Degrees of Housing Precariousness – A Latent Class Analysis of Housing Problems in Europe

Gielens, Erwin;[a] Seo, Hyojin;[a] Dewilde, Caroline[a]

[a] Department of Sociology, Tilburg University, the Netherlands

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Abstract

Housing precariousness poses a severe risk to the most disadvantaged but often remains invisible in aggregate statistics. To identify its extent and degree, we explore the stacking of specific combinations of housing problems, i.e. how eight indicators co-vary in different ways across countries and disadvantaged groups. A Latent Class Analysis on multiple waves of EU-SILC (2010-2023) identifies three 'degrees' of housing precariousness ranging from less to more severe concentrations of housing problems: quality-, cost-, and security-precariousness. Housing precariousness is generally more prevalent in Eastern- and Southern-Europe, but where it does occur in North-Western-Europe, it is of a more severe degree. Moreover, while our results corroborate concerns about housing precariousness in the market-rent sector, housing precariousness is equally severe in the reduced-rent sector. Our typology points to the concentration of disadvantaged groups as well as frequent quality concerns in cost-rent housing in the UK, Ireland, France and Belgium, pertaining to the 'residual' status of this tenure.

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1. Introduction

The provision of "*a decent home for all at a price within their means*" (Hills 2007: 1) is again a policy priority. Demographic shifts, welfare reform and labour market flexibilization, as well as re-commodification and financialization of housing have compromised citizens' 'right to housing' (Bengtsson 2001; Clair, Fledderjohann & Knowles 2021), especially amongst lower-income households across Western-Europe (Forrest & Hirayama 2018; see also Ronald & Kadi 2018). Housing precariousness is perhaps the most urgent consequence of this housing crisis: the most vulnerable households are increasingly sorted into overcrowded, deprived, and insecure living conditions (e.g. Dewilde 2022; Baeten et al. 2017; Hochstenbach 2025; see also DeLuca & Rosen 2022), risking health problems and homelessness (McKee et al. 2017, Galster & Lee 2021). With an estimated 273 million Europeans (17.5%) experiencing some combination of housing problems (Clair et al. 2019), the nineteenth-century 'housing question' is back on the agenda.

This paper contributes to the literature on housing precariousness by unpacking the interconnected nature of concentrated housing problems. A core premise of housing precariousness is that housing problems are causally related, leading to concentration amongst the most disadvantaged groups. For instance, high housing costs can lead to trade-offs in housing quality (Baker et al. 2017) or to rent arrears (Waldron 2023; Routhier 2019), the latter in turn contributing to tenure insecurity. In practice, some studies assume that various housing problems are directly interchangeable and can thus be 'added up' (Clair et al. 2019; Routhier 2019; Baker & Lester 2017; see also Hochstenbach 2025), while others define precarious housing categorically as a specific combination of housing conditions (e.g. Beer et al. 2016; Baker & Lester 2017; see also Alvarez and Steffen 2023). We propose to take the middle ground between these extremes: housing problems tend to accumulate gradually in meaningfully different ways. Through a Latent Class Analysis (LCA) of housing problems, we explore: (a) which housing problems tend to coincide, (b) to what extent these combinations of housing problems can be considered precarious, and (c) to what extent these combinations of housing problems vary between countries, tenures, and individuals in low-income households.

In this paper, we first conceptualize housing precariousness in relation to the broader literature on housing problems. After outlining our data and methodological approach, we show

evidence of three 'degrees' of housing precariousness with distinct structural origins: quality-, cost- and security-precariousness. Our findings point to the concentration of housing problems amongst a small minority in the Nordic countries of North-Western-Europe, as well as in the social housing sectors of UK, Ireland, France and Belgium. In the conclusion, we reflect on the broader implications of these findings, in terms of what this means for our understanding of housing precariousness, avenues for future research, and policy implications.

2. Conceptualizing housing precariousness

Housing problems are often researched as independent issues, broadly divisible into two streams: problems with quality of living and problems with housing affordability. The conceptual distinction within and between these types of housing problems is justified because they have different causes and thus require different policy solutions (e.g. Eurofound 2016). Problems with quality of living primarily refer to low-quality housing, also known as housing deprivation: damp and/or dark accommodations with limited sanitary facilities. These housing quality issues are arguably already so distinct as to be considered isolated quality problems themselves (Nolan & Winston 2011). Quality of living problems also typically include overcrowded living arrangements (Borg 2015), and problems with energy efficiency (Croon, Hoekstra & Dubois 2024). Quality concerns are nowadays still more common in Southern- and Eastern-European countries due to lagged economic development. Notwithstanding remarkable improvements in some countries, quality concerns persist due to the historical heritage of low-quality construction and/or the absence of governments in housing construction (Hick, Pomati & Stephens 2022; Norris & Shiels 2007). Affordability problems, on the other hand, emerge when (urban) housing costs outpace growth of wages and welfare benefits: a complex interrelation between housing markets, labour markets, and welfare systems (e.g. Galster & Lee 2020; Dewilde 2022; Tranøy, Stamsø & Hjertaker 2021).

Despite their uniqueness, however, housing problems are also connected. A minority of disadvantaged households, hidden in aggregate statistics, is exposed to multiple adverse living conditions. Studies on housing 'precariousness' or 'insecurity' emphasize that problems with quality, affordability, and tenure security coincide to form the most severe housing conditions (e.g. Routhier 2019; DeLuca & Rosen 2022). High rents sometimes force poor households to

move into overcrowded and low-quality housing, or to reduce consumption (Díaz McConnel 2017; Waldron 2024). Persistent affordability issues can also escalate into arrears of rent or utility bills (Waldron 2023: 194; Routhier 2019: 244). Consequently, the precariously housed are at higher risk of experiencing adverse events such as homelessness (Dorling 2014; Listerborn 2023) and health problems (e.g. Baker et al., 2016; McKee et al 2017; Clair et al. 2019). The stress from these adverse housing conditions can also pressure partner relationships, exacerbating household instability. From a stratification perspective, the precariously housed can arguably be deemed part of the 'precariat' (Standing 2011; see also Kallenberg 2009), a structurally disadvantaged category at the margins of society produced by sorting mechanisms in the labour market, housing market, and welfare system.

Housing precariousness is 'quantified' using well-known indicators for housing problems from large-scale survey data, such as low-quality housing, overcrowding, housing cost overburden and arrears. Some problems with these measures we cannot solve here, most notably the exclusion of the most vulnerable households from the sampling framework (e.g. those experiencing rooflessness), and the limited availability of indicators of tenure security. In addition, conceptualizing the concentration of various housing problems as housing precariousness is not immediately obvious. Related concepts, such as housing deprivation (e.g. Matel 2025) or Worst Case Needs (Alvarez and Steffen 2023) also combine indicators of cost burden and housing quality to identify poor and marginalized living conditions. In the following, we argue that conceptualizing precariousness as a *spectrum rather than a state* allows us to connect the literature on housing deprivation – predominantly focused on quality of living – to studies of housing precariousness.

2.1 Housing precariousness as a spectrum

Several authors have argued for a move from a binary to a more continuous concept of precariousness (e.g. Routhier 2019; Clair et al. 2019). Many quantitative applications categorize people as precariously housed if they experienced forced moves, rent privately, and have a high housing cost burden (e.g. Beer et al. 2016). Similarly, Alvarez and Steffen (2023) categorize individuals in Worst Case Need when they are private renters with low incomes, who spend more than half of their income on rent and/or live in 'severely inadequate' housing. While intuitive and

meaningful in context, this binary classification of precariousness disregards all but the most severe cases of housing deprivation. Consequently, such categorization underestimates the occurrence of milder degrees of housing precariousness, which might escalate over time (Routhier 2019).

Alternatively, the continuous approach suggests that exposure to 'more' housing problems increases the "*risk of experiencing a shock*" (Clair et al. 2019: 4). Similarly, Routhier (2019) uses a factor analysis to construct a measure of housing precariousness, which boils down to representing the degree of precariousness through a weighted sum of housing problems. While straightforward, such approaches have a major drawback: they assume that different combinations of housing problems are directly comparable (see also Hochstenbach 2025). Since some combinations (e.g. overcrowding and quality problems) have different meanings and implications than others (e.g. cost burden and rent arrears), the resulting measure is difficult to interpret substantively: high scores for one individual may mean something different than high scores for another individual. Our Latent Class Analysis provides a compromise between the binary and continuous approaches: it yields *profiles* of specific combinations of housing problems that are both interpretable and flexible.

2.2. Housing deprivation on the spectrum of precariousness

Studies on housing deprivation emphasize the importance of economic trajectories and political histories in explaining country-differences in living conditions. While mostly focused on quality concerns, these studies combine various sets of items on quality-of-living, such as low-quality housing, overcrowding, neighbourhood characteristics, material deprivation, but also housing cost overburden and rent or mortgage arrears to identify deprived housing conditions (for a review see Matel 2025). Especially 'severe housing deprivation', used by the European Union (EU), is a well-established but controversial attempt at capturing the concentration of housing problems in the quality-of-life domain (Hick, Pomati & Stephens 2022).

Problems with quality of living can be part of the concept of housing precariousness, both as a distinct state and as part of a gliding scale towards increasingly precarious conditions. First, in many cases, problems with quality and crowding are independent from affordability concerns.

This is most evident in Eastern-Europe, where outright ownership largely precludes payments arrears on rent and mortgages as well as the risk of eviction. Nonetheless, even in these conditions, a distinct form of precariousness arguably exists, not by the threat of eviction, but in the insecurity arising from involuntary dependence on family members implied by multigenerational housing.

Second, in some cases, low-quality and overcrowded housing are part of a gliding scale towards increasingly precarious housing conditions. Problems with quality of living are often incorporated as a component of housing precariousness. DeLuca and Rosen (2022: 345), for example, define housing insecurity as "*the state of having difficulty acquiring housing, having minimal control over one's housing, being at risk of losing housing, being uncertain about tenure, or living in housing that does not meet basic household needs*". On the margins of the housing market, households are forced to make 'trade-offs' (e.g. Clapham 2002; Baker & Lester 2017), among which the necessity to accept housing that is affordable but of poor quality, or the moral obligation to house (or call on) friends or family members that would otherwise be turned to the streets (e.g. Díaz-McConnel 2017; Waldron 2023). Thus, in the absence of affordability issues, quality concerns can constitute a first 'degree' of precariousness, locking households in cheap but poor housing conditions.

2.3 The relevance of housing regimes

In this paper we use a housing regime typology as a conceptual lens to help understand patterns in country differences. The prevailing perspective on housing precariousness is rather specific to liberal Western housing markets, focussing on the role of market pressures in the private rental sector (Dorling 2014; Beer et al 2016; Listerborn 2023). Many studies focus on those in private rental housing (e.g. Waldron 2023; DeLuca & Rosen 2022; Routhier 2019) or include private renting as part of the definition of housing precariousness (Beer et al. 2016; Baker & Lester 2017).

However, despite a common trend towards homeownership societies with more 'residualized' social housing (see, for instance, Grander & Stephens 2024), European countries have very different historical trajectories and policy environments known as housing regimes (e.g. Kemeny

1995; Norris & Domański 2009; Stephens 2011; Hick & Stephens 2023; Dewilde & De Decker 2016). The housing problems associated with specific tenures thus also differ strongly between European countries (see also Claire et al. 2019): private rental markets are more secure in the Nordic countries (Hulse & Milligan 2014), while quality problems are more common amongst outright owners in Eastern- and Southern Europe (Dewilde 2017) and social housing sectors in Western-Europe (Borg 2015; Hick, Pomati & Stephens 2022). In recognition of these entrenched institutional differences, we interpret country differences along six commonly recognized housing regimes (Grander & Stephens 2024:311-24; for a review see Flynn & Montelbano 2024):

- Social-democratic unitary rental market-countries;
- Conservative-corporatist unitary rental market-countries;
- North-West-European (NWE) homeownership countries with a dual rental market;
- Southern-European (SE) family-based homeownership countries (though Spain, Portugal, Malta and Cyprus embarked on a more financialized trajectory in recent decades);
- the Baltic states;
- and the Central- and Eastern-European (CEE) countries.

3. Data and Methods

3.1 Data

Our analyses are based on pooled EU-SILC-data from twelve waves (2010-2020; 2023) and 31 countries, with a total of N = 7,101,969 individuals.[1] Note that EU-SILC employs a four-year rotating panel: a quarter of the sample is renewed each year, meaning subsequent years have approximately 75 percent repeated measurements – the same individuals in different years – which decreases to approximately 50 percent after two years and 25 percent after three years, disregarding panel attrition and country differences in the rotational design. Running the LCA separately for each wave demonstrated that the solution is largely robust against this violation of local independence (see Appendix A section c). We include indicators of the following housing

[1] UK2018 is excluded due to a series break in tenure classification.

problems: housing cost burden, subjective cost burden, perceived energy poverty, utility arrears, rent/mortgage arrears, overcrowding, and low-quality housing.

Some of these indicators are directly taken from EU-SILC, such as subjective cost burden (To what extent are [total housing costs, including mortgage/rent, insurance and service charges and maintenance] a financial burden to you?; A heavy burden, A slight burden, No burden at all) and perceived energy poverty (Can your household afford to keep its home adequately warm?; Yes or No). Utility arrears and rent/mortgage arrears are recoded to (1) Yes for those in arrears once or twice or more in the past year and No (0). Low-quality housing follows the EUROSTAT-definition, as shown in Table 1. We exclude all cases that have missing values on all four underlying components (damp, dark, no bath, no toilet). This leads to very little missing values overall (~1%), except for the last two available waves. In 2020, by design, half of the German sample did not fill out the questionnaire, and about one-third of Irish cases are missing. More importantly, two components (No bath, No indoor toilet) are missing for most countries in 2023. Instead of removing the wave completely, we set the components bath and toilet to zero, which produces an approximate bias of less than 1% in almost all countries (except Estonia, 3.9%), based on a comparison of operationalisations for 2020. Ireland is excluded for 2023, as it did not include any of the four components of low-quality housing.

For some measures, we depart slightly from the EUROSTAT definitions. Housing cost burden is not based on a fixed 40 percent threshold (in relation to disposable household income), but on a variable threshold ranging from 25 percent for the lowest quintile to 50 percent for the highest quintile (see also Table 1), as it better reflects the experience of affordability problems for different income groups (Heylen 2023). Overcrowding follows the EUROSTAT definition, corresponding to one living room for the household (excluding bathrooms/toilets) and one bedroom for each adult and each couple of same-sex children over 12 years of age, or each couple of children below 12 years of age. We slightly alter this definition, making the exception that one-person households are not deemed overcrowded when living in a one-room apartment. A brief description of the indicators is included in Table 1. Covariates include country dummies, tenure status (outright owner, owner paying mortgage, market tenant, reduced-rate tenant, rent-free accommodation), income quintiles based on equivalized annual disposable household income per country, and migration status of the household reference person (local, EU and non-

EU). In EU-SILC, rental tenures are measured as 'at market-rate' versus 'below market-rate', which roughly (but not completely) corresponds to private renting and social housing. For example, reduced-rate rental housing can also be provided by employers. In Denmark, Sweden, and the Netherlands, EU-SILC makes no distinction between reduced and market rates: all renters are (re)categorized as reduced-rate renters here (given overall stricter rental market regulation). One workaround exists: in the Netherlands, we distinguish between market rent and reduced rent using the yearly updated 'liberalization threshold', which is the level of rent below which households are eligible for rent allowance.

Table 1: Brief description of housing problem indicators used in the LCA

Indicator	Description	Categories
Housing cost burden	Person living in household where total housing costs exceed a variable threshold of disposable income ('net' of housing allowances). Variable threshold: 25% for 1st quintile, 30% for 2nd quintile, 40% for 3rd quintile, 50% for 4th-5th quintile.	Overburdened, Not overburdened
Subjective cost burden	Person living in household experiencing a financial burden of the total housing cost (HS140), including mortgage/rent payments and insurance/service charges. Question: to what extent are these costs a financial burden to you?	A heavy burden, A slight burden, No burden at all
Perceived energy poverty	Person living in household unable to keep the home adequately warm for financial reasons (HH050). Question: can your household afford to keep its home adequately warm?	Yes, No
Utility arrears	Person living in household with arrears on utility bills in the past 12 months (HS020/1). Question: in the past twelve months, has the household been in arrears, i.e. has been unable to pay the utility bills (heating, electricity, gas, water etc.) of the main dwelling on time due to financial difficulties?	Yes (once, twice or more), No
Rent/mortgage arrears	Person living in household with arrears on mortgage or rental payments in the past 12 months (HS010/1). Question: in the past twelve months, has the household been in arrears, i.e. has been unable to pay on time due to financial difficulties for (a) rent (b) mortgage repayments for the main dwelling?	Yes (once, twice or more), No
Overcrowded	Person living in household with less rooms available than required given the composition of the household. Following EUROSTAT, except we do not consider one-person households living in studio apartments as overcrowded.	Overcrowded, Not overcrowded
Housing deprivation	Person living in household with one or more of the following dwelling problems: Leaking roof / damp walls / floors / foundation or rot in window frames (HH040); Accommodation too dark (HS160); No bath/shower (HH080/1); No indoor flushing toilet for sole use of the household (HH090/1).	Yes (one or more problems), No (no problems)

3.2 Method

Latent Class Analysis (LCA) is a statistical method used to cluster respondents based on observed response patterns over multiple indicators (Vermunt & Magdison 2004, for an example see Seo 2021). It is a clustering technique designed to handle categorical indicators and – unlike 'deterministic' clustering techniques – accounts for uncertainty in the clustering solution. It assumes that there are unobserved 'latent' categories underlying the indicators, that explain particular response patterns. We model the configuration of housing problems to identify 'latent' types of housing precariousness, i.e. consistently co-occurring housing problems, and how their co-incidence differs across countries and disadvantaged groups. LCA can help to identify forms of precariousness – typical combinations of housing problems – that remain hidden in single-variable comparisons and additive measures of housing precariousness.

A common issue with LCA is the tendency to produce unstable cluster solutions. To find a latent categorization that holds over time, the analysis is based on a pooled dataset of multiple waves (2010; 2012; 2014; 2016; 2018; 2020; 2023). Such a 'constrained' model assumes that the measurement of the latent classes is the same over time, an assumption we tested by running the latent class model separately for each wave, and by tests of measurement equivalence (see Appendix A). As is common in the monitoring of poverty and social exclusion at the European level, the analysis is performed on individual-level data (Atkinson et al., 2002). Cases with one or more missing values on the included indicators (5.9%) are excluded prior to the LCA. Fit statistics and procedural details are presented in Appendix A.

4. Results

We identify three 'degrees' of housing precariousness, which we interpreted as ranging from less to more severe based on their profiles. **Quality-precariousness** is most secure, with a limited housing cost burden and no rent/mortgage arrears. This type is least stratified by income and is mostly found in Central/Eastern-Europe and amongst rent-free tenants. **Cost-precariousness** additionally includes an objective housing cost burden and is more common amongst low-income groups in reduced-rent tenures. On top of the other problems, **security-precariousness** also includes rent/mortgage arrears (associated with the risk of eviction) and is most common

amongst the lowest-income respondents and non-EU migrant households. Before moving to the interpretation of results, we discuss our choice for the number of clusters and their corresponding interpretation. Next, we elaborate on the differences in cluster membership between countries, tenures, and social groups.

Table 2: LCA model fit statistics

	L^2	Degrees of freedom		Log-Likelihood	AIC	BIC	BIC reduction (%)		Class. Err.	Entropy R^2
1	9727507646	(1690342)	***	-16705547170	33411094357	33411094520	100,0%		0,0%	100,0%
2	6165064578	(1690283)	***	-14924325636	29848651407	29848652771	89,3%	***	7,5%	72,7%
3	4718372330	(1690224)	***	-14200979512	28401959276	28401961842	85,0%	***	11,2%	75,3%
4	3987019277	(1690165)	***	-13835302986	27670606341	27670610108	82,8%	***	12,7%	75,2%
5	3511596215	(1690106)	***	-13597591455	27195183398	27195188366	81,4%	***	14,5%	75,5%
6	3193696529	(1690047)	***	-13438641612	26877283829	26877289999	80,4%	***	14,8%	76,6%
7	2933381866	(1689988)	***	-13308484280	26616969284	26616976655	79,7%	***	14,4%	77,9%
8	2720497361	(1689929)	***	-13202042028	26404084897	26404093469	79,0%	***	10,9%	84,2%
9	2648111270	(1689950)	***	-13165848982	26331698764	26331706909	78,8%	***	14,2%	80,7%
10	2510998991	(1689901)	***	-13097292843	26194586583	26194595726	78,4%	***	13,6%	81,3%

Note: The p-values following L^2 compare the estimated model to a zero-residual-variance null model, with significance indicating that the model does not explain all variance between indicators. The significance following the BIC reduction is based on a likelihood ratio test, indicating the significant reduction of explained variance of the model (k) compared to the previous model (k-1). *p<.05; **p<.01; ***p<.001

By design, Latent Class Analysis leaves the selection of the optimal number of clusters to the discretion of the researcher. We select the 8-cluster solution based on the statistical indicators of model fit as well as the substantive interpretability of the cluster solution. The model fit statistics presented in Table 2 suggest that the 8-cluster solution is the most parsimonious, providing a good fit with the fewest clusters. While no model explains absolutely *all* variance (as indicated by the chi-square tests), the increasingly marginal relative declines in the Bayesian Information Criterion (BIC) indicate that adding more clusters explains little additional variance between the indicators. Moreover, the eight-cluster solution has one of the lowest rates of classification errors (11%) and the highest entropy R^2 (84%), whereas adding further clusters increases uncertainty in cluster assignments. Finally, the assumption of local independence is therefore no longer violated in the eight-cluster model (see Appendix A), or in other words, the eight-cluster model explains most of the variance between the housing problems included in the model. We opt for a model with eight clusters also for substantive reasons, derived from the profile information of alternative cluster solutions. While the 6-cluster solution already

distinguishes between two types of precariousness based on the presence and absence of an objective housing cost burden, the 8-cluster solution separates a third type of 'security' precariousness centred around rent/mortgage arrears. For more details on the various cluster solutions see Appendix A.

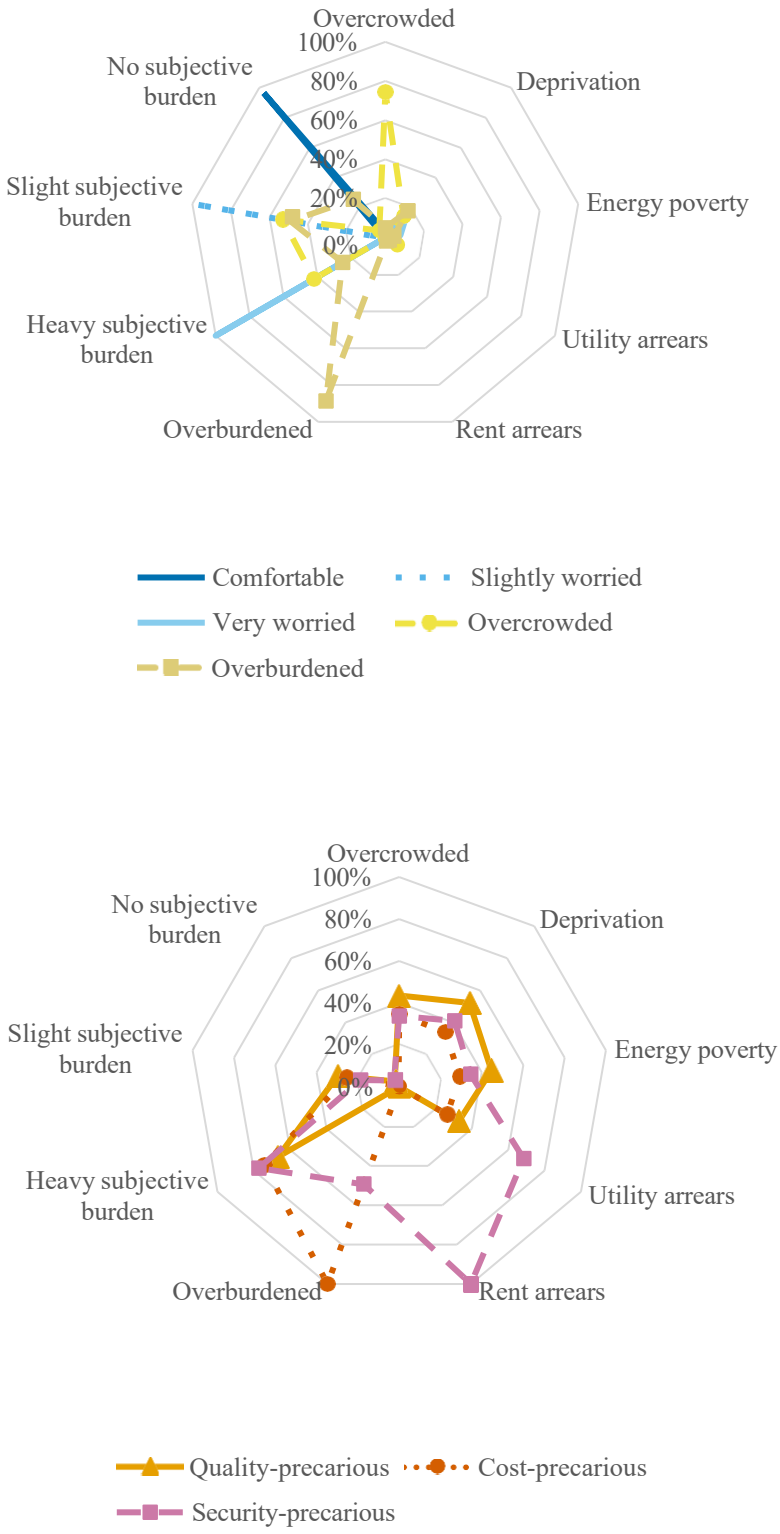
4.1 Degrees of precariousness

Based on the profile information in Figure 1, we label the eight clusters as comfortable, slightly worried, very worried, overcrowded, overburdened, quality-precarious, cost-precarious, and security-precarious. The class membership distribution is represented visually in Figure 2. A large proportion of the sample has little to no housing problems. The first three groups are either objectively and subjectively **comfortable** (30.3%), or **slightly worried** (18.5%), and **very worried** (15.8%) about their housing costs. In these groups, housing problems are mostly absent, except for a minority in low-quality housing. If anything, this clustering highlights the distinction between objective and subjective measures of affordability. Many perceive housing costs as a burden despite spending a manageable proportion of their household income on housing costs, perhaps because they have high costs of living outside of housing or because housing costs are diverged from a culturally accepted standard (Sunega & Lux 2016). Next, two single-problem groups emerge: an **overcrowded** cluster (9.3%) where most live in overcrowded housing and an **overburdened** cluster (8.0%) characterized by a high objective cost-burden, both mostly without facing any additional problems.[2]

Importantly, the clustering isolates the most precarious cases confronted with multiple housing problems. 18.0 percent of respondents is assigned to one of these precarious clusters, which is similar in size to the precarious group identified by Clair et al. (2019) based on the 2012 wave of EU-SILC. Unlike prior studies, the clustering separates three types of such precarious housing conditions. We argue these three clusters range from least to most precarious: the more severe

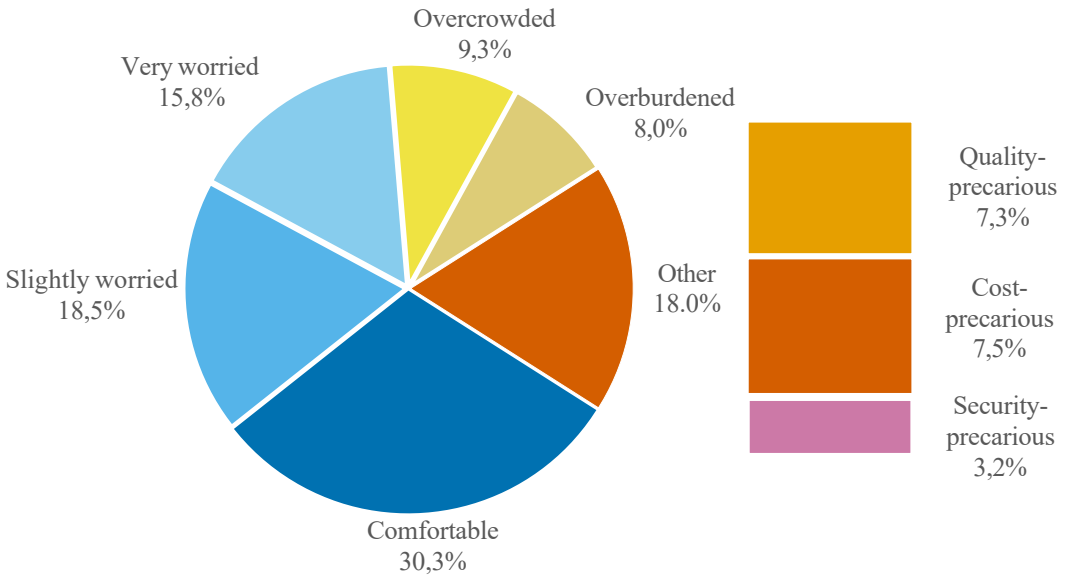
[2] While we label these clusters in accordance with the dominant single problem for ease of interpretation, these clusters are not equivalent to the indicators themselves. For example, those *only* in overcrowded housing tend to be assigned to the overcrowding cluster, while those in overcrowded *and* low-quality housing are more likely to be assigned to the quality-precarious cluster.

Figure 1: Profile information of latent classes



types of housing precariousness add problems with affordability and security to the mix of quality problems. The **quality-precarious** cluster (7.3%) scores relatively high on energy poverty, utility arrears, and especially low-quality housing. Notably, while this cluster is not objectively overburdened, many still indicate their housing costs are a heavy burden, and utility arrears are relatively frequent. It may be that this group faces high costs of living outside of the housing domain relative to their income, perhaps forced to compromise on housing quality to manage costs (e.g. Galster & Lee 2021: 20). Especially in Central-and-Eastern Europe, where this type is most prevalent (see Figure 3), low-income outright homeowners might face this trade-off between maintenance and cost-of-living.

Figure 2: Class membership proportions across Europe



Those in the **cost-precarious** cluster (7.5%) are all overburdened in terms of objective housing costs, in addition to a majority experiencing a heavy subjective burden, and a substantive proportion having difficulties heating their house, and living in overcrowded and low-quality housing. Finally, a small cluster of **security-precarious** (3.2%) faces the greatest housing problems. All individuals in this cluster have been in rent/mortgage arrears, experience a heavy cost burden, and around half has high housing costs. This is paired with relatively high rates of utility arrears, low-quality housing and overcrowding. Affordability problems in this

group seem to have transitioned into arrears, leaving them at a higher risk of eviction (Gerull 2014; Stenberg, Susanne & van Doorn 2011).

4.2 National contexts

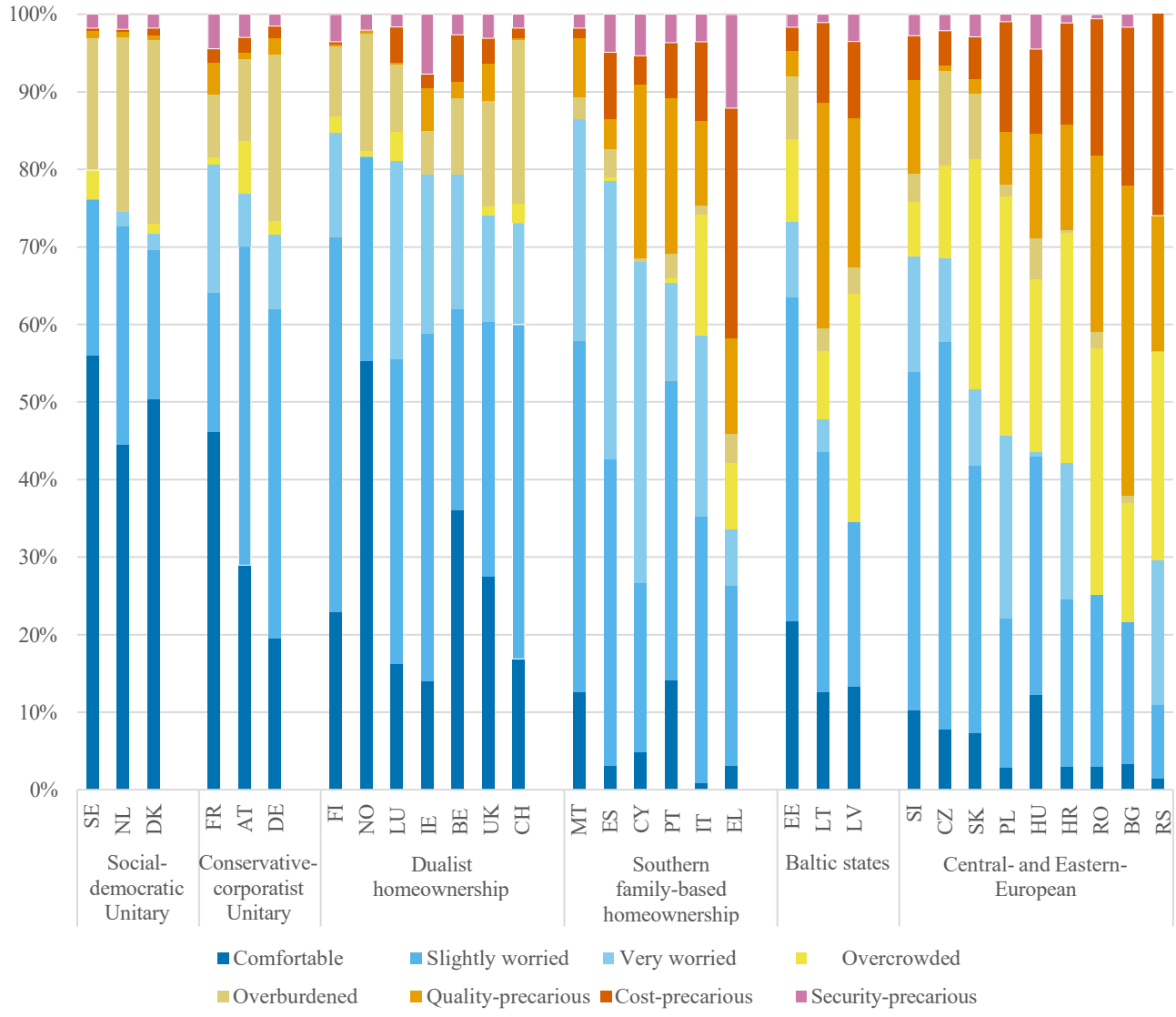
Figure 3 shows the distribution of class membership per country and regime type. The distribution of latent classes over countries produces familiar regime-patterns for the clusters without 'objective' housing problems. Furthermore, the precarious clusters are generally more prevalent in post-socialist states and Southern-Europe (Clair et al. 2019; see also Norris & Domański 2009). Grouping the countries by regime type reveals that quality-precariousness is especially common in former state-socialist countries, while security-precariousness is more common in Southern-Europe, notwithstanding significant variation between Southern countries. Moreover, when precariousness does occur in the unitary and dual rental market-regimes of North-Western Europe, it is more often of the more severe security-precarious type.

Unsurprisingly, the comfortable and slightly worried groups are more prevalent in the unitary and dualist regime types of North-Western Europe. In dual rental market-countries, where 'social' and 'private' rental markets are strongly segregated, the very worried group is consistently more prevalent than in unitary rental market-countries. A high housing cost burden as a singular issue is most common in social-democratic unitary rental market countries. This aligns with the emerging narrative on excessive house price inflation and the associated increase in rent and mortgage payments in these countries (Lennartz & Ronald 2017; Tranøy, Stamsø & Hjertaker 2021), where high building standards and market incentives for upper-segment construction prevented deterioration of housing quality (Dewilde & De Decker 2016). Second, as expected, overcrowding as an isolated issue is highly common in Central-and-Eastern European countries and the Baltic states. Again, such findings must be understood also in the light of cultural differences with respect to multigenerational co-residence, and the imposition of a 'objective' standard of overcrowding that does not always align with subjective experiences (Sunega & Lux 2016). Overcrowding is prevalent but also more accepted in these countries, albeit a norm of necessity (Soaita 2014).

Turning to the prevalence of the three precariousness clusters, precarious housing conditions in general tend to be more prevalent in Eastern- and Southern-Europe. In Bulgaria and Greece, approximately half of the population is confronted with some combination of housing

problems. There is substantial variation in the degree of precariousness across Central-and-Eastern-European and Southern-European countries. Especially in the Czech Republic, Slovakia, Estonia and Malta, levels of precariousness match those in North-Western Europe. In the Czech Republic and Slovakia, relatively low rates of housing precariousness can be partly attributed to a less radical transition to market-based provision of housing after the transition from state-socialism to a free-market economy. In the Czech Republic, for example, part of the public housing stock was retained by municipalities, its inhabitants protected by rent-control and by some degree of municipal responsibility for maintenance (Lux & Sunega 2010).

Figure 3: Distribution of cluster membership per country-regime



There are further country differences suggesting that Western-European policy regimes produce fewer but more extreme forms of housing precariousness. First, in the Nordic countries, when precariousness does occur, it is mostly security-precariousness, the most extreme stacking of housing problems. For example, of all those in precarious housing in the Netherlands (3.0%), almost two-thirds is classified as security-precarious (1.9%). These patterns are even more pronounced for respondents in low-income households (tables available upon request). For example, of all low-income Danes living in precarious conditions (10.9%), more than half is security-precarious (5.8%). They have been in arrears on rent/mortgage in addition to risking a high cost-burden and are often living in deprived and overcrowded accommodation. Conversely, less than one percent (0.8%) of low-income Danes lives in overcrowded and deprived accommodation without cost burden and rent/mortgage arrears. Similar patterns are found in Sweden, Finland and Norway.

Second, in liberal dual-rental-market countries such as Ireland and Finland, as well as in France, we find relatively high rates of the more severe form of security-precariousness. At the same time, this type of precariousness is relatively rare in Eastern-European housing-welfare regimes, i.e. much less common than the other types of housing precariousness, likely due to high rates of outright homeownership and rent-free housing in these countries. In contrast, cost-precariousness is relatively common in Belgium (5.9%) and Luxembourg (5.3%). This also translates into high rates of cost-precariousness amongst respondents in low income-households: around one in every four are classified as cost-precarious, which is relatively high compared to other North-West-European countries (tables available upon request). Both Belgium and Luxembourg have high housing cost overburden rates as well as high rates of low-quality housing, which translates into cost- but not security-precariousness in these countries.

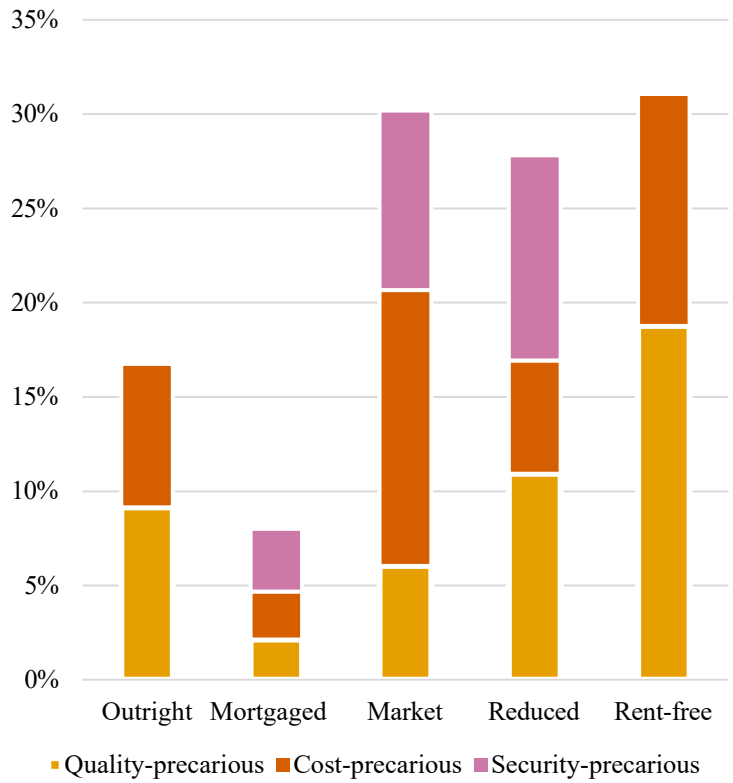
Finally, quality-precariousness is relatively common in Bulgaria and Lithuania, as well as in Portugal and Cyprus, where housing costs are low, but rates of low-quality housing are high. In the Central-and-Eastern European countries, this is related to the heritage of low-quality construction during the state-socialist era, and a continued lack of new construction later on (Soaita & Dewilde 2019). In Greece and Serbia, on the other hand, precariousness often involves the additional housing cost burden characteristic of cost-precariousness. Especially in Greece, this is partly due to the increasing tax burden and welfare austerity imposed on private

households after the financial crisis (Alexandri & Janoschka 2018). In these countries, we could argue that precariousness is not only more common, but also more severe.

4.3 Tenure

The distribution of housing precariousness by tenure is presented in Figure 4. Expectedly, housing precariousness is especially rare amongst mortgaged homeowners. Like Clair and colleagues (2019), we find that rental tenures have higher rates of housing precariousness, both at market and reduced rate, indicating that the exclusive focus on precariousness in private rental arrangements (e.g. Waldron 2023) deserves reconsideration. Especially in the United Kingdom (UK), Ireland, France, and Belgium, the social housing sector is marked by high rates of quality- and security-precariousness, pointing to the concentration of vulnerable and low-income individuals (e.g. Angel 2023, Hoekstra 2017, Ogrodowczyk & Marcińczak 2021) as well as to stagnation in the renovation of social housing (cf. Blackwell & Bengtsson 2023). Despite these high rates, however, precariousness in social housing should still be considered more secure compared to market renting. In social housing, late rent payments do not imply the same risk of eviction as in the private rental sector: social housing is expected to shield vulnerable tenants from eviction. While those in reduced rent may be more securely housed, we consider them nonetheless to be at greater risk of adverse events. The accumulation of debt brings stress that affects mental and physical health (McKee et al. 2017) and may still lead to eviction in the worst-case scenario (Collins et al. 2022). The difference is that the lack of income (and employment) is arguably more important in producing these precarious conditions in social housing than housing costs and landlord demands in the private sector (see also Figure 5). Around half of all precarious situations in the European reduced-rent sector are security-precarious (12.9%), a type that includes rent arrears and cost overburden. As we will see however, the rates of security-precariousness in the reduced-rent sector vary considerably between countries, to the extent that the concentration of the most disadvantaged in the reduced-rent sector may be more relevant in France, Belgium, Finland, Ireland, and the UK.

Figure 4: Distribution of precariousness types per tenure



Surprisingly, our results also point to high rates of quality-precariousness, conceptually akin to (severe) housing deprivation (Hick, Pomati & Stephens 2022). 13.9% of reduced-rate renters in Europe are classified as quality-precarious, a group with high rates of low-quality housing and overcrowded accommodation, as well as high rates of utility arrears and the inability to keep the house adequately warm. This is surprising because social housing stocks have long been considered of better quality compared to the private rental sector. Focusing on tenants' satisfaction, Blackwell and Bengtsson (2023: 284), for instance, found that "*in terms of standards and quality the social rental housing stock has proven generally resilient*". Borg (2015: 86), however, also finds that low-quality housing is most common for those in social housing: "*tenants renting at reduced rents seem to be the most vulnerable*". Our results corroborate previous findings, and question whether social housing quality is indeed as 'resilient' as claimed. On the other hand, the discrepancy might lie in subjective experiences versus objective criteria for deprived housing conditions, since subjective and objective measures of housing problems often differ substantially (e.g. Sunega & Lux 2016).

Importantly, as shown in Table 4, high rates of quality-precariousness in the reduced-rent sector are driven by results for specific countries. We identify high rates of quality-precariousness in the reduced-rent sector of the UK (15.8%), Ireland (17.7%), France (10.7%), and Belgium (9.8%). These countries have relatively high overall levels of housing precariousness in the reduced-rent sector, i.e. regardless of the type. At the same time, quality-precariousness is much lower in the market-rental sectors of these countries (see Table 5). Quality-precariousness in the reduced-rent sector is much less prevalent in Austria (1.9%), Luxembourg (1.1%), Finland (0.7%), and Norway (less than 1 percent). Shown in Table 5, quality-precariousness is similarly small in the unitary rental markets of Denmark (1.2%), the Netherlands (1.7%), and Sweden (2.1%). This is in line with prior studies that pointed to fewer problems with housing quality in the rental sectors of countries with large and more integrated social housing sectors (Borg 2015; Dewilde 2022). In addition, it may reflect differences in efforts to modernize the social housing stock, combined with the sale of low-quality units, e.g. in the Netherlands (compared with France or the UK; Croon, Hoekstra & Dubois 2024). It seems that while many countries have 'resilient' social housing sectors, social housing is quite precarious in the UK, Ireland, France and Belgium.

Table 4: Types of precariousness in the reduced-rental sector in North-West Europe

	Quality-precarious	Cost-precarious	Security-precarious	N
EU27+UK	9.9%	6.1%	10.7%	405090
DK	1.2%	2.5%	3.5%	40521
NL	1.7%	1.1%	5.2%	56213
SE	2.1%	1.0%	4.1%	40620
AT	1.9%	2.0%	4.6%	13890
DE	8.2%	2.3%	3.5%	6592
FR	10.7%	3.4%	12.4%	43702
BE	9.8%	12.3%	9.2%	12225
CH	.	1.3%	3.8%	8175
FI	0.7%	0.6%	11.4%	27000
IE	17.7%	3.9%	19.7%	16162
LU	1.1%	6.9%	4.6%	4772

NO	.	.	7.5%	2163
UK	15.8%	7.0%	12.0%	22913

Note: missing percentages are censored, following Eurostat regulations, because the cells contain fewer than 50 cases

Summarizing, in some countries, the 'residualization' of social housing (e.g. Angel 2023, Borg 2019) not only relates to a shrinking stock and a concentration of vulnerable groups, but also to often low-quality accommodations. This is especially damaging, as the primary goal of social housing was to prevent 'squalor' (e.g. Lund, Greener & Powell 2022). In some countries, the concentration of disadvantaged households in social housing tenures, along with the retention of lower-quality stock amongst housing corporations and lack of regular maintenance (e.g. Croon, Hoekstra & Dubois 2024), seemingly have resulted in high levels of precariousness in the very sector meant to shield its residents from such problems.

Figure 4 further shows that precariousness in the market-rental sector is more commonly associated with cost- and security-precariousness. Especially cost-precariousness is twice as common in the market rental sector (14.6%) than in the reduced-rent sector (6.6%). Only 6.0% of market renters lives in low-quality accommodation without a high housing cost burden. A substantial proportion of market renters (9.5%) is also behind on rent payments. This points to the exploitative character of part of the market rental sector, providing low-quality accommodation at high costs (Waldron 2023; Listerborn 2023; see also Desmond & Wilmers 2019). While private rental tenures may not be a threat to housing quality on the aggregate level (see Dewilde & De Decker 2016) – perhaps not least due to the apparent quality concerns in the social housing stock – precarious housing conditions are common in certain segments of the private rental sector, and generally of a more severe kind compared to the reduced-rent sector.

Country differences in precariousness in the market rate rental sector follow similar patterns as in the reduced-rate rental sector, as shown in Table 5. Precariousness, regardless of the type, is less common in the market rental sectors of the Netherlands (3.8%), Germany (8.8%), Finland (9.4%), and Norway (8.6%). High rates of precariousness are found in the market rental sectors of France (24.2%), Belgium (33.9%), Ireland (29.2%) and the UK (20.1%), much like in the reduced-rent sectors of these countries. An exception is Luxembourg, with high

rates of precariousness in the market rental sector (23.1%) compared to the reduced-rent sector (12.5%).

Table 5: Types of precariousness in the market-rental sector in North-West Europe

	Quality-precarious	Cost-precarious	Security-precarious	N
EU27+UK	5.7%	15.0%	9.6%	708736
NL	.	0.7%	3.1%	10092
AT	1.4%	5.7%	7.5%	40647
DE	3.2%	3.0%	2.6%	68688
FR	7.5%	6.1%	10.6%	50851
BE	3.4%	23.1%	7.3%	33504
CH	0.3%	2.3%	2.9%	79465
FI	0.5%	1.4%	7.5%	23849
IE	7.5%	6.9%	14.8%	14561
LU	0.2%	18.4%	4.6%	24871
NO	0.6%	0.5%	7.6%	13285
UK	6.5%	9.8%	3.7%	18223

Note: missing percentages are censored, following Eurostat regulations, because the cells contain fewer than 50 cases

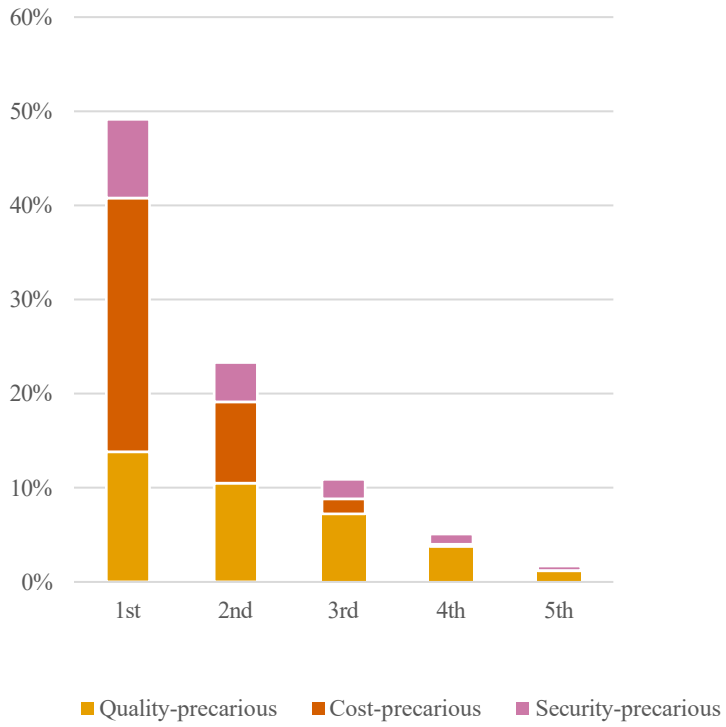
Finally, when considering the different types of precariousness, we find that housing conditions in the market rent tend to be more severe in countries with dualized (segmented) rental sectors. The precariously housed in market rent typically face a high cost-burden, particularly in Belgium, Luxembourg and the UK. Compared to better-regulated housing markets, less strict rental regulation combined with more targeted welfare provision typically leads to less affordable private renting (e.g. Dewilde & De Decker 2016). In Belgium, for example, 23.1% of market renters are classified as cost-precarious, often combining high housing costs with deprived and overcrowded accommodation, and another 7.3% is also behind on rent payments. Such a concentration of housing problems is much less prevalent amongst market renters in unitary rental market countries such as Denmark, the Netherlands, Sweden, Austria, and Germany. Nevertheless, when precarious housing conditions do occur in these countries, they are more often of the more severe security-precarious type. In Austria, for

example, of the total 14.6% private tenants in any type of precarious housing situation, more than half is classified as security-precarious (7.5%). Similarly, in Norway and Finland, roughly eight out of ten precarious private renters are classified as security-precarious. This points to the existence of a smaller exploitative segment of the private rental market in these countries, compared to the widely unaffordable stock in some dual rental market-countries.

4.4 Income groups

The incidence of precariousness increases exponentially for individuals in lower income quintiles (see Figure 5). This exponential growth is mostly explained by the increase of what we consider more severe types of housing precariousness. Particularly the incidence of cost-precariousness increases more sharply for lower-income groups compared with quality-precariousness. For example, quality-precariousness increases from 10.4% to 13.7% from the second to the bottom quintile (+3.3%), whereas cost-precariousness triples from 8.8% to 27.0% (+18.2%). Note that the incidence of cost-precariousness amongst low income-respondents could be exacerbated by our use of a variable threshold for housing cost overburden instead of single-threshold of 40%. Nonetheless, low-income households spending 25% of their income on housing costs realistically have little left to spend on necessities, matching their subjective experience of high housing cost burdens (Heylen 2023). Compared to cost-precariousness, security-precariousness is less concentrated amongst low income-respondents. Security-precariousness doubles from the second quintile (4.2%) to the first quintile (8.4%), but, unlike cost precariousness, is still observed in the fourth quintile (1.1%). Still, these patterns further establish the hierarchy in the types of housing precariousness and show that the more severe types are more strongly stratified by household income. In Appendix B, we discuss how the concentration of housing precariousness amongst low incomes varies across countries.

Figure 5: Distribution of precariousness per income quintile



5. Conclusion and discussion

The right to decent and affordable housing in Europe requires continued attention from researchers and policymakers. This study focuses on the minority of precariously housed, i.e. exposed to adverse living conditions, who often remain hidden in aggregate statistics. Through a Latent Class Analysis (LCA) of eight housing problem indicators, we demonstrated a meaningful distinction between three 'degrees' of housing precariousness, substantively ranging from less to more severe. Quality-precariousness is the least severe form of housing precariousness, least stratified by income, and is most found in Central- and-Eastern Europe and amongst rent-free households. Cost-precariousness additionally includes a disproportionate housing cost burden and is most common amongst low-income respondents in the market rental sector. Security-precariousness additionally adds rent/mortgage arrears to the mix of problems (associated with debts and the risk of eviction) and is most common amongst the lowest income-households in market rate and reduced-rate rental housing.

Based on this classification, this study offers several insights into variations of housing precariousness across Europe. First, while housing precariousness may be more prevalent in Eastern- and Southern-Europe overall (e.g. Clair et al. 2019; Waldron 2023), we show that the fewer instances of housing precariousness in North-Western-Europe tend to be more severe. Combinations of quality-related problems like overcrowding and low-quality housing are more common in Southern- and Central-and-Eastern European countries, where familial and state modes of housing production and allocation have long been dominant. Inversely, precarious housing is indeed much less common in countries such as Denmark, Sweden and the Netherlands. Nonetheless, when housing conditions are precarious, it is more often of a more severe degree (i.e. security-precarious), including cost burdens and rent/mortgage arrears in addition to quality concerns. Thus, if tenure insecurity is indeed a decisive factor (Dorling 2014; Beer et al. 2016), rates of (security) precariousness are not very different between European countries. This also has an interesting implication for the 'moderating' role of national-level contexts (Stephens 2011; Grander & Stephens 2023). It seems that while stricter market regulation drives down the level of precarious housing conditions in the population overall, such regulation has the least effect on group that needs it most, i.e. the minority confronted with security-precariousness. Such a trend is in tune with literature on dualization and increased welfare state selectivity and conditionality, which argues that vulnerable groups are pushed out of the regular labour market and welfare state, whilst Minimum Income Protection for these groups has also declined (Dewilde 2022). Western-European welfare states became less pro-poor, which may have contributed to situations of housing precariousness amongst those most affected by long-term trends in welfare states, and housing and labour markets.

Second, while existing research has stressed that precariousness mostly affects private renters (Waldron 2023; Listerborn 2023; Routhier 2019), we find good reason to direct some attention to the reduced-rate rent sector. Our results do corroborate concerns about precariousness in the market rent sector: housing precariousness is very prevalent for market renters and tends to be of a more severe kind. Cost-precariousness especially is at least twice as likely to occur in the market rental sector compared to other tenures, and security-precariousness is also particularly commonplace amongst market renters. Nonetheless, housing precariousness is equally prevalent in reduced-rate compared with market-rate rental housing. In the reduced-rent sector, quality-precariousness is more common than in the market rate-rent sector, particularly in

France, Ireland and the UK. The relatively high incidence of low-quality housing and overcrowded living conditions in the reduced-rent sector points to a problematic degree of quality problems in social housing (see also Borg 2015; Hick Pomati & Stephens 2022).

Moreover, we observe higher rates of security-precariousness in the reduced-rent sector – particularly in Ireland but also in France, Belgium and Luxembourg. Although social housing is less insecure by design, security-precariousness is very high: one in ten reduced-rent tenants are behind on rent payments, often *in addition* to residing in overcrowded and low-quality housing. This concentration of housing problems in reduced rent can be attributed at least in part to the increased targeting of social housing to low-income and high-need tenants (e.g. Angel 2023). In several countries, the concentration of high-need tenants in social housing, along with the retention (and selective allocation) of lower-quality stock amongst housing corporations, seemingly led to high concentrations of housing problems in the very sector meant to shield its residents from them.

Finally, this work has some interesting implications for policymakers intent on tackling housing precariousness. From a multi-problem perspective, the question is not which problem is most pressing, but rather (a) which households are in greatest need and (b) how to ensure these households receive assistance. Next to solving isolated problems such as rent burdens and renovations, a separate track could be envisioned for those households facing severe concentration of housing problems. Since the most vulnerable households are often least able to navigate the institutions designed to help them, a pro-active approach to identify these households is essential (e.g. Pawlowski & Scholta 2023). Housing precariousness in its various degrees could be identified through national statistical registries, from which the EU-SILC data is also partly derived, followed by an in-person conversation to ensure the need for assistance. The actual solving of these individual problems would likely require an approach spanning social domains, i.e. involving debt counselling, labour market integration, and legal counsel e.g. via tenant unions and related institutions.

5.1 Limitations and future research

Several data limitations must be kept in mind whilst interpreting the results of this study. First, by design, the most severe degree of housing precariousness (e.g. rooflessness) is not captured by EU-SILC. Our estimates of housing precariousness should hence be considered conservative.

Second, the use of rent arrears as an indicator of housing insecurity is suboptimal. While other indicators such as forced moves are sporadically available (Clair et al. 2019), we opted for rent arrears due to its consistent availability in EU-SILC. Third, while we point to high rates of precariousness in the social housing sector, our measurement of tenure has limitations. Reduced-rate renting includes social housing but also includes affordable housing provided by employers and specific private landlords, as well as all renters in Denmark and Sweden where no distinction between market- and reduced-rate renting is possible. Further research could explore whether housing precariousness is equally prevalent when observing social housing tenants more directly.

Our results point to several avenues for future study. First, the identified degrees of precariousness invite a reconsideration of the measurement of housing precariousness. The field would benefit greatly from an agreed-upon operational definition, specifying which indicators to include and how to combine them in ways that make sense. Second, since the current results are based on a pooled sample of waves over time, the stability and development of these clusters could be further examined with a longitudinal design. With repeated cross-sections we can test theories on what drives the concentration of housing problems over time, such as welfare retrenchment and the financialization of housing (e.g. Dorling 2014; Beer et al. 2016; Waldron 2023). Moreover, although panel data stretching beyond the 4-year rotational design of EU-SILC is difficult to obtain, it would be valuable to study the duration of (types of) precarious housing conditions (see also Beer et al. 2016). With panel data, especially requiring further study is the hypothesis that security-precariousness is more permanent than other forms, as well as the extent to which individuals transition into more severe types of precariousness over time and to the extent which this is driven by institutional changes in housing provision, labour markets and welfare states. Third, since precarious housing is tied to increased risks of homelessness and adverse health outcomes (McKee et al. 2017, Galster & Lee 2021), we suspect that these effects are stronger for the more severe types of housing precariousness. An investigation of such outcomes could further validate our typology.

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