HOUSING SPRINT

LAND REPORT*

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EXECUTIVE SUMMARY

Available land: There is a perception that Britain is a small country, mainly developed and with little space for more housing. The Barker Report (2006) revealed that more than half the population thought that at least half of the land in the country was developed. As the Land Cover data of 2005 showed this is not remotely true. If gardens are included as 'green', only 27.5 percent of even the GLA area is 'urban' and of South East England only 4.7 percent is covered by any sort of building. The purpose of the Green Belt is to prevent development – not to retain accessible or beautiful countryside: that is the function of National Parks. Areas of Outstanding Natural Beauty protect scenically attractive countryside but do not facilitate public access. Green Belt designation, the purpose of which is exclusively to prevent building, covers1.63 million hectares, 12.3 percent of England's surface: all buildings and gardens, including roads, railways and paths, cover some 8.53 percent of England's surface.

Prices and affordability: Because the stock of houses is so large relative to new building, changes in supply and demand (which of course determine price changes) only have a slow and cumulative effect. So it is essential to look at long term trends. These show that while the real prices of housing and housing land were more or less constant – although fluctuating with the economic cycle as that influenced demand – up until the mid-1950s, since then the real price of housing has increased 4.5-fold and that of housing land 15-fold. Affordability, measured as the ratio of median house prices to median incomes has continued to deteriorate and across British city regions ranged from a low of 2.75 in Burnley to 8.16 in London. International standards suggest a ratio of 3 is acceptably 'affordable'.

New housing supply: Housing supply consists of the stock of existing dwellings and the flow of new development – new supply: in Britain this is commonly only about 1 percent a year of the existing stock. There are two competing measures of new supply: 1) *Net new dwellings*; and 2) *Completions* – new houses built. In this report we favour completions, despite the increasing recent popularity of *net new dwellings* as a measure of new supply. Completed houses built can be unambiguously counted and data have been available for a long period. We show the total for England for every year since 1946 and, for the area now covered by the Greater London Authority, since 1871. More importantly, because net new dwellings net out demolition and include subdivision of existing houses, the shorter is supply, the more this measure exceeds that of completions. When building rates were higher in the 1970s unfit houses were demolished and the incentive to subdivide was weaker, so net new dwellings was a smaller number than completions. The reverse is true now.

The rate of building has been in long term decline. This is most obviously seen in the very long run series for the GLA area: in the nine years from 1930, the mean annual building rate was 63,934; in the nine years from 1960 it was 28,331; and in the most recent nine years 20,202. Moreover building rates are consistently higher in low demand markets than in high demand ones. Over the nearly 40 years from 1980 to 2018 a total of 56,340 houses were completed in Barnsley and Doncaster while population increased in those cities by 22,796. In Oxford and Cambridge 29,430 houses were built against population growth of 95,079.

Land Use: The area of Green Belt land has over the long term been remarkably stable. We found a data source for 1973 which showed that at that time the total area of land already designated or being considered for Green Belt designation was 1,681.1 Ha. Allowing for land

which was switched into the New Forest National Park that would be a total area of 1,633.8 Ha in 1973 compared to the observed total area for 2018 of 1,629.5 Ha.

Over the more than 30 years from 1990 to 2011 in most regions the majority of new residential development was on already developed land. At one extreme, in Wales, 66.3 percent of new housing was on previously undeveloped land; at the other, London, this figure was only 12.8 percent. Over the country as a whole remarkably little land moved from undeveloped land to residential development: the two regions losing the most land to housing were the East Midlands and the South East but even in these regions this was no more than 0.05 percent of the total area.

Land allocation: One of the most unexpected findings of the work embodied in this report is the fact that, despite its importance to the planning process and to the housing market, there is, in effect, no data on the supply of land allocated to housing. There is only one central source of data: the now 10 year old information on the percentage of 5-Years' land supply all those LAs reporting, claimed to have. Apart from its age, this data is not fit for purpose: it is entirely opaque in that the embodied assumptions on expected rates of increase of household numbers and assumed densities are not stated so cannot be tested; even the numbers are not available. Moreover, when we compare these numbers with the little data we have been able to find on actual current supply of allocated land, the two measures are entirely uncorrelated: R^2=0.005.

The alternative source of data is individual LA plans. The LSE team and, before them, Knight Frank, expended considerable efforts trying to collect this data. To do this it is necessary to contact LAs individually. Less than half of all LAs in fact have up to date (approved within the past five years) plans, so much of the data available is up to 20 years old. Although there are national standards for the processes LAs should go through to generate land allocations, this is done by individual LAs and they use different categories of allocation, idiosyncratic methodologies and entirely idiosyncratic reporting systems. So there is nothing that any researcher can classify as consistent information on land allocations. Combining the least unreliable values for those LAs the LSE team obtained with the most comparable values obtained by Knight Frank did yield data on land allocated for 73 LAs. But there must be very considerable reservations about the validity of these numbers. Not only are they uncorrelated with the 2009 measure but they are also totally uncorrelated with past population growth in the LA and since land allocations are supposed to reflect expected future population growth this seems anomalous, to say the least.

Conclusions: There is a serious and growing crisis of housing supply and affordability substantially, but not only, caused by a long term failure to allow enough land to be used for building. This in turn is mainly caused by policy constraints imposed on land supply since the evidence shows that the quantity of suitable land is very great – far exceeding the area of all existing development even avoiding all land with any environmental or amenity designation. There also appears to be a problem with information and a fragmented and idiosyncratic system for allocating land for residential use. Other factors – such as fiscal incentives and infrastructure constraints – are no doubt also significant but outside the scope of this work.

1. The Foundations of our Housing Crisis: two critical myths and misconceptions

This report sets out to inform the debate on land supply and its role in our crisis of housing affordability by providing data, and the best research evidence available, to address two myths or misconceptions on which the crisis is founded.

The first of these is that 'Britain is a small island' so there is just a nature-governed shortage of land for housing and unless we vigilantly ration the space available for building we are in danger of 'concreting over Britain'.

The second misconception is that if our planning system allocates land according to 'housing need', assessed on the basis of forecast growth in local household numbers, then supply of land for housing is in balance; and, by implication, if prices rise and affordability declines something else is at work. Or, in the words of Alain Berthaud:

> "*Urban planners are normative, that is they base their decisions on best practice…high land prices are often deplored but are usually thought to be caused by speculators…few planners make a connection between land prices and rents, and the supply of land and floorspace.* " (Berthaud, 2019, page 9)

The paper proceeds by first assembling information on the actual amount of land in Britain and how it is used and the origins of the 'small island myth'. Modern remote sensing and GIS technology have made collecting data on land use a precise process. We do know how much land is built on, how much is suitable for building on and how much, even though physically suitable and even appropriate in environmental terms, is unavailable because of particular policies. We can also track how much land has changed use over time and what type of land new building has been on. The further back in time we go, the less detailed the answers must be but there is quite good data from the 1930s. To anticipate: the answer to these questions will surprise most people: for example, in 2005 only 4.3 percent of the whole surface of England had any building on it at all.

It then moves on to how the price and so affordability of housing is determined. The price of land in any use is determined by the forces of demand and supply. The demand for land for housing is determined by people's preferences for it as, say, garden space or space inside houses, together with their capacity to pay – determined by incomes. Preferences for any good – including land – are influenced by a number of factors such as household size but also of the consumption of goods like cars, swimming pools or pool tables which are complementary to land. Demand is also of course influenced by the number of people wanting land/housing. 'Need' – until 2018 the only the metric the planning system used to allocate land for housing[1] – has been calibrated only on the basis of projected household numbers. Since 2018 some adjustment is supposed to be made for local affordability but it is too early to judge whether this will make any substantive difference. So the planning concept of 'need' has historically had almost no relationship to the concept of demand but it is demand in interaction with supply that determines price.

[1] Although as we demonstrate in Section 3, what evidence there is contradicts even this rationale for how much land to allocate: actual land allocations are not correlated with population growth.

Economic research, however, has shown quite convincingly that of the factors influencing demand for land, income is by far the most influential (see Cheshire *et al.*, 2014 or Muellbauer, 2018) and numbers have quite surprisingly little impact. On the supply side local land allocations are based only on numbers and price plays no part in influencing how much land is allocated. So we end up with a system where not only does supply not respond to price – local plans do not increase land allocations because houses are expensive – but it ignores the most important influences on demand. So long as our planning system supplies land only on the basis of projected household numbers – 'need' – it is inevitable that it undersupplies land, so inevitably generates ever rising house prices.

Running out of land: the gap between perception and reality

The emotive rhetoric surrounding land supply in Britain, in general, and England in particular, has been significant in conditioning popular perceptions of the availability of land for both housing and other urban uses, as well as the actual supply of unbuilt land. It also distorts both the purpose and effect of land designations such as Green Belts or Areas of Outstanding Natural Beauty, even National Parks.

The emotive use of language designed to influence perceptions is illustrated in phrases such as: 'Britain is a small Island'; or the threat of 'concreting over England' or 'balanced growth'. Whether or not Britain is a small island is a matter of relative perception: smaller than Australia or Greenland but much bigger than Iceland or Singapore. In either case the relevant issue is not how big an island is but how efficiently its land supply can accommodate its demands for space. The claim that there is a danger of concreting over England simply does not bear examination: in the current phrase, it is fake news. As we show below there is not enough concrete in the whole of Europe to concrete over the 72 percent of the surface of the GLA area which is not built on, let alone concrete over England. Balanced growth sounds sensible. But turning it round reveals its rhetorical construction: who could argue for unbalanced growth?

Artistic licence or propaganda: the threat of urban development?

Disentangling misconceptions from propaganda is not as easy as one might think. One can see this in artistic illustrations of the countryside and the 'threat' of development. In this debate arguably one of the most influential illustrations ever is the Punch cartoon of the heroic Mr William Smith answering the call of his country in 1914 and returning to find the idealised rural idyll he left despoiled by foul industrialisation in 1918 (Figure 1). This was influential in that it was used by Clough Williams-Ellis as the visual signature for the book *The Octopus and England*, a book which catalysed the foundation of the CPRE in 1928. But the cartoonist might have been well aware of the distortion it represented: it was, after all, a joke. On the other hand not only was it an emblem of CPRE's foundation but it informed the mind set which established the 1950 Holford Plan for Cambridge. This was explicitly designed to prevent Cambridge 'suffering' the fate of Oxford and experiencing significant economic growth.

This popular perception of the threat to the countryside and the fragility of protected status

by, for example, Green Belt designations, persists as Figure 2 demonstrates. This is from *Private Eye* in 2003.

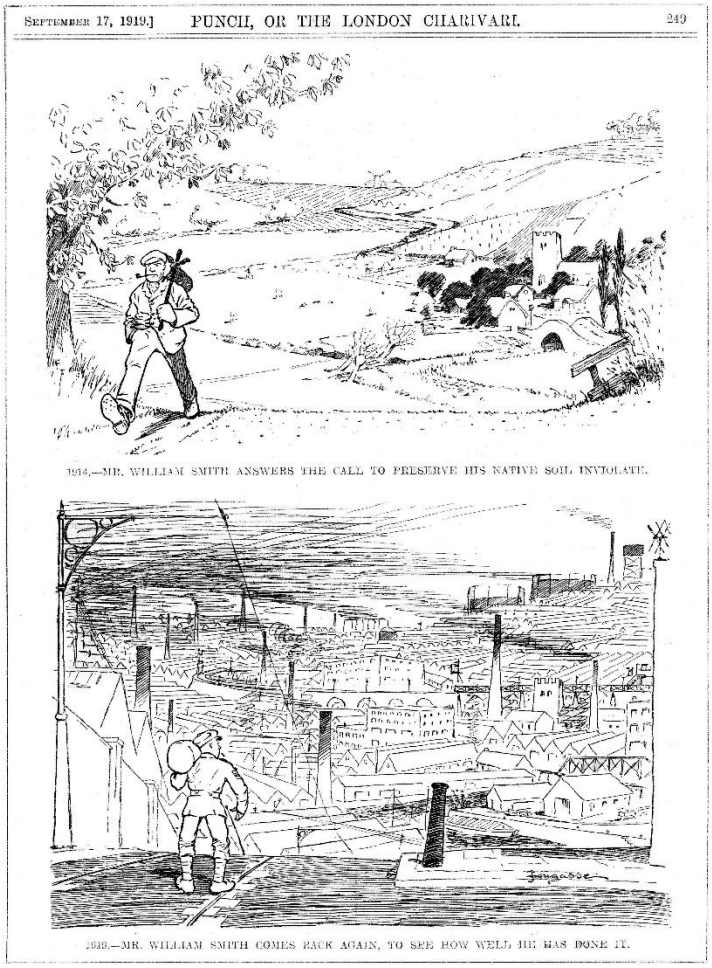


Figure 1: Prefatory cartoon: *Punch*, 17 September 1919

Figure 2: Private Eye 2003

One should not be surprised by these perceptions: they are both informed by, and inform, political pressure groups lobbying for countryside protection or NIMBYism depending on viewpoint. Table 1, taken from Barker 2006, shows that opinion surveys reveal more than half of the population believe that more than half of England is 'developed'. The best data available at that time suggested that the reality was 8.3 percent. More recent and particularly more accurate data available since the Generalised Land Use data for 2005 became available suggests a figure of 9.95 percent might have been more accurate.

Table 1: Public Opinion – What percentage of land in England is Developed?
Perceived % Developed in England

Perceived % land developed	**% responses**
75% or more	10
50 to 75%	21
About 50%	23
25 to 50%	19
25% or less	13
Don't know	15

Source: Barker 2006

What are the facts of Land Use: a summary?

Table 2: Actual Land Use

Sites of Special Scientific Interest	8.2
Special Protection Areas	4.7
Special Areas of Conservation	6.2
Areas of Outstanding Natural Beauty	15.6
Greenbelt	12.9
National Parks	7.6
All Urban Area	8.3/9.95*

Source Barker, 2006: * *Land Use Futures*, 2010

However even that is only a part of the story. Of all the land in urban areas, nearly half that was built–on, was 'green'. This is shown in Table 3. *Land Use Future*'s (2010) results show that of the 9.95 percent of England that they estimated was developed, by far the largest amount of land was devoted to gardens: an estimated 4.27 of the whole extent of England.

Table 3: The different uses of 'urban' land as Percent of All Land in England

Domestic Buildings	1.14
Non-domestic Buildings	0.66
Roads	2.23
Railways	0.14
Paths	0.11
Other	1.4
Gardens	4.27
Total Urban as % England	9.95

Source: *Land Use Futures*, 2010
www.bis.gov.uk/foresight/our-work/projects/current-projects/land-use-futures/reports-and-publications

Tables 4 and 5 then focus on a broad categorisation of land use: in 1) the GLA area; 2) the South East; and 3) England as a whole. Table 4 divides land use into just two broad categories: 'Built' and 'Green' but also shows the area of designated Green Belt. Even in the most built up region of England, the GLA area, nearly 65 percent of the land was 'Green' and the land designated as Green Belt covered close to the area that was built on. Even in the relatively urbanised South East only 4.7 percent of land was built on compared to the 16.6 percent designated as Green Belt.

Table 4: Developed, Green and Green Belt Land: Summary for GLA, South East & England

	All Built	All 'Green'	Green Belt*
London - GLA	27.5	65.0	22.1
South East	4.7	93.7	16.6
England	4.3	94.3	12.4

*Nearly all Green Belt land is in the All 'Green' category: some land is unclassified so numbers do not add to 100
Source: Generalised Land Use Data 2005

Table 5 shows the components of 'Built' and 'Green' for each region in more detail so one can see how land uses are categorised between the two broad types and also see the

Table 5: Land Use percentages in GLA, the South East and England

	Domestic buildings	Other buildings	Roads	Paths	Rail	**All Built**	Domestic gardens	Green space	Water	Other & Unclass.	**All 'Green'**	Total '000 hectares
GLA	8.7	4.7	12.2	0.8	1.1	**27.5**	23.8	38.2	2.8	7.5	**65.0**	159.6
S.E.	1.3	0.7	2.4	0.1	0.1	**4.7**	6.2	84.8	2.7	1.6	**93.7**	1,938.7
England	1.1	0.7	2.2	0.1	0.1	**4.3**	4.3	87.5	2.6	1.4	**94.3**	13,232.4
England 2017	*1.1*	*7.1*				***8.2***	*4.8*	*86.9*			***91.7***	

Note: Classifications changed between 2005 and 2017 so results are not strictly comparable.

Source: Generalised Land Use Data 2005: Land Use Statistics 2017

contribution individual uses make to all land. The main part of the table uses the 2005 Land Cover data. New data became available in June 2019 and the values for England are reported in the bottom row of the table. Classifications changed between the two surveys so most uses are not comparable over time. Again we see the reality; domestic buildings (houses, garages or sheds) relative to gardens cover about the same proportion of land in London as they do in England as a whole. Just, in London, there are obviously many more houses. Even so domestic buildings only cover 8.7 percent of the whole area of London compared to the 38.2 percent which is green space or 23.8 percent is in gardens. Residential buildings and gardens covered almost the same proportion of England in 2005 as in 2017.

Green Belts, Land Supply where people live and commute from

From the above it is clear that Green Belts in England are very extensive. This is illustrated in Figure 3. Moreover although called Green Belts there is no presumption that the land so designated is either green, beautiful or accessible. Most remains in private ownership, the most important use of the land is for intensive arable farming which has significant environmental net costs (Firbank *et al*., 2011) and the only rights of access are by means of public rights of way. The area of Green Belt land relative to the total area of all English Local Authorities (LAs) for each year since 1997 is available at: https://www.gov.uk/government/collections/green-belt-statistics .

Although originally envisaged as 'green lungs' for city dwellers the purpose of the Metropolitan Green Belt as defined when finally designated in 1955 was just to prevent development. As the Minister of Housing, Duncan Sandys, wrote: **"***even if…neither green nor particularly attractive scenically, the major function of the Greenbelt was…to stop further urban development***"**. That remains the function as confirmed in the *National Policy Planning Framework* of 2012. The purpose of Green Belts is to be empty spaces between cities, to protect the Home Counties from the encroachment of London and force urban expansion to jump over Surrey or Hertfordshire to Northants, Cambridgeshire or Hampshire.

Since 1955 Green Belts have been designated for nearly all major English cities. In one respect they have been extremely successful. They have prevented development. We can see this in Figure 4 which shows housebuilding by LA between 2005 and 2015. London's Greenbelt can be identified by where houses were not being built.

Figure 3: Green Belt boundaries

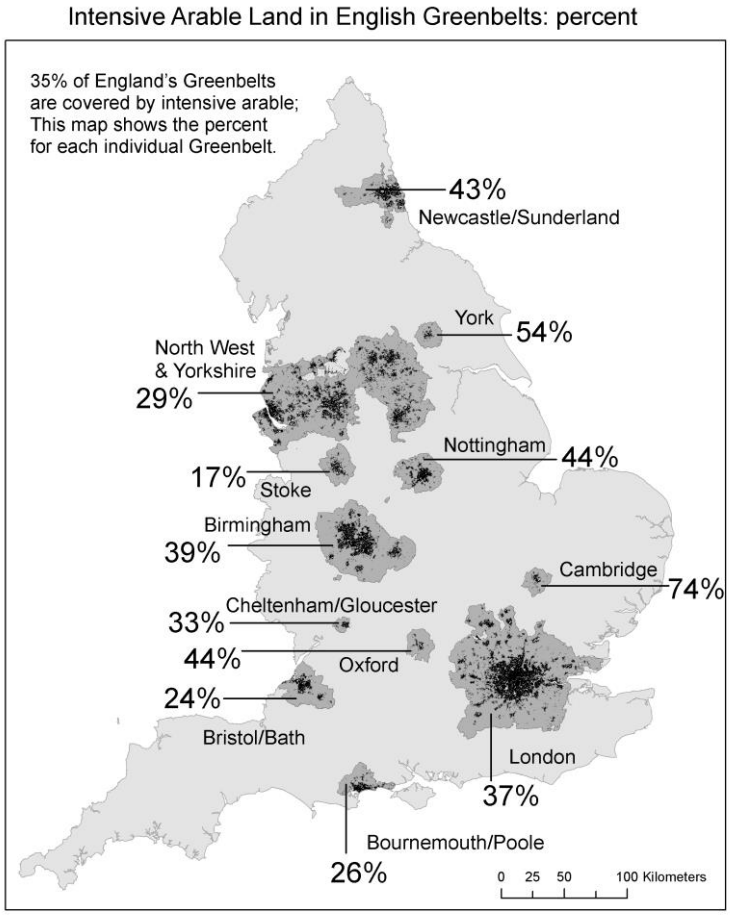
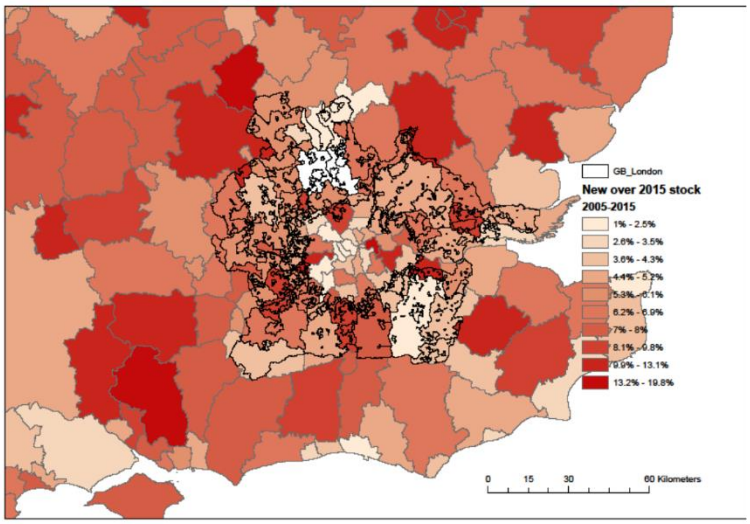


Figure 4: Housing Completions by LA 2005 to 2015, South East England



2. Housing: Supply, demand and affordability

Prices and Affordability

House prices are determined by the interaction of the supply of houses and the demand for them. In turn the affordability of housing is measured as the relationship between the price of houses and household incomes. This is conventionally measured as the ratio of the median household income to the median house price and can be measured for any given geographic area. In economic terms it makes the best sense to analyse housing supply, demand, prices and affordability at the level of the city regions: that is an area centred on a concentration of employment and the area from which people commute to work in those jobs. The reason for this is that peoples' demand for housing is determined by their incomes and most incomes derive from employment[2]. Thus a city-region more or less corresponds to a 'housing market area' with prices determined by demand for and supply of house within it. City-regions also tend to have common institutional and financial arrangements.

We try to follow this recommendation where possible but a major problem is that data tend to be available not for city-regions but for administrative areas such as Local Authorities, Regions or countries. None of these correspond to geographic housing markets except by chance.

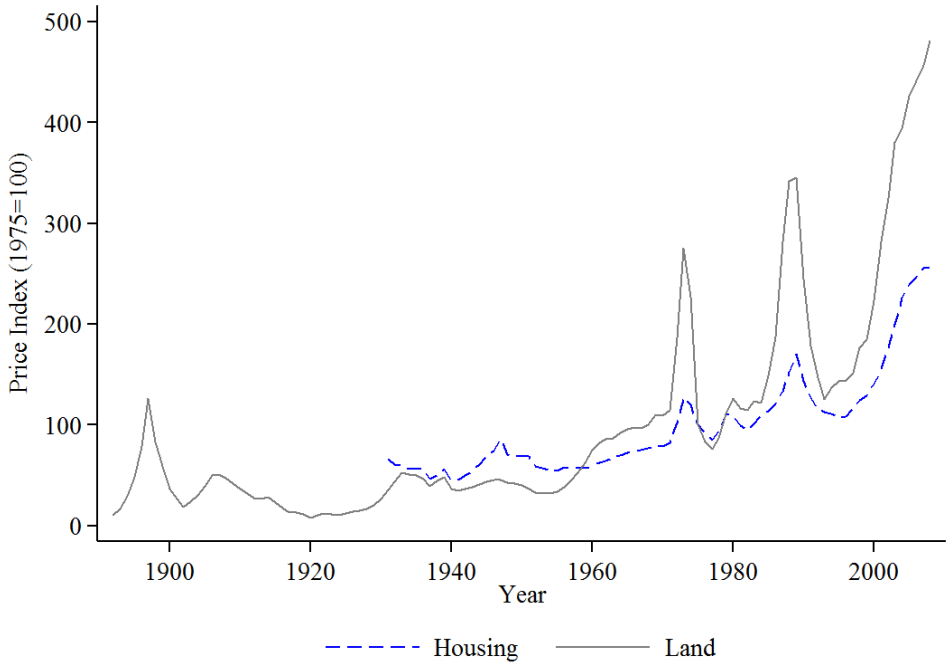
It would seem most logical to start by looking at house prices and how these vary by area and over time and then to move on to look at affordability. Since housing policies do not directly affect incomes we do not provide very much evidence on these except in the Section, below, where we discuss demand.

Prices

Figure 5 shows the real (that is discounted for inflation) prices of land for housing and of houses from 1892 in the case of housing land and from 1930 in the case of houses. We see that although subject to cycles and – when demand rose sharply in the late 19th Century land prices spiked – there was no secular increase in land prices right through from the earliest date to the late 1950's. New land for housing was always available at the edge of urban areas at the cost of agricultural land plus a mark-up for infrastructure. In effect we were making new (urban) land by extending transport infrastructure first with the London Underground and suburban railways and then with new road construction. However after supply of land became constricted by the imposition of Green Belts in the mid-1950s the price of land trended upwards but also became more cyclically volatile. Because the supply became less elastic in upturns the only adjustment was by price (not quantity) and similarly during downturns, only price could change, so changed proportionately more.

[2] There are a few markets in which retired people provide a substantial part of the demand for housing; even a few in which the demand for second homes is significant. But although these latter get much media attention, they are an almost vanishingly small fraction of all housing markets, especially if measured in terms of the number of people living in them. A study in 2008 found only 5 LAs where more than 10 percent of the housing stock was second homes and London Boroughs were two of these. The Isles of Scilly topped the list for rural areas but although proportionately high, the total number of houses was only 222. The study summarised its findings: '*The impact of second homes on house prices and affordability is assumed but not proven. In particular, there is a lack of robust evidence to support the contention that second homes increase house prices.'*

Figure 5: Real land and house price indices, England or England and Wales



Sources: Land prices are from 4 sources:
Vallis (1972a, b & c) *Estates Gazette* – 1892 to 1969 England;
Housing & Construction Statistics – 1963 to 1987 England & Wales;
Property Market Report, Valuation Office – 1983 to 2002, England;
Valuation Office Agency 2003 to 2008, England.
House Prices: ODPM/DCLG: Table 502 Housing Market: House Prices from 1930;
Deflated using the Retail Price Index.

Overall, since constraints on land supply were imposed, the real price of land has increased some 15-fold. Real house prices have also increased and they, too, have become more volatile for similar reasons. But the overall increase in house prices appears to be substantially less. Measurement is imprecise especially over such a long period and the allowances for the changing characteristics of houses both in terms of facilities such as central heating but perhaps more importantly, features such as internal space and plot size may not be accurate. The broad pattern seems clear, however. It is to be expected that if the binding constraint is on land supply the increase in house prices would be relative less than would be the case for housing land itself. Houses can be made smaller and built at higher densities. Less land, in other words, was used in their production as more expensive land was substituted out of the house production process.

These national trends conceal huge variation across space. In 2016 the median house price in Merthyr Tydfil was £87,000 compared to £935,000 in the City of Westminster. The most expensive LA outside the GLA area was Three Rivers, in Hertfordshire, with a median of £497,500. Across English and Welsh city regions at the same date median prices varies from £95,000 in Burnley to £428,260 in London.

Affordability

'Affordability' is most commonly measured as the ratio of median house prices to median incomes. Figure 6 shows how this ratio developed in the 20 years from 1997:

Figure 6: Ratio of Median House Price to Median Earnings 1997 to 2016

This Figure is reproduced from *Housing Affordability in England and Wales 2016* (ONS). Since 2016 housing has become only slightly less affordable but over the whole period the trend is clear: the affordability ratio in England has worsened from just of 3.5 to nearly 8. In the literature a ratio of 3 is usually regard as acceptable so English housing is self-evidently far beyond this norm. Figure 7 maps affordability ratios for Local Authorities and Table 6 shows them for City-Regions for the 3rd quarter of 2016. These are calculated somewhat differently so are not comparable with the ONS data – see Cheshire *et al.*, 2018 for details.

Looking at affordability it is almost inevitable since house prices have risen in real terms that they have become less affordable. Figure 6 tracked this process over the period 1997 to 2016. Table 6 summarises the relative affordability of housing across the major urban regions of Britain for the third quarter of 2016. There was substantial regional variation. Internationally a ratio of median house prices to median incomes of about 3 is supposed to measure a level at which housing is 'affordable'. There was only one urban region in Britain where the affordability ration was less than 3 – Burnley in Lancashire – although there was one in Wales and several in the North of England and Scotland where the ratio was less than 4. In southern England there were few urban regions where the ratio was less than 5. In most of the most productive and attractive urban areas such as Oxford, Cambridge, Exeter or Leamington Spa the ratio was over 6. In the London region – covering most of the Home Counties – the ratio was over 8. Thus in almost all of Britain housing was unaffordable and, in the most productive parts, exceptionally unaffordable

Table 6: UK Urban Regions[1]: Housing affordability Median House Price/Median Incomes

Urban Region[1]	Median House price : median income	**Urban Region[1]**	Median House price : median income
Aberdeen	4.744	Leicester	4.884
Dundee	3.744	Mansfield	3.998
Edinburgh	4.750	Northampton	5.171
Falkirk & Stirling	3.248	Nottingham	4.114
Glasgow	3.502	Bath	7.719
Perth	4.408	Bristol	6.175
Cardiff	4.037	Exeter	6.336
Newport	4.213	Plymouth	5.233
Swansea	3.482	London	8.163
Durham & Bishop Auckland	3.410	Bournemouth	7.136
Middlesbrough & Stockton	4.260	Dorchester & Weymouth	6.453
Newcastle	4.150	Isle of Wight	5.085
Blackburn	3.633	Poole	7.430
Blackpool	4.332	Portsmouth	4.971
Burnley	2.750	Southampton	5.929
Chester	4.755	Swindon	5.405
Lancaster & Morecambe	4.443	Bedford	5.462
Liverpool	3.763	Brighton	7.788
Manchester	4.306	Cambridge	6.759
Preston	4.304	Luton	6.560
Warrington & Wigan	3.718	Medway	5.111
Barnsley	3.408	Milton Keynes	5.365
Bradford	3.720	Oxford	6.365
Doncaster	3.675	Peterborough	4.624
Hull	4.086	Southend	5.969
Grimsby	4.057	**Market median**	4.426
Leeds	4.295		
Sheffield	4.080		
Wakefield & Castleford	3.934		
Birmingham	4.667		
Coventry	4.354		
Dudley	4.233		
Leamington Spa	6.901		
Stoke on Trent	3.728		
Stafford	4.659		
Telford	4.879		
Wolverhampton & Walsall	4.275		
Chesterfield	4.092		
Corby	4.785		
Derby	3.968		
Kettering & Wellingborough	4.559		

[1] These are defined as Travel to Work Areas

Source: Cheshire *et al.*, 2018

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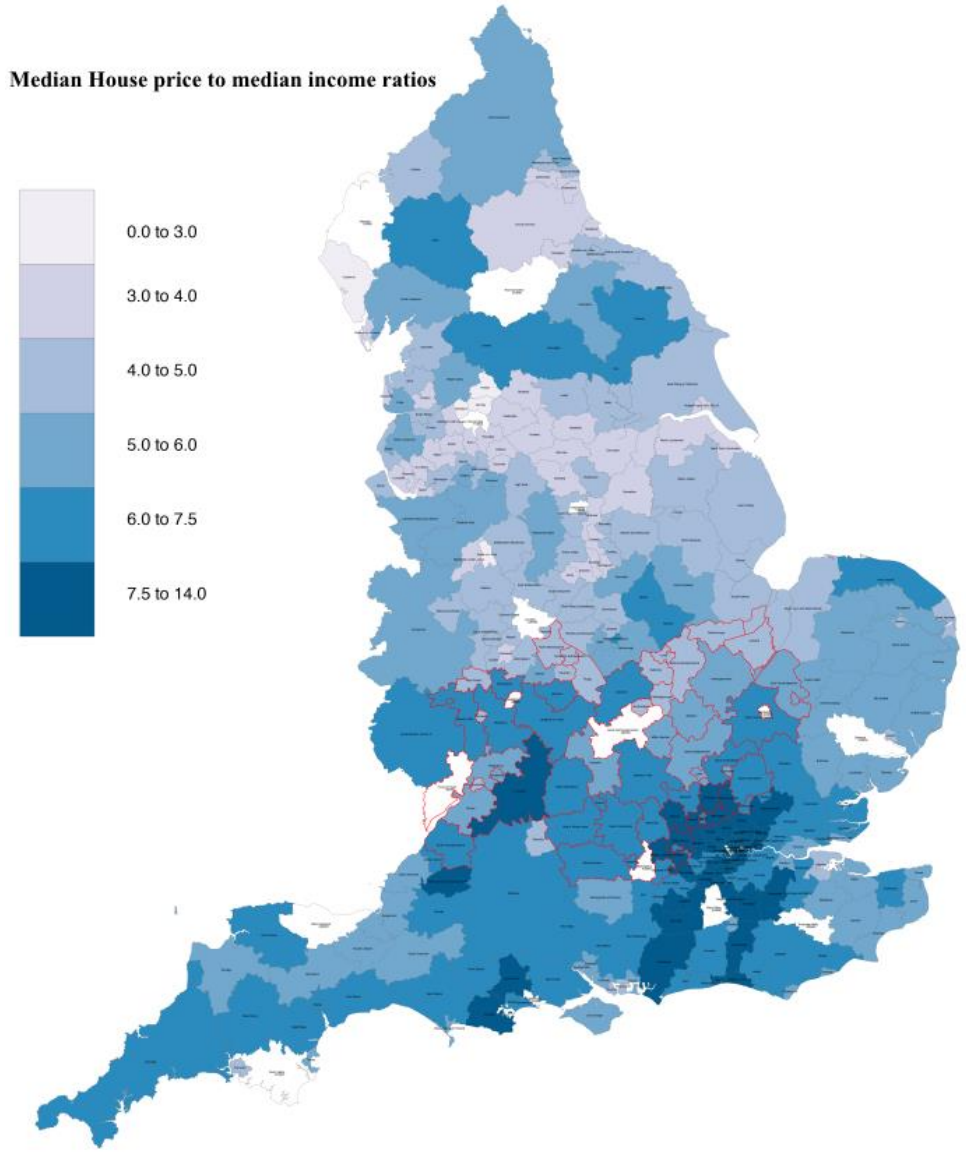
Figure 7 maps comparable information but for Local Authority Areas. These are perhaps not such appropriate areas since they do not often correspond to ‘housing market areas’ defined as the geographical area within which people live and work. However the map shows essentially the same regional pattern of unaffordability.

Figure 7: Housing affordability Median House Price/Median Incomes by LA, 2016



Note: Income data not available for some LAs which are left blank

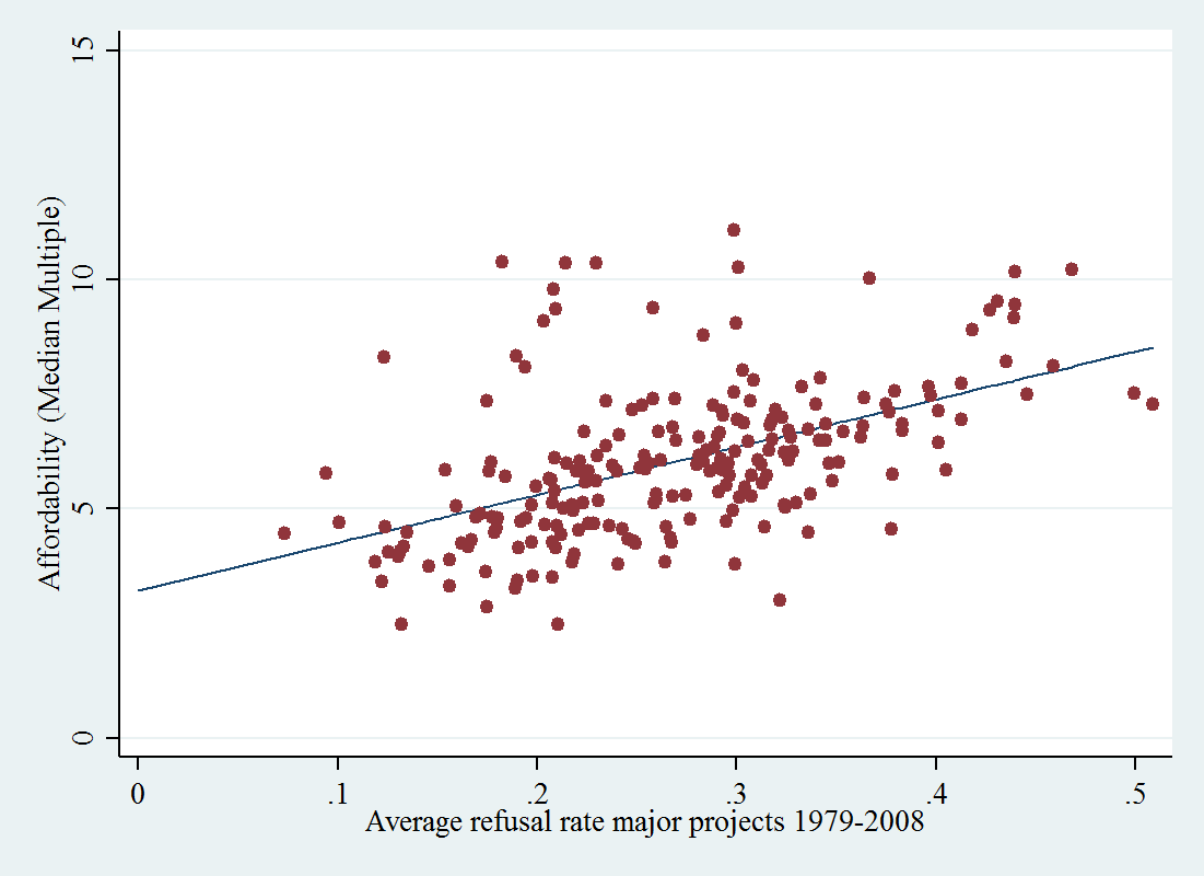
Affordability is, of course, an outcome of the price of houses in a market and the incomes of those living there. It has long been known that the restrictiveness of the local planning system, because this conditions the local supply of new housing, has a strong relationship with the price of housing. Cheshire & Sheppard (2002) showed this and estimated the impact

it had on economic welfare in terms of a measure of equivalent foregone income – think of that as an increase in income tax – in a highly restrictive local market in England. Hilber and Vermeulen (2016) rigorously identified the causal relationship between more restrictive local planning and the price of houses.

Their bottom line estimate was that if, since the early 1970s, the South East of England had been as comparatively unrestrictive as the North East, then house prices in the South East would have been 25 percent lower. This was a clear lower bound estimate since not only was there a degree of restrictiveness in the North East higher than that in many other countries in the world – for example Belgium – but even by 1973 researchers were commenting on the restrictive effect of Green Belts on house construction (see Hall *et al*., 1973).

Figure 8 just plots the general relationship between the long run restrictiveness of Local Authorities, measured by the proportion of major development proposals turned down on average over the period 1979-2008, and the measure of housing affordability in 2016.

Figure 8: The Relationship between local planning restrictiveness and housing affordability



The data underlying this are in Tables 2b and 3 in the Data Appendix

A note on 'affordable housing'

In the public discussion of housing affordability, affordability is often not distinguished from so-called 'affordable housing': that is housing available at below market price or rents. In the past Council housing was the most important source of this but since the introduction of the

'right to buy' in 1980 the stock of social housing in the UK has fallen from nearly 6.5 million units in 1979 to roughly 2 million units in 2017. This, and the squeeze on local government finance since about the same date, has meant that Council housing has almost disappeared in the flow of new construction (see Figure 11 for an illustration of this within the GLA area).

The major source of 'affordable' housing now is via Section 106 Agreements (so called because of the provision of Section 106 of The Town and Country Planning Act of 1990). These result from obligations imposed on developers as a condition of granting planning permission to provide some proportion of the housing built as 'affordable'. Negotiating such agreements is costly for both planning authorities and developers and increases development risk since they affect expected revenues but cannot be known in advance (see Cheshire, 2018 for a detailed discussion). As a result such Section 106 Agreements are often not made, especially by smaller LAs and for smaller developments. Table 7 shows some data from a 2018 study.

Table 7: Percent of Residential Planning Permissions with Developer Contributions 2016/17

	Number of Residential Units							
Type of contribution	0 units (Householder applications)	1 - 9	10 - 24	25-49	50-99	100-999	1000+	ALL
No contribution	96%	64%	45%	28%	26%	26%	7%	89%
S106 only	2%	6%	35%	48%	52%	53%	76%	3%
CIL only	2%	24%	10%	5%	5%	4%	0%	7%
CIL & S106	0%	6%	10%	19%	17%	17%	17%	1%

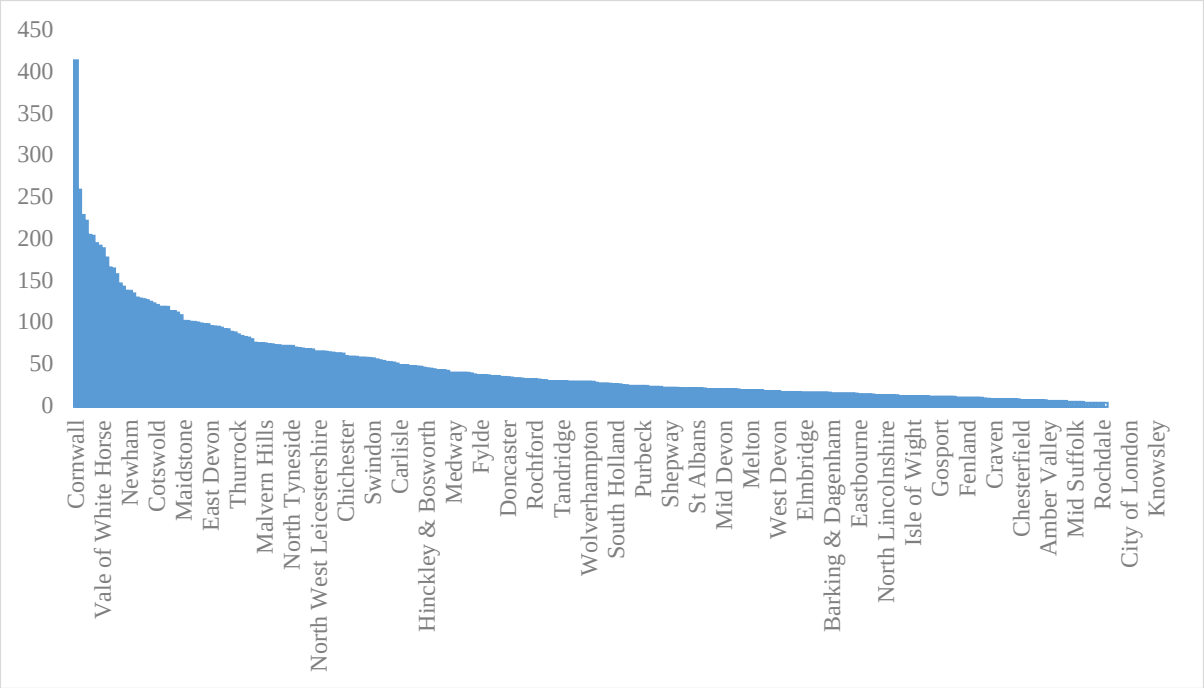
Source: Table 2.7 *The Incidence, Value and Delivery of Planning Obligations and Community Infrastructure Levy (CIL) in England in 2016-17*, MHCLG, March 2018
NOTEs:

- Data in above table derived from a survey of all Local Planning Authorities in England. The response rate to the survey was 46%.
- At the end of 2016/17, 133 out of a possible 339 LAs (39%) were charging CIL

The problem with this data is that while all LAs were surveyed, the response rate was only 46 percent. It is reasonable to assume that more active LAs with a significantly higher probability of charging CIL or imposing Section 106 Agreements, would be more likely to respond so the results almost certainly overstate the proportion of developments with contributions of 'affordable housing'. Nevertheless it will be seen that even for larger developments – between 100 and 999 houses – 30 percent had no planning obligations imposed.

Table 4c in the Data Appendix shows the annual mean construction of Section 106 housing for all LAs from 2015 to 2018. The results are illustrated in Figure 9:

Figure 9: Mean Annual Section 106 provision by LA: 2015-2018



Source: MHCLG Live Table 1111

As can be seen the distribution across LAs is very skewed with 20 of the 326 for which there are data building none at all and more than half of the total of 13,304 per year accounted for by 15 percent of all the LAs. The biggest builders are a very disparate group: Cornwall, Tower Hamlets, Wiltshire and Stratford-on-Avon top the list and account for 10 percent of all Section 106 houses constructed over the period. Moreover, for roughly half of LAs the number of Section 106 properties built per annum over this period is insignificant, less than 20 units.

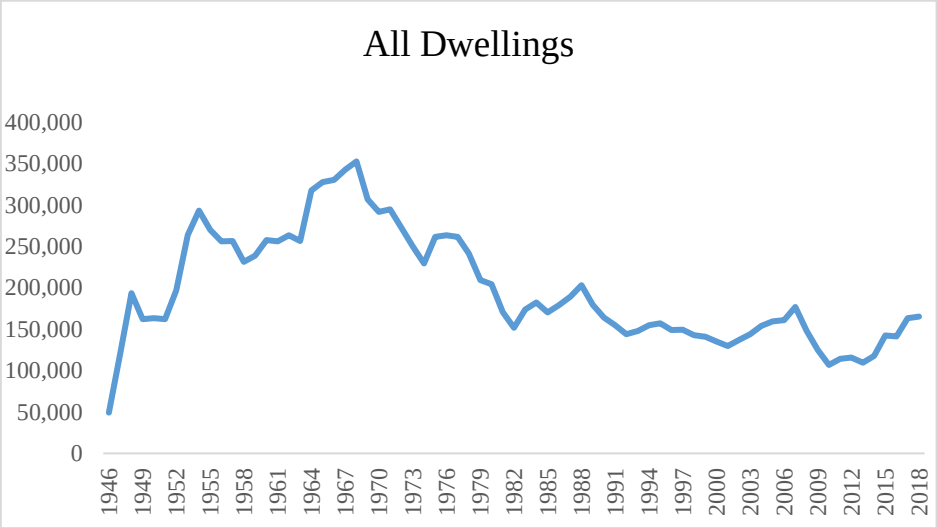
Supply: House Construction

Let us now turn to house construction. There are two competing measures for which one can get data: 1) *Net new dwellings*; and 2) *Completions*. In this report we favour house completions. There are good reasons for this despite the increasing popularity over the past 5 or 10 years of *net new dwellings* as a measure of new supply. Completed houses built can be unambiguously counted and data have been available for a long period. Figure 10 shows the total for England for each year since 1946: Figure 11, just for the area covered by the current GLA, goes all the way back to 1871.

Data for *Net new dwellings*, however, are only available for a relatively shorter period but – more importantly – as a measure of new supply have serious conceptual defects. The number for *net new dwellings* is sensitive to the extent of any housing surplus or shortage. This is because it is the outcome of the difference between construction of new dwellings, the demolition of old ones and the 'new dwellings' resulting from the change of non-residential to residential use or the conversion of existing houses into multiple occupation (or from multiple to single family occupation). In the 1960s, when housing building was high, old,

unfit dwellings tended to be demolished; newly forming households typically moved into their own house or flat; and because housing was relatively cheaper the incentive to convert older, larger houses into flats was less. Over many years, house *completions* was a larger figure than *net new dwellings* because of the demolition of obsolete stock. As the housing shortage became more acute, however, demolitions decreased and older houses were increasingly likely to be renovated instead, and, most recently, some office building has changed use to housing; newly forming households have become increasingly unable to move to their own homes but continue to live with parents. So the more acute the shortage of housing, the more likely it will be that *net new dwellings* is a larger figure than the number of new houses built. This is, itself, a symptom of housing shortages.

Figure 10: Permanent Dwellings Completed, England 1946-2018



Source: Live Table 244: MHCLG

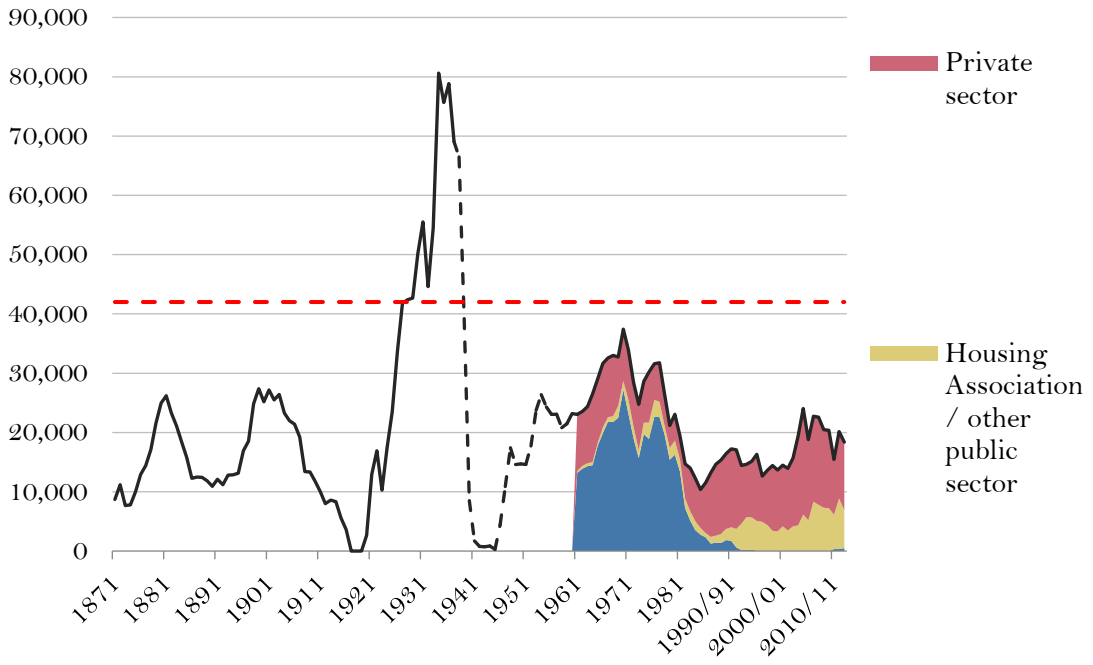
As we can see from Figure 10 new construction increased rapidly after WWII, peaking in the late 1960s at about 350,000 a year. It then went into decline. Numbers are sensitive to the economic cycle with troughs in the early 1980s, the early 1990s and again after 2007. The point to note, however, is that since 1970, despite a slight recovery from 2008/12, the total number of houses built at each peak has been less than at the previous one and each successive trough has been lower. There has been a 50-year secular decline in house building.

This is even more obvious from Figure 11 which shows 150 years of data for the area covered by the current GLA. The post WWII pattern is apparent but even the peak of the 1970s is far below that of the 1930s. When house building was able to respond freely to changes in demand, building was able to really boom: in several years during the 1930s, during the worst recorded economic downturn in 125 years, building was around 80,000 a year. Even in the 19th Century more houses were built in the booms than in the post 1980 period. House building capacity seems simply to have collapsed.

This collapse of house building and the increasing unresponsiveness of housing supply to demand has sometimes been blamed on the collapse of Council house building. Again the long run historical data for the GLA area shows that this is not the case. Certainly it is true that Council houses accounted for a substantial proportion of the building in the immediate

post WWII period and in the peak building of the 1970s. But they accounted for only a very small proportion of house building before WWII when many more houses were being built.

Figure 11: House Building within current GLA Area 1871 to 2012/



Sources: Compiled by GLA from:

- 1871-1937: Report of the Commissioner of the Metropolitan Police, via Quandl.com;
- 1946-1960: GLA estimates based on national data from 1946 to 1960 (DCLG, Live Table 244) and London's share of the national total before World War II (from B. Mitchell, British Historical Statistics, p392);
- 1961 to 1969: Annual Abstracts of Greater London Statistics;
- 1970 to 1989: Data provided to GLA by DCLG;
- 1990/91 to 2012/13: DCLG house building statistics

Table 8: Completions by LA 1980 to 2018 Relative to Population Change

Local Authority	New Houses 1980-2018*	Population 2011	Change in population 1981 to 2011	House building minus Population growth relative to 2011 population
Bristol	31260	428234	43359	-0.028
Cambridge	14980	123867	36673	-0.175
Middlesbrough	13510	138412	-10788	0.176
Burnley	7140	87059	-6219	0.153
London GLA	647970	8173941	1565428	-0.112
Oxford	14450	151906	58406	-0.289
Barnsley	27950	231221	7318	0.0892
Doncaster	28390	302402	15478	0.043

*In total there are 11 missing observations affecting Middlesbrough, Oxford, Barnsley and Doncaster: these were interpolated to eliminate missing observations.

Source: Live Table 253 for 2019 https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building

Table 8 makes a different point: not only are fewer and fewer houses being built in England but they are not being built where population is growing. It shows total new construction for a selection of LAs over the 38 years from 1980 and compares that to population growth (or decline). The last column tries to provide a simple measure showing the relationship between these two variables. It shows the difference between the total number of houses built in the LA and the change in population between the Censuses of 1981 and 2011; and then expresses that relative to the size of the population in 2011. So in Bristol there was a substantial number of houses built – 31,260 – but population increased by 43,359. So the difference is negative and, expressed relative to the size of Bristol in 2011 is -0.028. Oxford's population growth outstripped its house construction by the most, however, so the equivalent figure is 0.289. Middlesbrough and Burnley are at the opposite extremes with declining population over the period but quite strong housebuilding. For those areas the final ratio is around 0.15/17. It is not a surprise to find in the Data Appendix Table 2b both – particularly Burnley – are amongst the most affordable LAs in England: and, from Data Appendix Table 3, are – especially Middlesbrough – amongst the least restrictive in planning terms.

By differentially steering what house building there is to areas that are less restrictive in planning terms (including because there is more land not constrained by Green Belt designation) and where there is more 'brown field' land, new houses have been diverted to older industrial areas. The demand for housing is, however, strongest where income earning opportunities are best (and jobs are most productive) and population is growing. Over 38 years less than 14,500 houses in total were built in Oxford, for example, yet still its population increased by a third. So it is no surprise to see from Table 6 that with a median house price 6.4 times its median income, Oxford's housing market is one of the least affordable in Britain.

The Evolution of Housing Demand

We turn now to a brief discussion of long-run changes in housing demand over the last 4 decades. Housing is a peculiar good in that it is both a consumption good providing 'housing services' and an investment – an asset providing a return both in terms of rent (or housing services consumed directly by the occupier) and a capital return via appreciation. Demand for housing services is dominated by households, in their role of owner occupiers or renters of housing stock. But owner occupiers ae also consumers of housing services and capital returns. The main driver of demand for housing services is incomes but arguably demand for housing as an asset is also driven by expected future prices, themselves an outcome of past price increases. Prices are determined endogenously in housing market equilibrium and themselves depend on supply. Incomes are largely determined separately. A large literature in housing economics has sought to estimate the income elasticity of housing demand. In the United Kingdom, the estimated income elasticity of demand is typically above 1 (see Cheshire & Sheppard; 1998) and Andrew & Meen; 2003); even above 2 (Meen, 2013; Auterson, 2014). Therefore, we expect demand for housing to at least increase proportionately with income and likely more than proportionately with it.

The left panel of Figure 12 illustrates the long-run evolution of average real wages between 1975 and 2017, measured in 1995 GBP. We can observe that there has generally been a long–run trend to higher incomes, in line with economic growth in the country. Since 2007, real

wages fell for roughly 4 years before stabilising around 2002 levels. Still, the overall long-run trend is undoubtedly positive, so we would expect a large increase in housing demand over this period. Regional trends have largely followed a similar long-term path (not shown), with slightly faster growth rates in the South over the last two decades.

Figure 12: Fundamental Drivers of Housing Demand

Note: Left-panel represents real average gross hourly wages for full time employees in the United Kingdom. The sources are the New Earnings Survey (1975-1997) and the Annual Survey of Hours and Earnings. Series deflated using the long-term indicator of prices for consumer goods and services. Right-panel represents the number of private cars per capita in Great Britain. Data from the Department for Transport statistics.

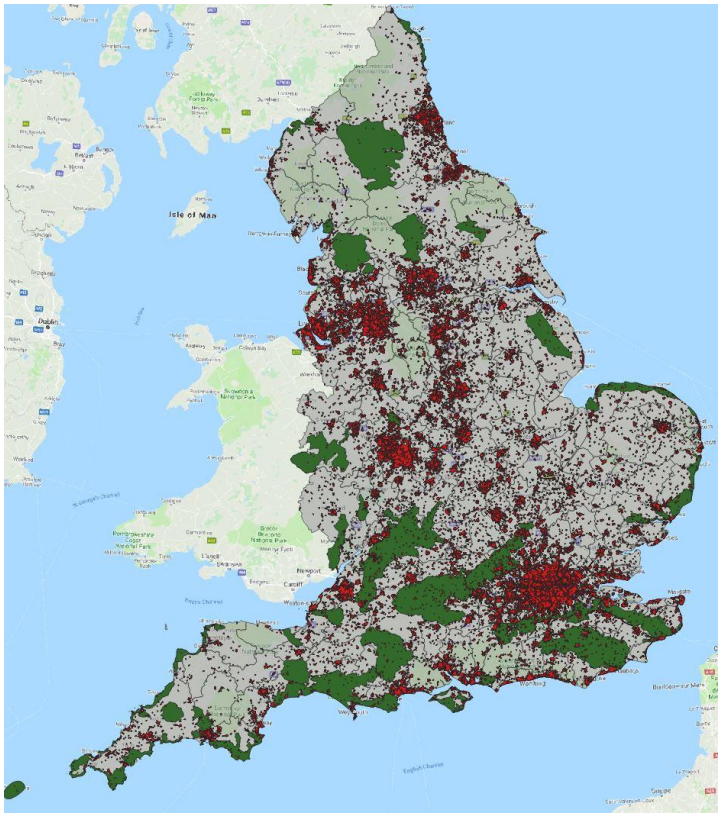
In order to explore determinants of demand further, we look at the long-run evolution of car ownership by UK households. Car ownership has been argued to be complementary with both the consumption of housing and land consumption, so that increases in ownership over time could add to the long-run trend increasing housing demand, especially for housing land. The time-series for the number of private cars per capita is reported in the right-panel of Figure 12. We observe a substantial sustained growth in this number which approximately doubles over the whole period. Data from the National Travel Survey also indicates a slight increase in the number of cars per household over the last 15 years.

These results emphasize that the fundamentals driving demand for houses and housing space have had a positive evolution over the long-run. It should not be very surprising that a long-run increase in demand coupled with a supply which is unresponsive to price changes have led to higher prices after this increase in demand. In turn the appreciation in real house prices (see Figure 5) fuels the demand for houses as assets, especially since the financial crisis and resulting very low returns on other asset classes.

3 Land Use and Changes in Land Use

To understand the role of land availability as an obstacle for new development as well as the role of Green Belts as binding land use constraints, we conduct a quantitative description of changes in land available for development in each English region. Combining digitized cartographic data from various sources, we compute the amount of land available for development in each region, as well as the fraction of this land which is designated as Green Belt and how these changed between 2000 and 2018. The point of this exercise is really to answer the questions: have there been substantial changes in the amount of available land for development? How binding is the Green belt as a constraint for development? In the conclusion we briefly look at one example of how Green Belt land might be used for development: the area of land within 800 metres of stations giving access to London Zone 1 within 45 minutes that has no designation or feature preventing its development except that it is designated as Green Belt.

Figure 13: Land Use: Total Developable Land in England



Note: Sample of spatial data used to compute land available for development: red polygons correspond to developed or partially developed areas using the 2018 version of CORINE land cover remote-sensing data. Green polygons correspond to areas of outstanding natural beauty.

A second set of 'scene setting' information is shown in Tables 9a & b. These provide aggregative data on the quantity of Green Belt land in England over time and its distribution between regions. There are several points to note: as far as we are aware this presents the first detailed information on the area of Green Belt land designated, or being considered for designation, before 1997. It is noteworthy how close that total is to the actual total of Green Belt land in 1997 – the first year for which there are official statistics. The second point to

note is how stable the total area has been over time. There was a redefinition in 2005/6 re-classifying Green Belt land near Bournemouth to the New Forest National Park. Allowing for that, the total area of Green Belt land in 1997 was 1,605,000 Ha compared to 1,629,510 Ha in 2018.

Table 9a: Area of Green Belt land in England 1973 to 2018: '000 Hectares

	1973	**1997**	**2003**	**2004**	**2006***	**2007**	**2008**	**2009**	**2010**
Area of Green Belt	1,681.1	1,652.3	1,671.6	1,678.2	1,631.8	1,635.9	1,639.7	1,639.5	1,639.5
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	
Area of Green Belt	1,639.5	1,639.2	1,631.8	1,638.6	1,636.5	1,635.5	1,634.6	1,629.5	

* **Note:** From 2006, estimates exclude the area of Green Belt land in New Forest DC and Test Valley BC (47,300 hectares) which were designated as New Forest National Park in 2005. National Park status confers a higher status of protection in relation to landscape and scenic beauty than Green Belt. The conservation of the natural beauty of the landscape and countryside should be given weight in planning decisions in these areas. Allowance needs to be made for this redesignation in comparing areas of Green Belt before and after 2005.

Table 9b: Regional distribution of Green Belt land, 1997 to 2011: '000 Hectares

Region	**1997**	**2003**	**2004**	**2006***	**2007**	**2009**	**2010**	**2011**
North East	53,410	66,330	71,910	71,910	73,000	72,990	72,990	72,990
North West	255,760	260,610	260,590	260,310	260,300	262,770	262,770	262,770
Yorks. & Humber.	261,350	262,640	262,640	264,930	264,450	264,640	264,640	264,640
East Midlands	79,710	79,520	79,480	78,900	79,000	78,930	78,930	78,930
West Midlands	269,170	269,140	269,460	269,260	268,770	269,380	269,380	269,380
East Anglia	26,690	26,690	26,750	26,300	26,270	26,100	26,030	26,030
Greater London	35,220	35,220	35,220	35,220	35,220	35,220	35,220	35,220
South East	565,100	565,250	566,190	498,670	519,020	519,490	519,450	519450
South West	105,900	106,180	105,950	106,330	109,640	110,130	110,130	110,130

* **Note:** From 2006, estimates exclude the area of Green Belt land in New Forest DC and Test Valley BC (47,300 hectares) which were designated as New Forest National Park in 2005. National Park status confers a higher status of protection in relation to landscape and scenic beauty than Green Belt. The conservation of the natural beauty of the landscape and countryside should be given weight in planning decisions in these areas. Allowance needs to be made for this redesignation in comparing areas of Green Belt before and after 2005.

Sources: Data for 1973 refer to the total of Green Belt areas 'Approved' and 'Under Consideration' as identified on the Map of Cherished Land produced by the *Geographical Magazine*, 1973. All other data derive from *Local Authority green belt statistics for England*, MHCLG various dates.

Table 10 assembles these data to show changes in the total land available for development. To do this we first compute the fraction of each region that is unavailable for development because it is physically unsuitable (e.g. coastlines, river banks or mountainous terrain), has been identified as having some intrinsic environmental or aesthetic value, or is already developed.[3] Next, we obtain estimates of total developed area per region. For this purpose, we use data from the 2000 and 2018 editions of CORINE. With this spatial information, we can obtain an estimate of land unavailable for development by merging the areas with intrinsic environmental value, the estimates of developed area, and other unavailable land (e.g. coastlines, flood plains, bogs). Finally, using spatial data on the location of land

[3] Area of Outstanding Natural Beauty (AONB), a National Park, a Site of Special Scientific Interest (SSSI)

denominated as Green Belt, we can identify what is the fraction of land available for development taken up by this constraint.

Table 10: Changes in Land available for development 2000 to 2018

	Changes 2018-2000		
Region	Available for development	Estimated Undeveloped Land **within the 2017-2018 Greenbelt**	Green Belt as % of Developable Land
North East	-1.10%	-0.10%	0.20%
North West	-1.40%	-0.20%	0.40%
Yorkshire and The Humber	-1.60%	-0.10%	0.50%
East Midlands	-1.50%	0.00%	0.10%
West Midlands	-1.30%	-0.20%	0.20%
East of England	-2.20%	-0.30%	-0.10%
London	-2.20%	-1.20%	5.90%
South East	-1.90%	-0.50%	-0.20%
South West	-1.20%	-0.10%	0.00%

Note: Change in percentages of total regional area for NUTS1 regions in England in first and second column. First column records the change between 2000 and 2018 in total land available for development. Land is unavailable for development if it lies in an AONB, an SSSI, National Trust Land, National and Country Parks, it is developed or is physically unavailable for development. Developed land estimated from CORINE 2000 and CORINE 2018. Column 2 records the change in fraction of regional area that is both available for development and falls within the Green Belt. Finally, column 3 records the change in the fraction of estimated land available for development taken up by the Green Belt.

We illustrate a sample of this spatial data in Figure 13. Red polygons correspond to the areas identified as developed or partially developed in the 2018 edition of CORINE. Green polygons correspond to Areas of Outstanding Natural Beauty. When computing changes in land use over time, we will consider both of these categories as containing land that is undeveloped and unsuitable for development, respectively.

Changes in available land resulting from this spatial analysis are summarized in Table 10. All reported figures correspond to changes between 2000 and 2018. The first column records the change in the fraction of the total area of each region that is available for development. We can see the fraction of land available for development has only changed slightly, by 1 or 2 percentage points of regional area over this 18-year period. Given that the CORINE data will assign interspersed development as urban land, this is likely to be an over-estimate of the change in developed land at the urban fringes. It is important to know that, with the exception of London, 40% or more of the land in English regions is physically suitable for development, is not protected by virtue of its natural or aesthetic value or is developed. This change in the area available for development in these regions over a 20-year period is therefore relatively small.

In column 2 of Table 10, we compute how much of the change in the total regional area that is available for development *and* is designated as Green Belt. We observe that there are

essentially only small changes in the amount of developable land in Green Belts over this period.

To obtain a more intuitive measure of the significance of Green Belts for land availability, we compute the fraction of all land available for development falling within these areas and their changes over time. Again, there is little change. In the case of London, we observe that the fraction of available land falling in Green Belts has increased, so that the constraints imposed by this designation are tighter now than 2000. According to our calculation, the fraction of available developable land that falls within the Green Belt in Greater London increased from 89.5% to 95.4% of all land.

CORINE is a very useful source of land use data since it has been available since before 2000 and covers the whole of Western Europe in a comparable way. However its resolution is not very precise. It does not allow gardens for example to be estimated independently of houses and its category of 'Continuous' urban space is very restrictive while its category of 'Discontinuous' urban space includes some very low density areas.[4]

Table 11: Developed, Green and Green Belt Land: percent

Region	Domestic Buildings	Other Buildings	Roads & Paths	Rail	All Built	Domestic Gardens	Green Space	Water	All 'Green'	Other & Unclass.
North East	0.899	0.510	2.101	0.143	3.653	2.412	91.188	1.708	95.308	1.040
North West	1.356	0.809	2.842	0.169	5.175	4.171	82.894	6.189	93.254	1.571
Yorks & Humb.	1.000	0.640	2.158	0.167	3.965	3.301	89.678	1.756	94.735	1.299
East Midlands	0.917	0.548	1.919	0.118	3.502	3.469	89.746	2.079	95.294	1.204
West Midlands	1.242	0.813	2.597	0.127	4.780	4.859	87.797	1.043	93.698	1.522
East of England	0.948	0.529	1.877	0.095	3.449	4.126	88.102	3.009	95.236	1.315
G. London Area	8.706	4.719	13.049	1.073	27.546	23.847	38.225	2.837	64.909	7.545
South East	1.319	0.653	2.571	0.144	4.688	6.202	84.813	2.723	93.738	1.574
South West	0.781	0.449	1.835	0.072	3.137	3.075	90.746	1.972	95.793	1.069
England	1.139	0.657	2.337	0.136	4.267	4.266	87.469	2.597	94.332	1.399

Source: Generalised Land Use Data 2005

To provide a detailed snap shot of the total pattern of land use, therefore, we prefer to rely on the 2005 Land Cover data (used for Tables 4 and 5) and shown for all English regions in Table 11. This confirms what a small proportion of England has any buildings on it and how 'green' our cities are. Table 12 confirms how little transfer of unbuilt land there has been into

[4] To illustrate: the swathe of land more than half km wide and 1.75 km long running north of the Thames in central London including The Inns of Court, Lincolns Inn Fields, Mecklenburg Square and Coram Fields is classified as 'Discontinuous' urbanisation although every built part of it is closely packed and high density; but in the outer fringes of London individual buildings and small settlements surrounded by open land may be amalgamated into a single polygon of 'Discontinuous' development.

residential use over the longer period 1990-2011. So we can still rely on the 2005 data to provide a reasonably accurate picture of the overall pattern of land use.

Land Use Change and Residential Land

We next study land use changes towards residential use specifically. In doing so, we want to show how much of the actual change in land resulting in new residential stock comes from previous uses. With this information, we can measure how much of the change to residential use comes from land that was previously used for housing, and how much was built on land previously undeveloped. Finally, we can calculate the extent to which new housing development has made significant reduction in land available at the regional level by reporting it as a fraction of total regional land.

There are no readily available digitized spatial datasets identifying changes to residential use. We therefore switch to using the Land Use Change Survey (LUCS) for this analysis. LUCS reports all land use changes yearly between 1990 and 2011 with a field indicating the location and size of the plot experiencing a change in use. Its source are updates of the maps produced by the Ordinance Survey. Moreover, it identifies changes between uses very precisely and so is ideal for our purposes. Using this information, we can compute total changes to residential use in the period 1990-2011 by local authority and region. The methodology used to compute these data changed in 2012 but for those values for which we judge it is not too misleading we show changes using the new series from 2015 to 2018.

Table 12: Where is new residential land coming from?

Region	**All changes to residential land use (Ha)**	**From Previous Residential Land (% of all change to Residential)**		**From Previously Undeveloped Land (% of all change to Residential)**		**From Previously Undeveloped Land (% of all Region Land)**
		1990-2011	2015-18	1990-2011	2015-18	
East Midlands	13535	13.76	9.95	57.78	55.85	0.050041528
East of England	18388	21.32	10.06	49.31	46.29	0.047407832
London	5063	27.91	21.55	12.79	17.38	0.041150372
North East	5287	8.86	7.39	52.62	54.18	0.032376422
North West	14364	12.03	12.48	40.85	44.30	0.041436104
South East	21780	27.46	12.39	44.38	48.26	0.050643086
South West	13252	18.68	14.54	60.05	51.21	0.039227222
Wales	2070	17.39	…	66.28	…	0.019173388
West Midlands	11440	15.23	8.24	47.94	53.91	0.042176727
Yorkshire and The Humber	12149	14.97	11.77	46.83	48.71	0.036915072

Note: Changes in Land Use obtained from the *Land Use Change Survey*: Period 1990-2011 and MHCLG Land Use Change Statistics Table P302**.**

The main data in Table 12 correspond to the period 1990-2011 and have been aggregated at the regional level (data aggregated at the local authority level are provided in the Data Appendix Table 6). Several things stand out. First, we observe that a substantial amount of the changes to residential use originate in land that was already used for residential purposes. These

land use changes are simply re-development of previous residential land and do not add to the share of land taken up by housing. Second, we observe that in most regions less than 50% of new development takes place in Previously Undeveloped Land. This number is remarkably low in London, but also moderate in the high demand areas of the South East. Finally, the fraction of land in each region going from undeveloped land to residential use over this twenty-one year period is tiny across the board, encompassing a maximum of 0.05% of all regional land. This final point is important to understanding that residential development in England and Wales has essentially made no dent on the amount of green field land available. The notion that expansions in residential stock are happening at the expense of large, even significant swathes of rural land is simply inconsistent with observed changes in land use.

The NPPF in 2012 introduced measures designed to reduce 'garden grabbing'. If this is defined as the proportion of new development occurring on previously developed land then the conclusion would seem to be that the policy change had no real effect. The data for 2015 to 2018 show that in four regions the use of undeveloped land increased but in five it fell but in no region except possibly London, was that change at all significant and the opposite movement in the South West was as substantial.

How much land is available at LA level?

What Local Authorities do

At present LAs are responsible for allocating land for development on the basis of projected household growth in their areas. They commonly do this informed by a Strategic Housing Market Assessment (SHMA). They will also provide a Strategic Housing Land Availability Assessment (SHLAA) which is a technical exercise to determine the quantity and suitability of land potentially available for housing development; in addition there is supposed to be a Housing and Economic Land Availability Assessment (HELAA). Together these feed into the Local Plan which identifies actual sites suitable for development. Finally LAs are supposed to provide estimates of the proportion of a five year housing land supply they have allocated.

Since all these functions are devolved to LAs there is great variability in the extent to which they are carried out, the methodologies and precision with which tasks are executed, the form in which the information is made available and even whether the tasks are done at all. LAs are supposed to have a local plan which is 'up to date' i.e. approved and adopted within the past 5 years. As at end October 2018 of the 338 LAs for which there was data, only 45 percent had such a plan; a further 41 percent had an older plan but while it was not up to date they were in the process of devising and approving a new one; and 14 percent had no adopted local plan.

Given this variation in the state of local plans it is not surprising that there is no consolidated knowledge of how much land is available for housing or where that land is. This is aggravated by the fact that local plans are just that: local. They are not held or made available in any comparable, even systematic way. To discover how much land has been allocated or where that land is, it is necessary to address each LA individually. The data is held in a variety of ways: some in accessible GIS formats; some in private GIS formats but much is in a pdf format, usually, but not always, publically accessible; some LAs just do not have information.

The most recent date for which there is a central record of 'Years Land Supply' is 2009. LAs reported the percentage of a 5-year supply they claimed they had allocated. Summary results for the regions are shown in Table 12. For this purpose National Parks are classed as planning authorities. Including these, 313 of the 363 LAs reporting – 86 percent – claimed to have 5-years of land supply for housing. The problem with these numbers, however, is that not only are they unverifiable but the assumptions underlying them are not available. They implicitly rest on both projected growth in household numbers and assumed densities.

Table 12: 5-Year Land Supply

		Number of local planning authorities	
Government Office Region	**Reporting**	**With 5 year land supply**	**As percentage**
North East	23	21	91
North West	43	39	91
Yorkshire and Humberside	21	17	81
East Midlands	40	31	78
West Midlands	34	31	91
East of England	48	41	85
London	33	30	91
South East	67	59	88
South West	45	35	78
National Parks	9	9	100
England	363	313	86

Source: MHCLG: https://webarchive.nationalarchives.gov.uk/20120920065012/http://www.communities.gov.uk/publications/corporate/statistics/landsupply2009

For the purposes of this report we have gone to considerable efforts to collate data on actual land available from as many LAs as possible. This work was partly done already by Knight Frank but has been augmented with data for all London Boroughs and nine additional LAs by the LSE team. Figure 14 plots the relationship between the years of land supply claimed to have been identified by LAs in 2009 and the actual areas of land shown in their local plans. It can be seen that the relationship is more or less random. Newham and Aylesbury Vale, for example, were two of the authorities with the lowest claimed land supply on the 2009 percent of 5-years' supply measure but had amongst the largest quantities of identified and allocated land per resident in 2018/9.

Not only because of the fact that is it 10 years old but also because of its opacity and apparent randomness we do not place any reliance on the percentage of 5-years' land supply reported by Local Authorities although the values are reproduced in the Data Appendix Table 7a.

Unfortunately it is difficult really to conclude very much from the data we have been able to assemble on land actually identified for development in current Local Authority documentations either. It is very incomplete, not systematic and seems to employ different definitions and criteria. So it is not comparable across LAs nor, so far as we can see, do the quantities identified follow any obvious logic. Combining the data the LSE team collected with those of Knight Frank yields 73 LAs for which we have some degree of belief in the comparability of the land allocation data. For these 73 LAs we defined shape files for all

areas identified from documentation associated with their SHLAAs. These were mapped and their areas calculated.

Figure 14a and 14b show two scatter plots for the resulting data in relation first to the 2009 values for the percentage of a 5-Year land supply reported by the same LA (Figure 14a) and related to outturn population growth between 2001 and 2011.

Figure 14a: Land allocations 2018/2019 & Reported % of 5-Year land supply 2009

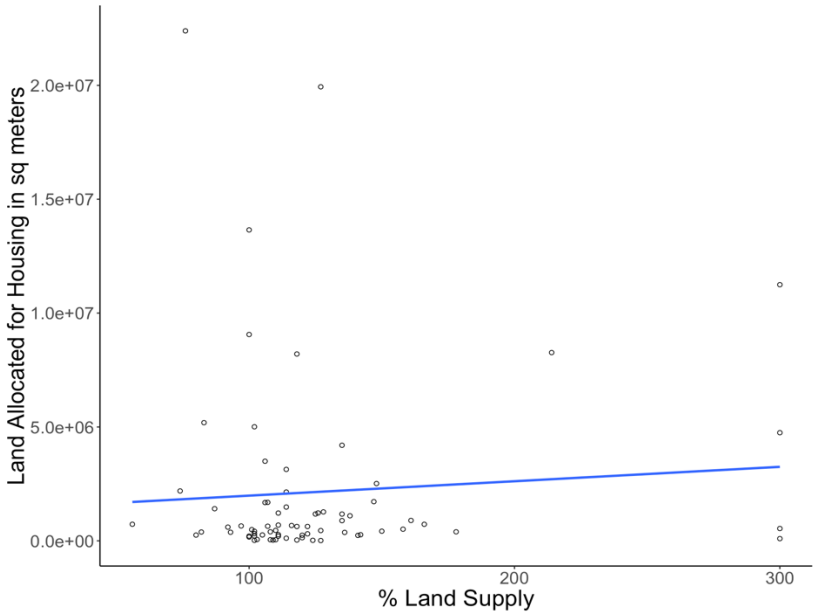
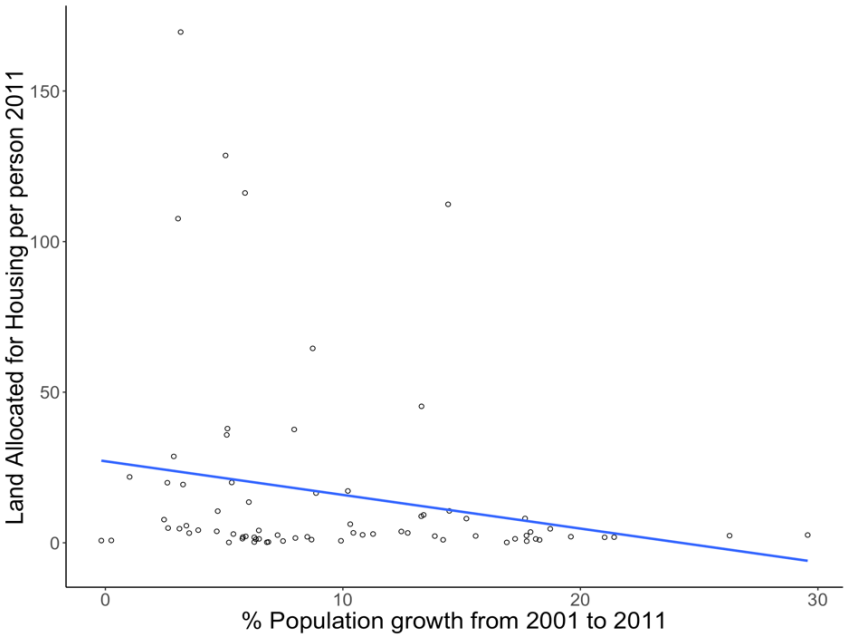


Figure 14b: Land allocations 2018/2019 & Population Growth 2001-2011



It is obvious that identified land allocations are related to neither the 2009 reported years' land supply nor to recent population growth: the R^2 s are respectively 0.005 and 0.05. In the latter case, although still not statistically significant, identified land supply is negatively

related to recent population growth. We should also note that the 2009 years' supply figures are unrelated to population growth. So our conclusion on Local Authority land allocations is: we do not know how they are arrived at or what their rationale might be: but in terms of area they certainly do not amount to much.

To sum up: it seems extraordinary that there is no centrally collated and verifiable data, defined on common and relevant standards on a subject as vital to our housing problem as planned land supply.

Conclusions

The evidence assembled for this report shows that while Britons think there is very little land available for housing because Britain is too tightly packed already, this is very far from the truth. There is plenty of potentially developable land but policies – particularly Green Belt designation – prevent its development. Moreover local planning authorities do not work to a common method or provide accessible data on what land can be developed or the logic for that land being allocated. It is very difficult to rigorously evaluate the land allocation process when it is all but impossible to know what that process produces. There is a system failure: the system of land allocation – for whatever reason – is not fit for purpose; nor can it be rigorously evaluated since the vital data is not available.

There have been several proposals as to how to supply more land to allow environmentally friendly development. One such is to release land close to train stations providing easy access to jobs when there is no obvious physical, environmental or amenity reason not to develop the land except for the fact that it is in the Green Belt. We can illustrate such a change in the context of two stations giving access to London Zone 1 within 45 minutes. One is Taplow – although the 45 minutes threshold waits on CrossRail – and the other is Northwood Hills on the Metropolitan line.

Figure 15a & b: Land use around Taplow and Northwood Hills stations

Taplow Northwood Hills

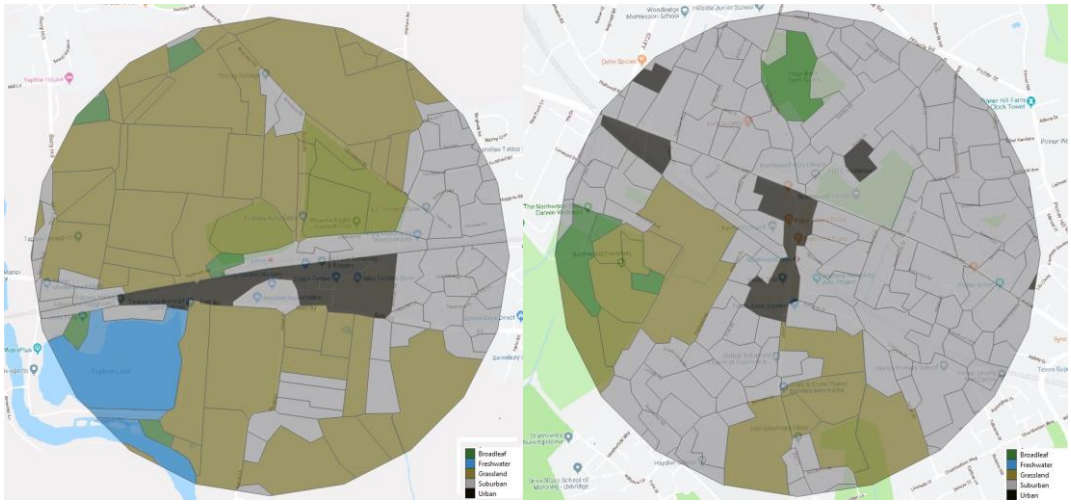


Table 13: Estimated Areas within 800 metres of Stations near London Zone 1

	Area in Hectare				
	Water	Woodland	Farmland	Suburban	Urban
Northwood Hills	-	7.9	40.6	140.7	8.7
Taplow	14.3	3.5	123.2	47.4	9.5

Source: Land Cover Map 2015, Version 1.2

The maps are for 800 metres radius around each station and show existing urban and suburban development as well as broad categories of use of existing land. Neither area contains any AONB, SSSI, Nature Reserves or publically accessible recreation areas: nor is there any flood plain land or land too steep to build. Table 13 then shows how much land would be available for 'transit development' if Green Belt designation was discounted.

If one considers farmland and woodland as suitable for development so close to public transport except for the Green Belt designation that would yield 126.7 Ha around Taplow and 48.5 around Northwood Hills stations. If one further required 10 percent of that land to be reserved for publically accessible green space, still there would be 157.6 Ha available for housing which, at a rate of 40 dwellings per Ha would allow 6,300 house to be built. There are, of course, many stations within 45 minutes of London Zone 1 since 45 minutes takes one out to Bedford or Reading, so this is just one illustration. A recent answer to a Parliamentary Question revealed that the MHCLG had undertaken an exercise which estimated[5] "there were just over 57,100 hectares of such land in England" although this land was not all within 45 minutes of London Zone 1 and might include some land unsuitable geologically or physically for building. It is, however, a considerable quantity of land.

The evidence presented in this report shows that there is a serious and growing crisis of housing supply and affordability and that this is caused substantially, but not exclusively, by a long term failure to allow enough land to be use for building. This in turn is mainly caused by policy constraints imposed on land supply, since the evidence shows that the quantity of suitable land is very great – far exceeding the area of all existing development even avoiding all land with any environmental or amenity designation. There is even 57,100 hectares of land near to train stations not built on only because of Green Belt designation. There also appears to be a problem with information and a fragmented and idiosyncratic system for allocating new residential land supply. Other factors – such as fiscal incentives and infrastructure constraints – are no doubt significant as well but outside the scope of this report.

[5] https://www.parliament.uk/business/publications/written-questions-answers-statements/written-questions-answers/?page=1&max=20&questiontype=AllQuestions&house=commons&member=193&keywords=land%2Cnear%2Ctrain%2Cstations

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