Cambridge Centre for Housing & Planning Research

Housing Costs, Affordability and Rent Setting

A report to Affinity Sutton

by

Christine Whitehead, Chihiro Udagawa and Alex Fenton

UNIVERSITY OF CAMBRIDGE

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Section 1: Introduction

In 2011, Affinity Sutton saw the government's proposed Affordable Rents at 80% of market rents as an opportunity to provide an affordable alternative to private sector rents. It was viewed as an intermediate product for those who would struggle to afford increasing private rents but who would not ordinarily have access to social housing - a core group of lower income working households. To test and verify this approach Affinity Sutton commissioned a team from the Cambridge Centre for Housing and Policy Research (CCHPR) to look at whether there would be demand for such a product and, if so, which households would be able to afford to pay affordable rents.

The resulting CCHPR paper, *Market-pegged rents and the social sector (2011),* examined the distribution of incomes in a range of local authority areas where Affinity Sutton owned significant stock to clarify whether there were likely to be significant numbers of households who could not reasonably afford private renting but could afford a rental product based on 80% of market without the help of Housing Benefit. The analysis first reviewed the literature on affordability, notably that on rent to income ratios and residual incomes, and determined an affordability criterion of a maximum of 35% of income spent on rent and the requirement that residual income should not fall below the Income Support applicable amount (ISAM).

Using this measure of affordability and estimating incomes by household type in five areas in the South of England, ranging from London to Plymouth, confirmed that there were significant numbers of working, particularly smaller, households who would benefit from an intermediate rent set around 80% of market. It also highlighted that, although London stood out with the highest rent to income ratios, affordability issues in the private rented sector were by no means limited to the capital and depended as much on low incomes as market rent levels.

The overall objective of the current research was to turn the question upside down and ask what can existing and potential tenants afford to pay. The aim was therefore to determine rent levels that might be deemed affordable given local incomes and/or earnings, taking account of the impact of geography, household size/composition and the current changes in welfare benefits. In other words, in the current environment which gives freedom to set rents for new lettings and for a proportion of re-lets, how might Housing Associations in line with their mission to support lower income households by providing adequate affordable housing.

In the end the research involved two quite different elements:

- the first, started from the earlier research, provided quantitative analysis of income distributions by household type allocated to the appropriate dwelling size to estimate the proportions of each household type that could afford market rents; affordable or 80% market rents; and current market rents in the twenty seven areas in eight regions where Affinity Sutton's housing stock is concentrated;

- using this analysis, together with other information from Affinity Sutton, about the attributes of their own tenants, the second element set out the principles that might be used to determine rent structures into the future, taking particular account of the impact of the current welfare system and indicated who could benefit from limiting the rents charged in different areas. The objective of this element was to feed into discussions about how better to set rents to help tenants while ensuring financial targets necessary to sustain development and good management could be met.

Section 2: Who can afford different rent levels – analysis at local authority level

2.1 Methodological approach

The methods used for this stage of the analysis are intended to inform the setting of rents relative to household incomes and the circumstances of potential tenants. We specifically wish to see how tenant household incomes and benefit rules might interact with varying levels of rent in the stock.

This first stage looks at what proportion of local working households of different types would find market rents, rents set above traditional General Needs (GN) rents but below market rents in line with the Affordable Rents regime, and GN rents themselves affordable without housing benefit. The focus here is on the local distribution of household income by household type. This analysis was carried out by CCHPR and updates and refines previous work carried out by the Centre for Affinity Sutton in 2010 (Fenton et al., 2011). In addition the analysis looks at the position of those of working age who are dependent on benefits.

Sub-market rents and local income distributions

Potential future tenants for sub-market rents are assumed to be drawn from the current population of the local authority district where stock is held. It is known that the average and distribution of household incomes varies both by household characteristics (such as household composition) and between local areas (because of variations in wages and employment rates). We first thus construct an estimated distribution of incomes by household type and local area, in order to then compare this to varying rent levels for dwellings of an appropriate size.

Methodological considerations

We do not have direct information on household incomes at local level. We do however have:

A) National household sample surveys which measure total household income in detail, considering income from sources like benefits, pensions and investments as well as earnings. The source of choice is the *Family Resources Survey*; also relevant are *Understanding Society* (US) and the *English Housing Survey* (EHS). Given sample size and construction, none can provide reliable estimates below regional level.

B) National sample surveys with larger samples which measure some components of income, particularly earnings. Most notable here is the *Annual Survey of Hours and Earnings* (ASHE). However, measurement is at individual, not household, level, and only a limited number of statistics (mean and quartile) are available.

C) Local enumerations of households, families or people, with data that are statistical correlates of income. This includes the Census (with data on occupation, employment status, household composition, age), but also administrative data on receipt of welfare benefits, dwelling values and so forth.

The method adopted is to combine the detailed national survey measurement of income (A) with the local correlates of income (C) in order to produce estimates by household type at local level. Survey measures of individual earnings (B) are used to verify the plausibility of the estimates.

The following steps are involved:

1. Selection of constraint variables
2. Iterative re-weighting of FRS cases to local area constraint tables
3. Cross-checking of derived estimates against ASHE earnings data
4. Testing income distributions by household type against varying rent levels for an appropriate property.

Technique

Two broad approaches were considered:

1. **Econometric modelling and prediction**: some kind of regression model is fitted to the sample survey data which estimates how some statistic of income (e.g. mean) is related to local characteristics in *B* and/or *C*. Once a model has been fitted, the parameters are used to make predictions for all local areas.
2. **Micro-simulation / reweighting**: the cases in the sample survey are given new weights, so that the re-weighted sample resembles the local population in terms of characteristics that predict income (employment status, occupation, age). Local income statistics are then made by using these new weights.

The two approaches are in fact closely theoretically related (Haslett et al., 2010), and both have been used in the UK (see Fenton, 2013 for an applied discussion). The micro-simulation method is adopted as it does not require access to the secure versions of survey data with local geographic identifiers.

The specific technique closely follows that described by Anderson (2007, 2011). Cases (households) from the FRS are given new weights in each area by iteratively re-weighting the cases to a set of control tables with Census variables. Only cases from the region in which the local authority is located are used. The Census variables are selected by regression modelling to explain inter-area variation in income which are explained at the household level.

For this exercise, we take advantage of the extensive preparatory modelling work reported in Anderson to make the variable selection. Variables available in the FRS and the Census are selected by estimating regional-level models of household income with them as predictors and using stepwise selection. An example of the variables used is the list from the North East region:

Household Composition
Employment Status of HRP
Housing Tenure
Number of Rooms
Accommodation Type
Gender of HRP
Number of Children
Ethnicity of HRP
Age of HRP

The variables are listed from the most significant to the least significant predictors of income identified by the model. For each local authority, the weights for cases from that region are iteratively adjusted to the Census constraints. The procedure and an example implementation in statistical software are described in detail in several sources (Ballas et al., 2005; Simpson and Tranmer, 2005).

Validation of the weights using ASHE: The new weights in each local authority area are considered to be acceptable when they satisfy cross-checking against a third source, the Annual Survey of Hours and Earnings (ASHE). The test is whether the median gross weekly earnings of full-time employees, calculated from the re-weighted FRS, lie between the 40^{th} and 60^{th} percentile of the equivalent value in ASHE.

Use of the re-weighted income data: To simplify the remaining calculations, each type/area income distribution is assumed to follow a log-normal distribution with this mean and estimated value. With the new weights, the mean and standard deviation of the log-income distribution is calculated in each local area for each household type.

The affordability calculation: Each household type is assigned to a size of dwelling according to the rules of the Bedroom Standard applied to Local Housing Allowance and latterly also to Housing Benefit for social tenants, with some simple assumptions made about the proportion of households with more than one child whose children would share bedrooms.

Only working-age households (those with a Household Reference Person aged under 65) are included in the affordability calculation. Households are separated into those which have at least one member in either part-time or full-time employment, and those which do not, and the affordability calculations made for these two groups separately.

The estimated distribution of incomes by household type can now be compared against different potential levels of rents for an appropriate dwelling, in order to estimate what proportion of households of that type would find that rent 'affordable'. The affordability criteria used is based on the Income Support amounts used in government benefits. A household is deemed to find a dwelling affordable when its residual income after gross rent has been paid is equal to 120% of the

applicable Income Support amount.

2.2 What we actually calculated

Household types

This study examined the following seven household types – each of them was further disaggregated into a working household group or a workless group. A working household means a household which contain at least one employed person – either full-time or part-time, albeit for singles, only full-time workers are treated as a working household.

couple only
couple with one dependent child
couple with two dependent children
couple with three dependent children
lone parent with one dependent child
lone parent with two dependent children
single

Households whose reference person (HRP) is aged at or over 65 years old in 2013 were excluded from the analyses.

Income thresholds to evaluate affordability

We assumed the following inequality should be applied to a working household's income.

household income ≥ 120% of Income Support + rent.

This implies that the minimum income at which a household perceives a specified rent level as affordable can be expressed as;

The minimum household income = 120% of Income Support + benchmark rent.

Drawing on this income threshold and an income distribution for each household type in each LA, a proportion of households who perceive the specified rent level as unaffordable was estimated. This is a different assumption to that made in the earlier estimates where it was calculated on 100% is chosen because here we are looking specifically at the position of those who would be accommodated in the social rented sector.

Rents against which to evaluate affordability

The set of benchmark rents in each LA market are the mean rents in the three sub-markets – private rent, a number of quasi-private (so-called "affordable") rents and social renting markets[1]. More specifically, this study assessed the situation with respect to the mean gross market rent (MR); 80% of MR; 65% of MR as a possible alternative rent structure and the mean of general needs social rents (GNR) all by property size and LA. All the data sets were provided by Affinity Sutton. The observation period for MR was January to September 2013, while GNR was as of the mid-October 2013. A gross rent means a weekly rent with any service charge.[2]

All the rent datasets are categorised by property size, measured by the number of bedrooms from bedsits to four or more bedrooms, which means the size categories need to be corresponded to the examined household types. We assign the minimum required property size to each household type, as our interest is marginal for affordability. Our definition of the minimum required (i.e. no spare rooms) property size is based on the rules for the size of accommodation in claiming Housing Benefit, which was introduced in the Welfare Reform Act 2012. Under the rules, singles and couples without children are matched to the one-bedroom category (for singles, the bedsit category is combined), while couples or lone parents with one child are allocated a two-bedroom unit. For households with multiple dependent children, the rules specify one bedroom to be occupied by any two same-sex children aged less than sixteen years or any two children aged less than ten years regardless of their gender. With this definition and the usual assumptions that children of a parent (or a household reference person) aged over forty years is around ten years and that a gender probability of children is fifty percent for each gender, household types with multiple children are associated with a two-, three- or four-bedroom category, conditional on the household reference person's age as Table 1.

Table 1: The number of minimum required bedrooms for households with multiple children

	Reference person's age		
Household type	≤34	35 to 44	≥45
couple/lone parent with two children	2	2(75% of households), 3(25%)	3
couple with three children	3	3	4

Income distribution by household type at LA level

We estimated a household income distribution by household type at a local authority area level, as there were no official data on the distribution. The estimation was carried out based on two established and widely held assumptions. First, for suitably disaggregated groups of households, income distribution follows a regular pattern which approximates to the 'lognormal' distribution - i.e. a distribution which becomes the standard normal distribution when incomes are converted

[1] The mean is used here because it is not possible to estimate a potential median.
[2] Service charge was assumed to contain sewage and water changes.

into logarithms (Bramley & Smart, 1996, p.241). Second, an income distribution for a household type in a small area can be approximated drawing on the equivalent income distribution at the upper spatial scale with some adjustment. In our context, an income distribution for a household type in a LA was estimated as a weighed income distribution for the household type in the region to which the LA belongs. Household income distributions at the regional level can be constructed from information in Family Resource Survey (FRS) 2011/12.[3] Thus, defining a weight for each household in FRS is key to the estimation of a local weight. There are several ways of creating such a weight. This paper drew on a procedure presented by Anderson (2007) with some simplifications – the details are in Annex 1.

2.3 The Findings

Assessing affordability requires three main steps:

1. Separating working-age households from pensioner households, and then households with someone in employment from those with no-one in paid work. The employed group includes self-employed and part-time workers for all household types but the single household category, which excludes part-time workers.
2. Estimating the local area income distribution of working-age households with someone in employment
3. Using this income distribution to assess the numbers and proportions of relevant households able to afford each level of gross rent.

We note again that affordability is here defined as leaving a residual income after rent of 120% the Income-Support Applicable Amount for that household - the ISAM being the base amount of means-tested benefits that household would receive. Note that this is a relatively tight definition of affordability compared either to percentage-disposable-income methods or to residual incomes based on poverty lines or consensual base living costs definition. So it both focuses more on the lower end of the overall income distribution, and produces smaller numbers and proportions of households unable to afford the market sector than other methods in the literature.

We also note that owner-occupiers are included in the numbers - although many will naturally be at the higher end of local income distributions. Pensioner households are excluded. Workless households are treated separately as rents paid by this group are generally determined by subsidy (Housing Benefit) regimes than earned income.

The starting point is the range of local rent levels. Table 2 shows current rents in the 27 local authority areas - including market rent (MR), 80% of MR, 65% of MR and Affinity Sutton's General Needs social rent for 2 bed units. Mean market rents (MR) vary from around £760 in Kensington

[3] Strictly speaking, as FRS is a sample survey (not a census), a regional income distribution from FRS is an estimate.

and Chelsea to just over £100 in Kingston upon Hull. Social rents (GNR) vary much less reflecting both the rules by which target rents were set (which took account of local area incomes as well as property size ratios as well market rents) from around £146 in Islington to £69 in Stoke on Trent. The range of affordable rents is considerably greater than for social rents but much less than for market and 80% market rents. Clearly the difference in the proportions able to afford the different rent levels will be much greater in higher rent areas.

Table 2: Average weekly gross rent for 2-bedroom properties (£)

Region	LA	Market Rent (MR)	80% of MR	65% of MR	GN Rent (GNR)
East of England	Chelmsford	182.17	145.74	118.41	100.70
East of England	Dacorum	215.87	172.70	140.32	120.44
East of England	Hertsmere	240.35	192.28	156.23	118.40
East of England	Stevenage				120.97
London	Bromley	243.90	195.12	158.54	122.38
London	Croydon	246.05	196.84	159.93	130.32
London	Islington	409.76	327.81	266.34	146.11
London	Kensington and Chelsea	759.86	607.89	493.91	114.69
London	Lewisham	277.11	221.69	180.12	114.71
London	Southwark	347.07	277.66	225.60	137.50
North East	Middlesbrough	107.48	85.98	69.86	77.81
North East	South Tyneside	109.00	87.20	70.85	73.67
North West	Bolton	107.15	85.72	69.65	74.79
North West	Halton	110.48	88.38	71.81	86.89
North West	Manchester	149.44	119.55	97.14	72.27
North West	Warrington	127.62	102.10	82.95	80.84
South East	Basingstoke and Deane	188.04	150.43	122.23	105.71
South East	Brighton and Hove	246.25	197.00	160.06	103.18
South East	Chichester	194.36	155.49	126.33	107.04
South East	Mid Sussex	196.93	157.54	128.00	112.44
South East	Milton Keynes	171.53	137.22	111.49	107.40
South East	Wealden	175.40	140.32	114.01	97.62
South West	Plymouth	139.84	111.87	90.90	75.31
West Midlands	Stoke-on-Trent	115.95	92.76	75.37	68.88
Yorkshire & The Humber	Bradford	109.77	87.82	71.35	74.97
Yorkshire & The Humber	Kingston upon Hull	100.11	80.09	65.07	71.09
Yorkshire & The Humber	Leeds	136.47	109.18	88.71	77.16

The next three tables show how the proportions unable to afford different levels of rent vary between household groups. Here we include: couple households without children; a full time working single household; and lone parent households with two dependent children.

Table 3 shows that couple households – who are allocated to a one bedroom unit in the relevant area - are generally able to afford market rents. Those unable to afford market rents range from 30% in Islington to 9% in Warrington. It also shows that area incomes and rents are to some extent positively related so that the pattern of affordability is not exactly similar to that for observed

rents. Even so London is clearly the region where rents are most likely to be unaffordable even for couple households.

The proportion able to afford social rents is clearly higher in all areas. However outside London the increase is rarely more than 4% and in low waged areas; notably in the North East, it can be less than 2%. This reflects far lower market rents as well as relatively high social rents that in some cases may differ little from that available in the market.

Table 3: Proportion of working couple households without children for whom market, intermediate and social rents are unaffordable

			% of working HHs the rent is unaffordable (120IS base)			
	LA	HH type	MR	80% MR	65% MR	GNR
East	Chelmsford	couple	11.1	9.1	7.6	7.6
East	Dacorum	couple	19.8	16.9	14.7	14.6
East	Hertsmere	couple	22.1	19.1	16.7	16.4
East	Stevenage	couple				16.8
London	Bromley	couple	20.3	17.5	15.5	14.8
London	Croydon	couple	27.4	24.4	22.0	20.8
London	Islington	couple	30.2	26.2	23.0	17.8
London	Kensington and Chelsea	couple	29.2	24.8	21.3	10.4
London	Lewisham	couple	28.4	25.2	22.6	19.8
London	Southwark	couple	26.8	23.2	20.4	16.9
NE	Middlesbrough	couple	13.9	11.7	10.0	11.2
NE	South Tyneside	couple	9.6	7.8	6.5	7.3
NW	Bolton	couple	16.6	14.7	13.2	14.1
NW	Halton	couple	17.3	15.2	13.6	15.2
NW	Manchester	couple	17.1	14.5	12.6	11.1
NW	Warrington	couple	8.5	6.8	5.7	5.9
SE	Basingstoke and Deane	couple	17.7	15.2	13.3	13.1
SE	Brighton and Hove	couple	20.7	17.8	15.6	13.8
SE	Chichester	couple	15.6	13.2	11.4	11.3
SE	Mid Sussex	couple	18.2	15.6	13.6	13.6
SE	Milton Keynes	couple	14.2	12.0	10.4	10.8
SE	Wealden	couple	13.1	11.0	9.5	9.5
SW	Plymouth	couple	14.8	12.7	11.1	10.9
WM	Stoke-on-Trent	couple	19.2	17.2	15.8	16.6
YH	Bradford	couple	11.2	9.5	8.3	9.2
YH	Kingston-upon-Hull	couple	14.8	12.9	11.5	13.3
YH	Leeds	couple	12.0	10.0	8.6	8.1

Table 4 gives similar information for single households working full time. The range of proportions of those unable to afford market rents is considerably higher than for couples with the largest proportions found in lower wage areas. Bromley stands out with the lowest proportion at 8.6% as compared to the highest, at nearly 37%, in South Tyneside. London boroughs generally fall in the middle of the range.

The range in the proportion of single full time workers unable to afford social rents varies even more with less than one percent unable to afford social rents in Kensington and Chelsea but nearly 34% in South Tyneside - little below the proportion for market rents.

Table 4: Proportion of single person households unable to afford market, intermediate and social rents

			% of working HHs the rent is unaffordable (120IS base)			
	LA	HH type	MR	80% MR	65% MR	GNR
East	Chelmsford	single	26.0	22.5	19.7	19.7
East	Dacorum	single	27.2	23.1	19.9	19.8
East	Hertsmere	single	30.2	25.7	22.2	21.6
East	Stevenage	single				20.7
London	Bromley	single	8.6	6.0	4.3	3.7
London	Croydon	single	15.5	11.7	9.0	7.7
London	Islington	single	25.6	19.3	14.6	8.0
London	Kensington and Chelsea	single	20.8	13.8	9.0	0.8
London	Lewisham	single	16.9	12.6	9.6	6.6
London	Southwark	single	23.4	17.8	13.7	9.1
NE	Middlesbrough	single	35.9	32.8	30.3	32.1
NE	South Tyneside	single	36.8	33.8	31.3	32.9
NW	Bolton	single	14.0	11.4	9.6	10.6
NW	Halton	single	14.8	12.1	10.1	12.1
NW	Manchester	single	19.2	15.6	12.9	10.8
NW	Warrington	single	18.1	15.1	12.9	13.4
SE	Basingstoke and Deane	single	13.5	9.9	7.4	7.2
SE	Brighton and Hove	single	19.2	14.4	11.0	8.4
SE	Chichester	single	16.1	12.1	9.3	9.2
SE	Mid Sussex	single	14.2	10.4	7.8	7.6
SE	Milton Keynes	single	13.9	10.3	7.9	8.5
SE	Wealden	single	12.6	9.3	7.0	7.1
SW	Plymouth	single	22.6	18.9	16.2	15.7
WM	Stoke-on-Trent	single	20.1	17.0	14.6	15.9
YH	Bradford	single	25.6	22.9	20.8	22.0
YH	Kingston-upon-Hull	single	25.3	22.5	20.3	23.1
YH	Leeds	single	23.3	20.0	17.5	16.8

Note: Full-time working singles only.

Table 5 gives one example of non-working households looking at the position of workless lone parents with 2 dependent children. Some in some areas can afford even market rents because of other income. But fundamentally it shows that the vast majority in most areas are dependent on welfare benefits.

Table 5: Proportion of workless lone parents with two dependent children for whom market, intermediate and social rents are unaffordable

			% of workless HHs the rent is unaffordable (120IS base)			
	LA	HH type	MR	80% MR	65% MR	GNR
East	Chelmsford	LP + 2	58.7	52.6	47.6	43.4
East	Dacorum	LP + 2	65.8	59.8	54.7	49.5
East	Hertsmere	LP + 2	73.4	68.0	63.2	57.1
East	Stevenage	LP + 2				53.1
London	Bromley	LP + 2	100.0	99.9	99.8	99.6
London	Croydon	LP + 2	100.0	100.0	99.9	99.7
London	Islington	LP + 2	100.0	100.0	100.0	100.0
London	Kensington and Chelsea	LP + 2	100.0	100.0	100.0	100.0
London	Lewisham	LP + 2	100.0	100.0	99.9	99.5
London	Southwark	LP + 2	100.0	100.0	99.9	99.4
NE	Middlesbrough	LP + 2	100.0	100.0	100.0	100.0
NE	South Tyneside	LP + 2	100.0	100.0	100.0	100.0
NW	Bolton	LP + 2	91.3	88.9	86.7	87.1
NW	Halton	LP + 2	91.7	89.3	87.0	88.7
NW	Manchester	LP + 2	89.9	86.7	83.6	79.6
NW	Warrington	LP + 2	91.9	89.1	86.4	84.1
SE	Basingstoke and Deane	LP + 2	98.6	97.6	96.3	95.2
SE	Brighton and Hove	LP + 2	99.7	99.3	98.8	96.5
SE	Chichester	LP + 2	95.4	93.4	91.2	89.2
SE	Mid Sussex	LP + 2	98.9	98.1	97.0	95.8
SE	Milton Keynes	LP + 2	96.0	94.2	92.3	91.8
SE	Wealden	LP + 2	97.7	96.3	94.7	92.0
SW	Plymouth	LP + 2	100.0	100.0	100.0	100.0
WM	Stoke-on-Trent	LP + 2	99.9	99.8	99.7	99.6
YH	Bradford	LP + 2	100.0	100.0	100.0	100.0
YH	Kingston-upon-Hull	LP + 2	100.0	100.0	100.0	100.0
YH	Leeds	LP + 2	100.0	100.0	100.0	100.0

Table 6 clarifies in more detail the relative position of different types of household in London – as the region with the greatest shortages of affordable homes. It reinforces the evidence that among working households it is the existence of children that make housing less affordable. It also clarifies again that even in areas where the range of earned incomes is large, social rents are often only affordable to around 10% more of the population than market rents. This reflects the concentrations of households with incomes well below the mean and by implication the overwhelming importance of housing benefit in ensuring affordability even among working households.

Table 6: Working households in London unable to afford market, affordable and social rents

		% of working HHs the rent is unaffordable (120IS base)			
LA	HH type	MR	80%MR	65%MR	GNR
Bromley	couple	20.3	17.5	15.5	14.8
Croydon	couple	27.4	24.4	22.0	20.8
Islington	couple	30.2	26.2	23.0	17.8
Kensington and Chelsea	couple	29.2	24.8	21.3	10.4
Lewisham	couple	28.4	25.2	22.6	19.8
Southwark	couple	26.8	23.2	20.4	16.9
Bromley	couple + 1	8.4	6.2	4.7	3.4
Croydon	couple + 1	21.4	17.6	14.8	12.6
Islington	couple + 1	24.7	19.0	14.8	7.5
Kensington and Chelsea	couple + 1	31.4	22.4	15.9	1.3
Lewisham	couple + 1	20.7	16.6	13.6	9.2
Southwark	couple + 1	19.3	14.5	11.2	6.3
Bromley	couple + 2	22.2	18.8	16.3	13.3
Croydon	couple + 2	28.5	24.8	21.9	19.0
Islington	couple + 2	33.3	28.5	24.6	15.8
Kensington and Chelsea	couple + 2	53.4	45.6	38.8	8.9
Lewisham	couple + 2	27.4	23.7	20.9	16.5
Southwark	couple + 2	30.5	26.0	22.6	15.9
Bromley	couple + 3	37.7	33.3	29.9	23.6
Croydon	couple + 3	58.2	54.7	51.7	46.4
Islington	couple + 3	62.8	58.1	54.1	38.9
Kensington and Chelsea	couple + 3	81.7	75.9	69.9	18.2
Lewisham	couple + 3	57.4	53.5	50.3	42.8
Southwark	couple + 3	54.5	49.7	45.7	35.7
Bromley	LP + 1	49.8	44.6	40.2	35.6
Croydon	LP + 1	77.3	73.1	69.3	65.8
Islington	LP + 1	75.0	69.7	64.8	52.1
Kensington and Chelsea	LP + 1	74.0	67.3	61.0	26.7
Lewisham	LP + 1	78.2	73.9	70.0	62.3
Southwark	LP + 1	64.3	58.2	52.9	42.2
Bromley	LP + 2	52.4	46.8	42.3	36.8
Croydon	LP + 2	74.7	69.9	65.7	60.7
Islington	LP + 2	76.7	70.3	64.3	42.2
Kensington and Chelsea	LP + 2	72.2	63.6	55.4	16.9
Lewisham	LP + 2	72.8	67.9	63.5	55.1
Southwark	LP + 2	61.2	54.1	48.1	35.5
Bromley	single	8.6	6.0	4.3	3.7
Croydon	single	15.5	11.7	9.0	7.7
Islington	single	25.6	19.3	14.6	8.0
Kensington and Chelsea	single	20.8	13.8	9.0	0.8
Lewisham	single	16.9	12.6	9.6	6.6
Southwark	single	23.4	17.8	13.7	9.1

Finally, Table 7 gives an example – for single working households - of the incomes necessary to be able to afford the relevant rents. These obviously vary enormously across the country but, of course, so do the opportunities in terms of wage rates and access to full time employment. It also shows, forgetting any tax and benefit loss implications, where income requirements are above the current minimum wage – all of London and much of the South of the country with respect to market rents and still often relevant for affordable rents.

Table 7: The minimum income to make the rent affordable for working single households

	LA	HH type	MR		80% MR		65% MR		GNR
East	Chelmsford	single	224.55		196.85		176.07		175.91
East	Dacorum	single	246.37	***	214.30		190.25		189.08
East	Hertsmere	single	260.37	***	225.50		199.35		195.52
East	Stevenage	single							193.32
London	Bromley	single	265.11	***	229.30		202.44		192.95
London	Croydon	single	267.90	***	231.53		204.25		190.85
London	Islington	single	394.85	***	333.09	***	286.77	***	217.09
London	Kensington and Chelsea	single	530.27	***	441.42	***	374.79	***	183.02
London	Lewisham	single	290.66	***	249.74	***	219.04		185.33
London	Southwark	single	344.44	***	292.76	***	254.00	***	208.46
NE	Middlesbrough	single	182.40		163.13		148.67		158.68
NE	South Tyneside	single	176.54		158.44		144.87		153.28
NW	Bolton	single	172.70		155.37		142.37		149.36
NW	Halton	single	178.07		159.66		145.86		159.71
NW	Manchester	single	207.02		182.82		164.68		150.21
NW	Warrington	single	189.20		168.57		153.09		156.62
SE	Basingstoke and Deane	single	233.37		203.90		181.80		179.39
SE	Brighton and Hove	single	255.18	***	221.35		195.98		175.02
SE	Chichester	single	231.43		202.35		180.54		179.77
SE	Mid Sussex	single	239.10	***	208.49		185.53		183.76
SE	Milton Keynes	single	220.87		193.90		173.68		178.55
SE	Wealden	single	220.15		193.33		173.21		173.78
SW	Plymouth	single	193.39		171.92		155.82		153.11
WM	Stoke-on-Trent	single	172.15		154.93		142.01		149.04
YH	Bradford	single	174.31		156.66		143.42		151.20
YH	Kingston-upon-Hull	single	173.79		156.24		143.08		160.10
YH	Leeds	single	194.16		172.54		156.32		151.49

Note: *** indicates " above 37-hour minimum wage (£233.47)".

Tables 3 – 7 give examples of the main findings from the quantitative analysis. Looking across the full set of estimates [4] some more general findings can be brought out, including:

- In the 27 authorities the largest proportions of working households unable to intermediate market rents (i.e. 80% or 65% MR) were usually among lone parent households. However the largest numbers were usually among couple or single person households.

[4] They may be available upon request (cu210@cam.ac.uk).

- Couples generally find market rents more affordable – this is partly because they may have two incomes while still being allocated a one-bedroom property.

- However in London (Kensington and Chelsea; Lewisham; Islington; Croydon and Southwark) over 25% of all working couples could not afford market rents.

- The picture for couples plus one child (who are allocated a 2 bed property) is more mixed with over 20% unable to afford market rents in e.g. Kensington and Chelsea; Islington; Kingston upon Hull; Brighton and Hove; Middlesbrough and Croydon.

- Among lone parents these proportions rise to up to 78% for those with one child in Lewisham; and to 77% for lone parents plus two children in Islington.

- Single person households generally face considerable difficulties in paying their rent with over 30% unable to afford market rents in South Tyneside; Middlesbrough and Hertsmere.

- The proportions of households who are able to afford 80% market rents but not full market rents is generally estimated as considerably smaller than in the earlier research. This may be to do with who is included as employed.

- The biggest groups who gain affordability from intermediate rents were concentrated in Kensington and Chelsea and to a lesser extent in the other inner London boroughs, as were those who were able to afford social rents, e.g. those set at the level of 80% or 65% MR, but not affordable rents.

- The benefit of intermediate rents (e.g. 65% of MR) to couples was relatively limited – with a maximum of 9% of couple households benefiting in Kensington and Chelsea but the average percentage being around 4%. Those brought into affordability by social rents were nearly 20% in Kensington and Chelsea but was generally still below 5%.

- The impact on couples with children and especially 2 or 3 children was somewhat greater for intermediate rents but considerably larger for social rents. The benefits were far greater for lone parent households. Among single person households the proportionate effect was moderate – but the numbers involved are much larger.

- Perhaps most importantly, the spatial distribution of market rent unaffordability reflects both the levels of incomes and the levels of rents and is by no means always concentrated in areas of highest housing pressure. This makes it particularly important that rent

structures relate to the employment opportunities available to tenants as well as simply to rents in relation to market levels.

Section 3: Setting new rent structures to improve affordability

3.1 The issues

The capacity to set new rent structures exists only in the context of lettings under the Affordable Rents regime. Established tenants are subject to the regime in place at the time that they moved in, which in most cases will mean they are subject to target rents.

Setting new rent structures to improve affordability needs to take account not only of the general evidence of affordability set out in Section 2 but also of which types of household are actually being accommodated as well as their eligibility for Housing Benefit.

There were nearly 2,500 nominations to new lets in Affinity Sutton properties under the Affordable Rents regime during the period December 2012 to November 2013. Among these 64% were on full or partial Housing Benefit in November 2013.

Within this total the two biggest groups were single persons (681) and single parents with one child (493). Couples without children on the other hand accounted for only 69 lettings.

Table 8 summarises some of the most important groups that are being accommodated. These proportions are important once account is taken of the impact of the welfare regime on affordability.

Table 8: Affordable renter attributes

HH Composition (where known)	Proportion of tenancies	Proportion on housing Benefit
Single*	28%	66%
Couple	3%	46%
Couple 1 child	9%	40%
Couple 2 plus children	13%	46%
Single parent one child	20%	76%
Single parent 2 plus children	16%	72%
Unknown composition	9%	73%
Total tenancies	2449	64%

Note: * of any age

3.2 The Principles of rent setting in the social sector

First there are legal and policy requirements:

- Rents for subsidised housing are required to be set below market levels, reflecting the existence of subsidy – although there is no requirement to set individual rents in relation to the subsidy provided; and

- It is also required that dwelling rents for similar properties be set on a similar basis – it is not legal to take account of the individual circumstances of the tenant when setting the rent for an individual property.

Secondly, on what basis might rents be set:

- Within these constraints rents can in principle be related to costs; to a set of dwelling characteristics; to market values; or to household circumstances – or indeed to some combination of these factors. Historically costs were sometimes used to set rents but now costs tend only to be relevant to determining the required rental income. Rent pooling is the norm – but it should be remembered that service charges, council tax and other unit based costs are increasingly important in affecting actual payments.

- Rents based on dwelling and sometimes neighbourhood characteristics were the norm for most providers in the seventies and eighties. Weights for each characteristic had to be determined – and increasingly this was done by a points system determined by each association. Over time these points values tended to relate more to consumer valuations and in part because of the complexities and because of government pressure property rents tended to be more closely related to market rents.

- The introduction of rent restructuring in 2000 aimed to generate a more coherent approach to rent setting by requiring Housing Associations to set rents on a 70/30 between relative county based earning and relative property values. It also specified a ratio between rents for different property sizes which meant rents on larger properties were much lower in relation to market rents than for smaller units.

- This system remains in place for social tenancies. However for new tenancies the Affordable Rents regime removes both the property size ratios and the income element and simply allows rents up to 80% of market value.

- While there are incentives in relation to development subsidies to charge rents close to that 80%, each Housing Association has the freedom to set rents where they wish taking account of the costs and benefits to the organisation and to their tenants and potential tenants.

- In this context they could for instance decide to set rents in relation to affordability and thus incomes in each area as long as they stay within the rules set by the subsidy framework.

- Thus for the Association within a required total revenue there are three basic decisions: should the proportion (of market rent) vary with location, with property size, with

affordability in the local area, or possibly with demand (accepting that below market rent means there will be queues).

- The simplest approach is to set rents at a given proportion of market value across all locations and property types. In practice affordability issues have tended to result in more complex rent structures. In particular the norm has been to set rents for smaller properties at a higher proportion of market value than for larger properties on the basis that larger households live in larger properties and have to satisfy larger needs from any given income.

- With respect to location the argument has been that incomes vary less than house prices and rents across regions and localities. Meeting affordability criteria therefore suggests that rents should be a smaller proportion of market values in higher valued areas in order to enable in work households in lower income jobs to have a chance of affording the rent. Both of these principles have been applied in setting rents within Affinity Sutton.

- An added complication is that the introduction of intermediate rent products allows the stock to be segmented into housing for those able to afford higher (although not market) rents. This was the starting point for the earlier research on whether there would always be demand for such products, normally at a maximum of 80% of market value.

3.3 The impact of housing benefit on rental affordability

In many ways the most important issue, if the objective is to improve affordability for tenants, is the extent to which the structure of the welfare system modifies not only the rent paid by the tenant but the income available to the tenant once the rent is paid.

Under the current Housing Benefit (HB) regime rent increases are fully covered whenever the tenant is on either full or partial housing benefit up to the LHA rent for the area. The only exception is if the tenant household is affected by the benefit cap set at £350 per week for an individual and £500 for a family. So if rents are held down the Association's revenues clearly suffer but the main beneficiary is the Department for Work and Pensions because they pay out less Housing Benefit. The other groups who benefit are tenants who receive no HB – on average around a third of all tenants and a small number who are enabled to escape Housing Benefit as a result purely of the lower rent.

This has the implication that all households with a given set of characteristics on full Housing Benefit have the same residual income wherever they live (although there may be differences arising from e.g. service charges and council tax allowances). The value to the household of this residual income in different locations depends on differentials in prices, especially for essentials.

Those on partial benefit keep small proportions of their additional income dependent upon the withdrawal of HB at 65% and of other benefits at varying rates.

Given the current HB structure a possible approach to rent setting, where a large proportion of households are on HB, is to set rents at LHA levels to maximise income. However this would clearly disadvantage those paying their own rent or those who would be able to avoid HB if rents were lower, both important groups for any association.

Rent setting policies aimed at improving affordability and tenant welfare must therefore concentrate on those who are or can become ineligible for HB. Tenants whose incomes are anyway high enough to avoid HB clearly benefit from any reduction in rent by the full amount of that reduction. This is the group to which the current research was initially addressed. The emphasis was on examining the proportions of each group who would gain residual income under different rent regimes.

The evidence showed enormous variations between areas both between and within regions. Even so, the strongest differences were between central London and the rest of the country.

The other group who can be helped are those who, while currently on HB, could avoid it with a lower rent. The income taper for housing benefit is 65%. So for every additional pound of income the tenant pays an additional 65p of rent until they are paying the full rent. Thus for example if the rent is £100 per week a tenant will have to earn £155 above the basic allowance to be free of HB. A lower rent would allow the tenant to get off benefit at a lower income. So if the rent is lowered to £90 the requirement falls to £138.50 above the basic allowance. If there are a reasonable number of households on relatively limited partial benefit a reduction in rent would help this group. But it would not affect the residual income of those remaining on HB. A big problem here is that even in the social sector such households often do not claim the small amount of benefit to which they are entitled.

The benefits of reducing rents may well reduce further under Universal Credit (UC) because HB is no longer identified separately and so the link between rent and the income taper will be less direct. Estimates of the point at which households might come off UC suggest that families will need to earn well over the median income to avoid benefits even where rents are low. Estimates for central London suggest that some households with incomes up to £90,000 would still be on UC if paying market rents.

It is obvious that the higher the rent the harder it is for households to get off HB. So those in lower rent areas will benefit more from limiting those rents. The position of such households may be further improved if it is additionally assumed that tenants will only be able to obtain jobs paying the minimum wage which remains the same across the whole country, enabling no offset for higher rents from higher incomes.

On the other hand, once households are no longer eligible for HB and thus paying their own rents, the benefit from a rent reduction is probably higher in higher priced regions, even though any given reduction buys more in lower cost areas.

3.4 Possible rules given these constraints

The logic of the welfare rules is that to improve affordability and welfare, rents should be lower the higher the proportion of households living in that type of property and area that are paying their own rents. These are also likely to be the same property types and areas where working households on partial benefit have incomes close to the level which frees from HB and makes the rent relevant to their own position.

The fundamental is therefore that in areas where tenant incomes are relatively high and housing costs relatively low there are likely to be more of a given household type who would benefit from lower rents. Equally where the make-up of the tenant population favours those most likely to be in work, there are likely to be benefits to those tenants in keeping rents down.

Thus to the extent that rent policy is to be used to improve affordability the emphasis should be on the third of Affinity Sutton's households that do not receive HB. Among new tenants these groups are concentrated among couple households with or without children (some 25% of lettings with 44% on HB). Single person households account for some 28%, and at 64% on HB, have an average propensity to be on HB. Single parents account for 36% of lettings and have the highest proportion on HB at 74%. Further the larger the number of children in family households the higher the chance of being on HB.

This leads to a number of counter intuitive implications:

(i) the numbers of couple households accessing any particular sized units will normally be less than the number of lone parents so may not be large enough to be relevant when rent setting for particular sized units. This is less true for intermediate housing where such couples are often expected to be the main beneficiaries;

(ii) under the current rules there is very little to be gained from holding down rents for larger units because the proportion of households on HB who cannot make enough money to get off benefits is likely to be high;

(iii) similarly, there are relatively few benefits in holding rents down in higher valued areas unless there are disproportionately high incomes available to tenants in these areas;

(iv) on the other hand in areas where a higher proportion of tenants are able to earn higher incomes there can be benefits to holding down rents. Unhappily (iii) is likely to dominate (iv);

(v) the most obvious group that can be helped by lower rents are single people because they have fewer benefits and therefore reach the point of zero HB at lower rents. However many single people are either of pensionable age and receive no working income or have other vulnerabilities which will make it less easy for them to earn enough to get free of HB at whatever rent.

The initial research also showed that in lower income areas household composition tends to drive affordability while in areas with higher local incomes household earnings were more important as there are more opportunities. However affordability is very local so it is difficult to identify broad area grouping which would help target assistance.

The research further showed that affordability in the marketplace has fallen since the earlier research with average household incomes not keeping pace with rent rises. Linking rents to a given proportion of market rents would mirror this decline and maintain revenues. This suggests that there is a case either for setting rents at a lower average proportion of current market rents if the burden of housing costs is to be maintained, or for putting more emphasis on intermediate rental housing for those with higher incomes but unable to afford market rents.

3.4 Possible Approaches

Preliminary points

The starting point for any rent policy should be that it should be as simple as possible, especially given that large proportions of households cannot be assisted by holding rents down. It is not clear however that there is an overwhelming rationale for any given set of rules.

A policy that maximises rental income from tenant payments and HB – i.e. putting rents at or close to LHA is not desirable because: (i) there are still around one third of tenants that do pay their own rents; (ii) it would increase the HAs dependence on welfare payments and leave them open to political complaint; and (iii) it would not be acceptable to local authority partners.

Options

- ***Option 1*** is to set all rents in relation to the same agreed principle. The possibilities are costs, physical characteristics or values. Given current general housing policies the only practical option is some proportion of market value.

- Given this decision the other options involve defining subsets where rents are set at different proportions of market value. Rents must be set in relation to the property rather than the characteristic of the individual tenant. This implies that any differentiation should

be related to property size (and possibly type); to location; and or sub tenure (i.e. intermediate rent/affordable rent/social rent).

- Because the evidence shows such a complex pattern of both rents and incomes in the market and within the social sector it is almost impossible to set rules to account of all of these differences - so the starting point might be that the basic rent structure should be kept as simple as possible. Any variation needs strong evidence in its favour.

- ***Option 2*** would vary rents with property type. It is generally agreed that market values take account of the difference in running costs and utility to tenants between houses and flats – so this difference is at least partially already taken into account. The biggest problem here is that the private tenants setting these rents have different attributes to social tenants (and therefore different utilities) and the ways that service charges and improvements are dealt with are different between the sectors. However these are both probably second order issues and best dealt with by assessing waiting lists and any evidence of excess supply rather than being set in stone in the rent policy.

- ***Option 3*** involves differentiating by size (and again there is a problem of the relationship between square metres, number of rooms and bedspaces, which is ignored here). The approach in the past has been to charge higher proportions of market value for smaller units and lower proportions for larger units.

- The case for lower rents for larger units under the current welfare environment is slim. In most areas family households in larger units are on HB and likely to remain so until their household characteristics change. When this happens they will be incentivised to downsize. Some of those not on HB will have non dependent children who can contribute. Targeting the small proportions of those in larger units able to avoid HB entirely is likely to be costly.

- The only obvious case for lower rents on larger units is where there is excess supply – suggesting that technically the rents currently set are above market levels for similar properties.

- The case for higher rents on smaller units appears even weaker – unless excess demand because of welfare changes is to be taken into account (a problem as by definition most of these rents are then paid by HB).

- Market rents for smaller units tend to be relatively high, while single people's benefits are more restricted - so the potential for coming off HB through employment is also higher, the lower the rent. The logic is for rents on smaller units if anything to be lower than average.

- ***Option 4*** The next set of options relate to location. This is a much more complex issue as there is such variation in prices and rents and the relationship between rents and tenant incomes.

- The starting point is that all social rents should be below market value. At the present time the extent to which rents are below market varies enormously – being close to market rents in some low priced areas mainly in the North (and indeed above real market rents where there is excess supply).

- An alternative approach would be to use the LHA as the basis for determining relativities as this better reflects the options available to tenants. It is worth noting in this context that the LHA will move further away from actual market rents as they rise with CPI rather than actual rents.

- The most obvious principled approach to affordability is to set rents to achieve similar residual incomes for tenant households not on housing benefit in different parts of the country. This could be done at a very detailed area level but it would lead to an extremely complex pattern of rents which would be subject to a lot of 'noise' because of the poor quality of the data and continuing changes in relativities. Such an approach would not be sustainable especially given the need for overall stability and predictability in the revenue stream.

- An approach which seems more consistent with underlying objectives while keeping rent structures simple would be to go for a small number of broad brush areas based on rents and incomes. ***Option 4a*** would probably identify Inner London and the rest of the country; while ***Option 4b*** might identify up to say four groups of areas. In either case there would still be some exceptions in high rent and very low income/low demand areas.

- This type of approach, based on roughly similar levels of affordability for typical households would have a consistent impact on helping those who are free of HB. It would be less useful as a means of assisting more households to get free of HB through lower rents. Here the emphasis would better be placed on reducing rents in areas, whether high rent or low, where the proportion able to earn enough to jump to freedom is highest. In a minimum wage or London living wage environment this would involve lowering rents in lower rent areas (***Option 5***).

- Finally ***Option 5a*** could be to combine option 5 with lowering rents for smaller units for the reasons set out above.

Two additional caveats should be noted:

First, all the quantitative analysis reported here are at local authority level. Associations might instead wish to use the principles set out here but apply them to mean (or if the data are available median) rents determined at much smaller spatial level. The benefits of such an approach seem quite limited, reducing transparency and increasing complexity and the need for regular adjustments.

Second, any rent structure introduced under the current welfare regime is likely to be subject to change as the implications of the introduction of Universal Credit become clearer.

3.5 Summary

- The rents set for subsidised housing are required to be below market levels and to cover costs. Within these constraints, given current policy and the fact that market rents reflect consumers' valuations and costs, the obvious starting point for determining rent structures is some proportion of that market rent which generates acceptable total revenues.

- More complex rent structures could take account of property size and type on the one hand and location on the other in order to improve rental affordability for particular groups.

Rents and Housing Benefit

- Some two thirds of social tenants receive Housing Benefit (HB). Under the current system all rent increases are fully covered by HB as long as rents are below the Local Housing Allowance (LHA). Thus for the majority of tenants rents can be set anywhere up to LHA without cost to the tenants. This could apply to a much larger proportion of tenants under Universal Credit (UC).

- The logic is therefore to set rents in such a way as to help the minority who are paying their own rent and those who, by lower rents, could be helped to avoid HB.

- For those paying their own rents lower rents give them more income to spend on other essentials. So reducing rents where rents are high as compared to these tenants' incomes makes the most sense.

- The higher the rent the more difficult it is to avoid HB. So lowering rents in low rent areas increases the chance of helping tenants avoid HB. This is particularly true if it is assumed that tenants who are in work earn only the minimum wage (or in London the London Living wage). Higher incomes in low rent areas would increase the chance of avoiding HB.

- It is unlikely that households with children, especially lone parents, can be helped off HB. The groups can best be helped are couples (a relatively small group) and single people in work.

- This generates a number of counter intuitive implications particularly that there is little benefit to keeping rents down for larger units and more to be gained from lowering rents for small units; equally it may be better to reduce rents in lower rent areas unless in high rent areas tenants can earn disproportionately higher incomes.

Possible approaches

- The general principle is to keep it simple – rents and affordability vary so greatly over small areas it is not possible to reflect such differences.

- Rents in the marketplace have risen faster than incomes, so any given proportion of market rent raises more revenue. This may provide an a priori reason for lowering proportions set when the Affordable Rents regime was introduced.

- To improve affordability and help people off HB and those paying their own rent, it is appropriate to move away from current policies which normally favour larger units towards at least a more proportionate approach and possibly towards lower rents for smaller properties.

- Equally it may well be better to move towards a more proportionate approach to rents by location – rather than keeping rents low in high priced areas and setting rents close to market in low demand low rent areas.

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Annex 1: Creating the Weights

- Calculate an initial raw weight – the ratio of the total number of households in a LA (drawn from the Census 2011) and the total number of households in the region to which the LA belong in FRS.

- Identify several household characteristics influencing income for each region drawing on data in – this was carried out the ordinary least square regression with household income as dependent variable and household characteristics as covariates – the covariates were selected by Stepwise method (i.e., the most influential covariates were included in regression. The procedure and the results to identify the influential household characteristics are set out in Annex 2.

- Calculate the number of households with the influencing characteristics for each region from FRS and the equivalent for each of the selected LA from the Census 2011, and create a characteristic weight – the ratio of the two numbers.

- Multiply the raw weight by the several characteristics weights, until the final weight is created – in this process, the characteristics weight could be reformulated, for example, square rooted to obtain a better outcome. [5] The final weight is defined as that satisfying the condition that one LA income indicator created with the weight fall in the valid zone which is available from the data source other than the FRS. In our examination, the indicator is the median gross weekly income from employment for HRPs who are full-time employed (excluding self-employment). The valid zone is the 40 to 60 percentile of the weekly gross pay for full-time workers in the specified LA (residential base) available from the Annual Survey of Hours and Earnings (ASHE). Recall that ASHE excludes self-employment and the figures are as of April pay period. Thus, the valid zone was created with the mean of the 2011 and 2011 ASHE figures – the validation result is in Table A1.

- Finally, the inflationary adjustment of 4.2% was provided to weighted income figures to be corresponded to the benchmark rent figures. The adjustment was created in reference to the inflation during the relevant period as set out in Table A2.5 in Annex 2.

[5] The process which involved reiteration was complexly long and was not uniform across the examined LAs, and thus was not reported in this paper.

Table A1: Full-time worker (excluding self-employment) weekly gross pay from ASHE and the estimated equivalent drawn from weighted FRS: £s p.w. 2011/12

	ASHE*			estimated	Difference between ASHE median
	40 percentile	median	60 percentile	median	& estimated median (%)
Chelmsford	521.5	598.2	669.2	596	-0.4
Dacorum	474.4	573.4	641.1	546	-4.8
Hertsmere	480.8	546.2	631.0	549	0.5
Stevenage	473.1	537.4	600.3	527	-1.9
Bromley	586.3	662.2	736.3	669	1.0
Croydon	511.4	577.5	646.1	573	-0.8
Islington	585.2	676.1	782.3	659	-2.5
Kensington and Chelsea	707.8	850.0	1,092.2	831	-2.2
Lewisham	518.2	577.2	648.0	574	-0.6
Southwark	557.0	628.9	717.0	610	-3.0
Middlesbrough	365.2	406.3	462.6	392	-3.5
South Tyneside	396.7	448.1	507.7	443	-1.1
Bolton	377.3	434.4	496.0	433	-0.3
Halton	392.1	442.4	507.1	434	-1.9
Manchester	392.1	445.4	507.4	447	0.4
Warrington	426.4	495.4	579.1	498	0.5
Basingstoke and Deane	508.2	575.1	649.2	579	0.7
Brighton and Hove	453.9	527.6	605.1	529	0.3
Chichester	439.6	524.3	589.8	526	0.3
Mid Sussex	501.1	584.5	679.2	587	0.4
Milton Keynes	463.2	536.5	620.2	545	1.6
Wealden	477.3	572.3	637.6	574	0.3
Plymouth	398.4	447.4	505.2	450	0.6
Stoke-on-Trent	376.8	422.7	477.8	419	-0.9
Bradford	379.9	422.2	485.7	422	0.0
Kingston upon Hull	363.9	416.2	463.6	414	-0.5
Leeds	420.3	476.3	542.9	460	-3.4

Note: * Simple averages of figures at the beginning and end of the observation period, which were calculated by Author.

Annex 2: Selection of household characteristics influencing household income

Household characteristics influencing a household income were identified through stepwise OLS regression in the following form.

The i-th household in the k-th region is:

$$H_{ik} = \alpha X_{ik} + \varepsilon ,$$

where
H: household income
X: a matrix of household characteristics (including a constant element)
α: a matrix of the coefficients
ε: an error term

Description of the covariates as in Table A2.1, and all the data was from FRS 2011/12. As the test took forward stepwise regression, only some of the explanatory variables were finally used. Through the test process, variables associated with a multi-colinearity problem were excluded.

Table A2.1 Variable description

variable group	variable	measurement unit
Household composition	single	dummy
	couple	dummy
	lone parent	dummy
	rest (reference)	
the number of dependent children		count
accommodation type	house	dummy
	neither house nor flat	dummy
	flat (reference)	
accommodation size		no. of rooms (top-coded as the maximum being ten)
Tenure	social renting	dummy
	private renting	dummy
	owing with mortgages	dummy
	rest (reference)	
HPR employment status	higher occupation	dummy
	middle occupation	dummy
	lower occupation	dummy
	economically inactive	dummy
	rest (reference)	
HPR age	16 to 24	dummy
	25 to 34	dummy
	35 to 49	dummy
	50 to 64 (reference)	
HRP gender	male	dummy

	female (reference)		
HRP ethnicity	white British	dummy	
	rest (reference)		

Table A2.2 presents the results at the stage of the stepwise regression and extent to which each of employed variables contributed to the results (as measured by R^2 change).

Table A2.2 Test results by regions

		North East				North West			
		coef.	SE		R^2 change	coef.	SE		R^2 change
HH composition	**single**	-1.436	(0.131)	***	0.235	-1.238	(0.099)	***	0.164
	Couple					-0.279	(0.082)	***	0.004
	lone parent					-0.441	(0.113)	***	0.002
no. of children									
accom. type	**House**								
	neither house/flat								
accom. Size		0.095	(0.042)	**	0.013	0.090	(0.020)	***	0.015
Tenure	**social renting**	-0.428	(0.149)	***	0.008	-0.542	(0.082)	***	0.009
	private renting	-0.636	(0.162)	***	0.009	-0.378	(0.080)	***	0.021
	mortgaged owing								
emp. Status	**middle**	1.008	(0.170)	***	0.030	0.849	(0.088)	***	0.041
	low	0.817	(0.168)	***	0.028	0.685	(0.088)	***	0.024
	Inactive	-0.757	(0.243)	***	0.052	-0.674	(0.133)	***	0.053
age	**16 to 24**					-0.331	(0.141)	**	0.003
	25 to 34								
	35 to 49								
gender	**Male**								
ethnicity	**white British**								
(constant)		5.048	(0.295)			5.478	(0.166)	***	

		Yorks and the Humber				West Midlands			
		coef.	SE		R^2 change	coef.	SE		R^2 change
HH composition	**single**	-1.051	(0.085)	***	0.155	-1.061	(0.095)	***	0.215
	Couple								
	lone parent					-0.433	(0.131)	***	0.004
no. of children									
accom. type	**House**					0.310	(0.119)	***	0.003
	neither house/flat								
accom. size		0.083	(0.024)	***	0.027	0.105	(0.027)	***	0.007
tenure	**social renting**	-0.527	(0.099)	***	0.007	-0.669	(0.105)	***	0.028
	private renting								
	mortgaged owing								
emp. status	**middle**	0.883	(0.118)	***	0.041	0.918	(0.119)	***	0.028
	low	0.871	(0.116)	***	0.008	0.951	(0.123)	***	0.012
	Inactive	-0.807	(0.165)	***	0.077	-0.427	(0.162)	***	0.046
age	**16 to 24**	-0.520	(0.164)	***	0.005				
	25 to 34								
	35 to 49								
gender	**Male**					-0.219	(0.075)	***	0.004
ethnicity	**white British**								
(constant)		5.142	(0.174)	***		4.830	(0.199)	***	

		East of England				London			
		coef.	SE		R^2 change	coef.	SE		R^2 change
HH composition	**single**	-0.968	(0.085)	***	0.153	-1.283	(0.118)	***	0.201

	Couple					-0.431	(0.098)	***	0.002
	lone parent					-0.532	(0.139)	***	0.002
no. of children						0.111	(0.035)	***	0.002
accom. type	**House**	0.271	(0.108)	**	0.002	-0.186	(0.085)	**	0.003
	neither house/flat	0.954	(0.426)	**	0.002				
accom. size		0.088	(0.023)	***	0.010	0.075	(0.026)	***	0.042
tenure	**social renting**	-0.504	(0.104)	***	0.004	-0.750	(0.101)	***	0.003
	private renting	-0.226	(0.090)	**	0.021	-0.261	(0.086)	***	0.012
	mortgaged owing								
emp. status	**middle**	0.885	(0.114)	***	0.030	1.190	(0.106)	***	0.053
	low	0.797	(0.117)	***	0.013	1.100	(0.111)	***	0.027
	Inactive	-1.125	(0.177)	***	0.076				
age	**16 to 24**								
	25 to 34								
	35 to 49								
gender	**Male**								
ethnicity	**white British**					0.217	(0.067)	***	0.003
(constant)		4.973	(0.182)	***		5.331	(0.191)	***	

		South East				**South West**			
		coef.	SE		R^2 change	coef.	SE		R^2 change
HH composition	**single**	-0.971	(0.091)	***	0.186	-1.285	(0.142)	***	0.190
	Couple	-0.295	(0.075)	***	0.005	-0.364	(0.124)	***	0.005
	lone parent	-0.679	(0.108)	***	0.007	-0.883	(0.179)	***	0.006
no. of children						0.082	(0.038)	**	0.003
accom. type	**House**	0.206	(0.071)	***	0.003	0.473	(0.109)	***	0.004
	neither house/flat					0.975	(0.356)	***	0.004
accom. size		0.081	(0.016)	***	0.023	0.058	(0.024)	**	0.029
tenure	**social renting**	-0.263	(0.078)	***	0.010	-0.491	(0.114)	***	0.008
	private renting					-0.242	(0.092)	***	0.013
	mortgaged owing	0.115	(0.052)	**	0.002				
emp. status	**middle**	0.762	(0.084)	***	0.033	0.891	(0.109)	***	0.044
	low	0.639	(0.095)	***	0.023	0.782	(0.110)	***	0.030
	Inactive	-0.895	(0.148)	***	0.054				
age	**16 to 24**								
	25 to 34								
	35 to 49								
gender	**Male**					-0.204	(0.072)	***	0.003
ethnicity	**white British**								
(constant)		5.356	(0.137)	***		5.343	(0.224)	***	

	N	R^2	Adj. R^2	*F*-value	
North East	571	0.453	0.446	58.392	***
North West	1,542	0.464	0.460	120.603	***
Yorkshire and the Humber	1,125	0.442	0.438	110.800	***
West Midlands	1,085	0.467	0.462	94.158	***
East of England	1,197	0.434	0.429	91.075	***
London	1,457	0.447	0.442	97.207	***
South East	1,605	0.438	0.434	113.083	***
South West	999	0.434	0.427	58.243	***

Note: *** and ** indicate 1%- and 5%-significance respectively.

From the test results, the top four variable groups influencing household income measured by the sum of R^2 change in each region are summarised as in Table A2.3. All the examined

regions set out, household composition, reference person's employment status, tenure and accommodation size were the top four influencer groups. Thus, weights were created as a ratio of household population with characteristics associated with the four categories (for example, the number of households whose reference person was engaged in a middle occupation) in a LA drawn from the Census to the equivalent population in the corresponding region drawn from FRS.

Table A2.3 Household characteristics (variable group) most influencing income by region

NE	R^2 change total	**NW**	R^2 change total
HH composition	0.235	HRP employment status	0.247
HRP employment status	0.188	HH composition	0.170
Tenure	0.017	Tenure	0.030
accommodation size	0.013	accommodation size	0.015
Y&H	R^2 change total	**WM**	R^2 change total
HRP employment status	0.248	HH composition	0.219
HH composition	0.155	HRP employment status	0.205
accommodation size	0.027	Tenure	0.028
Tenure	0.007	accommodation size	0.007
East	R^2 change total	**London**	R^2 change total
HRP employment status	0.241	HH composition	0.206
HH composition	0.153	HRP employment status	0.177
Tenure	0.025	accommodation size	0.042
accommodation size	0.010	Tenure	0.014
SE	R^2 change total	**SW**	R^2 change total
HRP employment status	0.202	HH composition	0.202
HH composition	0.198	HRP employment status	0.169
accommodation size	0.023	accommodation size	0.029
Tenure	0.011	Tenure	0.021

Note: The most influential characteristics presented first. The figures were the characteristics contribution to fit the model (as measured increment of R^2).

Table A2.4 Inflation rate for the income data observation period (2011/12) to the rent data observation period (2013): % p.a.

	minimum requirements; 2012-2013 (%)*	change in CPI**	RPI**
single	4.2		
couple	4.2		
couple + one child	3.4		
couple + two children	3.7	4.2	4.9
couple + three children	3.8		
Lone parent + one child	3.3		
Lone parents + two children	3.6		

Note: * Hirsch (2013) A Minimum Income Standard for the UK in 2013; JRF. ** Drawn from the average index in 2011/12 and the equivalents from January to August 2013.