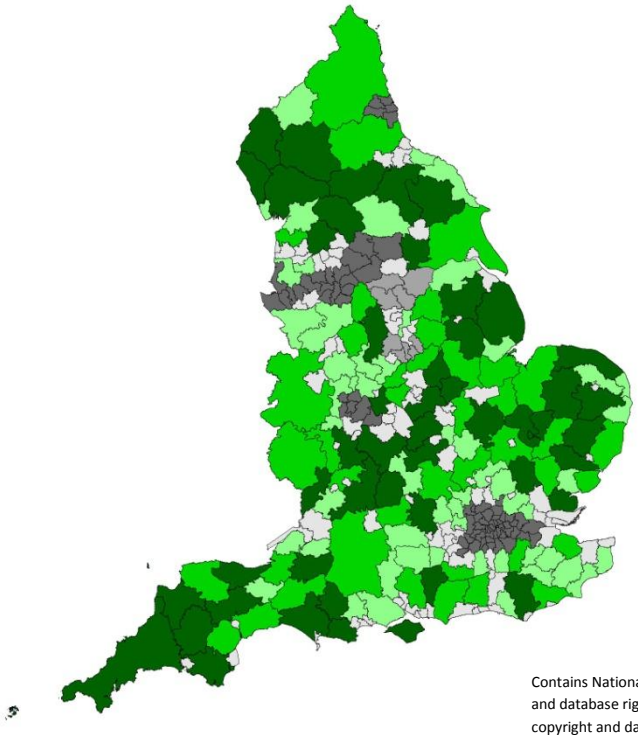
Department for Environment Food & Rural Affairs

Office for National Statistics

2011 Rural-Urban Classification of Local Authority Districts and Similar Geographic Units in England: Methodology



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Urban and Rural Classification of English Local Authority Districts and Similar Geographical Units: Methodology

1. Introduction

1.1 In January 2014, the Department for the Environment, Food and Rural Affairs (Defra) commissioned the University of Sheffield to update its Rural Urban Classification of Local Authority Districts (RUCLAD). The focus of concern is with lower tier Local Authority Districts, Unitary Authorities, Metropolitan Districts and London Boroughs (all referred to by the acronym LAD below), but the methods discussed also apply to other geographic units at similar scales. The original classification developed for the Department by the Rural Evidence Research Centre in 2005 (RERC,2005[1]) identified six categories of LADs (referred to as 'Major Urban' , 'Large Urban', 'Other Urban' , 'Significant Rural' , 'Rural 50' and 'Rural 80').

1.2 The original classification[2] (referred to below as RUCLAD2001) built on what is now referred to as the Rural Urban Classification for Small Area Geographies devised for use with the 2001 Census, and which distinguished at Census Output Area (OA) level an urban and a rural domain. The urban domain is defined as comprising physical settlements with a usually resident population of 10,000 people or more, all other areas being considered rural. This allowed for the identification of the 'rural' population of any LAD. The particular contribution of the work by RERC (2005) was that it acknowledged an important facet of urban-rural interdependence and identified a further rural-related component of the urban population. Assignment of a LAD to one of the six categories depended on the proportion of its total population that was accounted for by the sum of its 'rural' and rural-related components.

1.3 The rural-related population component identified by RERC (2005) in any LAD represented its Larger Market Towns, a subset of settlements in the 10,000-30,000 population band which might play a particular part in meeting the service requirements of rural residents. Building upon this previous work, the revised classification (RUCLAD2011) also assigns each LAD to a category on the basis of the combined share of the rural and rural-related components of its population. Under RUCLAD2011, the rural-related population identified is represented by the residents of a set of Hub Towns as described in Section 4 of this document.

1.4 Whilst Hub Towns are primarily required for the purposes of classification, they have already been found application in defining areas that are eligible for rural development funding through Local Enterprise Partnerships Local Action Groups as part of the Rural Development Programme for England 2014-2020.

[1] http://archive.defra.gov.uk/evidence/statistics/rural/documents/rural-defn/LAClassifications_technicalguide.pdf

[2] https://www.gov.uk/government/statistics/2001-rural-urban-definition-la-classification-and-other-geographies

2. Overview

2.1 Both the new classification of LADs and the identification of Hub Towns embedded within it rest upon a prior distinction between rural and urban domains made at OA level as described in Bibby and Brindley (2013). An OA is the smallest unit for which data from the decennial Census are released. In operational terms, the definition of the urban domain used in England and Wales depends upon the specification by Ordnance Survey of a set of built-up areas (see ONS, 2013). It also depends upon prior identification by the Office of National Statistics of a mosaic of OAs covering England (Cockings *et al*, 2011; ONS, 2011). Largely on the basis of their relationship to the built-up areas, the characteristic settlement type of each OA is identified, hence assigning it either to the urban or the rural domain (Bibby and Brindley, 2013). That work also classifies small statistical and administrative units larger than OAs on the basis of their specific mix of urban and rural OAs. These include Lower Layer Super Output Areas (LSOAs), Middle Layer Super Output Areas (MSOAs) and Wards.

2.2 The present work is concerned exclusively with larger areas, classifying them primarily on the basis of the balance of rural and urban OAs, but deploys a method somewhat different to that applied to smaller areas. As RERC (2005) noted, as the geographic scale of statistical reporting units increases, the proportion of such units assigned to rural classes tends to fall. Were LADs to be classified in the same way as smaller statistical units the significance of rural areas might be occluded. Moreover, the principle of grouping rural areas with their urban neighbours - which informed the design local authority boundaries following the Redcliffe-Maud review of local government - tends to increase the probability that rural areas are subsumed within larger territorial units whose urban components are predominant.

2.3 In the spirit of previous classifications of LADs sponsored by Defra (RERC, 2005; Defra, 2009) the present work therefore attempts to provide a classification of LADs which takes account of the importance of nearby towns in the urban domain to the rural population. It has regard both to the rural population as identified in work at finer scales and the rural-related population as discussed below. Identification of the rural-related population, a notion which recognises the importance of urban-rural interdependence, forms a key part of the present work. Having considered other approaches (see Section 3), the rural-related population is proxied by the population of the 'Hub Towns' in a particular area.

2.4 Hub Towns are here defined as physical settlements with a population of between 10,000 and 30,000 people whose location lend them advantages for the provision of local services and make them accessible to a substantial rural population. These aspects of location are assessed by reference to an estimate of the 'expected rural share of service custom' discussed in Section 4 and local concentration of households and business. Concentration is estimated by two measures referred to as 'the residential concentration score' and the 'non residential concentration score' as discussed in Section 5.

2.5 Having identified both the rural population resident within a LAD and its Hub Towns, the total population of the Hub Towns is treated as a rural-related component of the urban population. The sum of the rural population and rural-related population is treated as its augmented rural population. The basis of the LAD classification is the proportion of its total population that this augmented rural population represents. On the basis of these proportions, each LAD is assigned to a particular band.

3. Urban and Rural Interaction

3.1 There has long been a concern of interdependence between rural and nearby urban areas , demonstrated clearly by the work of the last comprehensive review of the structure of local government in England outside of London (Redcliffe-Maud, 1969). While increasing personal mobility now facilitates trips to service centres across broader geographic areas, the possibility of accessing a wide range of services electronically may in some circumstances render such trips unnecessary. The functional role of particular towns is changing and is susceptible to continuing change with the growing importance of E-commerce allowing for the possibility of quite marked shifts of role over relatively short periods.

3.2 For this reason, while the present work continues to consider local service centres in attempting to identify a rural-related population, it uses a slightly different approach than that of RERC (2005). While that earlier work took some care to identify specific services which might be found in settlements within the urban domain, the present work focuses on such specific services less sharply. It attempts to articulate the idea that around any place is an accessible population which may include varying proportions of people living in the urban and rural domains. It is important to appreciate the scale of the uncertainty arising from changing patterns of service use. These arise, for example, from the manner in which application of information technology is reducing the need for physical co-presence when purchasing some market services, and from the different potential responses of retailers to 'showrooming', (the practice of examining goods in a traditional retail store, but then purchasing online). Alongside this, related uncertainty arises more generally from continuing re-design of education and health care provision and from the continuous search for economies within both the public and private sectors.

3.3 The present work assumes that there will be a continuing requirement for personal visits to access local services, but it makes few presumptions concerning what those services might be. It assumes on the other hand that the distances that people tend typically to travel for purposes such as shopping might provide an indication of the distances they might be prepared to travel to access such services as might be important to them. Moreover, as the profile of local services changes, it seems likely that the supply of space from which those services can be offered will be conditioned by the current stock of service outlets.

3.4 Remaining noncommittal at this point about both the services in question and the most appropriate distances to consider, the idea of being accessible to a population might be made

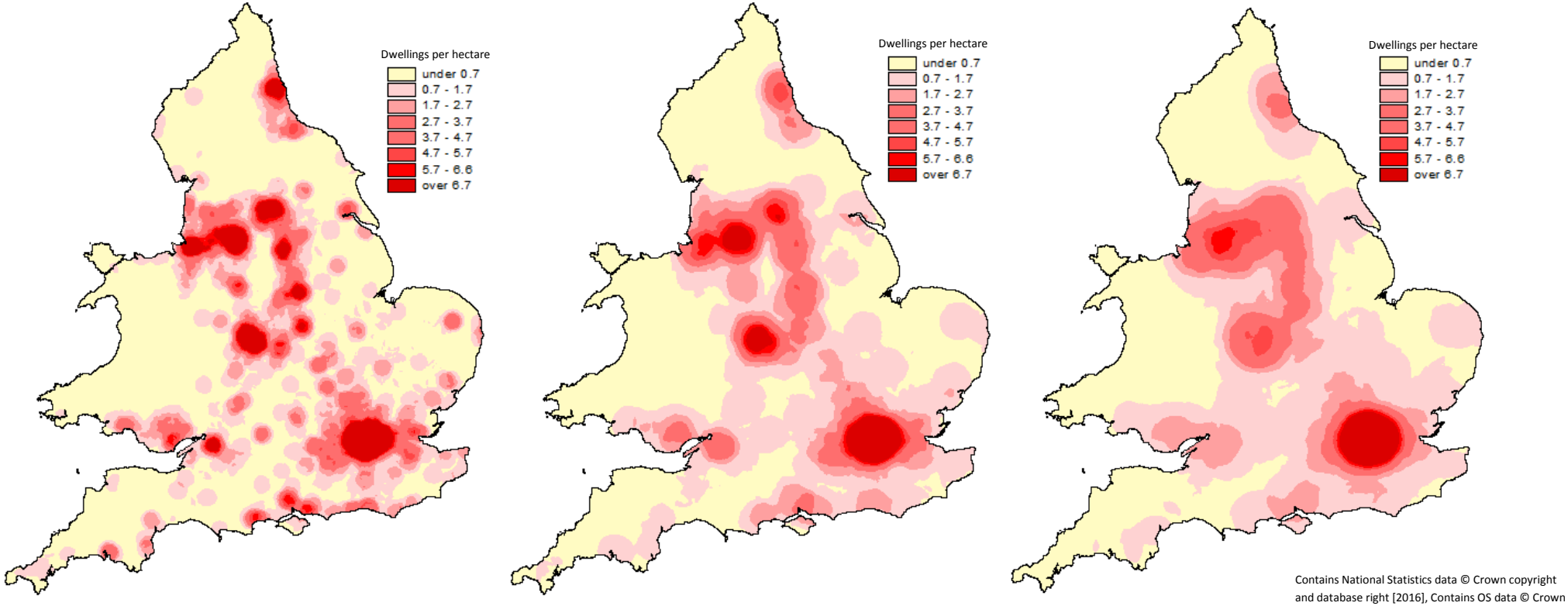
operational by reference to the number of dwellings within a certain distance of a given point or the average household density over a circle of a given radius. Assessment of the sparsity of population which forms part of the Urban-Rural classification of OAs (Bibby and Brindley, 2013) provides immediately available tools for gauging the magnitude of an accessible number of dwellings. This rests on calculating dwelling densities averaged at 10km, 20km and 30km scales as shown in Figure 3.1. These might be thought of as the 'household mass' or 'economic mass' of a place- a crude indication of the potential scale of the workforce that might be assembled at a particular point or aggregate accessible purchasing power of consumers.

3.5 The three scales provide related but differing images of the generalised distribution of population and hence of the numbers of people to whom any given place might be accessible. The manner in which increasing the geographic scale softens the urban-rural distinction is immediately clear. At the 10km scale there are notable rural gaps between the core Midland and Northern cities, but at the 30km scale those rural areas tend to be absorbed in a single arc stretching from Liverpool through the Mersey Belt, Leeds, Sheffield, Nottingham and Derby to Birmingham. In a similar manner the evident intercalation of rural and urban areas evident between the Severn and the Wash at the 10km scale gives way to a far more homogenous tract at the 30km scale, and the urban and rural differentiation of that part of southern England stretching from Hampshire to Kent, so clear at the 10km scale, also appears muted at the 30km scale.

3.6 Extending this approach just slightly, one might consider the degree to which any given place is accessible *to residents of the rural domain*. This might be achieved by first identifying only dwellings in the rural domain (on the basis of the Urban-Rural Classification at the OA level) and calculating geographic moving average densities for those rural dwellings alone. If the moving averages obtained for the rural domain alone are then expressed as a proportion of those for *all* dwellings (as represented in Figure 3.1), it becomes possible to identify at any of the three scales the share of that accessible household mass attributable to rural residents. This might be thought of the rural share of the customer base for services that people might typically travel that particular distance to access. These results are illustrated in Figure 3.2.

3.7 Although this highlights the importance of selecting an appropriate scale for such calculations, it also illustrates the likely dependence of particular urban areas on the custom of households resident in the rural domain. At the 10km scale, the size of the rural share of accessible household mass in Cumbria and the North Pennines is very clear, but the very low rural share in and around the conurbations is also evident. Thus, for example, even at the 10km scale it is clear that the rural share in areas such as the Wirral, the South Lancashire Plain and north-east Cheshire is very low and typically reaching around five percent (see Figure 3.3). In other words, people using the services offered in towns in these areas live overwhelmingly in the urban domain.

Figure 3.1: England and Wales: dwelling density moving average at 10km, 20km and 30km scales

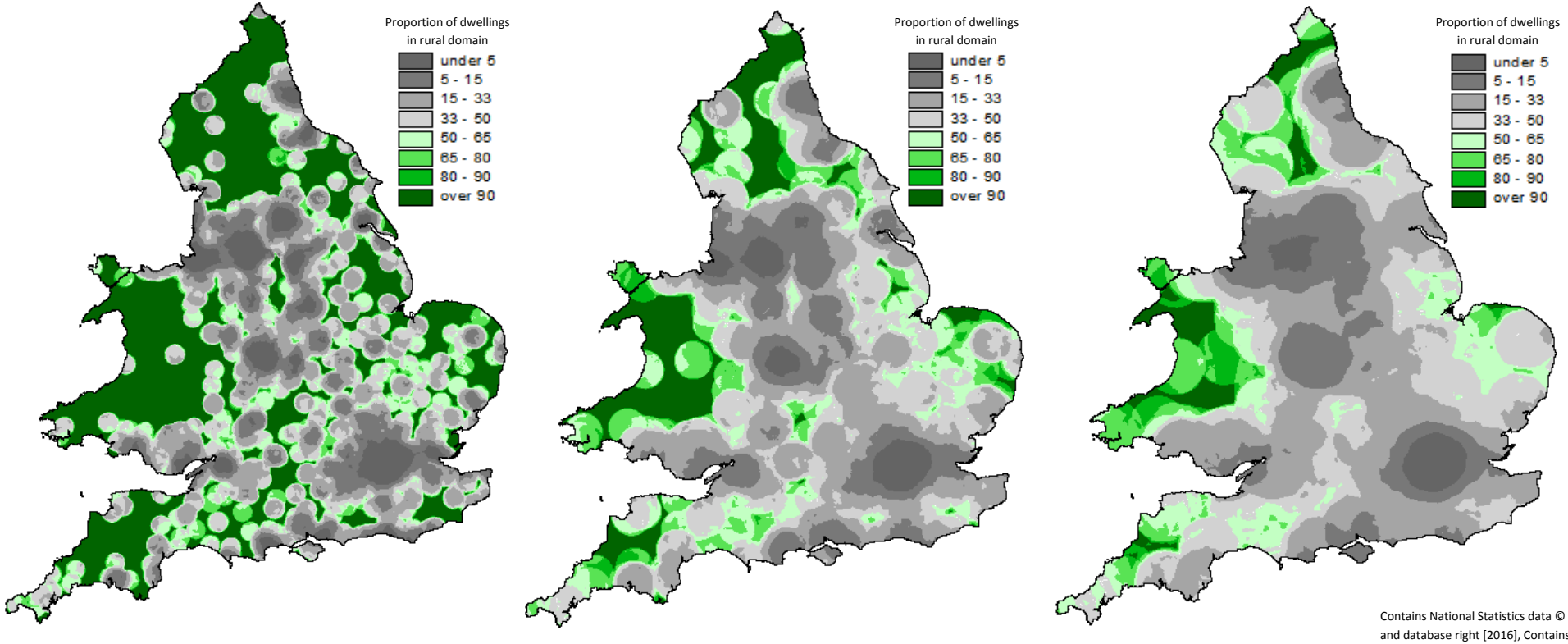


a) 10km scale

b) 20km scale

c) 30km scale

Figure 3.2: England and Wales: percentage of dwellings within the rural domain at 10km, 20km and 30km scales

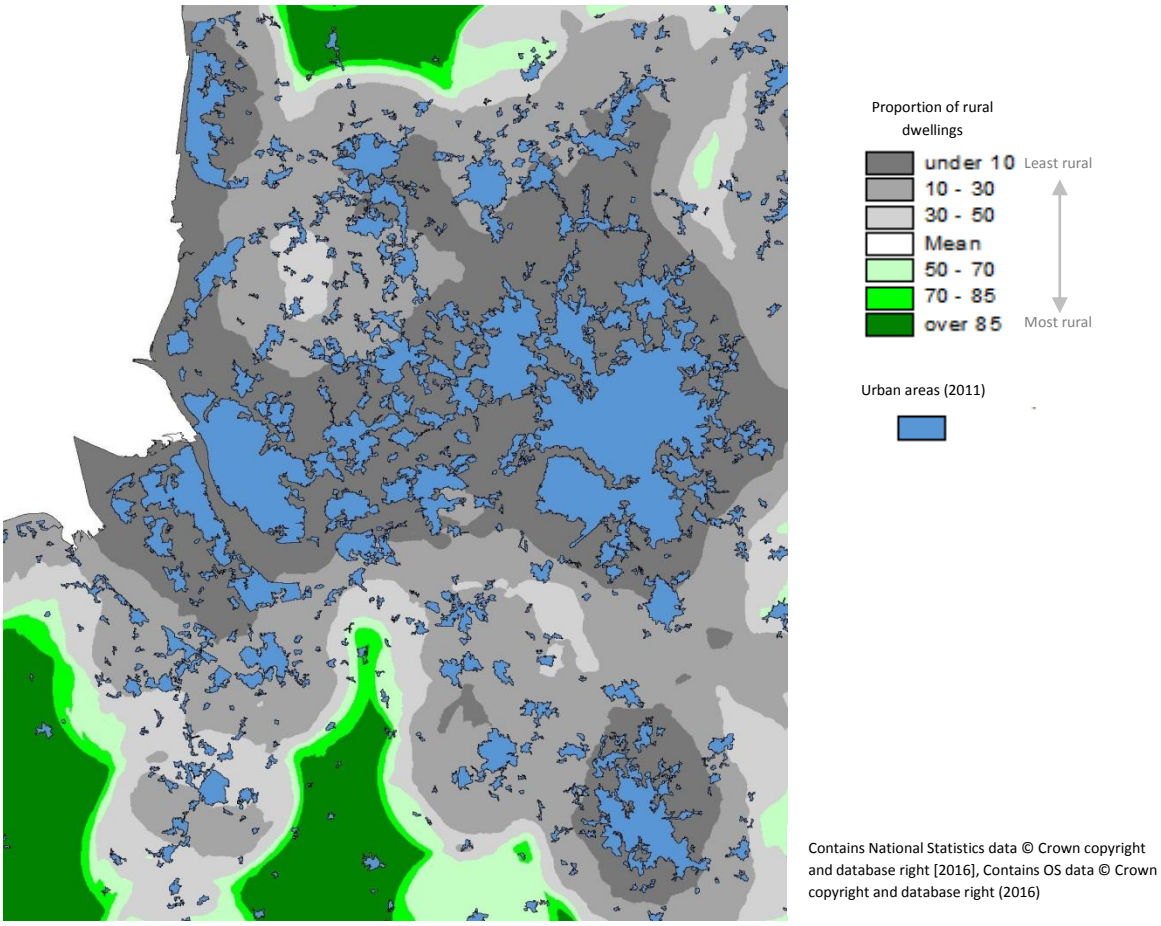


a) 10km scale

b) 20km scale

c) 30km scale

Figure 3.3: Rural share of accessible population, for the area between Blackpool and Stoke-on-Trent



3.8 Crucially, it is also important to appreciate the manner in which the chosen scale affects the estimated rural share. The rural shares calculated at these three scales (10km, 20km and 30km) are illustrated in Figure 3.2. There are some considerable variations between the rural shares of population which are estimated at the three scales. Glancing once again at the areas highlighted in paragraph 3.2, the distinctly high rural shares of the Peak District and the Cotswolds so clear at the 10km scale are effaced at the 30km scale and a similar effect is found across a substantial tract of Weald and downland in Sussex. More generally, the extent of the divergence between the measures calculated at the 10km, 20km, and 30km scales for any particular area depends upon its settlement structure. Although the rural share shifts markedly in cases such as those discussed above, there is very little difference between the three measures *within* the major conurbations.

3.9 There might, therefore, seem to be merit in identifying the scale which seemed most appropriate for estimating such a measure. Alternatively, there might be value in calculating a weighted measure where the significance of any place to particular potential service users was treated as inversely proportional to (some function of) its distance away. There is a long tradition of identifying population potential as a generalised indicator of accessibility (see for

example Stewart 1950, Rich 1980, Baradaran *et al*, 2001). This measure, P_i, is calculated by analogy with gravitational potential as:

$$P_i = \sum_j (m_j / D_{ij})$$

where: P_i is the population potential of area *i*,
m_j is the number of dwellings (mass) of area *j*, and
D_{ij} is the distance from area *i* to area *j*

Using this measure, the significance of places to relatively distant populations appears to fall very gently, however. Therefore, while it would be possible to identify the rural proportion of population potential, this would not provide a particularly satisfactory measure of the significance of distance as the gentle fall of interaction as distance increases is not consistent with the patterns revealed by retail studies (see for example Guy, 1991).

Implementing Rural-Urban Classification for LADs: Assessing the Expected Rural Share of Custom (ERSC)

3.10 To take this idea further, two measures might be considered. The first is the expected level of service custom at any place (the aggregate money value of services likely to be delivered-whether traded or not), and the second is the share of that custom which arises from the needs and wants of residents of the rural domain. It is the second measure - the expected rural share of service custom (or ERSC for short) - that is of primary concern. The two measures parallel the average household density at a particular geographic scale (which underlies the level of service custom and is mapped in Figure 3.1) and the proportion of that household mass attributable to rural households (mapped in Figure 3.2). Each of the results mapped in Figure 3.2 a, b and c shows the rural share of an accessible household mass defined at one specific scale. This would be particularly helpful for an understanding of urban rural interaction if service trips typically took place at that specific scale. The ERSC measure is intended to take account of interactions at all scales, but it weighs each possible scale in accordance with the propensity of households to travel that particular distance. The expected service custom might be thought of as representing the dwelling density measures analogous to those estimated at the 10km, 20km and 30km scales but calculated at all possible scales and then combined using weights reflecting the relative frequency with which people travel particular distances to access local services.

3.11 Calculation of the expected level of service custom at any locality assumes that the use made of services offered in a particular place will decline as the distance of potential users from that locality increases. Specifically it assumes that this pattern of distance decay will take the

form of a negative exponential function[3]. This type of formulation is often used in spatial interaction and retail modelling to gauge the extent to which interaction or service use is likely to fall as distance increases. For present purposes, it is assumed that shopping trips are representative of all local service trips and the average length of a shopping trip in Great Britain is estimated from the 2012 National Travel Survey as 7.14 km. Fitting a negative exponential function on this basis allows estimation of the amount of custom generated in a particular place that might be expected to derive from households living in any other place.

3.12 On this basis, the volume of custom, c_i, generated at any place *i* will depend on the willingness of households at any place j to make use of its service which might be approximated by the number of trips, t_{ij}, that might be made from any place j to place i and the average value of services sought on any trip by households in *j*:

$$c_i = \sum_j t_{ij}.s_j$$

3.13 On the assumptions of para 3.11, the number of trips t_{ij} from *j* to *i* might be estimated as

$$t_{ij} = K\, e^{-ßDij}$$

where: K is a constant,
e is the exponential constant, and
ß is a parameter to be estimated

Simplifying assumptions are made; the average sales per trip of all households are assumed equal regardless of their place of residence. The parameter ß is estimated as the reciprocal of the average distance actually travelled when making shopping trips.

3.14 Given that the expected level of service custom for any place is calculated by aggregating the custom anticipated from every residential origin, it may be decomposed into a rural component and an urban component by reference to the rural-urban classification of the OAs within which the custom originates If concern is then restricted to service trips made by households living in the rural domain, a second estimate of the level of service custom, say $c_{ir,}$ can be made exactly paralleling c_i in para 3.12 but without considering the service use of urban residents. Expressing service custom attributable to rural households c_{ir} as a percentage

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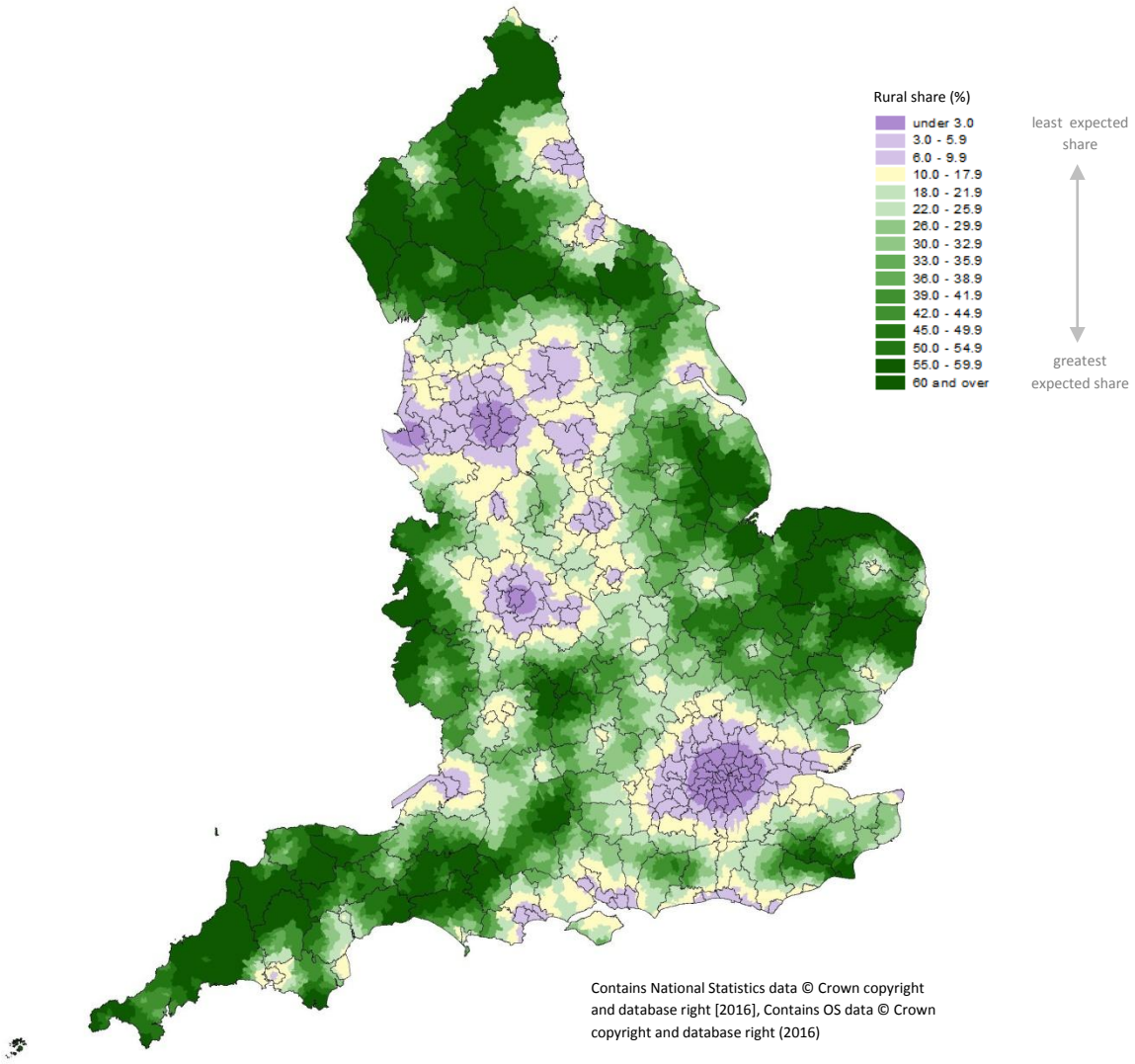
[3] Where a phenomenon, such as a probability p(x), can be described by an exponential function, it will vary in proportion to e^x where e is the exponential constant or Euler's number (approximately 2.718). In the case of an negative exponential function, the exponent x is negative. Thus if the probability p(d) of travelling a particular distance d is consistent with a negative exponential function, the tendency for the probability of travelling a specific distance will fall in accordance with the value of e^{-d}

of the expected level of service custom in that place, c_i, yields the ERSC, the expected rural share of custom, which is mapped in Figure 3.4

3.15 Figure 3.4 shows the manner in which the expected rural share of service custom varies across England. It highlights the degree to which centres such as Norwich depend on rural custom but underscore the previous conclusions with respect to the very low share of rural custom in Lancashire and Cheshire for example and the limited contribution in a ring of LADs surrounding Greater London.

Figure 3.4: Expected rural share of service custom (ERSC)



3.16 The expected rural share of custom in fact provides a measure that could be aggregated over each local authority district and used to generate an *adjusted* rural population share for each LAD taking account of rural-urban interdependencies of this type, just as the previous work on Rural Urban Classification produced an *augmented* population share for each LAD by combining rural and rural-related population components. It thus potentially provides an alternative approach to one which proceeds by identifying a specific set of service centres of

particular significance to rural residents, which formed an important feature of previous work (RERC, 2005; Defra, 2009).

3.17 Far from setting aside previous approaches, the current work identifies a set of Hub Towns for policy purposes as explained below. It complements the type of approach pursued in previous work by considering the expected rural share of custom, ERSC. In undertaking the present work the augmented population share is compared with ERSC. Crucially, towns were not considered as candidates for inclusion as Hub Towns if their anticipated rural share of custom falls below a threshold.

4. Implementing Rural-Urban Classification for LADs: Identifying Hub Towns through Assessment of Concentrations of Population and Businesses

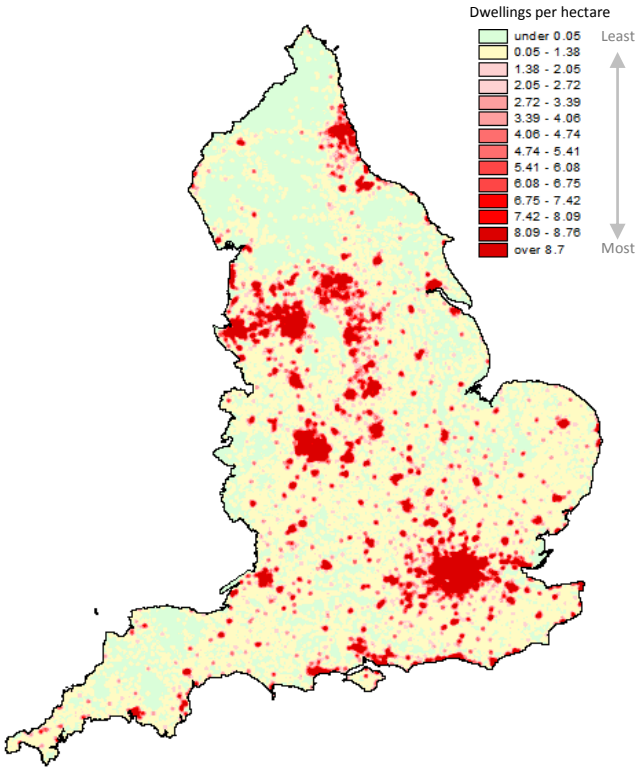
4.1 Consideration of the expected rural share of custom forms one of three matters which have been considered in identifying Hub Towns, assessed by the ***'rural share test'***. To be admitted as a Hub Town, a settlement's expected rural share of service custom must be greater than or equal to 5% of total expected custom. The second is the potential for the provision of services implied by the configuration of households around any point (which motivates the ***'residential concentration test'***). The third is the extent to which that potential appears to be realized when the actual configuration of non-residential establishments is considered which gives rise to the ***'non-residential concentration test'***.

The residential concentration test

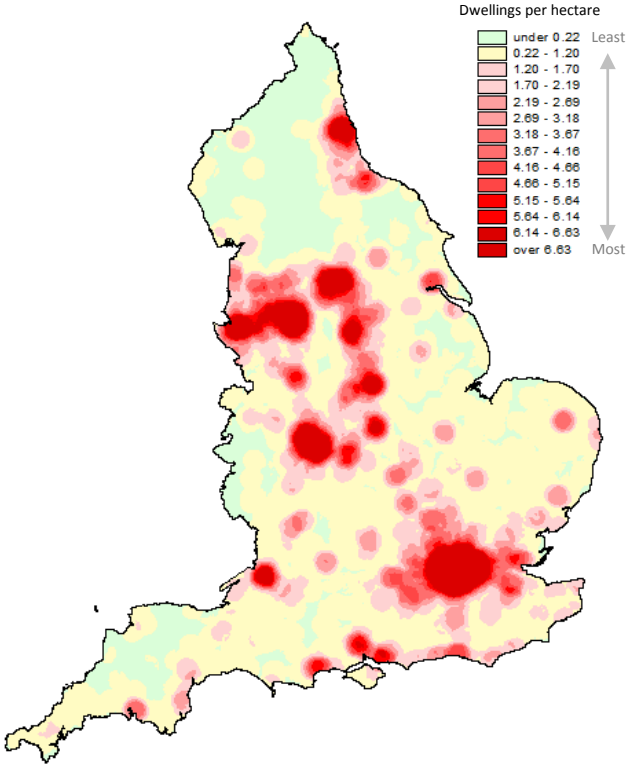
4.2 The starting point for the residential concentration test is that there are some services for which the majority of users would wish to travel relatively short distances- on a scale similar perhaps to shopping trips. For such services the level of demand at any point might be expected to have a relation to the number of households within 10km. From the point of view of an organisation attempting to supply such services, unless household densities were uniformly high there might be merit in locating closer to tighter concentrations of households.

4.3 To assess such concentration, two estimates of household density are made in each cell in a grid of 100m x100m cells covering England. Each cell covers an area of one hectare. The estimates are made at two distinct spatial scales. First, the density of households within a 2km radius of each cell is estimated, say $D2_k$ for the typical cell *k*. Second, the density of households within 10km of each point is estimated, say $D10_k$. The ratio h_k of the 2km density to the 10km density for any cell provides an immediate indicator of the relative potential of providing local services from cell *k*, and might be thought of as providing a residential concentration score. This ratio is readily assessed and builds on other elements of work used in producing the Rural-Urban Classification for small areas.

Figure 4.1: The Residential Concentration Ratio



a) D2: Density of households within a 2km radius of each cell

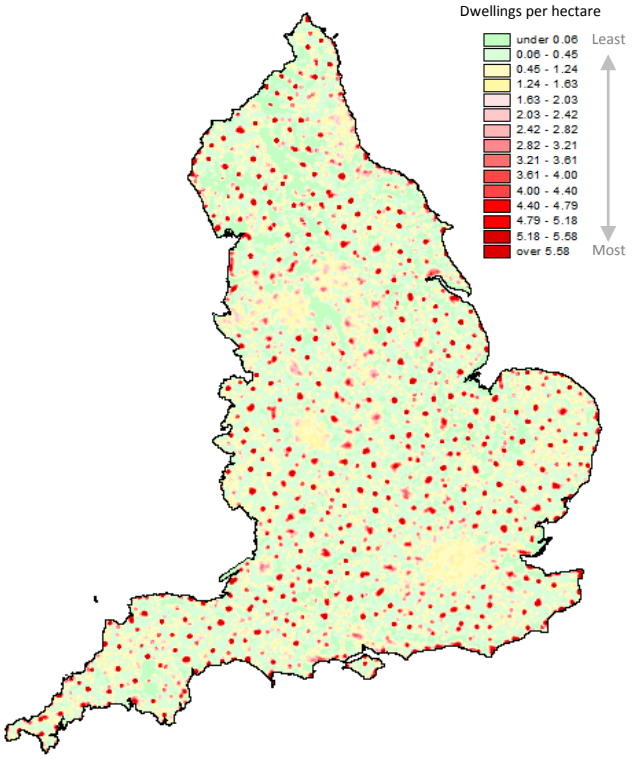


b) D10: Density of households within a 10km radius of each cell

Figure 4.1a shows the density of households across a circle of 2km radius ($D2_k$) for a typical 100m x 100m cell (k).

Figure 4.1b shows the density of households across a circle of 10km radius (D10k) for a typical 100m x 100m cell, k, and

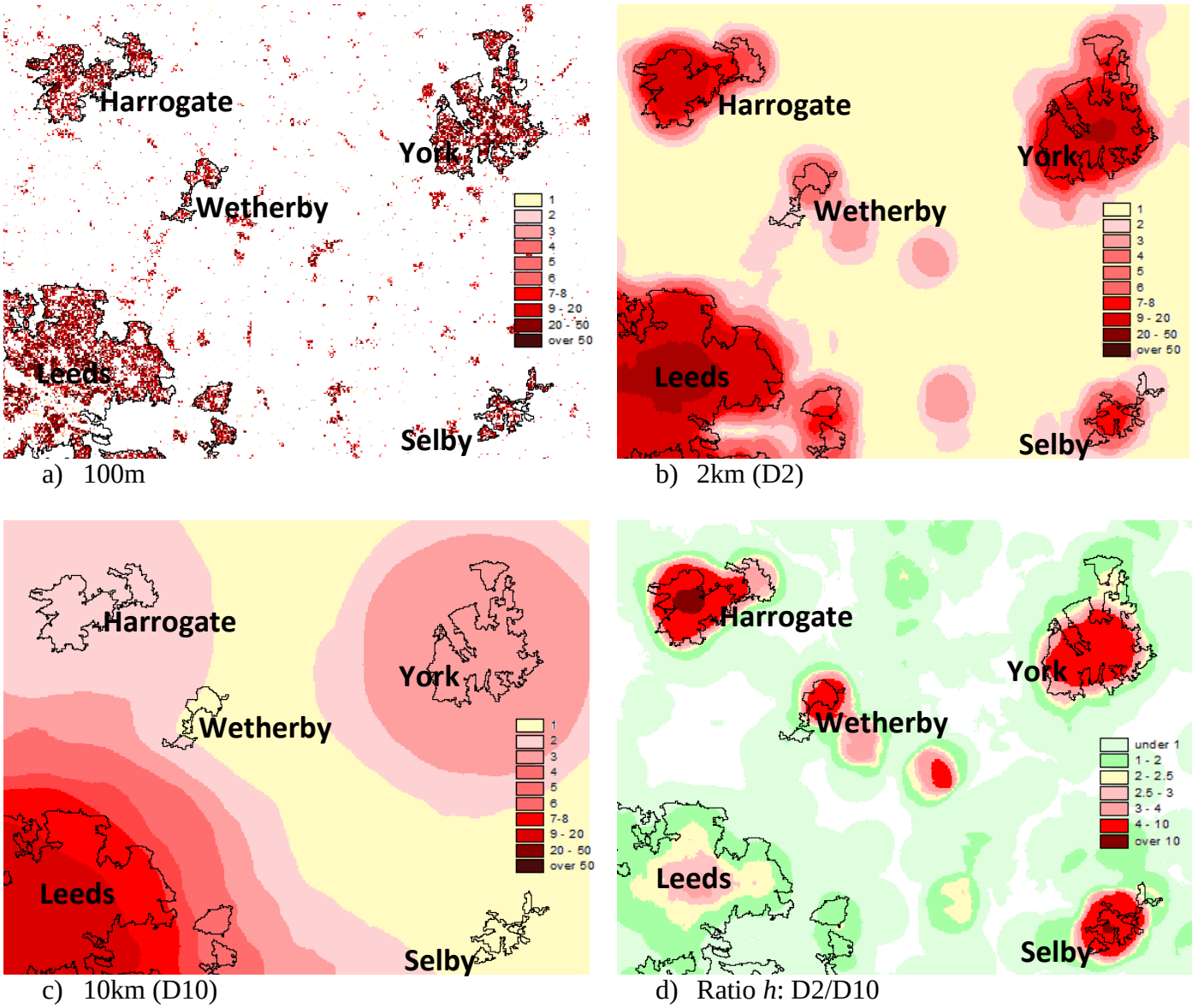
Figure 4.1c is generated by calculating the ratio Hk ($D2_k$ divided by $D10_k$) for each cell, which reflects both concentration and competition at a relevant scale



c) Result h = D2/D10

4.4 Figure 4.1 assists in visualizing the procedure. Figure 4.1 (a) represents households by reference to the 2km running mean [4]of dwelling density hectare by hectare across England. Figure 4.1(b) shows the 10km running mean in the same way. Figure 4.1 (c) shows the ratio resulting from division of values shown in Figure 4.1 (a) by those in Figure 4.1 (b).

Figure 4.2: The Residential Concentration Ratio: Leeds-York Corridor



a) 100m b) 2km (D2)

c) 10km (D10) d) Ratio *h*: D2/D10

4.5 By focussing on a much smaller area than Figure 4.1, Figure 4.2 seeks to further understanding of how the residential concentration ratio works. Figure 4.2(a) estimates households by representing on a hectare grid the number of residential addresses to which

[4] The geographic running mean (or geographic moving average) of a measure- say m(k) for a member, k, of a grid of cells is the average value of all cells within a specific distance of cell k. The 10km running mean of population density for cell k is thus the average population density of all cells within 10kms of that cell

Royal Mail delivers letters. On the basis of this grid the two kilometre running mean dwelling density may be estimated as illustrated in Figure 4.2(b). The ten kilometre running mean dwelling density illustrated in Figure 4.2(c) can be estimated in a similar manner. The residential concentration ratio obtained is illustrated in Figure 4.2(d). It should be noticed that because of the scales chosen, *local* concentrations are identified. Scores for suburban Leeds are low, and only modest for central Leeds are modest, but York, Harrogate, Wetherby and Selby stand out, and to a lesser extent the small market town of Tadcaster, and Boston Spa which abuts Wetherby.

4.6 Because of the chosen scales, the residential concentration ratio easily identifies 'classic' freestanding market towns in tracts of rural country, such as Berwick and Hexham, Kendal and Penrith, Malton and Driffield, Skipton and Clitheroe, Buxton and Matlock, Market Harborough and Melton Mowbray, Sleaford and Louth, Retford and Daventry, Stratford and Evesham, Bridgnorth and Oswestry, Ross and Leominster, Bodmin and Ilfracombe, March and Thetford, Witney and Petersfield and so on. In such places the ratio of the 2km dwelling density to the 10km dwelling density is well in excess of 5.0.

4.7 The values of this ratio in conurbations and suburbs are markedly different. Where relatively high household densities are sustained over broad areas, ratios are much lower – typically little different from 1.0. Intermediate values are found where potentially competing towns lie close to each other, or where there is a tendency for one town such as Nantwich to be overshadowed by its larger neighbour Crewe, or Droitwich by Worcester.

4.8 As discussed more fully below, a settlement is treated as a candidate for consideration as a Hub Town if the ratio of its 2km household density to its 10km household density is 2.5 or more. This definition embraces a large number of towns in addition to 'classic' cases such as those referred to within para 4.6. Before considering the reason for the choice of cut-off, it will be helpful to consider the slightly different perspective provided by the non-residential concentration ratio.

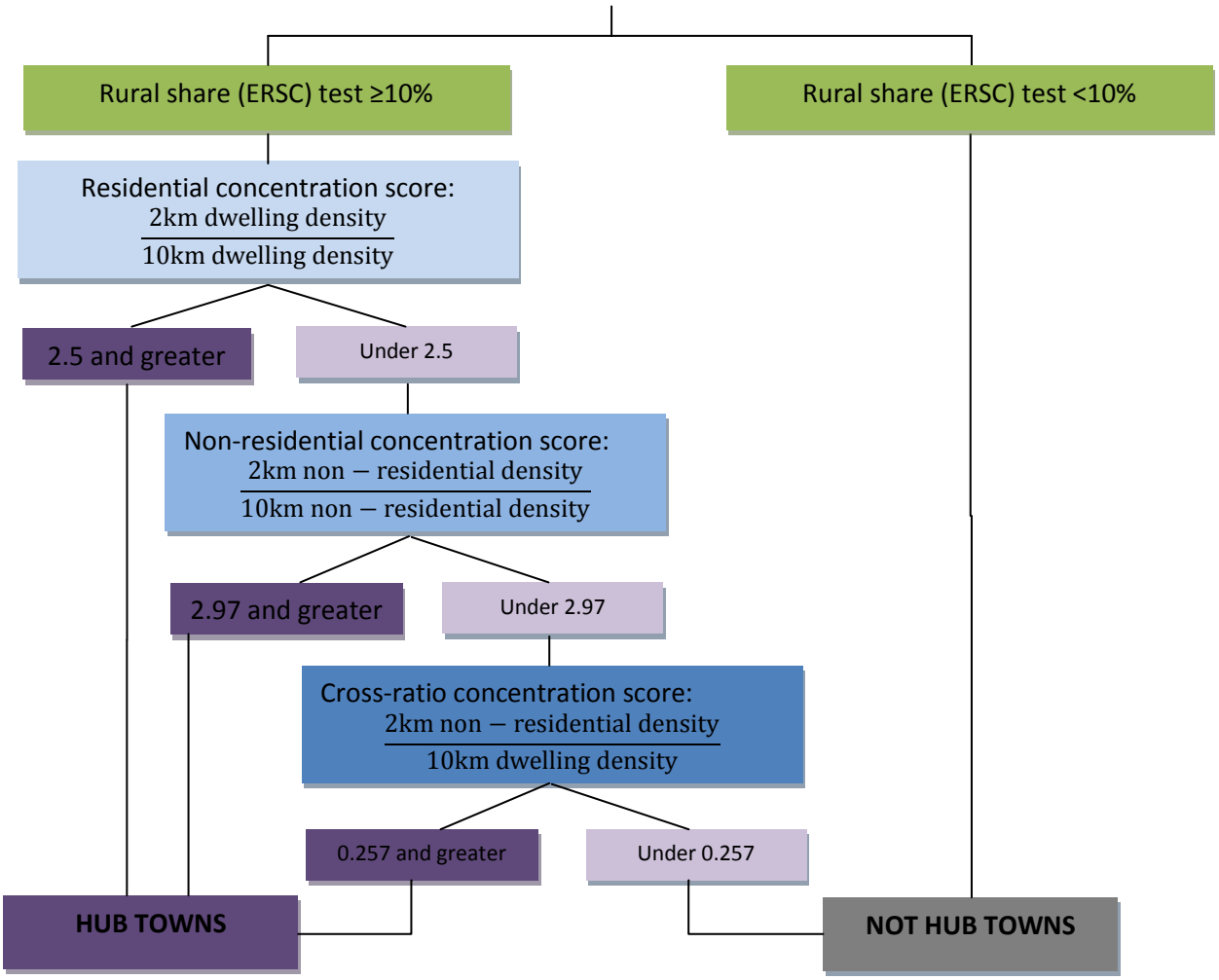
The non-residential concentration test:

4.9 While the residential ratio picks out archetypal market towns with ease, this arises simply because the advantages implied by the configuration of households have been exploited by service providers, no explicit account being taken in the measure of actual service provision. This reflects a deliberate attempt to identify points from which local services *might* be provided without having to know how the nature of those services might be changing. It might very reasonably be objected that there may be places in which local services are concentrated which cannot be identified in this way. For this reason, a second ratio is estimated, directly analogous to the first, referred to as the non-residential concentration ratio. Its numerator represents the density of non-residential establishments within 2km of a point, and its denominator represents the corresponding density across an area within 10km of that point. The establishments counted are those found within the Postcode Address File.

Statistically, there is a very close relation between the residential and non-residential concentration ratios (the former accounting for 93.2% of the variability of the latter).

4.10 In some cases however, such as Nantwich referred to above, the non-residential ratio is markedly higher than that which might be predicted on the basis of the residential concentration ratio. This may be the case where, although overshadowed by a larger neighbour, the particular character or service offer of a town makes it more attractive than the residential concentration ratio alone might suggest. For the purposes of identifying Hub Towns, a settlement also becomes a candidate when the non-residential concentration ratio exceeds 2.97. This value is chosen as it is that which would be expected statistically if the residential ratio were to be 2.5 (i.e. the cut-off referred to above). The residential and non-residential concentration tests thus provide alternative ways of demonstrating that a particular centre provides an important concentration of population and services. A group of towns including Henley-on-Thames and Ashby de la Zouch with residential ratios less than 2.5 are added to the list of Hub Towns on this basis.

Figure 4.3: Identifying Hub Towns



4.11 In constructing the method, provision was made as illustrated in Figure 4.3 to admit towns as Hub Towns on the basis of a cross-concentration ratio, but no town was in fact admitted on this basis.

Setting the Thresholds

4.12 Inevitably as both the rural share of expected custom and the residential and non-residential concentration ratios vary continuously, it is difficult to be clear where cut-offs should be set. In the exploratory work, the threshold for the residential concentration test was initially set high (at 4.0) and gradually lowered, considering the strength of the case for including additional centres at each step. The value of 4 was chosen initially as places with ratios at or above this value show a simple structure where a town is surrounded by a rural hinterland, and all centres with such values had previously been identified as Larger Market Towns. Places with lower values are found in more complex settlement configurations- typically being overshadowed by a single larger town or forming part of a group of 'suburban towns.'

4.13 Having considered the retail offer of those towns with residential ratios below 4.0 that were previously identified as Larger Market Towns, a cut-off of 2.5 was eventually adopted. This leads to the inclusion of towns that are obviously overshadowed by others, but this characteristic alone appears insufficient to suggest that a town should not be included. It is clear that some towns with values of less than 2.5 have a substantially higher service endowment that might be anticipated on the basis of their residential ratio. Given the strong relationship between the residential and non-residential concentration ratios (discussed at para 4.9), it seems appropriate to fix the threshold for the non-residential ratio on the basis discussed in para 4.10. The use of the second non-residential ratio test proves helpful in identifying locations where the implications of overshadowing are perhaps not as great as might be anticipated.

4.14 A particular concern was to ensure that the evidence underpinning previous work on identifying Larger Market Towns was brought to bear on the placing of thresholds. According to the criteria stated in the RERC (2005) technical paper, to be included as a Larger Market Town an urban area with between 10,000 and 30,000 would have had to have had

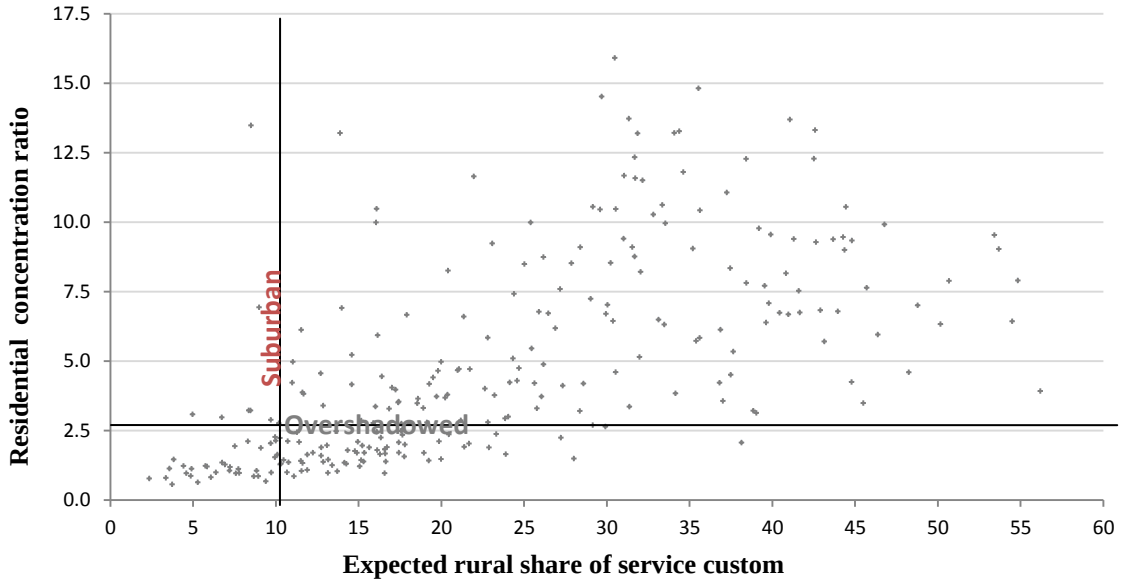
i) at least 3 shops,
ii) at least 1 bank or 1 solicitor,
iii) at least 1 General Practitioner,
iv) at least 3.5 percent of its addresses classified as ‘non residential’, and
v) at least 1.3 shops per 1000 population.

4.15 Initial exploratory work showed that all towns in the population size band would appear in fact to have met criterion i, and that almost all would have met criterion v. Given the changing nature of service provision discussed above there was some reluctance to focus sharply on the specific services (criteria ii and iii), but when these criteria were applied to

towns which appeared 'marginal' on the basis of their concentration ratios only one case was identified that did not meet criteria ii and iii).

In considering thresholds, therefore, the focus settled at the whole town level rather than presence or absence of specific services. As Figure 5.4 suggests, many places which are marginal with respect to concentration ratios are frequently also marginal with respect to ERSC, the rural share. They are towns not far removed from larger centres of population whose presence tends both to reduce the rural share and provide an alternative destination for service trips. They form a group of essentially suburban towns which plot at the bottom left of Figure 4.4. Some of these towns form part of a cluster of dormitory town, or commuter towns, that is to say settlements from which residents typically travel to work elsewhere on a daily basis.

Figure 4.4: Towns Compared: Residential Concentration and Estimated Rural Share of Custom



4.16 To appreciate the character of other towns right at the margin, two historic market towns - Ormskirk and Guisborough - might usefully be considered. Ormskirk lies at the centre of the West Lancashire plain but surrounded by much larger settlements not too far distant such that the rural share is only 8.3%. With a residential ratio of 2.12 it fails that test but passes the non-residential ratio with a score of 3.28. The town is overshadowed by its neighbours but retains much of its historic character and as suggested by the non-residential ratio, continues to provide a broader service offer than settlement configuration alone might suggest. It is the very low rural share that raises a question about its actual contribution to rural communities.

4.17 Guisborough proves even closer to the margin than Ormskirk. Unlike that town it easily passes the rural share test with a score of 19.9%. It fails both the residential ratio test (2.12) and the non-residential ratio test (2.88). Like Ormskirk its performance on the non-residential test is stronger than the residential ratio test and indeed Guisborough almost passes the non-residential ratio test. This in itself suggests high performance relative to limited potential which seems consistent with other information about the town's retail character[5].

5. From Identification of Hub Towns to Classification of Local Authorities

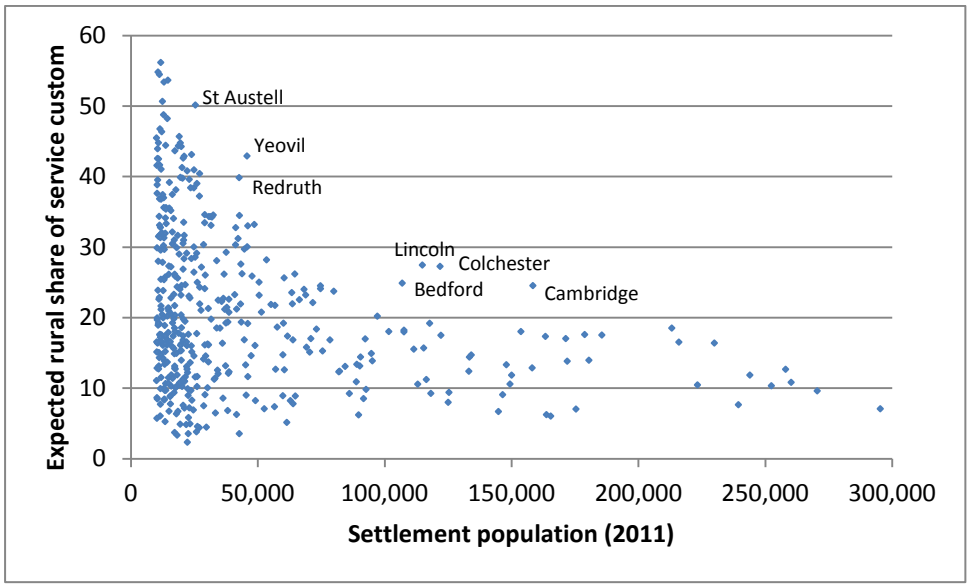
5.1 To move from consideration of urban-rural interdependence and the identification of Hub Towns to classification of local authorities, it is necessary to sum the various weighted population components of each LAD and to express the total as an augmented rural share of the LAD population. The previous work assigned a weight of 1 to each rural OA and gave urban OAs a weight of 1 if they impinged upon Larger Market Towns, but zero in other cases. Although the present work adopted a similar approach, an alternative considered would have weighted the population of each town by its expected share of rural service custom, and there may be merit in considering this further.

5.2 It might also be argued that in applying this principle there should be no arbitrary population threshold above which a settlement should not be considered a potential Hub Town. As the size of urban centres increases, the expected rural share of custom tends to fall, as illustrated in Figures 5.1a and b. It is clear from Figure 5.1a that ERSC rarely rises above 20% in urban areas with a population of 100,000 or more. It might therefore seem possible to construct a version of RUCLAD broadly compatible with earlier work but more closely aligned with an understanding of the importance of urban and rural interaction by having regard simply to ERSC rather than total population. Although this share may still be substantial in towns such as Yeovil which combine traditional market functions with a substantial range of other economic activity, most towns with a high ERSC, tend to be small (by comparison with the settlement size distribution of England as a whole). They might almost themselves be thought of as having a rural character even although they fall outside standard definitions of the rural domain.

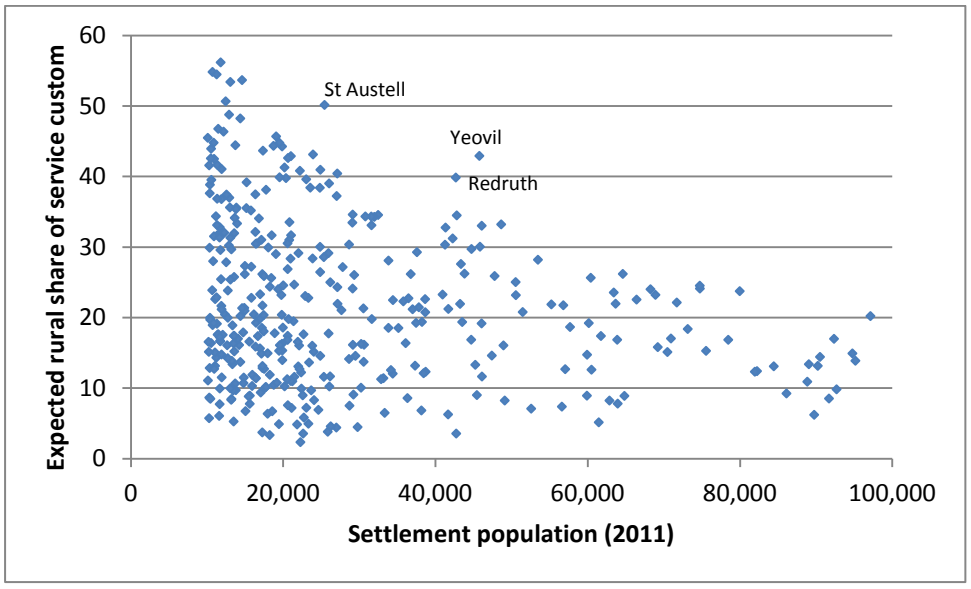
5.3 Although it would be possible to allow any town, irrespective of its size to contribute to the rural-related population measure for a LAD in proportion to its expected rural share of custom as estimated in Section 3, this would generate a major break with previous practice. Reference to Figure 5.1b suggests the scale of the effect of admitting towns of more than 30,000 population as Hub Towns on the basis of ERSC. This approach has not been pursued.

[5] The town showed fall in retail yield between 2000 and 2008 from 9.5% to 8%, suggesting a relatively high degree of investor confidence for a very marginal retail centre. A retail review for Redcar and Cleveland urban area by Nathaniel Lichfield and Partners suggests that the town serves itself. Recent planning history moreover, involved a very contentious application to build a Tesco store (withdrawn by the company), which would clearly improve the offer for those outside the town but had a potentially damaging effect on others within. Guisborough surely is right at the margin of places which it is appropriate to consider.

Figure 5.1: Expected Rural Share of Custom



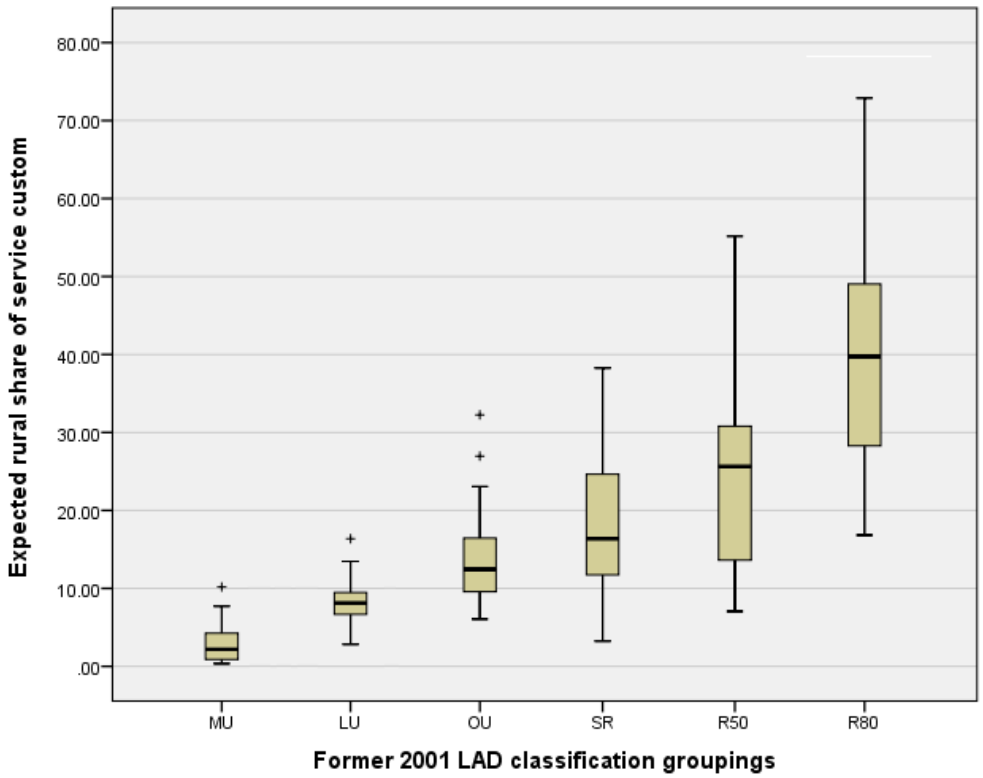
a) For settlements with a population between 10,000 and 300,000



b) Inset for settlements with a population between 10,000 and 100,000

5.4 Nevertheless, ERSC appears to be a useful measure in considering rural-urban interaction and in interpreting RUCLAD. It is clear from Figure 5.2 that there is a considerable risk that users of RUCLAD may overestimate the extent of dependence of particular districts on the residents of rural locales. While there is a very clear relation between the expected rural share of custom in a LAD and its class within RUCLAD2001, the augmented population shares of Rural50 (R50) and Rural80 (R80) authorities are much greater than the correspo**n**ding shares of expected rural custom. In part for this reason, it was decided while retaining the basic structure of RUCLAD2001 to adopt new descriptors for the categories.

Figure 5.2: Relation between ESRC and RUCLAD2001 categories



5.5 In RUCLAD2011, LADs are assigned to categories first on the basis of their augmented rural population share as follows. LAD represents

- 80% or more are described as 'Mainly Rural (rural including Hub Towns)' (previously R80)
- 50% or more, but less than 80% are described as 'Largely Rural (rural including Hub Towns)' (previously R50)
- 26% or more, but less than 50% are described as 'Urban with Significant Rural (rural including Hub Towns)' (previously SR)

5.6 Those local authority districts which are overwhelmingly urban – that it say where the rural and rural-related population together, have been subcategorised on the basis of their urban contexts. Three subcategorises are defined:-

- authorities serving parts of major conurbations,
- authorities serving parts of minor conurbations, and
- authorities serving cities and towns.

5.7 These three urban context categories are identified in RUC for OAs, and the RUCLAD assignment is made to the category to which the highest proportion of the constituent populations belong. The consideration of the urban population will include those populations that are in Hub Towns. The Hub Town populations will contribute to a LAD being classified as Mainly Rural, Largely Rural or Urban with Significant Rural as above, but will otherwise

still be regarded as an 'urban' population for the purposes of assigning an urban category. For most local authorities assigned to one of the three urban groups, one of the three contextual categories accounts for a very substantial majority of the population in a particular district. The design of local authority districts is such that some overwhelmingly urban authorities include differing urban contexts; Reigate and Banstead, for example, includes substantial populations in both a major conurbation and other urban areas; Ashfield includes alongside a population in a minor conurbation (Greater Nottingham), a substantial population in other urban areas. Nevertheless, even in these less homogenous cases, more than two thirds of the population within a LAD belong to the same contextual category. Using populations to assign categories for LADs differs from the methodology for rural urban classification of Census geographies (Bibby and Brindley, 2013) which is on the basis of the urban category of the majority of the constituent OAs rather than population.

5.8 The categories used within the classification are shown in Figure 5.3. Table 5.1 contains the assignment of the classification to each LAD, whilst Figure 5.4 illustrates the geographic footprint of the allocation. A summary of output aggregated to the classification groupings can be found within Table 5.1.

Figure 5.3: Classification groups for RUCLAD assignment

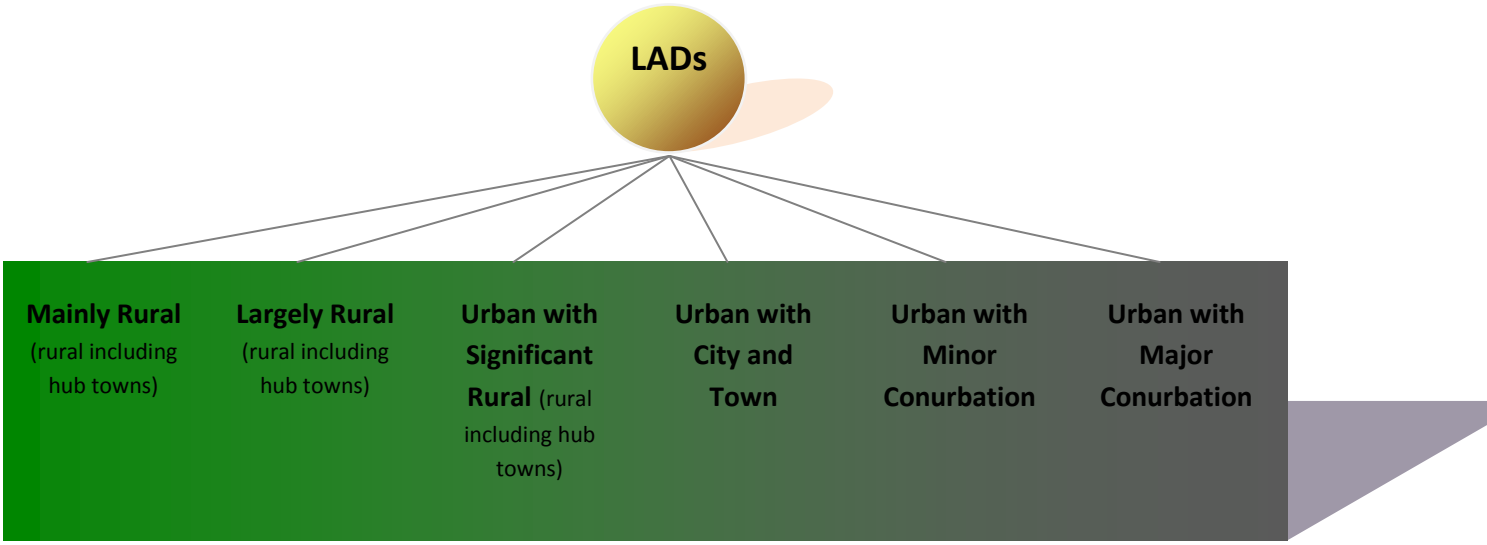
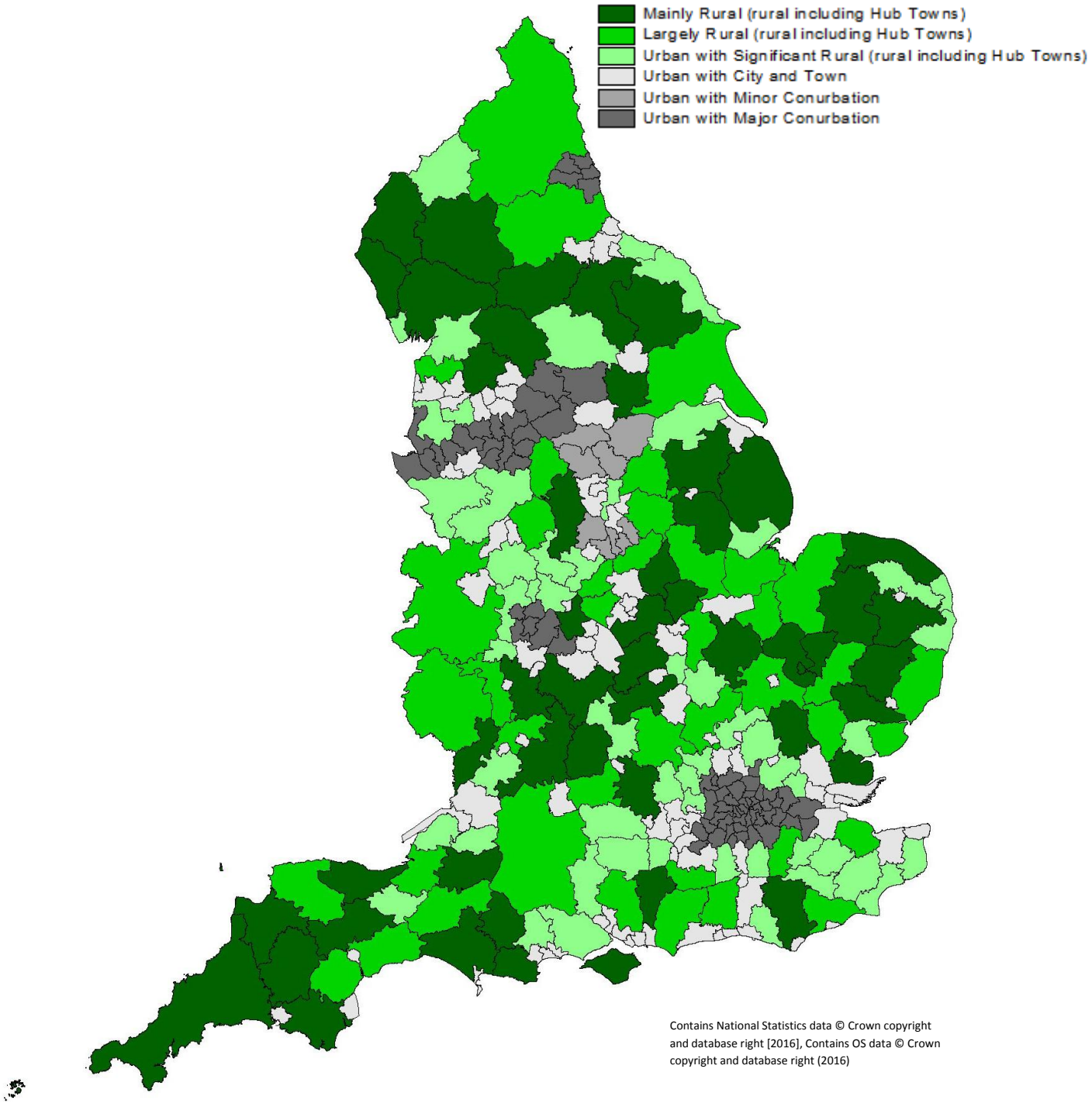


Table 5. 1: Distribution of Local Authority Districts And Population by RUCLAD Class, 2011

Category	LADs		Population (000s)				Rural & rural-related Share (%)
	Number	%	Rural	Rural-related	Rural & rural-related	Total	
Mainly Rural (rural including Hub Towns)	50	15.3	3,008	1,443	4,451	4,723	94.2

Largely Rural (rural including Hub Towns)	41	12.6	2,946	1,092	4,039	6,335	63.8
Urban with Significant Rural (rural including Hub Towns)	54	16.6	2,022	469	2,491	6,898	36.1
Urban with City and Town	97	29.8	853	82	936	14,078	6.6
Urban with Minor Conurbation	9	2.8	149	30	179	2,107	8.5
Urban with Major Conurbation	75	23.0	366	40	406	18,872	2.2
Total	**326**	**100.1**	**9,344**	**3,157**	**12,501**	**53,012**	**23.6**

Figure 5.4: Geographic footprint of RUCLAD classification



Conclusion

6.1 The foregoing discussion explains how the Rural-Urban classification of Local Authority Districts developed to complement the fundamental RUC classification has been updated. Both RUCLAD2001 and RUCLAD2011 move beyond a classification of urban and rural spaces based on settlement form and context to one which captures aspects of the character of space associated with urban-rural interactions. Updating has involved some significant developments of method enabling the identification of Hub Towns in order to identify the scale of the rural-related population of each authority. At the same time in undertaking the work, a series of decisions has been taken which have involved maintaining consistency with aspects of the method previously applied where possible. Overall, the work demonstrates that despite significant changes in detail the underlying geographic structure of Local Authority Districts is such that there is very substantial continuity between the present and previous classification.

6.2 Updating RUCLAD for use with the 2011 Census has entailed introducing some significant methodological innovations which also serve to tie it more closely to the underlying principles and methods of RUC. Continuing change in the way that both public and private services are accessed and delivered implies inevitable uncertainty about change in the balance of specific services to be provided in towns. Updating of RUCLAD has responded to this uncertainty in a very simple and direct way. Whatever specific services might motivate within individuals a demand to travel a distance of 10km or so, it seems highly likely that local concentrations of population will shape the pattern of service demand. Moreover, it would seem sensible to look at the current configuration of non-residential floorspace to suggest the likely geographic pattern of supply of property to accommodate such services. The residential and non-residential concentration tests introduced here attempt to capture these influences in a straightforward way that can be rapidly operationalised across the country as a whole. It would seem likely that these same ratios might be used to provide a background categorisation of different towns as changes in the character and intensity of property use within them is monitored over time.

6.3 The updating process also draws attention, however, to the types of anomaly that are likely to be encountered when applying decision rules with thresholds. In particular circumstances, approaches to identifying a rural-related population by reference to urban areas below a 30,000 threshold produce unanticipated results. Where several medium sized towns grow above this threshold (or disappear for definitional reasons), this may provoke a major change in classification. In undertaking the update, the thresholds previously used have been retained to provide consistency. The reported RUCLAD2011 assignments show not only the category of each LAD but explicitly report the separate rural and rural-related population components to allow greater understanding of the risks and nature of such changes.

References

Baradaran, S., and Ramjerdi, F., 2001, 'Performance of accessibility measures in Europe'. *Journal of Transportation and Statistics, 4*(2/3), 31-48.

Bibby, P. and Brindley, P., 2013, Urban and Rural Area Definitions for Policy Purposes in England and Wales: Methodology; https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239477/RUC11methodologypaperaug_28_Aug.pdf Last accessed 24th October 2014

Cockings, S., Harfoot, A., Martin, D. and Hornby, D., 2011, 'Maintaining existing zoning systems using automated zone-design techniques: methods for creating the 2011 Census output geographies for England and Wales'. *Environment and Planning A*, volume 43, pages 2399-2418

Defra, 2009, 'Defra Classification of Local Authorities in England: Updated Technical Guide'; http://archive.defra.gov.uk/evidence/statistics/rural/documents/rural-defn/laclassifications-techguide0409.pdf Last accessed 24th October 2014

Guy C M, 1991, 'Spatial interaction modelling in retail planning practice: the need for robust statistical methods' *Environment and Planning B: Planning and Design* **18**(2) 191 – 203

Office for National Statistics, 2013, 2011 Built-up Areas -Methodology and Guidance; http://www.ons.gov.uk/ons/guide-method/geography/products/census/key-statisics-for-built-up-areas-user-guidance.pdf. Last accessed 24th October 2014

Office for National Statistics (ONS) (2011) Output Areas; http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/census/output-area--oas-/index.html Last accessed 24th October 2014

Rich, D.C, 1980, *Potential Models in Human Geography*. CATMOG 26, Study Group in Quantitative Methods, Institute of British Geographers. University of East Anglia, Norwich: Geo Abstracts.

Rural Evidence Research Centre (RERC) (2005) Defra Classification of Local Authority Districts and Unitary Authorities in England; http://archive.defra.gov.uk/evidence/statistics/rural/documents/rural-defn/LAClassifications_technicalguide.pdf Last accessed 24th October 2014

Stewart, J. Q, 1950. 'Potential of Population and its Relationship to Marketing'. In: R. Cox and W. Alderson (Eds) *Theory in Marketing*, (Homewood, Illinois; Richard D. Irwin, Inc.,).