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The Compact City and Social Justice

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Introduction

A significant body of sustainable development rhetoric stresses the importance of social equity or social justice (the two terms will be used interchangeably thoughout this paper) (e.g. CEC, 1990; CIDA, 1991; Blowers, 1992; Yiftachel and Hedgcock, 1993). Agyeman and Evans (1994) argue that virtually all interpretations of sustainability imply some element of equity. For example, Elkin *et al.* (1991) claim that:

> sustainable development involves more than environmental conservation; it embraces the need for equity. Both intra-generational equity providing for the needs of the least advantaged in society, and inter-generational equity, ensuring a fair treatment of future generations, need to be considered. (p.203)

The centrality of equity has been acknowledged in policy as well as theory. At the Rio Summit the attainment of social justice was seen to be a prerequisite for combating ozone depletion and global warming (Pepper, 1993, p.xi), and this view has subsequently been reflected in several European and national policy documents, such as the EC's first report on sustainable cities (European Union Expert Group on the Urban Environment, 1994). The definition of sustainable development suggested at the opening of the Aalbourg Conference on *European Sustainable Cities and Towns* (May 1994) was 'equity extended into the future', and the resulting *Charter of European Cities and Towns: Towards Sustainability* (CEC, 1994) acknowledged that urban sustainability can only be achieved through 'social justice, sustainable economies and environmental sustainability' (Mega, 1996, p.139). According to Mega, this shows that 'Social equity is finally agreed as being a precondition for the achievement of sustainability' (Mega, 1996, p.139).

However, of the different aspects of sustainable development, social justice issues have received the least attention in research. Empirical research has focused on environmental sustainability, perhaps because social sustainability is more difficult to define and measure. The limited research which addresses social issues has tended to focus on the quality of life rather than on differential effects across different social groups (Mowbray, 1991). Social Impact Analysis, cost/benefit analyses, and balance sheet approaches generally aggregate costs and benefits rather than address the diversity of experience (Breheny, 1984; Morris *et al.*, 1989).

It is now widely accepted, particularly in the fields of land use planning, urban design and architecture, that the most effective solution to achieving sustainability in towns and cities is

implementation of the compact city idea, that is, advocacy of high-density, mixed-use urban form (DETR, 1998; Urban Task Force, 1999; Rudlin and Falk, 1999; UK government, 1999). The claimed advantages of the compact city have been well documented - they include: conservation of the countryside; less need to travel by car, thus reduced fuel emissions; support for public transport and walking and cycling; better access to services and facilities; more efficient utility and infrastructure provision; and revitalisation and regeneration of inner urban areas (see, for example, Jenks *et al.*, 1996). By implication, compact urban form is deemed not only to support environmental conservation but also to promote social equity. Researchers have begun to test the validity of these claims, especially those related to travel behaviour, but the evidence remains contentious (Breheny, 1992; Williams *et al.*, 2000). Of all the arguments, perhaps the least explored and most ambiguous is the claim that the compact city is socially equitable.

This paper summarises the results of a large-scale study of the relationship between urban compactness and social equity (see also Burton, 1998; 2000a; 2000b). The objectives of this research were:

- to examine the validity of claims that the compact (higher-density, mixed-use) city promotes social equity; and
- to identify the aspects of urban compactness that offer the greatest potential for facilitating social equity.

Commentators from a wide range of fields argue that the priority for equity studies is the development of a methodology for its measurement (e.g. Truelove, 1993). According to Cutter (1995): 'The debates currently underway are not about the salience of concern, but rather how do we define, classify and measure inequity . . . Geographers can make a major contribution to the formulation of equitable public policies by producing the methodological support for equity analyses' (p.119; see also Zimmerman, 1994). In his discussion of equity more than 20 years ago, Alonso (1971) stated: 'It is extraordinary that there has been so little technical discussion of a concept so central to political economy' (p.42). The research described in this paper begins to address this omission by developing not only a working definition of social equity, but also a set of indicators for its measurement within the context of the built environment.

Methodology

In essence, the study is a quantitative investigation, comparing, through statistical tests, a number of social equity criteria in a large sample of UK towns and cities of varying compactness.

For the purposes of the research, the compact city was interpreted as a free-standing urban settlement and defined as exhibiting one, two or all of three attributes: high densities, mixed uses, and intensification. The first two attributes refer to static conditions or outcomes while the third refers to the compact city as a process. Each of the attributes embraces a variety of dimensions. For example, high densities can be measured in terms of either overall or net densities, and can vary according to housing form.

To carry out the investigation, it was first necessary to define social equity in the context of sustainability and in relation to urban form. There are many different interpretations of the idea of social justice but the one perhaps most relevant to the subject area is the notion of distributive justice - fairness in the apportionment of resources in society (Schaffer and Lamb, 1981; Scruton, 1982). For a city to be deemed fair or unfair, it must be assumed that it delivers a range of costs and benefits to its inhabitants, and it is the manner in which these are distributed that governs whether or not it promotes equity.

Ideas of justice can only be applied to the compact city if it is accepted that the phenomenon is open to the influence of human agency - that is, that it is not a purely 'natural' phenomenon. This is accepted on the basis that the compact city is a concept actively promoted in practice through policy, particularly land use planning policy (e.g. Eisenschitz, 1997). Cities can become more compact through development, via the mechanisms of the market and through the influence of interventions such as planning policy. Where land uses themselves are concerned (except in agriculture and forestry and major transport and energy projects), the current UK planning system has direct controls over certain kinds of change in the environment - through strategic and local plans and development control. Planning authorities have external effects on the environment by giving or refusing

permissions to land uses which themselves have environmental impacts (Jacobs, 1993). Distributional justice may be viewed in terms of both the fairness of the outcome of distribution (the end result) and the fairness of the actions and procedures that bring this about. The focus of this research was limited to an investigation of the fairness of the intended end result of the compact city proposition.

An appropriate theory for judging the 'fairness' of the distribution of impacts in the compact city was selected by identifying the most common understanding of social equity within sustainable development literature. Existing interpretations of equity tend to focus on the satisfaction of the needs of the worst off. In particular, much of the sustainable development literature advocates the elimination of poverty (World Commission on Environment and Development, 1987; Durning, 1989; Khan, 1995), an objective closely linked to the idea of distribution according to need. However, most sustainability arguments extend the idea of social equity from the provision for need to include a relative dimension - that is, a redistribution of wealth and resources from the rich to the poor, both across and within nations (Blowers, 1992; Maclaren, 1996). The basis for these arguments is that environmental problems stem not only from poverty but also from affluence and inequality. Mullaney and Pinfield (1996) assert that the equity (or social justice) principle embedded in the Brundtland definition of sustainable development concerns the fairness with which economic, social and environmental costs and benefits are distributed between people, and the *Charter of European Cities and Towns: Towards Sustainability,* presented at the Aalbourg Conference (CEC, 1994), argues that an unequal distribution of income and wealth is likely to have draining effects on the vitality of urban activities and to be a source of unsustainable lifestyles (Mega, 1996). This idea of social equity is linked to the concept of equality of condition, and may require positive discrimination in favour of disadvantaged groups. In the context of sustainability, the compact city may be considered to encourage a 'fair' distribution of costs and benefits if:

> *greater urban compactness is associated with benefits for the conditions or life chances of the disadvantaged, so reducing the gap between the advantaged and the disadvantaged.*

This definition is similar to Rawls' difference principle, according to which:

> All social primary goods - liberty and opportunity, income and wealth, and the bases of self-respect - are to be distributed equally unless an unequal distribution of any or all of these goods is to the advantage of the least favoured. (1972, p.303)

Advantage and disadvantage are often defined in terms of the possession of certain social or 'primary' goods. For example, Campbell writes (1988):

> justice has to do with the distribution amongst persons of benefits and burdens, these being loosely defined so as to cover any desirable or undesirable thing or experience. . . Primary goods are those things which are necessary for the pursuit of any objective which is compatible with the exercise of moral agency, including freedom of thought, liberty of conscience, freedom of movement, free choice of occupation, income and wealth, and the 'social bases for self-respect'. (p.34)

For the purposes of this research, 'the disadvantaged' were defined as those on low incomes - that is, those worst off in terms of the possession of one of the social goods identified by Rawls. Improving the life chances of low-income groups will therefore involve an increase in their share of primary goods. The research was limited to an investigation of the primary goods which appear to be most influenced by urban compactness; more specifically, it focused on the effects of compactness on income and wealth, and a further 'good', quality of life, which may be considered to be one of the 'social bases for self-respect'. The issues of freedom of thought and liberty of conscience, although undeniably important, are beyond the scope of the investigation, particularly as they are probably more closely linked to the management and ownership of the built environment than to characteristics of physical form itself.

In order to operationalise the research objective - that is, to examine the validity of claims that the compact city promotes social equity - it was necessary to identify the potential costs and benefits that

may be delivered by the compact city, and to determine the ways in which these may affect the life chances of the disadvantaged. In effect, this generated a series of claims, which could then be tested through empirical investigation. The claimed social equity impacts of urban compactness identified in literature and existing research are listed in Table 1.

Table 1. Summary of claimed effects of compactness on social equity.

Claimed effect (balance of evidence/opinion)	**Conflicting claims exist**	**Nature of evidence**
1. Better access to facilities (Rees, 1988; Bromley and Thomas, 1993; DoE, 1992)		sparse
2. Poorer access to green space (Breheny, 1992; Knight, 1996; Stretton, 1994)	✓	sparse
3. Better job accessibility (Beer, 1994; Laws, 1994; Elkin *et al.*, 1991)	✓	sparse
4. Better public transport (ECOTEC, 1993; Goodchild, 1994)	✓	contentious
5. Greater opportunities for walking and cycling (Bourne, 1992; Newman, 1992; Bozeat *et al.,* 1992)		contentious
6. Reduced domestic living space (Brotchie, 1992; Forster, 1994; Stretton, 1996)		sparse
7. Poorer health - general, mental and respiratory (Freeman, 1992; McLaren, 1992; Schwartz, 1994)	✓	contentious
8. Reduced crime (Jacobs, 1961; Elkin *et al.,*1991; Petherick, 1991)	✓	contentious
9. Lower levels of social segregation (CEC, 1990; Hamnett, 1991; Fox, 1993; Van Kempen, 1994)		sparse
10. Increased job opportunities for the less skilled (Porter, 1991; Des Rossiers, 1992; Castells and Hall, 1994)	✓	sparse
11. Less affordable housing (Town and Country Planning Association, 1994)	✓	sparse
12. Increased wealth (Minnery, 1992)	✓	sparse

A large number of indicators was devised to measure each of the three aspects of urban compactness (density, mix of uses and intensification – 41 indicators altogether) and the 12 different social equity effects (53 indicators altogether). In addition, as each aspect of social equity is subject to many influences, a further range of indicators was developed to measure possible intervening variables, such as the socio-economic status of the town or city and the level of unemployment. Indicators were also devised to measure composite values, for example, overall social equity measures. The nature of these indicators is summarised in Tables 2-5 (for sources, see Burton, 1998).

Table 2. Summary of compactness indicators.

Dimension of compactness	**Nature of indicators**	No. of indicators
1. Density		
Density of population	Persons and households per hectare (within administrative district), and average of wards (population-weighted).	3
Density of built form	Persons and households per hectare within built-up area and residential area of district.	4
Density of sub-centres	Density of most dense ward, average of 4 most dense wards and variation in ward densities.	3
Density of housing	Percentage of housing stock made up of higher- and lower-density housing, and small and large dwellings.	4
2. Mix of uses		
Provision of facilities (balance of uses)	Quantity of 'key' facilities, ratio of residential to non-residential land, and frequency of new sagents.	3
Horizontal mix/spread of facilities	Percentage of postcode sectors containing less than two, four or more, six or more, and all seven key facilities per postcode sector, variation in number of facilities per postcode sector, and variation divided by average number of facilities per sector.	6
Vertical mix of uses	Incidence of mixed retail/residential and commercial/residential development.	2
3. Intensification		
Increase in population	Rate of in-migration 1981-	2
Increase in development	Rate of new house building, change in proportion of small and large dwellings, derelict land reclamation and planning approvals 1981-91.	9
Increase in density of new development	Changes in conventional and population-weighted densities 1981-91 and 1971-91.	4
Increase in density of sub-centres	Change in density of most dense ward 1981-91.	1

Table 3. Summary of social equity indicators.

Social equity issue	Nature of indicators	No. of indicators
Access to superstores	Average distance to nearest superstore, from all wards, most deprived ward, and difference for most and least deprived wards.	3
Access to green space	Average distance to nearest green space, from all wards, most deprived ward, and difference for most and least deprived wards.	3
Job accessibility	Percentage of low-income employees working outside the district, in absolute and relative terms (compared with high-income groups), and change 1981-91.	4
Public transport use	Percentage of low-income employees who travel to work by public transport, and change 1981-91.	2
Non-motorised travel	Percentage of low-income employees who travel to work on foot or by bicycle, in absolute terms and relative to high-income employees, and change 1981-91.	4
Amount of living space	Rooms per household (average, and for three-person, low-income households); extent of overcrowding; inequality in housing size.	7
Health	Percentage of residents with limiting long-term illness; death rate from mental illness and respiratory disease.	5
Crime	Cost of home contents insurance - all postcode sectors, worst sector, and difference between best and worst.	3
Segregation	Segregation, by ward, of ethnic households, owner-occupiers, local authority tenants, car-less households and single parent households, average across all groups, and change 1981-91.	11
Job opportunities	Number of low-income jobs per relevantly qualified economically active resident, in absolute terms and relative to high-income jobs, and change 1981-91.	4
Affordable housing	Average price of lower-cost dwellings relative to average income of manual workers, and change 1983-91; average local authority rent; level of homelessness.	5
Wealth	Increase in price of lower-cost dwelling 1983-91, and increase relative to higher-cost dwellings.	2

Table 4. Composite indicators.

Variable	Description
Compact	Average of all compactness variables.
Dens	Average of all density variables.
Mixuse	All mix of uses variables.
Intens	All intensification variables.
Intpop	All population intensification variables.
Intblt	All built form intensification variables.
Sequity	Overall measure of social equity - average across all variables.
Xsequity	Overall measure of social equity excluding variables measuring changes over time (that is, intensification effects).
Seearn	Measure of social equity across all variables related to earning capacity.
Seexpend	Measure of social equity across all variables related to living expenses.
Seqofl	Measure of social equity across all variables related to quality of life.

Table 5. Summary of intervening variables.

External influences	Nature of indicators	No. of indicators
Level of car ownership	Percentage of car-less households.	1
Socio-economic characteristics	Deprivation (Townsend score); housing need; inequality in income; average income; percentage of middle class residents; percentage of wealthy households.	6
Social characteristics	Average household size; percentage of residents over pension age.	1
Size of manufacturing sector	Percentage of employees working in sector, and change 1981-91.	2
Unemployment	The young unemployed: all 16 and 17 year olds unemployed as a percentage of those employed.	1
Tenure	Percentage of households in local authority accommodation, and change 1981-91.	2
Region	Standard region of England (categorical indicator).	1
Type	Standard types of district (categorical indicator).	2
Size	Total residents; total built-up area.	2

The following 25 towns and cities were selected for investigation (Table 6).

Table 6. Sample of towns and cities.

Large non-metropolitan cities	Small non-metropolitan cities	Industrial	Districts with new towns	Resort and retirement
Derby	Bath	Great Grimsby	Crawley	Blackpool
Southampton	Cambridge	Luton	Harlow	Eastbourne
	Cheltenham	Ipswich	Northampton	Hastings
	Exeter	Scunthorpe	Stevenage	Southend-on-Sea
	Gloucester	Slough		Worthing
	Lincoln			
	Oxford			
	Worcester			
	York			

N.B. Cities divided into Craig's (1985) categories

These towns and cities represent all free-standing English districts (that is, administrative districts with less than approximately 10% of their perimeters bordering on neighbouring towns/cities) with urban populations of 80,000 to 220,000, where the district boundary is close to the edge of the built-up area.

Values for the indicators were obtained by collecting a vast quantity of data on the sample of towns and cities. These data were derived primarily from secondary sources such as the 1991 and 1981 Censuses of Population, *Local Housing Statistics, England and Wales* (e.g. DoE and Welsh Office, 1992), *Mortality Statistics* (e.g. OPCS, 1993) and *Property Market Reports* (Valuation Office, 1991), and a variety of methods and calculations were employed to obtain final values.

These values were then analysed using statistical tests. More specifically, levels of compactness were compared with corresponding levels of social equity across all the towns and cities, using Pearson product-moment correlation coefficients. The purpose of this was to identify any significant relationships between the two sets of indicators. Examination of the correlation coefficients revealed those aspects of compactness most strongly related to positive equity effects, and those aspects of

social equity most likely to be influenced by compactness. In addition, because compactness is not the only influence on social equity, step-wise multiple linear regression analysis was employed to establish the most important predictors of greater social equity from the whole range of compactness and intervening variables.

Findings

The findings are discussed in terms of the two main objectives of the research, stated in the introduction.

How valid are the claims that the compact city promotes social equity?

Does the evidence support the claimed social equity effects of compactness?

The findings supported some of the claims made about the compact city, and contradicted others, as shown in Table 7.

Table 7. Evidence for compact city claims related to social equity.

Compact city claim	Evidence
Better access to facilities	✓
Poorer access to green space	✓
Better accessibility to jobs	?
Better public transport	✓
Greater opportunities for walking and cycling	✓×
Reduced domestic living space	✓
Poorer health	✓×
Reduced crime	×
Reduced social segregation	✓
Increased job opportunities	✓?
Lack of affordable housing	✓
Increased wealth	×

✓= supports claim; ×= contradicts claim; ✓× = claim supported in some respects but not others; ? = evidence is ambiguous; ✓? = evidence is weak but tends to support claim.

How does compactness affect social equity?

From the analyses, a complex picture emerges of the ways in which elements of urban compactness influence social equity (see Table 8 for a summary of the different associations). When social equity is examined in terms of the different issues identified for the purposes of the research, it appears that some aspects of social equity are more strongly influenced by compactness than others. Nearly all of the 14 social equity effects (health split into three separate issues) are related in some way to urban compactness: job accessibility and wealth being the exceptions. Of these, the following - nine in all - were shown to be more strongly related to compactness than to any of the intervening variables, suggesting that urban compactness may be a highly significant influence on social equity:

- access to superstores;
- access to green space;
- public transport use;
- extent of walking and cycling;
- amount of domestic living space;
- death rate from mental illness;
- death rate from respiratory disease;
- crime;
- social segregation.

It is important to note that the intervening variables used for the research do not constitute an exhaustive list. Although they represent the most likely external influences on these aspects of social equity, there may be other factors that would be found to be more significant.

Table 8. Summary of significant relationships between compactness and social equity.

Social equity effect (on relative or absolute position of poor)	**Significant relationships with compactness**			More strongly related to intervening variables
	density	**mix of uses**	**intensification**	
1. Access to superstores (relative)	+ (households)			
2. Access to green space (relative)	- (households)			
3. Job accessibility				✓
4. Public transport use (absolute)	+ (pop./extremes)			
5. Walking and cycling	- (housing form)	+ (spread/no. facilities)		
6. Domestic living space (absolute)	- (net/pop./hshlds/ form)			
7a. General health	- (extremes)	+ (horizontal mix) - (vertical mix)		✓
7b. Mental health	+ (housing form)			
7c. Respiratory health		- (spread/no. facilities)		
8. Crime (relative)	- (net/pop./ extremes)			only relative position of poor
9. Social segregation (esp. by tenure)	+ (housing form)		+ (in-migration)	
10. Job opportunities		+ (vertical/no. facs) - (spread facs)	+ (non-res./derelict land)	✓ (for overall measure)
11. Affordable housing (homeowners)	- (housing form)		+ (higher densities)	✓
12. Wealth (absolute)	-? (housing form)			✓
Overall measure of social equity	+ (housing form)			
Overall measure of social equality	- (variation)	+ (spread/no. facilities)		

+ = positive relationship; - = negative relationship; ? = unclear.

The key issue for the research relates to where the potential of the compact city concept may lie, in terms of individual social equity effects. Bearing in mind that there is some doubt about the validity of the indicators, the findings indicate that compactness is likely to be associated with five negative impacts (in descending order of significance):

- less domestic living space;
- lack of affordable housing;
- poor access to green space;
- increased crime levels; and
- higher death rate from respiratory disease (but weak indicator).

But may offer the following benefits (in descending order of significance):

- improved public transport use;
- lower death rate from mental illness (but weak indicator);
- reduced social segregation;

and, with remedial measures, possibly

- greater scope for walking and cycling;
- better job opportunities for the lower skilled; and
- better access to facilities.

How significant, overall, is compactness for social equity?

When looked at in its entirety, that is, as a combination of all the different indicators, social equity has a limited relationship with compactness; the concept has to be broken down into its constituent elements for meaningful relationships to be apparent. For some composite measures of social equity, there are stronger correlations with compactness indicators than with intervening variables. For example, social *equality* is related to two compactness indicators - the mix of uses and variation in density - but is unrelated to any external factors. In the multiple regression analyses, social equity indicators affecting expenditure were found to be most closely related to the proportion of terraced housing and flats, while the social equity indicators affecting quality of life were related more strongly to intervening variables such as the proportion of local authority tenants in the town/city. Overall, the proportion of local authority tenants was the most important predictor of social equity: the higher the proportion of council housing, the better the social equity, especially if the drop in those employed in manufacturing is low. Perhaps this is because, to some extent, housing factors, including quality, location and form, are controlled by standards in the public sector. Social housing offers the opportunity to ameliorate some of the negative effects that the market would otherwise deliver to low-income groups. The findings also suggest that, altogether, as expected, housing tenure and structural changes in employment have a greater influence than compactness on social equity. Regional location also influences the effect of compactness on social equity, especially social and quality of life aspects.

Many of the specific social equity effects examined in the research proved in statistical tests to be more strongly related to compactness, or at least specific aspects of compactness, than to any of a substantial number of intervening variables. Close relationships with compactness were more obvious for some social equity indicators than others. For example, it was unsurprising to find that the amount of domestic living space per household is less in a compact city. However, it was rather more surprising to find that compactness indicators were the strongest predictors of performance on the health indicators.

Which forms of compactness are most beneficial for social equity?

There are several ways of assessing the relative merits of different aspects of compactness. For example, the evaluation may be based simply on the numbers of individual social equity effects influenced by each main category of compactness (density, mix of uses and intensification). From a cursory examination of Table 8, density appears to have the greatest influence on social equity, in that it is related to the widest range of social equity indicators. However, not all of these influences are positive. In contrast, intensification is related to only three social equity impacts, but appears to be positive for all of these. Table 9 summarises the differing influences of the three different categories of compactness.

Table 9. The relative influence of aspects of compactness on the range of social equity effects.

Aspect of compactness	**Significant influences** no./14	**Positive influences** no./14	**Balance of influence** (no. of positive minus no. of negative influences)
Density	11	4	-2
Mix of uses	4	3	0
Intensification	3	3	+3

High densities appear to be positive for four aspects of social equity: access to superstores, public transport use, lower death rates from mental illness and lower social segregation; mixed land uses for three: walking and cycling, general health and job opportunities; and intensification, for social segregation, job opportunities and affordable housing. However, although the high-density city yields the greatest number of positive influences, it may not be the most beneficial type of compact city, in that the positive influences are outweighed by negative ones. In terms of the balance of influence, intensification appears to offer the most potential. Furthermore, the possibility that other influences of intensification may become apparent over a longer time-period cannot be dismissed. This is encouraging for compact city proponents as it supports the validity of implementing the compact city concept in practice. In terms of individual indicators, it is impossible to identify any one aspect of intensification as most beneficial: nearly all the different types - higher densities, in-migration, non-residential development, and development on derelict land - are associated with greater equity in one form or another.

Although the mix of land uses has a neutral influence overall, there are certain aspects that seem to be mainly positive, namely the quantity of facilities within the city. In other words, the range and number of facilities is more beneficial than their geographical spread. There appears to be a complex set of relationships related to the mix of uses, stemming from subtle differences in the distribution of land uses around the city. Similarly, for density, while the balance of influence is negative, certain aspects appear to be mainly beneficial: in particular, the proportion of high-density housing forms such as terraces and flats.

The drawback of this evaluation is that it fails to take into account either the strength of each influence or the relative importance of each different social equity effect. It is impossible to derive unequivocal weightings for the 14 different social equity effects, as the significance of each will vary for each low-income household. As the basis for an alternative assessment, the compactness indicators were correlated with the overall/composite measure of social equity. From this, the only significant aspect of compactness that emerges is the quantity of newsagents in the city. This is not a key measure of compactness, but nevertheless seems to represent something important about the character of cities that are most supportive of social equity. As it belongs to the family of 'mix of use' indicators, it supports the theory that the mix of uses in a city is the most important aspect of compactness for social equity, contrary to the arguments above, but as the quantity of newsagents in an area is influenced by the nature of the predominant built-up or housing forms, there is a danger in reading too much into the relationship.

What seems to be clearer from the results is that the relative position of the poor (compared with the affluent) is better in a mixed-use city. Correlation tests show that mixed-use cities tend to be the most egalitarian: that is, the effects of compactness benefit the advantaged and disadvantaged

equally. This was true also for the extent of variation in density across the city: the smaller the variation in density, the better the relative position of the poor. It is important to note, however, that these findings do not indicate that the poor are better off in an absolute sense or compared with their counterparts in other cities. In terms of earning capacity, cities with a high proportion of flats and terraced houses and a low proportion of detached and semi-detached houses appear to be the most supportive of social equity, confirming the importance of high-density housing. It is, perhaps, such individual components of compactness that should be the focus of attention in attempting to maximise the contribution of the compact city to social equity.

Conclusions

The compact city has been advocated as a sustainable form of urban development. The concept of social equity is an integral aspect of this argument, but an understanding of how it is influenced by compactness has been severely lacking. The quantitative methodology used for the research has gone some way towards redressing this deficiency through the provision of empirical evidence. While compactness appears to be positive for some aspects of social equity, it may be negative for others. Speculation alone would not have elicited these findings - many of the compact city claims were found to be untenable. The broader analyses suggest that the compact city may promote *equality* rather than *equity*, since it is more likely to improve the relative than the absolute position of the poor.

The goal of the research was to answer the question: does the compact city promote social equity? The results indicate that there can be no definitive answer; compactness may support equity in some respects but not in others. The research has shown that the potential of the compact city is unquestionably dependent on the form it takes. Certain dimensions appear to be more beneficial than others are: in particular, positive effects are emerging in response to re-urbanisation and development of previously derelict land. In general, the cities which most support equity are those with a large proportion of high-density housing, in the form of terraces and flats, and a large quantity of locally provided services and facilities, but at a more detailed level the forms of compactness most beneficial for individual aspects of social equity vary.

It should be noted that the cities used in the empirical investigation have evolved through periods of both explicit and implicit spatial segregation (of use, social class and housing type). In addition, since the 1920s, this has been coupled with policies, market opportunities and practice based on decentralisation: for example, peripheral development of private and social housing took place in the inter-war period. Therefore, until recently, these examples of relative compactness are unmarked by a positive intention to 'compact' or intensify. This is likely to affect the nature of the findings: the influence of compactness may have been more marked had it been possible to identify examples of more deliberately compacted cities.

The importance of the findings lies not only in their contribution to the academic debate but ultimately in their implications for compact city policies, already in place in many countries. An improved understanding of the concept may allow the promotion of greater justice in its implementation. The research provides evidence to support the view that the compact city *may* support equity, but only if it is implemented in such a way that maximises the benefits and ameliorates the potential problems. Conflicts arise in attempting to identify future directions for policy, as forms of compactness that appear to be positive for some effects are negative for others. These contradictions need to be resolved if social equity is to be facilitated.

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