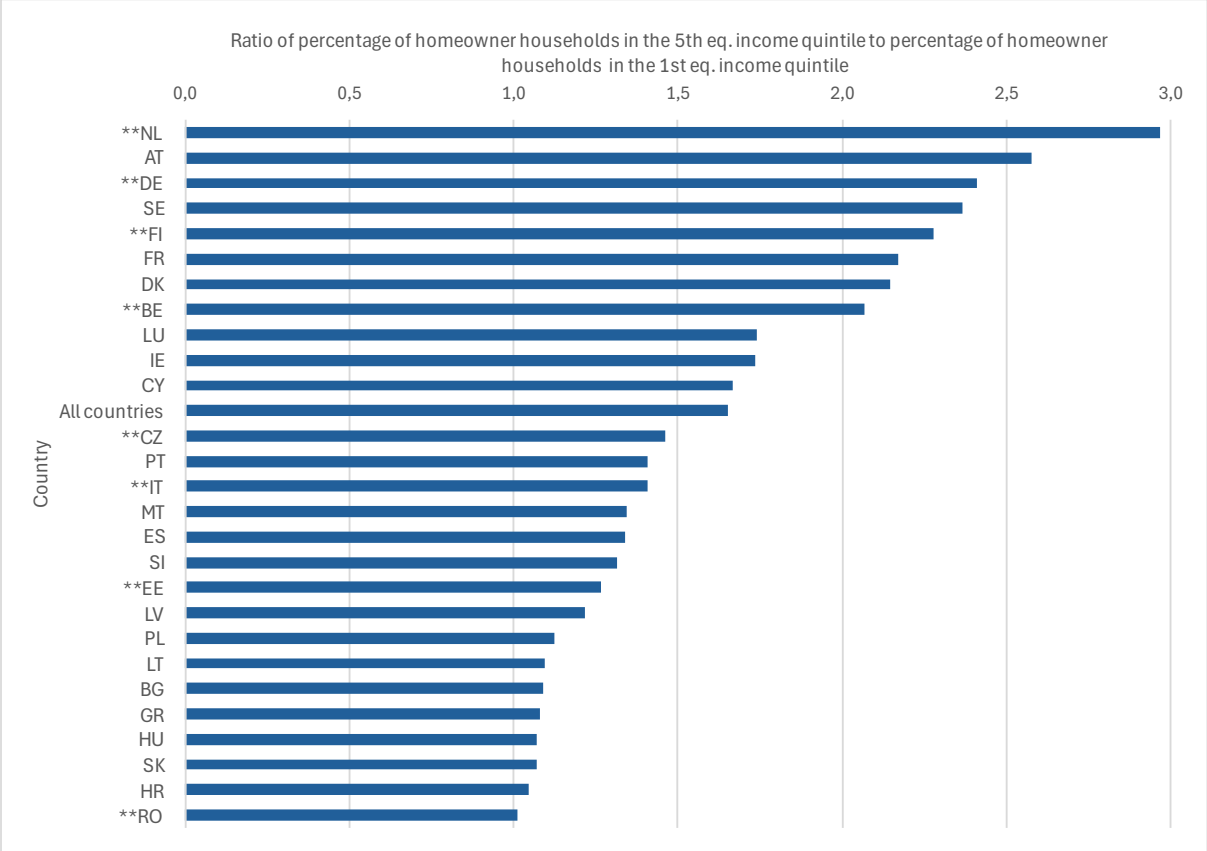

Figure 2: Housing tenure inequality by equivalised income quintiles in 2023

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

4.3.2. HOUSING AFFORDABILITY: HOUSING COST-TO-INCOME RATIO

Figure 3 shows the proportions of households in each country whose total housing cost-to-income exceeded 30%, 35% and 40% in 2023. We have added the alternatives of 30% and 35% to the official threshold used by Eurostat. The countries in the figure are ranked in descending order of the proportion of households with a cost-to-income ratio above 40%. It is clear from the Figure that if we had used a different burden threshold, the results would have been similar, but in some cases the ranking of the countries would have been different.

Focusing on the core countries, the Netherlands, followed by Germany and, to a lesser extent, the Czech Republic and Belgium, had the highest share of households with a total housing cost-to-income ratio above 40%. Conversely, Italy had the lowest proportion of households threatened by housing unaffordability, while Finland also had a relatively low proportion. Romania and Estonia were just below the EU average on this indicator.

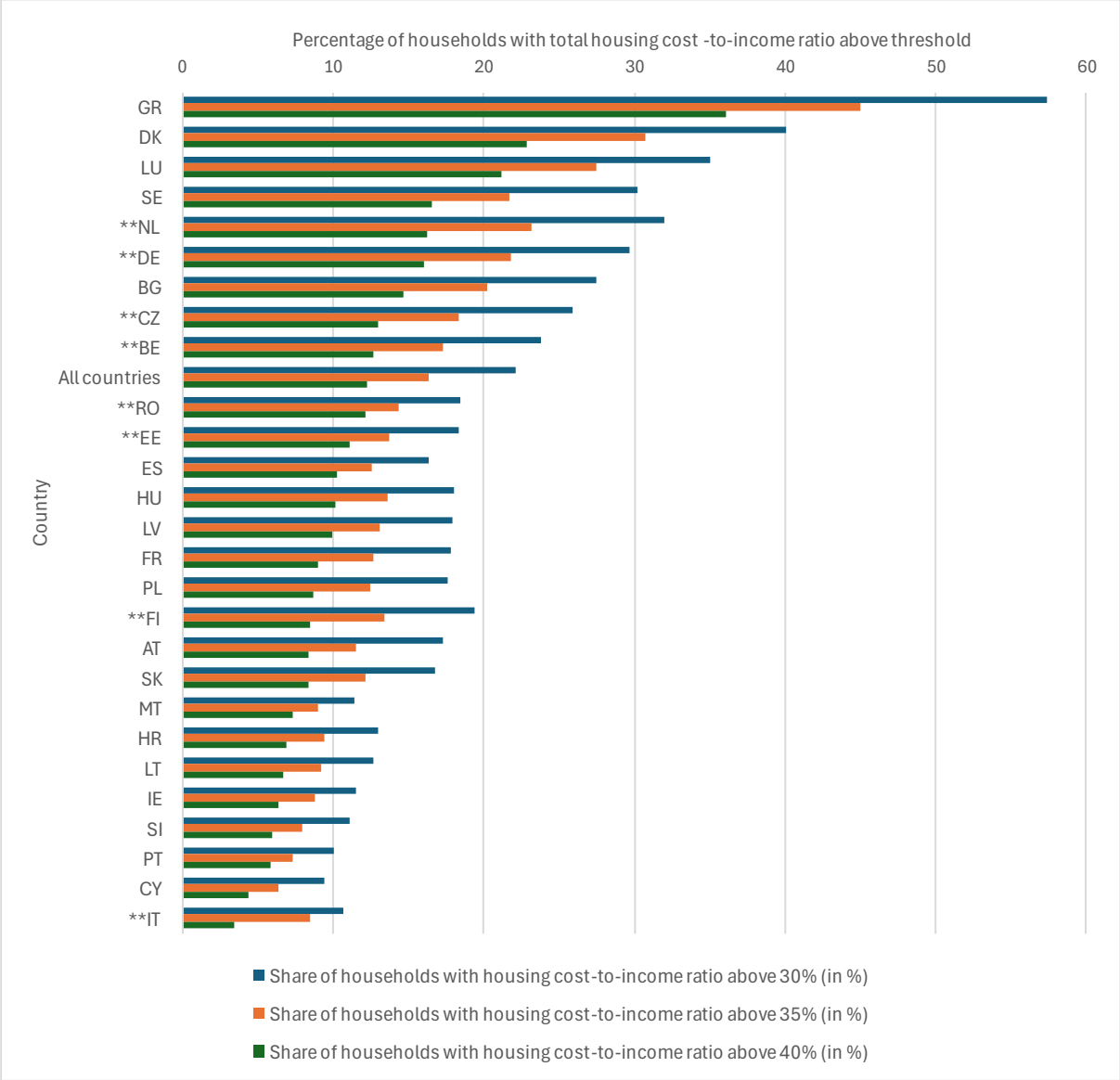

Figure 3: Percentage of households with total housing cost-to-income above 30%, 35%, and 40% in 2023

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

We know that total housing cost-to-income ratio is on average lower for households living in owner-occupied housing and higher for those living in rental housing. Figure 4 therefore shows the proportions of households with a total housing cost-to-income ratio above 40% for each country, but separately for each housing tenure. It is clear from the Figure that in all countries the share of households with total housing costs above 40% is significantly higher among renters. Although the share of households in rental housing with a total housing cost-to-income ratio is highest in Romania, it does not add much to the overall average cost burden in this country because rental housing forms the marginal share of total

housing stock here (see Figure 1). For Greece and Denmark, where the share of rental housing is higher than in Romania, it has on the opposite a significant impact on their ranking among EU countries. In other words, the aggregated values in Figure 3 somewhat hide the diametrically different situation of homeowners and tenants.

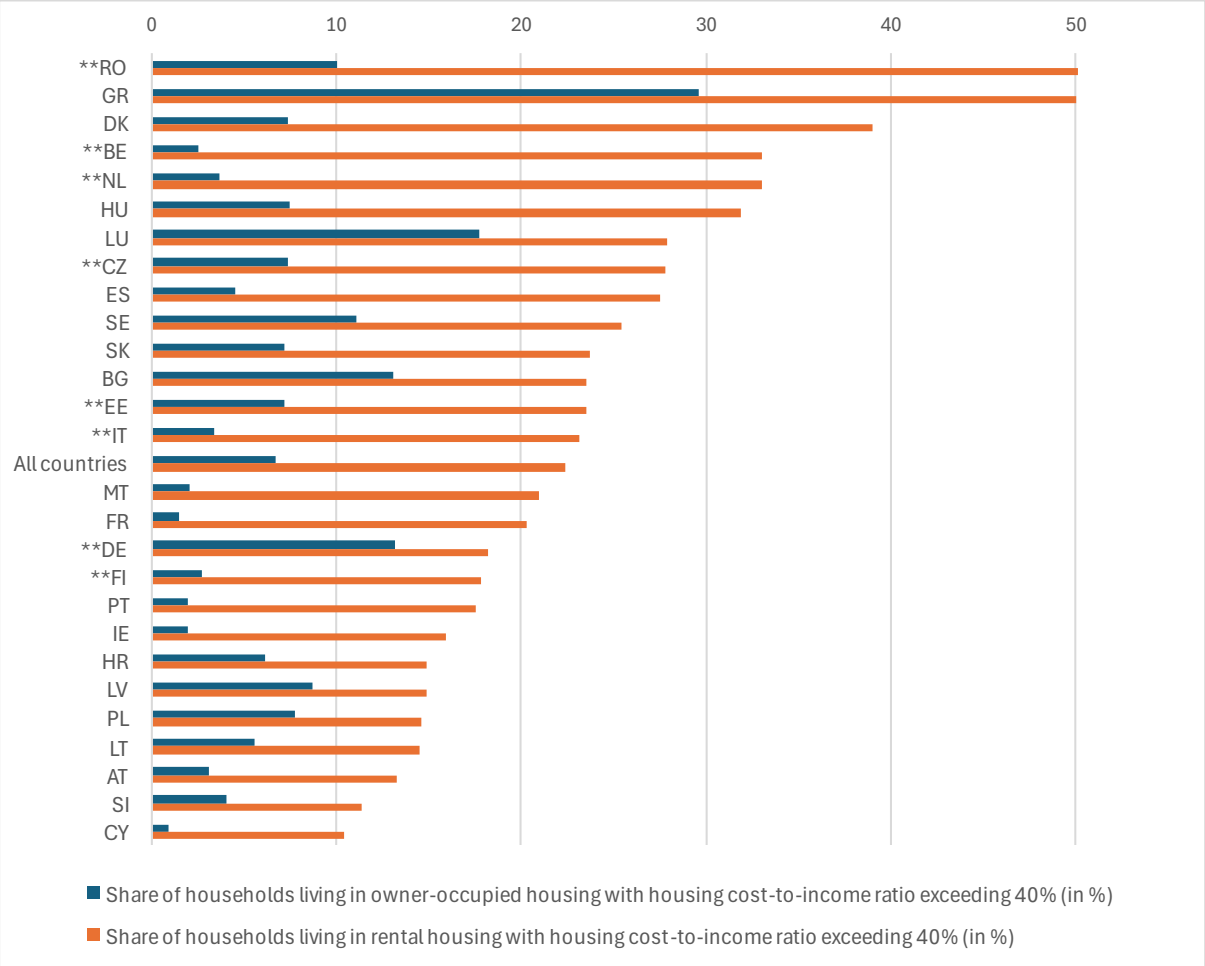

Figure 4: Percentage of households with total housing cost-to-income above 40% by tenure in 2023

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

Figure 5 ranks the countries in descending order according to the value of the coefficient of variation of the ratio of housing costs-to-income in the EU-SILC dataset for 2023. The figure shows that the highest variance (inequality) in the values of the indicator was observed in Italy, followed by Estonia and Romania (i.e. countries with a relatively high homeownership rate) in the group of core countries. The lowest value was for the Czech Republic, the Netherlands and Finland (i.e. mostly countries with a relatively high share of rental housing).

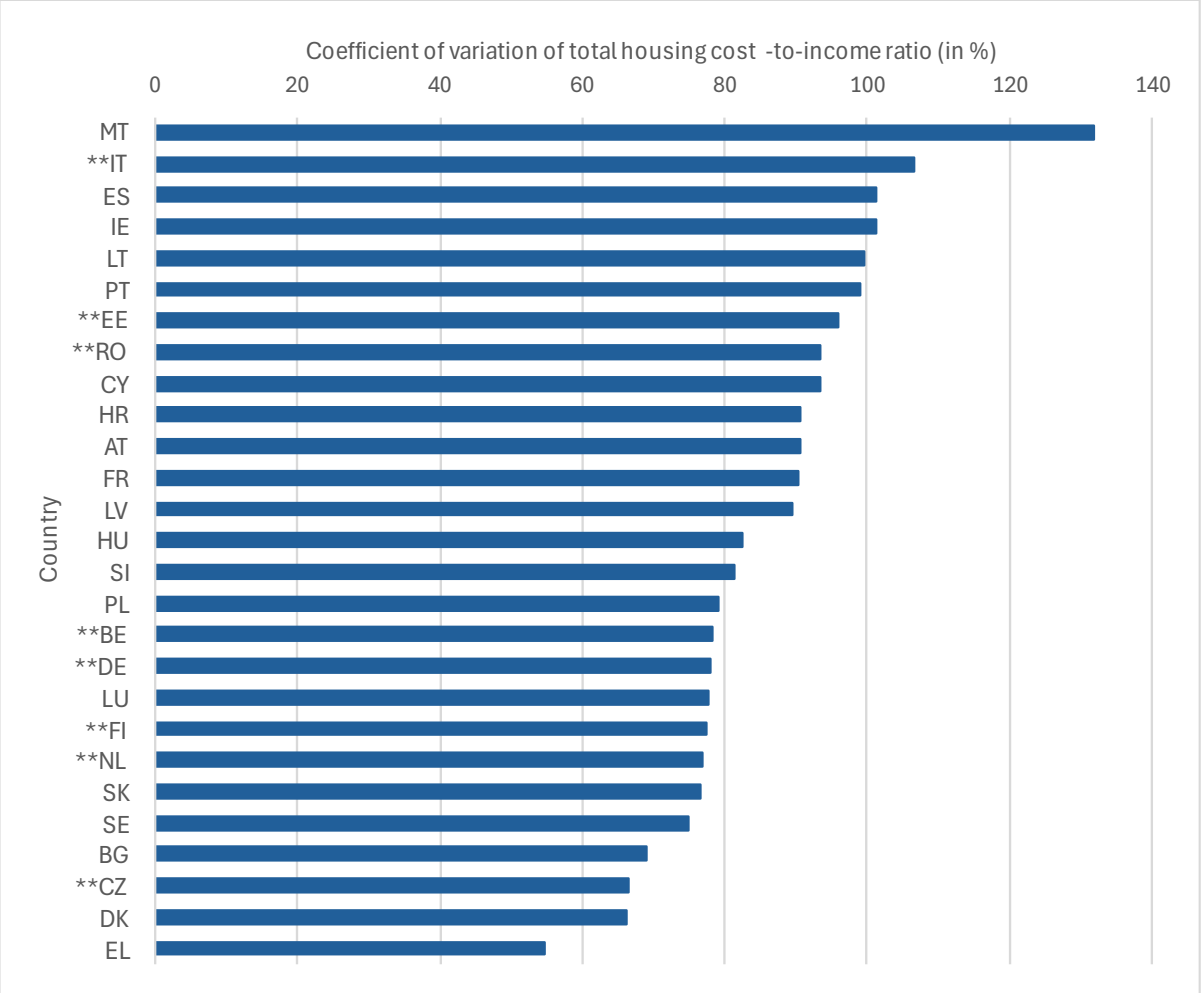

Figure 5: Coefficient of variation of total housing cost-to-income ratio in 2023

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

In Figure 6, countries are ranked according to the ratio of the average residual income of households in the 5th quintile (highest-income households by equivalised disposable income) to the average residual income of households in the 1st quintile (lowest-income households). The figure shows that, according to this indicator, the highest levels of inequality were observed in Latvia, Croatia, Bulgaria, Lithuania and Estonia. The lowest levels of inequality were found in Slovakia, Belgium, France and Romania. Focusing on the core countries, high levels of inequality were observed in Estonia, Germany, the Netherlands and Finland. On the other hand, relatively low levels of inequality were found in Belgium, Romania and the Czech Republic.

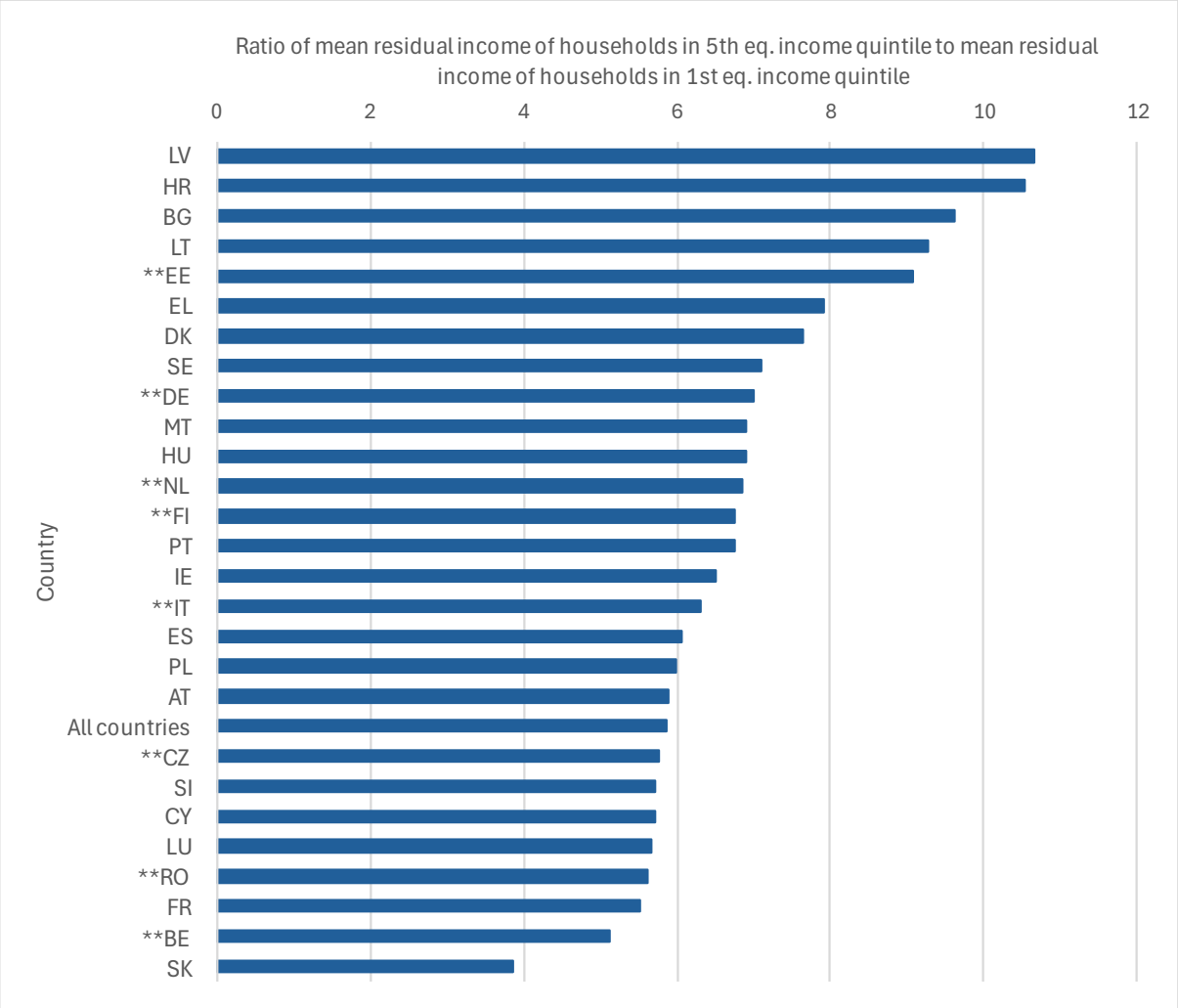

Figure 6: Ratio of the mean residual income of households in the 5th quintile to the mean residual income of households in the 1st quintile (2023)

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

4.3.3. HOUSING AFFORDABILITY: RENT-TO-INCOME RATIO

Figure 7 shows for each country the shares of households living in rental housing with rent-to-income ratios above 20%, 25% and 30% in 2023. Only households living in rental housing and paying rent (market rent or reduced rent) were included. The countries are ranked in descending order according to the proportion of households with a rent-to-income ratio above 30%. Among the core group countries, the highest proportion of households with a rent-to-income ratio above 30% has been in Belgium, followed by Finland, Romania, Estonia and the Netherlands. On the other hand, the lowest proportion of households with rent-to-income ratios above 30% was in the Czech Republic and Germany.

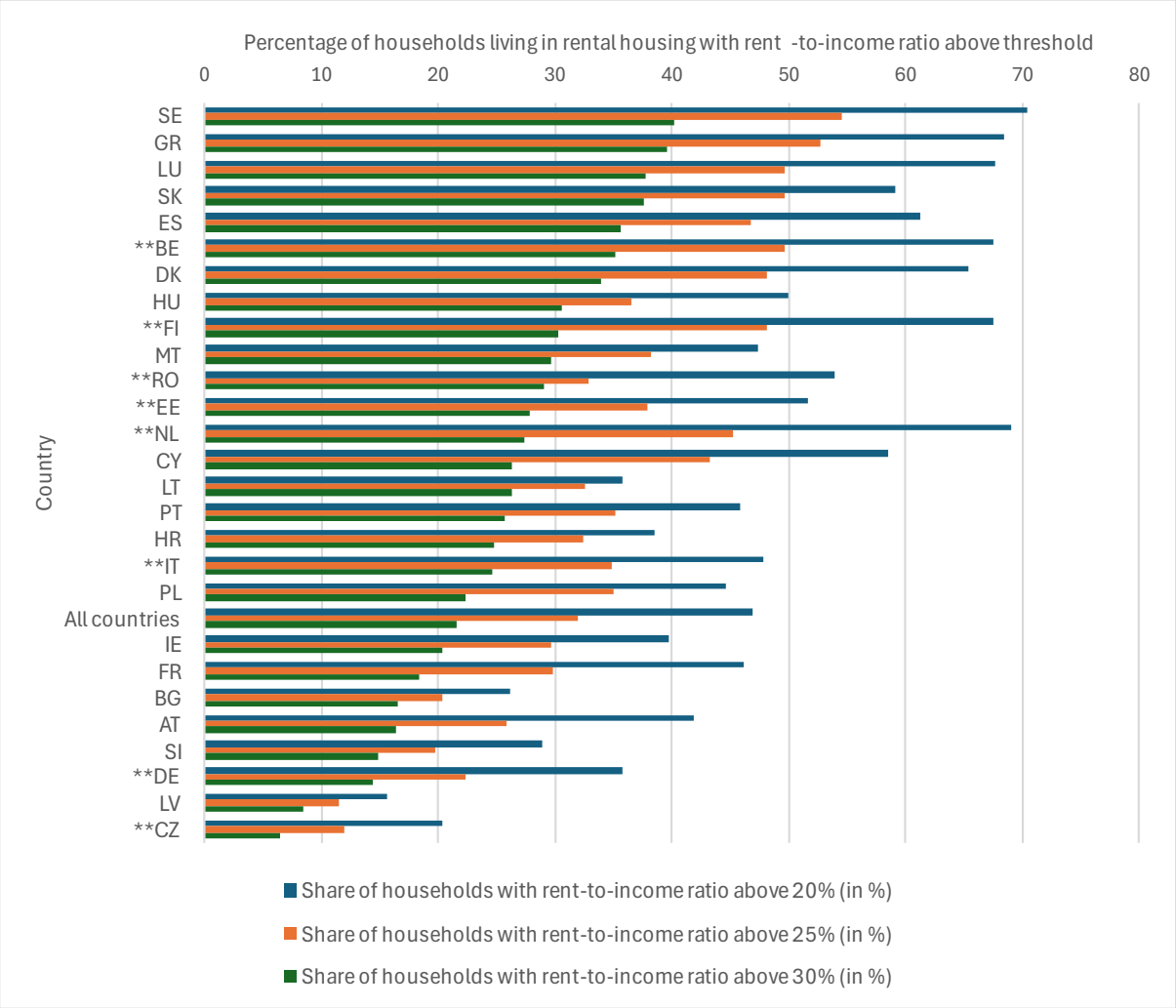

Figure 7: Percentage of households with rent-to-income above 20%, 25%, and 30% in 2023

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

4.3.4. HOUSING AFFORDABILITY: PRICE-TO-INCOME RATIO

Figure 8 ranks the countries participating in the EU-SILC survey in descending order according to the average value of the price-to-income ratio. According to the value of this indicator, the affordability of owner-occupied housing in 2020 was worst in Luxembourg, Malta, Austria, Portugal and Belgium. In Luxembourg, for example, the value of the indicator indicated that almost ten net annual incomes would be needed to purchase the average dwelling. In contrast, price-to-income ratio has been relatively low in Latvia, Lithuania or Bulgaria. In Bulgaria, for example, just over three annual incomes were needed to buy the average dwelling. Among core group countries, Belgium, the Netherlands, Italy, the Czech Republic and Germany belonged among those with the worst affordability of owner-occupied housing while Estonia, Romania and Finland were among the countries with the best affordability of owner-occupied housing in 2020.

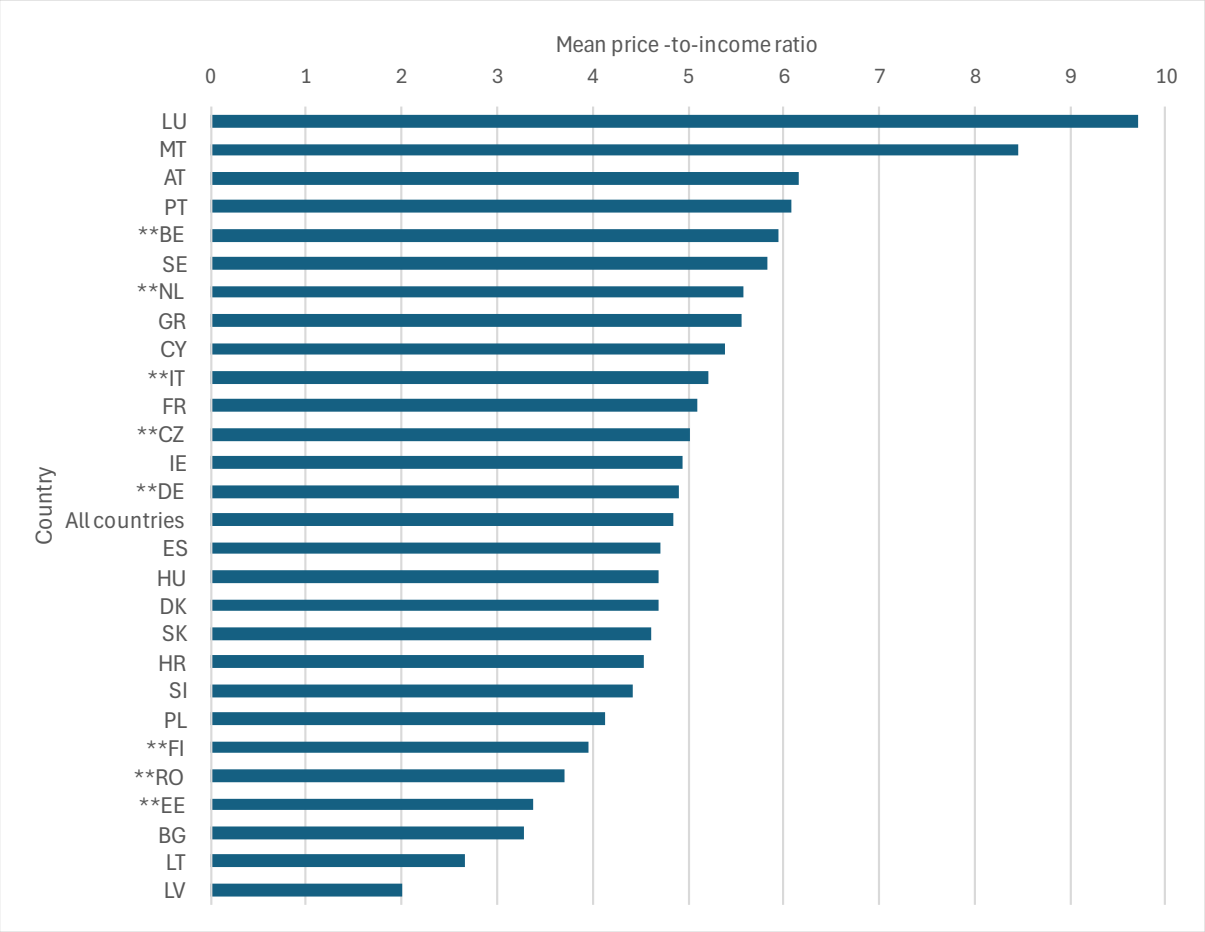

Figure 8: Mean price-to-income ratio in 2020

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2020 – version of 2023-09, own calculations.

The values in Figure 9 compare the affordability of owner-occupied housing for the highest-income households (households in the 5th quintile of equivalised net income) with the affordability of owner-occupied housing for the lowest-income households (households in the 1st quintile of equivalised net income). The higher the value of the indicator, the greater the inequality in the affordability of owner-occupied housing between the two groups. The Figure shows that the largest inequalities in 2020 were in Malta, Greece, Bulgaria, Croatia and Ireland. Conversely, the lowest inequalities were found in Sweden, Finland, Germany, Spain and France. Looking at the core countries, Italy and the Czech Republic were among the countries with relatively high inequalities in access to owner-occupied housing according to the P/I indicator. On the other hand, countries with low inequalities in access to owner-occupied housing include Finland, Germany and, to a lesser extent, Romania and the Netherlands.

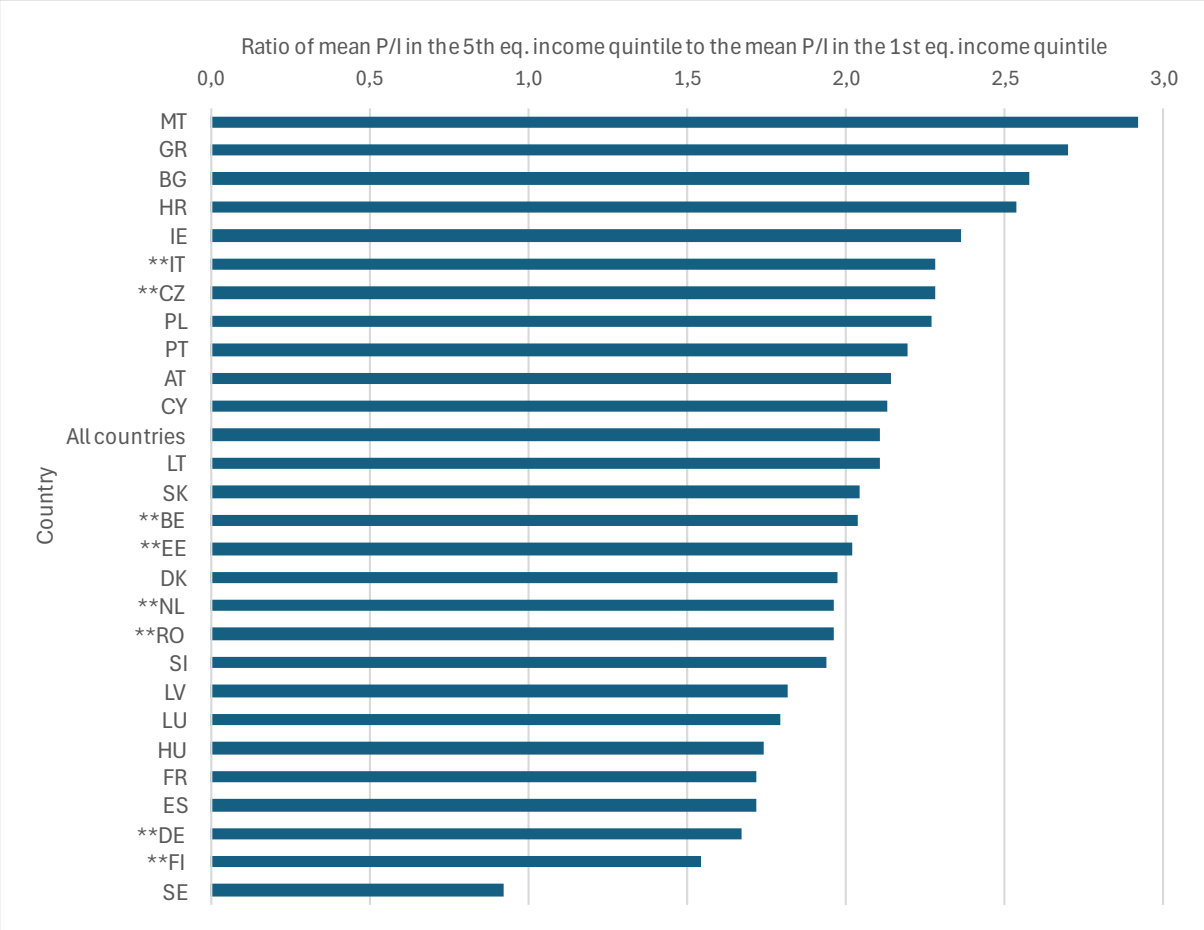

Figure 9: Ratio of mean P/I in the 5th eq. income quintile to the mean P/I in the 1st eq. income quintile (2020)

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2020 – version of 2023-09, own calculations.

4.3.5. HOUSING INEQUALITIES MEASURED BY SUBJECTIVE INDICATORS

Figure 10 presents the proportion of households in each country that reported in the 2023 EU-SILC survey that total housing costs were for them a heavy burden (subjective perspective). Concurrently, the same figure demonstrates the proportion of households with total housing cost-to-income above 40% (objective perspective). Countries are ranked in descending order according to the proportion of households with total housing cost-to-income above 40%. The figure demonstrates that the values of both indicators differ quite significantly for most countries. In only three countries did a situation arise where the share of households with a total housing cost-to-income ratio above 40% was higher than the share of households that reported that total housing costs were a heavy burden for them. Specifically, this was the case for Denmark, Sweden and the Netherlands. In the remaining countries, the reverse was observed, i.e. the proportion of households reporting housing costs as a heavy burden was consistently higher than the proportion of households with a housing cost-to-income ratio above 40%. The most pronounced disparity between the values of the two indicators was observed in Poland, Cyprus, Italy,

Croatia, Romania and Spain. Conversely, the smallest disparities in both indicators were observed in Estonia, Hungary, Lithuania, Germany, Sweden and Latvia.

Among the core countries, the Netherlands was the only country (as mentioned above) for which the proportion of households with total housing cost-to-income above 40% was higher than the proportion of households that reported that total housing costs were a heavy burden for them. The substantial disparities in the values of the two indicators were particularly evident for Italy and Romania. In contrast, the disparities were comparatively less pronounced in Estonia, Germany, the Czech Republic, the Netherlands, Finland and Belgium.

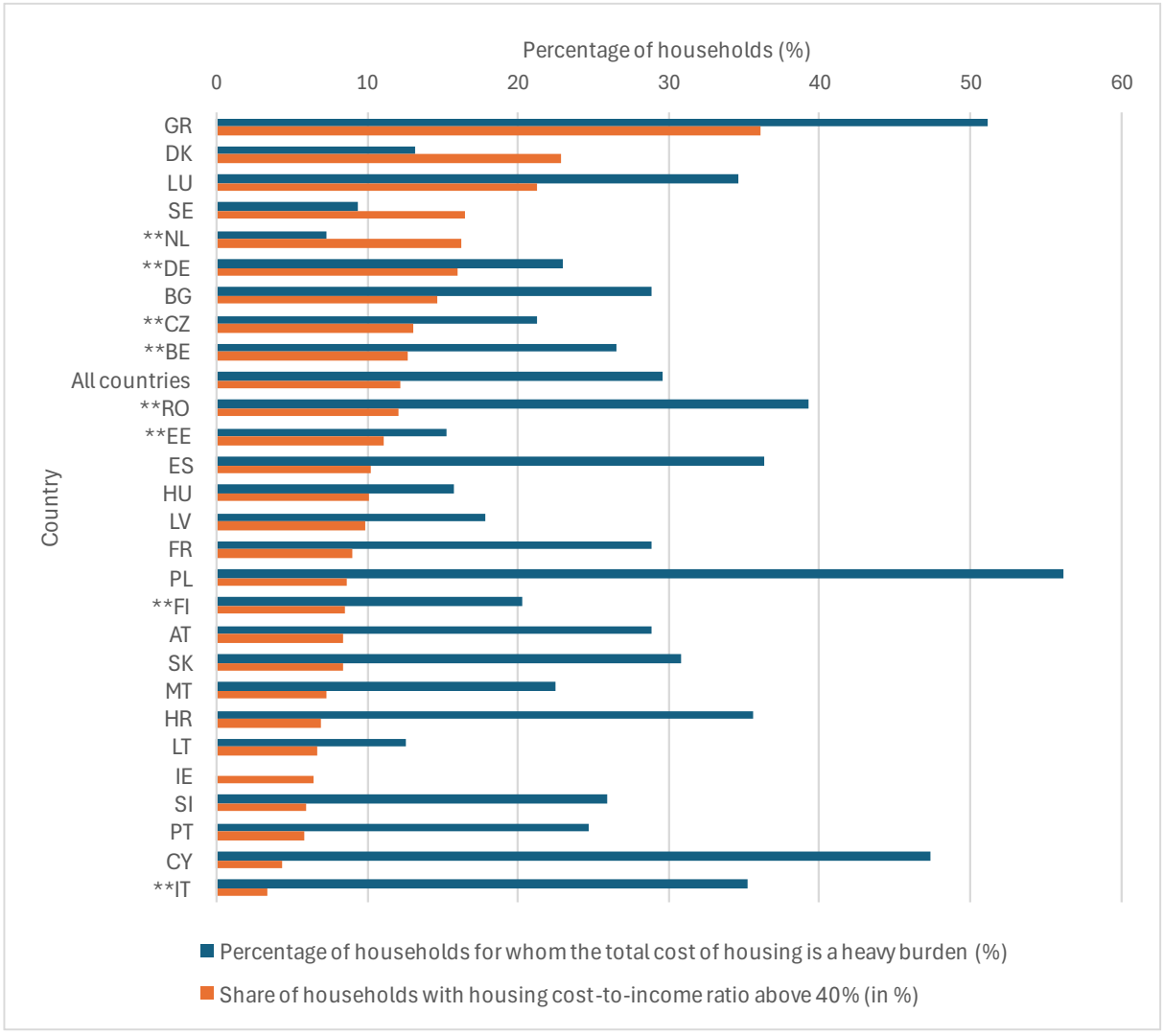

Figure 10: Comparison of the total housing costs burden from an objective and subjective perspective (2023)

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

Figure 11 shows the share of households that reported having a problem with a shortage of space in their dwelling in 2012 (subjective perspective).[3] At the same time, the same figure shows the proportion of households living in overcrowded dwellings according to Eurostat's official definition (objective perspective) in 2012. The countries in the Figure are ranked in descending order according to the proportion of households living in overcrowded dwellings. The figure shows that in some countries the two perspectives diverge quite dramatically. In 11 out of 28 countries, the proportion of households actually living in overcrowded dwellings was higher than the proportion of households reporting problems with a shortage of space in their dwelling. In the remaining countries, the reverse was true. It is interesting to note that the first group of 11 countries is almost exclusively made up of CEE and SEE countries. The second group consists almost exclusively of Western European countries, the only exceptions being Lithuania and Estonia. Croatia, Hungary, Poland, Romania, Slovakia, Bulgaria, Cyprus and Latvia showed the greatest difference in the values of both indicators. On the other hand, Sweden, Finland, Estonia, Austria, France, Lithuania and Germany had the closest values.

Within the group of core countries, Romania, Italy and the Czech Republic were among those where the proportion of households living in overcrowded dwellings (according to the objective perspective) was higher than the proportion of households for which shortage of space in the dwelling was a problem (according to the subjective perspective). The opposite was the case in Belgium, the Netherlands, Germany, Finland and Estonia.

[3] The data for 2012 have been used because this is the most recent year in which households have been asked about the problem of space in their dwelling in the EU-SILC survey.

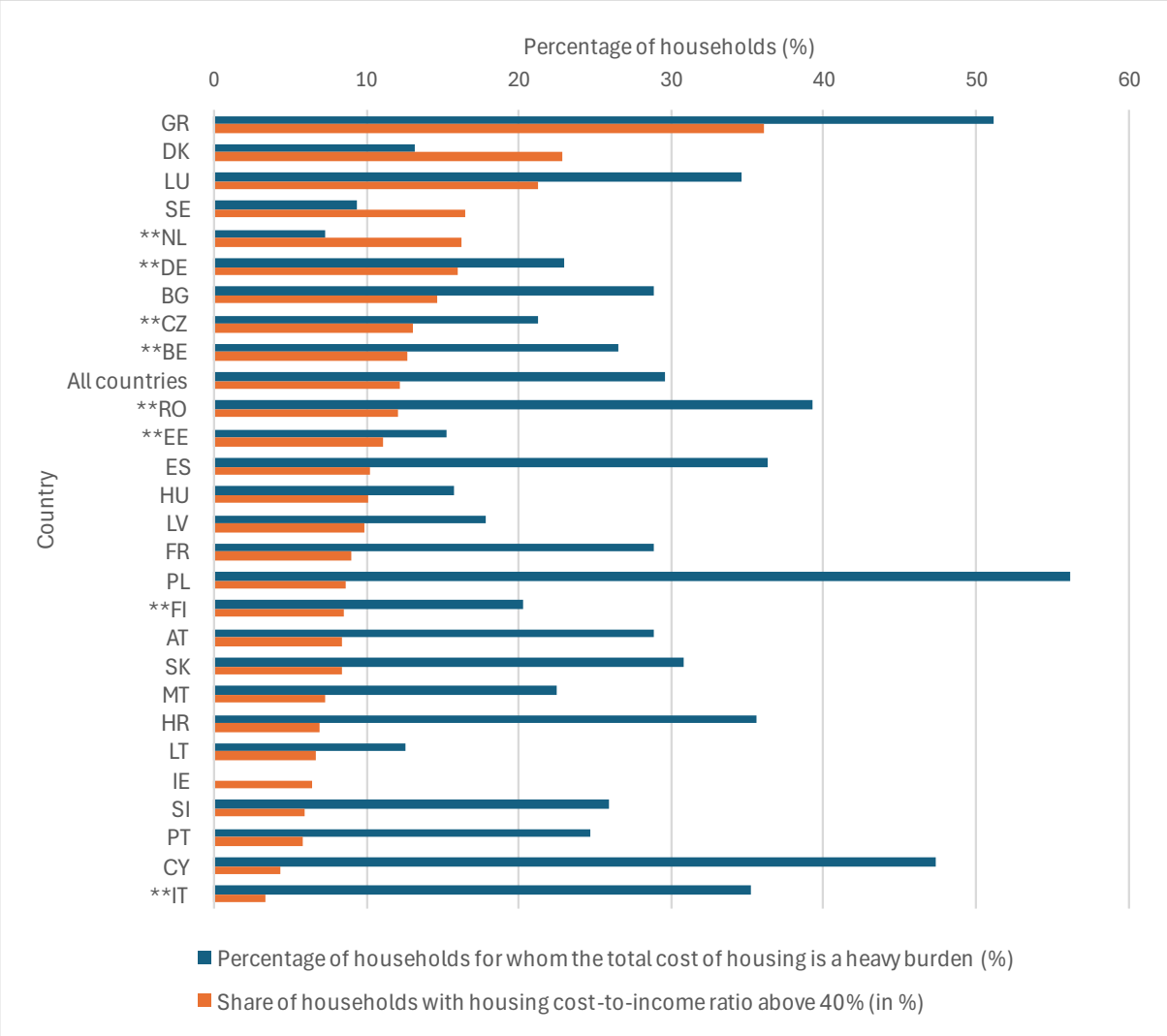

Figure 11: Comparison of the overcrowding from an objective and subjective perspective (2012)

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2012 – version of 2019-03, own calculations.

4.3.6. HOUSING PRECARITY

As demonstrated in Figure 12, the proportion of households experiencing a given number of dimensions of housing precarity is depicted. Specifically, in the case of Romania in 2023, the data reveal that just under 52% of households were not affected by any of the dimensions of precarity, 36% by one dimension, 10% by two dimensions, and 2% by three dimensions. It should be noted that the concept of precarity in housing includes four dimensions: affordability, security, housing quality and quality of neighbourhood. Households with a total housing cost-to-income ratio above 40% were found to have a problem with *housing affordability*. Furthermore, households that were unable to meet their rental or mortgage obligations, or other housing-related expenses, in a timely manner over the past 12 months were identified as experiencing *housing insecurity*. *The quality of housing* was found to be problematic for households

residing in overcrowded dwellings, those unable to maintain adequate warmth in their dwellings, and those living in dwellings of substandard quality, defined as dwellings with leaking roofs, damp walls/floors/foundations, or visible signs of rot in window frames or floors. The fourth dimension (i.e. *quality of neighbourhood*) was omitted for the purpose of this calculation, as it proved to be relatively insignificant compared to the remaining three dimensions.

The highest precarity in the core countries[4] was recorded in Romania with almost 50% of households having deficiencies in at least one of the three dimensions (affordability, security and quality). In contrast, the country with the lowest housing precarity was Belgium with less than a third of households having problems in at least one dimension.

As the Figure 12 shows, the overall levels of housing precarity in multiple of the core countries do not differ substantially (e.g. Czechia, Finland and Belgium have almost the same share of households without problems in any of the dimensions). However, when we look at the individual dimensions of housing precarity, we see larger variance. For instance, in the case of housing affordability measured by housing overburden rate (i.e. total housing cost-to-income ratio), the Netherlands have highest share of households that spends over 40% of disposable income on housing costs which explains most of its housing precarity (38% households with problems in at least one dimension).

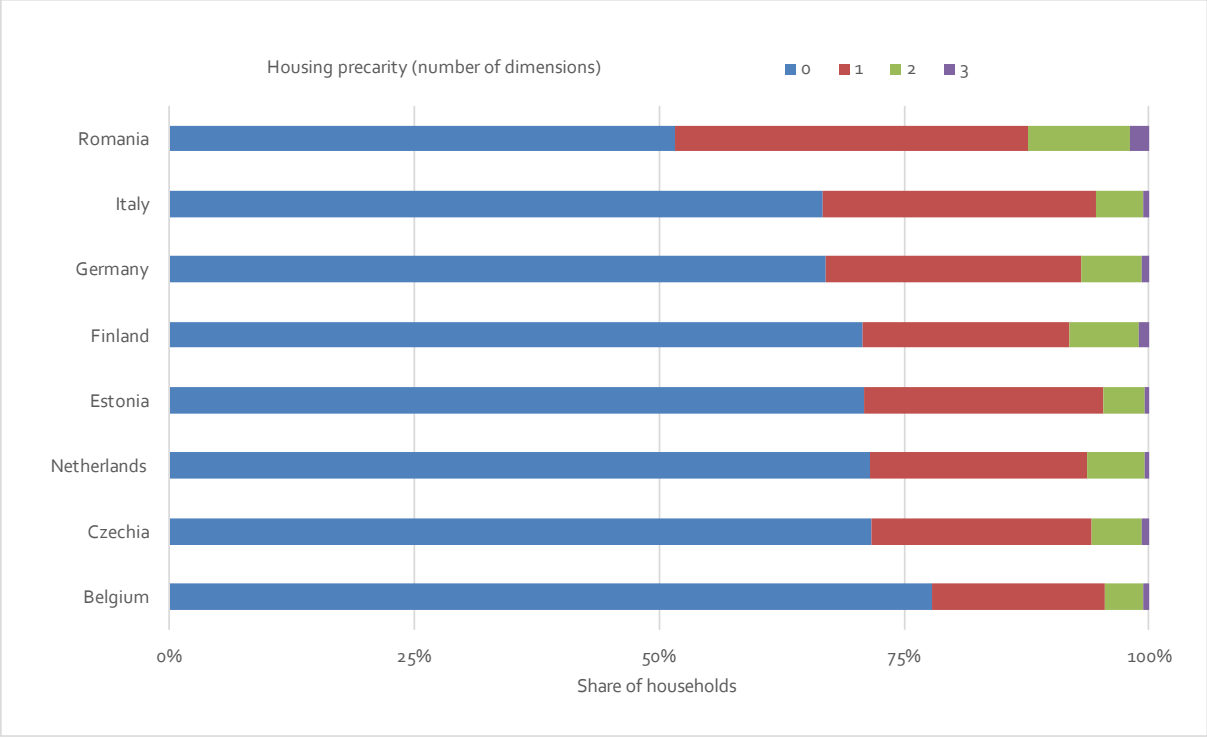

Figure 12: Housing precarity

Note: Core group countries are marked by **

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

[4] The UK is missing as EU-SILC data for the UK is only available up to 2018.

The second dimension of housing precarity is housing (in)security, measured by the existence of arrears on utilities and mortgage/rent payments (Figure 13). Here, the core country with the highest share of households having problems in this dimension is Romania (14%), while the country with the lowest share is the Netherlands (2.4%). Disaggregating into the indicators, the high position of Romania is driven by a high share of households having arrears on utilities (see Figure 14).

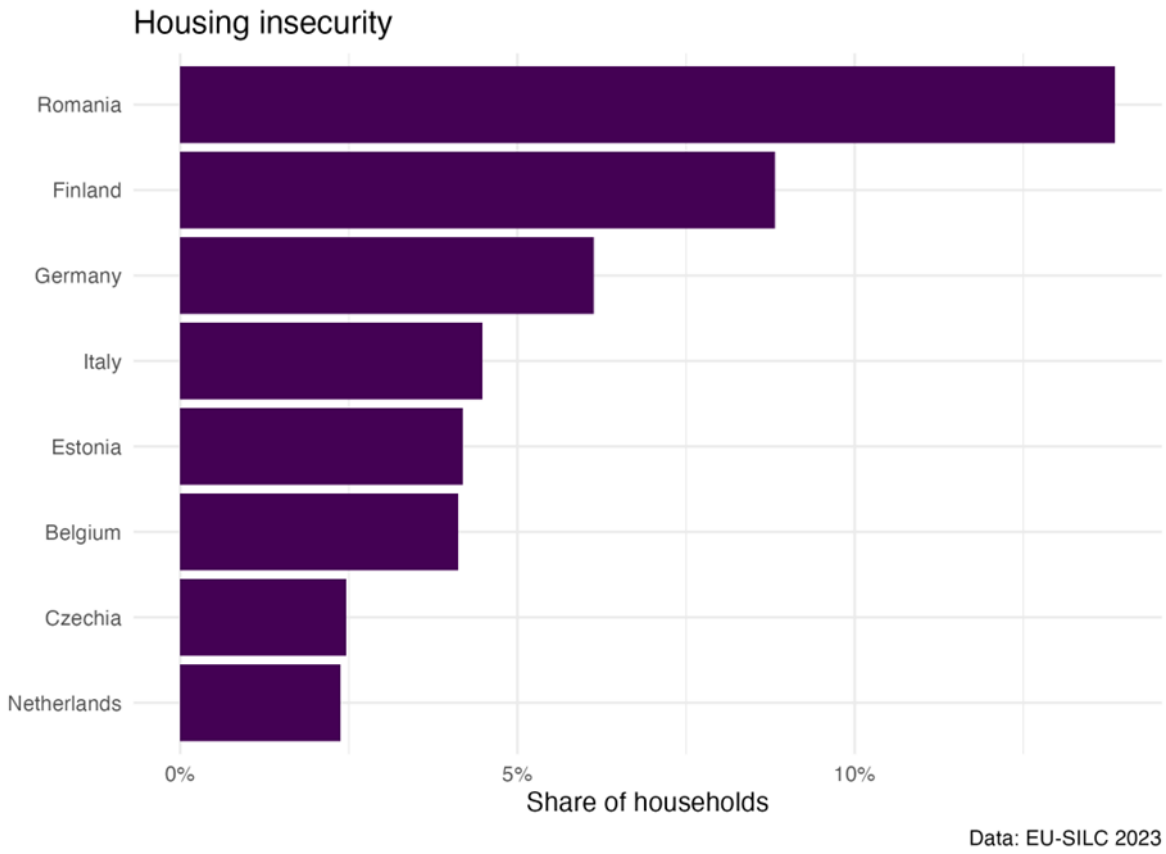

Figure 13: Housing insecurity

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

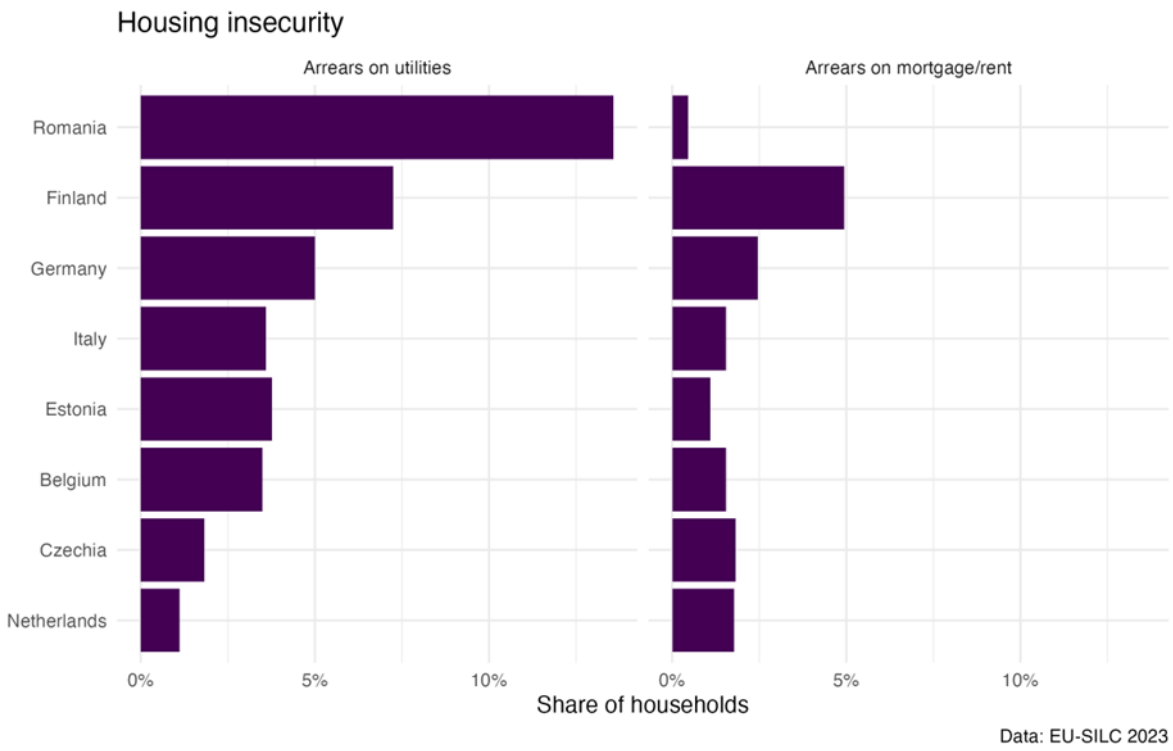

Figure 14: Housing insecurity indicators

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

Finally, the third dimension of housing precarity is housing quality measured by three indicators: 1) overcrowding, 2) leaks/damp, and 3) inability to keep the dwelling warm. Here, Romania tops the list of core countries, followed by Italy and Germany (Figure 15).

Figure 15: Housing quality indicators

Source: EU-SILC Cross UDB 2023 – version of 2024-09, own calculations.

4.3.7. HOUSING WEALTH INEQUALITY

The data in Figure 16 show the values of the Gini coefficient, the Atkinson index and the Theil index for household wealth inequality among countries that participated in wave 4 of the HFCS survey in 2021. However, wealth does not include only housing wealth and it is calculated from estimates of total household net wealth excluding public and occupational pensions made by respondents of HFCS. These results are thus only illustrative and they were actually taken from the Austrian National Bank's web application (see https://oenb.shinyapps.io/HFCS_Keyfigures/). In the Figure, countries are ranked in descending order according to the value of the Gini coefficient. The figure shows that the highest wealth inequalities in 2021 were observed in Germany, followed by Estonia, Austria, Latvia, Finland and Spain. The lowest wealth inequalities were found in countries such as Slovakia, Malta, the Czech Republic, Lithuania, Greece and Slovenia. Within the core group countries, Germany and Estonia are clearly the countries with the highest levels of wealth inequality, with the Czech Republic and Belgium at the other end of the ranking. In between are Finland, the Netherlands and Italy.

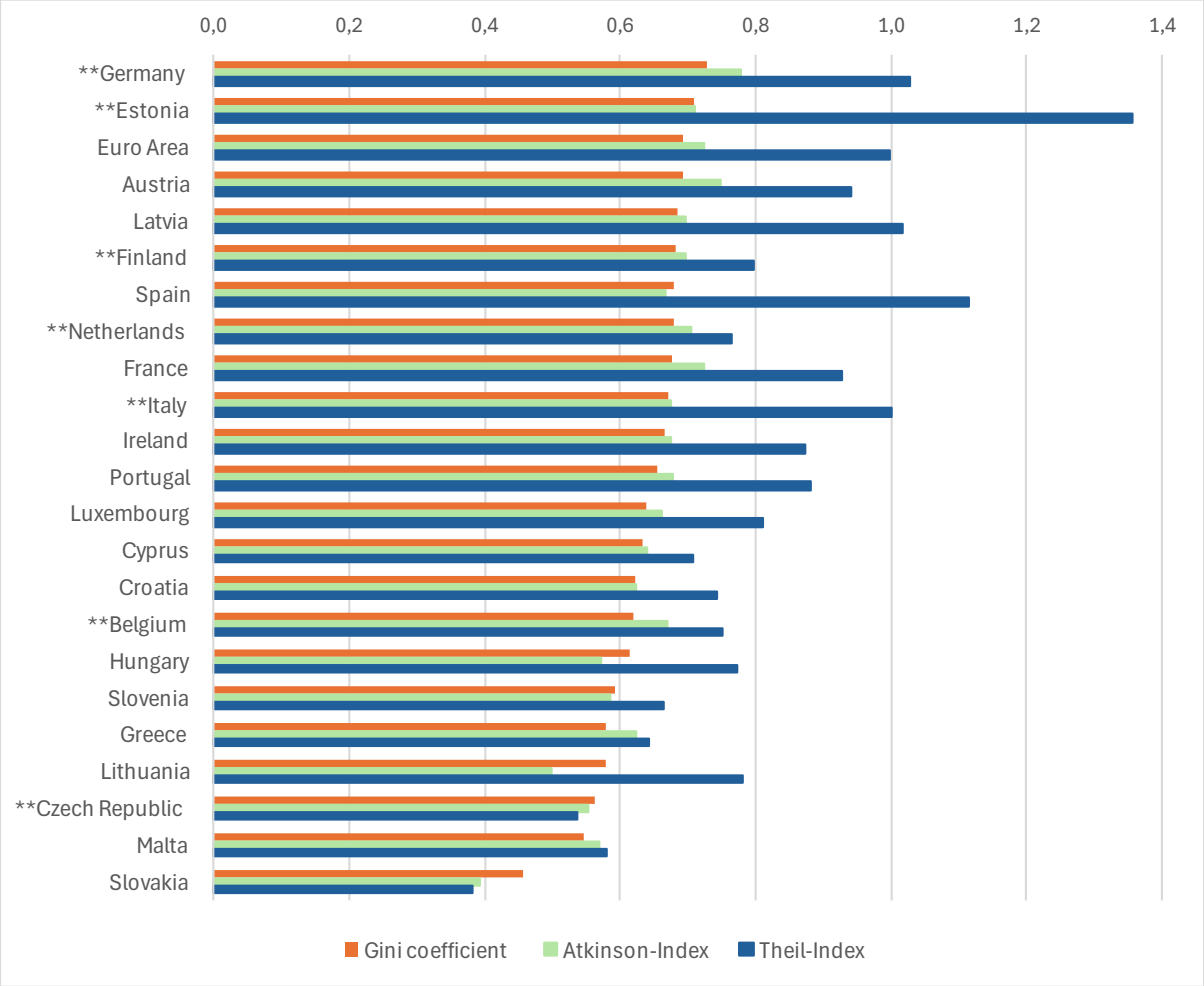

Figure 16: Net wealth inequalities – Gini coefficient, Atkinson index and Theil index

Note: Core group countries are marked by **

Source: Eurosystem HFCS, https://oenb.shinyapps.io/HFCS_Keyfigures/.

4.4. OVERVIEW OF THE ILLUSTRATIVE RESULTS OF HOUSING INEQUALITY MEASUREMENT

In the preceding text, a plethora of indicators of housing inequality were presented. This was just a selection from a broader set of possible indicators, and even so, the reader may feel somewhat overwhelmed. We have therefore attempted to distil the findings from the preceding sections into the Table 6 only for the group of core countries.

Table 6: Ranking of core group countries by selected housing inequality outcomes

Indicator / Country	Finland	Germany	Netherlands	Italy	Belgium	Czechia	Estonia	Romania
Homeownership accessibility (level)	Rather low	Low	Low	Rather high	Average	Rather high	High	High
Homeownership accessibility (distribution)	Rather high	High	High	Average	Rather high	Average	Rather low	Low
Housing cost-to-income ratio (level)	Rather low	High	High	Low	Average	Average	Average	Average
Housing cost-to-income ratio (distribution)	Rather low	Rather low	Rather low	High	Rather low	Low	Rather high	Rather high
Rent-to-income (level)	Rather high	Low	Rather high	Average	High	Low	Rather high	Rather high
Price-to-income (level)	Rather low	Average	High	Rather high	High	Average	Rather low	Rather low
Price-to-income (distribution)	Low	Low	Rather low	High	Average	High	Average	Rather low
Housing cost burden (subj. level)	Rather low	Rather low	Low	Rather high	Average	Rather low	Low	High
Overcrowding (subj. level)	Rather low	Average	Average	Low	Low	Low	Rather high	High
Housing precarity (level)	Average	Rather high	Rather low	High	Low	Rather low	Average	High
Housing wealth (distribution)	Rather high	High	Rather high	Average	Rather low	Low	High	-

Note: data for UK not available (EU-SILC data for the UK available only up to 2018). "High" as used in this context refers to elevated levels of volatility in the values of the given indicator overall or by income distribution, that is to say high levels of housing inequality.

Source: authors.

5. CONCLUSION

The aim of this report was to describe selection of countries for further quantitative data analysis, not only within WP3 but also within other WPs of the HouseInc project. Furthermore, the goal was to provide an overview of available international surveys and data sources appropriate for a more detailed quantitative analysis of housing inequality; to propose appropriate indicators of financial levels of housing inequality; and to present few preliminary and illustrative results from their measurement.

For practical reasons (including the limited budget for the international survey to be carried out in WP4 and its feasibility), it was necessary to limit the number of countries included into the "core group" to eight countries. One of the main criteria for their selection was the availability of secondary statistical data, which was mainly related to the countries' participation in large international questionnaire surveys such as EU-SILC and HFCS. Furthermore, the diversity of countries according to broader institutional contexts (housing regimes, housing systems and welfare regimes) was taken into account. Other criteria contained diversity of the selected countries in terms of the level of housing affordability, the level of wealth (especially housing wealth), macroeconomic indicators (especially GDP and inflation), geographical location, climatic factors, and demographic trends. The selection results in the following 8 countries: UK, Finland, Germany, Netherlands / Romania, Italy, Belgium, Czechia, and Estonia. While the Netherlands has been included into the core group for WP 3 tasks (as it represents specific housing regime and secondary data from large comparative surveys are available), Romania has been included into core group for WP 4 tasks (and the multinational survey) because it represents the post-socialist South European region, also with its specific climate. However, Romania did not took part in several major international (EU) comparative surveys and thus is not suitable for secondary data analysis made by WP 3.

We presented the most commonly used definitions and methodological approaches to measuring financial aspects of housing inequality and proposed and discussed advantages and disadvantages of particular statistics. In addition, the practical aspects of the housing affordability indicators that have been officially used so far and their main shortcomings were mentioned. One of them was the rigidity of the single "critical" threshold of housing cost burden used by Eurostat, which may not sufficiently reflect the specificities and cultural differences of individual EU Member States. Furthermore, there is, for example, limited reflection on subjective aspects and indicators, which are increasingly used in the fields of well-being, life satisfaction and others. Finally, more complex approaches to measuring housing inequalities were proposed within definition of housing precarity.

We presented the main indicators of housing inequality. Specifically, these were the levels and variations in (a) housing cost-to-income ratio (rent-to-income, price-to-income), (b) residual income (income after housing costs), (c) overburden rate (share of households with cost-to-income above a threshold or share of households with residual income below a threshold, both computed for different levels of threshold), (d) housing precarity (combination of overburden, overcrowding and bad housing and neighbourhood quality), (e) subjective affordability (for overburden, quality, overcrowding), (f) annuity-to-income, (g) homeownership accessibility, and (h) housing wealth.

We have justified the choice of the household as the unit of analysis, rather than the individual, as is the case for most Eurostat statistics, and described the adjustments to some of the variables we have used in the empirical part (e.g. equivalisation of household income). We then described in detail the method of calculation (what variables we used, how we adjusted them and what operations we performed on them)

and any modifications to the indicators we used in the empirical part. We also mentioned potential factors (drivers) of inequality in housing affordability. All indicators of housing inequality and selected drivers were summarized in the so-called *Data Overview* (DO). The DO is produced in MS Excel and represents a useful tool for following quantitative analyses of housing inequality. DO allows for selection of data/variables according to different criteria (country, source of data, time, indicators/drivers, etc.). For household surveys, only variable names and sources/surveys where data can be drawn are listed but for some crucial variables, time series are presented directly (if available). DO provides a comprehensive overview of the available data. This includes data that are not mentioned in this report due to space limitations. DO is not a closed task; instead, new variables and time series of indicators of housing inequality and their drivers that were not known in time of writing this report will continuously be added into database till the end of the HouseInc project.

We have described in detail the surveys (EU-SILC, HFCS and ESS) whose datasets were the main source for the quantitative analyses based on individual and/or household data in the empirical part of this report.

In the empirical section of the report we have shown illustrative and preliminary results from measurement of housing inequality. We demonstrated, e.g., that there are significant differences among the core group countries in housing tenure structure and that the countries with the highest proportions of owner-occupiers are among those where owner-occupiers are relatively evenly spread across the income spectrum, i.e. where inequality in homeownership accessibility is relatively low. On the contrary, the Netherlands, Germany and Finland are among the countries with the highest levels of inequality in this domain.

Our preliminary data analyses have also shown that measuring inequalities in housing affordability with only one figure per country masks significant differences between the situation of tenants and homeowners: in all countries, the share of households with total housing costs-to-income ratio above 40% was significantly higher among tenants than among homeowners. The highest variance in the values of the total housing cost-to-income ratio was observed in Italy, followed by Estonia and Romania (i.e. mainly in countries with a relatively high proportion of homeowners) while it was lowest in the Czech Republic, the Netherlands and Finland (i.e. mainly in countries with a relatively high share of rental housing).

We measured inequalities in the affordability of owner-occupied housing using price-to-income (P/I). P/I takes into account the financing of a home purchase using only own resources. We measured inequalities in the affordability of owner-occupied housing as the ratio between the average P/I of the lowest-income households (1st quintile of equivalised net income) and the highest-income households (5th quintile of equivalised net income). Italy and the Czech Republic were among the countries with relatively high inequalities in access to owner-occupied housing according to both indicators. On the other hand, countries with low inequalities in access to owner-occupied housing include Finland, Germany and, to a lesser extent, Romania and the Netherlands.

As a representative of subjective indicators that can be compared with their objective counterparts, the proportion of households that reported that the total cost of housing was a heavy burden was chosen. For each country, this share was compared with the share of households with a total housing cost-to-income ratio above 40 per cent. The Netherlands was the only country for which the proportion of households with total housing cost-to-income above 40% was higher than the proportion of households that reported that total housing costs were a heavy burden for them. The substantial disparities in the values of the two

indicators were particularly evident for Italy and Romania. In contrast, the disparities were comparatively less pronounced in Estonia, Germany, the Czech Republic, the Netherlands, Finland and Belgium.

We further compared the proportion of households reporting that lack of space in their dwelling was a problem with the proportion of households living in overcrowded dwellings as defined by Eurostat. In 11 out of the 28 countries, the proportion of households actually living in overcrowded dwellings was higher than the proportion of households reporting problems with a shortage of space in their dwelling. In the remaining countries, the reverse was true. It is interesting to note that the first group of 11 countries is almost exclusively made up of CEE and SEE countries. The second group of countries is almost exclusively formed by Western European countries, the only exceptions being Lithuania and Estonia.

We found that the highest precarity in the core countries was recorded in Romania, with almost 50 % of households having deficiencies in at least one of the four dimensions. In contrast, the country with the lowest housing precarity was Belgium with less than a third of households having problems in at least one dimension. The overall levels of housing precarity do not differ substantially among core group countries. However, when we look at the individual dimensions of housing precarity, we see larger variance.

Finally, it should be noted that we are aware that the analyses presented in this report are only a selection from a large set of potential indicators and variables by which housing inequality can be measured. Similarly, the data presented in this report are only a selection from a much larger body of information collected as part of Activity T3.2. Some of the findings, such as the discrepancy between objective and subjective indicators, or inequalities in housing precarity and housing wealth, will be the subject of much more detailed investigation in the course of the project.

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7. ANNEX – CRITERIA USED FOR SELECTION OF COUNTRIES

7.1. SECONDARY DATA AVAILABILITY

Table 7: Micro-level (household) datasets (comparative surveys)

	EU-SILC cross	EU-SILC longitudinal	HFCS	EQLS	ESS (R10)
Austria	YES	YES	YES	YES	YES
Belgium	YES	YES	YES	YES	YES
Bulgaria	YES	YES	NO	YES	YES
Croatia	YES	YES	YES	YES	YES
Czechia	YES	YES	YES	YES	YES
Denmark	YES	YES	NO	YES	NO
Estonia	YES	YES	YES	YES	YES
Finland	YES	YES	YES	YES	YES
France	YES	YES	YES	YES	YES
Germany	YES	YES	YES	YES	YES
Greece	YES	YES	YES	YES	YES
Hungary	YES	YES	YES	YES	YES
Ireland	YES	YES	YES	YES	YES
Italy	YES	YES	YES	YES	YES
Latvia	YES	YES	YES	YES	YES
Lithuania	YES	YES	YES	YES	YES
Netherlands	YES	YES	YES	YES	YES
Poland	YES	YES	NO	YES	YES
Portugal	YES	YES	YES	YES	YES
Romania	YES	YES	NO	YES	NO
Slovakia	YES	YES	YES	YES	YES
Slovenia	YES	YES	YES	YES	YES
Spain	YES	YES	YES	YES	YES
Sweden	YES	YES	NO	YES	YES
UK	YES	YES	NO	YES	YES

Source: DO, authors.

7.2. HOUSING/WELFARE REGIMES CATEGORIZATION (HOUSING TENURE, HOUSING/SOCIAL POLICY, HOUSING FINANCIALIZATION)

Table 8: Kemeny (housing regimes); Esping-Andersen (welfare state regimes); Schwartz & Seabrooke (VORC)

Country	Housing regime	Welfare state regime	Residential capitalism
UK	Dualist	Liberal	Liberal-market
Ireland	Dualist	Liberal	-
Finland	Dualist (partly)	Social-democratic	Statist-developmentalist
Norway	Dualist (partly)	Social-democratic	Liberal-market
Germany	Unitary	Conservative	Corporatist-market
Austria	Unitary	Conservative	Statist-developmentalist
France	Unitary (partly)	Conservative	Statist-developmentalist
Netherlands	Unitary	Hybrid (SD&CONS)	Corporatists-market
Sweden	Unitary	Social-democratic	Corporatists-market
Denmark	Unitary	Social-democratic	Corporatists-market
Italy	*(Dualist)*	Conservative	Familial
Belgium	*(Dualist)*	*(Conservative)*	Familial
Portugal	*(Dualist)*	Rudimentary/familial	Familial
Spain	*(Dualist)*	Rudimentary/familial	Familial
Greece	*(Dualist)*	Rudimentary/familial	-
Czechia	*(Dualist)*	*(Post-socialist)*	Statist-developmentalist
Estonia	*(Dualist)*	*(Post-socialist)*	.
Romania	*(Dualist)*	*(Post-socialist)*	Familial
Slovakia	*(Dualist)*	*(Post-socialist)*	Familial
Hungary	*(Dualist)*	*(Post-socialist)*	Familial
Poland	*(Dualist)*	*(Post-socialist)*	Familial
Bulgaria	*(Dualist)*	*(Post-socialist)*	Familial
Slovenia	*(Dualist)*	*(Post-socialist)*	Familial
Croatia	*(Dualist)*	*(Post-socialist)*	-
Latvia	*(Dualist)*	*(Post-socialist)*	-
Lithuania	*(Dualist)*	*(Post-socialist)*	-

Note : Bracket means that the country has not been included in original typology made by Kemeny or Esping-Andersen but type of ithe regime has been estimated in some later theory extensions by different authors. Countries selected to core group are highlighted.

Source : authors.

7.3. GEOGRAPHY

Table 9: Geography; Climate; Emission of greenhouse gas

	Geography	Climate	Emission of greenhouse gas
Ireland	West	Ocean	Low
Belgium	West	Ocean	Low (middle)
UK	West	Ocean	High
Netherlands	West	Ocean	High
France	West	Ocean	High
Finland	North	Continental	Low
Sweden	North	Continental	Low
Norway	North	Ocean/mix	Low
Denmark	North	Ocean	Low
Germany	Central	Ocean/Continental	High (highest)
Austria	Central	Continental/Ocean	Low
Slovenia	Central	Mediterranean/Cont.	Low
Czechia	Central	Continental	Low (middle)
Italy	South	Subtrop/Continental	High
Spain	South	Mediterranean/Cont.	High
Croatia	South	Mediterranean	Low
Greece	South	Mediterranean	Low
Portugal	South	Subtrop/Ocean	Low
Poland	East	Ocean/Continental	High
Slovakia	East	Continental	Low
Hungary	East	Continental	Low
Romania	East	Continental	Low
Estonia	East	Continental	Low
Latvia	East	Continental	Low
Lithuania	East	Continental	Low
Bulgaria	East	Mediterranean/Cont.	Low

Source: authors

7.4. ECONOMY AND INCOME INEQUALITY

Table 10: Average inflation rate 1996-2023; Difference to EU average

	Average inflation rate 1996-2023	Difference to EU average
Ireland	1.49	-0.89
Denmark	1.87	-0.51
France	1.87	-0.51
Greece	1.88	-0.5
Portugal	1.88	-0.5
Finland	2.02	-0.36
Italy	2.08	-0.3
Sweden	2.09	-0.29
Spain	2.13	-0.25
Germany	2.21	-0.17
Netherlands	2.24	-0.14
EU	**2.38**	**0**
Slovenia	2.39	0.01
Belgium	2.4	0.02
Austria	2.59	0.21
Croatia	2.68	0.3
UK	2.91	0.53
Slovak Republic	3.02	0.64
Czechia	3.39	1.01
Poland	3.42	1.04
Bulgaria	3.82	1.44
Lithuania	4.2	1.82
Estonia	4.49	2.11
Latvia	4.58	2.2
Hungary	4.81	2.43
Romania	4.93	2.55

Source: IMF World Economic Outlook.

Table 11: Real average GDP growth rate 1996-2023; difference to EU average

	Real average GDP growth rate 1996-2023	Difference to EU average
Italy	0.61	-1.16
Greece	1.05	-0.72
Germany	1.23	-0.54
Portugal	1.46	-0.31
France	1.49	-0.28
Austria	1.68	-0.09
Denmark	1.7	-0.07
EU	1.77	0
Belgium	1.79	0.02
UK	1.8	0.03
Finland	1.96	0.19
Spain	1.99	0.22
Netherlands	2	0.23
Czechia	2.31	0.54
Bulgaria	2.33	0.56
Sweden	2.36	0.59
Croatia	2.49	0.72
Hungary	2.53	0.75
Slovenia	2.7	0.93
Romania	2.92	1.15
Slovakia	3.44	1.67
Latvia	3.64	1.87
Estonia	3.78	2.01
Poland	3.91	2.14
Lithuania	3.99	2.22
Ireland	6.12	4.35

Source: IMF World Economic Outlook.

Table 12: GDP per capita in current prices (US dollar, 2023); Difference to EU average

	GDP per capita in current prices (US dollar, 2023)	Difference to EU average
Bulgaria	6,386	-23,311
Romania	7,818	-21,879
Poland	11,048	-18,649
Latvia	11,717	-17,980
Croatia	11,778	-17,919
Hungary	11,991	-17,706
Lithuania	12,373	-17,324
Slovak Republic	13,514	-16,184
Estonia	15,017	-14,680
Czechia	16,808	-12,889
Portugal	19,433	-10,265
Greece	20,185	-9,512
Slovenia	20,590	-9,108
Spain	25,754	-3,943
EU	**29,697**	**0**
Italy	31,221	1,524
France	37,257	7,560
Germany	39,408	9,710
UK	39,411	9,713
Belgium	39,583	9,885
Finland	41,679	11,981
Austria	42,236	12,538
Netherlands	44,948	15,251
Sweden	47,020	17,323
Denmark	52,153	22,456
Ireland	55,752	26,055

Source: IMF World Economic Outlook.

Table 13: Income inequality - Gini on equalised disposable income (2018)

	Gini on equalised disposable income (2018)
Slovakia	20.9
Slovenia	23.4
Czechia	24
Belgium	25.7
Finland	25.9
Austria	26.8
Sweden	27
Netherlands	27.4
Denmark	27.8
Poland	27.8
France	28.5
Hungary	28.7
Ireland	28.9
Cyprus	29.1
Croatia	29.7
Estonia	30.6
EU	30.8
Germany	31.1
Luxembourg	31.3
Portugal	32.1
Greece	32.3
Spain	33.2
Italy	33.4
UK	33.5
Romania	35.1
Latvia	35.6
Lithuania	36.9
Bulgaria	39.6

Source: Eurostat, https://ec.europa.eu/eurostat/databrowser/view/ilc_di12__custom_11362623/default/table?lang=en

7.5. DEMOGRAPHICS

Table 14: Population size (2022,2023)

	Population size (2022,2023)
Estonia	1,365,884
Latvia	1,883,008
Slovenia	2,116,792
Lithuania	2,857,279
Croatia	3,850,894
Ireland	5,194,336
Slovakia	5,428,792
Finland	5,563,970
Denmark	5,932,654
Bulgaria	6,447,710
Austria	9,104,772
Hungary	9,597,085
Greece	10,394,055
Portugal	10,467,366
Sweden	10,521,556
Czechia	10,827,529
Belgium	11,754,004
Netherlands	17,811,291
Romania	19,051,562
Poland	36,753,736
Spain	48,059,777
Italy	58,850,717
UK	67,931,576
France	68,070,697
Germany	84,358,845

Source: Eurostat.

Table 15: Proportion of population aged 65 years and more (society ageing), 2022, 2023

	Proportion of population aged 65 years and more	Difference to EU average
Ireland	14.4	-6.2
Slovak Republic	16.6	-4.0
Poland	18.2	-2.4
UK	18.4	-2.2
Romania	18.9	-1.7
Austria	19.0	-1.6
Belgium	19.1	-1.5
Netherlands	19.5	-1.1
Spain	19.6	-1.0
Czechia	19.9	-0.7
Denmark	19.9	-0.7
Hungary	19.9	-0.7
Lithuania	19.9	-0.7
Estonia	20.0	-0.6
Sweden	20.0	-0.6
Slovenia	20.2	-0.4
Latvia	20.3	-0.3
France	20.4	-0.2
EU	**20.6**	**0.0**
Croatia	21.0	0.4
Bulgaria	21.6	1.0
Germany	21.8	1.2
Portugal	22.1	1.5
Finland	22.3	1.7
Greece	22.3	1.7
Italy	23.2	2.6

Source: Eurostat.

7.6. HOUSING AFFORDABILITY/INEQUALITY

Table 16: Housing cost overburden rate - EU-SILC survey, 2022, 2023

	Housing cost overburden rate	Difference to EU average
Slovak Republic	2.5	-6.2
Lithuania	3.5	-5.2
Ireland	3.9	-4.8
Croatia	4	-4.7
Slovenia	4.1	-4.6
Portugal	5	-3.7
Finland	5.4	-3.3
Latvia	5.4	-3.3
Poland	5.6	-3.1
Austria	6	-2.7
France	6.5	-2.2
Italy	6.6	-2.1
Estonia	7.6	-1.1
Belgium	7.7	-1
Romania	8.5	-0.2
EU	8.7	0
Hungary	8.7	0
Czechia	9.1	0.4
Spain	9.2	0.5
Netherlands	10	1.3
Sweden	10.9	2.2
Bulgaria	11.1	2.4
Germany	13.6	4.9
United Kingdom	15.1	6.4
Denmark	15.4	6.7
Greece	28.5	19.8

Source: Eurostat, https://ec.europa.eu/eurostat/databrowser/view/ilc_lvho07c__custom_11341481/default/table?lang=en

Table 17: Housing dwellings per 1,000 inhabitants (2021, 2022, 2023)

	Housing dwellings per 1,000 inhabitants
Slovenia	331
UK	375
Slovakia	409
Poland	412
Ireland	416
Estonia	419
Latvia	428
Italy	434
Austria	446
Netherlands	460
Belgium	466
Denmark	471
Hungary	471
Sweden	497
EU	498
Romania	499
Czechia	509
Finland	509
Germany	518
Spain	546
France	553
Lithuania	557
Portugal	580
Croatia	593
Greece	597
Bulgaria	619

Source: The State of the Housing in Europe 2023, national statistical offices, population (2021) – Eurostat.

Table 18: House price growth 2010-2023 (%)

	House price growth 2010-2023 (%)
Italy	-8.30
Spain	9.80
Finland	12.40
Romania	24.20
France	31.60
Denmark	46.10
Belgium	48.70
EU	**50.00**
Slovenia	58.70
Ireland	59.50
Croatia	62.80
Netherlands	64.40
UK	64.20
Poland	70.20
Bulgaria	76.40
Germany	77.80
Sweden	78.40
Slovakia	81.40
Portugal	91.70
Norway	94.80
Austria	112.30
Czechia	122.40
Latvia	137.70
Lithuania	154.40
Hungary	187.00
Estonia	209.40

Source: Eurostat, https://ec.europa.eu/eurostat/databrowser/view/prc_hpi_a__custom_11362217/default/table?lang=en

Table 19: Residential wealth inequality – Gini on net wealth, excluding public and occupational pensions

	Gini on net wealth
Slovakia	0.46
Czechia	0.56
Greece	0.58
Lithuania	0.58
Slovenia	0.59
Hungary	0.61
Belgium	0.62
Croatia	0.62
Cyprus	0.63
Luxembourg	0.64
Portugal	0.66
Ireland	0.67
Italy	0.67
France	0.68
Netherlands	0.68
Spain	0.68
Finland	0.68
Latvia	0.69
Austria	0.69
Estonia	0.71
Germany	0.73

Source: HFCS wave 4 (2021), https://oenb.shinyapps.io/HFCS_Keyfigures
Note: Missing UK, Romania.