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Incremental residential densification and urban spatial justice: The case of England between 2001 and 2011

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Abstract

Study of the relation between urban density and social equity has been based mostly upon comparative analysis at the city level. It therefore fails to address variations in intra-urban experience and sheds no light on the process of urban densification. Incremental residential development is particularly poorly recorded and under-researched, yet cumulatively it makes a substantial contribution to the supply of dwellings. The article presents a detailed examination of this form of development in England between 2001 and 2011, and considers its impact on urban spatial justice. We find that the incidence of soft residential densification was very uneven. It had disproportionately large effects on neighbourhoods that were already densely developed and that were characterised by lower income households with access to relatively little residential space. It thus contributed to an increase in the level of inequality in the distribution of residential space, increasing socio-spatial injustice.

Keywords

England, incremental residential development, spatial justice, urban densification

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摘要

对城市密集度和社会公平之间关系的研究主要基于城市一级的比较分析。因此，它未能解决城市内部体验的差异，也未能揭示城市密集化的过程。对增量住宅开发的记录特别差，研究也不够，但累积起来，它为住宅供应做出了巨大贡献。本文详细考察了2001年至2011年间英国的这种发展形式，并考虑了其对城市空间公平的影响。我们发现软性住宅密集化的发生非常不均匀。它对已经很密集的街区产生了不成比例的巨大影响，这些街区的特点是低收入家庭只能获得相对较少的居住空间。因此，它加剧了居住空间分配的不平等，加剧了社会空间的不公正。

关键词

英国、增量住宅开发、空间公正、城市密集化

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Introduction

Urban densification policies have been widely adopted in developed countries (Breheny, 1997; OECD, 2012). Such policies have in common a combination of measures that constrain the expansion of urban areas, restrain development in rural areas and maintain the separation of settlements, thereby preventing urban sprawl and focusing resources on the re/development of existing towns and cities (Burton, 2002; Lee et al., 2015; Nelson et al., 2004; Pinnegar et al., 2015). Differences in the tightness of the urban envelope, in the means used to contain the urban area and in the strictness with which extra-urban development is controlled all result in local variation in processes and outcomes (Millward, 2006; Westerink et al., 2013). However, the shared aim is to produce ‘... a relatively high-density, mixed-use city, based on an efficient public transport system and dimensions that encourage walking and cycling ...’ (Burton, 2000: 1969).

Such a compact, dense urban form is the result of urban ‘intensification’, ‘consolidation’ or ‘densification’ (Burton, 2000), and is claimed to result in a more environmentally, economically and socially sustainable city (Vallance et al., 2009). This equation of

density with sustainability has been the subject of vigorous debate for decades (see e.g. Boyko and Cooper, 2011; Jenks et al., 1996; Neuman, 2005). Gradually, a more nuanced understanding has developed of the complexity both of the concepts involved and of their interrelations. Denser urban environments are considered to offer contrasting benefits and disbenefits to their inhabitants. Depending on the dis/benefit that is the subject of analysis and the context within which it is being examined, ‘high planning densities can be helpful, problematic or unimportant’ (Forsyth, 2018: 350). Thus, for example, the social advantages of higher urban densities may include greater diversity, vitality, accessibility and social interaction, but these must be balanced against the disadvantages of an environment that is more crowded and cramped, overshadowed and stressful, and more competitive (Boyko and Cooper, 2011; Holman et al., 2015; Waters, 2016).

One of the most contentious claims for the compact city is that it promotes social justice. Debates about justice have been pursued for millennia (Harvey, 2003). However, the notion of urban social justice – rooted in Lefebvre’s (1996) argument that space, because it is constituted by social relations, cannot be a mere physical backdrop to a consideration of those relations – began its

rise to prominence relatively recently (see Castells, 1977; Harvey, 1973). That rise was reinforced by the propositions that all social groups have the right to contribute to the re/production of the city (Purcell, 2002) and that justice rather than economy or efficiency should be the key criterion for evaluating urban policy and its outcomes (Fainstein, 2014). '[T]he values of equity, democracy and diversity ... constitute the basic elements of justice' (Fainstein, 2014: 13). From this perspective, the achievement of spatial justice (Soja, 2010) in a just city (Fainstein, 2010) depends upon maximising participation (diversity) in open and meaningful political-economic processes (democracy) and ensuring that the benefits and costs of urban re/development are distributed fairly between social groups (equity). Because of the variation in different social groups' ability to pursue their competing needs and wants, just means may not produce just outcomes. In these circumstances, Fainstein (2010, 2014) argues that priority should be given to social equity.

Research that focuses specifically on the relation between urban density and social justice – as opposed to work that makes generalised claims for this relationship or that considers social sustainability – is very rare (see reviews by Ahlfeldt and Pietrostefani, 2017; Boyko and Cooper, 2011). Burton (2000) is the main substantive example. Her focus is on distributional justice: on '... the fairness of the intended end-result of the compact city proposition' (Burton, 2000: 1971). To examine this, Burton (2000) identifies the potential social benefits and costs of compactness (as summarised earlier), and develops indicators of their impact on social equity (e.g. access to facilities, services, amenities and employment). She then undertakes a comparative analysis of 25 medium-sized English cities to explore the relations between their density and their performance against these indicators. Finally, a list of those

features of denser areas that contribute to or detract from social equity is presented (see Burton, 2000: 1981, Table 4).

While much useful information on the potential social effects of densification is provided, determining the implications for spatial equity is problematic. The dearth of detailed empirical evidence on the matter (Bibby et al., 2020; Burton, 2000) prevented analysis of the relative distribution of the benefits and disbenefits of compactness between the different social groups *within* the subject cities. Consequently, while a particular dis/benefit may become more or less marked as density increases or decreases, there is no measure of the unevenness of its impact on richer and poorer socio-economic groups; that is, of the related degree of social equity. Also, because the study is cross-sectional, it cannot examine the *redistribution* of resources between richer and poorer groups over time. Instead, the argument is made that because denser areas produce conditions that benefit or disbenefit poorer groups – along with all other groups – then further densification will result, respectively, in an increase or decrease in social equity. But this proposition confuses overall outcomes with group outcomes and '... the justness of a distribution at the aggregate ... level may bear little relation to its justness considered at a disaggregate ... scale' (Pirie, 1983: 469). In order to address these points, what is required is an examination of (a facet of) social equity at a high level of spatial disaggregation and over time. Only this combination will determine whether a particular policy regime aimed at achieving more compact, denser cities is increasing or decreasing urban spatial justice.

Jehling et al. (2020) engage with some of these issues in their study of densification in the Frankfurt region between 2012 and 2017. Using an automated GIS approach, they produce a spatially fine-grained analysis of change in building coverage – their

selected measure of density – within existing urban areas over that period. However, the measure does not capture the physical form or the use of the buildings in question. Consequently, Jehling et al. (2020) could draw only broad conclusions about the extent to which the revealed pattern of densification has contributed to utilitarian justice, libertarian justice and social justice. They were unable to ‘... address the societal and environmental consequences of densification for different groups of actors and spaces’, which would require ‘more in-depth research’ (Jehling et al., 2020: 235).

We are engaged in such research. Our application of spatial analytical techniques to relevant data sets allows changes in physical land uses in England arising from development to be identified at the hectare cell (100 m × 100 m) level (see Bibby et al., 2020, and below). The cells may be aggregated to match other geographies, such as those based on census output areas (OAs), administrative areas and so on. This enabled analysis to be pursued at a detailed level for the period 2001–2011. It also enabled us to distinguish between new-build and dwelling conversion and subdivision, and between incremental or ‘soft’ densification and ‘hard’ or larger-scale densification (Pinnegar et al., 2015; Touati-Morel, 2015, 2016). The former is pursued by actors of limited resource operating only locally, such as individual owner-occupiers and property owners, local contractors and others in related businesses or professions. It is largely outside the purview of planning strategies. The latter is undertaken by ‘external’ actors such as large property developers and volume house builders who work with planners within formal planning frameworks.

A rich picture emerged of the effects of the UK’s long-established strategy of urban containment (Hall, 1974), reinforced more recently by policies to encourage the re-use of brownfield land (Bibby et al., 2020). This

approach was largely successful – at least in relation to the spatial pattern of development – between 2001 and 2011. Over that decade, the number of dwellings in England grew from 21.0 million to 22.8 million, an increase of 1.8 million or 8.8%. The number of those additional dwellings that were accommodated in England’s existing urban areas – that is, settlements with a population of 10,000 or more – was 1.1 million, or 60% of the national total. Urban residential development occurred predominantly in suburbs, with activity split two thirds to one third between hard and soft densification. Thus, the latter proved to be an important source of additional dwellings. These trends resulted in increases in densities of 0.33 dwellings per hectare across urban areas overall (0.32 dwellings per hectare in suburbs and 0.46 dwellings per hectare elsewhere in urban areas).

Within that general picture, there were wide regional variations. Soft densification accounted for almost half (48.5%) of additional dwellings in the North-West, but for little more than a fifth (21.7%) in the Eastern region. The micro-scale processes underlying these variations in the intensity of soft densification also differed greatly. In London, subdivision and conversion of existing buildings accounted for more than twice as many additional dwellings as did infill construction. In the North-West, these two forms of incremental development were roughly in balance. In all other regions, infill construction was the dominant form of soft densification: markedly so in the South-East and the South-West. Using the example of the London region, Bibby et al. (2020) also illustrated the substantial intra-urban variation in soft densification. Some of the conurbation’s inner suburbs were obvious foci of soft densification: densification primarily achieved through the subdivision of dwellings. Other, more central, areas were little affected. In contrast, small-scale action at

the local level led to decreases in density in many outer suburbs.

Bibby et al.'s approach offers the opportunity to examine the implications of (soft) densification in detail and over time. A major concern relates to crowding – the reduction in the amount of living space available to residents – ‘perhaps the single most direct effect of compactness on social equity’ (Burton, 2000: 1983). The supply constraints that are a consequence of compaction policies result in higher house and housing land prices (Anthony, 2003; Dawkins et al., 2002; Hilber and Vermeulen, 2016). This prompts shifts in relative housing space consumption by different socio-economic groups that were examined by Tunstall (2015). She found that, after a long period of improvement, housing space inequality in England began to increase again in the 1980s ‘... and, by 2011, by some measures, this new trend had wiped out a century’s worth of reductions in inequality’ (Tunstall, 2015: 119). Johnston et al. (2016) added a spatial dimension to this type of analysis. Using data from the 2001 and 2011 censuses for the OAs of London, they found strong ‘circumstantial evidence that BME members in London on average lived at (increasingly) greater housing densities than their white counterparts’ (Johnston et al., 2016: 370). However, the lack of empirical information about small area physical change prevented them from pursuing the issue.

This is the starting point for the article. We build on our recent work (Bibby et al., 2020) to analyse the pattern of physical change in urban residential areas in England between 2001 and 2011 and to consider the implications for the equity dimension of spatial justice (as defined by Fainstein (2010, 2014) above). We do this in a way that captures inter- and intra-urban variations in experience. The focus is on soft densification. The research is reported in five

sections. First, we outline the definitions, data sources and analytical methods underpinning the work. Next, we describe how soft densification has played out across individual urban areas and the wide differences in its form and effects. In the third section, we examine the distribution of soft residential densification across different social groups, the impact that this has on the consumption of residential space and the consequences for spatial justice. Then we present detailed examples of the intra-urban patterns of densification and de-densification that result from these processes. Finally, we discuss the implications of our findings.

Definitions, data sources and methodology

The empirical work of this article depends initially on identifying the detailed components of change that directly increase or decrease the dwelling stock and that underlie phenomena such as densification that are evident at larger scales. Here we describe how specific data sources are used to generate proxies for these components and the approach taken to aggregation (to produce outcome indicators for areal mosaics at different scales and complementary measures of social characteristics) before setting out the approach to analysing the changing shares of residential space that result.

The most obvious events that alter the housing stock involve either building new dwellings (B) or demolishing existing ones (D). Subdivision of residential properties into flats (S) provides further dwellings, but amalgamation that produces larger, higher-value single-family accommodation (R) reduces the stock. Further dwellings are gained through conversion of non-residential buildings (C), but conversion of dwellings to other uses (L) results in losses. For the period 2001–2011, two data sources allow proxies for these events to be constructed at

a very fine scale.¹ The Land Use Change Statistics (LUCS) provide an estimate of the number of dwellings constructed on each developed parcel of land (together with their size and centroid). Royal Mail's Postcode Address File (PAF) indicates the number of dwellings and non-residential units at each postal address at a particular time. In principle, these elementary data may be aggregated to any scale.

This article is concerned only with events within suburbs styled 'single-family residential neighbourhoods' (SFRNs). SFRNs are defined by reference to OAs whose housing stock comprised whole houses or flats converted from such houses at the time of the 2001 Census. Those OAs and parts of OAs falling outside physical urban areas' boundaries in 2001 are excluded from the definition of SFRNs. Here we aggregate the elementary data within SFRNs to individual OAs and to individual physical urban areas. The net change in dwellings for any area (G_k) over the period is obtained by subtracting the total number of dwellings identified in PAF for April 2001 ($H_{k,2001}$) from the corresponding number for April 2011. Total new build is derived directly from LUCS. For any area k , the growth in the dwelling stock, G_k , is equivalent to

$$G_k = B_k + S_k + C_k - D_k - R_k - L_k$$

and the rate of growth of the dwelling stock is given by $g_k = G_k/H_{k,2001}$. As the analysis is restricted only to development *within* physical urban areas on their 2001 limits, G_k is also the growth of the stock due to densification, and the rate of growth of the dwelling stock (g_k) is also the rate of densification (RD).

Further outcome indicators may be estimated for any area to capture the relative importance of the components above and the extent of *soft* densification. The events which underlie soft densification represent 'minor developments' within English

planning administration (HMG, 2015). Such events account for more than 90% of planning applications but lie largely outside the purview of planning strategies. Events that involve building out residential sites of more than 0.4 hectares or that require the creation of a new unit postcode are excluded from our operational definition of minor development. By restricting attention solely to minor development, the growth of the stock due to soft densification (GSD) may be defined and hence the rate of soft densification (RSD) (i.e. $GSD_k/H_{k,2001}$). RSD is a principal indicator in the analyses that follow. Because it combines many minor effects, RSD may be negative, as discussed below. It is also useful to distinguish soft densification due to infill construction (RSDI, which must be positive) from soft densification due to subdivision (RSDS). The 'crowding effect' of soft densification is measured simply by its contribution to change in ambient density² between 2001 and 2011 (i.e. $GSD/A_{k,2001}$ where A_k is the area of unit k in hectares).

Having defined indicators of soft densification at the OA level over the period from 2001 to 2011, the next step is to ascertain how they vary between areas of different social character. The OA classification generated for the Office for National Statistics (ONS) by Vickers et al. (2005) is used for this purpose. It groups OAs into clusters based on similarity of scores on 41 indicators from the 2001 Census. It is entirely empirical, using k-means clustering to identify clusters in a multi-dimensional space defined by the indicators. The classification is structured as a three-level hierarchy involving seven named supergroups, 21 named groups and 52 subgroups, each of which is attributed key characteristics (see Table 2).

The final step in the analysis is to examine the effect of soft densification over the period on changes in the inequality of shares of 'residential space' available to residents of SFRNs in each of these 52 subgroups of

OAs. Residential space is a proxy for living space and is defined as the area of the footprint of domestic buildings together with domestic gardens. It is based on Generalised Land Use Database (GLUD) statistics for England estimated at the OA level by Ordnance Survey in 2005 for the then Department of Communities and Local Government. Consequently, no account can be taken of any differences that may have existed in the aggregate areas of residential space in SFRNs between 2001 and 2005 or between 2005 and 2011.

Inequality in shares of residential space is measured by T , the Theil index (Theil, 1967), which is typically used in exploring income inequality. It is constructed by first estimating the ratio of the share of England's residential space accorded to each subgroup of OAs to that subgroup's share of households. This ratio stands as a Location Quotient (LQ; Miller et al., 1991) for each OA subgroup, indicating the extent to which the amount of residential space enjoyed by households in that subgroup is above or below average. The Theil index is then calculated by multiplying the logarithm of this ratio (LQ) for each OA subgroup t by its share of England's residential space, s_t , and summing the values over every OA subgroup, (i.e. $T = \sum s_t \cdot l_t$). The value of T may vary from 0 (where shares of residential space and of households are everywhere proportionate) to 1 (where they are maximally unequal). The measure $ct = st \cdot l_t$ captures the contribution of OA subgroup t to inequality in the distribution of residential space.

Inter-urban variation in soft densification

Inter-urban variation in the extent and form of soft densification is considerable. The experience of individual towns and cities is illustrated in Table 1. It covers those settlements in England with more than 40,000

dwelling in SFRNs in 2001,³ the largest of which is London, followed by Manchester and Birmingham (see column [1]). An indication of the relative strength of demand for housing in relation to supply is given by average house prices between 2001 and 2011 (column [2]) that are, unsurprisingly, positively correlated ($r = 0.542$) with the rate of net growth in settlements' total housing stock (g and RD ; column [3]). The rate of soft densification (RSD) is given in column [4]. It averaged 1.58% between 2001 and 2011. The larger part of the growth was attributable to infill construction (RSDI; column [5]), but unusually high values of RSD tended to reflect high values of conversion and subdivision (RSDS; column [6]).

Settlements that experienced high rates of infill construction (RSDI; column [5]) were predominantly buoyant towns with house prices at least as high as the national average, including Southampton, York, Oxford, Cheltenham, Bristol and Lincoln. Amongst these towns, only Bournemouth and Bristol had an unusually high RSD overall. In other such towns, the activities of householders and small developers designed to create larger single-family dwellings from the existing stock through amalgamation (R , indicated by negative RSDS, column [6]) offset gains through infill (RSDI, column [5]), and in towns such as Cheltenham negated them entirely. Other areas of high demand, such as the Blackwater Valley towns (Farnham, Aldershot), showed negative RSD because they were subjected to 'tear-down' or 'knockdown' that involved 20th-century houses on large plots being demolished and rebuilt at similar or lower densities (Thorpe, 2014).

In contrast, high RSD in less buoyant towns such as Hastings, Blackburn and Derby (column [4]) was largely the result of the subdivision of houses (RSDS; column [6]). In Hastings and Blackburn, the proportions are extreme. In both towns, the

Table 1. Soft densification in English urban areas, 2001–2011; key measures.

Settlement	SFRN dwelling stock 2001 (000s) [1]	Average house price 2001–2011 (£000) [2]	Rate of net stock growth (g; RD) 2001–2011 (%) [3]	Soft densification 2001–2011				
				(RSD) Overall (%) [4]	(RSDI) Infill (%) [5]	(RSDS) Subdivision/ conversion (%) [6]	RSDS share of RSD (%) [7]	Density Change (dph) [8]
Barnsley	74	168	4.72	1.32	1.72	-0.40	-30.00	0.22
Birmingham	854	216	3.05	1.46	0.96	0.50	34.20	0.23
Blackburn	54	165	1.41	4.64	0.78	3.86	83.10	0.84
Blackpool	107	212	5.47	0.71	0.81	-0.10	-13.80	0.12
Blackwater Valley	83	292	6.40	-2.00	1.15	-3.15	157.60	-0.23
Bournemouth	145	314	7.52	4.38	3.07	1.31	30.00	0.68
Brighton	175	310	6.04	3.43	0.76	2.67	77.80	0.72
Bristol	211	238	9.43	4.74	1.87	2.87	60.50	0.82
Burnley	60	162	-0.99	0.73	0.94	-0.21	-28.60	0.16
Cambridge	41	344	10.54	0.55	1.45	-0.90	-163.70	0.08
Cheltenham	43	305	11.35	-0.32	1.88	-2.20	688.50	-0.05
Chesterfield	41	186	4.48	2.76	0.57	2.19	79.20	0.42
Colchester	41	233	14.01	-0.55	1.37	-1.92	349.80	-0.08
Coventry	128	201	4.93	0.76	0.70	0.06	7.60	0.14
Crawley	63	294	7.04	-0.80	1.34	-2.14	267.70	-0.11
Derby	96	224	4.79	4.01	0.96	3.05	76.00	0.73
Doncaster	54	171	1.48	2.04	0.51	1.53	75.10	0.33
Eastbourne	43	298	6.78	2.16	1.57	0.59	27.40	0.44
Gillingham	89	246	4.15	1.82	0.90	0.92	50.40	0.34
Gloucester	54	211	10.57	-0.79	1.23	-2.02	256.20	-0.13
Grimsby	47	149	2.12	2.18	1.00	1.18	54.00	0.40
Hastings	51	228	3.93	5.10	1.01	4.09	80.20	0.89
Ipswich	55	206	10.49	3.82	1.42	2.40	62.90	0.58
Kingston upon Hull	129	160	-0.31	3.00	0.47	2.53	84.40	0.54
Leeds	572	196	6.16	1.88	1.21	0.67	35.60	0.32
Leicester	151	207	5.98	2.57	0.71	1.86	72.20	0.46
Lincoln	40	193	8.22	0.99	1.73	-0.74	-75.10	0.17
Liverpool	328	183	3.25	2.04	1.09	0.95	46.40	0.39
London	2449	413	7.13	2.67	1.02	1.65	61.90	0.51

(continued)

Table I. Continued

Settlement	SFRN dwelling stock 2001 (000s) [1]	Average house price 2001–2011 (£000) [2]	Rate of net stock growth (g; RD) 2001–2011 (%) [3]	Soft densification 2001–2011				
				(RSD) Overall (%) [4]	(RSDI) Infill (%) [5]	(RSDS) Subdivision/ conversion (%) [6]	RSDS share of RSD (%) [7]	Density Change (dph) [8]
Luton	86	205	5.17	1.54	0.78	0.76	49.20	0.29
Manchester	884	203	4.76	2.40	1.31	1.09	45.40	0.43
Mansfield	68	185	5.86	2.00	1.05	0.95	47.60	0.31
Margate	49	206	9.39	2.45	2.60	-0.15	-6.30	0.47
Middlesbrough	150	170	1.74	0.68	0.73	-0.05	-7.90	0.10
Milton Keynes	72	245	6.31	1.78	1.05	0.73	40.80	0.24
Newcastle upon Tyne	345	200	2.51	1.35	0.59	0.76	56.20	0.25
Northampton	76	206	5.82	1.09	1.03	0.06	5.80	0.18
Norwich	72	226	7.04	2.00	1.00	1.00	49.80	0.30
Nottingham	266	201	5.55	0.92	0.99	-0.07	-8.10	0.17
Nuneaton	49	200	6.07	2.37	1.66	0.71	30.10	0.39
Oxford	47	386	10.44	0.90	1.95	-1.05	-116.40	0.16
Peterborough	56	208	4.95	1.53	0.68	0.85	55.60	0.23
Plymouth	92	211	6.97	1.50	0.88	0.62	41.30	0.25
Portsmouth	158	243	4.45	2.60	1.19	1.41	54.20	0.51
Preston	100	202	4.16	2.52	0.77	1.75	69.40	0.46
Reading	130	332	7.41	-0.83	1.21	-2.04	246.10	-0.13
Sheffield	247	189	5.30	1.27	1.03	0.24	18.80	0.21
Slough	42	286	7.97	2.42	1.47	0.95	39.30	0.45
Southampton	104	245	8.99	1.34	2.35	-1.01	-75.20	0.23
Southend-on-Sea	111	261	3.98	2.49	1.00	1.49	60.00	0.44
Southport	46	260	3.14	0.34	1.00	-0.66	-194.40	0.06
St Albans	41	397	11.05	0.70	1.31	-0.61	-86.50	0.10
Stoke-on-Trent	152	167	3.55	0.29	0.68	-0.39	-135.20	0.05
Sunderland	71	199	2.12	0.63	0.87	-0.24	-38.50	0.12
Swindon	62	215	9.12	2.17	0.82	1.35	62.20	0.36
Telford	47	209	4.80	-1.11	0.85	-1.96	176.40	-0.14
Torquay	44	225	7.66	-0.73	1.28	-2.01	274.90	-0.13
Warrington	64	205	8.42	0.32	0.67	-0.35	-109.40	0.05

(continued)

Table 1. Continued

Settlement	SFRN dwelling stock 2001 (000s) [1]	Average house price 2001–2011 (£000) [2]	Rate of net stock growth (g; RD) 2001–2011 (%) [3]	Soft densification 2001–2011				Density Change (dph) [8]
				(RSD) Overall (%) [4]	(RSDI) Infill (%) [5]	(RSDS) Subdivision/conversion (%) [6]	RSDS share of RSD (%) [7]	
Wigan	64	181	4.16	2.28	0.94	1.34	58.70	0.42
Wirral	131	176	4.68	3.21	1.09	2.12	66.00	0.51
York	54	240	10.77	2.46	1.99	0.47	19.10	0.46

Note: [2] Land Registry all residential transactions 2001–2011 (converted to 2013 QIV prices).

number of dwellings that were created through subdivision of existing property exceeded the overall net increase in the dwelling stock. The resulting dwellings took the form of ‘poor quality private rented sector accommodation’ (Hastings Borough Council, 2017: 3), many of which were ‘houses in multiple occupation’ (Blackburn with Darwen Borough Council, 2012). These two cases highlight how provision of cheap, low quality accommodation has produced a particular form of soft densification. In Blackburn, in particular, RSDS was much faster than growth in the housing stock as a whole, as the broader housing market stagnated. Variants of this situation marked a number of other northern settlements, such as (Kingston upon) Hull.

Variation at the neighbourhood scale: The socio-spatial impact of soft densification

In this section, we consider how neighbourhoods of different types have been affected by soft densification using the three-level OA classification discussed above. Table 2 describes, for each of the 52 clusters of OAs, their SFRN dwelling stock in 2001 (column [1]), ambient density (column [2]), growth of the stock due to soft densification (GSD; column [3]), rate of soft densification (RSD; column [4]) and the proportion of GSD resulting from subdivision (column [5]). The OA clusters are presented in descending order of their contribution to accommodating dwellings by soft densification (share of total GSD; column [6]), with the cumulative contribution given in column [7].

Viewed through the frame of this classification, two striking findings emerge about soft densification. The first is its extremely uneven incidence at the neighbourhood scale. Just eight of the 52 subgroups accommodated half of the additional dwellings attributable to soft densification over the

Table 2. Measures of soft densification 2011 for output areas, 2001 area classification, England, single-family residential neighbourhoods; urban areas with 10,000 or more population.

Supergroup	Group		Subgroup	SFRN dwelling stock 2001 (000s) [1]	Ambient density (dph) [2]	Soft densification 2001–2011					Key characteristics of area type
						GSD (000s) [3]	RSD (%) [4]	Proportion of GSD from subdivision (%) [5]	Share of total GSD (%) [6]	Cumulative share of total GSD (%) [7]	
Code	Name	Code	Name	Code							
7	Multicultural	7b	Afro-Caribbean communities	7b1	453	26.4	34	7.6	79.0	12.5	Flats; terraced housing; private and public renting; BME
7	Multicultural	7a	Asian communities	7a3	637	22.1	21	3.4	65.6	7.8	Flats; terraced housing; private renting; BME
7	Multicultural	7a	Asian communities	7a1	390	21.8	16	4.2	74.2	5.9	Terraced housing; private and public renting; BME
7	Multicultural	7a	Asian communities	7a2	511	18.8	15	2.9	58.2	5.4	Flats; terraced housing; private and public renting; BME
6	Typical traits	6c	Young families in terraced homes	6c2	432	19.6	14	3.3	39.2	5.2	Terraced housing; private renting
2	City living	2b	Settled in the city	2b2	433	20.8	14	3.2	41.4	5.1	Flats; terraced housing; private sector renting
6	Typical traits	6c	Young families in terraced homes	6c1	493	23.4	13	2.7	54.6	4.9	Terraced housing; private renting; not BME
6	Typical traits	6a	Settled households	6a1	531	16.5	9	1.8	25.3	3.4	Terraced housing; flats; private renting; not BME
1	Blue collar communities	1b	Younger blue collar	1b1	709	18.4	7	1.0	6.3	2.6	Terraced housing; public sector renting
2	City living	2a	Transient communities	2a2	121	28.6	7	5.9	72.1	2.6	Flats; private sector renting
5	Constrained by circumstances	5b	Older workers	5b3	480	19.5	7	1.5	15.4	2.5	Terraced housing; flats; public sector renting
4	Prospering suburbs	4a	Prospering younger families	4a2	369	15.6	7	1.8	49.3	2.4	Detached housing
6	Typical traits	6d	Aspiring households	6d1	429	15.5	6	1.5	12.6	2.3	Terraced housing; minimal public sector renting
2	City living	2b	Settled in the city	2b1	193	17.3	6	3.2	25.4	2.2	Flats; private sector renting
4	Prospering suburbs	4d	Thriving suburbs	4d2	449	12.4	6	1.3	7.2	2.2	Detached housing
1	Blue collar communities	1b	Younger blue collar	1b2	536	20.4	6	1.0	21.1	2.0	Terraced housing; public sector renting
6	Typical traits	6b	Least divergent	6b3	296	14.1	6	1.9	17.6	2.0	..
6	Typical traits	6d	Aspiring households	6d2	360	16.1	6	1.5	-9.2	2.0	Terraced housing; flats; private renting; not BME
4	Prospering suburbs	4c	Prospering semis	4c2	482	15.2	5	1.1	22.2	1.9	Detached housing
5	Constrained by circumstances	5b	Older workers	5b4	289	17.6	5	1.8	12.4	1.9	Flats; terraced housing; public sector renting
6	Typical traits	6b	Least divergent	6b1	195	15.3	5	2.5	-2.5	1.8	Terraced housing; flats; private renting; not BME
4	Prospering suburbs	4a	Prospering younger families	4a1	172	14.7	4	2.4	62.0	1.5	Detached housing
6	Typical traits	6b	Least divergent	6b2	360	14.1	4	1.1	-40.2	1.5	Flats; not BME
1	Blue collar communities	1c	Older blue collar	1c1	293	13.8	3	1.2	-6.3	1.3	Terraced housing; public sector renting
6	Typical traits	6a	Settled households	6a2	466	21.1	4	0.8	28.1	1.3	Terraced housing; flats; private renting; not BME
1	Blue collar communities	1c	Older blue collar	1c3	300	16.0	3	1.1	-0.7	1.2	Terraced housing; public sector renting
4	Prospering suburbs	4d	Thriving suburbs	4d1	336	9.8	3	0.9	-3.5	1.1	Detached housing
3	Countryside	3c	Accessible countryside	3c1	136	11.0	3	2.0	24.7	1.0	Detached housing
3	Countryside	3a	Village life	3a1	151	11.5	3	1.7	20.8	0.9	Detached housing
4	Prospering suburbs	4b	Prospering older families	4b3	254	10.0	2	1.0	24.5	0.9	Detached housing
4	Prospering suburbs	4b	Prospering older families	4b4	191	11.6	3	1.3	28.6	0.9	Detached housing
3	Countryside	3a	Village life	3a2	127	13.2	2	1.7	-4.7	0.8	Detached housing
3	Countryside	3c	Accessible countryside	3c2	130	11.3	2	1.7	-9.5	0.8	Detached housing
4	Prospering suburbs	4b	Prospering older families	4b2	235	14.8	2	1.0	41.3	0.8	Detached housing

(continued)

Table 2. Continued

Supergroup	Group	Subgroup	SFRN dwelling stock 2001 (000s) [1]	Ambient density (dph) [2]	Soft densification 2001–2011		Proportion of GSD from subdivision (%) [5]	Share of total GSD (%) [6]	Cumulative share of total GSD (%) [7]	Key characteristics of area type		
					GSD (000s) [3]	RSD (%) [4]						
Code	Name	Code										
4	Prospering suburbs	4c	Prospering semis	4c1	379	16.9	2	0.5	0.2	0.8	95.7	Detached housing
5	Constrained by circumstances	5b	Older workers	5b2	209	17.4	2	1.0	-36.6	0.8	93.5	Flats; public sector renting
5	Constrained by circumstances	5c	Public housing	5c3	162	20.5	2	1.3	11.4	0.8	94.2	Flats; terraced housing; public sector renting
7	Multicultural	7b	Afro-Caribbean communities	7b2	26	29.0	2	7.8	86.9	0.8	95.0	Flats; public renting; BME
4	Prospering suburbs	4b	Prospering older families	4b1	224	13.0	2	0.9	6.4	0.7	96.4	Detached housing
1	Blue collar communities	1a	Terraced blue collar	1a1	222	20.1	2	0.8	19.4	0.6	97.7	Terraced housing; public sector renting
3	Countryside	3b	Agricultural	3b2	85	14.5	2	2.1	18.7	0.6	97.1	Detached housing
1	Blue collar communities	1a	Terraced blue collar	1a3	196	19.2	1	0.7	18.3	0.5	98.2	Terraced housing; public sector renting
5	Constrained by circumstances	5c	Public housing	5c1	73	21.7	1	1.7	61.6	0.5	98.7	Flats; public sector renting
1	Blue collar communities	1c	Older blue collar	1c2	180	16.7	1	0.7	15.4	0.4	99.1	Public sector renting
3	Countryside	3b	Agricultural	3b1	43	12.0	1	2.3	39.6	0.4	99.5	Detached housing
4	Prospering suburbs	4c	Prospering semis	4c3	359	19.6	1	0.2	-54.6	0.3	100.1	Mixed type & tenure
5	Constrained by circumstances	5b	Older workers	5b1	166	20.0	1	0.6	-21.3	0.3	99.8	Flats; terraced housing; public sector renting
1	Blue collar communities	1a	Terraced blue collar	1a2	97	21.2	0	0.1	-274.6	0.1	100.2	Terraced housing; public sector renting
5	Constrained by circumstances	5c	Public housing	5c2	13	21.2	0	1.4	35.9	0.1	100.1	Flats; public sector renting
5	Constrained by circumstances	5a	Senior communities	5a1	27	19.5	0	-0.4	297.1	0.0	100.1	Flats; public sector renting
5	Constrained by circumstances	5a	Senior communities	5a2	33	15.0	0	-0.3	433.6	0.0	100.1	Flats; public sector renting
2	City living	2a	Transient communities	2a1	44	25.5	0	-0.7	439.1	-0.1	100.0	Flats; private sector renting

decade (column [7]). The second is that at the neighbourhood level the shifting balance between the processes leading variously to increases or reductions of density (described in Table 1) is largely obscured. Only three subgroups of neighbourhoods show negative RSD and these are not high-status clusters.

Four of the eight subgroups that together accommodated roughly half of all the units attributable to soft densification belong to Supergroup 7 ('Multicultural'), with populations disproportionately drawn from Black and Minority Ethnic (BME) groups. OAs within Subgroup 7b1 alone accommodated one eighth of all such dwellings (column [6]). These neighbourhoods were found mainly within London, and were marked by a very high overall ambient density in 2001 (26.4 dph; column [2]). Gains due to soft densification amounted to 34,000 units over the decade (column [3]), equivalent to 7.6% of their stock in 2001 (column [4]), and were predominantly the result of the subdivision of houses (the source of 79.0% of GSD; column [5]).

The second cluster (7a3) has strong similarities with 7b1. Combining high ambient densities in 2001 (22.1 dph) and high rates of soft densification (3.4%) arising mainly from subdivision (65.6%), these neighbourhoods were found almost entirely within London. A third group of neighbourhoods (7a1), again marked by initially high ambient densities (21.8 dph) and high RSD (4.18%), was particularly strongly focused on Birmingham and northern cities. These characteristics are reproduced through subdivision of terraced housing (74.2%), creating further private lets. It was this process which within a sub-regional context of low demand and shrinking dwelling stock created the circumstances of Blackburn (discussed above). The fourth subgroup of OAs (7a2) was concentrated around Birmingham and London. It is again marked by coincidence of terraced housing and converted flats that were the subject of

further densification through subdivision (58.2%). Taken together, these four subgroups accounted for 31.5% of dwellings added to England's SFRNs by soft densification over the decade.⁴

Consideration of soft densification of OAs within a further set of four subgroups (6c2, 2b2, 6c1 and 6a1) covers half (50.1%) of all dwellings generated through such processes in urban SFRNs. One of these clusters (2b2) belongs to the 'City living' supergroup, marked at the time of the 2001 Census by private renting, converted flats and a social mix in which single-person households (other than pensioners) and individuals born outside the UK feature relatively highly. OAs in this subgroup are found within cities, particularly London. The other members of this set (6c2, 6c1 and 6a1) belong to the 'Typical traits' supergroup that is 'characterised by its averageness' (Vickers et al., 2005: 57). SFRNs within these subgroups, in reflecting national averages at the micro-scale, rarely impinge on areas developed as large-scale social housing estates and, in the case of 6c2, 6c1 and 6a1, show an over-representation of terraced housing. Moreover, these 'mixed terraced' areas are characteristic of northern urban areas whose physical structure intermingles residential, non-residential and undeveloped land, in which small new developments are fairly easily accommodated. Consequently, soft densification of neighbourhoods of this type was less dependent on subdivision of existing houses than the forms typical of Supergroup 7 (see column [5]).

In contrast to the above neighbourhoods, areas characterised by high proportions of detached housing were little affected by soft densification. Within the OA classification, these correspond to Supergroup 4, 'Prospering Suburbs', and Supergroup 3 that, although styled 'Countryside', includes suburban neighbourhoods developed at low density across England away from major cities. These OAs

are characteristic of the suburbs of a number of major towns, especially in the South-West region, including Cheltenham, Swindon, Bournemouth and Exeter.

While there is a clear tendency for additional dwellings attributable to soft densification to be disproportionately concentrated within OAs in categories near the head of Table 2, it is more difficult to grasp the differing contributions to and effects of soft densification in the other neighbourhood types. There is little clear relationship between the specific characteristics of subgroups within the detached housing supergroups (3 and 4) and the pattern of soft densification that occurred within them. The tendency towards negative RSD in particular areas of high demand is not reflected in distinctions between different subgroups of neighbourhoods on the OA classification. Although, in aggregate, the sets of neighbourhoods characterised by detached houses did not show negative values of RSD, in many high-status neighbourhoods any additional dwellings arising from soft densification were entirely offset by losses.

The effect of soft densification on neighbourhood shares of residential space

The effect of soft densification between 2001 and 2011 on the inequality of the distribution of residential space between subgroups of OAs remains to be examined. Table 3 allows the basic indicators of soft densification (i.e. total net additional dwellings and RSD) to be located relative to overall change in households in areas with different social characteristics.

Each OA subgroup's share of England's residential space is shown in Table 3 (column [1]) alongside its share of households (column [2] for 2001 and column [5] for 2011). The ratio of share of residential space to share of households or LQ is shown in

column [3] for 2001 and column [6] for 2011. An OA subgroup whose share of residential space is the same as its share of households would have an LQ of 1: the average. Values much greater than 1 indicate lavish shares of space, while values significantly less than 1 indicate cramming. The measure *ct* captures the contribution of a particular OA subgroup to inequality in the distribution of residential space (Table 3, column [4] for 2001 and column [7] for 2011).

On this basis, the Theil index (T), the measure of inequality of shares of residential space, is 0.138 for 2001. Because of the manner in which it is constructed, *ct*, the contribution that any subgroup makes to overall inequality (or the impact of inequality upon it) may easily be assessed. Positive values for *ct* in 2001 (column [4]) show that a group secured a disproportionately large share of residential space, while negative values indicate that a group's share is disproportionately low. Because the table is ordered by decreasing significance of soft densification (i.e. in the same order as Table 2), it is immediately clear that the incidence of soft densification over the inter-censal decade was greatest in those areas that already had the least favourable shares of residential space in 2001 (subgroups whose inequality contribution is below -0.0050 are shown with grey shading). It is also clear from the values of *ct* in 2011 (column [7]) that the pattern of soft densification over the decade has intensified this aspect of disadvantage; those living in OAs in group 7b1 fare worst. Overall, inequality of shares of residential space increased and the Theil index (T) for 2011 was 0.149.

More generally, it is clear that the burden of securing a more compact city was disproportionately borne by the 'Multicultural' communities in Supergroup 7. In contrast, the two supergroups characterised by detached housing (3 and 4), and that have the highest endowment of residential space

Table 3. The impact of soft densification on the inequality in the distribution of residential space, 2001–2011.

Supergroup		Group		Subgroup	2001				2011			Key characteristics of area type
Code	Name	Code	Name	Code	Share of residential space [1]	Share of households [2]	LQ Location quotient [3]	ctInequality contribution [4]	Share of households [5]	LQ Location quotient [6]	ctInequality contribution [7]	
7	Multicultural	7b	Afro-Caribbean communities	7b1	0.0109	0.0306	0.3563	-0.0113	0.0349	0.3123	-0.0127	Flats; terraced housing; private and public renting; BME
7	Multicultural	7a	Asian communities	7a3	0.0156	0.0312	0.5000	-0.0108	0.0296	0.5264	-0.0100	Flats; terraced housing; private renting; BME
7	Multicultural	7a	Asian communities	7a1	0.0093	0.0234	0.3954	-0.0086	0.0191	0.4842	-0.0067	Terraced housing; private and public renting; BME
7	Multicultural	7a	Asian communities	7a2	0.0135	0.0241	0.5588	-0.0078	0.0242	0.5565	-0.0079	Flats; terraced housing; private and public renting; BME
6	Typical traits	6c	Young families in terraced homes	6c2	0.0177	0.0244	0.7272	-0.0056	0.0249	0.7112	-0.0060	Terraced housing; private renting
2	City living	2b	Settled in the city	2b2	0.0139	0.0266	0.5230	-0.0090	0.0286	0.4878	-0.0100	Flats; terraced housing; private sector renting
6	Typical traits	6c	Young families in terraced homes	6c1	0.0136	0.0243	0.5573	-0.0079	0.0246	0.5507	-0.0081	Terraced housing; private renting; not BME
6	Typical traits	6a	Settled households	6a1	0.0314	0.0356	0.8802	-0.0040	0.0351	0.8926	-0.0036	Terraced housing; flats; private renting; not BME
2	City living	2a	Transient communities	2a2	0.0043	0.0160	0.2662	-0.0056	0.0215	0.1981	-0.0069	Terraced housing; public sector renting
1	Blue collar communities	1b	Younger blue collar	1b1	0.0278	0.0389	0.7143	-0.0093	0.0362	0.7668	-0.0074	Flats; private sector renting
5	Constrained by circumstances	5b	Older workers	5b3	0.0171	0.0256	0.6677	-0.0069	0.0276	0.6192	-0.0082	Terraced housing; flats; public sector renting
4	Prospering suburbs	4a	Prospering younger families	4a2	0.0300	0.0287	1.0436	0.0013	0.0275	1.0900	0.0026	Detached housing
6	Typical traits	6d	Aspiring households	6d1	0.0196	0.0233	0.8418	-0.0034	0.0234	0.8388	-0.0034	Terraced housing; minimal public sector renting
2	City living	2b	Settled in the city	2b1	0.0127	0.0150	0.8461	-0.0021	0.0177	0.7175	-0.0042	Flats; private sector renting
4	Prospering suburbs	4d	Thriving suburbs	4d2	0.0442	0.0296	1.4928	0.0177	0.0288	1.5352	0.0189	Detached housing
6	Typical traits	6b	Least divergent	6b3	0.0206	0.0201	1.0268	0.0005	0.0201	1.0265	0.0005	Terraced housing; public sector renting
6	Typical traits	6d	Aspiring households	6d2	0.0209	0.0205	1.0228	0.0005	0.0206	1.0147	0.0003	..
1	Blue collar communities	1b	Younger blue collar	1b2	0.0197	0.0295	0.6668	-0.0080	0.0273	0.7205	-0.0065	Terraced housing; flats; private renting; not BME
4	Prospering suburbs	4c	Prospering semis	4c2	0.0347	0.0314	1.1040	0.0034	0.0295	1.1742	0.0056	Detached housing
5	Constrained by circumstances	5b	Older workers	5b4	0.0127	0.0167	0.7617	-0.0035	0.0185	0.6884	-0.0048	Flats; terraced housing; public sector renting
6	Typical traits	6b	Least divergent	6b1	0.0140	0.0136	1.0278	0.0004	0.0146	0.9592	-0.0006	Terraced housing; flats; private renting; not BME
6	Typical traits	6b	Least divergent	6b2	0.0211	0.0214	0.9870	-0.0003	0.0216	0.9795	-0.0004	Detached housing
4	Prospering suburbs	4a	Prospering younger families	4a1	0.0131	0.0132	0.9913	-0.0001	0.0117	1.1213	0.0015	Flats; not BME
6	Typical traits	6a	Settled households	6a2	0.0160	0.0236	0.6796	-0.0062	0.0220	0.7297	-0.0050	Terraced housing; public sector renting
1	Blue collar communities	1c	Older blue collar	1c1	0.0233	0.0230	1.0129	0.0003	0.0224	1.0391	0.0009	Terraced housing; flats; private renting; not BME
1	Blue collar communities	1c	Older blue collar	1c3	0.0203	0.0217	0.9363	-0.0013	0.0206	0.9851	-0.0003	Terraced housing; public sector renting
4	Prospering suburbs	4d	Thriving suburbs	4d1	0.0282	0.0181	1.5562	0.0125	0.0160	1.7636	0.0160	Detached housing
3	Countryside	3c	Accessible countryside	3c1	0.0532	0.0258	2.0653	0.0386	0.0258	2.0610	0.0385	Detached housing
3	Countryside	3a	Village life	3a1	0.0452	0.0259	1.7459	0.0252	0.0253	1.7873	0.0263	Detached housing
4	Prospering suburbs	4b	Prospering older families	4b4	0.0287	0.0166	1.7292	0.0157	0.0159	1.8067	0.0170	Detached housing
4	Prospering suburbs	4b	Prospering older families	4b3	0.0311	0.0161	1.9282	0.0204	0.0142	2.1923	0.0244	Detached housing
4	Prospering suburbs	4b	Prospering older families	4b2	0.0192	0.0163	1.1817	0.0032	0.0145	1.3229	0.0054	Detached housing
3	Countryside	3c	Accessible countryside	3c2	0.0415	0.0186	2.2362	0.0334	0.0190	2.1859	0.0324	Detached housing
3	Countryside	3a	Village life	3a2	0.0438	0.0235	1.8616	0.0272	0.0237	1.8522	0.0270	Detached housing
5	Constrained by circumstances	5b	Older workers	5b2	0.0127	0.0137	0.9262	-0.0010	0.0154	0.8267	-0.0024	Detached housing

(continued)

Table 3. Continued

Supergroup		Group		Subgroup	2001				2011			Key characteristics of area type
Code	Name	Code	Name	Code	Share of residential space [1]	Share of households [2]	LQ Location quotient [3]	ctInequality contribution [4]	Share of households [5]	LQ Location quotient [6]	ctInequality contribution [7]	
5	Constrained by circumstances	5c	Public housing	5c3	0.0071	0.0115	0.6177	-0.0034	0.0120	0.5916	-0.0037	Flats; public sector renting
7	Multicultural	7b	Afro-Caribbean communities	7b2	0.0028	0.0207	0.1374	-0.0056	0.0220	0.1292	-0.0058	Flats; terraced housing; public sector renting
4	Prospering suburbs	4c	Prospering semis	4c1	0.0246	0.0234	1.0485	0.0012	0.0221	1.1095	0.0026	Flats; public renting; BME
4	Prospering suburbs	4b	Prospering older families	4b1	0.0302	0.0181	1.6724	0.0155	0.0182	1.6546	0.0152	Detached housing
3	Countryside	3b	Agricultural	3b2	0.0334	0.0144	2.3144	0.0281	0.0159	2.1000	0.0248	Terraced housing; public sector renting
1	Blue collar communities	1a	Terraced blue collar	1a1	0.0096	0.0135	0.7072	-0.0033	0.0122	0.7826	-0.0023	Detached housing
1	Blue collar communities	1a	Terraced blue collar	1a3	0.0067	0.0117	0.5772	-0.0037	0.0103	0.6575	-0.0028	Terraced housing; public sector renting
5	Constrained by circumstances	5c	Public housing	5c1	0.0027	0.0046	0.5863	-0.0014	0.0049	0.5566	-0.0016	Flats; public sector renting
1	Blue collar communities	1c	Older blue collar	1c2	0.0111	0.0117	0.9495	-0.0006	0.0109	1.0204	0.0002	Public sector renting
3	Countryside	3b	Agricultural	3b1	0.0351	0.0125	2.8026	0.0362	0.0134	2.6166	0.0338	Detached housing
5	Constrained by circumstances	5b	Older workers	5b1	0.0059	0.0090	0.6593	-0.0025	0.0097	0.6140	-0.0029	Mixed type & tenure
4	Prospering suburbs	4c	Prospering semis	4c3	0.0159	0.0187	0.8518	-0.0026	0.0171	0.9327	-0.0011	Flats; terraced housing; public sector renting
5	Constrained by circumstances	5c	Public housing	5c2	0.0013	0.0027	0.4717	-0.0010	0.0032	0.3966	-0.0012	Terraced housing; public sector renting
1	Blue collar communities	1a	Terraced blue collar	1a2	0.0037	0.0053	0.6947	-0.0013	0.0050	0.7360	-0.0011	Flats; public sector renting
5	Constrained by circumstances	5a	Senior communities	5a1	0.0029	0.0054	0.5352	-0.0018	0.0078	0.3695	-0.0029	Flats; public sector renting
5	Constrained by circumstances	5a	Senior communities	5a2	0.0031	0.0037	0.8229	-0.0006	0.0052	0.5878	-0.0016	Flats; public sector renting
2	City living	2a	Transient communities	2a1	0.0023	0.0063	0.3641	-0.0023	0.0076	0.3017	-0.0028	Flats; private sector renting
Column total					1.0000	1.0000		0.1383	1.0000		0.1488	
								T (Theil index)				T (Theil index)

Note: Grey shading indicates those subgroups with an inequality contribution below -0.0050.

relative to their shares of households, have accommodated far fewer units through soft densification. Consequently, they made little contribution to the retention of a compact urban form, and their relative space advantage was for the most part sustained (although some subgroups, e.g. 4b1 and 4c3, faltered in this respect).

Between these two extremes are neighbourhood subgroups whose share of England’s households in 2001 was broadly similar to their share of the country’s residential space. These subgroups – amongst whom social housing tenants (subgroups within Supergroup 5 ‘Constrained by circumstances’) figured prominently – were little affected by soft densification. Soft densification was minimal in OAs in subgroups 5a1 and 5a2, where the unusually large share of elderly households might

imply less concern to densify even where units on estates have been sold to occupiers.

Intra-urban patterns of soft densification and de-densification

Finally, we consider how the process of soft densification has played out in individual urban areas. Every settlement, whether the overall trend was for density to increase or to decrease, contained areas both of densification and of de-densification. Each settlement’s unique extant urban form reflects both the historical development of its housing stock and the different opportunities afforded more recently to its constituent social groups within prevailing political-economic circumstances. Figure 1 illustrates this. It describes the patterns of soft densification across the SFRNs of three cities at the

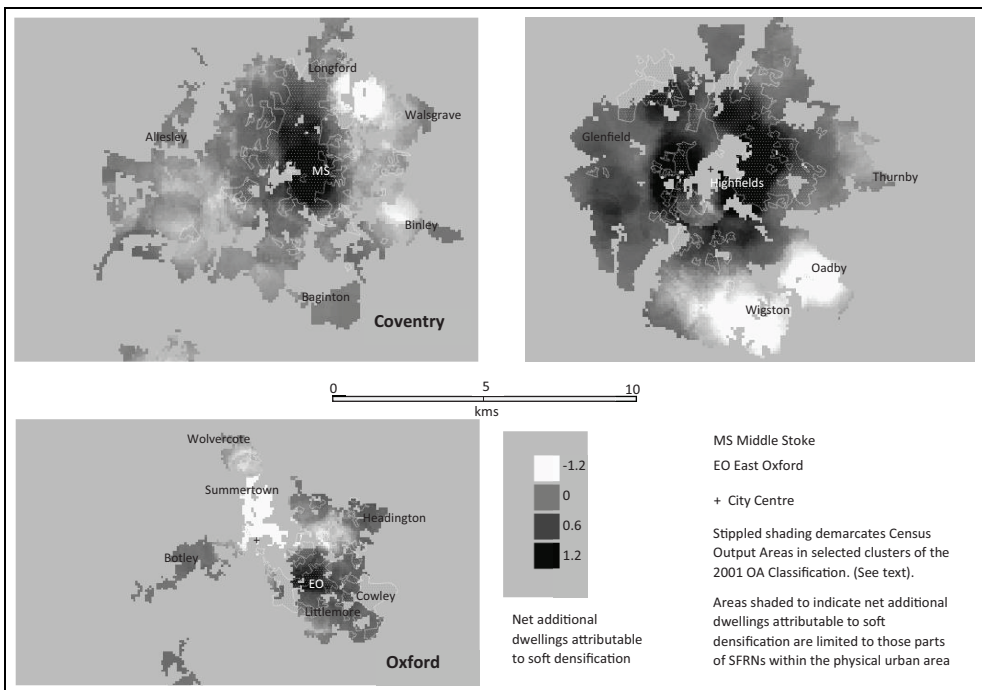


Figure 1. Intra-urban variation in soft densification of SFRNs in three English cities, 2001–2011.

hectare cell level (1 km moving average). Coventry and Leicester in the English Midlands both show marked soft densification in certain inner suburbs, the peak in Coventry being in 19th-century terraces to the east of the centre focused on Middle Stoke, and in Leicester around Highfields immediately to the south-east of the centre where student demand has added to pressure for subdivision. In the outer suburbs of both cities, relatively few units were gained through soft densification, and affluent residential areas of Leicester – most notably Oadby and southern Wigston – saw de-densification. Oxford exhibited a much starker contrast of outcomes, with amalgamation leading to de-densification in Summertown (the city's most expensive residential area), and the East Oxford suburbs showing marked soft densification. In all three cities, there was a tendency for the extent of soft densification over the decade to reflect neighbourhood social mix in 2001. In particular, there is a clear coincidence between neighbourhoods with high rates of soft densification and the four OAs whose residents already had the lowest shares of residential space (indicated by the stippled shading in Figure 1).

Conclusion

Cities are continually developing and evolving. Consequently, urban form is 'both the structure that shapes process and the structure that emerges from process' (Neuman, 2005: 22). The present character of a city is no more than a snapshot of the cumulative results of a continuous process of urbanisation; it is not a fixed condition. This poses problems for the analysis of the relation between urban density and spatial justice. Until recently, such analysis has been undertaken at the city level that, because it is cross-sectional, sheds no light on the processes of densification. In addition, it fails to

address variations in the intra-urban experience of densification and the redistributive effects to which they give rise.

Detailed case studies of particular parts of particular cities and/or of particular forms of residential densification have begun to address these shortcomings. However, the complex, contingent nature of densification that is revealed by in-depth analyses cautions against any wider conclusions being drawn from them. Additional challenges are posed by incremental residential development. Most metropolitan planning strategies focus on the large-scale activities of substantial actors. Small-scale, more informal, gradual, fragmented change '... slips through the cracks ...' (Pinnegar et al., 2015: 281). This is because, by its nature, such change is difficult to monitor and control. Nevertheless, its cumulative impact on urban form is considerable.

This was the context for our analysis. Our approach was comprehensive, covering all urban residential areas (SFRNs) in England. It was detailed, incorporating the various forms of densification and de-densification at the hectare cell level and aggregations thereof. It focused on soft residential densification, a poorly recorded and under-researched process but one that accounted for one third of net additional dwellings produced between 2001 and 2011.

The heterogeneity of the inter- and intra-urban experience of soft residential densification was considerable. In most urban areas, soft densification contributed to growth of the dwelling stock. However, the mix of infill construction and subdivision and conversion varied enormously, as did the offsetting effect of amalgamation. Overall outcomes thus mask significant differences in the behaviour of the constituent elements of change. Despite the heterogeneity of the processes and forms of soft densification, its implications for one aspect of urban spatial justice – the equitable distribution of residential space – are clear.

Fainstein (2010: 3) argues that ‘Our knowledge of what constitutes injustice is virtually instinctive – it consists of actions that disadvantage those who already have less ...’. This is precisely the outcome of the process of soft densification. Its incidence was markedly uneven at the neighbourhood scale. Just eight of 52 OA types accounted for half of all soft densification between 2001 and 2011. These neighbourhoods were already densely developed and were characterised by lower income households that occupied significantly less residential space than the average. Subdivision and conversion were the dominant forms of densification in these areas and contributed to a further loss in their shares of residential space. This resulted in an increase in the level of inequality in the distribution of residential space between different social groups in England between 2001 and 2011.

These findings constitute a significant addition to the debate around the interrelation between urban densification and socio-spatial justice. They also raise questions about the recent management of urban development in England. By the millennium, the possibilities for densification were framed by institutional structures with established predispositions towards both corporatist intervention and neoliberal *laissez-faire*. The former was articulated through continuing urban containment and a focus on the re-development of brownfield land; and the latter through increasing reliance on private sector provision of owner-occupied and rented accommodation (Bibby et al., 2020). These factors reinforced the supply-constrained nature of the market. Without the mitigating effect of the substantial provision of affordable social housing developed by local authorities during the post-war long boom, this is a market where everyone gets only what they are able to pay for. In these circumstances, subdivision is the most efficient way that small-scale developers can

produce additional dwellings affordable for those on lower incomes. By its very nature, this reduces the share of space available to the less well-off. Incremental development by way of infill, amalgamation and ‘knock-down’ produces larger and more expensive dwellings. Further inequality in access to residential space is the result.

These circumstances have major social implications, not least because changes in government planning and housing policy since 2010 have made it more regressive in nature. Urban constraint and the reliance on the private sector for housing supply have continued. Notwithstanding the recent focus on increasing the rate of new house building, under-supply remains a significant problem (Wilson and Barton, 2020). Demand-side support (provided, for example, by Help to Buy) is preferred to supply-side restructuring (such as a substantial increase in the construction of social housing), further raising house prices (NAO, 2017). Cuts in welfare provision in general and housing benefit in particular, combined with additional deregulation of the private rented sector, have further weakened the housing position of those on lower incomes (Stephens and Stephenson, 2016). The re-casting of planning as a market-driven system has been pursued with renewed vigour (Ferm and Raco, 2020). It seems likely, therefore, that the tendency for the distribution of residential space between social groups to become more unequal has continued since 2011.

Housing policy is a core constituent of social policy. The character of housing and of its immediate environment has a significant impact on residents’ quality of life, on their physical, mental and social health (Bonney, 2007; Brindley et al., 2018) and on their educational attainment (Friedman, 2010). It also affects residents’ access to facilities, services and employment, and their labour productivity. Consequently, the contribution of soft densification to increasing

inequality in the distribution of residential space is a matter of concern. Local small-scale developers are making decisions that collectively reshape cities, and are complicit in adaptive responses to structural constraint. At the same time, analysts and administrators are unaware of the significance of the actions of such developers. Hence further research is needed into soft densification and related policies.

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Data sources

This article is based on the analysis of data drawn from the following sources: the Land Use Change Statistics (LUCS), managed by the Ministry for Housing, Communities and Local Government (for details, see <https://www.gov.uk/government/collections/land-use-change-statistics>); and the Royal Mail’s Postcode Address File (PAF) (for details, see http://www.postcodeaddressfile.co.uk/products/postcode_address_file_paf/paf_product_detail.htm).


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Notes

1. That of the hectare cell (100 m × 100 m). They also allow for the provision of fine-grained context, such as the previous uses of land parcels (in the case of Land Use Change Statistics (LUCS)) or the classification of the type of building that might have been subdivided (in the case of Postcode Address File (PAF)).
2. The density of dwellings across an entire area (e.g. an administrative or statistical unit) as distinct from the density at which dwellings are built on a site. The ambient density is much lower than the site density, as the area over which it is calculated includes land in all non-residential uses including offices, parks etc.
3. An arbitrary cut-off point to keep Table 1 to a manageable size.
4. The OAs belonging to these subgroups in Coventry, Leicester and Oxford are picked out by the stippled shading in Figure 1.

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