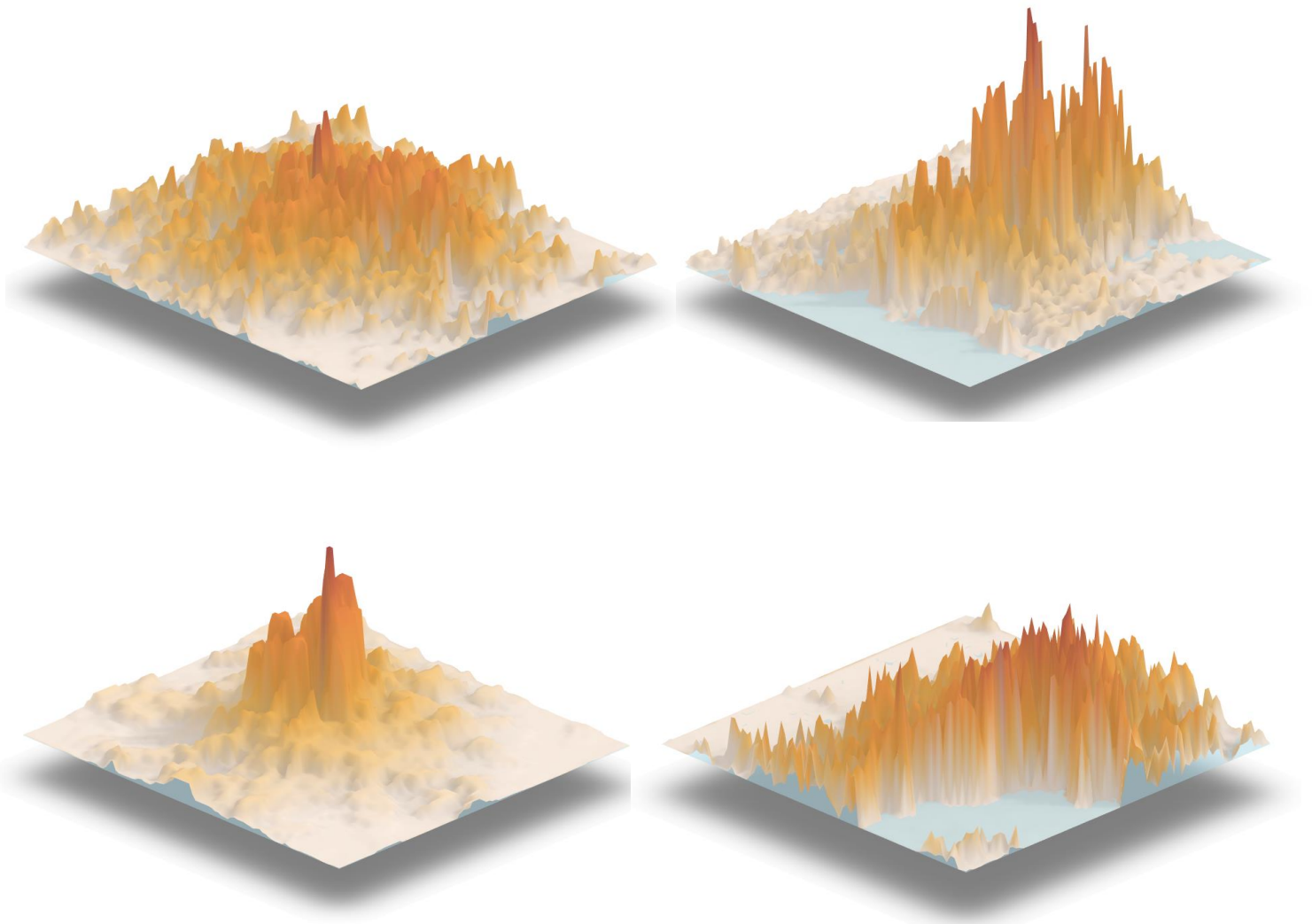


Housing Research Note 3

Housing in four world cities: London, New York, Paris and Tokyo



James Gleeson

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Software and code used:

- The cover image shows 3D visualisations of population density in (clockwise from top left) London, New York, Tokyo and Paris. Created using several R packages, notably 'rayshader' (Tyler Morgan-Wall) and 'raster' (Robert J. Hijmans et al). The procedure used to produce the plots was adapted from code published by John Burn-Murdoch of the Financial Times (<https://gist.github.com/johnburnmurdoch>).
- The line charts and bar charts were produced using the R packages 'ggplot2' (Hadley Wickham et al) and 'ggthemes' (Jeffrey B. Arnold et al)
- The population density maps were produced using QGIS (QGIS Development Team)

Copies of this report are available from <http://data.london.gov.uk>

1. Introduction

- 1.1 This report compares housing supply and the characteristics of the housing stock in four 'world cities': London, New York, Paris and Tokyo. It sets out how the number of homes in the four cities has grown in recent decades, and highlights similarities and differences in the type, tenure, age, height and size of housing in each of them today.
- 1.2 The data behind the analysis was collected from a range of public statistical sources (described in detail in the Appendix). This data has been made available as a single file on the London Datastore¹, with the intention of updating it over time as new data becomes available.
- 1.3 Feedback on this report or suggestions for improvements are welcomed, and should be sent to housing.analysis@london.gov.uk.

2. Key findings

- 2.1 Comparisons between the four cities are complicated and compromised by differences in the definitions used, when the data was collected and how each city was geographically defined. However, some overall conclusions can still be drawn:
 - Compared to the other three cities, London's housing is older, lower-rise, more likely to be social housing and less likely to be vacant.
 - New York's housing stock has grown at the slowest rate of the four cities since the late 1960s and it has the lowest proportion of homeowners but the largest homes in terms of average floor area.
 - Paris has the most medium-rise homes, the highest proportion of second homes and the highest proportion that are accessible by elevator.
 - Tokyo has built by far the most housing in recent decades, has the highest proportion of vacant homes and has similar amounts of floorspace per person as London and Paris.

3. Methodology

- 3.1 In this report, London is compared with three cities that are widely considered its pre-eminent global peers. The four cities were chosen according to a number of criteria that can be summarised as follows:
 - Size: All four cities as defined in this report are the largest in their respective countries, with populations ranging from 6.8 million in Paris (as of 2015) to 8.5 million in New York (2016), 8.8 million in London (2017) and 13.3 million in Tokyo (2013)².
 - Economic position: Each of the four cities is the largest in a G7 nation, and all four regularly top various global measures of economic connectedness or prominence³. A 2016 analysis by GLA Economics found that they comprised four of the top five cities in the world in terms of economic output, with Shanghai in fourth ahead of London⁴.
 - Historical development: All four cities were already very large by 1900, with London, New York and Paris estimated to be the three largest cities in the world in 1900 and Tokyo seventh (behind Berlin, Chicago and Vienna), albeit using different geographic definitions than this paper⁵. They have also each experienced an acceleration in population growth since roughly the early 1990s.
 - Data availability: Data is available on a reasonably comparable basis for each city across a range of topics from number of dwellings to housing stock characteristics. The

data on Tokyo was taken from sources in both English and Japanese, while the data on Paris was published in French (see Appendix 1 for a list of sources).

- 3.2 The same criteria explain the exclusion of a number of other cities, due to smaller size (for example Berlin and Sydney), a less central position in economic networks (for example Mexico City, Madrid and Barcelona), and/or a lack of suitable data (including Moscow, several cities in Africa and the major cities in China and India).
- 3.3 While best efforts have been made to identify the most comparable data, it is inevitable that some of the differences between cities identified in this report are caused by differences in definitions and methods of data collection.
- 3.4 In particular, any boundary drawn around a city will be 'wrong' to some degree, as it will inevitably fail to include some places with strong economic or commuting links and include others that are relatively disconnected. Comparisons between cities tend to compound this issue, with some cities relatively 'under-bound' (that is, defined for statistical purposes in such a way as to exclude some of their urban or suburban area) and others 'over-bound' (defined as including large swathes of rural area or distinct cities).
- 3.5 This issue is best illustrated by Paris, where statistics are primarily available for two different definitions of the city. The first is based on the long-standing administrative geography of 'departments', with the central department of Paris, divided into twenty arrondissements and governed by a Mayor, joined by three departments comprising the 'petite couronne' or 'inner ring' (Hauts-de-Seine, Seine-Saint-Denis and Val-de-Marne). Together these four departments, referred to in the rest of this report as 'Paris + petite couronne', had a population of 6.8 million in 2015⁶.
- 3.6 The second definition is known as the Paris 'unité urbaine' or 'urban unit', a statistical area defined by the French national statistics office INSEE. The unité urbaine comprises a collection of communes (the smallest unit of local government in France) that together form a continuously built up area. As of 2015 this area had a population of 10.71 million. This report mainly focuses on the first definition (the city proper plus its petite couronne), but the dataset published alongside the report includes data using both definitions.
- 3.7 Defining London is more straightforward, as the Greater London Area has been the most widely accepted definition of the city for political and statistical purposes since it was formally established in 1965.
- 3.8 In the case of New York, the administrative boundary of the city (comprising the boroughs of Manhattan, Brooklyn, Queens, The Bronx and Staten Island) is also commonly used for statistical purposes, and is the main definition used in this report. The US Census Bureau also defines a wider Metropolitan Statistical Area (MSA) that includes parts of New Jersey and Pennsylvania states, within which is a 'central city' area with a similar population to New York City that is used to produce the estimates of floor area.
- 3.9 Tokyo's urban area is the largest in the world, with the Greater Tokyo Area estimated to accommodate around 37 million people. However, for administrative and statistical purposes Tokyo is typically defined as the prefecture of the same name, known as Tokyo Metropolis. Leaving aside the small island groups that also form part of the prefecture, this area is essentially a large slice of the Greater Tokyo area, and in its westmost third is mountainous and largely rural.

3.10 For the sake of brevity the text of this report will refer to each city by its shorthand label set out in Table 1 below, but each chart will specify the precise definition used.

Table 1: Default city definitions used in this report

Shorthand label	Default definition	Population	Area
London	Greater London	8.8m (2017)	1,572 km ²
New York	New York City	8.5m (2016)	784 km ²
Paris	Paris + petite couronne	6.8m (2015)	762 km ²
Tokyo	Tokyo Metropolis	13.3m (2013)	2,188 km ²

4. Population densities

4.1 The population and area data in the table above can be used to calculate a gross population density for each city, but gross densities can be misleading because each city contains some areas of open space or open water where nobody lives. The patterns of open space and population density in each city are shown in the four maps below, which are based on gridded population data⁷ and shown to the same scale.

4.2 A more informative measure is that of ‘weighted population density’, which essentially calculates the local population density experienced by the typical resident⁸. Estimates of the weighted population density of each city have been calculated using the same gridded population data shown in the maps, and the results are given in the table below (with separate rows for the different definitions of both Paris and Tokyo to illustrate the impact of different spatial definitions). According to this measure, London is the least densely populated of the four cities and New York the most (about twice as dense as London). According to the default definitions used in this report, the densities of Paris and Tokyo both lie around half way between London and New York, and densities are lower when the more expansive definitions are used.

Table 2: Weighted density per km²

City definition	Weighted density
Greater London	8,942
New York City	19,169
Paris + petite couronne	15,147
Paris (unité urbaine)	10,828
Tokyo Metropolis	15,716
Greater Tokyo	12,858

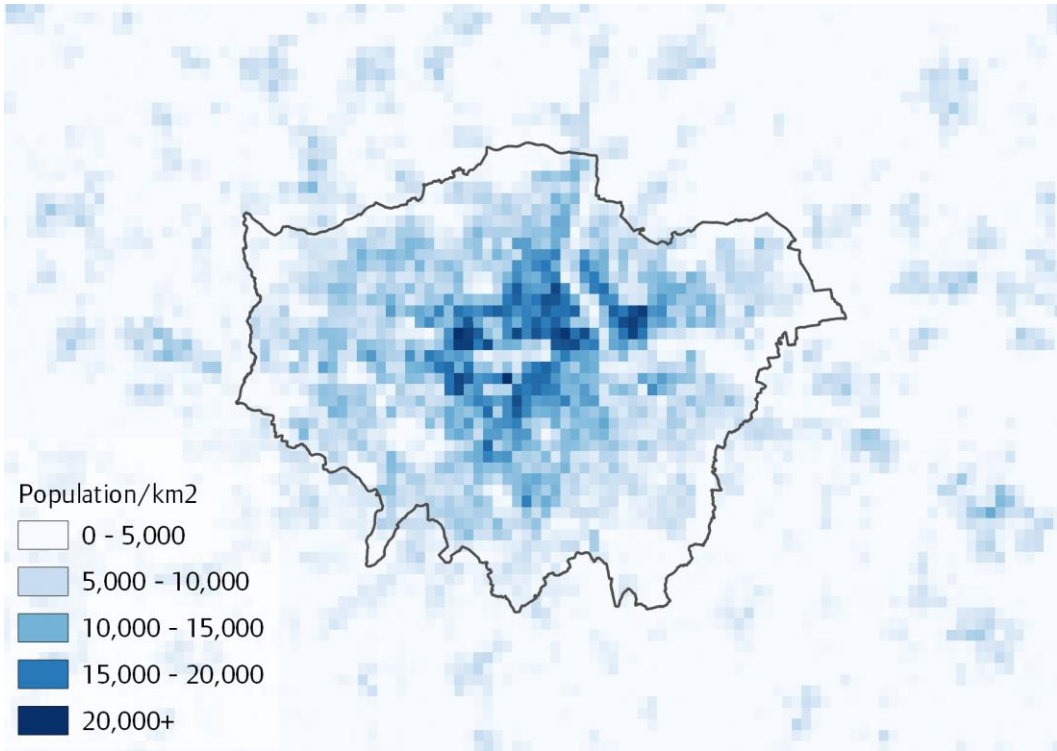


Figure 1: Greater London boundary and population density

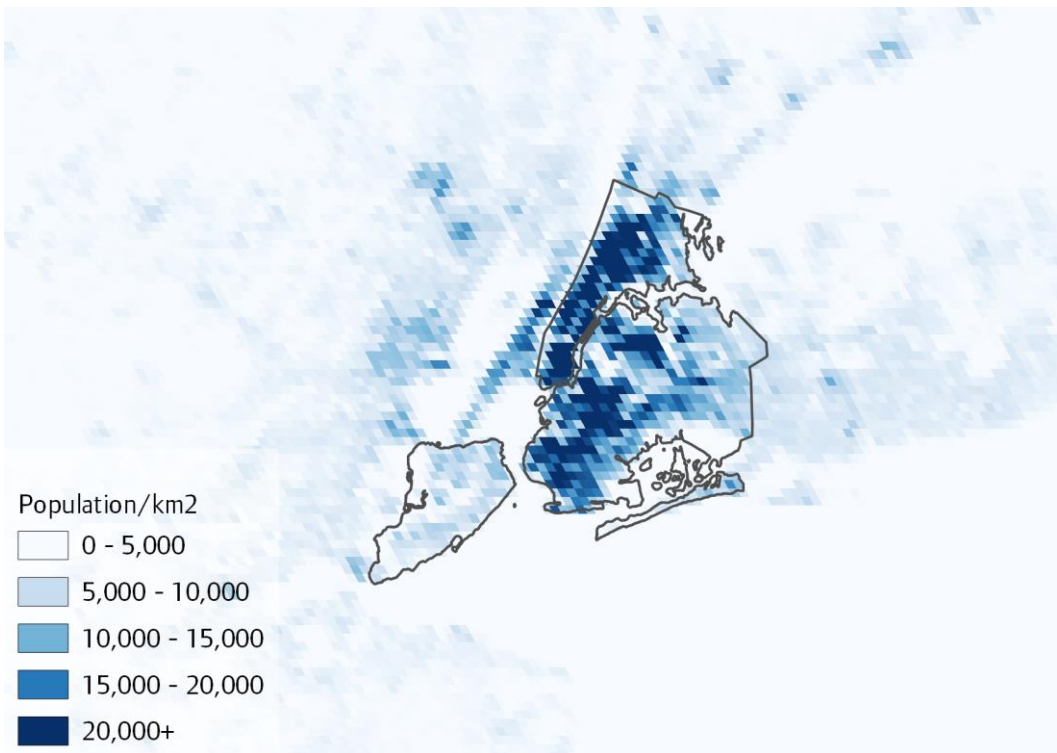


Figure 2: New York City boundary and population density

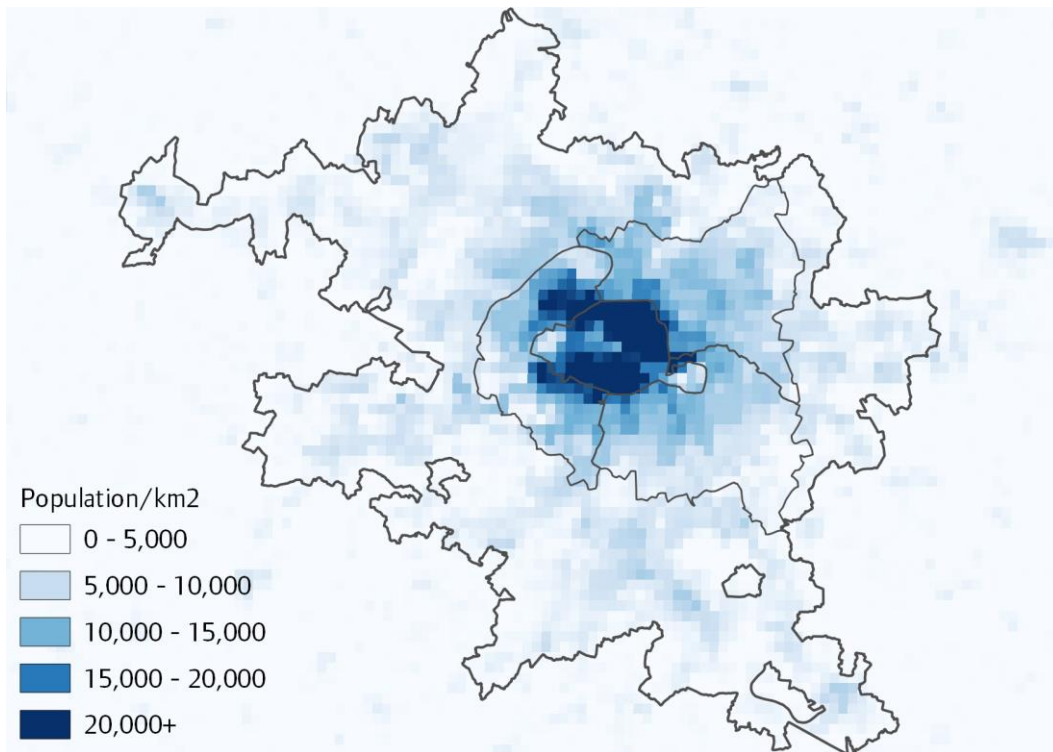


Figure 3: Paris boundary and population density. The inner boundary describes the 'Paris + petite couronne' area while the outer boundary describes the 'unité urbaine'

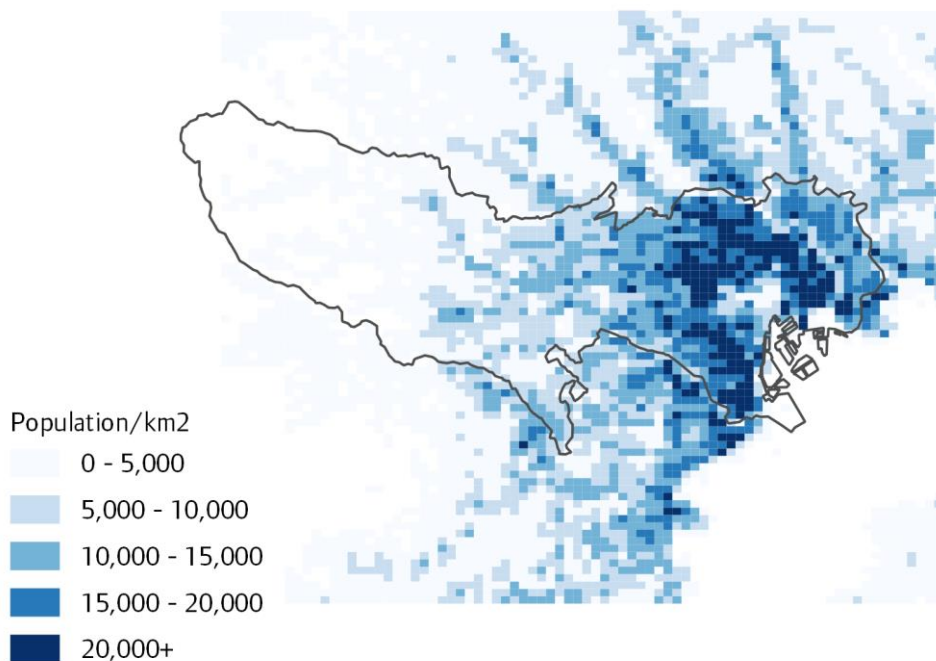


Figure 4: Tokyo Metropolis boundary and population density

5. Findings

Number of dwellings and growth over time

- 5.1 According to the latest statistics available for each city, the overall size of the dwelling stock has followed a very similar trend in London, New York and Paris, but a remarkably

different one in Tokyo. There were 3.52 million dwellings in London in 2017, 3.47 million in New York (also in 2017) and 3.42 million in Paris in 2015, compared to 7.36 million in Tokyo in 2013. Our data starts in the 1960s, and the chart below shows how the number of homes in each city has grown since then. Tokyo is clearly the outlier, as its housing stock has nearly trebled in size in fifty years, having started at 2.51 million in 1963. By contrast, the other three cities have converged, although the underlying growth rates vary, with London's housing stock having grown by 36% since 1971, New York's by 19% since 1970 and Paris's by 32% since 1968.

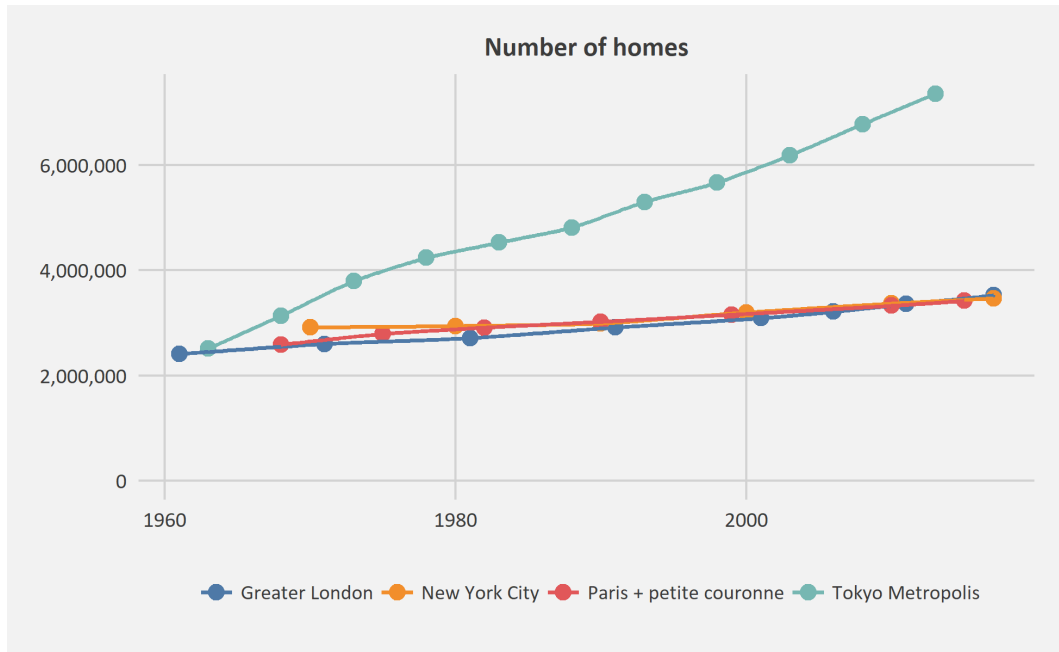


Figure 5

People per dwelling

- 5.2 Calculating the number of people per dwelling and tracking this measure over time is a simple way to assess whether the growth of a city's housing stock has exceeded or fallen behind the growth of its population (which in turn is likely to be affected by the availability of housing). The number of people per dwelling in a city is conceptually similar to its average household size but is easier to calculate (as definitions of what constitutes a household can vary between places and over time). It also differs by including non-household residents (for example, those living in communal accommodation) in its numerator and vacant dwellings in its denominator.
- 5.3 Over the roughly fifty years our data covers, the number of people per home has fallen in each of the four cities, but not in a consistent fashion. Tokyo stands out as having both the most people per home at the start of this period (4.15 in 1963) and the lowest at the end (1.81 in 2013), a testament to its consistently high rate of housing growth.

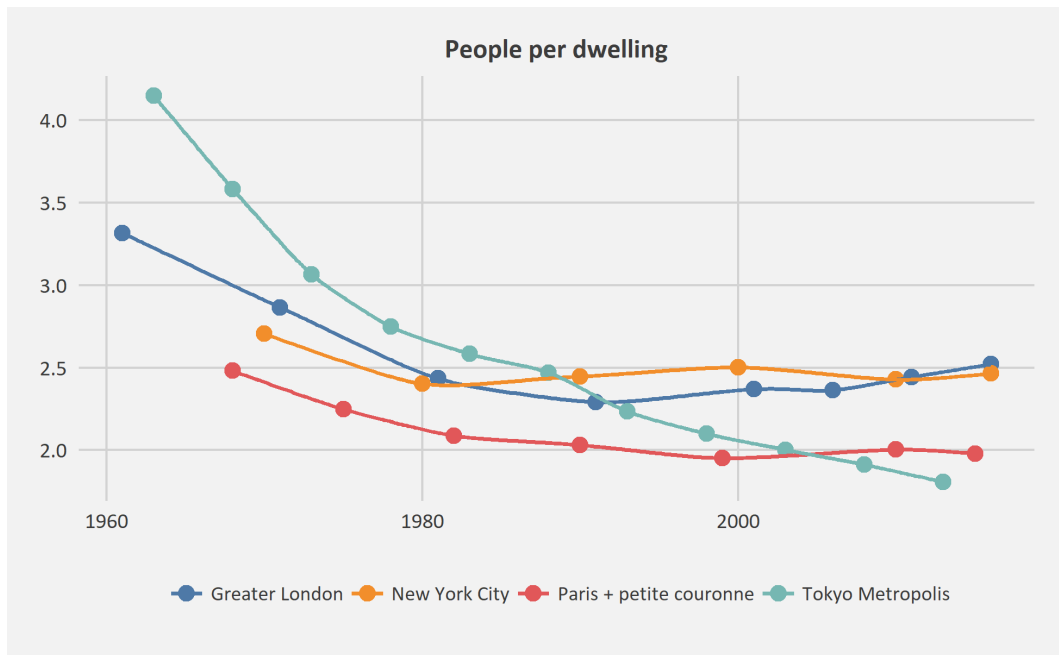


Figure 6

- 5.4 In contrast, the other three cities each see smaller reductions in the number of people per dwelling, with most of these reductions coming in the first half of the period:
- London started out with 3.32 people per dwelling in 1961, a figure that fell to a low of 2.29 in 1991 before rising again to 2.52 in 2016 as population growth outstripped housing growth.
 - Our earliest data for New York is from 1970, when it had 2.71 people for each dwelling. This figure fell to a low of 2.40 in 1980 before rising again to 2.45 in 1990, a level it has roughly maintained since.
 - Paris started out with the lowest figure of the four cities, with 2.48 people per dwelling in 1968. This figure fell to 1.95 in 1999 and has been roughly steady since then.

Vacant and second homes

- 5.5 In any housing market some percentage of homes are vacant at any given time while on the market for rent or sale. In addition to such 'frictional' vacancy, some homes may also be vacant for longer periods for a variety of reasons including undergoing or awaiting renovation or conversion, awaiting demolition, or for reasons particular to the owner. The distinction between these two categories of vacancy is not always clear in practice, and the figures in this section combine them.
- 5.6 They also separately identify dwellings that are held as second homes or are temporarily occupied, for example as holiday lets or accommodation for homeless households. Again, these distinctions are not always clear, definitions are likely to vary significantly from city to city, and in the case of London data on vacant, second and temporarily occupied homes comes from different data sources⁹. For these reasons, these figures should be treated with particular caution.

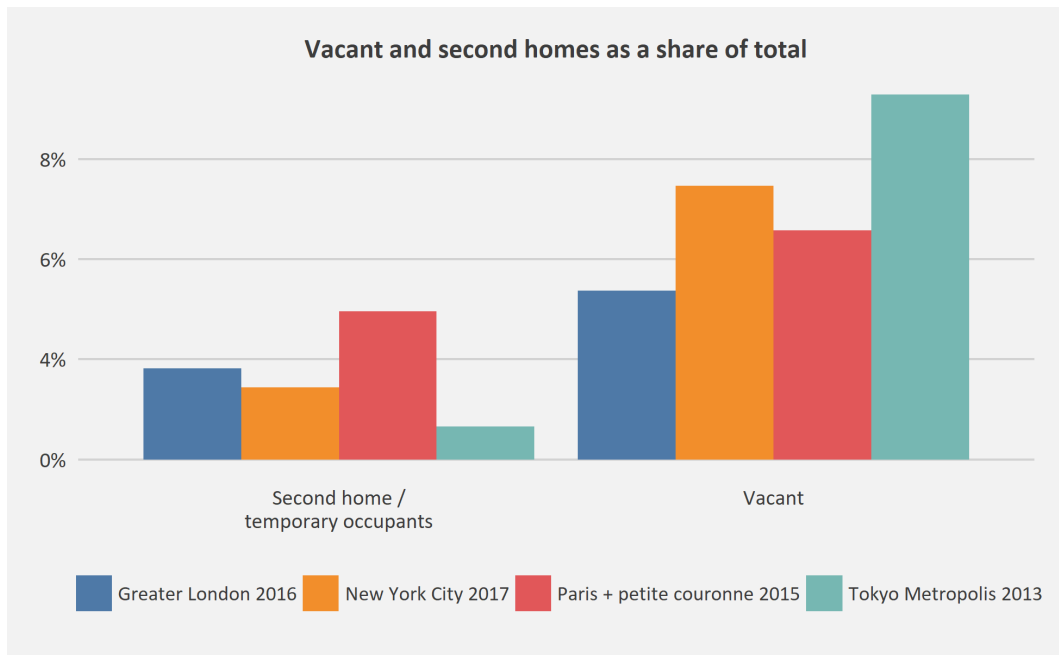


Figure 7

5.7 In London just over 5% of homes are estimated to be vacant, the lowest figure of the four cities. Tokyo has the highest vacancy rate at 11%, but the lowest proportion of second homes, which comprise only 1% of its housing stock. Paris has the highest proportion of second homes at 4% of its stock, which when combined with its vacancy rate give a combined figure of 11%, just above New York. London has the lowest combined total at 8%.

Tenure

5.8 There are many different types of housing tenure, but this report focuses on three broad categories: owner occupation, private renting (including rent-free housing and homes with regulated rents, but not capped rents) and a final category combining social or public housing with homes rented from private landlords at capped rents. The rationale for combining social or public housing with capped rent dwellings (that is, those subject to what is known as ‘first generation’ rent control) is that in each case the government (whether local, regional or national) has intervened to engineer or maintain a rent level below the market rate. The middle category reflects the fact that rent regulations (also known as ‘second generation’ rent controls) typically seek to limit the rate of growth of rents (in a variety of ways and to a variety of degrees) while allowing the rent level at the start of a tenancy to be set by the market.

5.9 According to this typology, London has the largest owner-occupied sector of the four cities, comprising 48% of its occupied housing stock¹⁰. New York has the smallest proportion of homeowners at 32%, with Paris and Tokyo closer to London at 39% and 46% respectively.

5.10 The open market or regulated rent sector is largest in New York, accounting for 59% of its homes. This figure is split almost equally between rent stabilized units (which numbered 966,400 in 2017) and unregulated units (which numbered 936,900). London’s private rented sector is almost entirely unregulated and comprises 29% of its homes, below Paris at 37% and Tokyo at 38%.

- 5.11 Turning to the final category, London and Paris have quite similar figures but quite different models. 23% of London’s homes are social housing, owned and operated by either local authorities or housing associations. In Paris, 24% of the stock consists of privately or publicly owned homes subject to a government rent ceiling regime, called Habitations à Loyer Modéré or HLM.
- 5.12 10% of homes in Tokyo are owned by local governments, the Urban Renaissance Agency or are issued to employees by private companies (the latter two categories not necessarily targeting low-income households). In New York, only around 20,000 homes were rent controlled in 2017, but another 260,000 fell into one of a number of categories of government-assisted accommodation including public housing.

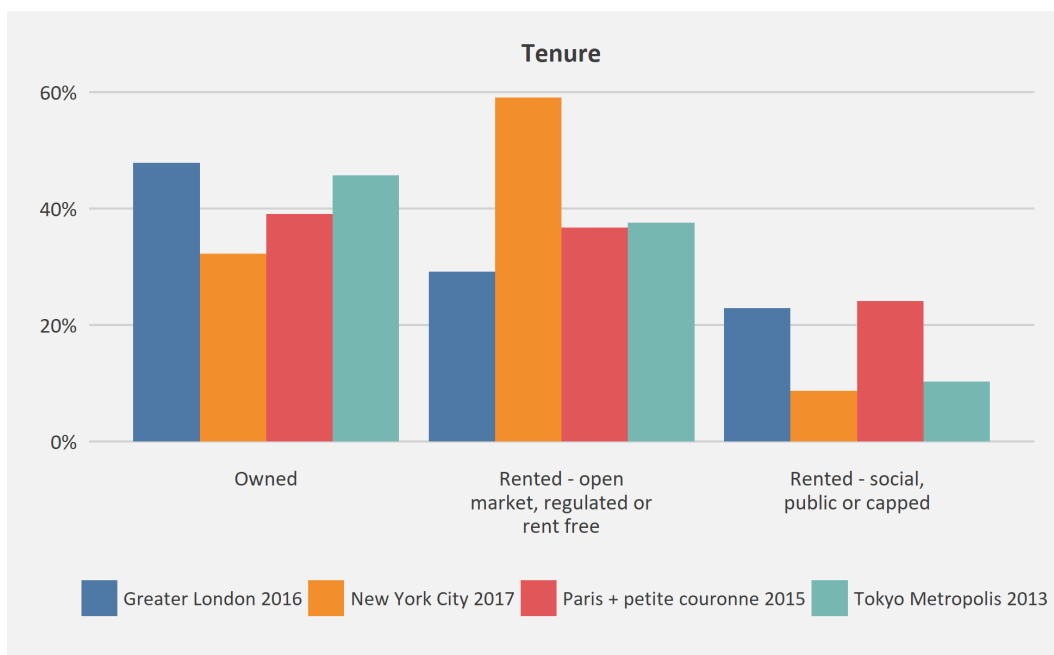


Figure 8

Dwelling age

- 5.13 Comparing the age of the housing stock between cities is particularly challenging, for a number of reasons. First, the age profile of a city depends on where its boundary is drawn, with older dwellings generally found closer to the centre. Second, each city uses different categories when reporting dwelling ages. Thirdly, dwelling age profiles can differ markedly for largely historical reasons, as set out below. However, some broad comparisons can still be made.
- 5.14 The percentage of homes in each city that dates to before or during the Second World War (or, in the case of Tokyo, to before 1951) varies from only 1% in Tokyo to 57% in both London and New York. The very low figure in Tokyo is explained by the huge destruction it suffered during the war, by its very rapid growth in the subsequent decades, and by its wholesale replacement of older homes over time. The figure of 33% in Paris may seem low, but is explained by the stark contrast between the city centre, much of which consists of 19th century homes, and the larger and more recently built suburbs.
- 5.15 At the other end of the age spectrum, the proportion of homes built since 1991 (or 1990 in the case of New York) varies from 9% in New York to 55% in Tokyo.



Figure 9

Building height

- 5.16 As with dwelling age, comparing building heights between cities is complicated by where boundaries are drawn and by the different categories used by statistical agencies. The most straightforward comparison is the proportion of homes in each city that are in buildings of five or more storeys¹¹.
- 5.17 In London this figure is only 13%, reflecting its predominantly two- and three-storey built form and the relatively small amount of high-density redevelopment it has experienced. Despite its high population densities, Tokyo was also until recently relatively low-rise, but by 2013 several decades of concerted intensification meant that 38% of its homes were in buildings of 5 or more storeys.
- 5.18 In New York this figure is 52%, with its well-known neighbourhoods of skyscrapers and mid-rise tenements offset by large areas of relatively low-rise development in its outer boroughs. The highest figure of 59% is found in Paris (using data from 1999, the latest year available), although this is driven mainly by a very large number of medium-rise residential buildings rather than homes in high-rise buildings (those of nine or more storeys), of which it has fewer than New York¹².

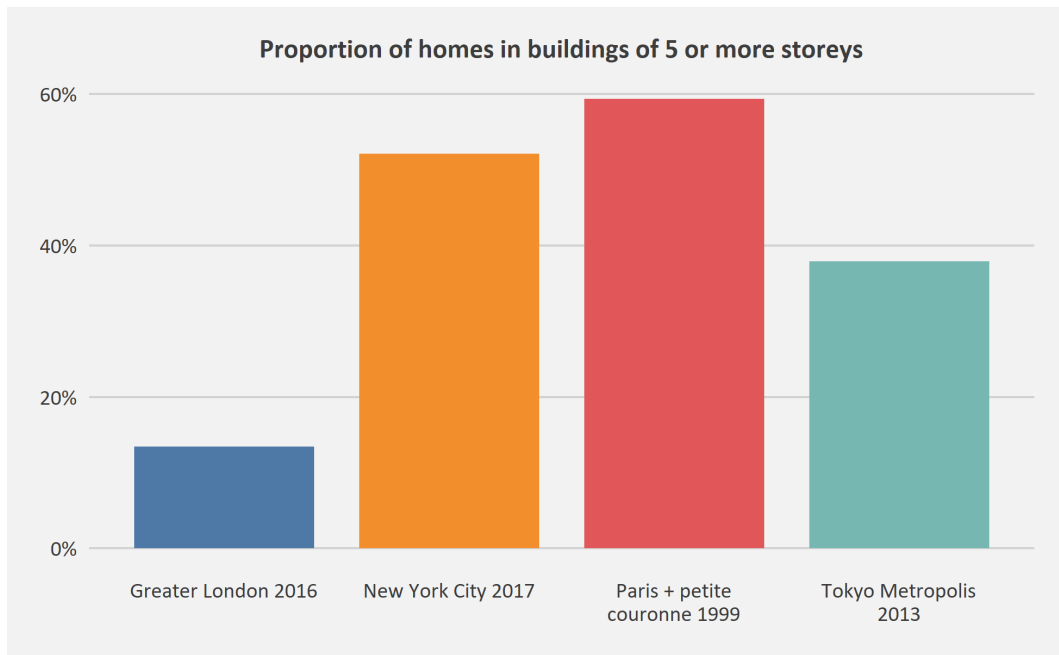


Figure 10

Homes accessible by elevator

5.19 The proportion of dwellings accessible by elevator¹³ in each city is closely related to its share of taller buildings. Paris has the highest share of elevator-accessible homes, at 52%, ahead of New York at 43%. Tokyo is slightly behind at 38%, with its relative lack of high-rise dwellings (compared to New York) offset by a far newer housing stock¹⁴. Unsurprisingly for a city with a relatively old and low-rise housing stock, London has the lowest proportion of elevator-accessible dwellings at 15%.

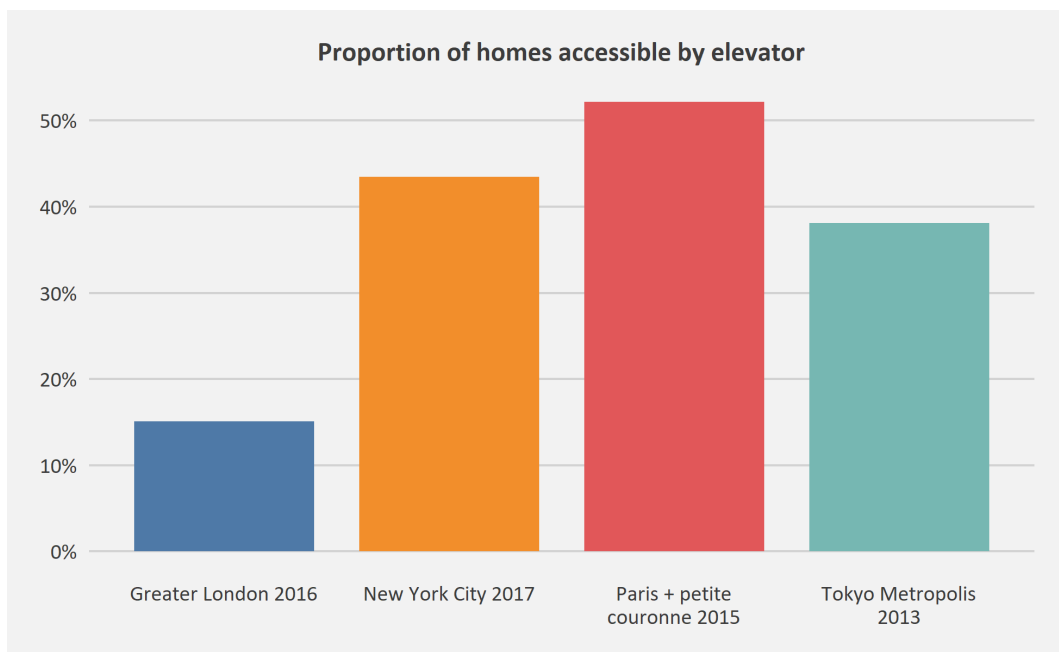


Figure 11

Unit floor area, including per person

5.20 Within any given city, the typical size of a dwelling in terms of floor area is likely to vary widely, with larger units generally found in suburban areas where land costs are lower¹⁵. With that caveat, the average floor area of dwellings and the average area per person can

still give us a sense of how much space is available to residents in each city¹⁶. Definitions of floor area vary between cities, as described in Appendix 2, so this comparison should not be seen as exact.

- 5.21 The largest homes on average are found in New York, which has a mean floor area of 105m². London's homes are the next largest at 82m² on average, with Paris (using the unité urbaine definition) next at 71m². Tokyo has the smallest homes on average at 64m².
- 5.22 Average floor area per person has been calculated by dividing average floor area per occupied dwelling by average household size. By this measure Paris and Tokyo have similar amounts of space per person as London, at 31, 32 and 33m² per person respectively. In New York every person has an average of 43m² in floor area¹⁷.

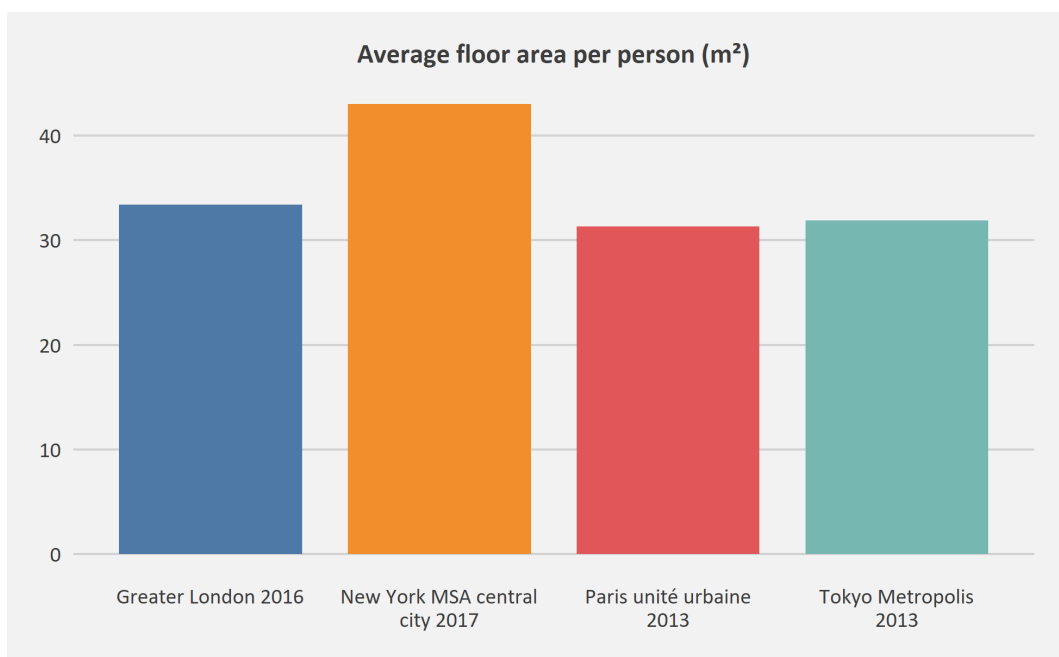


Figure 12

6. Potential future work

- 6.1 This report has presented a high-level descriptive analysis of the average characteristics of housing in four world cities, as a starting point for benchmarking international urban housing outcomes. Future work could build on this starting point in a number of ways, for example by:
- Tracking change in these cities over time;
 - Widening the analysis to include other cities (and sub-areas of cities);
 - Analysing how characteristics of occupants relate to housing characteristics;
 - Seeking to identify explanatory factors behind the patterns and trends uncovered.

Appendix 1: Data sources

The main sources of data for each city are summarised below. The efforts of the respective statistical agencies to make their data available are gratefully acknowledged.

London: Data on the number of dwellings in London comes from a combination of decadal Census data (1961 to 2011) republished by the Greater London Authority¹⁸ and more recent annual data published by the Ministry for Housing, Communities and Local Government (MHCLG)¹⁹. Population data comes from a similar combination of historic Census data and more recent mid-year estimates published by the Office for National Statistics²⁰.

Data on the characteristics of dwellings and households was calculated by the Greater London Authority using microdata from MHCLG's English Housing Survey disseminated by the UK Data Service²¹. Statistics from the English Housing Survey published by MHCLG are largely limited to the national level and include very little detail on London or other regions.

New York: Housing stock data for 1970 to 2010 is from United States Census / American Community Survey data republished by the Furman Centre²². 2017 data on total housing stock, dwelling age, number of storeys, elevators, tenure and occupancy was taken from the New York City Housing and Vacancy Survey, either from the initial findings published by the City or calculated by the GLA from the accompanying microdata²³. Floor area and floor area person was calculated from American Housing Survey data published by the US Census Bureau²⁴.

Paris: The majority of data for Paris in this report comes from the French Censuses carried out at irregular intervals between 1968 and 2015 and reported by INSEE²⁵. The remainder come from the 2013 national housing survey (Enquête Logement), also reported by INSEE²⁶.

Tokyo: All of the data on Tokyo in this report is ultimately derived from the Housing and Land Survey carried out every five years by the Statistics Bureau of Japan. The latest published results are from the 2013 survey, which surveyed a random sample of around 3.5 million dwellings / households²⁷. Detailed tabulations of the results are published (many in both Japanese and English) by Statistics Japan²⁸ and by Tokyo Metropolitan Government in its Tokyo Statistical Yearbook²⁹.

Appendix 2: Definitions of floor area

This appendix reproduces the definitions of floor area used in each of the data sources used for this report.

London: MHCLG, 'EHS 2015/16 – 2016/17 - Dictionary of derived variables'

"The useable floor area supplied in the EHS data represents such floor space as could be reasonably used for habitation. It therefore represents all area within the footprint of the dwelling, minus the three following areas

The area under the external walls

The area under internal walls

The area occupied by staircases.

The area left should thus 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."

New York: US Census Bureau, 'American Housing Survey Codebook'³⁰

Question to respondents: "Thinking about all the rooms you mentioned earlier, as well as the hallways and entry ways in this housing unit, about how many square feet is that?"

Paris: INSEE, 'Enquête Logement en 2013 - Questionnaire'³¹

Original: "Quelle est la SURFACE TOTALE HABITABLE de votre logement, en dehors des pièces professionnelles et des pièces annexes (en m²) ? Ne pas compter les surfaces au sol dont la hauteur sous plafond est inférieure à 1,80 m. Tenir compte de toutes les pièces situées dans le logement, couloirs, pièces de service, cuisine. Ne pas inclure la surface des balcons, loggias, terrasses, cours, garages, parkings, caves, autres sous-sols, combles non aménagés, réserves, remises et vérandas."

Translation: "What is the TOTAL HABITABLE SURFACE of your home, apart from professional rooms and attached rooms (in m²)? Do not count floor areas with a ceiling height of less than 1.80 m. Take into account all the rooms located in the dwelling, corridors, service rooms, kitchen. Do not include the surface of balconies, loggias, terraces, courtyards, garages, car parks, cellars, other basements, undeveloped attics, reserves, sheds and verandas."

Tokyo: Statistics Japan, 'Housing and Land Survey - Explanation of Terms of the 2013 Survey'³²

"The area of floor space refers to the total floor space covering the entrance, kitchen, toilet, bathroom, corridor, earth floor, closets, etc. and rooms used for professional or business purposes, such as stores and offices, as well as dwelling rooms. However, storehouses and garages as well as warehouses, workshops, etc. for a business located separate from the main part of the dwelling were not included in the floor area. In the case of apartments, such jointly used areas as passageways, kitchens and toilets were also excluded."

Endnotes

- ¹ <https://data.london.gov.uk/dataset/housing-research-notes>
- ² As discussed below, population estimates depend on how cities are spatially defined
- ³ For example, all four are classified by the Globalization and World Cities Research Network as among the top ten most connected cities in the global services sector (with London and New York the top two in the world)
- ⁴ Wingham (2016), 'London in Comparison with other global cities'. GLA Economics Current Issues Note 48. <https://www.london.gov.uk/sites/default/files/cin48-international-comparisons.pdf>. The definition of Shanghai used in this report is the provincial one, which includes some rural areas and smaller neighbouring cities.
- ⁵ Reba, Reitsma and Seto (2018), 'Historical Urban Population: 3700 BC - AD 2000' <http://sedac.ciesin.columbia.edu/data/set/urbanspatial-hist-urban-pop-3700bc-ad2000/data-download>
- ⁶ This definition is very similar to that of the Métropole du Grand Paris, an administrative structure established in 2016 which as well as these four departments also includes seven communes in Essonne.
- ⁷ In the cases of London, New York and Paris, the data source for the maps and the weighted density calculation is: European Commission, Joint Research Centre; Columbia University, Center for International Earth Science Information Network (2015): GHS population grid, derived from GPW4, 2015: http://data.europa.eu/89h/jrc-ghsl-ghs_pop_gpw4_globe_r2015a. In the case of Tokyo, the source is Statistics Japan's 2015 Census mesh grid data http://www.stat.go.jp/data/mesh/h27_w.html
- ⁸ Further information on population weighted densities is available from a number of sources, including this publication by the EU Joint Research Centre <https://data.europa.eu/euodp/data/dataset/jrc-luisa-ui-population-weighted-density-ref-2014>.
- ⁹ Data on temporarily occupied homes is taken from MHCLG live tables on homeless households in temporary accommodation, while data on second homes is taken from MHCLG's Council Tax Base 2016. In both cases these are administrative sources and there is some risk of undercount
- ¹⁰ The statistics in this section refer to occupied dwellings only as the tenure of vacant dwellings is typically ambiguous or changeable
- ¹¹ In London and Tokyo these figures refer to floors above ground. In New York, a basement is counted if there are people living in it. The source Paris does not specify whether basements are counted
- ¹² In Paris, 15% of homes in 1999 were in buildings of 9 or more storeys, while in New York 20% of homes in 2017 were in buildings of 11 or more storeys
- ¹³ Being accessible by elevator makes it more likely that homes are accessible to wheelchair users, but it may not always be the case as some apartment buildings may still have stepped entrances, cramped elevators, narrow doors or other barriers
- ¹⁴ Note, the Tokyo figure refers to non-wooden dwellings only, but the number of wooden dwellings with lifts is likely to be very small
- ¹⁵ 'Prime' areas in each city can be an exception to this rule, characterised by larger than average dwellings in relatively central locations, occupied by particularly wealthy households. The Kensington area of London is one example
- ¹⁶ These figures are for occupied homes only, as the floor area of vacant dwellings is generally unknown
- ¹⁷ The New York figure is slightly imprecise as it was estimated from binned data
- ¹⁸ London Datastore, 'Historical Census Tables' <https://data.london.gov.uk/dataset/historical-census-tables>
- ¹⁹ MHCLG, 'Housing live table 125: Dwelling stock estimates by local authority district' <https://www.gov.uk/government/statistical-data-sets/live-tables-on-dwelling-stock-including-vacants>
- ²⁰ ONS, 'Population estimates' <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates>
- ²¹ <https://beta.ukdataservice.ac.uk/datacatalogue/series/series?id=200010>
- ²² Furman Centre, 'State of New York's Housing & Neighbourhoods', various years <https://www1.nyc.gov/site/hpd/about/nychvs.page>
- ²³ <https://www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html>
- ²⁴ <https://www.insee.fr/fr/statistiques/zones/3569225>
- ²⁵ <https://www.insee.fr/fr/statistiques/2586377>
- ²⁶ See 'Housing and Land Survey: Outline of the 2013 Survey' <https://www.stat.go.jp/english/data/jyutaku/2501.html>
- ²⁷ <https://www.stat.go.jp/english/data/jyutaku/index.html>
- ²⁸ <http://www.toukei.metro.tokyo.jp/tnenkan/tn-eindex.htm>
- ²⁹ <https://www.census.gov/data-tools/demo/codebook/ahs/ahsdict.html>
- ³⁰ <https://www.insee.fr/fr/metadonnees/source/operation/s1251/processus-statistique>
- ³¹ <https://www.stat.go.jp/english/data/jyutaku/2502.html>