



ARTICLE

# Housing affordability and poverty in Europe: on the deteriorating position of market renters

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## Abstract

There are growing concerns about housing affordability throughout Europe. Recent studies by Housing Europe and the OECD have suggested that we are witnessing a generalised deterioration in housing affordability, while other studies point to worsening housing affordability for specific groups, such as renters or low-income households. The aim of this paper is to explore trends in, and incidences and determinants of, housing affordability in a comparative European context over the period 2010 to 2018. To do this we analyse data from the EU Statistics on Income and Living Conditions survey. We examine trends across different measures of housing affordability; examine its association with a variety of socio-economic characteristics and explore country-level differences in housing affordability problems. Our study finds that despite claims of worsening housing affordability, affordability measures show little sign of generalised deterioration over the period in question but that risks of affordability problems have become more concentrated on market renters during this period. At the country level, we find that gross domestic product (GDP) per capita and the at-risk-of-poverty rate are associated with housing affordability problems both between countries as well as within countries over time, while housing allowance coverage and rent regulation stringency are associated with affordability problems between countries.

**Keywords:** housing affordability; poverty; Europe; tenant; EU-SILC; comparative

## Introduction

Of the many meanings given to the term ‘housing crisis’ in Europe, the one invoked most frequently concerns the affordability of housing. There is growing attention to pressures on housing affordability, with a recent OECD (2021, p. 4) report claiming that ‘Over the past two decades, as housing prices have risen in most OECD countries, households are, on average, spending a large and increasing share of their budget on housing’.

Unaffordable housing has clear implications for families living below, or around, the poverty line. It is commonly recognised that housing costs often represent the first and largest item of a household’s budget (Stone, 2006, p. 159), and that

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low-income households spend a particularly high proportion of their income on housing (Pittini, 2012). There is thus a concern that deteriorating housing affordability might lead to an intensification of poverty (e.g. Alcántara & Vogel, 2021; Saunders, 2017). At the same time, it cannot straight-forwardly be assumed that concerns about deteriorating housing affordability relate to the poor – Madden and Marcuse (2016, p. 10) claim that the housing crisis portrayed in the media is more concerned with middle-class would-be homeowners than with the struggle of low-income households to afford their housing costs. Analytically, interest in the relationship between housing costs and poverty can be obscured because the dominant class of measures of housing affordability – namely, ratio measures – do not focus only on the poor, capture affordability problems all the way up the income distribution and it is therefore not clear whether deteriorating affordability on such measures reflects a worsening of the position of people in poverty.

The aim of this paper is to explore trends in, and incidences and determinants of, housing affordability in a comparative European context and how these problems fare differently for low-income households. In pursuing this aim, we examine trends across different measures of housing affordability; examine the association between socio-economic characteristics and housing affordability, with a particular focus on the evolving relationship with housing tenure; and seek to explore country-level differences in housing affordability problems. Our concern is with ongoing housing *costs* and not one-off house *prices*. Rising house prices may prevent young people in particular from becoming homeowners, and there is evidence of falling homeownership and delayed independent living amongst young people throughout Europe (Hick *et al.*, 2022a). Our focus here, however, is on the ongoing housing costs borne by owners and renters and how these relate to household income. More broadly, this paper represents a contribution towards the greater integration between Housing Studies and Social Policy of late (e.g. Dewilde & Haffner, 2022; Hick & Stephens, 2023; Kholodilin *et al.*, 2022), after a period where debates had at times become rather specialised and siloed.

The paper is structured as follows. In the next section, we provide an overview of recent empirical literature on housing affordability, paying particular attention to comparative European studies. In the second section, we set out our analytic approach and discuss our data and method. The analysis is then divided into three sections: examining trends over time, analysis of within-country ('micro') determinants of housing affordability and, subsequently, of between-country ('macro') predictors of housing affordability. The concluding section reflects on the findings and summarises the lessons that have been learned.

## Background and literature

Claims about deteriorating housing affordability can relate either to a generalised deterioration in housing affordability or to such worsening as being limited to specific groups. Some of the more prominent accounts of a generalised deterioration of housing affordability relate to the analysis of house *prices*. A recent review by Housing Europe (2022: 6-7) noted that 'house prices have been growing steadily across the Euro area for nearly a decade' and that 'this trend has clear implications

for housing affordability', though these were not examined directly. Similar claims were made in the OECD's (2021) recent study.

In addition, a series of studies make more limited claims that housing affordability is deteriorating for specific groups. Gabor and Kohl (2022) emphasise worsening affordability for people living in major urban centres. Others identify the problem as being more acute for low-income households – for example, Hegedüs and Horváth (2015, p. 13) examine the EU housing cost overburden measure, which identifies households spending more than 40 per cent of their disposable income on housing costs as experiencing cost overburden, and emphasise the deteriorating position of low-income groups (see also Dewilde & De Decker, 2016, p. 144; Pittini, 2012, p. 4). Then there are studies that emphasise changing affordability patterns by housing tenure. A World Bank study (Inchauste *et al.*, 2018, p. 60) similarly examined the EU housing cost overburden measure over time and concluded that increases are observed more frequently for tenants than for owners. Dewilde (2018) examines affordability problems in twelve Western European countries for private renters before (1995–2007) and after (2007–2013) the financial crisis and finds that affordability for low-income private renters declined in the period leading to the financial crisis.

These various studies present what we label a *concentration argument* – in essence, suggesting that affordability problems are real but are concentrated on particular groups. These studies emphasise a variety of different at-risk groups, with renters, people living on low incomes, the young, and families living in major urban centres the primary groups that have been identified. Deteriorating housing affordability for specific groups is consistent with either the presence or absence of a generalised deterioration in housing affordability. In this paper we pay particular attention to the position of affordability problems of renters and owners. While previous studies have pointed towards deteriorating housing affordability for private renters, in particular, it is unclear whether this is due to changes in housing costs, household incomes, or both. It is also unclear whether any observed deterioration may be explained by differences in compositional characteristics between renters and owners. Our study sheds light on both of these issues.

There is also the question of what explains variation in housing affordability rates between countries. Housing affordability refers to the relationship between housing costs and household resources and theoretical accounts impinge on both sides of this equation. Housing-specific explanations can relate both to system differences and to policy measures. One 'system' explanation emphasises the process of housing market financialisation, which has itself been the subject of a wide range of claims and causal accounts. Initial accounts stressed the role played by mortgage securitisation in facilitating an extension of homeownership but also contributing to house price inflation (e.g. Aalbers, 2017). Some accounts also stress developments in the private rented sector – for example, arising from the growth in 'petty landlordism' due to the growth in Buy-to-Let mortgages in the UK (Kemp, 2015) or the emergence of new actors, such as foreign institutional investors, who, competing with domestic residents, contribute to house price increases (e.g. Hearne, 2020). While accounts of housing market financialisation differ, they typically converge around claims that this process has led to a rise in asset prices, which in turn exacerbates affordability problems for recent homeowners and for market renters

more generally (Hick & Stephens, 2023). Dewilde (2018, pp. 2633–2634) finds that changes in the mortgage debt to GDP ratio, a proxy for financialisation, is correlated with changes in housing affordability after controlling for the size of the private rented sector and levels of net migration, observing a marginally significant association amongst households in rural, but not urban, regions in twelve European countries. However, Borg and Guio (2021) find no association with this measure and housing affordability for the year 2015. Given the strength of the claims made in relation to housing market financialisation, this is undoubtedly an area in need of further scrutiny.

A second way in which housing system differences have been expressed is through a measure of tenure balances, which takes inspiration from the work of Kemeny (1992, 1995). Kemeny examined housing differences in eight countries, arguing that the central differences between housing systems originated from the nature of their rental markets – between what he labelled unitary and dualist rental systems. In the unitary system the state’s support for cost rental housing enables this sector to compete with the private rental market, which in turn drives down costs and sets a floor on housing standards across the entire private market. In the dualist system, the state’s adoption of a residualised cost rental sector shapes preferences in favour of owner-occupation, and would leave many in the private rental market experiencing greater affordability and housing quality problems (Kemeny, 1995, p. 132, 18). That is, Kemeny was clear that these different types of system would have predictable consequences in terms of housing outcomes. Stephens (2020) argues that the dynamic between rental markets is no longer the central mechanism explaining change in housing systems, and a number of empirical accounts have emphasised trends in homeownership, or the balance between owners and renters, as being of greater contemporary relevance. But empirical evidence of the significance of tenure structures on housing affordability is far from universal: Borg and Guio (2021) find, for instance, that tenure balance measures are not related to country-level differences in housing affordability. That said, tenure balances remain important and commonly analysed explanations of housing outcomes and we include them in our study.

In relation to housing policy variables, and third, the extent of rental market regulation can restrain rent levels and, potentially, reduce affordability problems at the national level. Weber (2017) and Kholodilin *et al.* (2018) have constructed an index of rent regulation stringency between countries and over time. Dewilde (2022) examines the relationship between this index and a measure of living-conditions deprivation<sup>1</sup> and finds that rental market regulation has an impact on living conditions-deprivation at the country level, after controlling for low income and a set of household-level variables. Another policy variable, and fourth, concerns the provision of housing allowances, a central mechanism in some welfare states to alleviate housing affordability problems (Griggs & Kemp, 2012; Nelson *et al.*, 2023). Housing allowances reduce the amount that households will need to pay in rent and, in the analysis conducted below, all measures of housing affordability problems are net of housing allowances, so we anticipate that greater housing allowance coverage should be associated with lower housing affordability problems at the national level.

In addition to variables capturing differences in housing institutions, housing affordability might also be explained through reference to economic variables.

We know that, within countries, households in poverty have higher cost burdens than those above the poverty line (Hick *et al.*, 2022a, p. 26) and might extrapolate from this that countries with higher poverty rates would be expected to have higher rates of housing affordability problems. But it is also possible that economic concerns matter, but that the relative income poverty rate is not the most important economic variable. The enlargement of the EU to Central and Eastern European nations from 2004 increased significantly the variation in levels of wealth and standards of living across the Union. We test whether average wealth, as measured by GDP per capita, is associated with housing affordability problems. Overall, there is no *a priori* reason to believe that one of these explanations will dominate others, and we examine these both individually and jointly to advance understanding of the determinants of housing affordability in Europe. It is to our analytic approach and these data and measurement questions that we now turn.

### Analytic approach, data and method

The analysis presented in this paper draws on household-level microdata from the EU Statistics on Income and Living Conditions (SILC) dataset for twenty-seven European nations between 2010 and 2018. Our country cases are drawn from the as-was EU-28 (the EU-27 plus the UK); however, Denmark has been dropped because of missing data reasons. Our measure of housing costs is broad, including mortgage interest or rent payments, service charges and/or property taxes, regular maintenance and repair costs, and utility bills (all captured by HH070) as well as mortgage principal payments (HH071). The official Eurostat measure of housing cost overburden counts only HH070 in its measure of housing costs – that is, it excludes mortgage principal payments on the grounds that this reflects savings accumulating wealth rather than a sunk cost.

For certain purposes this may make sense and while some studies follow this approach (e.g. Borg & Guio, 2021), from an immediate budgetary perspective it is undeniable that mortgage principal *does* restrict a household's remaining disposable income just as does mortgage interest. Moreover, one of our aims in this paper is to compare the incidence of housing affordability problems by households in different tenures and this comparison is frustrated if a major cost for homeowners is overlooked. Given our purposes, we believe it makes more sense to include mortgage principal repayments in our measure of housing costs and housing affordability measures (see also Deidda, 2015, Saunders *et al.*, 2022, who, like us, include mortgage principal payments in their measure of housing costs). Our focus on households' budgetary perspectives also explains why we do not include imputed rental incomes in our analyses. These in essence provide a measure of housing *consumption* rather than *expenditure*, seeking to proxy household's standard of living by adjusting their incomes. However, incorporating imputed rents into the measurement of income would artificially depress housing affordability problems of owner occupiers and reduced rate tenants and, again, would move us away from the actual financial circumstances of households in these tenures. We follow Eurostat in excluding imputed rents from our measurement of income.

Our housing costs measure includes not only rent or mortgage payments but also property taxes and utility bills. Data on these are contained in the same variable

(HH070), meaning that we are unable to disentangle these quite different components. This is a limitation of the housing-related data contained in SILC (something we discuss in Hick *et al.*, 2022a, pp. 13–14) and might explain the sometimes counter-intuitive findings that are alleged to flow from analysis of the housing cost overburden measure (Borg & Guio, 2021).

Mortgage principal repayments aside, we followed EUROSTAT's methodology in computing the ratio between housing costs and incomes. We divide housing costs by disposable income (both net of housing allowances), to produce a cost-to-income scale. Our primary measure of housing affordability problems is the EU housing cost overburden measure, where household spend more than 40 per cent of their disposable income on housing costs (that is, the underlying variable described above with a threshold set at 40 per cent). Such 'ratio' measures are sometimes criticised on the grounds that some whose housing expenditures exceed these ratios may 'overconsume' housing and that the incidence of these problems can be experienced across the whole income distribution (Meen & Whitehead, 2020, pp. 27–29; see also Stephens & Hick, 2024). As a secondary measure, therefore, we construct a High-Cost Low-Income (HCLI) indicator of housing affordability. This is a hybrid measure, inspired by the Australian 30:40 measure of housing stress (Pawson *et al.*, 2020). However, in order to emphasise a focus on poverty, we count only those who spend in excess of the 40 per cent threshold *and* who experience poverty on an after housing cost (AHC) basis.

Another important issue concerns the measurement of housing tenure, a fundamentally important variable for any housing study. The tenure variable (HH021) does not distinguish between private and social renting but rather between tenants renting 'at prevailing or market rate' and those renting 'at a reduced price'. This classification is akin to the distinction between 'profit renting' and 'cost renting' that was emphasised by Kemeny (1995, 35) as being more meaningful than whether a tenant was renting from private or public landlords. Two important issues arise. First, this distinction leads to splits between rental types that do not graft unproblematically onto national estimates of social housing tenures (in relation to Ireland, see Kelly *et al.*, 2021). Second, in countries with significant state intervention into rental markets to reduce costs, where Kemeny's 'unitary' rental system might be said to be in operation, *all* rented accommodation is categorised as being paid at the 'prevailing or market' rent (our emphasis; see also Kholodilin *et al.*, 2022 on the challenges of comparing definitions of 'social housing' in international terms). This affects Sweden and the Netherlands (and we re-classify rented accommodation in these countries as being at a reduced rate). Issues in relation to homeownership are not so significant but a division between mortgaged and outright owners is only made from around 2010 (and mortgage principal payments are only measured from this time), thus shortening our observation window. We discuss these issues elsewhere, including how the measurement of housing-related variables in SILC requires investment and improvement by Eurostat (Hick *et al.*, 2022a).

Our primary analysis is based on households where the head of household is under the age of 60 and the household is taken as the unit of analysis. Denmark has been excluded on the grounds that there is no information on mortgage principal repayments and data from Luxembourg is treated with caution on the grounds that its mortgage principal distributions change significantly from 2016.



In the country-level component of our multi-level analysis, we draw on measures capturing both housing-related as well as economic differences. In relation to the former, our empirical proxy of the financialisation of housing is the Total Outstanding Loans as a proportion of GDP rate, proposed by Schwartz and Seabrooke (2008) to characterise the degree to which housing finance was 'liberal' or 'controlled'. Data for this measure is taken from the European Mortgage Federation (2021). This is not the only possible measure of housing market financialisation, but it is the primary measure discussed in the comparative literature and, importantly for our purposes, it is a measure with data available for all countries examined here. Additionally, we examine the proportion of households who are homeowners with mortgages as a means of tapping into housing system differences, again influenced by Schwartz and Seabrooke (2008), who treat the homeownership rate as a measure of commodification.

We also examine the impact of rent regulation and housing allowances on housing affordability. Our rent regulation measure is drawn from the Rental Market Index (ReMaIn) database,<sup>2</sup> building on the work of Weber (2017) and Kholodilin *et al.* (2018). The data contained in this index are on a 0–1 scale<sup>3</sup> based on a series of items relating to tenure security laws and rent regulation. Data are available for twenty-three of our twenty-seven nations, with missing data being concentrated amongst nations in Central and Eastern Europe (Bulgaria, Croatia, Hungary, Slovenia). Further, we use data on housing allowances contained within SILC (variable HY070), aggregating this to the country level in a measure of housing allowance coverage. In relation to our economic variables, we examine GDP per capita (taken from Eurostat) to capture absolute differences in average wealth and the at-risk-of-poverty rate (AROP) rate, aggregated to country-level from the micro-data, to reflect differences in poverty.

We present the analysis in three sections – relating to descriptive trends, within-country differences and between-country differences, respectively. In terms of our regression modelling strategy, we used multilevel logit models to estimate the probability of housing affordability. Specifically, we estimate a three-level model with households (level-1 units) nested within country-years (level-2 units), nested within countries (level-3 units). A key advantage of the random effects model is that it allows country-level co-variables to be considered, which enables us to model the effects of the rate of mortgaged homeownership, poverty rates, GDP per capita and others on housing affordability, while also controlling for compositional differences between countries. The three-level nesting structure also allows us to take into account the non-independence of observations from different years within the same countries and enables us to differentiate within-country and between-country effects of time-varying country-level variables (Fairbrother, 2014). In Tables 1 and 2 we focus specifically on overall micro-level coefficients from this multi-level model. The subsequent macro model presented in Table 3 predicts variation in the random intercepts (adjusted for the variables in Table 1, except for income) using country-level variables (between effects) as well as within-country annual changes (within effects, representing year 'deviations' from the overall country mean) (see Te Grotenhuis *et al.*, 2015). Following the hierarchical modelling literature, we also include a random slope effect for tenure, which can improve the fit of the overall model as well as the estimates of our coefficients (Heisig *et al.*, 2017; Heisig & Schaeffer, 2019), though this is not shown as it is not our central parameter

of interest. All multilevel analyses were fitted in R's lme4 package using household survey weights. The primary ethical consideration in our study has been the secure handling and storage of data. In ensuring this, we have agreed, to and abided with, the conditions attached to data access set by Eurostat.

## Analysis

### *Trends in housing affordability in Europe*

We begin our analysis by presenting aggregate trends in housing affordability between 2010 and 2018 (see Figure 1), using the cost-to-income ratio. While in later analysis we impose a threshold at 40 per cent to capture the EU housing cost overburden ratio, here we simply present average values of the underlying scale. We can see in Figure 1 that the costs-to-income ratio for countries as a whole has been rather stable in most European countries over this time period, in some nations rising modestly between 2010 and about 2014, only to fall again by 2018.<sup>4</sup> The most notable case is that of Greece, which experienced an alarming increase in cost burdens between 2010 and 2015, which was only very partially reversed by 2018. Other notable cases include the UK, Romania, and Croatia, and there is also a sharp increase over the period in Bulgaria. However, what is arguably most significant here is the relative stability of ratios in most nations, and especially in the period since about 2013, when house prices started rising quite consistently in Europe (Hick *et al.*, 2022a, pp. 11–12). In further analysis, we decompose change in these ratios by changes in housing costs and incomes. This analysis, which is presented in Figures 3.1 and 3.2 of the Supplementary Analysis file, finds that housing cost increases were often matched by increases in total household income, particularly in the second half of the period we consider and especially in Central and Eastern Europe. That said, this decomposition demonstrates that countries can arrive at stable or declining cost burdens via quite different trajectories in relation to housing costs and incomes.

Housing affordability can be understood in different ways, as we have discussed above, and to account for this we have produced separate versions of this figure based on: the average ratio with mortgage principal omitted, the EU housing cost overburden measure, our High-Cost Low-Income measure, and, importantly, a subjective measure asking respondents whether housing costs represent 'a heavy burden' (see Figures 1.1 to 1.4 in the Supplementary Material file). At the aggregate level, there is little evidence of a generalised deterioration of housing affordability in the last decade on *any* of these measures. This matters because it runs contrary to the picture of declining housing affordability that has been painted in a recent high-level report (OECD, 2021) as well as in much public discussion, but is consistent with the counter-intuitive performance of housing affordability indicators noted by Borg & Guio (2021).

In Figure 2, we compare the country-level incidence of our two measures in 2018. Recall that the High-Cost Low-Income measure is a subset of the EU housing cost overburden measure, capturing those who spend more than 40 per cent of their disposable income on housing *and* who experience poverty after housing costs. Figure 2 shows that most households who are cost overburdened on the ratio measure also experience High-Cost Low-Income overburden, that this is consistent



**Table 1.** Multilevel logistic regression model estimating incidence of EU housing cost overburden

<i>Predictors</i>	M1	M2	M3	M3b	M4
	<i>Log-Odds</i>	<i>Log-Odds</i>	<i>Log-Odds</i>	<i>Log-Odds</i>	<i>Log-Odds</i>
(Intercept)	-1.15***	-0.64***	-1.30***	-1.21***	-0.41*
2014 (ref: 2010)	0.15**	0.15**	0.14*	0.07	0.06
2018	-0.14**	-0.14**	-0.21***	-0.43***	-0.55***
Market-rate tenant (ref: Mortgaged homeowner)	0.40***	0.33***	0.08***	-0.25***	-1.35***
Outright owner	-1.62***	-1.67***	-1.81***	-1.80***	-3.18***
Rent free	-1.41***	-1.53***	-1.92***	-1.91***	-3.75***
Reduced-rate tenant	0.07***	-0.08***	-0.32***	-0.33***	-1.78***
Semi-detached (ref: Detached)		-0.24***	-0.27***	-0.27***	-0.35***
Apartment in a building with < 10 dwellings		-0.21***	-0.33***	-0.32***	-0.21***
Apartment or flat in a building with ≥ 10 dwellings		-0.26***	-0.40***	-0.40***	-0.17***
Number of rooms (recoded)		-0.17***	0.04***	0.04***	0.30***
Intermediate area (ref: Densely populated)		-0.10***	-0.08***	-0.09***	-0.25***
Thinly populated		-0.08***	-0.06***	-0.06***	-0.52***
Area info missing		0.25***	0.13	0.12	-0.24**
Single person HH (ref: Two adults, no children)			1.26***	1.27***	1.07***
Single parent HH			0.90***	0.90***	-0.17***
Two adults, children			-0.00	-0.01	-0.58***
Other HH, no children			-0.57***	-0.58***	-0.89***
Other HH, children			-0.44***	-0.45***	-0.87***
Household size			-0.09***	-0.09***	-0.50***
EU national (ref: National)			0.58***	0.57***	0.57***
Non-EU national			0.73***	0.72***	0.45***
Household head 20–29 (ref: 40–49)			0.52***	0.53***	0.35***
Household head 30–39			0.07***	0.07***	0.25***
Household head 50–59			0.06***	0.06***	-0.14***
Market-rate tenant*2014				0.23***	0.33***
Market-rate tenant*2018				0.86***	1.17***
Income Decile 1/Lowest (ref: Decile 5)					2.94***
Income Decile 2					1.50***

(Continued)

**Table 1.** (Continued)

<i>Predictors</i>	M1	M2	M3	M3b	M4
	<i>Log-Odds</i>	<i>Log-Odds</i>	<i>Log-Odds</i>	<i>Log-Odds</i>	<i>Log-Odds</i>
Income Decile 3					0.97***
Income Decile 4					0.51***
Income Decile 6					-0.46***
Income Decile 7					-0.89***
Income Decile 8					-1.29***
Income Decile 9					-1.74***
Income Decile 10					-2.70***
Observations	1,152,389	1,115,088	1,107,138	1,107,138	1,107,138
Marginal R <sup>2</sup> /Conditional R <sup>2</sup>	0.171/ 0.263	0.177/ 0.258	0.266/ 0.393	0.271/ 0.394	0.524/ 0.674
AIC	937,784	819,432	765,525	763,437	577,657

\**p* < 0.05; \*\**p* < 0.01; \*\*\**p* < 0.001.

Note: All models are run on data using twenty-seven countries (level 3) and nine years (level 2). Period dummies for each year included in the models but, aside from 2014 and 2018, are suppressed here.

**Table 2.** Logistic regression model estimating incidence of High-Cost Low-Income measure of housing affordability

<i>Predictors</i>	M1	M2	M3	M3b
	<i>Log-Odds</i>	<i>Log-Odds</i>	<i>Log-Odds</i>	<i>Log-Odds</i>
(Intercept)	-2.01***	-1.52***	-2.21***	-2.15***
2014 (ref 2010)	0.15***	0.15***	0.12**	0.08
2018	-0.10*	-0.10*	-0.17***	-0.31***
Market-rate tenant (ref: mortgaged homeowner)	1.13***	1.04***	0.82***	0.64***
Outright owner	-0.82***	-0.86***	-0.95***	-0.95***
Rent free	-0.60***	-0.74***	-1.04***	-1.03***
Reduced-rate tenant	0.81***	0.67***	0.45***	0.44***
Market-rate tenant*2014				0.14***
Market-rate tenant*2018				0.47***
Observations	1,160,581	1,123,082	1,114,515	1,114,515
Marginal R <sup>2</sup> /Conditional R <sup>2</sup>	0.126/ 0.206	0.135/ 0.207	0.204/ 0.315	0.206/ 0.315
AIC	822,614	717,590	678,077	677,567

\**p* < 0.1; \*\**p* < 0.05; \*\*\**p* < 0.01.

Note: All models are run on data using twenty-seven countries (level 3) and nine years (level 2). Period dummies for each year included in the models but, aside from 2014 and 2018, are suppressed here.

**Table 3.** Macro-level determinants of housing cost overburden

Predictors	M0 Null	M1 Wealth	M2 Poverty	M3 Housing system	M4 Housing Allowance	M5 Rent Regulation	M6 Econ	M7 Housing	M8 Econ + Housing	M9 Econ + Housing + Rentreg
	Log-Odds	Log-Odds	Log-Odds	Log-Odds	Log-Odds	Log-Odds	Log-Odds	Log-Odds	Log-Odds	Log-Odds
(Intercept)	-1.15***	-1.12***	-1.15***	-1.14***	-1.14***	-1.24***	-1.14***	-1.14***	-1.14***	-1.18***
Log GDP – BW		-0.89***					-0.77***		-0.69***	-0.31
Log GDP – WI		-1.68***					-1.42***		-1.61***	-1.68***
AROP – BW			0.13***				0.09**		0.08**	0.08***
AROP – WI			0.10***				0.09***		0.10***	0.09***
Res Loans to GDP – BW				0.01						
Res Loans to GDP – WI				0.01**				0.01**	-0.01	
% mortgaged owners – BW				-0.04**				-0.02*	0.01	
% mortgaged owners – WI				-0.02**				-0.02**	0.01	
Housing allowances – BW					-0.06***			-0.04**	-0.03*	-0.03**
Housing allowances – WI					0.00					
Rent regulation – BW						-0.02**				-0.01**
Random Effects										
$\tau_{11}$	0.42	0.42	0.43	0.42	0.42	0.47	0.43	0.42	0.43	0.41
ICC	0.20	0.13	0.16	0.15	0.14	0.18	0.11	0.13	0.11	0.10
Countries	27	27	27	27	27	23	27	27	27	23
Years	9	9	9	9	9	9	9	9	9	9
Observations	1,107,138	1,107,138	1,107,138	1,107,138	1,107,138	958,801	1,107,138	1,107,138	1,107,138	958,801
AIC	753,899	753,847	753,848	753,890	753,890	734,984	753,804	753,885	753,806	734,893
log-Likelihood	-376,923	-376,895	-376,895	-376,914	-376,916	-367,463	-376,871	-376,911	-376,868	-367,413

\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Note: BW = between effect, WI = within effect. Models also control for ‘micro’ characteristics as in Table 1, Model 3b.

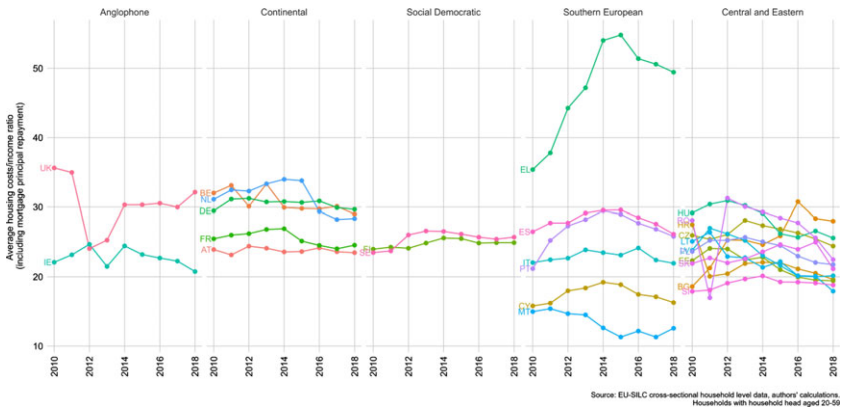


Figure 1. Average housing cost burdens in Europe over time.

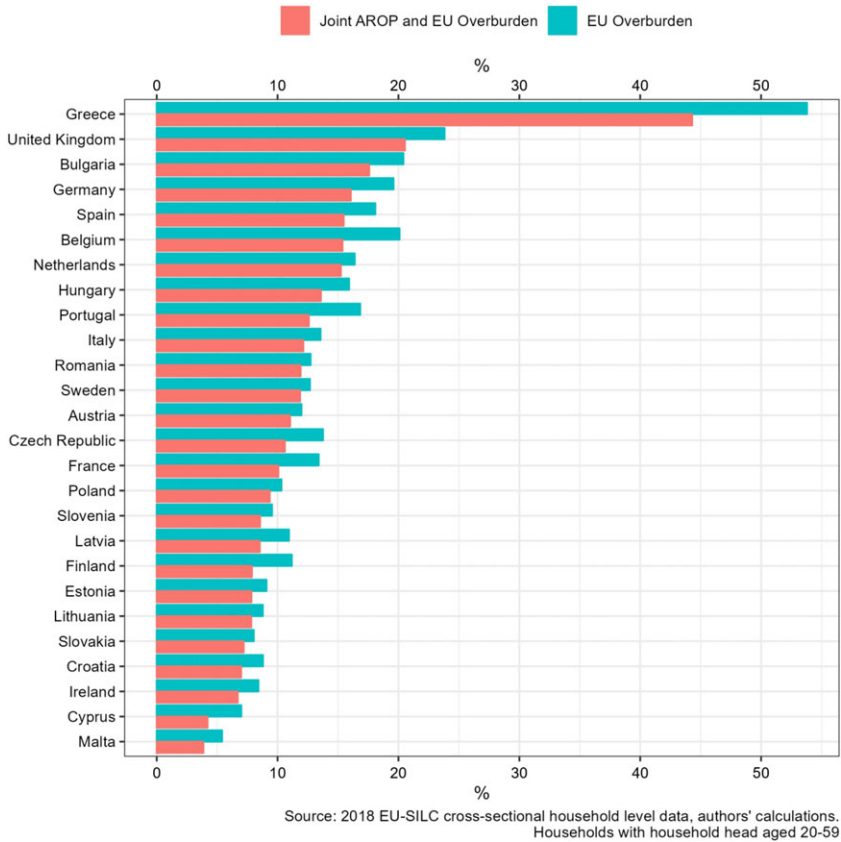


Figure 2. Comparison of country-level incidence of EU housing cost overburden and High-Cost Low-Income measures, 2018.

across countries, and that the country-rankings on these two measures do not differ substantially. Thus, our two measures do not tell very different stories when it comes to the countries with the highest rates of housing affordability problems.

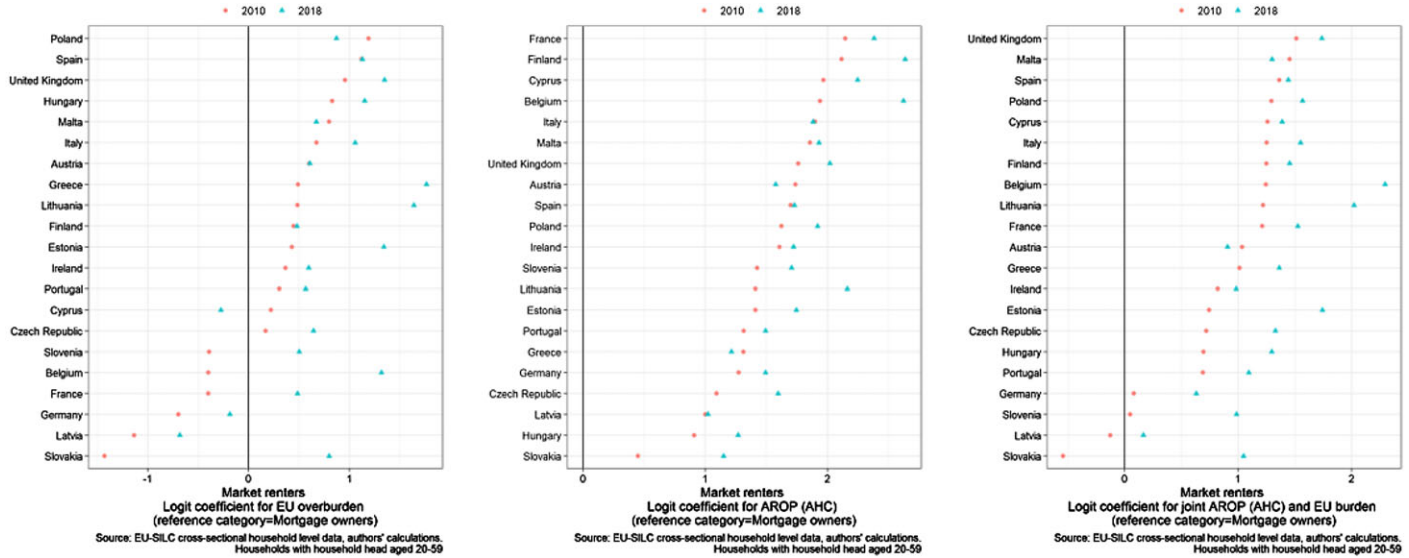
Aggregate trends may hide diverging trajectories for different groups, however. In further analysis, we find that these measures do have different tenure compositions (see Figure 2.1 in the Supplementary Material file). That is, the overlap between these two measures is *very* high for outright owners, and for reduced rate and to a lesser extent market renters, but it is considerably lower for mortgaged homeowners.<sup>5</sup> Thus, a relatively modest aggregate difference in the incidence of these measures can be associated with important differences in tenure composition. That is, a substantial number of mortgaged homeowners who are cost overburdened do not also experience poverty, and the overlap between these measures varies across countries (see supplementary analyses Figure 2.1; the different tenure composition of these measures is also evident from Figure 3).

Figure 3 presents a comparison of tenure groups in three panels for twenty-one European nations – we omit nations with very small private rented sectors (Bulgaria, Croatia, Romania), where SILC does not successfully distinguish between market and non-market renting (Netherlands and Sweden) and where mortgage data for 2018 appears questionable (Luxembourg).

The left panel relates to the EU housing cost overburden measure; the middle panel captures the After Housing Cost measure of poverty (AROP-AHC); and the right-hand panel captures the intersection – both housing cost overburdened (on the EU measure) and also income poor, our High-Cost Low-Income measure. The red dots represent the relative differences (expressed in log odds) between market renters and mortgaged homeowners in 2010; the turquoise triangles relate to the estimate for 2018, and we present these estimates separately for each country. Looking at the left-hand panel (EU housing cost overburden) we can see first that the red dots are, in most cases, to the right of the vertical line, indicating that market renters have higher odds of cost overburden than mortgaged homeowners in most countries. But there are exceptions: in six countries, market renters have lower odds of housing cost overburden than mortgaged homeowners. Looking then at the turquoise triangles, we see that in most countries, the relative position of market renters has deteriorated between the years 2010 and 2018. In the middle panel, focussing on AHC poverty, we see now that the relative risk of market renters being poor is much greater than mortgaged homeowners (i.e. values are more strongly positive than on the cost overburden measure) and there is some increase over time, albeit with less intensity than is observed in the first panel. We also observe a deterioration in the position of market renters in our right-hand panel, capturing the High-Cost Low-Income model. Thus, in terms of *both* housing cost burdens and low incomes, the position of market renters has deteriorated relative to mortgaged homeowners over the period 2010–2018.

### **Micro analysis: socio-economic characteristics and housing affordability problems**

In this section, we examine the risk of experiencing housing affordability problems for different groups. In Table 1, we present micro-level estimates from a series of multi-level logistic regression models. These models estimate the incidence of EU



**Figure 3.** The deterioration in the position of market renters relative to mortgaged homeowners, three measures.

*Note:* The figure shows that the risk of cost overburden (left panel), the risk of poverty (middle panel) and a High-Cost Low-Income measure of housing affordability (right panel) have each deteriorated for market renters compared with mortgaged homeowners between 2010 and 2018.



housing cost overburden for a variety of socio-economic groups, while controlling for a range of compositional factors and adjusting for country differences via the estimation of country-level random intercepts. Informed by the preceding analysis, we are particularly interested in tenure differences in the likelihood of experiencing housing cost overburden and the extent to which these are moderated by other socio-economic factors.

The models presented in Table 1 proceed in stepwise fashion. In Model 1 we include only tenure and period dummies. In Model 2 we include other dwelling characteristics (type of dwelling, the number of rooms, and the location of the dwelling). Model 3 introduces household characteristics (household composition and size, citizenship status, and age of the household head). Model 3b is the same as Model 3 but includes a time-tenure dummy, to see if the effect of being a market-rate tenant changes over time after controlling for the compositional differences contained in Model 3. Model 4 also controls for income deciles.

We can see in Table 1 that, controlling only for the period dummies, market-rate tenants have a significantly higher log-odds of housing cost overburden than mortgaged homeowners – and this is so even considering the mortgage principal of the latter. Reduced-rate tenants have marginally higher risk of overburden on the EU measure compared to mortgaged homeowners. The period dummies show that the risk of housing cost overburden rises modestly by 2014, only to fall by 2018.

When we introduce other dwelling characteristics in Model 2, we find that housing cost overburden is associated with respondents living in detached houses and in smaller dwellings. Once we control for these characteristics, we find that the difference in risk for both market and reduced rent tenants reduces relative to mortgaged homeowners, becoming negative in the case of reduced-rate tenants.

In Model 3, we introduce household characteristics. Here, we find that housing cost overburden is associated with smaller family types and with migrant status, and also with households with a younger head. Controlling for these variables again moderates the rental effect – market-rate renters are now only marginally more likely to experience housing cost overburden, while reduced-rate renters are now substantially less likely than mortgaged homeowners to experience cost overburden. In Model 3b, we include a time-tenure interaction, which tests our descriptive finding that the position of market-rate renters in relation to housing affordability is deteriorating vis-à-vis mortgaged homeowners. We find that there is a statistically significant interaction between market-rate tenants and time, with effect sizes increasing throughout the period, even after controlling for the characteristics contained in Model 3.

In Model 4, we control for income decile. This model shows that housing cost overburden is significantly associated with low income (and especially with an income in the lowest income decile). Controlling for household income also changes the other coefficients in important ways and requires careful interpretation. Once we control for household income, the log-odds for the two rental groups reduce significantly (to  $-1.35$  for market-rate renters and  $-1.78$  for reduced-rate renters). That the effects for each of the tenure groups becomes significantly more negative on controlling for income decile<sup>6</sup> suggests that some mortgaged homeowners are classified as experiencing housing cost overburden on the EU measure are choosing to spend in excess of the 40 per cent threshold.

The coefficients for number of rooms also becomes more sharply positive – that is, strengthening the association between housing cost overburden is associated with *larger* dwellings. This is consistent with there being some investment component to housing cost ratios.

In sum, this analysis shows that renters fare worse than owners, but that their elevated rates of housing cost overburden are substantially explained by dwelling and, especially, socio-demographic characteristics. Once we consider their economic position, as captured by income quintiles, we see that renters are *less* likely to experience housing cost overburden, and this appears to be because owners are more likely to be ‘overspenders’, consistent with concern about ‘ratio’ measures of housing affordability (see above; for related findings, see Nieuwenhuis & Zigel, 2023, p. 197). In Table 2 we present model coefficients for the tenure variable only drawn from an equivalent model where the dependent variable is the High-Cost Low-Income measure of housing affordability. We show only the coefficients for tenure so as to concentrate attention here; the controls added in each model are identical to those contained in Table 1 and the values for these coefficients are quite similar (the full model appears as Table 1.1 in the Supplementary Material file).<sup>7</sup> On this poverty-sensitive measure of housing affordability problems, we find that both rental categories have risks of affordability problems that are *substantially* greater than when we rely on the ratio measure (consistent with the descriptive finding in Figure 3) and that this elevated risk, while attenuated, is not fully explained by reference to dwelling or household characteristics, contrary to what we find in relation to the official EU housing cost overburden measure. A time-tenure interaction continues to be observed.

Our micro analysis serves to demonstrate that the relative deterioration of the position of market renters vis-à-vis mortgaged homeowners is not explained by compositional differences and is observed in relation to both our ratio and hybrid measures of housing affordability.

### **Macro analysis: explaining country differences in housing affordability problems**

Are variations in housing affordability best explained by housing-specific or economic explanations, and which aspects of these explanatory factors are most salient? In Table 3, we present coefficients for country-level variables drawn from a series of multi-level logistic regression models. These models also control for the micro-level independent variables as are contained in Table 1, Model 3b, but the time-tenure interaction is included as a random slope. These random intercepts must reflect particular reference households and, given the descriptive results above, we select market-rate tenants (as well as the reference categories for the other variables in Table 1) as the reference household. We estimate between and within country coefficients to examine the significance of difference in average values between countries (‘between’) and change in values between 2010 and 2018 (‘within’) in relation to variables contained in the macro analysis in explaining country-level differences in housing affordability problems.

To examine the significance of both economic and housing-specific determinants of housing affordability, we analyse six variables: average wealth (log of GDP per capita); the relative income poverty rate (AROP, measured Before Housing Costs);

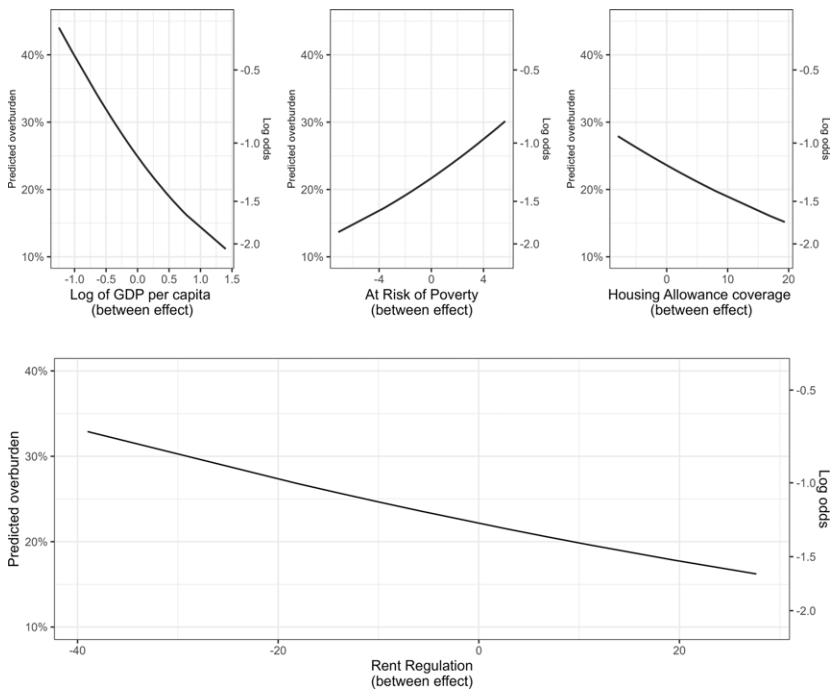
total residential loans to GDP; the proportion of households that are occupied on a mortgaged ownership basis; housing allowance coverage; and rent regulation stringency.<sup>8</sup> Since we include AROP as one of our country-level variables, we conduct this analysis on the EU housing cost overburden measure only. Given the relatively limited degrees of freedom in our country-level models (we discuss this limitation in Hick *et al.*, 2022b, p. 1291), we examine these variables first in separate blocks and work towards their joint analysis. Descriptive statistics for these macro-level variables are included in Table A2 in the Supplementary Material file.

In Models 1 to 5, we examine the effects of wealth, poverty, housing systems, housing allowances, and rent regulation, respectively. Individually, each of the variables of interest is statistically significant, though not always for both the between and within coefficients (see the between coefficient for Total Residential Loans to GDP and the within coefficient for housing allowance coverage). The coefficients are mostly in the expected direction, though higher rates of mortgaged homeownership are associated with *lower* housing affordability problems, contrary to what we might expect. In terms of the model fit statistics (the log likelihood and AIC),<sup>9</sup> the model with rent regulation (M5) is the best fitting, though this model has four fewer country-cases and is thus not comparable with the other models. Of those models for which we have full data, Models 1 and 2 (wealth and poverty) provide a better fit than either Models 3 and 4, focussing on housing systems and housing allowance coverage, respectively.

We then begin to amalgamate some of these clusters where effects are significant in the individual models. In Model 6, we test our economic variables (wealth and poverty) jointly. This serves to moderate the effect sizes, though all coefficients remain statistically significant, and this is a better fitting model than either of the previous two economic models (i.e. Models 1 and 2). We then combine the previously significant housing variables (besides rent regulation, for now, for the reasons discussed) in Model 7. Again, some of these effects attenuate somewhat but remain statistically significant. This joint housing model does not provide a substantially better fit than the housing system or housing allowance models individually, however (see AIC and log likelihood figures).

In Model 8, we combine economic and housing explanations. In this model, the economic effects remain rather similar but three of the housing coefficients, relating to tenure composition and financialisation, change signs and lose significance. This model clearly fits better than the housing model (Model 7), but it is not obviously preferable to the economic model (Model 6). Overall, this final model demonstrates the importance of the economic variables with, of the housing variables, housing allowance coverage being the sole variable retaining statistical significance. Finally, Model 9 retains the significant effects from Model 8 but includes rent regulation, which results in the loss of four country-cases. In most cases the coefficients remain similar – the exception is the between effect of log GDP, which halves in size.<sup>10</sup> Stronger rent regulation is also shown to be associated with lower housing affordability problems. In terms of minimising AIC, Models 8 and 9 are the best-fitting, combining explanatory power and parsimony.

A series of alternative models were also estimated as tests of sensitivity. First, we ran the final models with a set of period dummies. Second, we tested models with a housing allowance generosity measure and one that captured the product of



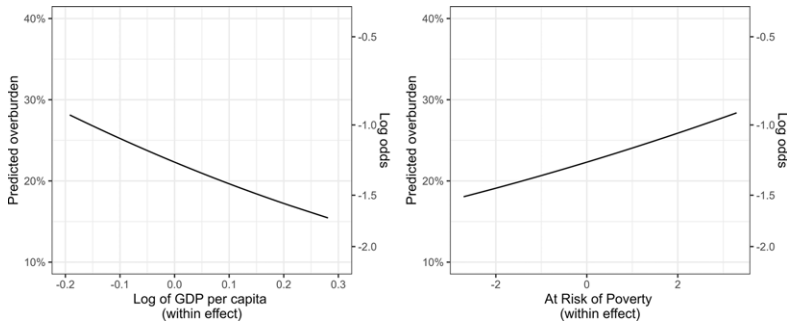
**Figure 4.** Predicted probabilities for significant macro effects – between effects.

*Note:* All figures show the predicted changes in the probability of housing cost overburden (y-axis) as a function of the main macro-level variables (x-axis), expressed as deviation from the mean (where 0 is the average across countries). For example, the top-right figure shows how the predicted level of housing cost overburden is lower in countries with higher housing allowance coverage.

coverage and generosity. Third, we considered social expenditure as a proportion of GDP as a more general measure of welfare state generosity in addition to the domain measure of housing allowance coverage. In each case, these variables had little explanatory power or resulted in worse-fitting statistical models. Finally, and mindful that the random intercept model models probability of cost overburden for households with the joint product of reference categories, we re-ran the macro-level analysis but select mortgaged homeowners rather than market-rate renters as our reference category to compute the random intercepts. The results were very similar to those in the main analysis.

To better understand which factors are most important in explaining country-level differences in housing affordability, in Figures 4 and 5 we plot predicted probabilities from Model 8 for the between and within effects of these macro-level variables respectively across their observed range.<sup>11</sup> The charts hold all other micro variables at their reference category and the macro variables at their mean.

In terms of the between effects (Figure 4), we see that the strongest effect is for GDP per capita, where moving from the lowest to highest value is associated with a more than thirty percentage point difference in the incidence of cost overburden. Moving across observed range of the at-risk-of-poverty rate and rent regulation is also associated with more than fifteen percentage point difference in the incidence



**Figure 5.** Predicted probabilities for significant macro effects – within effects.

*Note:* The figures show the predicted changes in the probability of housing cost overburden (y-axis) as a function of the change in the main macro-level variables over time (x-axis), expressed as deviation from the country mean (where 0 is the country mean). For example, the figure on the right shows within-country increases in the at-risk-of-poverty rate over the period we examine here are associated with within-country increases in rates of housing cost overburden.

of cost overburden, while housing allowance coverage also exhibits a strong effect, from almost 30 per cent cost overburdened where coverage is entirely absent, to 15 per cent where coverage is at the maximum amongst the countries considered here.

The within effects are shown in Figure 5. The within effect for GDP per capita is strong, with a move from the average (zero) to the maximum value (0.3) associated with a reduction of the risk of cost overburden of about seven percentage points. The effect for at-risk-of-poverty is slightly more moderate, with an increase of about three percentage points (from the mean to maximum value) in the risk-of-poverty rate associated with an increase in cost overburden by about six percentage points.

This macro-level analysis produces three main findings. First, both economic and housing variables contribute to the explanation of country-level differences in housing cost overburden. GDP per capita and the at-risk-of-poverty rate are significant predictors of cost overburden both between nations and within nations over time, while the housing allowance coverage rate and rent regulation stringency are significant predictors of the rate of such problems between nations. Second, of these two types of predictors, economic variables tend to predict cost overburden more strongly than the housing-specific variables – we can see this in terms of the balance of significant predictors and the extent to which these survive mediation, the strength of the observed effects, and in the model fit statistics. Third, of the housing variables, policy variables appear more useful than ‘system’ variables in accounting for differences in housing affordability problems. In particular, the extent of housing market financialisation between countries is not a significant predictor of cost overburden even when no other aggregate variable is controlled for, and the within effect for this variable and the effect for the proportion of households who are mortgaged homeowners are significant only until we control for the economic effects.

## Conclusions

Claims of a ‘housing crisis’ in European societies and beyond often revolve around concerns about the affordability of housing, with recent Housing Europe (2022) and

OECD (2021) reports pointing to deteriorating housing affordability in industrialised nations. Our findings paint a rather different picture and there is value, we believe, in considering the problem of housing affordability in relation to different measures, trends, tenures, and patterns across countries.

First, we have examined trends and incidence in housing affordability problems using two measures of this problem – the first, a ratio measure identifying households who spend in excess of 40 per cent of their disposable income on housing as cost overburdened; the second, those who spend in excess of this ratio *and* fall below an after housing costs poverty line. We find that a high proportion of those experiencing housing cost overburden on the EU's measure are below the AHC poverty line, suggesting that at least some of the criticism of expenditure ratios risks going too far. This was apparent when we compared country performances, where the rankings between countries do not change substantially depending on which measure of affordability we use. Within countries, the covariates explaining affordability do not differ substantially either in most cases. The one major exception to this is for housing tenure: renters are substantially more likely to experience affordability problems on the High-Cost Low-Income measure than they are on the ratio one. These conclusions can be reconciled because the overwhelming proportion of those who spend at high ratios but are not poor are mortgaged homeowners.

Second, we observe, contrary to some of the claims made in recent literature, that average affordability ratios have been reasonably stable over the period 2010 to 2018 and do not show signs of deterioration in most countries. Importantly, this conclusion is robust to the selection of alternative measures of affordability, including those that focus attention solely on low-income households. There are of course exceptions (most notably Greece and Bulgaria) and when we omit mortgage principal payments and extend the observation window back to 2005, we observe reasonably widespread deterioration in affordability ratios in the years leading up to the Global Financial Crisis. Nonetheless, while house prices have risen in most parts of Europe since around 2013 (Hick *et al.*, 2022a), there has *not* been a deterioration in housing affordability as it relates to ongoing costs and household incomes at the aggregate level. This is a significant finding. Possible reasons for this apparently counter-intuitive finding are: (a) that tenure aggregates mask pockets of deteriorating affordability – for instance, in relation to renters in new tenancies or recent homeowners. Sample sizes make this kind of analysis using SILC challenging, but our exploratory analysis (not shown here) suggests that this is not a major factor in most countries; (b) that the emphasis on *household* income as the denominator makes housing affordability more sensitive to the number of workers in the household than to pay rates (also a finding of the in-work poverty literature, see Hick and Lanau, 2018), or (c) that the primary manifestation of deteriorating affordability is constrained mobility and/or access (e.g. young people living with parents for longer, more sharing of accommodation, reductions in homeownership, etc). In our wider work, we find evidence of delays in young people living independently occurring over the period in question (Hick *et al.*, 2022a, pp. 20–21). Each of these potential explanations represent important avenues for future work.



Third, our findings also point to important tenure differences in relation to housing affordability problems and how these are evolving. While tenure is sometimes argued to receive too much emphasis as a variable in housing studies (e.g. Zhang, 2023), we show that in most countries market renters have elevated risks of housing affordability problems vis-à-vis mortgaged homeowners. Moreover, over the period considered here, we see a relative deterioration in the position of renters compared to mortgaged owners almost everywhere, and this is not accounted for by social or demographic compositional factors. Thus, not only is tenure an important variable in housing research, but it would appear to have become *more* important in European societies in the last decade.

Fourth, and finally, we show that there are both economic as well as housing-specific determinants of rates of housing cost overburden. We find that GDP per capita and the at-risk-of-poverty rate are associated with housing affordability problems both between countries as well as within countries over time, while housing allowance coverage and rent regulation stringency are associated with affordability problems between countries. With a relatively small number of countries, some caution in interpreting macro-level findings is needed (see also Hick *et al.*, 2022b). Nonetheless, our findings suggest that economic variables are particularly important predictors of cost overburden and that these dominate housing-specific variables. Moreover, of the housing-specific variables that we examine, policy variables are better predictors than those capturing the housing 'system'.

What are the implications of our research for policy and for research? For policy, evidence of a deteriorating relative position of market renters in many countries, when combined with falling homeownership amongst low-income households, gives rise to concern about housing tenure as becoming an increasingly important social division requiring direct policy attention. This might come about through more stringent rent regulation or by increasing housing allowances, or by increasing housing supply, especially of reduced rent and affordable homes, in an attempt to depress costs. In terms of research, our findings call into question the ability of a leading theoretical account – namely, that of housing market financialisation – to explain between-country differences in housing affordability for market renters. Housing market financialisation is a concept that can be understood in different ways, and we concede that alternative operationalisations of this concept may yield different results. But our study has relied on perhaps the primary measure of housing market financialisation, and our findings do suggest a need for further work in two areas: first, exploring whether accounts of housing market financialisation might be defined and measured in different ways that might more successfully predict differences in housing outcomes (see also Hick and Stephens, 2023); second, and conversely, to search for alternative explanations for affordability differences between countries, especially those that relate to the operation of housing policies, so as to further increase our confidence about the relative importance of housing-specific and economic determinants of affordability problems, and to provide better guidance for policy in this area.

**Supplementary material.** For supplementary material accompanying this paper visit <https://doi.org/10.1017/S0047279423000703>

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**Data availability statement.** This paper is based on an analysis of EU Statistics on Income and Living Conditions microdata 2004–2018, release 2 in 2020. Information about this data release can be found at <https://ec.europa.eu/eurostat/documents/203647/203704/EU+SILC+DOI+2020v2.pdf>. These data are held by Eurostat. Data are made available for scientific purposes only to researchers working at a recognised research entity. To apply for access to the microdata, please see the following file: [https://ec.europa.eu/eurostat/documents/203647/771732/How\\_to\\_apply\\_for\\_microdata\\_access.pdf](https://ec.europa.eu/eurostat/documents/203647/771732/How_to_apply_for_microdata_access.pdf).

**Competing interests.** The authors declare none.

## Notes

- 1 A 20-item composite measure of material deprivation and housing deprivation items.
- 2 [www.remain-data.org](http://www.remain-data.org)
- 3 We multiply this scale by 100 so that the coefficients are easier to interpret.
- 4 This figure includes mortgage principal payments, which means that our observation window extends back only as far as 2010, but we have also produced analysis excluding mortgage principal payments and including data from 2005. The trends do not differ substantially in the period 2010–2018, but they do provide evidence of rising housing cost burdens in years before the Global Financial Crisis in some countries (see Figure 1.1 in the Supplementary Material file).
- 5 The proportion of market-rate tenants experiencing housing cost overburden who *also* experience poverty after housing costs is high in all countries bar Romania (in excess of 90 per cent in many cases), whereas the proportion of overburdened homeowners experiencing AHC poverty is both much lower and highly variable (ranging between 25 per cent and 75 per cent).
- 6 Additional analysis not shown here shows that this is the case even if we fit Model 4 without a time-tenure interaction effect.
- 7 There is no Model 4 since household income is included in the dependent variable.
- 8 In preparing these models we also analysed the relationship between a second measure of poverty – the material deprivation rate. This displayed high levels of correlation with GDP per capita for both the between *and* within measures, so we decided not to include it in the main analysis due to this collinearity.
- 9 Lower values of AIC and higher values of log likelihood signify better fitting models.
- 10 In further analysis, we find that this reduction occurs primarily due to the loss of four country-cases, and that controlling for rent regulation is only a secondary factor.
- 11 We are interested in the conditional relationship of these variables so plot these estimates based on our final model. We select Model 8 as the final model because we do not want to lose four country-cases by including rent regulation, as we subsequently do in Model 9. The plot for rent regulation only comes is based on Model 9.

## References

- Aalbers, M. B. (2017). *The financialisation of housing: A political economy approach*. Abingdon: Routledge.
- Alcántara, A. L., & Vogel, C. (2021). Rising housing costs and income poverty among the elderly in Germany. *Housing Studies*, 1–19.
- Borg, I., & Guio, A.-C. (2021). Improving our knowledge of housing conditions at EU level. In A.-C. Guio, E. Marlier, & B. Nolan (Eds.), *Improving the understanding of poverty and social exclusion in Europe*, Luxembourg: Publications Office of the European Union.

- Deidda, M.** (2015). Economic hardship, housing cost burden and tenure status: Evidence from EU-SILC. *Journal of Family and Economic Issues*, **36**, 531–556.
- Dewilde, C.** (2018). Explaining the declined affordability of housing for low-income private renters across Western Europe. *Urban Studies*, **55**(12), 2618–2639.
- Dewilde, C.** (2022). How housing affects the association between low income and living conditions-deprivation across Europe. *Socio-Economic Review*, **20**(1), 373–400.
- Dewilde, C., & De Decker, P.** (2016). Changing inequalities in housing outcomes across Western Europe. *Housing, Theory and Society*, **33**(2), 121–161.
- Dewilde, C., & Haffner, M.** (2022). Long-Term developments in housing policy and research. In K. Nelson, R. Nieuwenhuis, & M.A. Yerkes (Eds.), *Social Policy in Changing European Societies: Research Agendas for the 21st Century* (pp. 66–84), Cheltenham: Edward Elgar.
- European Mortgage Federation** (2021). *Hypostat2021: A review of Europe's mortgage and housing markets*. [https://hypo.org/app/uploads/sites/2/2021/11/HYPOSTAT-2021\\_vdef.pdf](https://hypo.org/app/uploads/sites/2/2021/11/HYPOSTAT-2021_vdef.pdf)
- Housing Europe** (2022). *The state of housing in Europe 2022 mid-term update*. <https://www.housingeurope.eu/resource-1705/the-state-of-housing-in-europe-2022> (accessed 9 November 2022).
- Fairbrother, M.** (2014). Two multilevel modeling techniques for analyzing comparative longitudinal survey datasets. *Political Science Research and Methods*, **2**(1), 119–140.
- Gabor, D., & Kohl, S.** (2022). *The financialisation of housing in Europe: 'My home is an asset class'*. Brussels: The Greens/EFA.
- Griggs, J., & Kemp, P. A.** (2012). Housing allowances as income support: comparing European welfare regimes. *International Journal of Housing Policy*, **12**(4), 391–412.
- Hearn, R.** (2020). *Housing shock: The Irish housing crisis and how to solve it*. Bristol: Policy Press.
- Hegedüs, J., & Horváth, V.** (2015). *Housing in Europe', housing review 2015: affordability, sustainability, livability, habitat for humanity*. [https://www.researchgate.net/profile/Jozsef\\_Hegedues/publication/320107594\\_Housing\\_in\\_Europe/links/59ce66590f7e9b4fd7e1b527/Housing-in-Europe.pdf](https://www.researchgate.net/profile/Jozsef_Hegedues/publication/320107594_Housing_in_Europe/links/59ce66590f7e9b4fd7e1b527/Housing-in-Europe.pdf)
- Heisig, J. P., & Schaeffer, M.** (2019). Why you should always include a random slope for the lower-level variable involved in a cross-level interaction. *European Sociological Review*, **35**, 258–279.
- Heisig, J. P., Schaeffer, M., & Giesecke, J.** (2017). The costs of simplicity: Why multilevel models may benefit from accounting for cross-cluster differences in the effects of controls. *American Sociological Review*, **82**, 796–827.
- Hick, R., & Lanau, A.** (2018). Moving in and out of in-work poverty in the UK: An analysis of transitions, trajectories and trigger events. *Journal of Social Policy*, **47**(4), 661–682.
- Hick, R., Pomati, M., & Stephens, M.** (2022a). *Housing and poverty in Europe: Examining the interconnections in the face of rising house prices*. Cardiff: Cardiff University.
- Hick, R., Pomati, M., & Stephens, M.** (2022b). Severe housing deprivation in the European Union: A joint analysis of measurement and theory. *Social Indicators Research*, **164**, 1271–1295.
- Hick, R., & Stephens, M.** (2023). Housing, the welfare state and poverty: On the financialization of housing and the dependent variable problem. *Housing, Theory and Society*, **40**(1), 78–95.
- Inchauste, G., Karver, J., Kim, Y. S., & Jelil, M. A.** (2018). *Living and leaving: Housing, mobility and welfare in the European Union*. Washington, D.C.: The World Bank.
- Kelly, J., Kennedy, G., & Lambert, D.** (2021). *The cost of housing and indebtedness across European and OECD households*. Central Bank of Ireland Financial Stability Notes No. 10, Dublin: Central Bank of Ireland.
- Kemeny, J.** (1992). *Housing and Social Theory*. Abington: Routledge.
- Kemeny, J.** (1995). *From public housing to the social market: Rental policy strategies in comparative perspective*. Abington: Routledge.
- Kemp, P. A.** (2015). Private renting after the global financial crisis. *Housing Studies*, **30**(4), 601–620.
- Kholodilin, K., Weber, J. P., & Sebastian, S.** (2018). *Rental market regulation over the last 100 years in an international comparison*. DIW Weekly report, Berlin.
- Kholodilin, K. A., Kohl, S., & Müller, F.** (2022). The rise and fall of social housing? Housing decommodification in long-run comparison. *Journal of Social Policy*, 1–27.
- Madden, D., & Marcuse, P.** (2016). *In defense of housing*. London: Verso Books.
- Meen, G., & Whitehead, C.** (2020). *Understanding affordability: The economics of housing markets*. Bristol: Bristol University Press.

- Nelson, K., Borg, I., Nieuwenhuis, R., & Alm, S.** (2023). The political determinants of housing benefits. *European Sociological Review*, *39*(1), 104–117.
- Nieuwenhuis, R., & Zagel, H.** (2023). Housing conditions of single mothers in Europe: the role of housing policies. *European Societies*, *25*(2), 181–207.
- OECD** (2021). Building for a better tomorrow: Policies to make housing more affordable. In *Employment, labour and social affairs policy briefs*, Paris: OECD.
- Pawson, H., Milligan, V., & Yates, J.** (2020). *Housing policy in Australia: A case for system reform*. Singapore: Palgrave Macmillan.
- Pittini, A.** (2012). *Housing affordability in the EU: Current situation and recent trends*. CECODHAS European Social Housing Observatory.
- Saunders, P.** (2017). Housing costs, poverty and inequality in Australia. *Housing Studies*, *32*(6), 742–757.
- Saunders, P., Naidoo, Y., & Wong, M.** (2022). The crumbling pillar: Assessing the impact of housing costs on recent trends in poverty and deprivation in Australia. *International Journal of Social Welfare*, *31*(4), 421–432.
- Schwartz, H., & Seabrooke, L.** (2008). Varieties of residential capitalism in the international political economy: Old welfare states and the new politics of housing. *Comparative European Politics*, *6*, 237–261.
- Stephens, M.** (2020). How housing systems are changing and why: A critique of Kemeny's theory of housing regimes. *Housing, Theory and Society*, *37*(5), 521–547.
- Stephens, M., & Hick, R.** (2024). Comparative housing research. In K. Jacobs, K. Flanagan, J. de Vries, & E. MacDonald (Eds.), *Research handbook on housing, the home and society*, Cheltenham, Edward Elgar.
- Stone, M. E.** (2006). What is housing affordability? The case for the residual income approach. *Housing Policy Debate*, *17*(1), 151–184.
- Te Grotenhuis, M., Scholte, M., De Graaf, N. D., & Pelzer, B.** (2015). The between and within effects of social security on church attendance in Europe 1980–1998: The danger of testing hypotheses cross-nationally. *European Sociological Review*, *31*(5), 643–654.
- Weber, J. P.** (2017). *The regulation of private tenancies – A multi-country analysis*. Regensburg: University of Regensburg.
- Zhang, B.** (2023). Re-conceptualising housing tenure beyond the owner-renting dichotomy: insights from housing and financialisation. *Housing Studies*, *38*(8), 1512–1535.