



Evaluating requirements
for market and
affordable housing

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Executive Summary

This paper examines some of the key issues local authorities need to consider when analysing their local housing markets, and developing their housing and planning policies. It examines the current guidance to authorities about the assessment of affordability in relation to house prices and private rents. It provides a new set of estimates of local household incomes, derived from national datasets, that authorities may wish to consider when making those assessments. It concludes with a national assessment of housing market affordability for every local authority area in England based on the earlier analyses.

House prices and first-time buyers

Current housing needs assessment guidance suggests that lower quartile prices should be used by local authorities as a threshold when assessing whether or not households are able to access home.

The analyses in this paper show that on average, over the years from 1996 to 2008, 36 per cent of all first-time buyers purchased at or below lower quartile prices (Land Registry), with some limited variability between years. On average 40 per cent of all first-time buyers purchasing with a mortgage buy at or below lower quartile prices (from the Regulated Mortgage Survey).

The regional analyses for 2005, a recent and reasonably typical year for detailed consideration, show that more than a quarter of all first-time buyers purchase at or below Land Registry lower quartile prices in all regions although there are some regional differences. The proportions are higher in the south of England, and lower in the northern regions. More first-time buyers, around 40 per cent, purchase two bedroom dwellings than any other size of dwelling. First-time buyers account for about half of all two bedroom purchases. Between 29 per cent (North West and West Midlands) and 35 per cent (South West) purchased at or below lower quartile prices for two bedroom dwellings.

One of the reasons given to support the use of lower quartile house prices in the current guidance is that lower value dwellings may be in poor condition. Analysis of data from the 2005/06 English House Condition Survey (EHCS) shows that while there is a relationship between stock condition and the value of owner occupied dwellings, its extent is limited.

The analysis shows that 27 per cent of all owner occupied dwellings fail the (Housing Health and Safety Rating System (HHSRS) based) decent home standard on grounds other than on the thermal comfort criteria alone. Against that baseline the failure rate for dwellings valued at between lower decile and lower quartile prices is only marginally higher at 28 per cent. For dwellings in the lower decile price band the equivalent failure rate rises to 35 per cent.

The analyses focus on the stock condition measure excluding thermal comfort because the EHCS shows that the costs of rectifying that deficiency for dwellings that fail the decent homes standard solely on that criteria are very modest.

There is regional variability, with higher proportions of lower value dwellings failing the decent homes standard (other than solely on the grounds of thermal comfort) in the midland and northern regions, and fewest in the southern regions (outside of London).

Together these analyses suggest that the current guidance that affordability assessments should be based on lower quartile house prices overstate the actual barriers to households accessing owner occupied dwellings, and that the evidence on variations in stock condition do not provide a sufficient rationale for the use of that threshold. There is a case for suggesting that Communities and Local Government should review this aspect of the current guidance.

The analyses suggest that a house price threshold between the 10th and 15th percentile might be more appropriate for affordability analyses as a general rule. There should also be some scope for authorities to modify that approach where that can be supported by evidence on the composition, condition and price distribution of owner occupied dwellings in their local housing markets.

The private rented sector

Around 40 per cent of all moves are into the private rented sector. This sector has grown in importance although it is given little attention in many housing market assessments. The analysis highlights the need for more attention to be given to the assessment of the private rented sector in local housing requirement studies and local planning policies.

This is particularly important in the context of the last decade where private rents have simply kept pace with earnings, while house prices have grown far more rapidly. By 2008 the average private rent for a two bedroom dwelling was just 72 per cent of the costs of buying a similar size property (based on a twenty five year repayment mortgage but without making any provision of home owner repairs or other costs).

This means that a proportion of households unable to afford to buy are nonetheless able to afford to rent privately. While a higher proportion of lower value private rented sector dwellings fail the decent homes standard than is the case for owner occupied dwellings, the relationship between stock condition and value is limited.

Analysis of EHCS data shows that 38 per cent of all private rented sector dwellings fail the (HHSRS based) decent home standard on grounds other than on the thermal comfort criteria alone. Against that baseline the failure rate for dwellings valued at between lower decile and lower quartile prices is a little higher at 42 per cent. For dwellings in the lower decile price band the equivalent failure rate rises to 59 per cent.

Official data currently routinely available for the private rented sector have significant limitations, especially when compared to the data available in respect of the owner occupied sector. The analyses in this paper used private rents data purchased from Hometrack.

The private rented sector has grown in importance within the wider housing market over the past ten years. The absence of timely national data sets providing local data on the incidence and costs of private renting prevents a proper assessment of the sector and needs addressing.

There is the potential for local authorities to make use of their council tax records to derive better current estimates of the size and location of private rented sector dwellings in their areas.

Local estimates of household incomes

Robust estimates of local income levels and distributions are needed for the assessment and monitoring of affordability. A key aim of the research has been to develop a method to estimate relevant household income distributions from secondary data sources at local authority level.

A multi-stage procedure is adopted to produce model-based estimates of average incomes and the distribution of incomes for all households and key sub-groups of younger households. This starts from the main official data source on incomes, the Family Resources Survey (FRS), and the modelled incomes are controlled back to the levels observed in this source at the level of locality type by broad region.

Key predictors (drivers) of income variation are identified from modelling using FRS data at the micro and aggregated level. These are then used in conjunction with locally available data to predict income patterns for all local authorities in England. These predictors include occupations, earnings, economic activity levels, household composition, age, tenure, housing characteristics and other factors.

The resulting local income estimates cannot be presented with formal confidence intervals, but it is possible to present a range of evidence bearing on their degree of precision. From this the typical error margin would be of the order of 5 per cent or less; smaller for larger authorities or subregions, larger for smaller units or smaller sub-groups of households.

The typical distribution of income differs between household sub-groups, including younger and working households and younger families. There are also significant differences in the distribution of income between different types of locality.

Systematic comparison of the new income estimates with two existing estimates, the CACI Paycheck system and Bramley's earlier affordability model, suggest that the new estimates are better able than these to represent the levels and patterns of income across regions, subregions, types of locality and local authorities themselves. Annex A at <http://www.communities.gov.uk/nhpau/keypublications/research/> contains these estimates for 2007 at local authority level.

For affordability purposes it is most useful to focus on younger (under-40 years old) households and on income adjusted to exclude 'extra' adults' incomes and means tested benefits. Within that age band, all households, working households, and family households (including multi-adult households) are considered. Information is provided on both the income patterns for these groups and their relative incidence in different types of area. Estimates of median income and the distribution of income for households aged under 40 by Local Authority for 2007 are given in Annex B on the website <http://www.communities.gov.uk/nhpau/keypublications/research/>.

2007 Local affordability analyses

Affordability was modelled at local authority level across England using the modelled incomes and house price and rent thresholds. House prices were taken at the mid-point between the lower decile and lower quartile price for a two and a three bedroom property. Affordability results are in Annex C on the website <http://www.communities.gov.uk/nhpau/keypublications/research/>.

The baseline estimates of affordability to buy show that less than 38 per cent of younger households could buy in 2007, and that the range of variation between regions (27 – 48 per cent) and locality types (14 – 48 per cent) was quite wide. More working households could buy, but still only a minority. Meanwhile, the proportion of families able to buy 3-bedroom housing is very much lower (less than 25 per cent), and negligible in some parts of London.

There is rather a weak correspondence between affordability as measured in this way and the ratio of the lower quartile house price to lower quartile earnings.

At local level two types of authority stand out as having severe affordability problems: poorer inner London boroughs, and coastal areas in the south and south west of England. By contrast, the most affordable localities are mainly urban industrial/mining areas, and some partly rural areas, in the north or midlands. Some of these areas previous exhibited low demand symptoms and this may be a continuing issue in some cases.

Affordability estimates are replicated for 2005 and 2008. Affordability deteriorated by one-fifth (9 percentage points) between 2005 and 2007; about a third of this deterioration had been recovered by 2008 (just looking at prices and incomes).

The difference between assessing affordability on the lower decile of house prices rather than the lower quartile would alter the affordability rate by nearly a quarter (9 percentage points). This sensitivity is much greater in the north and less in London. Some cautionary notes are sounded about an assumption of much easier affordability in the north.

Private renting is much more affordable than buying, under recent conditions. Nearly half as many again could afford to rent as could afford to buy in 2007. Private renting offers the largest increment to affordability in the more rural regions and more prosperous localities.

1. Introduction

The general aim of this research project is to provide a review of key data and assumptions used to estimate affordability at local and regional level. These data and assumptions relate on the one hand to housing prices and rental costs, and particularly the key threshold levels for access to the market, on the other hand to income levels and distributions.

This report examines firstly the evidence in respect of house price distributions, and the relationship between the costs of house purchase and private rents. The analysis provides a basis for suggesting some revisions to the guidance provided to local authorities about how they assess the need for affordable housing in their local housing strategies.

Secondly, improved local authority level estimates of household incomes derived from national datasets are developed. Those estimates are combined with the analysis of house price and private rental distributions to provide a local authority level analysis of housing market affordability.

The principal user group for the outputs of this research are local authorities, in the context of their work on Strategic Housing Market Assessments (SHMAs), although increasingly this work is organised on a subregional partnership basis. Other users include regional planning bodies, Government Offices for the regions and the NHPAU itself. An important aim is to provide a package of data tools and estimates which can provide a common set of benchmark measures as well as guidance on the interpretation of various available datasets.

2. House prices and first-time buyers

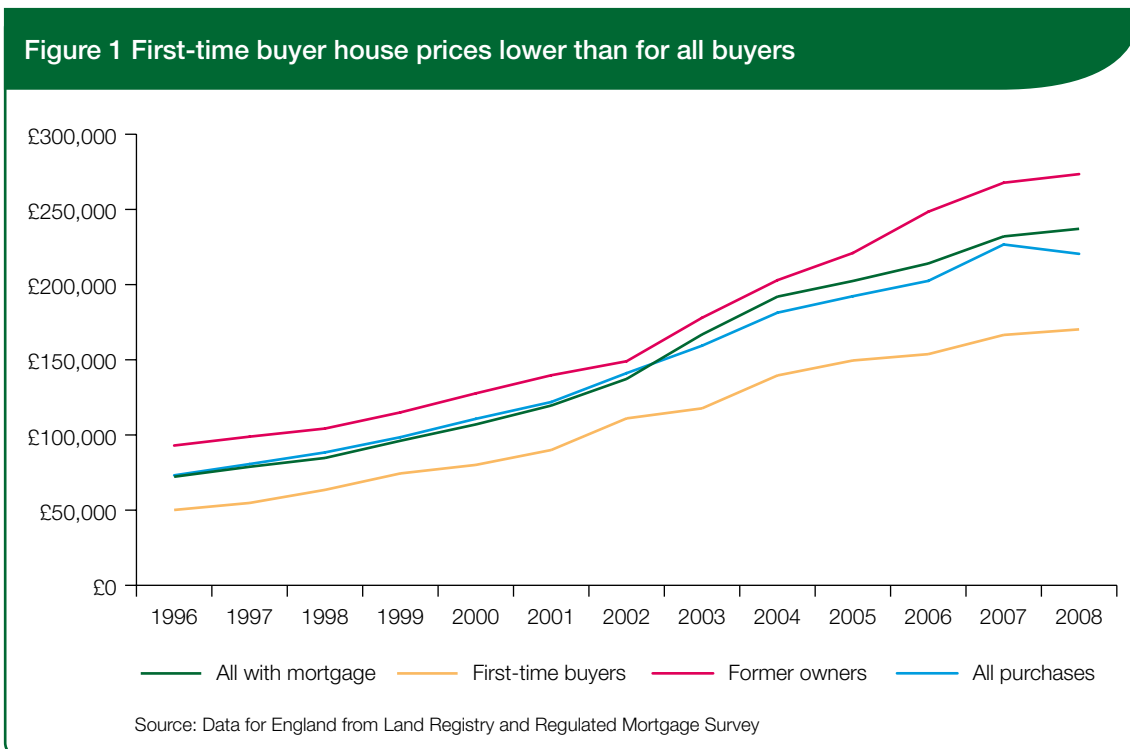
Strategic Housing Market Assessments (SHMAs), and their consequent housing strategies, analyse the proportions of households able, or unable, to secure adequate accommodation in the private housing sector. Those unable to secure private housing without assistance are in turn held to require some form of affordable housing.

Statements about the mix of market and affordable housing are central to local authority housing strategies and their planning policies. The standard guidance to local authorities (CLG 2007) suggests that households should be found to be unable to secure market housing if they cannot afford to purchase a dwelling at lower quartile prices.

First-time buyer house prices

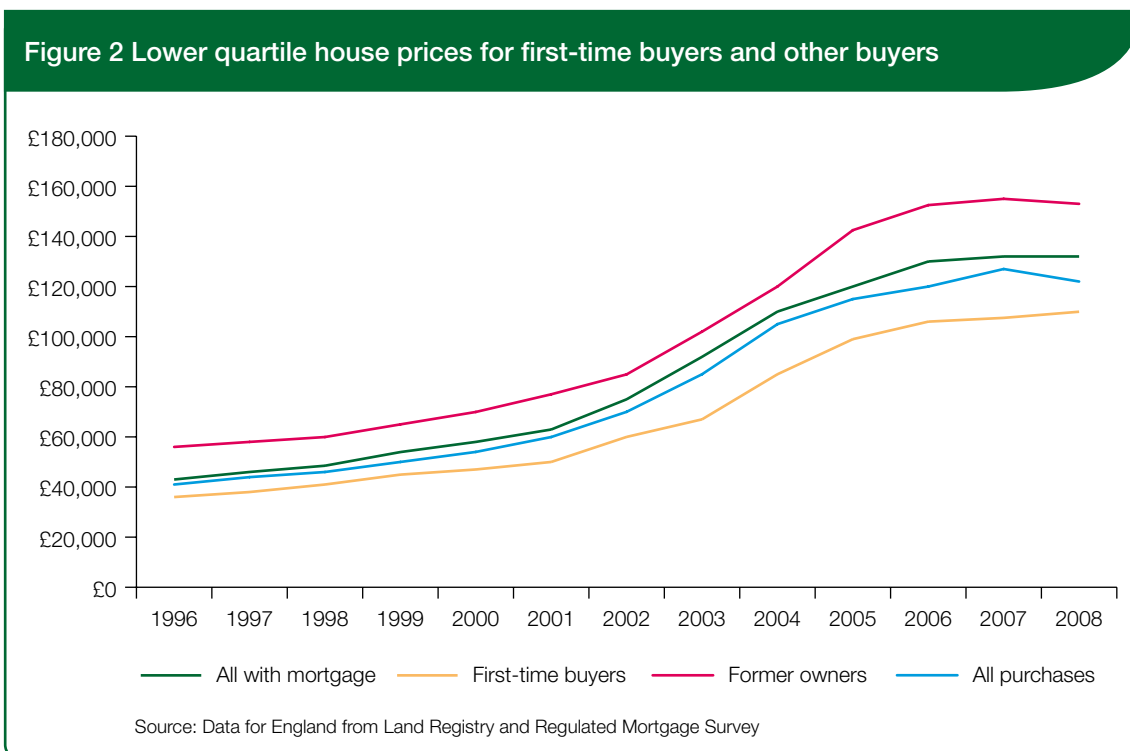
House prices paid by first-time buyers are lower than those paid by existing owners moving to a new dwelling as is consistently shown in series of house price data based on the sales of dwellings with a mortgage, such as the Regulated Mortgage Survey.

Figure 1 shows that over the last two decades average first-time buyer house prices have been typically around 75 per cent of the average price for all home buyers with a mortgage, and around 60 per cent of the average price for dwellings purchased by former owners moving to a new dwelling. Land Registry data show that the average prices for all purchasers with a mortgage are close to the average price for all purchases, including those not involving a mortgage, albeit that they are a little lower in the years from 2004 to 2008.



While it follows from this that a higher proportion of first-time buyers will purchase dwellings within the lower half of the house price distribution, there are no routinely published analyses that compare the distributions of house prices for first-time buyers with those for all buyers. This report explores the extent to which first-time buyers purchase dwellings within the lower quartile price band, based on all transactions.

Figure 2 shows the relative levels of lower quartile prices for first-time buyers and moving households with a mortgage, compared to those for all purchasers with a mortgage, and all transactions (with or without a mortgage). This shows a similar picture as that for average prices in Figure 1, with far lower values for first-time buyers relative to other purchasers.



Lower quartile prices for all transactions based on Land Registry data are lower than those for all purchases with a mortgage based on the Regulated Mortgage Survey data. This reflects a higher incidence of low value purchases funded without a mortgage, including purchases for the purpose of renting, and existing home owners trading down in the market, whether in response to changes of circumstance or as a planned retirement move. Overall only some 6 per cent of first-time buyers purchase a dwelling without a mortgage, while about a quarter of all purchases by former owners are made without the use of a mortgage. Over the last decade purchases for the purpose of renting have also grown to comprise a significant proportion of all market transactions.

Table 1 analyses the distribution of house prices, comparing the prices paid by first-time buyers, moving former owners and all buyers (with and without mortgages), for each year from 1996 through to 2008. The 'all buyers' price data are from the Land Registry, while the data for first-time buyers and former owners are from the Regulated Mortgage Survey. In both cases the data exclude discounted 'right to buy' sales to sitting tenants.

Table 1: The proportion of first-time buyers and moving owners buying dwellings with a mortgage at or below lower quartile prices (all sales price distribution)

Year	Lower Quartile Price	Proportion of buyers with a mortgage below Lower Quartile Price (per cent)		
		All sales	First-time buyers	Former owners
1996	£41,000		37	8
1997	£43,950		38	9
1998	£45,995		34	11
1999	£50,000		33	11
2000	£54,000		33	12
2001	£59,950		36	13
2002	£70,000		31	17
2003	£85,000		37	16
2004	£105,000		38	17
2005	£115,000		37	12
2006	£119,995		35	11
2007	£127,000		41	13
2008	£122,000		34	11

Source: Analysis of Land Registry and Regulated Mortgage Survey data

While there is some variation from year to year, on average some 36 per cent of all first-time buyers in a year purchase dwellings at or below lower quartile prices. In contrast, on average, only one in eight former owners moving with a mortgage purchased dwellings at or below lower quartile prices.

The analysis of RMS data in Table 2 shows the proportions of first-time buyers and moving former owners able to buy at or below lower quartile prices for all purchases supported by a mortgage. This analysis excludes cases where the data did not indicate whether the purchaser was a first-time buyer or a former owner.

The somewhat higher lower quartile prices derived from the RMS result in a larger proportion of households with a mortgage purchasing a dwelling at or below those lower quartile prices, when compared to the analysis based on the lower quartile prices derived from the Land Registry data.

On average just over 40 per cent of all first-time buyers in a year purchase dwellings at or below the RMS lower quartile prices. In contrast on average only some 15 per cent of former owners moving with a mortgage purchased dwellings at or below lower quartile prices.

Table 2: The proportion of first-time buyers and moving owners buying dwellings with a mortgage at or below lower quartile prices (all mortgagors price distribution)

Year	Lower Quartile Price	Proportion of buyers with a mortgage below Lower Quartile Price (per cent)	
		First-time buyers	Former owners
1996	£43,000	42	10
1997	£46,000	43	11
1998	£48,500	38	13
1999	£53,950	39	14
2000	£58,000	38	15
2001	£62,950	39	15
2002	£75,000	34	19
2003	£91,950	42	20
2004	£110,000	40	19
2005	£120,000	43	15
2006	£130,000	44	15
2007	£132,000	44	15
2008	£132,000	42	16

Source: Analysis of Regulated Mortgage Survey data

Somewhere between 30 and 40 per cent of all first-time buyers become home owners each year by purchasing lower value dwellings, depending on the data source and definition used.

The proportion of first-time buyers purchasing dwellings at or below lower decile house prices was analysed, using both Land Registry prices (Table 3) and RMS prices (Table 4).

This showed that while there is some variation from year to year, typically some 14 per cent of first-time buyers in a year purchase dwellings at or below Land Registry lower decile prices. Results from the RMS showed that almost 20 per cent of all first-time buyers purchase at or below that price threshold level each year. So, on average between one in seven and one in five first-time buyers purchase dwellings at or below lower decile prices in any year.

Table 3: The proportion of first-time buyers and moving owners buying dwellings with a mortgage at or below lower decile prices (all sales price distribution)

Year	Lower Decile Price	Proportion of buyers with a mortgage at or below Lower Decile Price (per cent)	
		First-time buyers	Former owners
	All sales		
1996	£29,500	12	2
1997	£31,500	13	2
1998	£32,000	11	3
1999	£35,000	11	3
2000	£35,950	12	3
2001	£38,000	13	3
2002	£43,000	16	5
2003	£54,000	17	5
2004	£70,000	17	5
2005	£80,000	12	3
2006	£86,000	13	3
2007	£95,000	17	4
2008	£89,000	14	4

Source: Analysis of Land Registry and Regulated Mortgage Survey data

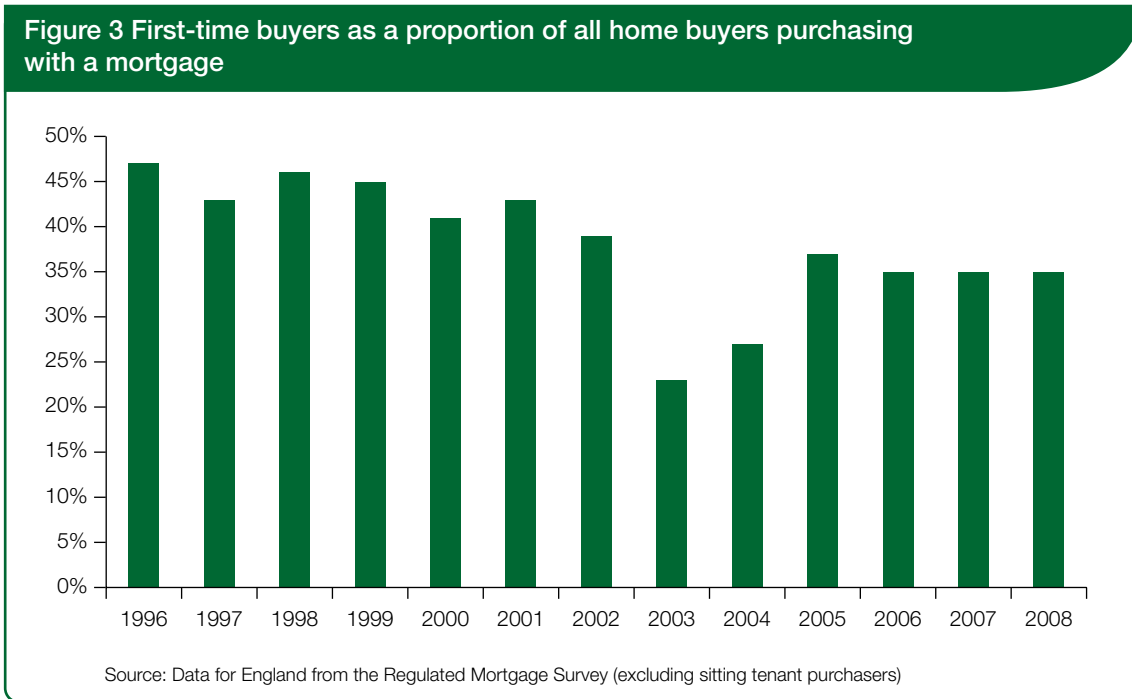
Table 4: The proportion of first-time buyers and moving owners buying dwellings with a mortgage at or below lower decile prices (all mortgagors price distribution)

Year	Lower Decile Price	Proportion of buyers with a mortgage at or below Lower Decile Price (per cent)	
		All buyers with a Mortgage	Former owners
1996	£33,000	18	3
1997	£35,000	19	3
1998	£36,000	16	4
1999	£39,000	17	4
2000	£40,500	17	5
2001	£42,000	17	5
2002	£45,000	17	6
2003	£60,000	21	6
2004	£75,865	20	6
2005	£90,000	19	5
2006	£97,000	20	5
2007	£98,925	20	5
2008	£98,000	19	5

Source: Analysis of Regulated Mortgage Survey data

The fluctuations in the proportion of first-time buyers purchasing dwellings at the lower end of the housing market from one year to another reflect in part the variations of the proportion of dwellings purchased by first-time buyers in any year. Between 1996 and 2008, first-time buyers (excluding sitting tenant purchasers) comprised a variable proportion of all purchases by home owners with a mortgage, as shown in Figure 3.

The proportion of first-time buyers (excluding sitting tenant purchasers) was particularly low in 2003 and 2004, but more generally the proportion of first-time buyers gradually declined over the thirteen years to 2008. The reasons for that decline are partly cyclical, but also reflect the increased availability of private renting as an alternative option for households. The key point is that with a declining proportion of first-time buyers among all purchasers it becomes more feasible (but not automatic) for a higher proportion of them to purchase within the lower range of house prices.



Differentiated analyses

The house price analyses above have all related to England as a whole. There are also significant variations in house prices based both on location and on property size, and the distribution of first-time buyers against house prices both by region, and property size has been analysed. While the regional analysis has used both the Land Registry and Regulated Mortgage Survey prices, property size data are only available from the RMS.

Results are presented here of differentiated analyses of Land Registry and RMS data for the year 2005. This year is selected because it is both relatively recent, and the more disaggregated analysis of the Regulated Mortgage Survey is based on a much larger sample than is the case for the years prior to 2002 when it was limited to a 5 per cent sample.

2005 was also a reasonably typical year, albeit one when the proportion of first-time buyers purchasing at the low end of the market was just above the average for the period from 1996 to 2008. The proportion of first-time buyers (excluding sitting tenant purchasers) among all purchasers was slightly below the average for the period.

The results of the regional analyses are shown against lower quartile and lower decile prices, derived both from the Land Registry and Regulated Mortgage Survey datasets. Tables 5 and 6 show the results based on lower quartile prices, while Tables 7 and 8 show the results based on lower decile prices.

Table 5: The proportion of first-time buyers and moving owners buying dwellings with a mortgage at or below lower quartile prices in 2005 (all transactions)

Region	Lower Quartile Price	Proportion of buyers below Lower Quartile Price (per cent)	
		First-time buyers	Former owners
North West	£80,000	29	8
North East	£74,300	30	8
Yorkshire & Humber	£85,000	36	10
West Midlands	£102,000	37	11
East Midlands	£100,000	41	12
Eastern	£130,000	41	13
London	£177,000	36	13
South East	£147,500	42	13
South West	£131,000	47	13

Source: Analysis of 2005 Land Registry data

There are two key points to note. The first is that while the lower quartile prices based on all transactions are lower than those based on the Regulated Mortgage Survey in all regions, the differences are modest; only amounting to just over 10 per cent in the North East and the North West.

The second is that there are quite marked regional differences in the proportion of first-time buyers purchasing dwellings below lower quartile prices, especially in the analysis based on Land Registry (all transactions) data. While 30 per cent (or just under) of first-time buyers in the North East and North West purchased below (all transactions) lower quartile prices, over 40 per cent did so in the Eastern, East Midlands, South East and South West regions.

Table 6: The proportion of first-time buyers and moving owners buying dwellings with a mortgage at or below lower quartile prices in 2005 (all mortgaggers price distribution)

Region	Lower Quartile Price	Proportion of buyers below Lower Quartile Price (per cent)	
		First-time buyers	Former owners
	All buyers with a mortgage		
North West	£90,000	43	13
North East	£82,000	42	13
Yorkshire & Humber	£90,000	43	12
West Midlands	£107,500	43	13
East Midlands	£104,000	45	14
Eastern	£135,000	45	15
London	£180,000	38	14
South East	£152,000	47	15
South West	£132,950	49	14

Source: Analysis of 2005 Regulated Mortgage Survey data

The proportions of first-time buyers purchasing below the lower quartile price based on the Regulated Mortgage Survey were rather higher in all regions. The degree of regional variation was much less than in relation to the all transactions prices. While the highest proportions buying below lower quartile prices were in the same four regions, in this case the lowest proportion was in London.

Table 7: The proportion of first-time buyers and moving owners buying dwellings with a mortgage at or below lower decile prices in 2005 (all transactions)

Region	Lower Decile Price	Proportion of buyers below Lower Decile Price (per cent)	
		First-time buyers	Former owners
North West	£54,600	5	1
North East	£52,000	6	1
Yorkshire & Humber	£60,500	8	2
West Midlands	£79,200	12	3
East Midlands	£80,000	15	3
Eastern	£104,000	15	4
London	£145,000	14	4
South East	£117,000	15	3
South West	£107,000	17	4

Source: Analysis of 2005 Land Registry data

The proportions of first-time buyers purchasing dwellings below lower decile prices in each region show a similar pattern (Table 7), with much greater regional diversity shown by the analysis based on Land Registry data.

In the northern regions, the proportions of home buyers with a mortgage purchasing the lower value dwellings are very low. This indicates that a significant proportion of those dwellings are either purchased without a mortgage, or are purchased for the purpose of private renting.

In contrast between 14 per cent and 17 per cent of all first-time buyers purchase dwellings in the lower decile price bands (based on Land Registry data) in the southern regions of England, with the highest proportions in the south west.

Analysis of the RMS data shows much less regional variation. These show almost 20 per cent of all first-time buyers purchasing dwellings below those price thresholds, with the lowest proportion in London. This greater regional conformity reflects the more limited regional differentials in the RMS lower decile prices. While the RMS lower decile prices for the northern regions are substantially higher than their Land Registry equivalents, there are only limited differences in the price levels from the two data sources for the southern regions.

Table 8: The proportion of first-time buyers and moving owners buying dwellings with a mortgage at or below lower decile prices in 2005 (all mortgagors price distribution)

Region	Lower Decile Price	Proportion of buyers below Lower Decile Price (per cent)	
		First-time buyers	Former owners
	All buyers with a mortgage		
North West	£71,000	18	4
North East	£66,000	19	4
Yorkshire & Humber	£72,000	19	4
West Midlands	£86,000	18	5
East Midlands	£84,000	19	5
Eastern	£110,000	19	5
London	£148,000	16	5
South East	£123,000	21	5
South West	£111,500	21	5

Source: Analysis of 2005 Regulated Mortgage Survey data

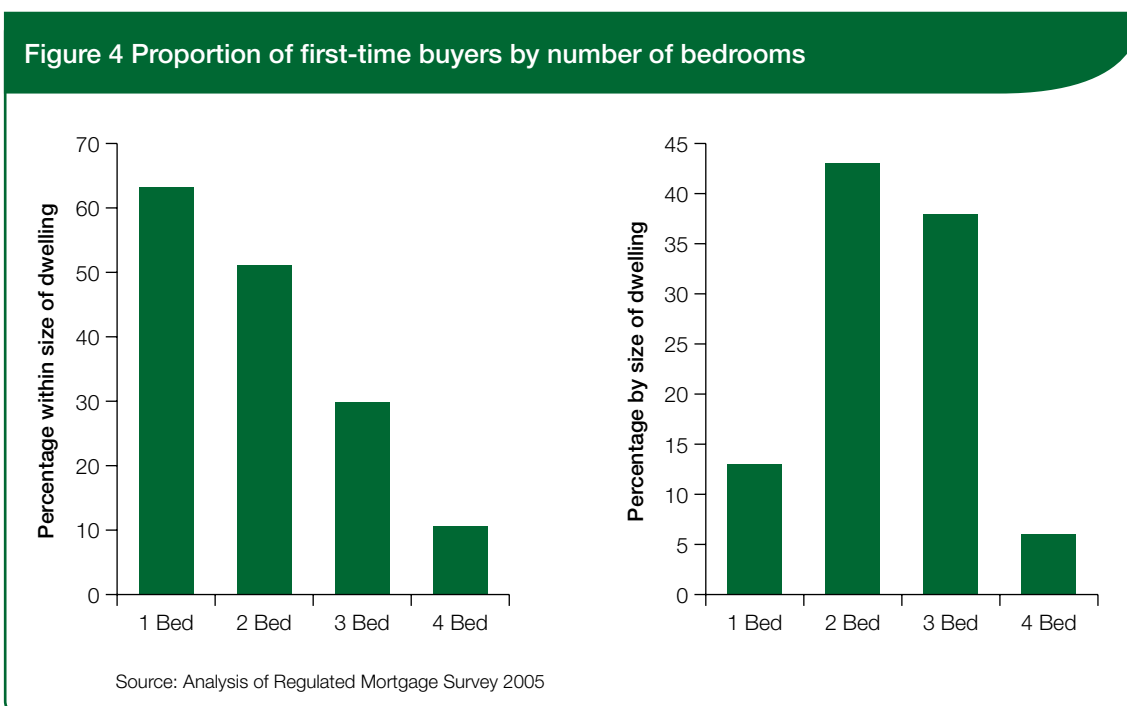
Size

A further important dimension in the distribution of house prices is property size. First-time buyers tend to buy smaller dwellings within the housing market, as well as dwellings with lower values.

Figure 4 shows the relationship between type of purchaser and size of dwelling based on data from the 2005 Regulated Mortgage Survey. This relates only to dwellings purchased for home ownership with a mortgage and not all property transactions. This analysis is based on just over two thirds of all mortgages reported to the RMS in the year as not all lenders supply data on the number of bedrooms.

Just over 60 per cent of all one bedroom dwellings were purchased by first-time buyers, with the balance purchased by moving home owners. Purchases of one bedroom dwellings were only 7 per cent of all mortgaged purchases, and only one in eight of all purchases by first-time buyers.

Mortgaged purchases of two bedroom dwellings are evenly split between first-time buyers and existing owner occupiers. Total purchases of two bedroom dwellings constituted 29 per cent of all mortgaged purchases, but just over 40 per cent of all mortgaged purchases by first-time buyers.



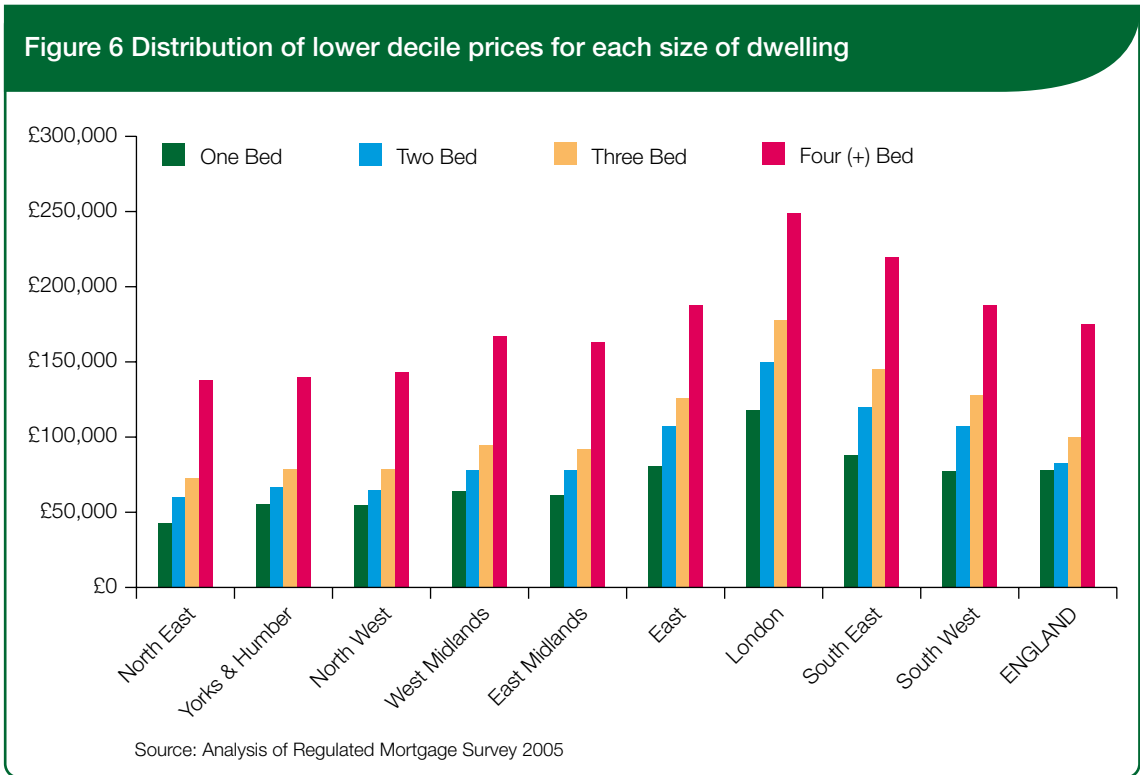
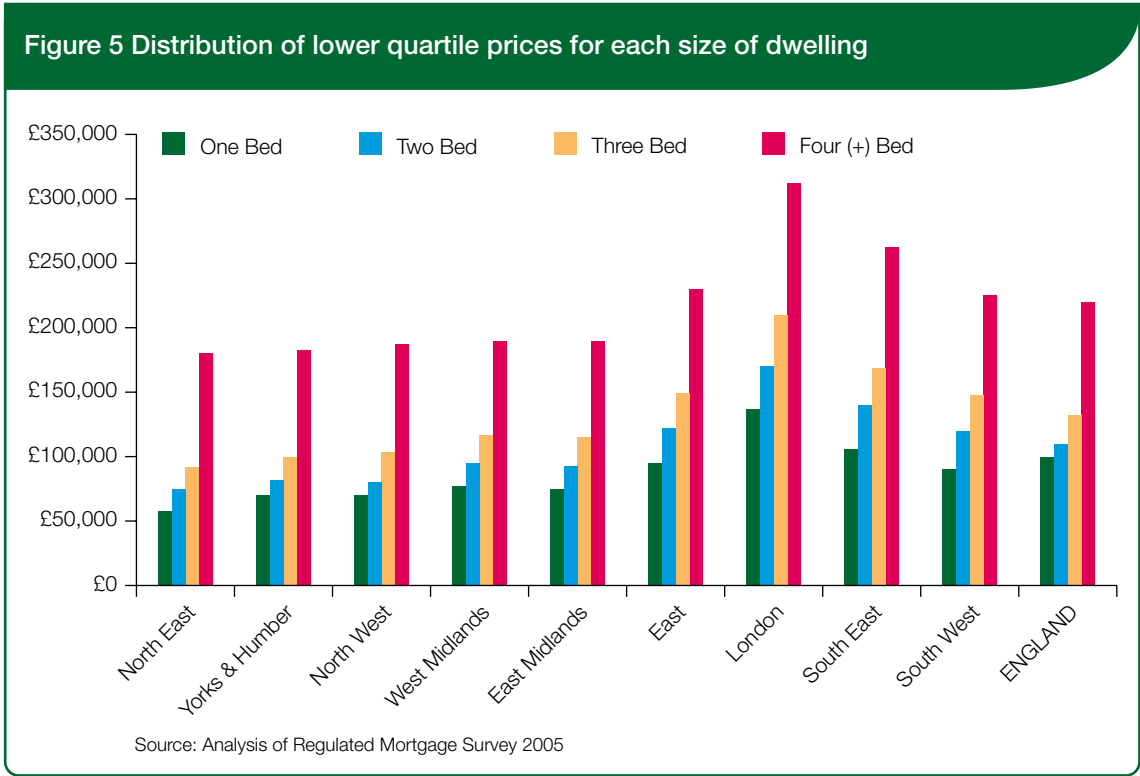
In contrast first-time buyers accounted for 30 per cent of all mortgaged purchases of three bedroom dwellings, but these represented 38 per cent of all purchases by first-time buyers. Altogether 44 per cent of all mortgaged purchases were of three bedroom dwellings.

While 20 per cent of all mortgaged purchases were of four bedroom, or larger, dwellings, first-time buyers only accounted for one in ten of those purchases. In turn these represented just 6 per cent of all dwellings purchased by first-time buyers.

The regional distribution of lower quartile prices for each size of dwelling in 2005 is shown in Figure 5, while the regional distribution of lower decile prices for each size of dwelling is shown in Figure 6. The figures also show the size related distribution of prices for each size of dwelling for England as a whole, but these need to be viewed in the context that there are a much higher proportion of sales of one bedroom dwellings in London.

Sales of one bedroom dwellings account for 16 per cent of all mortgaged purchases in London, 6-7 per cent in the other southern regions, and just 2-4 per cent in the midlands and northern regions. Consequently the sales of one bedroom dwellings in London represent 37 per cent of all mortgaged purchases of one bedroom dwellings in England.

At the other extreme Figures 5 and 6 both show that there is a particularly large gulf between the prices of four bedroom and larger dwellings relative to those for three bedroom dwellings, and smaller differentials between the prices for one, two and three bedroom dwellings. There is also a much lower proportion of mortgaged purchases of four (plus) bedroom dwellings in London compared to the rest of England.



The proportions of first-time buyers purchasing below the lower price threshold levels is much higher in relation to the prices for larger dwellings, and much lower in relation to smaller dwellings.

Figure 7 shows that the great majority of first-time buyers within each region (for all sizes of dwellings) purchased at prices below the lower quartile prices for four (plus) bedroom dwellings, while close to 60 per cent purchased at prices below the lower quartile prices for three bedroom dwellings.

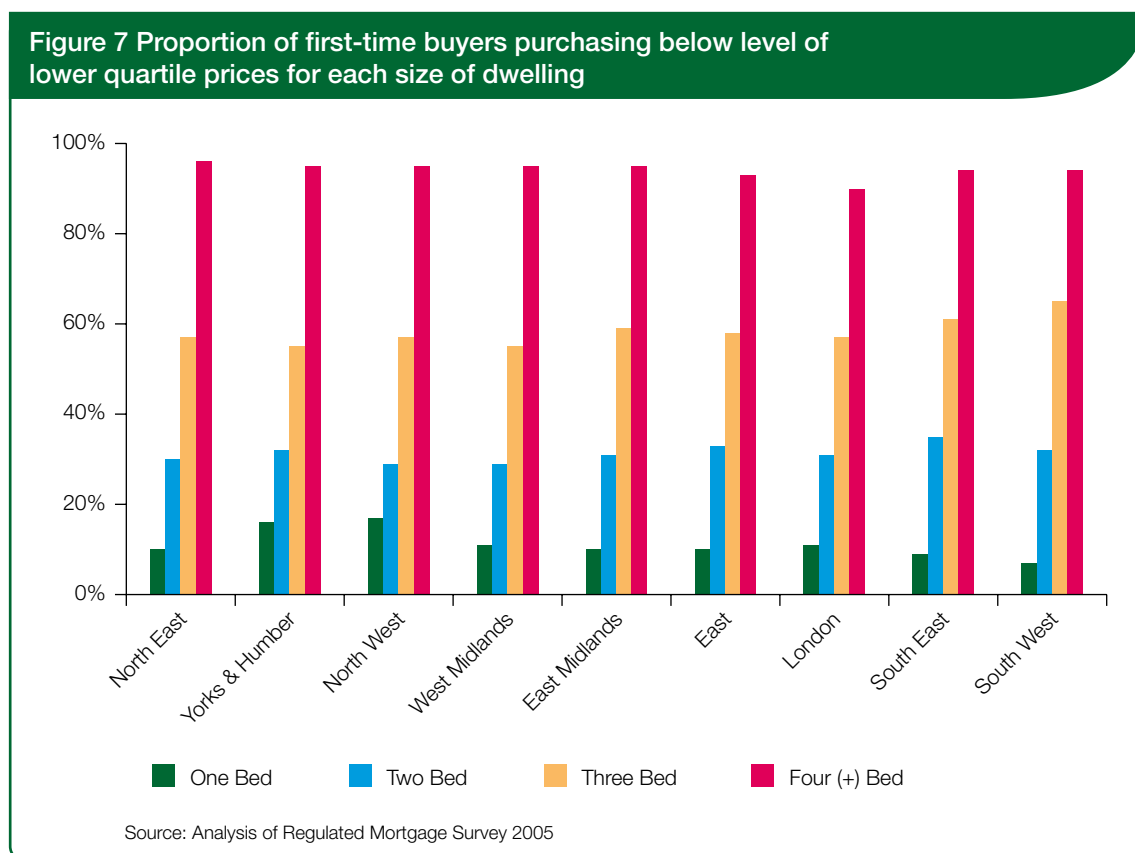
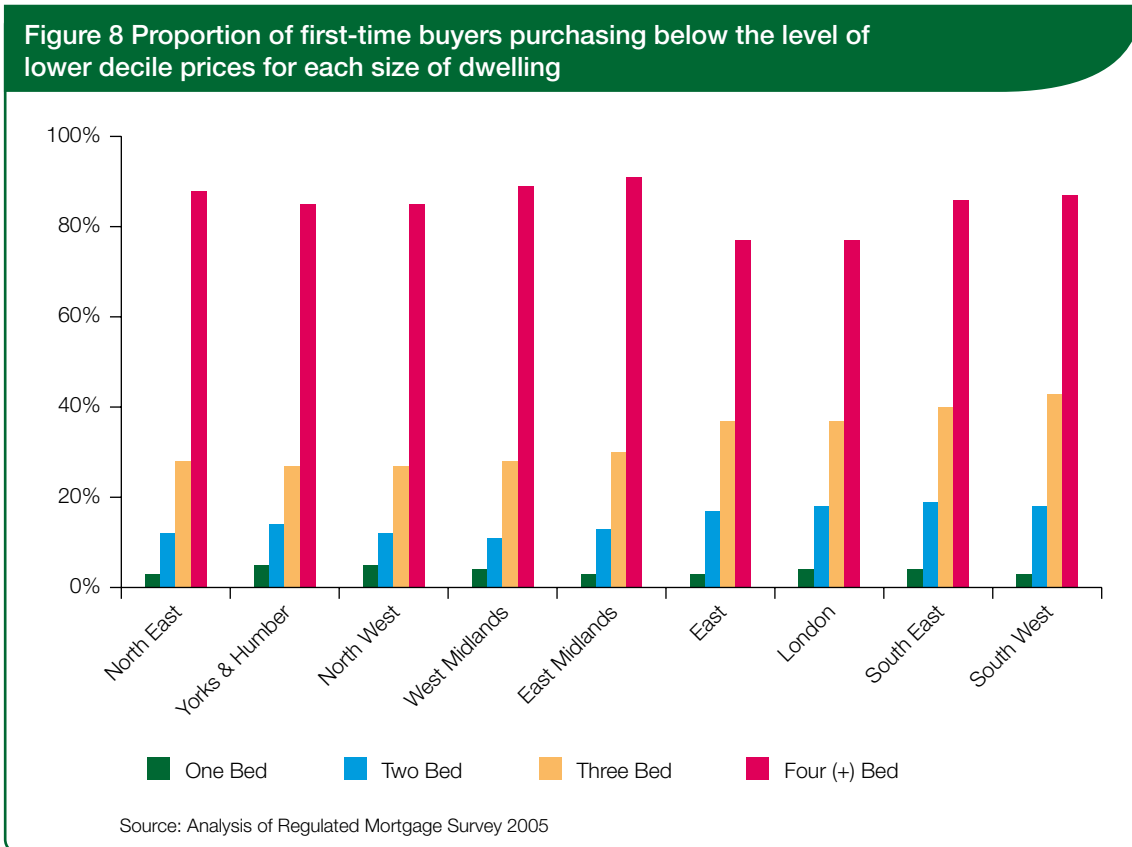


Figure 7 shows:

- between 29 per cent (North West and West Midlands) and 35 per cent (South West) purchased at prices below the lower quartile prices for two bedroom dwellings; and
- between 7 per cent (South West) and 17 per cent (North West) purchased at prices below the lower quartile prices for one bedroom dwellings.

Figure 8 shows the profile of the proportions of first-time buyers within each region purchasing dwellings below the lower decile price levels for each size of dwelling is similar to that of the lower quartile prices.



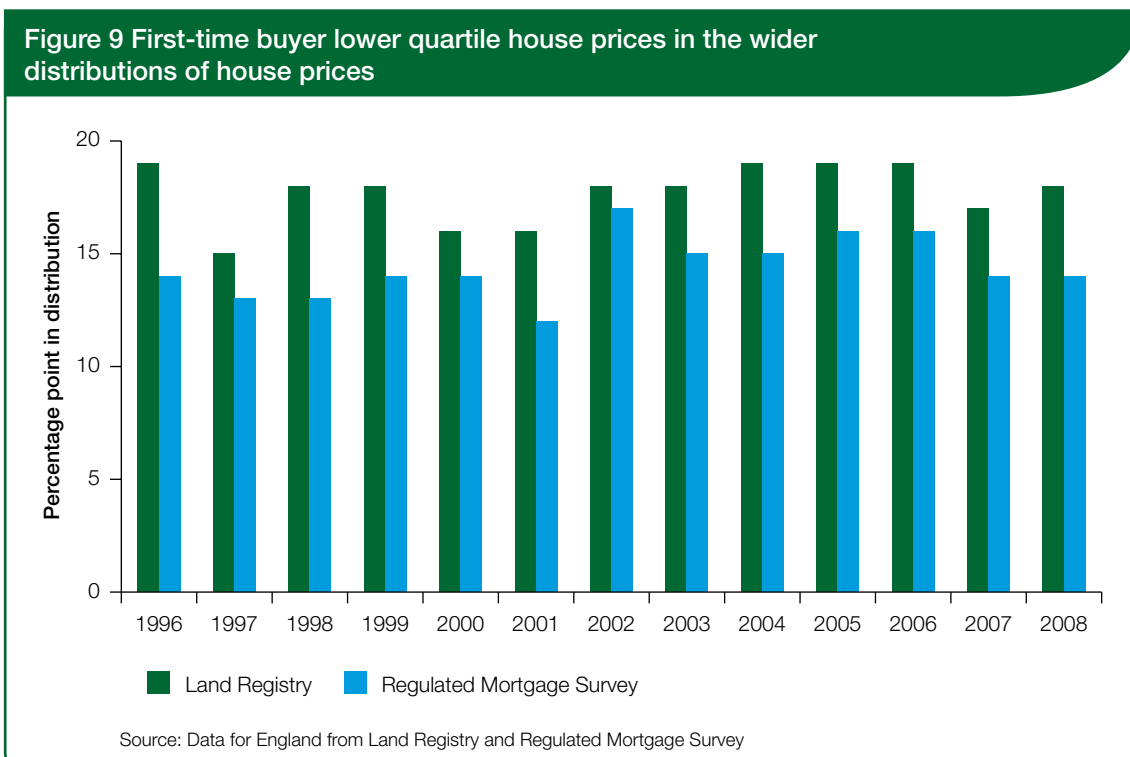
This shows:

- between 27 per cent (North West and Yorkshire & Humber) and 43 per cent (South West) of all first-time buyers within each region (for all sizes of dwellings) purchased at prices below the lower decile prices for three bedroom dwellings;
- between 11 per cent (West Midlands) and 19 per cent (South East) purchased at prices below the lower decile prices for two bedroom dwellings; and
- only 3-5 per cent purchased at prices below the lower decile prices for one bedroom dwellings.

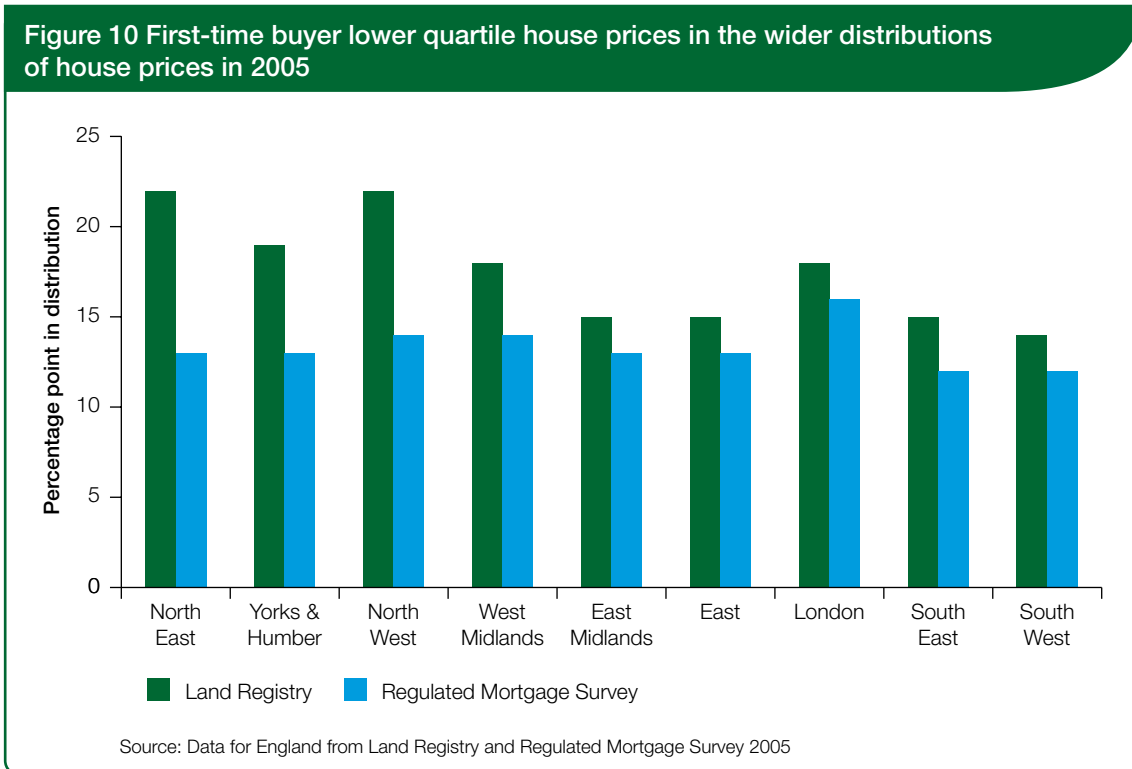
The extent of regional variations in house prices, and the different distributions of both price differentials and proportions of dwellings of each size purchased with a mortgage between regions, highlight the need for this factor to be taken into account in strategic housing market assessments.

The reverse distribution

The above analyses have all focused on the proportion of first-time buyers purchasing dwellings below threshold points in the overall price distribution. The relationship between first-time buyer prices and wider prices can also be seen in the reverse direction, as shown in Figure 9.



On average, a quarter of first-time buyers in a year purchased below the 18th percentile point in the distribution of prices for all transactions (Land Registry), and below the 14th percentile point for all purchases with a mortgage. The regional analysis of this relationship in 2005 is shown in Figure 10.



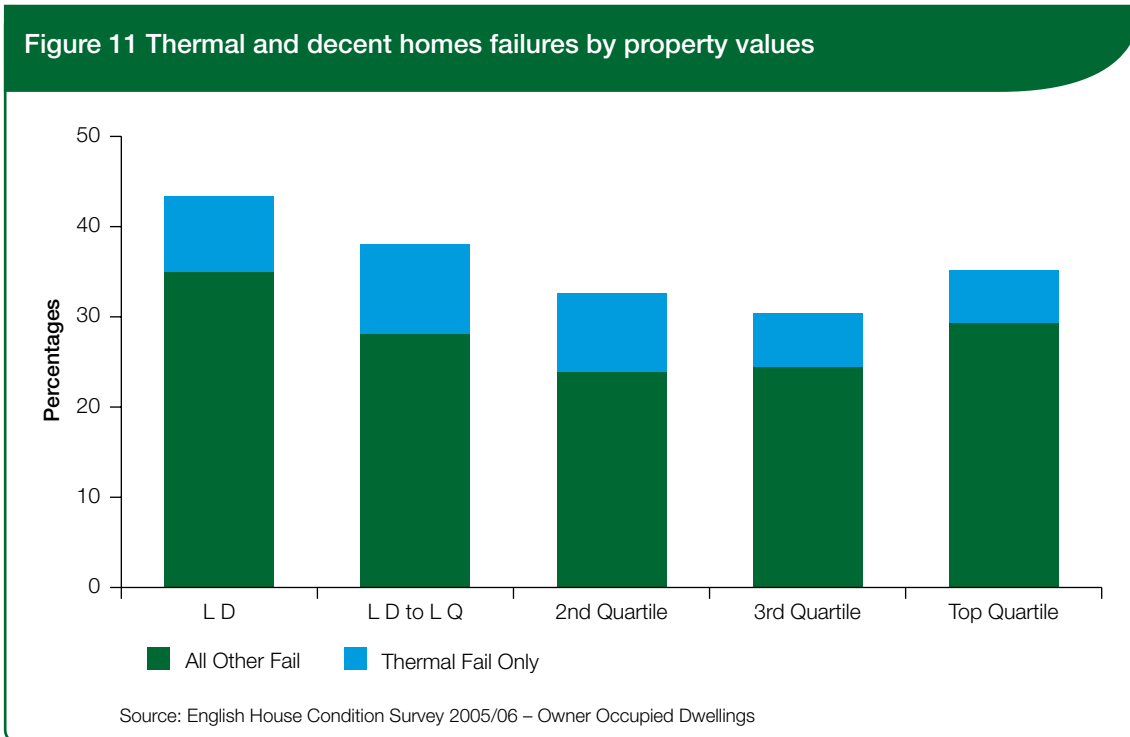
Lower quartile prices for first-time buyers tend to be higher in the overall price distribution in those regions where affordability issues are less acute. There is also more regional variability against prices for all transactions, than against prices for all home owner purchases with a mortgage. This is indicative of the varying regional role for purchases undertaken for home ownership without mortgage, and for purchases with or without a mortgage for the purpose of renting.

Stock condition

Part of the rationale in setting a lower quartile house price threshold is that lower value dwellings include a high proportion that are of relatively poor quality. The evidence base for that argument is assessed here.

There is a clear relationship between property value and the likelihood that a dwelling may be in poor condition, but it is a relationship of probability and degree, rather than one that is absolute and invariable.

Figure 11 shows that the proportion of owner occupied dwellings failing the decent homes standard is proportionately higher for the lower valuation bands. This is based on an analysis of 2005/06 English House Condition Survey (EHCS) data, and the definition of decent homes that includes the Housing Health and Safety Rating System (HHSRS) dimension (rather than the unfitness dimension).



Almost a third of all owner occupied dwellings in the second quartile value band (ie between lower quartile and median values) failed to meet the decent homes standard in 2005/06. However 9 per cent failed the standard only on inadequate thermal efficiency, with 24 per cent failing for other and/or multiple reasons.

While the failures are higher for lower value dwellings, the proportion that fail for reasons other than thermal efficiency alone rises only slightly to 28 per cent for dwellings with values in the lower decile to lower quartile band, and more substantially to 35 per cent for owner occupied dwellings in the lower decile price band.

The 2005/06 EHCS estimated that the average cost of improving owner occupied dwellings to meet the thermal efficiency standard was some £2,350, while the overall average cost of improving owner occupied dwellings to the decent homes standard was £7,150 (for each dwelling below the standard).

Given the strong north south variations in property values, the relationship between stock condition and property value has also been analysed at the ‘broad’ regional level as limited sample sizes preclude reliable analysis at the government office regional level. There are also very limited differences in the distribution of owner occupied property values in the government office regions within the ‘broad regions’, provided that London is treated as a broad region in its own right, and distinguished from the rest of the south (East, South East and South West regions).

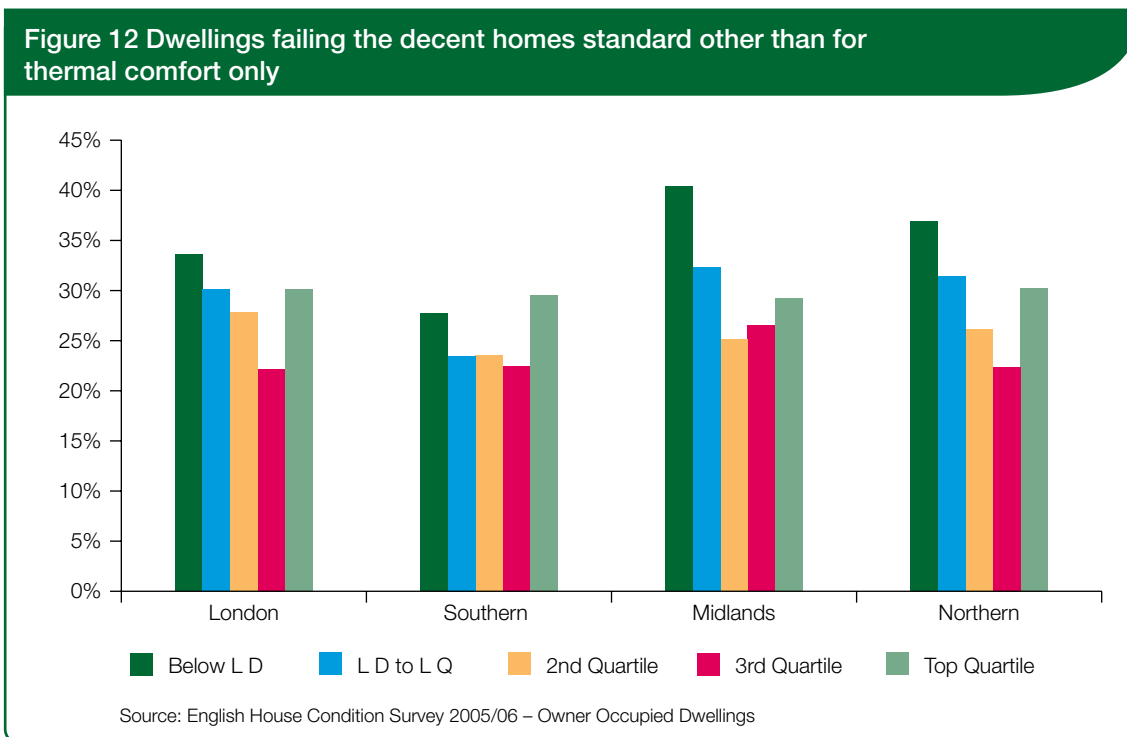


Figure 12 shows the proportion of owner occupied dwellings failing the decent homes standard other than solely on the grounds of inadequate thermal comfort. While the overall profile within the regions is very similar to that shown by the national analysis in Figure 11, there are significant regional variations in the proportions failing the standard in the lower decile band.

It confirms that the clear but limited relationship between property values and stock condition operates within regions, as well as at the national level. Between 24 per cent and 31 per cent of owner occupied dwellings with values between lower decile and lower quartile levels fail the decent homes standard on grounds other than solely thermal comfort. Failures for dwellings with values between lower quartile and median levels are only a little lower varying between 24 per cent and 28 per cent.

This analysis suggests that while it might be appropriate to take some account of the slightly higher likelihood that lower value dwellings may need some attention, the evidence is not strong enough to support a blanket presumption that lower value dwellings should be excluded from consideration when assessing affordability.

House prices and the assessment of affordability

The above analysis makes the case for reviewing the current guidance on the price thresholds used for assessing whether or not households might require affordable housing. In particular it questions the use of lower quartile house price thresholds given the proportion of first-time buyers that become home owners each year by purchasing dwellings below that threshold level.

There is a clear case for strategic housing market assessments to use some minimum price threshold, both because at the margins there can be erratic outliers in the very lowest value dwellings, and more simply because only one household can ever purchase the very cheapest dwelling.

The analyses also show that a relatively high proportion of first-time buyers in each region enter home ownership by purchasing dwellings below lower decile prices. There are regional variations in the extent of first-time buyer entry through the purchase of such lower value dwellings, in the size distribution of stock, and the capacity of first-time buyer households to purchase dwellings of a particular size in local housing markets.

While the analysis might support a general proposition that households unable to purchase dwellings at lower decile prices might be considered to require affordable housing, it also suggests that this presumption should be reviewed in the light of the composition of the local housing market.

In particular it suggests the case for, wherever practical, a more refined analysis that takes account both of the variations in house prices between the different sizes of dwellings in the local housing market, and the local composition of households seeking to enter the market (with a particular emphasis on the distinction between households with and without children).

There is a clear, but limited relationship between stock condition and property value in the owner occupied sector. The costs of dealing with properties that solely fail the thermal efficiency criteria are quite modest, and even in the lower decile to lower quartile house price band more than 60 per cent of owner occupied dwellings fully comply with the decent homes standard.

As with the distribution of house prices for first-time buyers, there is some regional variability with higher levels of below standard owner occupied dwellings in the midland and northern regions. This suggests that there is some scope for different approaches at the local authority level where it can be supported by evidence on the quality of the owner occupied stock within the local area.

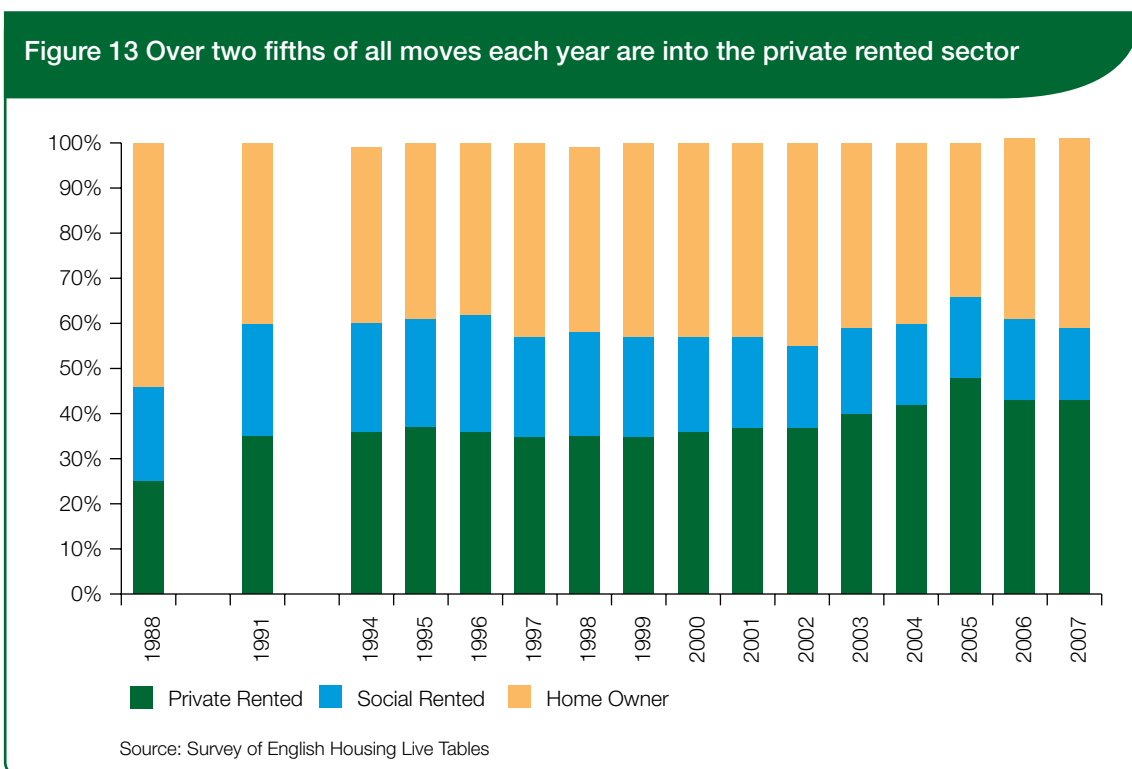
Finally any revised guidance on the assessment of affordability should draw attention to the practical significance of using different house price data sets, and the need to take care in understanding their composition, strengths and weaknesses.

3. Private rented sector

There is very little guidance about how authorities should consider the specific role of private rented sector dwellings within their strategic housing market assessments. For most purposes it is assumed that the analysis of the composition, availability and trends in the supply of private rented sector dwellings should follow the same guidance as for the owner occupied sector.

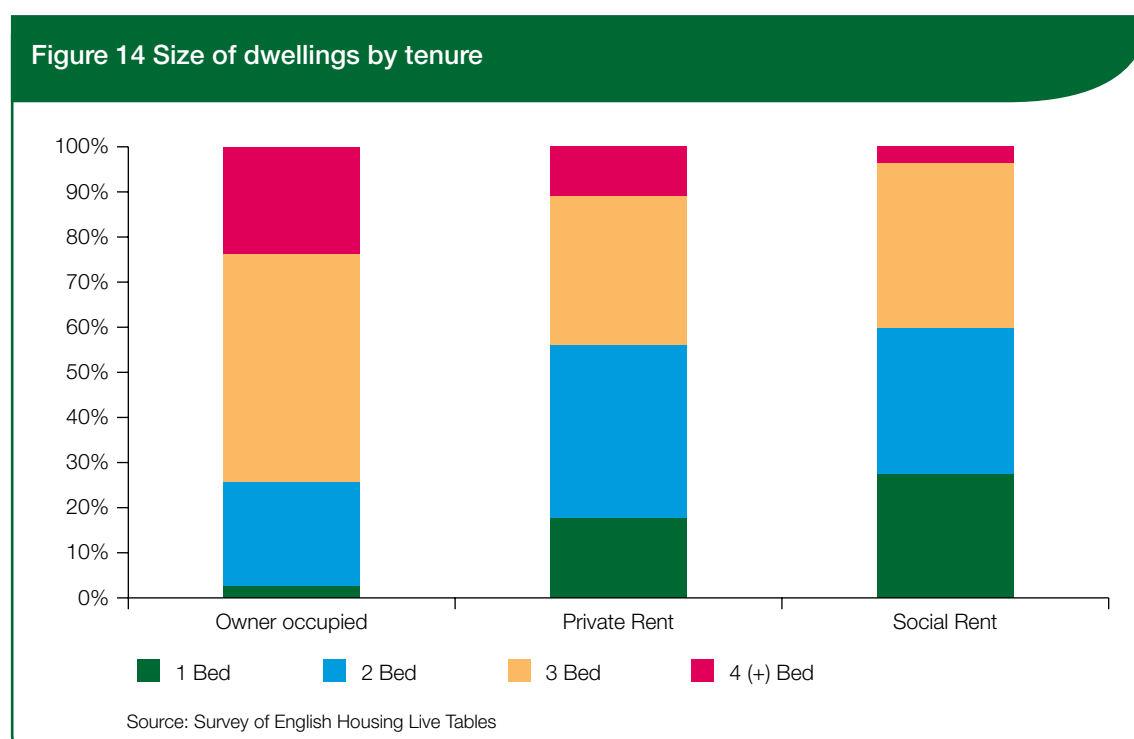
The one specific element of guidance relates to the assessment of affordability, which is principally defined in terms of the ability of a household to meet a private sector rent within a maximum of 25 per cent of their gross household income (excluding benefits) (CLG, 2007).

The private rented sector has a very specific role in local housing markets. That role varies from one area to another, and has changed quite significantly over the last decade. While the private rented sector remains far smaller than the owner occupied sector, both as a result of its recent growth, and the higher rate of mobility among households in the private rented sector, households moving into the private rented sector in any year now account for more than 40 per cent of all household moves (Figure 13).



The private rented sector plays a far more active part in the housing market than suggested solely by the size of the stock. This now amounts to 14 per cent of the total English housing stock, but there is a significant distinction between London, where it accounts for 21 per cent of the stock, and the other regions of England where it varies from between 11 per cent and 14 per cent of the stock (Table S135, CLG Website).

The sector is also distinctive in its composition in terms of dwelling type and size, as shown in Figure 14. It has a substantially larger proportion of one bedroom dwellings (18 per cent) compared to the owner occupied sector (3 per cent); albeit that the proportion is lower than in social rented sector (28 per cent). It also has a higher proportion of two bedroom dwellings compared to both of the other main tenures, and a correspondingly smaller proportion of larger family size dwellings.

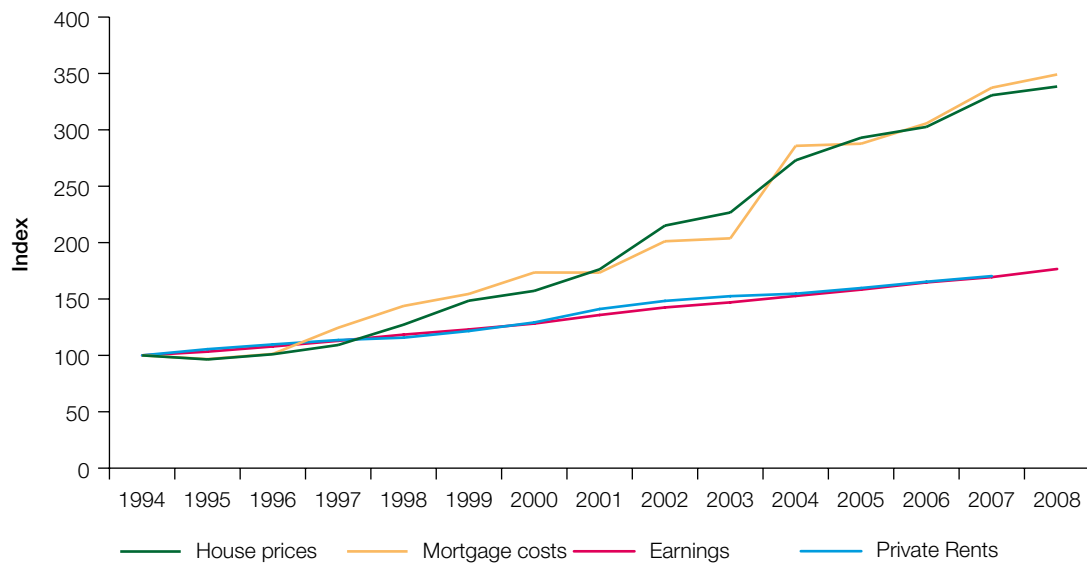


The evidence presented in the recent Rugg review of the private rented sector emphasised the diversity of the sector (Rugg & Rhodes, 2008). While it has a particular role to play in terms of providing short to medium term housing for smaller households, it is not confined to that role.

The Rugg review also highlighted the changes in the sector over the last decade. Not only has it grown significantly in size, but it has tended to bring better quality dwellings to the sector, and in the process reduced the proportion of sub-standard dwellings within the sector.

In previous work NHPAU analysed the small contribution that investment in private rented housing made in terms of the upward pressures on house prices over the last decade (Taylor, 2008). This effect will be fully captured by analyses of home ownership affordability at current prices. Over the same period increases in private rents lagged behind the increases in house prices, and house purchase costs, moving broadly in line with earnings (Figure 15).

Figure 15 House prices, mortgage costs, rents and earnings compared (1994 = 100)



Source: Computed from RMS, SEH & ASHE data

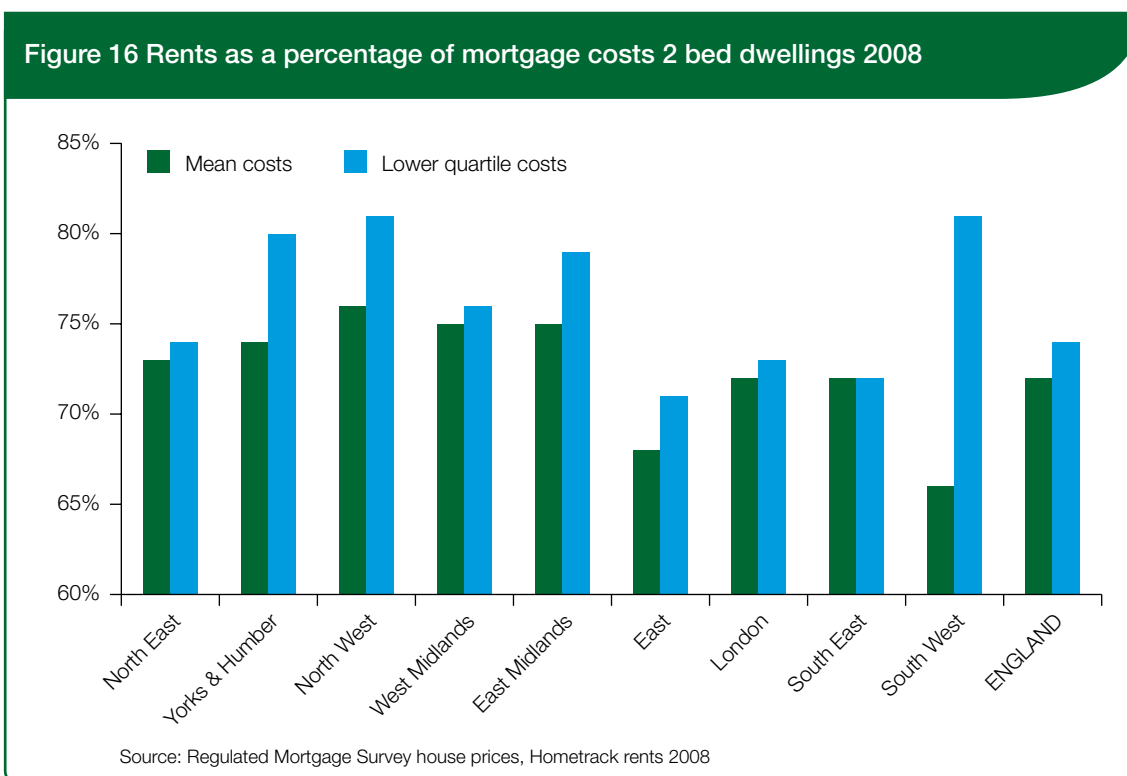
As a result a gulf opened up between the costs of renting and buying. In recent years it has been cheaper to rent in the private sector than to buy, in all regions of the country, after taking account of the differences in the size composition of dwellings in the owner occupied and private rented sector.

Figure 16 shows the relative costs of renting and buying a two bedroom dwelling in each region of England in 2008, based on Hometrack rent data and RMS house price data. On average the cost of renting a 2 bedroom dwelling in England was 72 per cent of the cost of buying (based on a 100 per cent standard 25 year annuity at the 5.5 per cent prevailing average new mortgage interest rates in 2008¹). There is a similar, but marginally smaller, difference when comparing the costs of buying and renting lower quartile value two bedroom dwellings.

The figure also shows that there is a limited regional variation in the relationship between the cost of renting and buying – ranging from 66 per cent in the South West to 76 per cent in the North West in respect of average rents and house prices, and from 72 per cent in the East to 81 per cent in the North West and South West in respect of lower quartile rents and house prices.

There is greater variation at the local level. There is only one local authority area in England where the cost of an average rent for a two bedroom dwelling exceeds the cost of buying a similar property. In the case of lower quartile values there are just three local areas where the cost of renting exceeds the cost of buying.

¹ Source: Regulated Mortgage Survey for new mortgages.



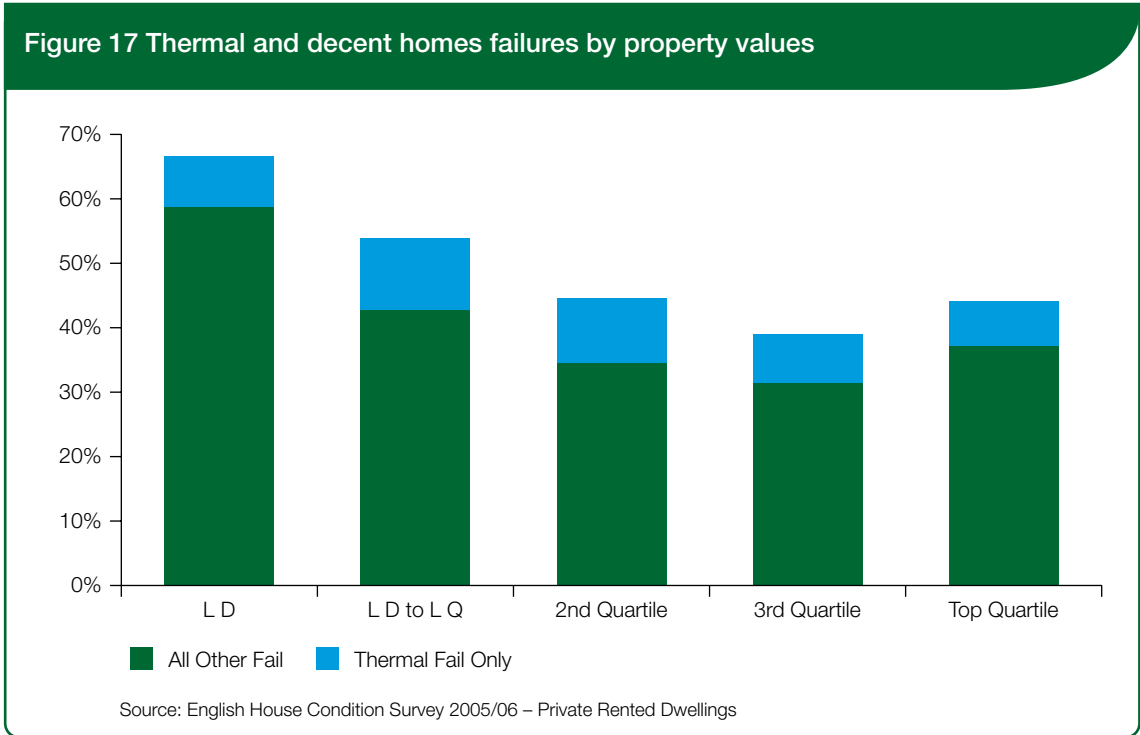
This highlights the importance of the separate affordability analysis for the costs for private renting, compared to the costs of buying. Clearly many households that cannot afford to buy can afford to rent a similar size dwelling.

The guidance on how to assess affordability for access to home ownership and access to private renting differs in structure (with home ownership affordability based on prices as a multiple of income and rental affordability based on rents as a percentage of income). The practical difference between these two approaches is limited (or at least while average mortgage rates are in the 5-6 per cent range).

If private renting is typically currently cheaper than the costs of buying, there are other issues to take into account in assessing the role of the private rented sector in local housing markets. In addition to stock condition, there are concerns in respect of security of tenure and the quality of housing management, particularly in some sub sectors of local markets. There is also the more basic issue about the level of supply of private rented stock.

Stock condition

Despite the introduction of better quality dwellings into the sector over the last decade, there are proportionately more lower quality homes in the private rented sector than in any other tenure. Figure 17 shows the variation in stock condition by distribution of property values within the private rented sector.

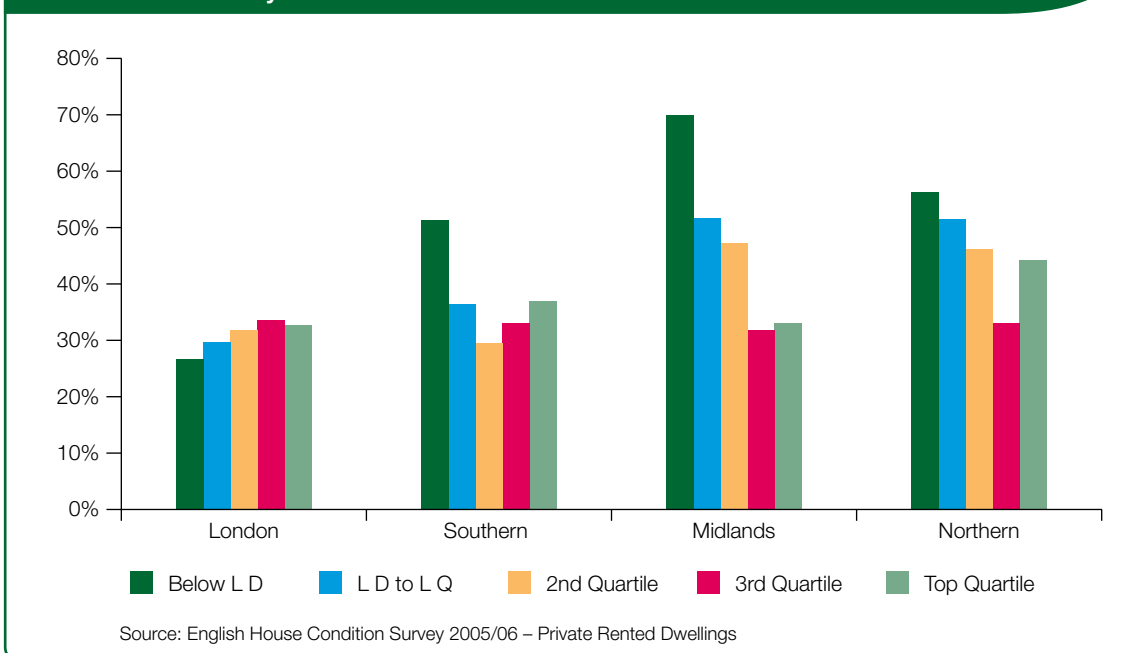


Altogether 47 per cent of all private rented dwellings fell below the decent homes standard in 2005/06, compared to 35 per cent of all owner occupied dwellings. While there is a clear relationship between property value and stock condition, it is not an invariable relationship, with upper quartile value rented dwellings more likely to fail to reach the decent homes standard than dwellings in the two middle value quartiles. There is a particularly sharp increase in the incidence of poor stock condition in properties with lower decile values within the sector – with two thirds of those dwellings failing to meet the decent homes standard.

There are marked regional variations in the proportions of private rented dwellings that fail the decent homes standard. Figure 18 shows the proportions of dwellings within the ‘broad’ regions that fail the decent homes standard other than solely on the grounds of inadequate thermal comfort. The proportions are higher in the Midlands and Northern regions, and lower in London and the South of England.

In the private rented sector the responsibility for dealing with stock condition rests with the landlord rather than the tenant; and there is no obligation or general targets for private landlords to comply with the decent homes standard. There are only targets to reduce the proportion of ‘vulnerable’ households living in non decent homes in the private rented sector. Of more immediate concern are the 30 per cent of private rented dwellings that fail the HHSRS criteria, rather than the wider decent homes standard of which the HHSRS requirements are one dimension. The HHSRS failure rate in the private rented sector rises sharply to 40 per cent for lower decile value dwellings.

Figure 18 Dwellings failing the decent homes standard other than for thermal comfort only



Local authorities can approach these concerns in two ways. The most direct approach is to require and encourage as appropriate improvements in the quality of the stock in their housing policies and strategies. Beyond that there is a question about whether they also take the incidence of poor quality private rented stock into account when assessing the available level of potential supply from the sector, particularly in respect of stock failing the HHSRS criteria.

There is no rationale for adjusting the affordability criteria in assessing the affordability of private rented dwellings, as there are very limited differences in the quality of stock between dwellings in the second quartile value band, and dwellings in the lower decile to lower quartile price band. As tenants do not have responsibility for the condition of the stock there is no basis for making cash adjustments to the rental thresholds used to determine the affordability of private rents.

Security of tenure and quality of management

One of the central findings of the Rugg review was that while there are important issues around security of tenure and quality of management in the private rented sector those issues are effectively concentrated in a limited portion of the sector.

While in formal terms most new tenancies in the private rented sector are offered on assured shorthold tenancies, landlords do not automatically seek to terminate tenancies at the end of a six month period. Indeed the evidence is (as is entirely logical) that where a landlord has a satisfactory tenant they will usually want the tenant to remain as long as possible. This avoids the costs associated with terminating a tenancy and then reletting, and also avoids the uncertainty about whether or not there would be any issues with a succeeding tenant.

Average periods of occupation in the private rented sector (excluding short term student lettings) are typically for a few years. The available evidence is that in the vast majority of cases tenancies are brought to an end at the instigation of the tenant, rather than by landlord action (Wilcox, 2008).

While there are important issues around poor quality management, and these may be more significant in some localities, these are predominantly a matter for local authority tenancy relations policies, and enforcement action as required.

The overall level of incidence is not such as to provide any presumption against taking the availability of private renting into account for the purposes of local housing market strategies. More generally it should be noted in this context that private landlords (of all types) have relatively high satisfaction levels, with only 15 per cent of all private tenants expressing dissatisfaction in 2006 (Rugg & Rhodes, 2008).

While it might be considered that, particularly for households with children, greater security of tenure would be desirable, this is a matter for national policy debate. While 85 per cent of all assured lettings are of the 'shorthold' variety that offers only limited security, the other 15 per cent provide longer term security of tenure (subject to the usual grounds for possession) (Table 510, CLG Website).

A further consideration is the role of the private rented sector in providing accommodation for lower income households supported by housing benefit. If this is acknowledged as a continuing role, rather than as a 'stop gap' measure due to the shortage of available social sector rented dwellings, then this would logically imply that some account be taken of this in housing market assessments. While typically low income tenants in receipt of housing benefit are likely to have a rent to income ratio that exceeds the 25 per cent ratio in current guidance, it should be recognised that this is also often the case for low income tenants in the social rented sector.

Data on the private rented sector

There is far less routinely available data for the private rented sector, than is the case for dwellings in the owner occupied sector. This applies to data on the local scale of availability of private rented dwellings, and on local levels of private rents.

Comprehensive local data on the scale and location of private rented sector dwellings can be obtained from the 2001 Census. Such has been the rate of change in the sector in the intervening years, these data are of limited value in assessing current levels of provision.

Local authorities can supplement that data in a number of ways. They can use their housing benefit records to provide information on the scale and location of private rented dwellings let to low income households in receipt of housing benefit. This is a relatively small sub sector of the market, which varies substantially between different areas.

Council tax records can provide data on the location and scale of private rented dwellings, as data provided to councils to determine a persons liability to pay council tax will show the occupiers legal interest in the dwelling (under Section 6 of the Local Government Finance Act 1992).

This should enable authorities to obtain reasonably robust data on the numbers and location of dwellings occupied by tenants. These can then be compared with records on the scale and location of social sector rented dwellings, to provide data on private renting.

The only officially available data on rents at a local level is in the form of the Local Housing Allowance levels set by rent officers for the purposes of housing benefit. The allowances are set for 'broad rental market areas' rather than local authority areas. Local level data on private rents can be obtained (at a cost) from Hometrack. Hometrack data have been used for the analyses in this report.

Private rented sector assessments

Differentiated assessments of the availability and affordability of private rented dwellings are an increasingly important dimension of strategic housing market assessments given the differences between the costs of buying and renting in the private rented sector.

While there are some issues, in respect of stock quality in particular, that need to be considered these do not suggest that there is a case for taking a different general approach to setting price thresholds to measure affordability in the private rented sector, than that taken in the owner occupied sector. This may suggest the use of lower decile rents rather than lower quartile rents as the primary threshold measure, as in the analysis of affordability in the owner occupied sector. This would have the same caveat that this general presumption should be reviewed in the light of local market circumstances.

Given the growth in the importance of the private rented sector within the wider housing market the absence of timely national data sets providing local data on the incidence and costs of private renting assumes a similarly greater significance.

4. Local income estimates

Since 1990 local authorities have increasingly engaged consultants to provide estimates of affordability and associated housing needs, often utilising local household surveys which offer the possibility of measuring local incomes and relating these to household circumstances and housing cost data. The continuing lack of comprehensive official data on household income patterns at local level has fuelled this demand for local needs surveys. There have been ongoing concerns about the robustness of local surveys, given the intrinsic difficulties entailed in collecting robust income information through this method.

In this context, provision of robust local income estimates would have value to users both as a benchmark for comparing with surveys, and for adjusting such surveys where necessary. Potentially, these income estimates could be used as an alternative basis for affordability estimates based on secondary data, thereby reducing the need for frequent commissioning of relatively expensive local surveys.

The key aim of this part of the research has been to develop a method to estimate relevant household income distributions from secondary data sources at local authority level². The resulting estimates can then be compared with existing sources, including earlier local incomes model (Bramley & Smart 1996, Bramley & Lancaster 1998, Bramley & Karley 2005, Bramley et al 2006), and any differences assessed. It is important to keep track of the potential sources of error in any such estimates and to provide guidance on the intrinsic degree of precision which is likely to be involved.

Having developed a methodology and applied it to recent data, tables of values can be created at local authority level as a key output for the user community. By combining these with the work on house price and rental thresholds, tables of affordability estimates can be created for key groups. It is also possible to demonstrate the sensitivity of these estimates to key assumptions, for example regarding price thresholds.

The methodology in summary

Local authority level measures of the level and distribution of household income, consistent with the main official national source (the Family Resources Survey, FRS) have been developed. These estimates are for all households and all household income, and for relevant sub-groupings of households and relevant definitions of income (relevant that is to the ultimate task of assessing affordability).

A multi-stage procedure was adopted to produce model-based estimates of average incomes and the distribution of incomes for all households and key sub-groups of younger households. This started from the main official data source on incomes, the Family Resources Survey, and the modelled incomes are controlled back to the levels observed in this source at the level of locality type by broad region.

² Local Authority District or LAD, the 354 lower tier local housing and planning authorities in existence from 1998, before the effects of recent reorganisations in certain areas.

Key predictors (drivers) of income variation are identified from modelling using FRS data at the micro and aggregated level, and these are used in conjunction with locally available data to predict income patterns for all local authorities in England. These predictors include occupations, earnings, economic activity levels, household composition, age, tenure, housing characteristics and other factors.

As part of the process, values based on the original sources and modelled local estimates have been tabulated for intermediate categories of areas, both the conventional regions and groupings of similar authorities by broader regions. These are useful for providing a general descriptive profile, benchmarks for local authorities, control values for modelled estimates, and comparisons with other sources. The ONS 2001-based 'Super-Groups' of LAs have been used as the basis for the second classification, in conjunction with broad regions.

The methodology is outlined in more detail in Appendix A along with a discussion of technical issues.

How accurate are the estimates?

One of the key questions for users is: how accurate are these local income estimates? Can one put a 'confidence interval' on the figures? In view of the complex multi-stage nature of the estimation process, and the lack of an authoritative 'right answer' at the local level, it is not possible to provide a formal statistical confidence interval on the final figures. There are several pieces of evidence which are indicative of the likely order of magnitude of any such margin of uncertainty.

The first piece of evidence is the goodness of fit of the aggregated FRS regression models used at Step 5.³ How good are the models at predicting proportions of a spatially clustered sample population who fall below specified income bands, using data on the characteristics of the sample population and some other area factors? Most of these models look reasonable in terms of adjusted r-squared measures (proportion of variance explained), which is above 0.8 in most cases and often well above 0.9. The models for under-40 working households are a bit weaker, as are the models to predict the proportion below the lowest income bands generally.

The standard error of the estimate is the average deviation between the predicted and observed proportion of households below the relevant income band. These figures are shown in the lower part of table 9. On average, the error for all households across the income bands is 2.5 percentage points. This rises somewhat, to between 3.0 per cent and 3.7 per cent for the under-40 subgroups. Assuming normally distributed errors, a 95 per cent 'confidence interval' would be plus or minus twice the standard error, which would be 5 per cent for all household income, 6 per cent for all under-40s, 6.3 per cent for under-40 working and 7.4 per cent for under-40 families. 67 per cent of cases would lie within +/- 1 standard error, i.e. the figures of 2.5 per cent /3.0 per cent /3.7 per cent quoted above.

These figures may provide an overestimate of the 'true' errors. Firstly, the FRS data is a sample and there is considerable sampling error (noise) in the observed dependent variable in this aggregated sample model. The predicted values might be closer to the true 'actual' value than the sample observed value. Secondly, at a later stage in the process control factors are applied at the level of broad region by LA Super-Group type. These controls could well have the effect of

³ See detailed methodology in Appendix A

reducing errors arising from the regression model, insofar as these errors were systematic between these types.

Table 9: Goodness of fit measures and implied confidence intervals for income estimates based on local-level aggregated models using FRS data (Step 5 models)

Measure	All households HHd Inc	U40 BU Inc	U40 working BU Inc	U40 family BU Inc
<i>Adj R-Sq</i>				
In(median) propn <	0.932	0.927	0.889	0.937
£100	0.154	0.802	0.114	0.720
£200	0.585	0.849	0.403	0.893
£300	0.827	0.881	0.653	0.909
£400	0.901	0.897	0.796	0.910
£500	0.924	0.873	0.834	0.867
£600	0.916	0.896	0.868	0.881
£800	0.902	0.871	0.871	0.826
<i>Std Err Estimate</i>				
In(median) propn <	0.045	0.065	0.560	0.072
£100	0.009	0.021	0.013	0.034
£200	0.025	0.025	0.022	0.029
£300	0.030	0.027	0.029	0.032
£400	0.028	0.030	0.034	0.035
£500	0.027	0.037	0.041	0.045
£600	0.025	0.034	0.039	0.041
£800	0.030	0.037	0.042	0.044
Average	0.025	0.030	0.031	0.037
95% CI as % pts	5.0%	6.0%	6.3%	7.4%

The second type of evidence derives from the final stage of the estimation process, when predicted local income distribution values using local data have been controlled at the higher level to the FRS values. The resulting figures, for various regional or subregional groupings, can be compared with the FRS actuals for various regional or subregional groupings. For example, using the 2007 full household income, after controlling the mean absolute deviation or error at regional level would be 1.5 per cent for the mean and 1.0 per cent for the median. At the level of the 36 subregions used in Bramley's Index of Multiple Deprivation (IMD) affordability index study, the mean absolute error would be 2.3 per cent (mean) and 2.5 per cent (median). At the level of LA districts, the mean errors are considerably higher, at 8.0 per cent (mean) and 9.1 per cent (median), but this is comparing with FRS data subject to substantial sampling error, particularly for smaller local authorities. Looking only at the 47 local authorities with more than 100,000 resident households, where the FRS samples would be more substantial, the mean absolute errors are 5.0 per cent (mean) and 5.8 per cent (median).

For all household income in 2007, the errors in the estimates of proportions of households below different income bands across the 36 subregions range from 0.4 percentage points in the lowest income band (<£100pw) to 2.4 percentage points in the middle band (<£500pw). The average across the seven bands used is 1.7 percentage points. Expressed as a 95 per cent confidence interval this would be +/-3.4 percentage points, for the subregional level.

Taking all of this evidence together, the order of magnitude of likely errors in these income estimates at local level is 'about 5 per cent' in round terms. For all households' incomes and for subregional groupings or larger local authorities the errors will tend to be smaller; for subgroups of households and smaller individual authorities they are likely to be larger.

Income distribution patterns

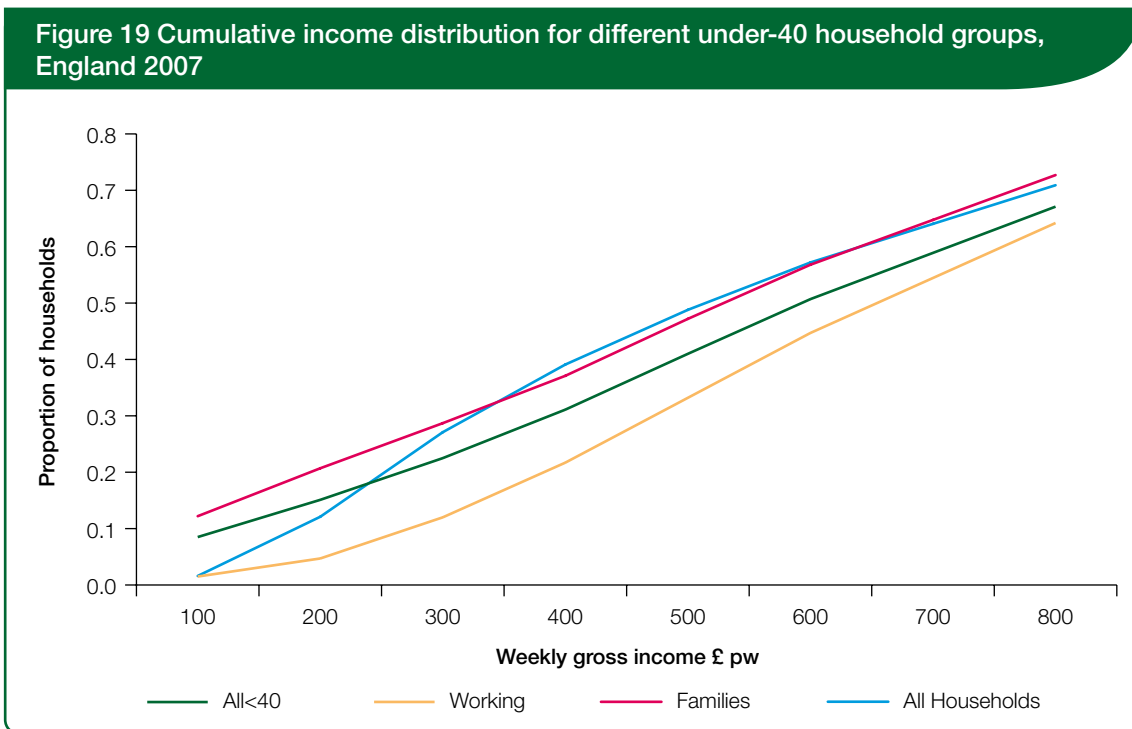
Income distribution is crucial in measuring affordability. In particular information on what proportion of households have incomes greater or less than the particular level of income needed to afford particular housing options in the market, such as a 2 bedroom home at the lower decile price. The income prediction models developed as described above are designed to estimate income distributions, as well as means or medians, at local level.

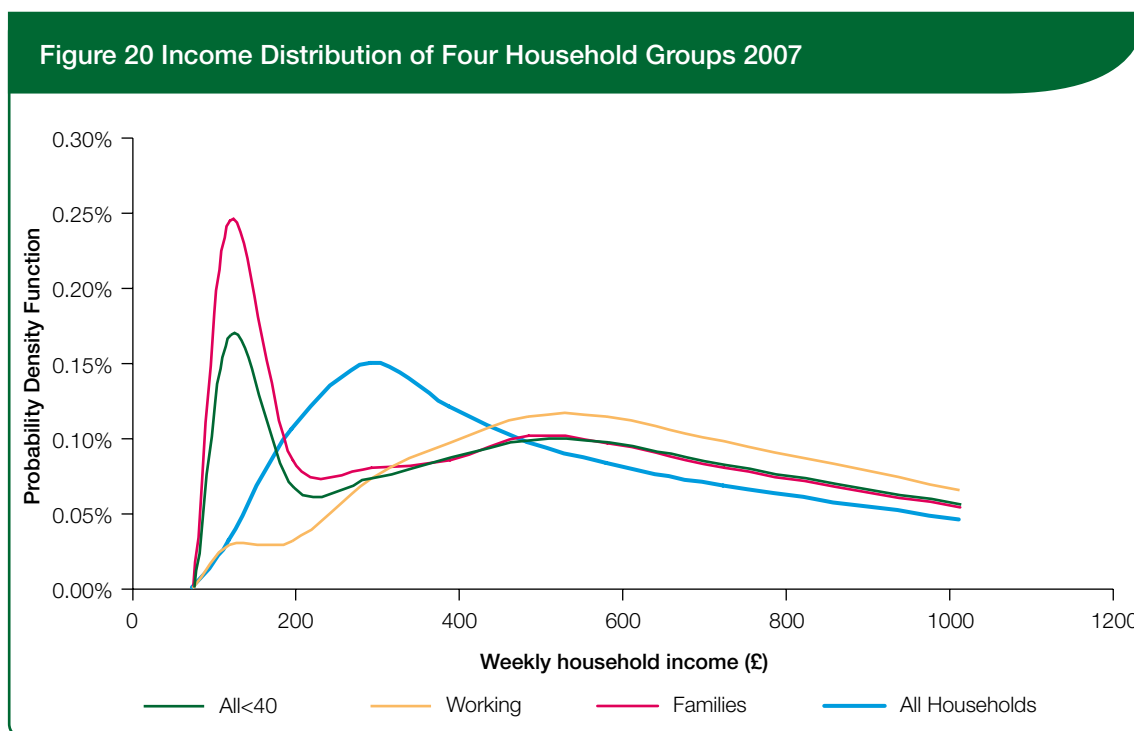
Income distributions are generally represented by frequency distributions. These may be cumulative frequencies – the numbers or proportions of households below successive income levels – or relative frequencies - the numbers or proportions whose incomes fall in a particular band. The latter may be referred to as a 'probability density function' (PDF), which measures the percentage of households per £ of income in the relevant range.

Firstly, the cumulative frequency as a proportion or percentage for each of seven gross income levels (£100, £200, £300, £400, £500, £600 and £800 per week) is estimated. These may be derived directly from the FRS for the national population or larger regional or subregional areas. The modelling then reproduces such distributions for the local authority areas, consistent with the FRS at the higher level. The relative frequencies or PDFs are derived by linear interpolation between these bands. This is an acceptable approximation in most cases, although it can be a bit more tricky for the lowest bands (what is the effective minimum income) and for the highest band (above £800).

Figure 19 illustrates this by showing the cumulative distributions for the four household groups considered in this study, while Figure 20 shows the corresponding relative frequency distribution (or PDF). The points in these charts are linked by curves, although in practice this study applies piecewise linear functions. The all households analysis is for all household income whereas for the other three groups (the under-40s) it is first benefit unit income excluding income-related benefits. The data in these charts are national and directly derived from the FRS.

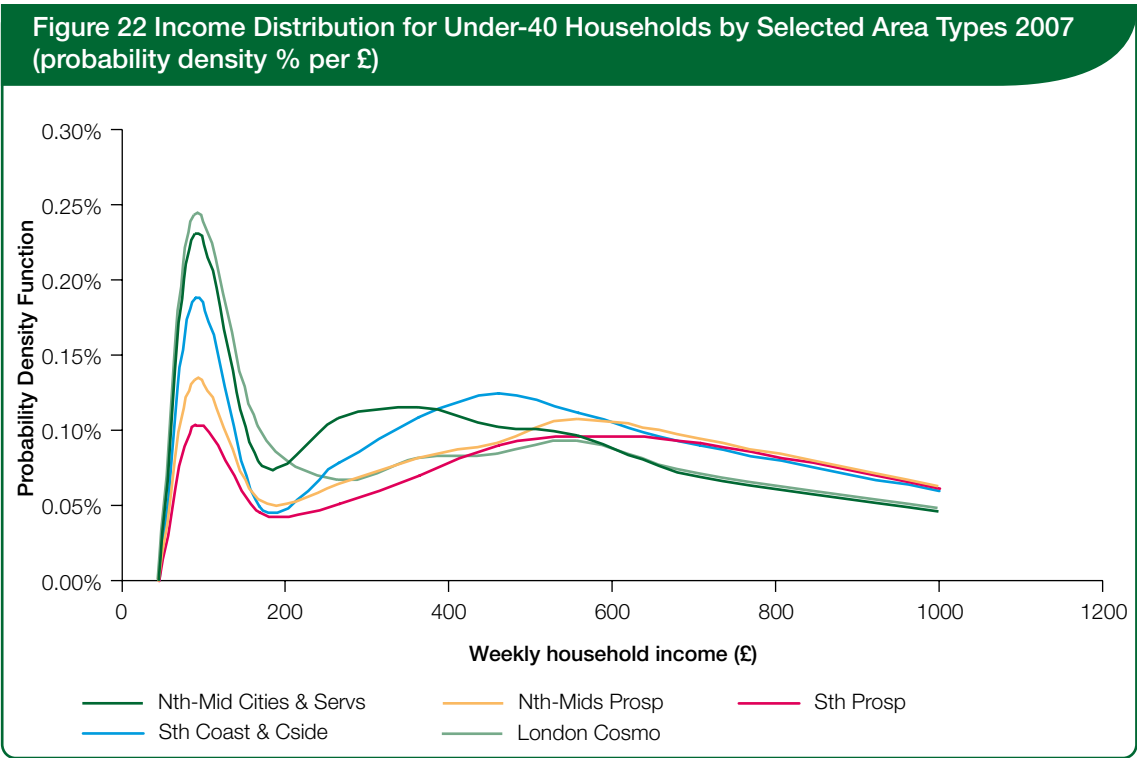
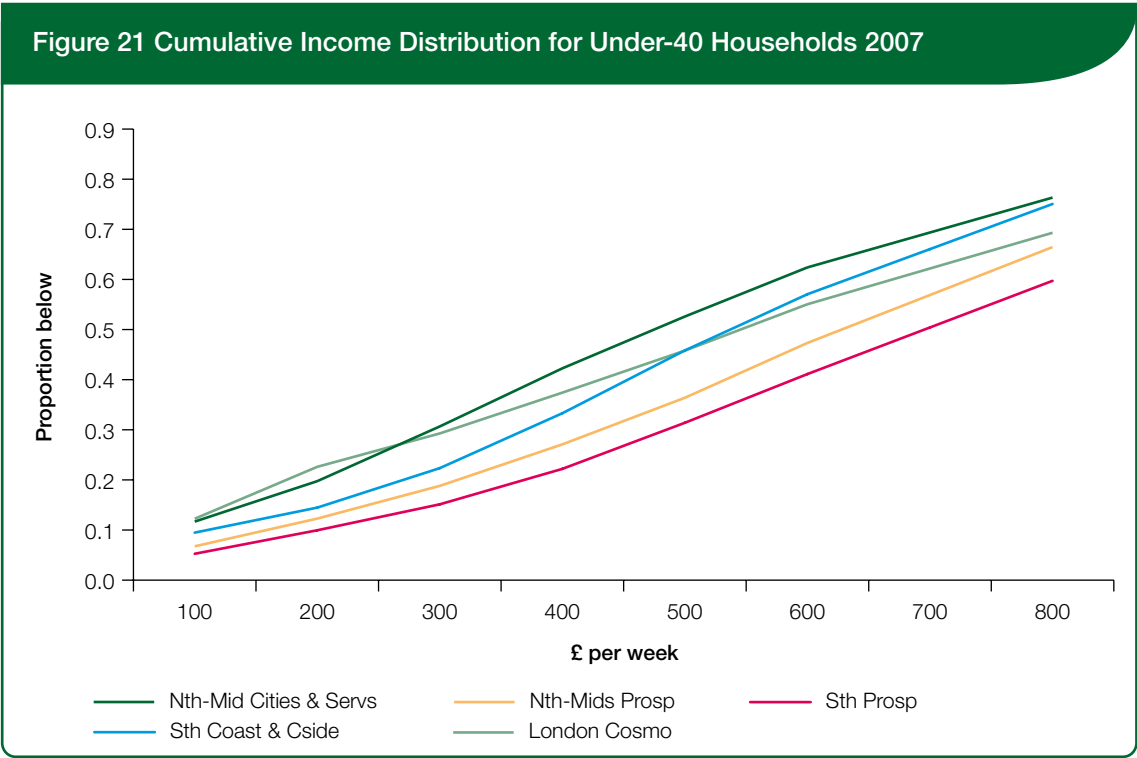
Both all households and under-40 working households have relatively few cases in the lowest income band. They then deviate, with all households having quite a lot of cases in the moderately low bands (£200-£300), including obviously retired households, whereas the working under-40s have relatively few in these bands. All under-40s and under-40s families have a noticeable spike of cases in the low income band. In the medium and higher income bands, all households have fewer cases while under-40 working households have more cases, with all under-40s and families occupying an intermediate position.





The next two figures (21 and 22) illustrate the way in which income distributions may vary between different types of locality and region. This time the focus is on under-40 households, the key group in terms of affordability.

Two area types illustrated, North-Midland Cities & Services, and London Cosmopolitan, have quite a pronounced peak of households on very low incomes. South Coast and Countryside also has quite a lot of low income households. More prosperous localities, especially in the South, have much smaller clusters of low income households.



In the moderate income bands up to £400 pw, the northern cities have relatively more households, while the prosperous areas have relatively few. In the middle range around £500 most area types have a similar proportion of households, but South Coast and Countryside is notable for having more in this category. As incomes rise above £600 pw, the northern cities and London Cosmopolitan areas have relatively few households represented, while unsurprisingly the prosperous areas have more in these bands, but the South Coast and Countryside also has quite a lot.

Comparisons by region and type of locality

Basic descriptive data are provided comparing the actual FRS income figures for 2007 with 'predicted values', and for comparison two alternative 'models', CACI Paycheck and Bramley's local affordability model.

PayCheck is CACI's household income model providing estimates of gross household income (including investments, income support and welfare), from postcode level upwards. PayCheck classifies household income within defined bands of £5,000 ranging from £0 to up to £100,000+. It is a model designed to work at fine levels of geographic detail, at the level of full postcode rather than Local Authority. It is built using published data from years earlier than 2007 and projected forward to give estimates for the 'current' year of 2007. It is not calibrated to fit the FRS. In relation to LA figures the calibration fits income distributions for postcodes and in the trade off between fit at low versus high incomes seeks to be better at lower incomes.

These initial comparisons are for full household income of all households (i.e. all ages, working or not)⁴. Tables are shown for GO regions and for the combination of LA Super-Groups and broad regions. Table 10 shows the figures for mean household income, while Table 11 and Figure 23 show the median estimates.

⁴ Strictly, Bramley affordability model measures income as first benefit unit rather than full household, so would be expected to be slightly lower, in respect of complex households.

Table 10: Mean household income estimates by region and area type, 2007, £pw

Region/Area Type	Mean Act FRS	Mean Estimate 1	Mean CACI	Mean Bramley
North	533	516	543	474
Yorks & Humber	564	558	567	515
North West	572	567	578	527
East Midlands	572	589	595	573
West Midlands	576	583	585	545
South West	617	626	595	582
East	682	685	653	663
South East	733	725	685	725
London	757	750	709	728
England	640	639	624	611
Nth-Mid Cities&Servs	533	533	550	471
Nth-Mids Prosp	649	649	638	643
Nth-Mids Coast&Cside	562	562	549	526
Nth-Mids Min&Manuf	525	525	550	488
Sth Cities&Servs	614	614	601	552
Sth Prosp	736	736	687	730
Sth Coast&Cside	545	545	550	526
London Sub	752	751	698	664
London Cent	873	873	757	956
London Cosmo	654	654	663	560
England	640	639	624	611

Table 10 suggests that the mean household income in 2007 was £640 pw, (£33,280 pa) with range between regions of £533 (NE) to £757 (London). The table underlines the general north-south pattern of average income. The range in our predicted values is (£516-£750). CACI has a slightly lower mean, a similar ranking, but a narrower regional range (£543-£709). Bramley (previous model) shows a marginally wider range (£474-728) with this time South East similar to London.

The range in the LA Super-Groups/broad region classification is rather wider, because of the splitting of London into three groups – it now runs from £525 (Mids-Nth-Mining&Manuf) to £873 (London Centre). Apart from Central London, the most affluent areas are ‘South Prosperous’ and ‘London Suburbs’ (c£740-£750). The predicted values are the same because of controlling. CACI again shows a narrower range, from £550 (three mid/northern categories) to £757 (Central London), underlining a general theme from these comparisons. Bramley (previous model) shows a slightly wider range, from £471 (Nth-Mids Cities&Services) to £956 (Central London).

Table 11 and Figure 23 provide an equivalent presentation of median household income estimates.

Table 11: Median household income estimates by region and area type 2005, £pw

Region/Area Type	Median Actual FRS	Median Estimate 1	Median CACI	Median Bramley
North	398	404	455	385
Yorks & Humber	448	437	479	420
North West	448	447	488	421
East Midlands	469	467	506	457
West Midlands	449	459	497	440
South West	501	498	509	466
East	549	546	559	520
South East	581	578	587	558
London	553	550	606	510
England	501	499	531	475
Nth-Mid Cities&Servs	412	412	463	381
Nth-Mids Prosp	521	520	542	509
Nth-Mids Coast&Cside	452	452	470	422
Nth-Mids Min&Manuf	411	411	464	399
Sth Cities&Servs	486	486	513	435
Sth Prosp	592	588	588	567
Sth Coast&Cside	433	433	472	422
London Sub	581	581	597	503
London Cent	556	556	647	554
London Cosmo	482	482	565	415
England	501	499	531	475

Median incomes are at a generally lower level than means because income distributions are generally positively skewed. The national average value in 2007 was £501 pw and the range was from £398 (NE) to £581 (SE) – the South East is clearly higher than London on this criterion. Another slight modification to the north-south pattern is the lower figure in the West Midlands, the same as the North West value.

The lower part of the table shows variation from around £412 in north-midland urban areas to £592 in south-prosperous. The high peak in central London at the mean is cut off at the median.

CACI median incomes are significantly higher than the FRS figures by about 6 per cent overall, but as much as 14 per cent in NE, 11 per cent in WM and 9 per cent in NW; whereas their figure for SE is almost spot on. This is rather different from the results for the means, and suggests some systematic factor in the underlying distribution assumptions in the CACI system. There are particularly large deviations for some of the Super-Groups, eg. London Centre and Cosmopolitan, North-Midlands Cities & Services and Mining & Manufacturing.

The former Bramley model ‘pseudo’ median estimate is pretty close to the FRS actuals in most regions, and has a similar overall range, although it underpredicts somewhat in SW and London.

The differences between the estimates are shown in Table 12.

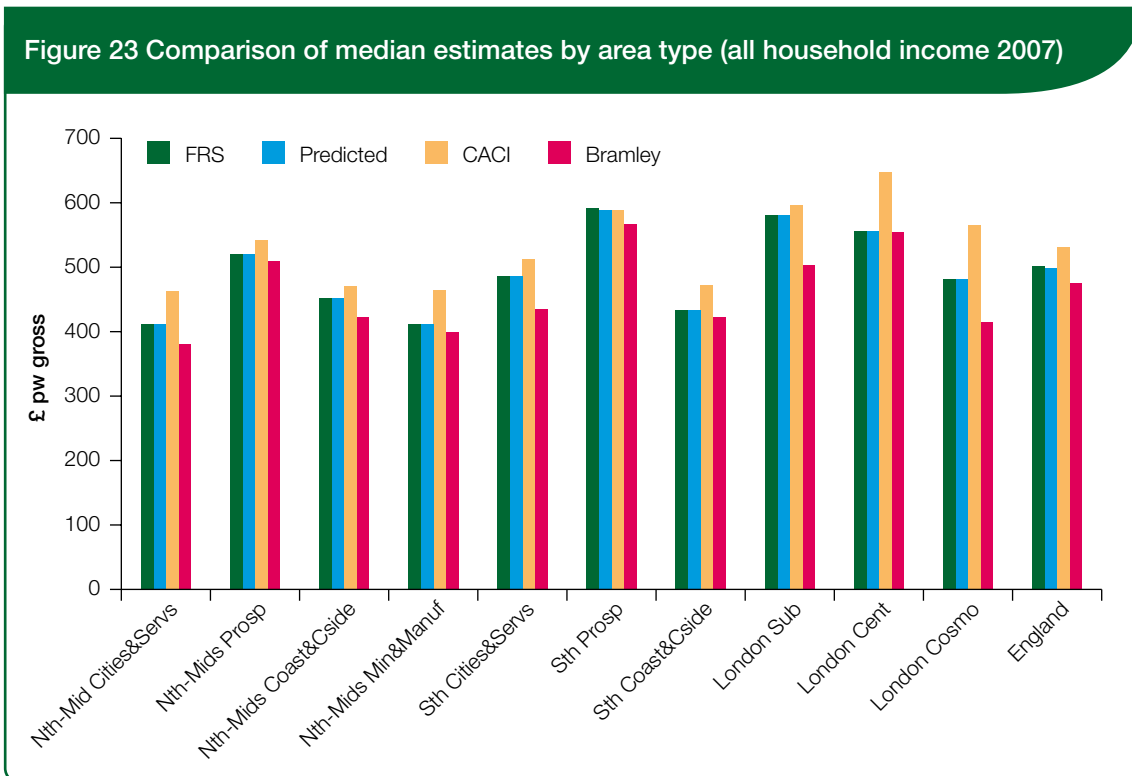


Table 12 Differences between new predicted income levels and alternative estimates, at mean and median levels (per cent, 2005)

Region/Area Type	Differences % vs FRS actual			Differences % vs FRS actual		
	Mean Pred	Mean CACI	Mean Bramley	Median Pred	Median CACI	Median Bramley
gor2						
North	-3.3	1.7	-11.1	1.5	14.3	-3.4
Yorks & Humber	-1.0	0.6	-8.6	-2.4	6.9	-6.2
North West	-0.9	1.1	-7.8	-0.2	9.1	-5.8
East Midlands	3.0	4.1	0.2	-0.3	7.9	-2.6
West Midlands	1.1	1.6	-5.5	2.1	10.6	-2.1
South West	1.5	-3.6	-5.6	-0.6	1.5	-7.0
East	0.4	-4.3	-2.8	-0.6	1.7	-5.3
South East	-1.0	-6.5	-1.1	-0.5	1.1	-3.9
London	-0.9	-6.4	-3.9	-0.5	9.7	-7.7
England	-0.2	-2.5	-4.5	-0.3	6.1	-5.2
MAD	1.5%	3.3%	5.2%	1.0%	7.0%	4.9%
Nth-Mid Cities&Servs	0.0	3.2	-11.6	0.0	12.4	-7.5
Nth-Mids Prosp	0.0	-1.7	-1.0	0.0	4.1	-2.1
Nth-Mids Coast&Cside	0.0	-2.3	-6.3	0.0	3.9	-6.7
Nth-Mids Min&Manuf	0.0	4.8	-7.1	0.0	13.0	-2.9
Sth Cities&Servs	0.0	-2.1	-10.1	0.0	5.6	-10.6
Sth Prosp	0.0	-6.8	-0.9	-0.8	-0.8	-4.3
Sth Coast&Cside	0.0	1.0	-3.5	0.0	9.1	-2.4
London Sub	0.0	-7.2	-11.6	0.0	2.7	-13.5
London Cent	0.0	-13.3	9.4	0.0	16.4	-0.3
London Cosmo	0.0	1.4	-14.4	0.0	17.2	-13.8
England	-0.2	-2.5	-4.5	-0.3	6.1	-5.2
MAD	0.0%	4.5%	4.9%	0.0%	10.7%	3.5%

Note: 'MAD' stands for Mean Absolute Deviation.

The bottom row in these tables, labelled 'MAD', refers to the mean absolute deviation across the regions and Super-Groups respectively. This provides a form of overall test of how closely each estimate comes to the actual FRS data. On this basis, the regional patterns suggest that the new estimates are better than both Bramley (previous) and CACI

Another way of looking at performance is to look at the correlation between the estimates at sub-regional level (this is more of a test of ranking than of whether the range of variation between high and low is right). Table 13 presents these figures, and indicates the ranking of performance. The geographical units are 36 sub-regional ('LACAT') areas used in previous work on IMD affordability index.

Table 13: Correlations of different estimates of mean and median household income with FRS estimates at subregional (LACAT) level

Variable	Correlation FRS mean	Rank	Variable	Correlation FRS median	Rank
Mean predicted	0.978	1	Median predicted	0.981	1
prmnhhinlac			prmdhhincla1c		
CACI mean	0.962	3	CACI median	0.941	3
cacmnhhincw			cacmdhhincw		
Bramley mean	0.961	2	Bramley median	0.965	2
(Mnyall)			(Myall)		

These correlations again suggest that the predicted average measures are markedly better than either of the comparators, CACI or Bramley, although the latter comes closer in the case of the median.

It is possible to run these correlation and deviation tests at a finer geographical level, including local authority. Sampling error within the FRS data means that these generally show a lower score, although the ranking is the same. For example, the correlation for median incomes at district level is 0.834 for the predicted value, 0.803 for CACI and 0.808 for Bramley.

These analyses have also been carried out for a different definition of income (first benefit unit excluding income-related benefits) and, for both income measures, for households with head (HRP) aged under 40. However, these cannot be so readily compared with either CACI or Bramley.

Reference was made in the previous section to the mean absolute deviation between predicted incomes and FRS values at local authority level. Allowance must clearly be made for FRS sampling errors in this case, but the mean deviation for predicted median income was 9.1 per cent whereas for CACI median it was 12.4 per cent. However, for the 47 largest local authorities, the mean deviation for predicted income of 5.8 per cent compares well with the CACI figure of 12.4 per cent.

A table of income estimates is provided at LA level in Annex A downloadable at <http://www.communities.gov.uk/nhpau/keypublications/research/>. Table 14 below provides an extract from this listing, simply showing the top 20 and bottom 20 local authorities in England in terms of predicted median household income. Summary averages for the top and bottom 20 are shown at the bottom of this table.

The top 20 most affluent districts (places like Wokingham, Hart, St Albans, Surrey Heath, Elmbridge, Chiltern and Richmond) have incomes double the level of the bottom 20 (places like Hull, Middlesbrough, South Tyneside, Liverpool, Hartlepool and Nottingham). The difference is 1.94 times for the mean and 2.01 times for the median. The predicted values do not quite match this range of variation, being 1.82 (mean) and 1.85 (median). They are considerably closer than CACI, which shows a systematically narrower range of variation, with ratios of 1.53 (mean) and 1.56 (median). CACI underestimates the highest incomes and over-estimates the lowest incomes at district level. The earlier Bramley model slightly exaggerates the range in terms of mean incomes but comes close to FRS in matching the range for median incomes.

The predicted median shown above is based on the regression of the log of median income with controlling at Super-Group-broad region level; an alternative estimate may be inferred by interpolation from the income band predications, themselves subject to such controlling. The two sets of predicted values are clearly quite similar, showing perhaps a similar or marginally lower range of variation. Estimate 2 in Table 14 is about £20-25 on the high side, despite the controlling of the band proportions; this must be a consequence of the interpolation process.

Table 14: Different household income measures compared for 'top 20' and 'bottom 20' local authorities in England, 2007 (£pw)

LA name	Mean Est 1 prmnhinc1ac	Mean CACI cacmnhincw	Mean Bramley myall	Median Est 1 prmdhinc1ac	Median Est 2 prmdhinc2	Median CACI cacmdhincw	Median Bramley myall
<i>Top 20</i>							
Wokingham	954	846	1131	761	787	730	866
Hart	950	841	1116	758	770	727	854
St Albans	937	806	1108	747	805	695	792
Surrey Heath	923	847	986	736	778	727	769
Windsor	892	799	1036	711	773	686	744
Elmbridge	883	836	1215	705	770	720	805
Chiltern	880	795	1077	702	760	682	788
Richmond	893	866	1206	702	762	751	782
Bracknell	863	792	883	688	724	680	673
Mole Valley	862	760	1017	687	751	654	736
S Oxford	856	749	906	683	716	644	689
Winchester	855	716	855	682	729	612	659
Vale Wht Horse	853	728	841	680	707	626	677
S Cambs	852	733	903	680	704	632	703
Tandridge	852	768	912	680	720	661	670
Woking	850	790	882	678	735	679	652
Waverley	848	760	958	677	729	653	685
S Bucks	846	800	955	675	707	688	690
Guildford	842	767	885	672	715	658	647
Epsom	842	777	975	672	718	669	679

Table 14: Different household income measures compared for 'top 20' and 'bottom 20' local authorities in England, 2007 (£pw)
(continued)

LA name	Mean Est 1 prmnhhinlac	Mean CACI cacmnhhincw	Mean Bramley myall	Median Est 1 prmdhhinlac1c	Median Est 2 prmdhhinlac2	Median CACI cacmdhhincw	Median Bramley myall
<i>Bottom 20</i>							
Lincoln	506	531	442	391	423	451	372
Waveney	492	522	460	391	408	446	381
Manchester	503	531	431	389	417	447	336
Sandwell	502	504	437	388	410	430	355
Easington	494	483	420	387	413	412	353
Wansbeck	492	515	475	385	399	430	384
Gateshead	492	523	452	385	409	440	365
Wear Valley	487	517	467	381	391	439	382
Blackpool	474	517	405	381	378	443	337
Stoke	486	501	434	380	407	426	367
Sunderland	486	521	440	380	405	438	363
Gt Yarmouth	472	511	446	375	398	436	364
NE Lincs	475	532	445	372	394	450	370
Knowsley	472	517	420	369	385	434	343
Nottingham	477	518	421	369	399	438	327
Hartlepool	466	532	444	365	380	442	357
Liverpool	470	516	399	364	382	434	323
S Tyneside	462	513	432	361	388	431	340
Middlesbrough	451	522	411	353	373	438	340
Hull	445	482	400	348	381	406	332

Table 14: Different household income measures compared for 'top 20' and 'bottom 20' local authorities in England, 2007 (£pw)
(continued)

LA name	Mean Act FRS mnhhincf	Mean Est 1 prmhinc1ac	Mean CACI cacmhhincw	Mean Bramley myall	Median Act FRS mdhhincf	Median Est 1 prmhinc1ac	Median Est 2 pmdhhinc2	Median CACI cacmdhhincw	Median Bramley myall
Top 20	922	877	789	992	724	699	743	679	728
Bottom 20	473	480	515	434	360	376	397	436	354
Ratio	1.95	1.83	1.53	2.29	2.01	1.86	1.87	1.56	2.05

Note: FRS measures for individual LAs are suppressed to respect disclosure rules and small sample numbers in many LAs.

Under-40 household groups: incomes and incidence

The previous section focused on household income for all ages of household, as this is the best basis for comparison with the other estimates. The affordability analysis is concerned with under-40 households as a group, and specific sub-groups including working households and family households. The under-40 analysis also uses a narrower definition of 'First Benefit Unit Income excluding Income-related Benefits. Modelled estimates of the median income and distribution of income for this group are in Annex B at <http://www.communities.gov.uk/nhpau/keypublications/research/>.

Table 15 presents a simple comparison of median values for the under-40 sub-groups, derived directly from FRS, broken down as usual by region and LA Super-Group.

Table 15: Median incomes for all households and under-40 groups by region and area type (£pw)

Region / Area Type	All households	Under-40 households				
	Household income	Household income	1st BU income	Working BU inc	Family BU inc	Family working
North East	415	501	471	553	440	540
Yorks & Humb	462	559	539	597	487	578
North West	442	539	517	593	459	577
East Midlands	469	554	523	594	503	605
West Midlands	455	528	505	577	472	579
South West	504	596	568	607	549	614
East	564	671	641	699	608	688
South East	611	715	682	728	624	711
London	584	714	638	738	507	677
England	508	608	575	647	520	624
Nth-Mid Cities&Servs	424	493	447	539	399	522
Nth-Mids Prosp	531	642	620	665	598	667
Nth-Mids Coast&Cside	432	545	490	558	432	487
Nth-Mids Min&Manuf	424	520	499	578	468	566
Sth Cities&Servs	499	609	547	622	466	569
Sth Prosp	613	709	686	727	656	722
Sth Coast&Cside	442	548	520	576	497	574
London Sub	612	741	663	739	569	712
London Cent	668	934	791	935	488	618
London Cosmo	515	576	517	607	373	534
England	508	608	575	647	520	624

Source: FRS pooled data.

The comparison in the first two columns of Table 15 shows that incomes for this younger group are generally higher than those for the whole household population. This is because the large retired group are included in the all ages figures and these tend to have lower incomes. The overall difference is about £100 per week.

The table also shows the extent to which median incomes are depressed by excluding second benefit unit incomes and incomes derived from income-related benefits. While the overall reduction in the median is quite modest at around 5.5 per cent, this reduction is greater in some of the urban areas including London. The reduction is least in the more prosperous areas.

Working under-40 households unsurprisingly have higher incomes on average than all under-40s. The average difference is 12.5 per cent, but this is greater in London and the northern cities, and less in the southern regions.

Family households have lower incomes than all under-40 households. This is despite their having more family members and, critically for housing affordability, requiring larger dwellings. The difference at the median is 9.5 per cent less income, and affordability will be markedly poorer for this group. Family incomes are sharply lower than all under-40s in London (21 per cent lower) especially in the Cosmopolitan and Central areas.

The incomes for under-40 working family households are not as low as the all-families figures but they are still below the median for all under-40 working households, by 3.5 per cent, rising to 34 per cent lower in Central London.

The proportion of households falling into the various under-40 sub-groups are shown in Table 16. Regression-based predictive models have been developed to estimate these proportions at LA district level.

Under-40 households comprise just over 30 per cent of all households. This proportion is much higher in London, approaching half in the Central and Cosmopolitan areas, and low in Southern Coast & Countryside areas. A quarter of all households are under-40 working households; again, this proportion is higher in London, especially the Central area, and lower in the Coast and Countryside areas. Sixteen per cent of all households are under-40 families, and this proportion does not vary so widely although it is also lower in the Coast & Countryside areas. 12.5 per cent of all households are working families.

Table 16: Incidence of under-40 household sub-groups as percentage of all households, by region and area type

Region/Area Type	Under-40 all	Under-40 working	Under-40 family	Under-40 working family
North East	27.4%	21.6%	16.7%	12.8%
Yorks & Humb	29.9%	24.8%	16.2%	12.9%
North West	29.0%	23.3%	16.5%	12.4%
East Midlands	29.2%	24.2%	15.9%	12.1%
West Midlands	29.0%	23.5%	16.3%	12.6%
South West	26.9%	23.8%	13.6%	11.8%
East	28.8%	25.2%	14.9%	12.6%
South East	28.4%	25.0%	14.7%	12.4%
London	39.6%	32.7%	17.4%	13.1%
England	30.3%	25.4%	15.8%	12.5%
Nth-Mid Cities&Servs	33.1%	25.6%	18.0%	13.1%
Nth-Mids Prosp	26.5%	23.1%	14.6%	12.1%
Nth-Mids Coast&Cside	22.4%	19.1%	12.7%	10.2%
Nth-Mids Min&Manuf	28.3%	22.9%	16.7%	12.8%
Sth Cities&Servs	35.1%	29.5%	16.2%	13.0%
Sth Prosp	27.8%	25.0%	14.5%	12.6%
Sth Coast&Cside	20.2%	17.0%	11.4%	9.3%
London Sub	36.7%	31.2%	17.9%	14.1%
London Cent	48.6%	39.9%	15.6%	11.6%
London Cosmo	43.9%	34.6%	17.6%	12.2%
England	30.3%	25.4%	15.8%	12.5%

Source: FRS pooled data

5. Affordability estimates

This brings together the two parts of the study using the income distribution estimates to generate affordability estimates at local authority level. The approach has been to focus on under-40 households and the 'first benefit unit excluding income-related benefits' income measure. Threshold house prices based on the RMS have been used. For the initial run, the threshold price was set at the mid-point between the 10th and 25th percentile of house prices for 2-bedroom homes (and 3-bedroom in the case of families). This is a compromise measure between the current SHMA guidance and the recommendation earlier in this study for using the lower decile. It has the advantage that the initial affordability estimates derived in this way may be compared with those derived from a recent run of the Bramley affordability model, which used the same mid-point.

The initial estimates focus on 2007, the same recent year for which incomes have been estimated in detail. This year was the peak year in terms of house prices and so will tend to show affordability at its worst level in recent years.

The affordability criterion used is the basic 25 per cent of gross income⁵. Assuming a 95 per cent mortgage on a 25 year repayment basis, at an interest rate of 7.44 per cent⁶, a combined annual payment, including the repayment element, can be calculated. From this, a threshold gross income level to be able to just afford to buy a threshold price level dwelling on the basis of income, ignoring any issues about deposits or access to wealth, can be calculated. The model can be adapted to different criteria, for example lending multipliers, if desired.

The model then searches for the income band within which this threshold income lies. The proportion of households with incomes below this level is given by the modelled proportion with income below the lower bound, plus the difference between the threshold income and the lower income bound times the 'PDF' (per cent of households per £ of income) previously calculated for that band. The proportion of households who *can buy* is 100 minus this percentage. It should be noted that this procedure is one of linear interpolation within bands.

For the lowest and topmost income bands it is necessary to assume a notional minimum and maximum income, respectively, to apply this linear interpolation. The affordability threshold is not generally in the lowest income band, but it can be in the topmost band, particularly for families in London. The values for this notional maximum income are adjusted for those localities where there are a lot of higher incomes. These values are somewhat arbitrary, as this aspect of the model does not work very well for these extreme cases. Where affordability is estimated as less than 5 per cent of households, the figure is set at a minimum of 5 per cent.

The initial local affordability estimates are shown in Table 17 below, averaged at regional level and LA Super-Group within broad region. The new model provides three measures of affordability to buy: for all under-40 households seeking a 2-bed home, for under-40 working households seeking 2 beds, and for under-40 families seeking 3-bed homes. For England in 2007, 37.7 per cent of the first group could afford to buy. This is close to the comparable estimate from the previous Bramley model, which is 38.3 per cent. There are many detailed differences in the models⁷ but the broad results are similar. The new estimates range from 47.9 per cent in NE to 27 per cent in London, while Bramley ranges from 47.2 per cent in EM to 22.6 per cent in London (the latter

⁵ This analysis can be done using income multiples.

⁶ 7.44% is the average mortgage interest rate quoted in Table 13 of H M Treasury 'Pocket Data Bank' (Nov 2009) for 2007. In 2008, this interest rate was 5.38%.

⁷ Bramley uses under-35 households split between three size groups, with lending multiplier as the primary criterion but a second test based on residual income, with income distributions modelled on a lognormal basis for different household types.

figure being lower probably because of the family effect). The second most unaffordable region after London is the SW at 30.4 per cent (similar to recent findings by Wilcox). The most affordable Super-Group is North-Mids Mining & Manufacturing (48 per cent) with the least affordable being London Cosmopolitan (13.7 per cent).

Table 17: Affordability to buy estimates for 2007 by region and area type (per cent of relevant group)

Region/Area Type	per cent can buy							Lower quartile price: earnings ratio
	U40	U40 working	U40 family	Bramley previous model				
				(income)	(wealth-adjusted)	working		
North East	47.9	56.4	31.7	45.4	48.2	60.1	6.12	
Yorks & Humb	44.7	50.8	30.0	45.0	48.7	57.9	6.70	
North West	44.3	50.7	29.6	44.2	48.6	58.2	6.60	
East Midlands	42.9	48.4	30.4	47.2	51.7	59.8	7.00	
West Midlands	40.9	46.3	27.0	42.0	46.9	54.9	7.46	
South West	30.4	32.1	19.6	35.5	42.3	45.9	9.23	
East	36.6	38.7	24.7	38.7	45.5	49.3	8.65	
South East	34.9	38.0	21.8	36.5	44.5	46.4	9.39	
London	27.0	31.2	8.4	22.6	28.6	31.3	9.95	
England	37.7	42.2	23.5	38.3	44.0	49.8	8.16	
Nth-Mid Cities&Servs	41.7	48.0	26.0	41.0	44.8	55.7	6.41	
Nth-Mids Prosp	42.6	47.1	30.5	46.8	52.8	58.0	7.86	
Nth-Mids Coast&Cside	39.2	43.2	22.6	44.6	50.3	56.2	7.74	
Nth-Mids Min&Manuf	48.0	56.0	33.5	46.1	48.8	60.4	6.12	
Sth Cities&Servs	27.3	30.0	12.3	30.6	36.4	40.8	8.79	
Sth Prosp	37.8	40.4	26.5	39.3	47.0	49.3	9.09	
Sth Coast&Cside	25.1	26.5	12.8	33.3	40.6	44.6	9.73	
London Sub	31.7	36.9	10.4	23.1	28.7	32.0	9.74	
London Cent	28.9	31.8	5.7	21.6	29.3	29.8	11.23	
London Cosmo	13.7	16.6	5.0	16.2	20.9	24.4	9.88	
England	37.7	42.2	23.5	38.3	44.0	49.8	8.16	

The second group considered are under-40 working households. More of this group could buy in 2007, but this was still only 42.2 per cent for England. The range was from 56 per cent in the NE to 31 per cent in London and only 32 per cent in SW. For Super-Groups the range was between 56 per cent and 17 per cent.

The third group considered are under-40 families (including large adult households). For this group, affordability is markedly lower at 23.5 per cent. The range is from 32 per cent in NE to only 8 per cent in London, with less than 20 per cent in the SW. For Super-Groups the range is from 33.5 per cent to the minimum of 5 per cent.

The final column of the table shows the average values for the lower quartile ratio of house prices to full time earnings. This measure is used by the NHPAU in reaching its supply range advice and in Government targets for affordability. It can be seen that there is a rough inverse correlation across these areas between this ratio and the calculated percentages able to buy. There are some differences in ranking, for example between YH and NW and between SW and SE; for the Super-Groups there are more marked differences in ranking.

At local authority level these differences are more apparent still. The LA-level correlation between the main affordability measure and the lower quartile price:earnings ratio is only -0.65. Even for working households our measure only has a correlation of -0.71 with the lower quartile ratio. This underlines the point that affordability measured on the basis of household incomes, and allowing for size of accommodation required, is different from affordability based solely on the earnings of full-time employees and a lower quartile price not allowing for size.

Local authority level affordability figures are provided in Annex C downloadable from the website at <http://www.communities.gov.uk/nhpau/keypublications/research/>.

Table 18 shows the top and bottom local authorities in terms of affordability to buy in 2007, comparing our three new measures with the previous Bramley model estimate. The 'top' authorities for affordability tend to be northern or midland industrial, mining or semi-rural areas away from the major cities. Quite a number of these areas have a history of 'low demand' (Bramley & Pawson 2002), which would be consistent with their having low house prices, particularly at the entry level in the secondhand market. In some of these cases, buying a house at the lower decile level might entail moving into an area with an uncertain future and with considerable neighbourhood problems as well as possibly condition and quality problems. This highlights the importance of adjusting price thresholds to reflect local conditions of this kind.

The 'bottom' authorities for affordability fall into two main groups: poorer or polarised inner or middle ring London boroughs (many with high ethnic minority presence, probably classed as 'Cosmopolitan' in our Super-Groups); and coastal areas in South and South West England, particularly in Cornwall, Devon, and Dorset. Clearly, the London housing market is driven by an overall excess of demand, with some consumers and investors having high purchasing power. The South and West coastal areas attract a lot of demand from outside of the local economy, including pre-retirement and retirement migrants, long distance commuters, and second home buyers.

The lower part of the table illustrates the problem in applying the model to the extreme areas in London, particularly for families. 3-bedroom prices are only affordable by people with incomes above the highest band modelled (£800 pw).

The ratios suggest that the range of variation in affordability is of the order of 1.6-1.7 times between the most and least affordable areas. This ratio may be relatively low in the year 2007, because this was a period when previously lower priced areas in the north tended to catch up with London and the South. At different points in the cycle the ratio could vary. The fact that the ratios vary less than the ratios for income should not be surprising. Areas which have higher incomes tend also to have higher house prices, and broadly speaking the amplitude of the house price variation is greater than that for incomes. Thus the 'south' generally has worse affordability even though it has higher incomes.

Table 18: Authorities with high and low levels of affordability to buy in 2007 (per cent of each group able to buy on basis of income)

Mean	per cent can buy			
	U40 all households	U40 working	U40 family	Bramley previous
<i>Top 20</i>				
Barrow	64.7	75.2	45.3	61.5
Castle Morpeth	63.7	70.0	43.2	58.5
W Lindsey	63.0	70.1	42.5	58.4
Pendle	60.4	70.5	39.1	52.7
Copeland	59.5	68.5	47.1	54.5
Burnley	58.0	68.9	39.3	53.8
Easington	57.2	69.5	43.5	51.0
Rossendale	56.9	63.8	36.9	52.0
Wansbeck	55.5	66.3	40.4	50.5
Derwentside	55.0	65.0	43.0	52.8
Sedgefield	54.4	65.2	40.8	49.1
Redcar	54.3	64.5	32.8	49.5
Stoke	53.7	64.7	40.9	47.9
Bolsover	53.4	62.4	42.7	54.0
Wear Valley	53.4	63.6	38.2	52.7
Hyndburn	53.1	61.8	37.2	49.4
Hartlepool	53.1	64.7	33.7	48.6
Rutland	52.8	55.3	32.6	52.1
NE Lincs	52.7	61.5	43.9	49.1
Calderdale	52.7	59.0	34.0	51.2

Table 18: Authorities with high and low levels of affordability to buy in 2007 (per cent of each group able to buy on basis of income) (continued)

Mean	per cent can buy			
	U40 all households	U40 working	U40 family	Bramley previous
<i>Bottom 20</i>				
Worthing	22.3	25.9	9.5	31.7
Southampton	22.1	23.1	12.4	30.9
Isle of Wight	22.1	25.0	12.1	32.6
Teignbridge	21.9	25.4	13.4	34.0
Purbeck	21.2	21.9	10.1	28.0
Weymouth	21.0	25.4	10.9	24.9
Carrick	20.9	21.9	11.0	24.1
W Devon	20.9	20.2	13.1	35.3
Restormel	20.2	21.1	12.3	32.2
N Cornwall	18.9	14.9	13.2	29.9
Torrige	18.4	14.8	12.4	32.8
Penwith	18.0	17.8	10.6	21.1
Kerrier	17.4	16.3	10.2	24.4
Kensington	16.8	18.6	5.0	28.7
Lewisham	15.8	17.5	5.0	19.3
Newham	11.5	11.4	5.0	13.1
Haringey	11.4	12.7	5.0	16.8
Southwark	11.0	23.8	5.0	17.2
Hackney	9.9	10.5	5.0	13.7
Brent	9.1	10.1	5.0	14.7
Top 20	47	53	32	48
Bottom 20	29	32	18	35
Ratio	1.59	1.64	1.71	1.37

Affordability changes since 2005

The model run for two years earlier, 2005, reflects the incomes and price thresholds estimated for that year. These results are summarised in Table 19, which also shows the changes from 2005 to 2007. In 2005 the headline affordability to buy for all under-40s would have been 46.7 per cent, with 52.6 per cent for working under-40s and 30.8 per cent for families. There was clearly a marked deterioration in affordability between 2005 and 2007, equivalent to 9.0 percentage points for all under-40s, 10.4 percentage points for working under-40s and 7.3 percentage points for families.

Table 19: Affordability to buy in 2005 and changes 2005-07 by region and area type (per cent; percentage points)

Region/Area type	per cent can buy 2005			Difference per cent can buy (percentage points) 2005-07		
	U40	U40 working	U40 family	U40	U40 working	U40 family
North East	60.2	71.2	42.7	-12.3	-14.8	-11.0
Yorks & Humb	56.6	65.6	40.3	-11.9	-14.9	-10.3
North West	56.3	65.3	41.1	-12.0	-14.6	-11.5
East Midlands	52.5	59.4	38.5	-9.5	-11.1	-8.0
West Midlands	49.5	56.6	33.4	-8.6	-10.3	-6.5
South West	40.1	42.8	22.7	-9.7	-10.7	-3.1
East	45.1	48.3	29.3	-8.4	-9.6	-4.6
South East	40.5	44.4	27.4	-5.6	-6.4	-5.7
London	33.2	37.4	15.0	-6.2	-6.2	-6.6
England	46.7	52.6	30.8	-9.0	-10.4	-7.3
Nth-Mid Cities&Servs	50.6	60.5	35.3	-9.0	-12.6	-9.3
Nth-Mids Prosp	54.3	59.6	39.4	-11.7	-12.5	-8.9
Nth-Mids Coast&Cside	51.4	56.9	30.1	-12.2	-13.8	-7.5
Nth-Mids Min&Manuf	59.6	69.9	43.8	-11.5	-13.9	-10.2
Sth Cities&Servs	37.2	41.6	20.6	-9.8	-11.6	-8.3
Sth Prosp	44.4	47.6	30.5	-6.5	-7.2	-4.0
Sth Coast&Cside	35.1	37.9	15.8	-10.0	-11.4	-2.9
London Sub	33.9	38.3	15.0	-2.1	-1.4	-4.6
London Cent	39.2	42.3	6.7	-10.3	-10.5	-1.0
London Cosmo	24.8	26.8	11.7	-11.1	-10.2	-6.7
England	46.7	52.6	30.8	-9.0	-10.4	-7.3

The change from 2005 to 2007 was more pronounced in the northern regions (11-15 per cent worse) and least in the South East and London (5-7 per cent worse). This confirms the picture of the north 'catching up' later in the price cycle. Coast & Countryside areas deteriorated more than prosperous suburbs, but London Centre and Cosmopolitan areas also deteriorated markedly more than the London suburbs.

It is possible to compare results for 2007 and 2008. For this comparison income patterns are not re-estimated, as there is not sufficient detailed information to do this. It is assumed that incomes rose by the amount of the published increase in earnings – 3.7 per cent. Reducing the observed 2008 house prices by 3.7 per cent and then testing affordability using the detailed 2007 incomes gives an equivalent result. Table 20 presents the results of this test.

Table 20: Affordability to buy in 2008 and changes from 2007 by region and area type

Region/Area Type	per cent can buy			Differences: percentage change can buy		
	U40	U40 working	U40 family	U40	U40 working	U40 family
North East	51.2	60.7	35.1	3.3	4.3	3.4
Yorks & Humb	47.5	54.1	33.0	2.8	3.3	3.0
North West	48.3	55.6	33.3	3.9	4.9	3.7
East Midlands	48.9	55.2	35.3	5.9	6.9	4.9
West Midlands	44.4	50.6	29.8	3.5	4.3	2.8
South West	33.3	35.3	21.4	3.0	3.1	1.8
East	38.1	40.3	25.5	1.4	1.6	0.8
South East	37.0	40.2	23.8	2.1	2.2	2.0
London	28.2	32.3	9.9	1.2	1.1	1.5
England	40.6	45.5	26.1	2.9	3.3	2.6
Nth-Mid Cities&Servs	45.3	52.8	29.4	3.6	4.8	3.4
Nth-Mids Prosp	47.3	52.4	34.0	4.6	5.2	3.5
Nth-Mids Coast&Cside	40.0	44.4	23.0	0.8	1.2	0.4
Nth-Mids Min&Manuf	51.8	60.4	37.4	3.7	4.4	3.8
Sth Cities&Servs	29.0	32.0	13.3	1.7	2.0	1.0
Sth Prosp	40.0	42.7	28.3	2.2	2.3	1.8
Sth Coast&Cside	27.7	29.4	14.6	2.6	2.8	1.8
London Sub	33.7	38.6	12.8	1.9	1.8	2.4
London Cent	27.3	30.0	6.3	-1.7	-1.8	0.6
London Cosmo	15.9	18.9	5.0	2.3	2.3	0.0
England	40.6	45.5	26.1	2.9	3.3	2.6

The story for 2008 is not very dramatic. Affordability improved by around 3 percentage points, a bit more for working households and a bit less for families. The improvement was a bit more marked in the north and midland regions, and rather less so in London and the south. Affordability deteriorated slightly in London Central.

The reason for the undramatic nature of these changes is partly that, although prices fell from late 2007 until early 2009, in nearly all areas, the comparison here is with the whole year average for 2008 and the whole year average for 2007. It is not a comparison of trough with peak.

A further and obvious cautionary note is that this is affordability to buy as conventionally calculated, simply taking account of income, assuming buyers only need a 5 per cent deposit. The reality of the mortgage market in 2008 was of course quite different from that as deposit required by first-time buyers rose sharply.

Sensitivity to price threshold

In an earlier part of this report arguments and evidence for using the lower decile house price as the normal threshold for affordability calculations in the context of SHMAs were presented. So far in this section, affordability calculations have been based on the mid-point between lower quartile and lower decile. It is a relatively simple matter to test how much difference it would make to the affordability rates in 2007 if the lower decile was used. These results are summarised in Table 21.

Table 21: Affordability to buy at lower decile threshold in 2007 and differences from 'midpoint' threshold affordability, by region and area type (per cent; percentage points)

Region/Area Type	per cent can buy			Differences: percentage point change can buy		
	U40	U40 working	U40 family	U40	U40 working	U40 family
North East	56.2	66.8	40.6	8.3	10.4	8.9
Yorks & Humb	53.1	60.8	39.6	8.4	10.0	9.6
North West	50.9	59.1	38.0	6.6	8.4	8.4
East Midlands	47.0	53.0	35.2	4.0	4.7	4.8
West Midlands	45.9	52.3	31.4	4.9	6.0	4.4
South West	33.5	35.5	20.6	3.1	3.3	1.0
East	39.5	42.0	26.4	2.9	3.3	1.7
South East	36.9	40.1	23.6	2.0	2.1	1.9
London	29.3	33.5	9.7	2.3	2.3	1.3
England	42.0	47.3	27.8	4.4	5.1	4.3
Nth-Mid Cities&Servs	48.8	57.1	34.4	7.1	9.2	8.5
Nth-Mids Prosp	47.2	52.4	34.8	4.6	5.3	4.4
Nth-Mids Coast&Cside	43.4	48.2	27.4	4.2	5.1	4.8
Nth-Mids Min&Manuf	55.4	64.9	42.2	7.4	8.9	8.6
Sth Cities&Servs	30.2	33.3	14.1	2.9	3.3	1.8
Sth Prosp	40.0	42.7	28.0	2.1	2.3	1.6
Sth Coast&Cside	29.2	31.2	14.6	4.1	4.7	1.8
London Sub	32.5	37.6	11.4	0.8	0.7	1.0
London Cent	33.8	37.1	7.8	4.8	5.3	2.1
London Cosmo	17.1	19.7	6.2	3.5	3.1	1.2
England	42.0	47.3	27.8	4.4	5.1	4.3

Overall, switching to the lower decile from the mid-point would improve affordability by between 4 and 5 percentage points (e.g. from 37.7 per cent to 42.0 per cent for all under-40s). The inference is that shifting from the lower quartile to the lower decile might make as much as 8 - 10 percentage points difference in the affordability rate. The results are indeed moderately sensitive to this parameter.

Table 21 also shows clearly that there is considerable variation between regions and types of area in this sensitivity. Affordability is much more sensitive to the decile-quartile choice in the north, and much less sensitive in London and the south. Affordability is particularly insensitive to this in London Suburban areas, and for families in London Cosmopolitan areas. It is most sensitive in North-Midland Cities & Services and Mining & Manufacturing areas.

Lack of sensitivity can arise for at least three reasons: (a) the price decile might be very similar to the quartile, a sort of floor on prices, rather than there being a long tail of low valued properties; (b) the relevant part of the income distribution may be more thinly populated, typically because it is well up the range; (c) in extreme cases, mainly for families in London, the floor affordability rate set at 5 per cent is hit.

This discussion highlights caution about these findings. To suggest that far more households could afford to buy in the poorer parts of the country, which also have a poorer housing stock, raises some concerns.

Firstly, this is applying a simple, uniform affordability ratio in all cases. Some theoretical and practical approaches suggest that such a ratio should be more of a sliding scale depending on income/price levels and household type. Such approaches may be related to the notion of residual income and the argument that people should not be placing themselves in or near poverty through house purchase commitments. Any modified approach to take account of such arguments would probably have most impact, reducing affordability, in these northern urban areas.

Secondly, while it was argued earlier that in general lower priced properties are not, in the majority of cases, non-decent or requiring heavy expenditure to bring up to standard, it will be true in some areas that lower priced properties have a higher risk of being in this category. Typically northern urban areas will be more likely to be in this situation.

Thirdly, as already noted, some of these areas have a history of 'low demand', which in a minority of cases may never have fully gone away. There is thus a greater element of risk in buying such low-value properties.

Affordability of private renting

An earlier section of this report discussed the role of the private rented sector in offering affordable opportunities, and the nature and significance of recent trends in rents and supply in the sector. Table 22 presents the affordability numbers for private renting in 2007, showing the level of weekly rent for a 2-bed home used in the analysis (based on lower quartile) and differences from the affordability of buying expressed as percentage points.

The key finding is that private renting was indeed much more affordable than house purchase in 2007 in particular. The difference of around 20 percentage points means that half as many households again, within the under-40 group, can afford to get into the private rental market, compared with the number who could afford to buy. This big difference follows from the large difference in private rental costs versus costs of ownership documented earlier in this report. The cost gap between ownership and renting will have risen during the 2000s, but 2007 will probably be something of a peak for this differential. This is likely to fall somewhat with the expected fall in house prices.

Private renting was particularly affordable, relative to buying, in the SW, EE and EM regions, all regions which have a greater proportion of rural areas. The lower part of the table confirms that South Coast & Countryside areas had a particularly high difference (29 per cent all under-40; 34 per cent working); northern coast & countryside and prosperous areas north and south tended also to have relatively higher affordability of private renting. Northern cities and industrial areas and London Centre and Suburbs showed smaller differences.

Table 22: Affordability to rent privately at lower quartile threshold in 2007 and differences from 'midpoint' threshold affordability to buy, by region and area type (per cent; percentage points)

Region/Area Type	per cent can rent			Rent 2Bed LQ £pw	Differences: percentage point change can rent v can buy		
	U40	U40 working	U40 family		U40	U40 working	U40 family
North East	62.8	74.5	49.3	97	14.9	18.2	17.6
Yorks & Humb	61.2	70.3	47.7	106	16.5	19.6	17.6
North West	61.8	71.4	47.6	106	17.5	20.7	18.0
East Midlands	65.5	74.3	53.1	106	22.6	25.9	22.6
West Midlands	61.8	71.0	47.3	111	20.8	24.7	20.3
South West	56.8	61.9	42.7	134	26.5	29.8	23.1
East	59.7	65.4	46.3	139	23.1	26.8	21.6
South East	55.2	60.6	41.2	159	20.3	22.6	19.4
London	39.8	44.7	22.7	239	12.8	13.5	14.2
England	57.1	64.3	42.7	141	19.4	22.2	19.2
Nth-Mid Cities&Servs	55.3	65.2	40.0	106	13.6	17.3	14.1
Nth-Mids Prosp	67.9	75.6	56.7	114	25.3	28.5	26.2
Nth-Mids Coast&Cside	62.2	69.6	44.5	104	23.1	26.5	21.9
Nth-Mids Min&Manuf	64.6	75.7	50.9	99	16.6	19.7	17.4
Sth Cities&Servs	47.9	54.0	30.6	149	20.6	24.0	18.4
Sth Prosp	59.9	64.9	47.3	150	22.1	24.5	20.8
Sth Coast&Cside	54.1	60.4	38.8	126	29.0	33.9	25.9
London Sub	43.2	48.3	30.3	206	11.5	11.5	19.9
London Cent	40.3	44.3	10.0	345	11.3	12.5	4.4
London Cosmo	28.0	30.9	14.9	222	14.3	14.3	9.9
England	57.1	64.3	42.7	141	19.4	22.2	19.2

Conclusions

Robust estimates of local income levels and distributions are critical for the assessment and monitoring of affordability. A key aim of this research has been to develop a method to estimate relevant household income distributions from secondary data sources at local authority level.

A multi-stage procedure was adopted to produce model-based estimates of average incomes and the distribution of incomes for all households and key sub-groups of younger households. This started from the main official data source on incomes, the Family Resources Survey, and the modelled incomes are controlled back to the levels observed in this source at the level of locality type by broad region.

Key predictors (drivers) of income variation are identified from modelling using FRS data at the micro and aggregated level, and these are used in conjunction with locally available data to predict income patterns for all local authorities in England. These predictors include occupations, earnings, economic activity levels, household composition, age, tenure, housing characteristics and other factors.

The resulting local income estimates cannot be presented with formal confidence intervals. A range of evidence bearing on their degree of precision indicates that the typical error margin would be of the order of 5 per cent or less; smaller for larger authorities or subregions, larger for smaller units or smaller sub-groups of households.

Typical distributions of income of household sub-groups, including younger and working households and younger families are compared. There are significant differences in the distribution of income between different types of locality.

Systematic comparison of the new income estimates with two existing estimates, the CACI Paycheck system and Bramley's earlier affordability model, suggest that the new estimates are better able than these to represent the levels and patterns of income across regions, subregions, types of locality and local authorities themselves.

The affordability analysis has focussed on younger (under-40) households and on income adjusted to exclude 'extra' adults' incomes and means tested benefits. Within that age band all households, working households, and family households (including multi-adult households) are considered. Information is provided on both the income patterns for these groups and also their relative incidence in different types of area.

Affordability is modelled at local authority level across England combining the income estimates with house price and rent thresholds. The baseline estimates of affordability to buy in 2007 are consistent with another established model. They show that less than 38 per cent of younger households could buy in 2007, and that the range of variation between regions (27 - 48 per cent) and locality types (14 - 48 per cent) was quite wide. More working household could buy, but still only a minority. Meanwhile, the proportion of families able to buy 3-bedroom housing is very much lower (less than a quarter), and negligible in some parts of London.

Measuring affordability in this way has a weak correspondence with the ratio of the lower quartile house price to lower quartile earnings.

At local level two types of authority stand out as having severe affordability problems: poorer inner London boroughs, and coastal areas in the south and south west of England. By contrast, the most affordable localities are mainly urban industrial/mining areas, and some partly rural areas, in the north or midlands. Some of these areas previous exhibited low demand symptoms and this may be a continuing issue in some cases.

Affordability estimates are replicated for 2005 and 2008. Affordability deteriorated by 20 per cent (9 percentage points) between 2005 and 2007; about a third of this deterioration had been recovered by 2008 (just looking at prices and incomes).

The difference between assessing affordability on the lower decile of house prices rather than the lower quartile would alter the affordability rate by nearly a quarter (9 percentage points). This sensitivity is much greater in the north and less in London. Some cautionary notes are sounded about an assumption of much easier affordability in the north.

Private renting is much more affordable than buying, under recent conditions. Nearly half as many again could afford to rent as could afford to buy in 2007. Private renting offers the largest increment to affordability in the more rural regions and more prosperous localities.

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Appendix A: Methodology and technical issues

Family Resources Survey (FRS)

The current income estimates are based on FRS data for the period up to 2006/07 (the latest year available when accessing the data). It is general practice to use pooled, repriced data over three years (N=60,000 households) for any particular target year. The main estimates presented are for 2007, while the model has been replicated for 2005.

To use FRS data for the analyses in this study it is necessary to access the micro-data with local authority district codes attached. This requires a special consent procedure for each application. Although statistical associations between raw FRS data and the synthetic estimates and other estimates at different geographical levels down to district level are examined, it is not possible to publish any raw FRS data at that level. The main emphasis in such comparisons is on higher level aggregations, particularly the combination of the ONS 2001 Local Authority Classification known as 'Super-Groups' with broad regions (north & midlands – south – London).

Methodology

The main steps in the method are as follows:

1. Compile local authority-level indicators to be used as predictors for the local estimates, and also in some cases for attachment to the FRS data. The main sources involved here are the Annual Survey of Hours and Earnings (ASHE), the Annual Population Survey (APS, replacing previous local Labour Force Survey), the 2001 Census, and (indirectly⁸) the household projections. To damp down random year-to-year fluctuations, sample data (from ASHE and APS) are pooled over 3-year periods.
2. Attach certain indicators from step1 to the FRS data, also pooled over three years with incomes repriced to the target year (2007 or 2005). Create the relevant income measures (full household income; first benefit unit income excluding income-related benefits), household type categories, and individual/household level predictor variables, mainly in dummy form suitable for use in regressions.
3. Fit models to the individual household data in FRS to predict income level and proportions of households below a set of thresholds (£200 pw, £300 pw etc up to £800 pw). The former model is OLS regression with log of income as dependent variable; the latter are logistic regression models. Eliminate variables which are consistently insignificant.
4. Tabulate actual and predicted incomes and proportions below thresholds by region and LA-type/broad region.
5. Aggregate FRS sample and attached data to either LA level or to a sub-regional grouping of LAs⁹. Perform OLS regressions on these aggregated sample data using the same variables as in step 3, and further reduce the models to a more parsimonious form.

⁸ Household type composition projected values, derived from 2001 Census and trends from the household projections, were sourced via the Bramley local affordability model.

⁹ For all household income, where samples are larger, the aggregation units are LA districts; for under-40 household groups, aggregation is to London Boroughs, Met Districts, 1997 Unitary Authorities and county area remainders.

6. Using the data assembled in step 1 at LA level, construct predictor equations for average income levels and proportions below thresholds, using the coefficients as calibrated in step 5. Because some variables are measured slightly differently, or in different units, adjustment factors must also be applied to reflect differences in the mean values of equivalent variables in the LA dataset and their corresponding mean values in the FRS aggregated sample data.
7. Compare the raw predicted values from step 6 with the FRS actuals tabulated at LA-Super-Group-broad region level from step 4, and calculate control factors.
8. Apply these control factors to the raw predictions at LA level to generate the final LA estimates of income level and distribution. Tabulate results at both region and LA levels
9. Calculate probability densities for the distributions for each segment between income thresholds for each LA.
10. Bring in threshold price measures from RMS and rent measures from Hometrack, and calculate affordability using the results from steps 8 and 9.

Step 5 has been included as an additional intermediate step between the micro-modelling and the LA aggregate modelling. This was found to be a more effective way of predicting the distribution points in an unbiased fashion. It is not so easy to move directly from micro-regressions to aggregated predictor functions when predicting distribution points away from the central part of the distribution.

Discussion of technical issues

Intermediate area aggregation units

Different options were explored for grouping observations in step 5. In the end LADs were used (with a weighting for sample size) when working with the full sample on all household incomes. The average sample at LA level is about 164. As smaller sub-groups of households were used, the sample numbers at LA level become smaller. In this context, subregional groupings of similar/contiguous LAs were chosen to ensure that the units have adequate sample numbers. As noted in footnote 3 in Step 5, the units used were larger metropolitan and unitary authorities and county area remainders (N=148). With fewer observations in the aggregated FRS dataset, it may be that a smaller number of regressors will remain significant, but the resulting models should be more robust.

The intermediate area aggregations of FRS data are not intended to represent an accurate profile of these local areas' characteristics. Rather, they are sample populations for a geographical unit of this scale, with some actual locality attributes attached. The regressions run on these intermediate aggregations are intended to capture the effect of household (and area) attributes on aggregated income distribution outcomes, drawing primarily on the within-sample relationships.

Household sub-groups

There is a case for splitting households according to size, partly to capture the differences in number of earners and partly to capture differences in dwelling size requirements. The whole process (steps 3 to 10 above) is moderately laborious, and further disaggregation makes for smaller and less viable sample numbers. From a practical point of view it was decided to limit the sub-groups of households which would be modelled separately. The 'bottom line' is that the primary interest is in the affordability of households entering the housing market, i.e. younger working age households. After modelling all households (to facilitate wider comparisons), the focus has been on 'under-40' households (i.e. households with an HRP aged under 40), under-40 working households (recognising that few non-working households will be able to buy), and under-40 'family' (including larger adult) households.

Income definition

For the total under-40 group, a modified definition of household income is used. This is the income of the 'first benefit unit' in the household, excluding income from income-related (means-tested) benefits. Benefit units are individual adults or couples who are treated as a single financial unit by the Benefit system. The first benefit unit is the main householder and any partner. Other adults present in any 'complex' household would be separate benefit units, and we do not include their income. The rationale for this is twofold: (a) younger households entering the housing market primarily do so as simple, not complex, households; (b) mortgage lenders generally only look at the income of householder and partners when assessing mortgageability. The rationale for excluding income-related benefits is that these would also not be considered reckonable income for the purposes of obtaining a mortgage.

Apart from these modifications, the income definition used in the analysis, based on the FRS, is a comprehensive one. It includes employee earnings, self-employment income, income from rent, savings or investments, maintenance, private pensions, and income from state pensions and benefits where entitlement is structural, as a function of age or disability rather than means-tested. Income is gross, before the deduction of tax or national insurance contributions. It may be thought of as 'original' income, before the redistributive impacts of tax and means tested benefits, although it does include structural benefits. This definition is most relevant to the question of affordability, the amount of money people potentially have available to pay for housing.

The role of earnings

Household income, even when modified in the way described above, is substantively different from full time employee earnings, the data (from ASHE) frequently used to provide indicators of affordability. There is a good deal of income other than earnings coming into households, although this is truer for groups like the elderly and disabled than for many younger households. Equally important, the economic activity composition of households varies widely between different household types and different geographical areas, with the gulf between the potential income of a household with one part-time worker and a household with two or more full time workers being massive. Any model of affordability based on the ASHE earnings data has to make arbitrary assumptions about who lives with whom and who works full and part time in what occupations. The definition and methodology used here avoids having to make such arbitrary and limiting

assumptions, and allows examination of the actual empirical income patterns observed for households. As shown in a later section, household income, even for under-40 working households, displays different distributional patterns across geographical areas than the ASHE earnings data.

The available ASHE data on the local distribution of earnings has been used to help predict the distribution of household incomes. To this end measures have been constructed from ASHE of the proportions of earnings below the same thresholds (£200 per week, £300 per week, etc) used in the household income modelling, as well as the median value. These are inferred by interpolation from the published quantiles. In the final version data pooled over three years with the thresholds adjusted for earnings inflation have been used. These variables do play a role in the final models but perhaps not as dominant as originally envisaged.

Occupation groups

Previous work on local income estimation has shown that the occupational mix of the working population is a very important determinant (Williamson 2002; Lee et al 1995). Reflecting this, the 2000 standard occupational classification (SOCC) has been used at its highest level of aggregation (9 categories). Not all of these are significant in the regressions and groups 1+2 and 6+7+9 were combined in the final predictor equations. APS provides local estimates of the shares in these same occupational groups, again based on pooling over three years. These play quite a strong role in the final model.

Other predictors

Other variables which come into the prediction models include: age (particularly under 25 and over 60), proportion working, proportion with 2+ workers, part-time workers, long term illness, rental tenures, household size, selected household types (younger and older singles, lone parents, multi-adult households), number of rooms, no car and 2+cars, detached houses, flats, council tax bands A&B and G&H, IMD low income score and IMD geographical barriers score (rural proxy)¹⁰, central London dummy, and LA share of high class occupations.

The effects of different variables for the different models and parts of the income distribution are discussed further below.

Controlling

It makes sense to apply control factors to ensure that the final estimates are broadly consistent with the actual FRS data. The combination of ONS LA Super-Groups with three broad regions (north-midlands, south, London) has been used to reflect different LA types, as well as regional factors. Controlling is done separately for mean, median and each income band.

Most of the control factors are not that different from 1.0, but in some cases there are larger differences. This is more noticeable with estimates for the lowest income bands (£100pw, £200pw) and for the sub-groups with smaller samples, particularly under-40 working households. For example, for under-40 working households the correction factors for the proportion with below £200 pw range between 0.475 (London Central) and 2.12 (North-Midlands Coast & Countryside).

¹⁰ For description and discussion of IMD deprivation indices, see, Noble et al (2004, 2006) Noble & Deas et al (2003).

The fact that controlling is necessary may be indicative of some limitations with the basic regression models. For example, they may not adequately reflect some income determinants, which have a regional/area type pattern; or they may not reflect the way combinations of factors interact in different areas. The latter point suggests that the basic linear (or log-linear) model forms are too simple, and that perhaps experimenting with interaction and nonlinear terms may be necessary. This is something which it may be possible to explore further, but these are an added complexity, with coefficients often more difficult to interpret. Controlling is a more commonsense procedure.

The drivers or predictors of local incomes

It is difficult to summarise the results of the regression modelling in terms of the effects of individual variables, because of the large number of variables and models run. For each of four income definition/household groups models have been run for mean log (or median) income and for (log-odds or) proportions below seven thresholds, (a) using individual household data in FRS, and (b) using intermediate aggregated local units. That is about 54 regressions, for each time period (2007, 2005). The resulting coefficients have been applied to local authority level data on equivalent variables with adjustment factors to allow for differences in units.

The individual level models run within the FRS dataset tend to contain more separate variables. The intermediate aggregated local level models tend to be more parsimonious, with fewer variables significant and some grouping of categories. It is probably more useful to report on the extent to which particular variables or factors remain significant in these 'cut-down' models, which are the ones used for local prediction.

Annex D provides summary statistics for all of the variables used at the different levels. This is at <http://www.communities.gov.uk/nhpau/keypublications/research/> .

Table A1 below lists all of the variables used in the LA-level predictor functions, as calibrated on the intermediate aggregated FRS data in Step 5. The selection of variables for these models was initially based on the micro models tested on FRS in Step 3. Variables tested but found not significant in the aggregated models are generally omitted. Most variables included are statistically significant, although a few key structural characteristics are retained across models for different income bands to help maintain consistency, even though they may not be significant in all cases.

The table shows in the first two columns the models for full household income of all households. The first column summarises the effects on predicted median income in terms of the direction of effect. The second column of this pair shows the number of regression models for proportion of households below specific income bands (less than £100 pw, less than £200pw, less than £300pw etc.), for which that variable is retained, and the direction of its effect (+ or -). In general, as expected, the direction of effect in the second column is the opposite of that in the first column (higher average income means smaller proportions of households below any particular band). In some cases, the direction of effect is different for different bands. Sometimes this makes reasonable sense, as a particular factor may work differently at different parts of the income distribution. Sometimes these differences may reflect correlations with other variables included or excluded.

The remaining pairs of columns in the table repeat this exercise for (a) all households under 40 (first benefit unit income); (b) under-40 working households; (c) under-40 family and multi-adult households.

Looking initially at all households, most of the effects on median income are as expected. Incomes are higher for working households, households with 2+ workers, higher occupational groups and higher social class, larger households, households living in larger dwellings especially in CT Bands G-H, and in localities where median full time earnings are higher. Incomes are lower where there are more part-time workers, lower occupational groups, single person and elderly single households, high scores on the IMD low income deprivation factor, more dwellings in CT Bands A-B, and in rural areas (proxied by IMD 'Geographical Barriers').

Some effects are not quite as expected: the positives for being aged under 25 or over 60 for example. These might be explained by the link between income and household formation, in the former case, and because many older households have significant assets and additional sources of income, and are eligible for higher benefit rates than younger households, so that they may be slightly better off than would appear from their economic activity profile. These comments may extend to the long term illness category. The effects of housing tenure are ambiguous in the median model. Size of dwelling is a positive predictor, but allowing for this and other factors (including Council Tax Bands) detached housing is a negative factor. Central London also has ambiguous effects, which can also be seen across the sub-groups. This is an untypical area where the patterns are different for different demographic and economic activity groups and where distributions have a different (more polarised) shape.

The results for the under-40 sub-groups are broadly consistent, although differing in respect of certain variables, not least the demographic ones as one might expect. These sub-group models are based on smaller sample numbers and thus as expected they do not fit quite so well, and fewer variables are significant. A few points may be highlighted. For all of the under-40 subgroups, being aged under 25 is more generally a negative for income. Social and private renting are generally associated with more households having incomes below thresholds. Lone parent and multi-adult households are generally associated with lower incomes. IMD low income is a consistently good predictor of income level and distribution, as are Council Tax bands shares, particularly proportion in Bands A & B. Rural incomes are generally lower.

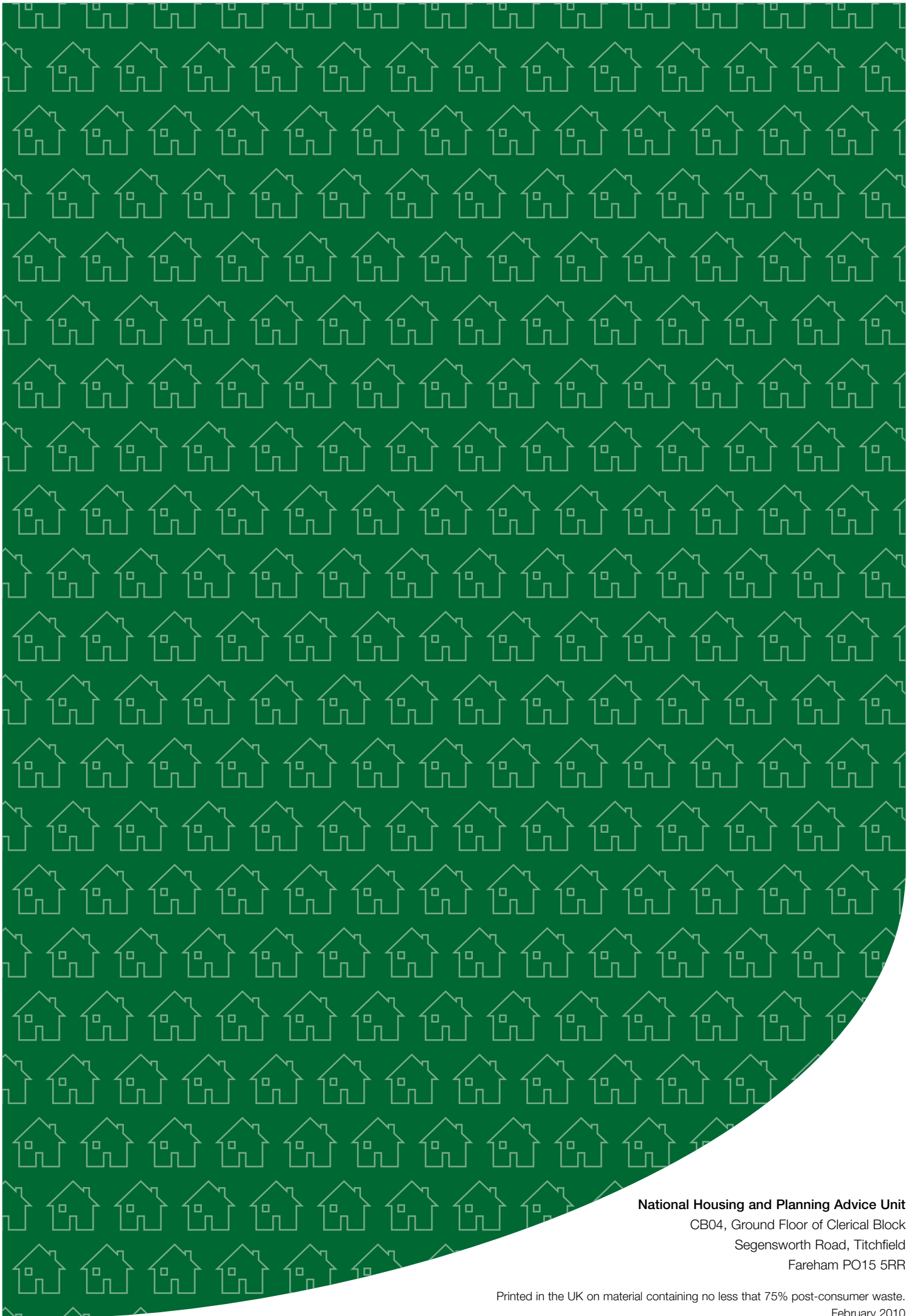
In general, and as originally anticipated, the local proportion of earnings (based on ASHE) below a relevant (similar) banded amount is a significant predictor of households with incomes below that band. However, the effects are quantitatively weaker than expected, and in a number of instances the direction of the effect is opposite to what would have been expected. This usually arises in the low income bands.

Table A1: Summary of aggregated regression model effects by household group (direction of effect and number of equations for which the variable is included)

Shortname	Description	All Households Household Income		Under 40 All Households 1st BU Income		Under 40 Working Households 1st BU Income		Under 40 Families 1st BU Income	
		Log Median	Proportion below bands	Log Median	Proportion below bands	Log Median	Proportion below bands	Log Median	Proportion below bands
ageu25	HRP aged under 25	+	(7 -)	-	5 + 2 -	-	6 +	-	6 +
age2534	HRP aged 25-34		(1 -)		1 -				
age60ov	HRP aged 60 & over	+	6 -						
Pwork	Any working % hshlds	+	7 -	+	2 + 5 -			+	5 -
pct2w	Hshlds with 2+ working %	+	7 -	+	7 -	+	1 + 6 -	+	7 -
Nptwkr	No. of part time wkr /hshld	-	7 +	-	6 +	-	6 +	-	6 +
Plti	Pers with limiting l t illness %	+	6 -						
Lapsocr	Social renting hshld %	+/-	5 -		3 +		4 +	-	4 +
Lapprvr	Private renting hshld %		1 +		2 +		6 +		3 +
pocc12	Std Occupation Grps 1-2 %	+	7 -	+	7 -	+	1 + 5 -	+	1 + 6 -
pocc3	Std Occupation Grp 3 %	+	7 -	-	1 + 5 -	+	6 -	+	6 -
pocc679	Std Occupation Grps 6, 7, 9 %	-	5 + 2 -	-	5 + 2 -	-	3 + 4 -	+	5 + 2 -
Lahcias	High social class %	+	1 + 4 -	+		+	1 -	+	
Hhsize	Ave hshld size	+	1 + 6 -	+	3 -		3 -	+	2 -
lahh1	Single non-eld hshld %	-	3 + 3 -	+	1 + 3 -		1 +		
lahh1k	Lone parent hshld %		1 -		3 + 1 -		3 + 1 -		1 +

Table A1: Summary of aggregated regression model effects by household group (direction of effect and number of equations for which the variable is included) (continued)

Shortname	Description	All Households Household Income		Under 40 All Households 1st BU Income		Under 40 Working Households 1st BU Income		Under 40 Families 1st BU Income	
		Log Median	Proportion below bands	Log Median	Proportion below bands	Log Median	Proportion below bands	Log Median	Proportion below bands
lahh3	Multi-adult hshlds %		1 + 1 -		5 +		7 +		5 +
lahh1p	Single elderly hshld %	-	5 +						
Rooms	Ave no. of rooms in dwg	+	6 -	+	3 -	+	1 -	-	1 -
lapnocar	Hshlds with no car %						3 +		
lapcars2	Hshlds with 2+ cars %				2 -				1 -
Pdet	Detached dwellings %	-	5 + 1 -						1 -
Pflat	Flats % of dwellings		1 -						
imd07lwinc	IMD2007 Low Income Score	-	6 + 1 -	-	7 +	-	7 +	-	7 +
Ctbab	Council Tax Bands A-B % dwg	-	6 +	-	5 + 1 -	-	5 +	-	3 +
Ctbgh	Council Tax Bands G-H % dwg	+	6 -	+		+		+	
Geogbar	IMD2007 Geographical barriers	-	5 + 1 -	-	1 + 1 -	-	1 +	+	2 -
centlond	Central London dummy	+/-	4 +	+	3 -	+	2 -	-	2 +
lnmede07	log of median earnings	+		+		+		+	
peltxxx	F T Earnings <£xxx pw		6 + 1 -		5 + 2 -		5 + 2 -		5 + 2 -



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