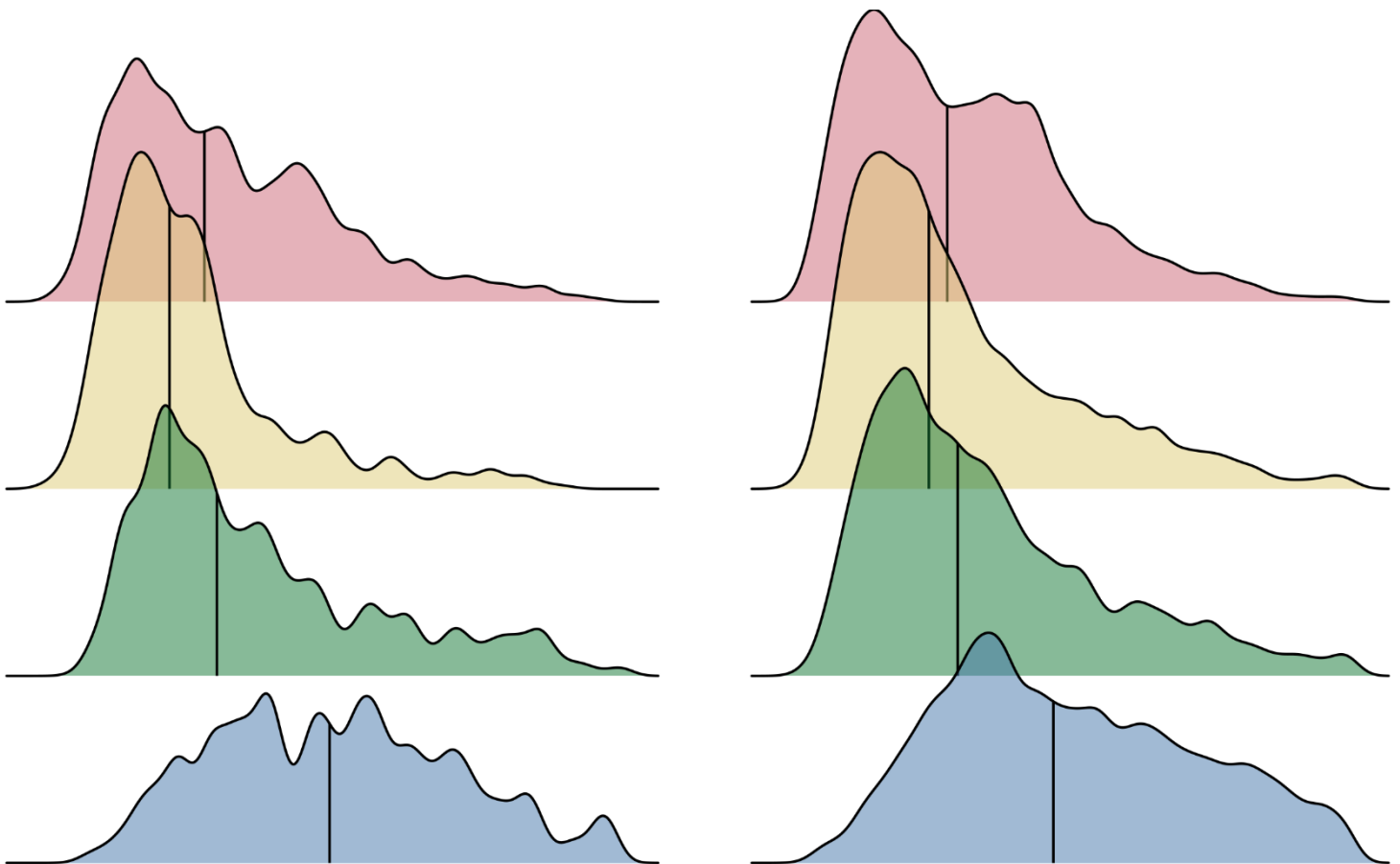


Housing Research Note 6

An analysis of housing floorspace per person



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1. Introduction

- 1.1 This report examines patterns and trends over time in housing floorspace in London and England, as well as making some indicative comparisons between countries and between London boroughs. It focuses on the measurement of floorspace *per person*, calculated as the average space (in square metres) per occupied dwelling divided by the average number of people per household.

2. Summary

- This report uses national survey data to track the floorspace per dwelling and per person over time in London and England between 1996 and 2018, including comparing different sub-groups of the population.
- Floorspace per person is measured as the average space per occupied dwelling divided by the average household size.
- As of 2018 the average floorspace per dwelling was 90.4m² across England as a whole and 80.7m² in London.
- Between 1996 and 2018 floorspace per person rose from 34.8m² to 38.1m² in England and from 31.4m² to 32.6m² in London, with very little change in the last decade.
- Over this period the average floorspace per person fell for households in the private rented sector and rose for owner occupiers, while remaining fairly steady for social housing tenants.
- Most of the increase in floorspace per person since 1996 accrued to households headed by someone aged 65 or over, while younger households saw little or no change on average.
- There are signs of convergence in the average space per person available to households headed by people of White and other ethnicities, but important differences within these two very broad categories.
- Within London there are very large differences between floorspace per person in London boroughs, driven as much by variation in average household sizes as in dwelling sizes.
- Since the 1990s, growth in floorspace per person in England has lagged behind France, Germany and Japan. Average dwelling sizes are fairly similar among the four countries, but England has larger households on average.
- The relatively slow growth in floorspace per person in England and particularly in London is consistent with evidence of a shortfall in the availability and affordability of housing to accommodate new households, with renters and younger households most affected.
- As the latest data analysed is for 2018, the results presented here do not take account of any impacts arising from the Coronavirus pandemic.

3. Why analyse floorspace?

- 3.1 A key reason to study the evolution of housing floorspace over time is that it provides an alternative to measuring housing supply or availability based on the number of dwellings. Simply counting dwellings does not take account of the fact that they vary widely across many characteristics, notably in their size. Households are typically willing to pay more for larger dwellings, and they can comfortably accommodate more people than smaller ones. A floorspace-based measure can also capture the effect of extensions to the existing housing stock, which can increase the aggregate supply of housing without affecting the number of dwellings.

- 3.2 The size of homes has also become a topic of both popular and political debates in the UK in recent years¹, with space standards being introduced for new homes on a mandatory basis in London. High rates of overcrowding in social rented and private rented housing in London and other urban areas are also a significant concern, and have been highlighted as potentially contributing to the transmission of Coronavirus and other diseases.
- 3.3 However, extra floorspace is not always unambiguously positive, since larger homes cost more to buy or rent, and to heat. A large home in an expensive area may also not make good use of valuable land compared to two or more smaller ones.

4. Data and methods

Data

- 4.1 The majority of the analysis in this report is based on data from the English Housing Survey and its predecessor the English House Condition Survey. These studies provide a consistent time series from 1996 to 2018 (on an intermittent basis between 1996 and 2006 and then annually from 2008) for the key variables covered, notably floorspace and housing size.
- 4.2 There have been some minor changes in definitions over this period. The English Housing Survey data caps dwelling size at 500m² and household size at 9 people, so the same caps have been applied here to data from earlier years to ensure consistency (with very little impact on the results). There have also been changes in whether and how the space under walls is calculated and whether integral garages and balconies are included, which according to the English Housing Survey team at the Ministry for Housing, Communities and Local Government (MHCLG) are likely to have led to a small increase in measured floor area from 2006 onwards.

Definitions

- 4.3 The report focuses on the floorspace available in occupied homes rather than across the dwelling stock as a whole, because its main focus is on the space available per person and it is less meaningful to include space in vacant homes in this measure. Throughout the report, 'floorspace per dwelling' is used as a shorthand for space per household in occupied homes. There is a very small number of dwellings that accommodate more than one household, but so few that it makes no noticeable difference to the results.
- 4.4 The average floorspace per person in an area or among a particular group is calculated as the average space per (occupied) dwelling divided by the average household size. This is a subtly different measure than that derived by calculating floorspace per person in each household and then averaging that figure, as the latter is biased towards smaller households.

Note on the charts

- 4.5 Due to the volatility inherent in results drawn from limited samples, there is some statistical noise in the annual estimates calculated below, particularly for London and for smaller groups of people. The time series charts therefore combine estimates for single years shown as dots and an interpolated trend through these estimates shown as a line.

¹ Belfield et al (2015), '[Housing: Trends in Prices, Costs and Tenure](#)'; Mulheirn (2017), '[2.1 billion square metres to swing a cat in](#)', Park (2017); '[One Hundred Years of Space Standards](#)'; Centre for Cities (2019), '[Making room: How and why living space varies between cities](#)'

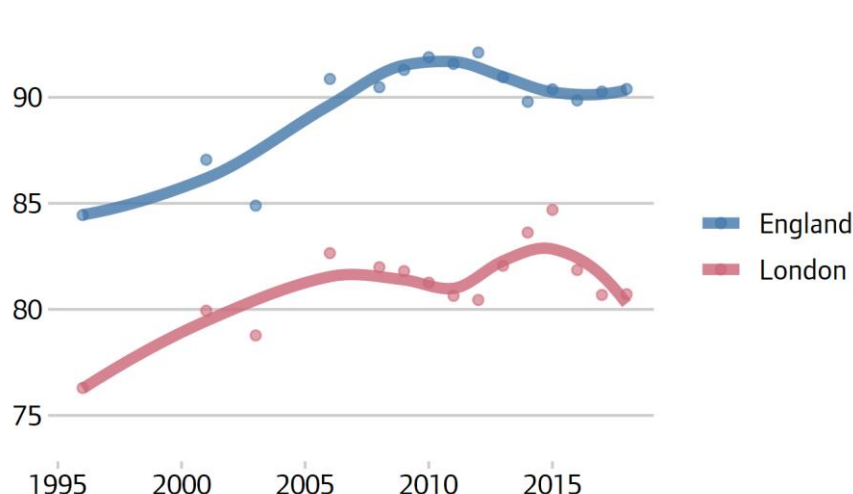
5. Analysis

- 5.1 This section first analyses overall trends in space per dwelling and space per person in England and London, before breaking down these trends by key variables including tenure, age and ethnicity.

Trends in space per dwelling - England and London

- 5.2 In 2018 the average floorspace per dwelling in England was 90.4m², up from 84.4m² in 1996 (Figure 1). All of this increase took place between 1996 and 2010, with a slight decrease between then and 2018.
- 5.3 Dwellings are smaller in London, where the average floorspace in 2018 was 80.7m², up from 76.3m² in 1996. While the trend over time is more volatile than in England as a whole, most of the increase again took place in the earlier years of the period.

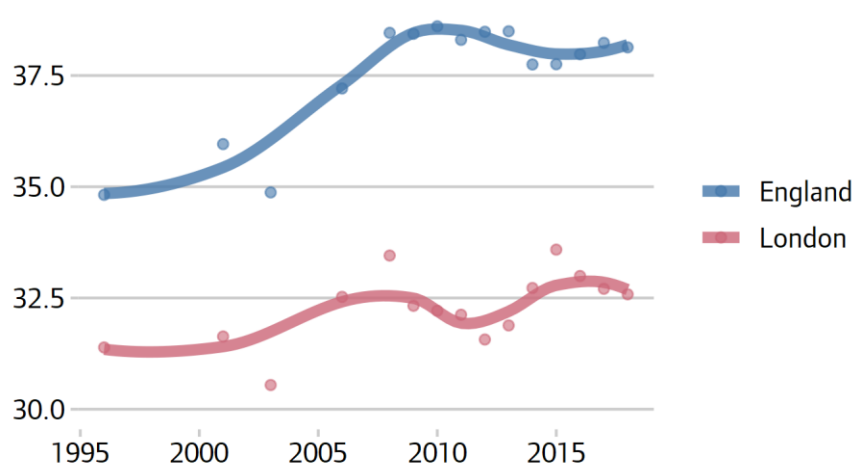
Figure 1: Floorspace (m²) per dwelling in London and England



Trends in space per person - England and London

- 5.4 When looking at floorspace per person (by dividing average space per occupied dwelling by average household size), there is an even starker divergence between London and England as a whole. Across England the average space per person rose from 34.8m² in 1996 to 38.1m² in 2018, again with very little change in the last decade (Figure 2). But in London there was little change over the period as a whole, with only a slight increase from 31.4m² in 1996 to 32.6m² in 2018. As a visual inspection of these two charts indicates, much of the increase in average floorspace per person in the first half of this period was driven by growth in average dwelling sizes, particularly at the national level.

Figure 2: Floorspace (m²) per person in London and England



- 5.5 The main driver of the divergence between London and England was a slight increase in average household size in London coupled with a decrease across the country as a whole, rather than a widening gap in the average size of dwellings (a gap which has stayed fairly constant throughout this period). As of 2018 there were 2.5 people per household in London and 2.4 across England according to the English Housing Survey data².
- 5.6 The relatively slow growth in space per person was not driven by any increase in the average number of children per household, as that actually fell between 1996 and 2018 in both London and the country as a whole. When excluding children from the equation, floorspace per adult in London in 2018 was no higher than it had been in 1996, having increased in the first half of the period and then fallen back again.

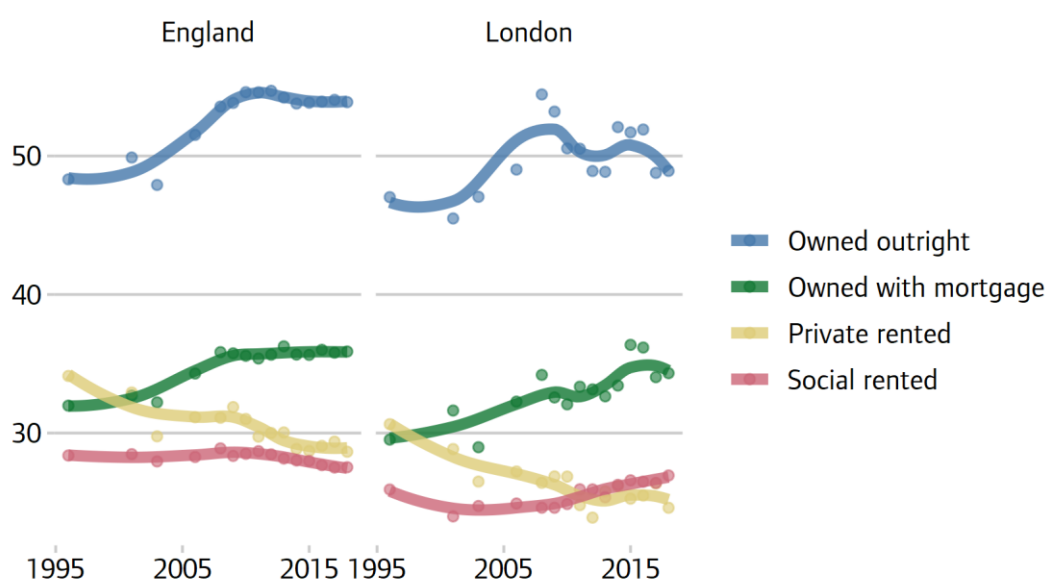
Space per person by tenure

- 5.7 These overall trends can be further disaggregated using a number of key variables, starting with housing tenure. It is already well known that there are significant differences in both affordability and housing conditions for those who rent and for those who own their homes (both in London and in England as a whole)³, and this section investigates whether these differences are also reflected in average floorspace.
- 5.8 As Figure 3 shows, there are indeed stark differences at the national level in space per person by tenure, including between outright owners and those with a mortgage. In 2018 households that owned their home outright had an average of 53.9m² per person, compared to 35.9m² for those with a mortgage, 28.6m² for private renters and 27.5m² for social housing tenants.

² The Labour Force Survey reports a higher average household size in London, but the English Housing Survey figures have been used here for consistency with the floorspace estimates

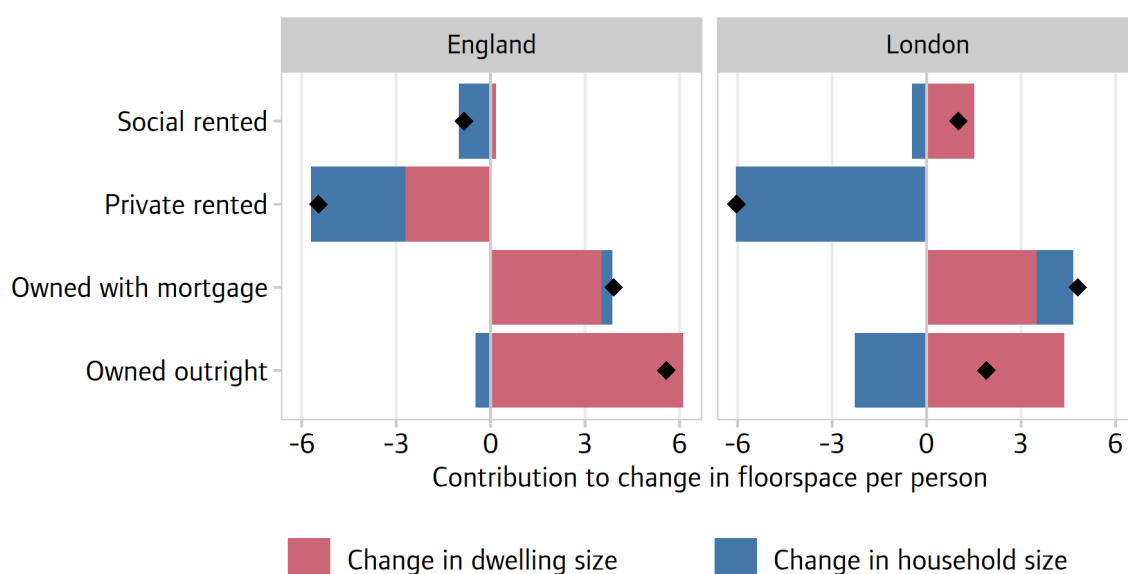
³ See for example the statistics presented in the Greater London Authority's 2020 '[Housing in London](#)' report

Figure 3: Floorspace (m²) per person in England and London by tenure



- 5.9 A number of clear trends emerge when looking at changes over time. Space per person has increased since 1996 for both outright owners and those with a mortgage, but with little or no change in the last decade. The average space per social housing resident fell slightly from 28.4m² in 1996 to 27.5m² in 2018. But among private tenants, the average space per person fell from 34.1m² in 1996 to 28.6m² in 2018.
- 5.10 In London the trends are broadly similar, with again a notable divergence between private renters and those who own their home with a mortgage. The main differences are that space per person for outright owners has not risen very much but there has been a slight increase for social renters in the last decade. Private renters in London had an average of 24.6m² of space per person in 2018, down from 30.6m² in 1996.
- 5.11 The differences in space per person between tenures can be broken down into differences in average dwelling size and average household size. Homeowners tend to live in larger dwellings than renters, with average sizes in England in 2018 ranging from 63m² in social housing and 72m² in private rented housing to 101.8m² for owners with a mortgage and 104.6m² for outright owners.
- 5.12 These gaps have grown over time, with the average size of dwellings owned by homeowners rising and the average size of privately rented homes falling (there was no significant change for social housing). Some of this change in average sizes may be driven by compositional factors, for example if the growth in private renting was disproportionately concentrated in dense, high-cost areas where dwelling sizes tend to be lower. The role of these compositional changes is likely to be lower in smaller areas like London than across the country as a whole.
- 5.13 Figure 4 decomposes changes in space per person into two factors: the effect of changes in dwelling size (holding household size constant) and the effect of changes in household size (holding dwelling size constant). At both national and London levels, the increase in space per person since 1996 among homeowners is largely due to an increase in dwelling sizes. Among private renters across England as a whole, the decrease in space per person is due to a roughly equal combination of rising household sizes and falling dwelling sizes, while in London it is all about rising household sizes as there has been no change in dwelling sizes. For social renters there has been relatively little change over time.

Figure 4: Components of change in floorspace (m²) per person by tenure

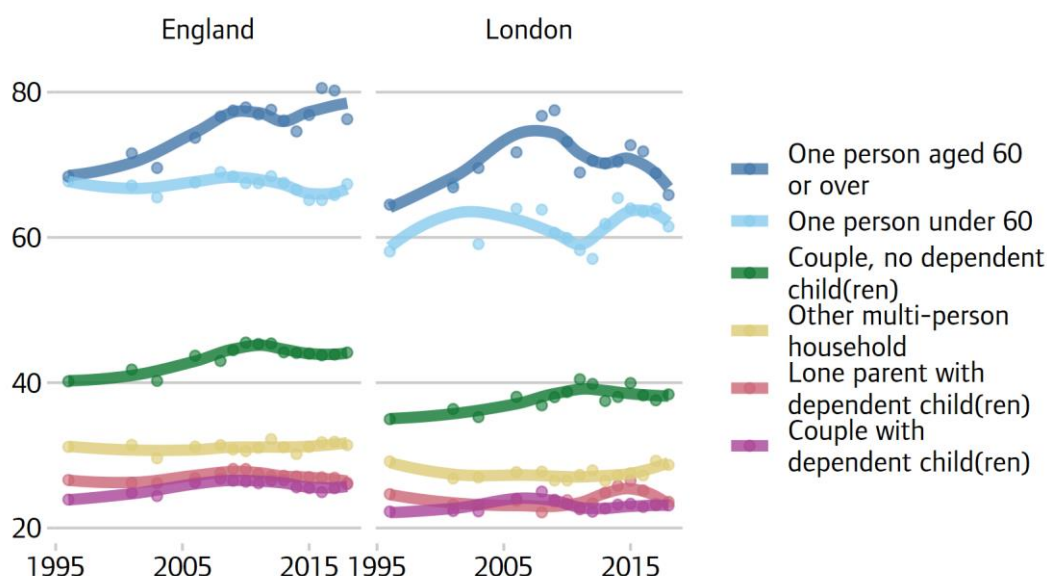


Space per person by household type

- 5.14 Living arrangements and thus space per person are also likely to be influenced by household type, for example whether people live alone, as part of a couple or in a family with children. As Figure 5 shows, there are wide and fairly persistent differences in space per person for different types of households at both England and London level, although households of each type in London tend to have less space per person available. Perhaps unsurprisingly it is those aged 60 or above and who are living alone who have the most space per person on average (65.8m² in London and 76.3m² across England as a whole in 2018). At the other end of the scale there are households with children (whether couples or lone parents), who have roughly 25m² of space per person at both the national and London levels.
- 5.15 At the national level, the main changes between 1996 and 2018 were the increase in space for single-person households aged 60 or over (from 68.4m² in 1996 to 76.3m² in 2018) and for couples with no dependent children (from 40.2m² to 44.2m²), while in London the average space per person for single-person households aged 60 or above has actually fallen in the last decade (driven by a fall in average dwelling size, which may be evidence of a higher rate of ‘downsizing’) and there was little significant change for the other household types.
- 5.16 It is worth noting that the distribution of household types can be quite variable over time. For example, longer life expectancies have led to continued growth in the number of single-person households over 60. But the most striking trend has been the growth in the number of ‘other multi-person households’, which increased by 63% in London and 55% across England as a whole between 1996 and 2018. These households, which generally comprise unrelated adults sharing a house or flat, accounted for one in seven of all households in London and one in eleven of the England total in 2018.
- 5.17 The growth in adults sharing accommodation is likely to be a response to rising housing costs making it more difficult for people (particularly single people) to move into their own homes. This conclusion is supported by recent findings from the English Housing Survey, which reported that the estimated number of households in England with at least one ‘concealed household’ (defined as adults who wanted to buy or rent their own place

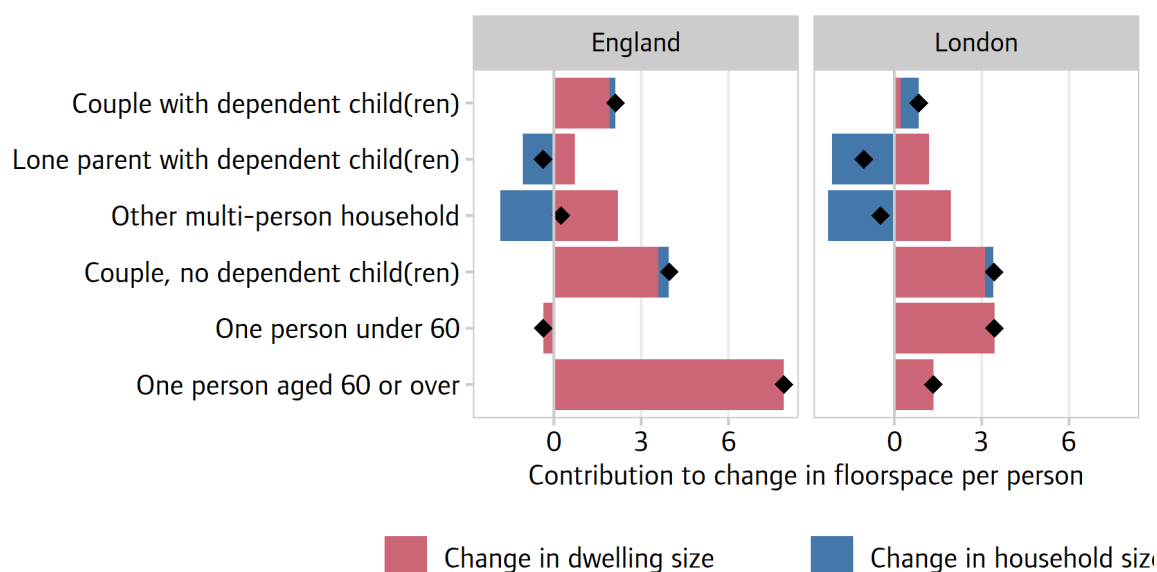
but couldn't afford to do so) increased from 1.4 million in 2012/13 (6% of all households) to 1.6 million in 2018/19 (7% of the total)⁴.

Figure 5: Floorspace (m²) per person in England and London by household type



5.18 At London level, the most notable contributions to changes in space per person between 1996 and 2018 were the increases in average dwelling space for couples without dependent children and people under 60 living alone (Figure 6). Across England as a whole, the biggest change by far was a large increase in average dwelling sizes for people aged 60 or over living alone. Rising household sizes for lone parent and other multi-person households offset the slight increases those household types saw in average dwelling sizes.

Figure 6: Components of change in floorspace per person by household type

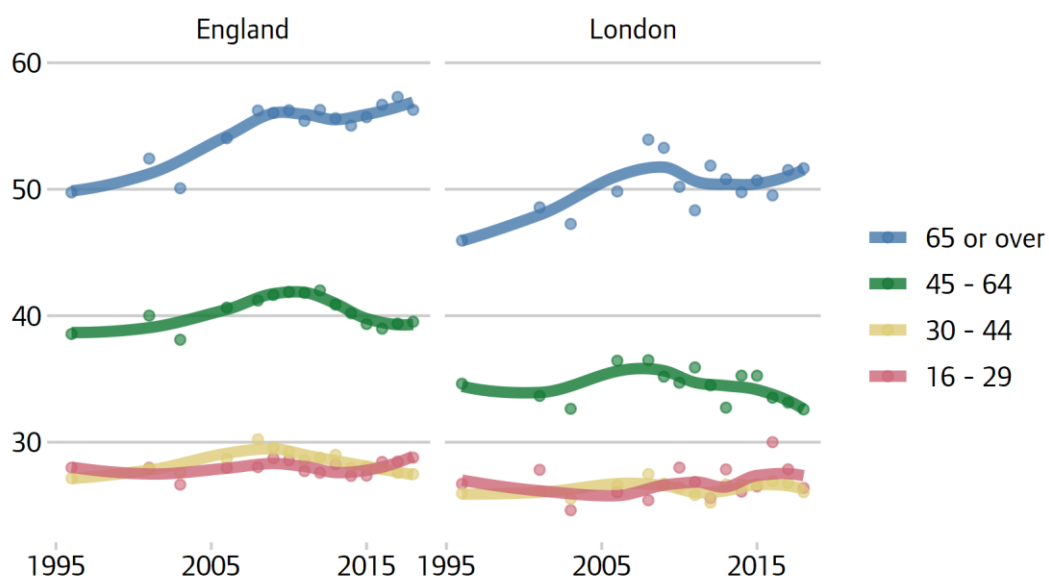


⁴ MHCLG (2020), [‘English Housing Survey 2018 to 2019: sofa surfing and concealed households’](#)

Space per person by age of household reference person

- 5.19 As the previous section showed, older people living alone generally have the most space per person among different household types. This finding is reinforced when we compare space per person across age groups (based on the age of the 'household reference person' (HRP)⁵). Again there are very large and persistent differences by age (Figure 7), with households headed by someone aged 65 or over occupying around twice as much space per person on average (56.3m² in England and 51.7m² in London) as households headed by someone aged less than 45 (27.8m² in England and 26.1m² in London).
- 5.20 The main trend over time is an increase in the average space available to older households (who are also more likely to be single-person or childless couple households).

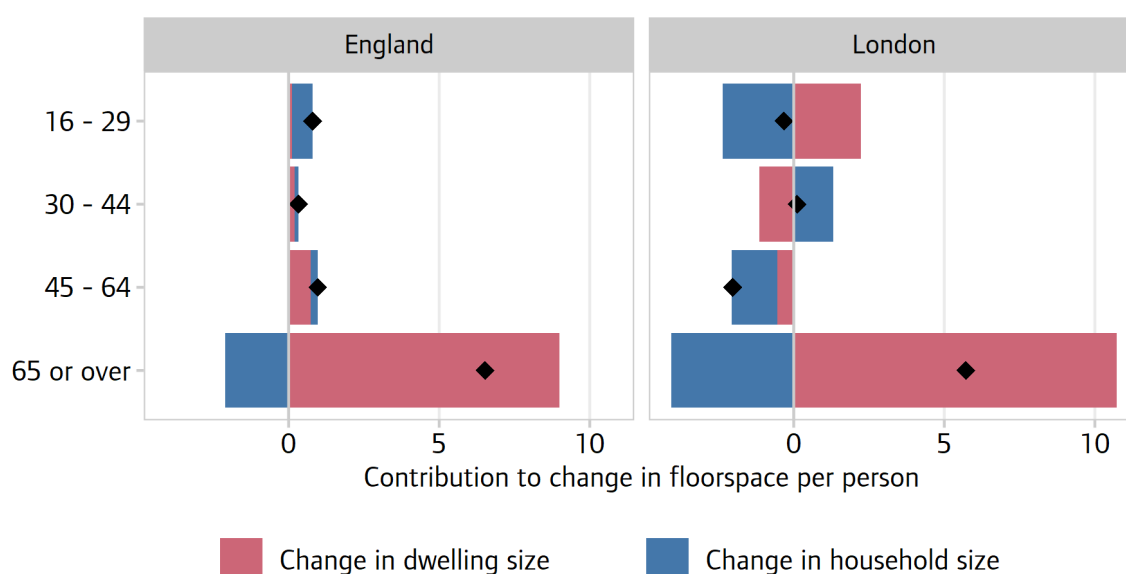
Figure 7: Floorspace (m2) per person in England and London by age of HRP



- 5.21 At the national level, the increased space for older households is driven by an increase in dwelling sizes, as average household sizes for this age group have actually increased over time (Figure 8). The other age groups show no large changes over the period in either average dwelling sizes or average household sizes, apart from offsetting increases in dwelling size and average household size among younger households in London.

⁵ The household reference person (HRP) is defined as a "householder" (that is a person in whose name the accommodation is owned or rented). For households with joint householders, it is the person with the highest income; if two or more householders have exactly the same income, the older is selected. Prior to 2001 the term 'head of household' was used, and gave automatic priority to male partners. In the text the term 'headed by' refers to the HRP

Figure 8: Components of change in floorspace per person by age of HRP

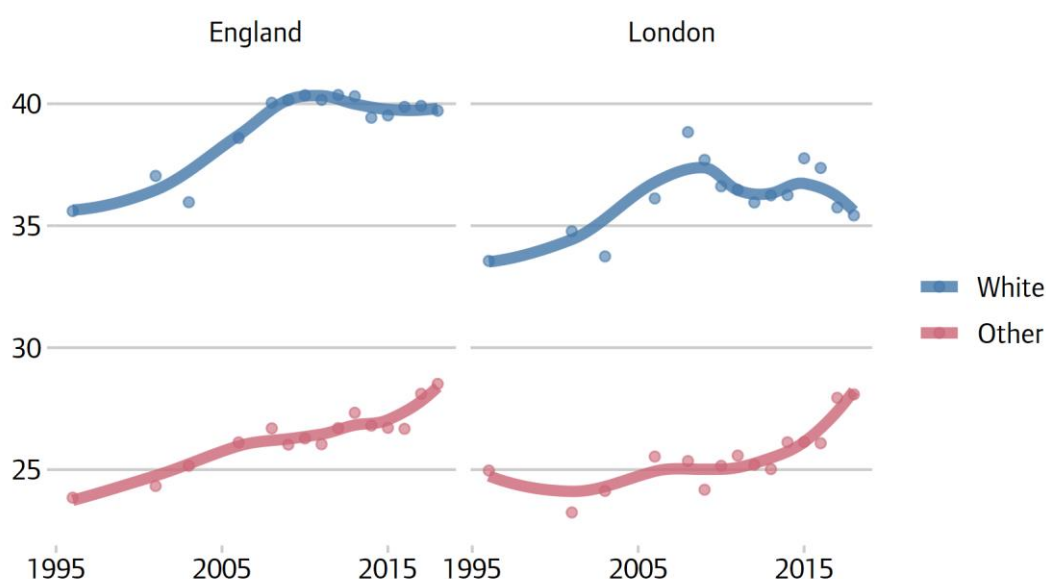


Space per person by ethnicity of household reference person

- 5.22 We can also disaggregate the headline trends in floorspace per person by the ethnicity of the household reference person. Existing evidence indicates that people from different ethnic backgrounds experience very different levels of overcrowding and other forms of housing disadvantage⁶. These differences are likely to be caused by a range of factors including variation in incomes, different residential location patterns and housing market discrimination.
- 5.23 Unfortunately, limitations of the historic data used in this report mean that for trend analysis between 1996 and 2018 we only have available two extremely broad ethnicity categories ('White' and 'Other') that clearly do not come close to reflecting the full diversity of ethnic identities between households (let alone the fact that individual households can contain people of different ethnicities). A snapshot of recent data using more detailed categories is provided later in the section.
- 5.24 The trends show a large gap in space per person between White and other ethnicities, but a convergence the last decade due to an increase in space among households headed by someone of Black, Asian and other non-White ethnicity (Figure 9). As of 2018, households headed by someone of White ethnicity had an average of 39.7m² per person across England as a whole, compared to 28.5m² for other households. In London the main difference was that households headed by someone of White ethnicity had less space per person than the national average at 35.4m².

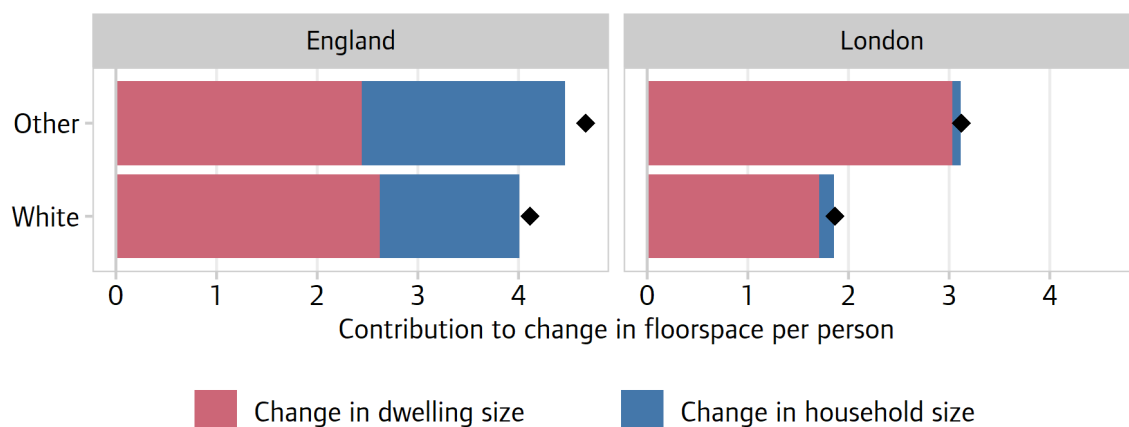
⁶ See the Cabinet Office's ['Ethnicity Facts and Figures' website](#)

Figure 9: Floorspace (m2) per person in England and London by ethnicity of HRP



- 5.25 Decomposing these trends shows that within each of these broad ethnicity categories there has been an increase in space per person in London and the country as a whole due to rising dwelling sizes, while at the national level there was also a substantial contribution from falling household sizes (Figure 10).

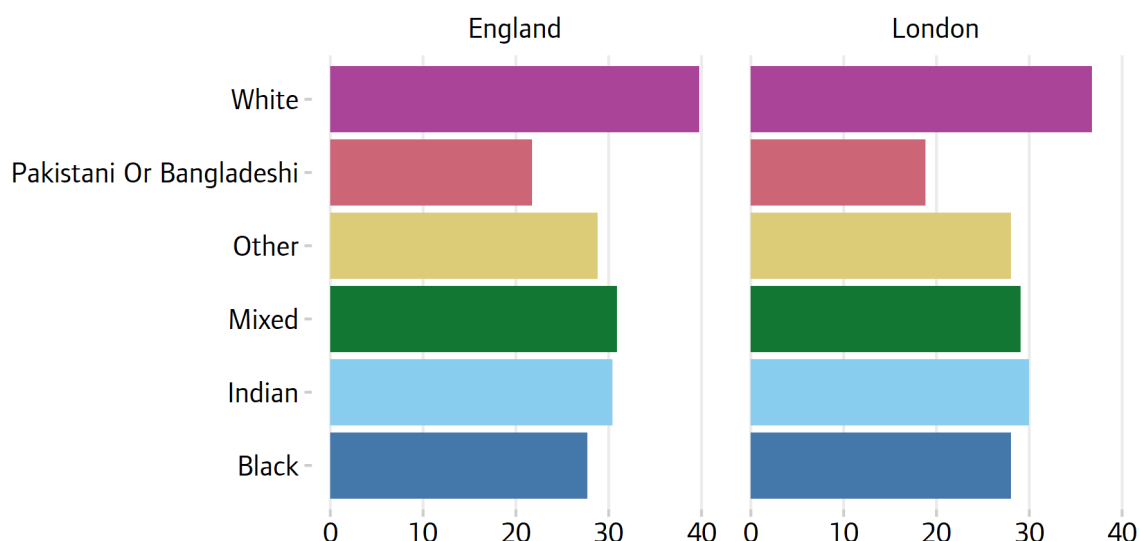
Figure 10: Components of change in floorspace per person by ethnicity of HRP



- 5.26 It may be tempting to conclude from this finding that the relatively slow increase in space per person across the population as a whole can be simply 'explained' by an increase in the number of households of Black, Asian or other non-White ethnicities. But households of non-White ethnic backgrounds account for almost all of the net increase in younger households since 1996, and the number who rent privately has also increased much more quickly than that of households from White ethnic backgrounds. So to the extent that there are distinctive trends affecting private renters (for example rising rents) and younger households (for example rising barriers to home ownership) then these are likely to be confounded with growth in the number of households from Black, Asian and other non-White backgrounds.

- 5.27 While trend data for the period since 1996 is only available for two extremely broad ethnicity categories, a more disaggregated snapshot can be produced using more detailed English Housing Survey data for recent years (Figure 11). However, even this more detailed categorisation still obscures some meaningful distinctions, for example between Black Caribbean and Black African or White British and White non-British ethnicities.

Figure 11: Floorspace per person (m²) by ethnic category of HRP, England and London 2015-2017

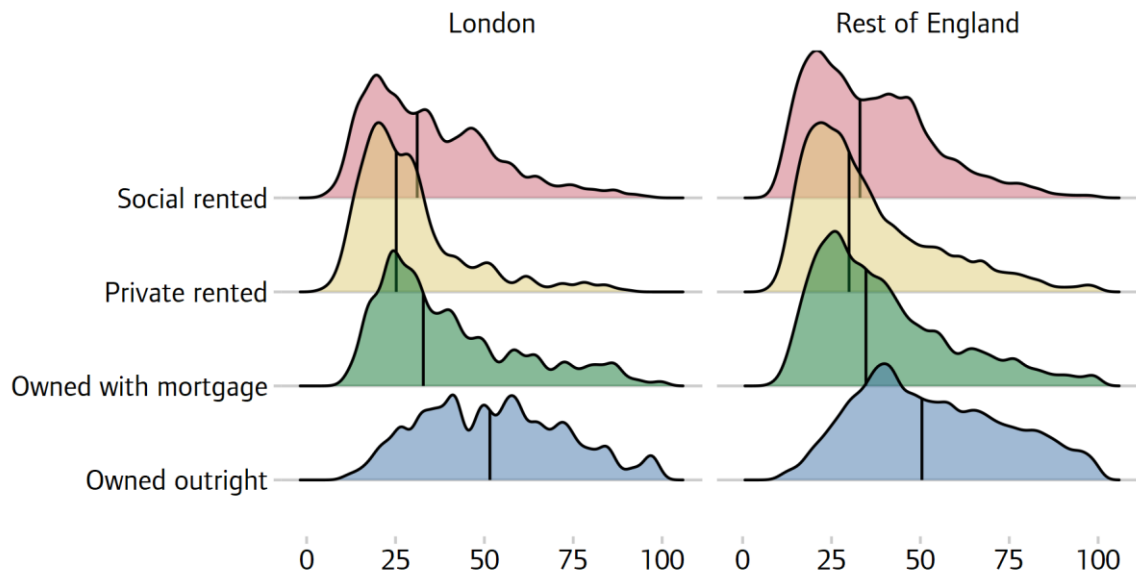


- 5.28 Households headed by someone of White ethnicity again have the most space per person on average, but this time we can discern clear differences between some of the other ethnic categories. Households headed by someone of Indian ethnicity have around 30m² of space per person both in London and across England as a whole, more than households headed by someone from a Black ethnic background, while households headed by someone of Pakistani or Bangladeshi ethnicity have the least space per person on average at around 20m².

6. Distribution of floorspace per person

- 6.1 Averages only tell us so much, and they hide the significant amount of variation within these various categories. For example, Figure 12 below shows the distribution of floorspace per person between households in London and the rest of England in 2016 to 2018 (combining multiple years to increase the size of the sample), split by tenure. The height of the line at each point shows the proportion of households in that tenure with each amount of floorspace per person, and the vertical line within each distribution shows the median value for that group.
- 6.2 The chart shows that a far higher proportion of outright owners in London have at least 50m² of space per person (56.7%) than those in other tenures, while nearly half of private renting households in London have less than 25m² of space per person.
- 6.3 In the rest of England the distribution of space among private renting households looks more similar to that of social housing tenants and mortgaged owners, while outright owners again have a very different distribution.

Figure 12: Distribution of floorspace per person (m2) by tenure in 2016 to 2018

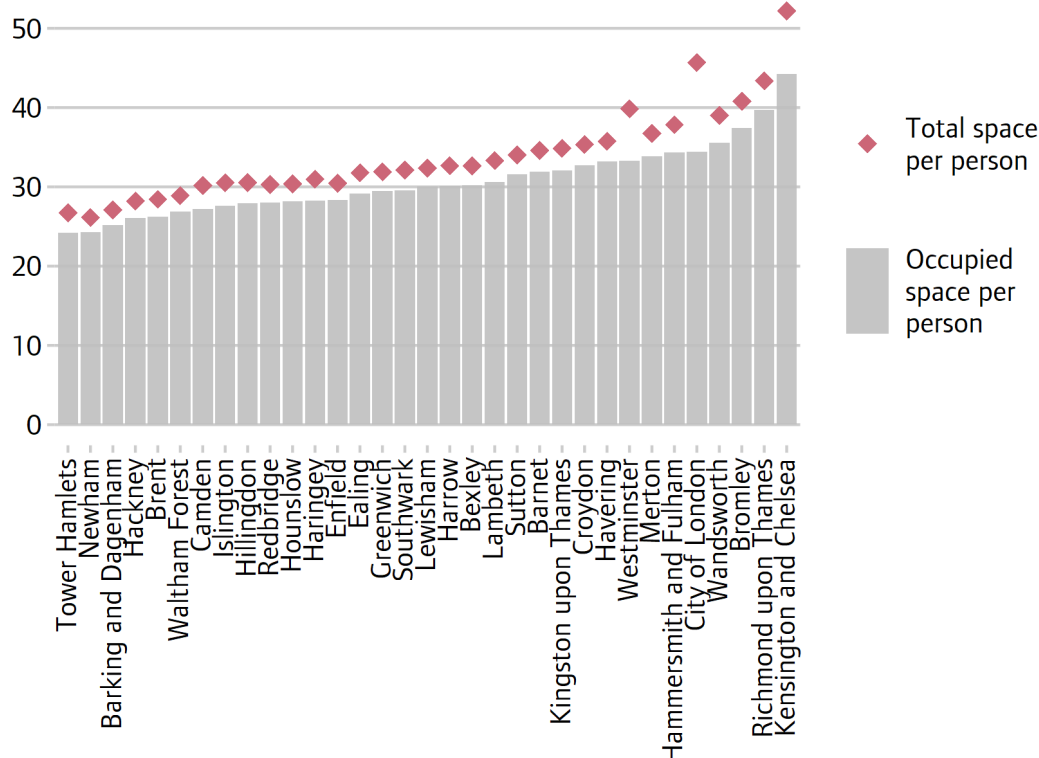


7. Local-level comparisons within London

- 7.1 The sample size of the EHS is not large enough to produce robust local estimates of floorspace per person, so this section uses estimates for local authorities produced by combining data from a range of sources: MHCLG data on land use and the dwelling stock, ONS mid-year population estimates, dwelling occupancy rates from the 2011 Census, and average floorspace per dwelling from Energy Performance Certificates⁷. For each borough both the occupied space per person and the total residential floorspace (including vacant dwellings) per person are shown, with the gap between the two indicating the dwelling vacancy rate.
- 7.2 These figures were produced using different data sources and a different methodology to the London-wide figures presented elsewhere in this report, and produce slightly lower estimates for floorspace per dwelling and per person. They should therefore be seen as an illustration of the variation within London rather than precise estimates.

⁷ The method used follows the approach set out in Angel et al, '[Anatomy of Density I](#)'

Figure 13: Estimated average floorspace per person (m²) by London borough, 2018



7.3 The results (Figure 13) indicate a very wide range among London boroughs of average occupied floorspace per person, from 24.2m² in Tower Hamlets to 44.2m² in Kensington and Chelsea. These differences in floorspace per person are driven at least as much by variation in household sizes as in dwelling sizes: for example, there are 2.8 people per household in Tower Hamlets and 2 in Kensington and Chelsea, while average floorspace per dwelling is 67.2m² in Tower Hamlets and 88.4m² in Kensington and Chelsea.

7.4 The borough-level patterns are likely to reflect the combined effects of all of the variables discussed in the preceding sections, as well as spatial ‘sorting’ by income and wealth. The fact that Kensington and Chelsea has both the highest house prices and the most space per person in London indicates that many (though by no means all) of its residents are affluent enough to be able to afford ample amounts of even the most expensive housing.

8. International comparisons

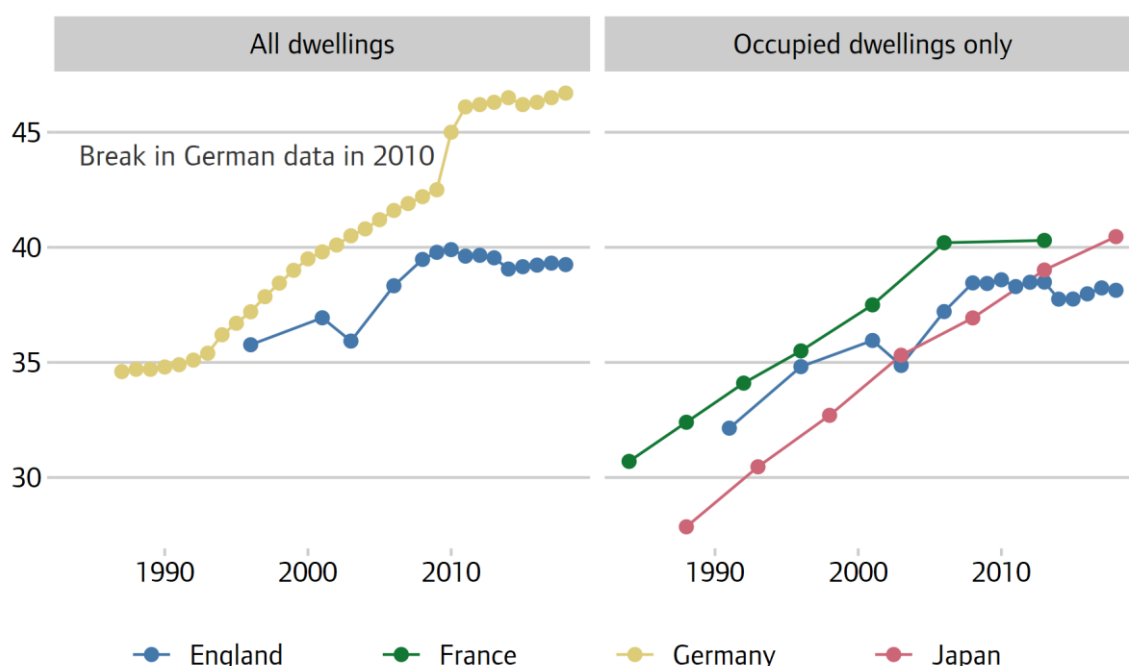
8.1 As well as looking at variation in floorspace per person within London, we can also compare the England average with that of other countries. The differences in definitions and data gathering methods are likely to play a more significant role here, so the comparisons should be treated as indicative rather than precisely like-for-like⁸.

8.2 Figure 14 below shows the trends in average floorspace per person in England, Germany, France and Japan. These four countries have been chosen partly for reasons of data availability and partly because in international terms they are reasonably comparable in terms of population size, geography and economic development.

⁸ See the appendices for more details of the data sources used to calculate these figures

- 8.3 The only data available for Germany covers the entire dwelling stock (including vacant homes), so the first panel in the chart compares England and Germany on the basis of total residential floor area per person, while the second panel compares England with France and Japan on the basis of occupied floor area per person (including an estimate for of 32.1m² in 1991 taken from the 1991 English House Condition Survey report).

Figure 14: Trends in average housing floorspace (m²) per person by country



- 8.4 In each of the four countries there has been an increase in floorspace per person since the 1990s, but this growth has slowed in France and Germany and particularly in England in the last decade. The rate of growth has also slowed somewhat in Japan over time while remaining much higher than in the other three countries.
- 8.5 Variation in average household sizes appears to be the primary driver of differences in space per person between England and its peers, as the estimated average dwelling sizes are quite similar: occupied homes average 90m² in England compared to 91m² in France and 93m² in Japan, while occupied and vacant dwellings average 90m² in England and 92m² in Germany. Average household sizes range from 2.0 in Germany to 2.3 in France and Japan and 2.4 in England.

9. Discussion

- 9.1 A number of conclusions can be drawn from the findings presented here. First, at the regional and national levels there is an unsurprising link between housing costs and space per person. London is the most expensive region in England and has significantly less space per person than the national average, while growth in space per person in England has lagged behind France, Germany and Japan just as its house price growth has outpaced theirs.
- 9.2 But at the local authority level this relationship breaks down, and households in the most expensive boroughs actually have more space per person. This apparent contradiction is probably due to the effects of housing costs on the spatial 'sorting' of population, as it is generally only the wealthiest households who can afford to move into boroughs like

Kensington and Chelsea, and who despite the high costs can afford to consume relatively large amounts of floorspace.

- 9.3 Trends over time at the regional and national levels also indicate the role of relative housing costs. Growth in floorspace per person in London has lagged behind the national average, and growth in England has lagged behind its international peers. But growth in Germany, France and even Japan has also slowed in the last decade, suggesting that the struggle to accommodate rising populations in already crowded urban areas is a common one.
- 9.4 In England as a whole and in London, what growth in floorspace per person there was mainly accrued to home owners and older households (between which two categories there is a substantial overlap). Some of this growth probably reflects the ability of older homeowners to use accumulated housing equity to finance their next purchase, and some the ability of homeowners to remain living in large, valuable homes even as adult children move out and the household size shrinks.
- 9.5 In sharp contrast it is private renters, the group most exposed to market forces, who have seen a fall in space per person. At the national level this fall in space per person was driven by a combination of falling dwelling sizes and rising household sizes, while in London it was entirely down to rising household sizes.
- 9.6 Similarly, at local and international levels variation in household size is at least as important as variation in dwelling size in explaining differences in space per person. When compared to its peers England does not have unusually small dwellings, but it does have unusually large households.
- 9.7 Household sizes are affected by a range of demographic, social and economic factors, but one important element is whether the formation of new households is constrained by the availability and affordability of housing to accommodate them. Evidence for this mechanism comes from the relatively high housing costs and low housing vacancy rates in England and the UK compared to comparable countries, as well as the growing number of 'concealed households' mentioned above.
- 9.8 Finally, as the latest data analysed is for 2018, the results presented here do not take account of any impacts arising from the Coronavirus pandemic.

Appendices

Definitions of key English Housing Survey variables

Floor area is measured with the 'floorx' variable of 'usable floor area'. According to the English Housing Survey documentation, it "represents such floor space as could be reasonably used for habitation. It therefore represents all area within the footprint of the dwelling, minus the area under the external walls, the area under internal walls and the area occupied by staircases. The area left should represent the total of all room areas, hallways and circulation space (other than stairs) including cupboards, integral balconies and integral garages. Loft space is not included unless the loft is habitable, with a fixed stair in place to access it.

This measure of floorspace is distinct from the newer 'floory' variable introduced to the EHS in 2013 and aligned to building regulations. Further details of how these variables are defined and changes over time are available in the EHS dictionary of derived variables.

Household size is measured using the 'hhsizex' variable.

Data sources for local and international comparison

The estimates of average floorspace per person at local authority level were calculated from the following data sources:

- MHCLG, Live tables on land use: [Table 400b - Total land area \(hectares\) by usage type, 2018](#)
- MHCLG, Live tables on dwelling stock: [Table 125 - Dwelling stock estimates by local authority district](#)
- ONS, [Mid-year population estimates 2018](#)
- MHCLG, Live tables on Energy Performance of Buildings Certificates: [Table EB3](#)
- ONS, [2011 Census table KS401EW \(Dwellings, household spaces and accommodation type\)](#)

The international comparisons were calculated from these sources:

- England: MHCLG, English House Condition Survey and English Housing Survey data (accessed through the UK Data Service)
- France: Insee, ['Les conditions de logement en France, Édition 2017'](#)
- Germany: Statistisches Bundesamt (Destatis), ['Gebäude und Wohnungen - Bestand an Wohnungen und Wohngebäuden - Bauabgang von Wohnungen und Wohngebäuden - Lange Reihen ab 1969 - 2018'](#)
- Japan: e-stat, [Housing and Land Survey of Japan - Basic Tabulation on Dwellings and Households](#)