Mixing housing tenures: Is it good for social well-being?

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SUMMARY *Mixing tenures (tenure diversification) is now a widely accepted policy designed to tackle problems of social exclusion in disadvantaged neighbourhoods. However, the evidence base for the efficacy of mixing tenures is fragmented and ambiguous. With few exceptions, studies of mixed tenure effects have been small scale, one-off investigations of individual communities, providing only a rudimentary basis for comparative evaluation. Furthermore, these studies have paid little or no attention to such issues as how the level of mixing might impact on outcomes or how the geographic scale of investigation might influence results and conclusions. The present study has been explicitly designed to address some of these issues through a systematic, multi-scale investigation of the relationship between tenure mix and social well-being in Britain.*

Introduction

In the late 1990s mixing tenures (otherwise known as tenure diversification) was adopted by the then Labour government as part of a raft of policy initiatives designed to tackle the problems of social exclusion in disadvantaged neighbourhoods. The adoption of this policy, which relates predominantly to the promotion of owner occupation in areas of concentrated social housing, followed the recommendations of a series of high level reports from the Social Exclusion Unit of the Cabinet Office, from the Department for the Environment, Transport and the Regions (DETR), the Scottish Office and from the Urban Task Force on sustainable urban regeneration set up in 1998 by the Deputy Prime Minister (Rodgers, 1999; 2005). These recommendations were endorsed and adopted in the 2000 Urban White Paper (DETR, 2000). Under a variety of rubrics - 'Sustainable Communities' (ODPM, 2005a), 'Mixed and Inclusive Communities' (ODPM, 2005b) - mixing tenures is now a central ingredient of government neighbourhood regeneration policy.

In contrast to the enthusiastic adoption of tenure diversification by government, conclusions from much of the research on the efficacy of the policy as a mechanism for neighbourhood improvement tend to be ambiguous and, rather than endorsing the policy, typically offer a cautious commentary (see for instance Schwartz and Tajbakhsh, 1997; Power, 1997; Jupp, 1999; Pawson *et al*., 2000;

Atkinson and Kintrea, 2000; Kleinman, 2000; Ostendorf *et al*., 2001; Smith, 2002; Wood, 2003; Musterd and Anderson, 2005; Arthurson, 2005). The ambiguity and uncertainty associated with determining the impact of mixing tenure can, in part, be attributed to the lack of comparability between studies which have mostly been small in scale, one-off snap shots providing only a rudimentary basis for comparative evaluation. Further, few studies - the main exceptions seem to be some investigations from the USA (e.g. Brophy *et al* 1999) - have examined inputs. That is, they have paid little or no attention to how issues such as the level of mixing (the relative proportions of owner occupiers and social renters) or the geographic scale of investigation (the size of the community) might impact on outcomes. Evidence from such studies therefore provides little ground for generalisation or for an overall evaluation of the accomplishments of the policy. Exceptions to these small scale studies are provided by the work by Musterd (2002) in the Netherlands and by Musterd and Andersson (2006) in Sweden. In both these studies country-wide individual population data were examined longitudinally in an attempt to determine the impact of tenure mix. The results of the later (and more comprehensive) Swedish study were more positive (especially with regard to enhanced employment trends) than those for the Netherlands where negative effects on the employment prospects of some sections of the neighbourhood population were identified; these conflicting results add to the ambiguity and confusion over the impact of the policy.

In Britain, where disaggregated individual data covering large areas are not available, comparable studies to those from the Netherlands and Sweden are not possible. However, using aggregate small area from the decennial censuses for 1991 and 2001 and geocoded data from vital registration we have been able to construct a national level, ecological analysis of mixed tenure in Great Britain (England, Wales and Scotland). Using four outcome measures, unemployment, standardized limiting long term illness, standardized mortality and premature mortality our investigation seeks to address some of the lacunae of previous British studies. First, our study moves beyond the limitations of the one-off, case study approach in that it is national in scope, embracing the whole of Britain and involves a systematic comparison across two time periods. Secondly, we explicitly address the question of how the level of mixing between tenures affects outcomes. Thirdly, we attempt to identify the impact that the type of mixing - that is the spatial

distribution of different tenure groups within neighbourhoods - has on outcomes and, fourthly, we address the issue of scale, how the size of the neighbourhood might impact on outcomes.

Background to the study

The present day promotion of tenure diversification revives and furthers similar and related policies pursued with varying levels of enthusiasm by successive governments during the post war decades[1]- for example, in the design of communities and neighbourhoods for New Towns; in the 'right to buy' legislation of the 1980s; in the Estate Action Programme in England during the late 80s and early 90s; in the New Life for Urban Scotland initiative of the early 1990s, as well as in the policy guidelines associated with the English Neighbourhood Regeneration Programmes and the Social Inclusion Partnerships in Scotland, both launched at the end of the 1990s. Most recently tenure mix has been identified as a central tenet of the Housing Market Renewal Pathfinders initiative in England. With central government encouragement tenure diversification has been embraced by many local authorities, housing associations (Martin and Watkinson, 2003) and other organisations charged with responsibility for housing and social planning (e.g. the Housing Corporation's 'Neighbourhoods and Communities Strategy', 2006; see also, Scottish Homes, 2001; Communities Scotland, 2004; Scottish Executive, 2006;). Further, the adoption of a mixing tenures policy has received endorsement and encouragement from a number of independent housing organisations such as the Joseph Rowntree Foundation[2] (Cowans, 1999; Holmes, 2006), the Chartered Institute of Housing (2003), and most recently from the Confederation of British Industry (2005).

Britain has not been alone in pursuing mixed tenure as a way of dealing with disadvantaged communities. In the USA tenure diversification was a component of the HOPE VI programme (Popkin *et al* 2004), and mixed tenure policies have been adopted in Australia (Adelaide City Council, 2002) Ireland (Norris, 2005), the Netherlands (Priemus, 1998) and Malaysia (Ahmad and Rashid, 2005). Presently mixing tenure (under the rubric of 'social balance') is a contentious issue of debate and policy development in the European Union with Belgium, Denmark, Luxembourg, Finland, France and Sweden among those countries experimenting

with tenure diversification projects (Norris and Shiels, 2004; CECODHAS, 2004; FEANTSA, 2001).

Though there are differences in terms of the operational detail, the goals and objectives of these mixed tenure initiatives all share the assumption that the promotion of tenure diversification - the promotion of home ownership - in areas of concentrated social housing will provide a boost to the local economy and increase the overall levels of social well-being of area residents. [3] The spin-offs are assumed to be economic (e.g. boosting of local retail services) and social (e.g. providing behaviour role models for some incumbent social housing residents). Additional benefits are identified in terms of a shift in the perception of an area from one with a negative image, where financial credit is denied to residents and employers are reluctant to recruit, to one with a more positive image both externally and internally, the latter encouraging residential stability through a reduction in the out-migration of households. Similarly, it has been argued that mixing tenures can have a positive outcome on the health of area residents. Population stability, rising aspirations, better self-image and increased social capital – all identified as positively associated with tenure diversification – have been cited as correlates of improved health outcomes (see for example Easterlow *et al*, 2000 and Macintyre *et al,* 2002).

Notwithstanding the more positive, though often still tentative, outcomes of some recent research (e.g. Johnston, 2002; Knox *et al*, 2002; Groves, *et al* 2003; Allen, *et al* 2005; Berube, 2005; Holmes, 2006; Tunstall and Fenton, 2006), the evidence base for mixing tenure remains fragmentary and surprising insubstantial; indeed a recent authorative overview of mixing tenure concludes,

> A clear problem for those who have consistently asked for more socially diverse communities as the basis for sustainability and social equity is that this position has relied on an *intuitive* rather than explicit evidence-base. …research points directly at complex causative processes capable of generating negative as well as positive outcomes. This will remain a challenge to policy-makers who might see socially mixed communities as some kind of answer to urban problems. (Atkinson, 2005, p. 23; emphasis in original)

Our study is motivated by what we see is a need for more systematic, large scale quantitative studies of the impact of mixing tenure in order to test the evidence on which the policy is based. [4] Asking the question whether mixing housing tenures is good for social well-being, the objective of our research is to establish under what,

if any, circumstances tenure mixing in Britain is positively related to indicators of social well-being of an area's population. The perceived gains from the promotion of tenure diversification can be considered as a manifestation of 'neighbourhood effects'. This is the notion that the neighbourhood in which an individual lives can have an effect on the social well-being and life chances independent of the personal characteristics of that individual. From one perspective our study can be regarded as an attempt to identify 'neighbourhood effects' associated with mixed tenure: that is the impact mixing might have on the social well-being of the neighbourhood over and above that attributed to a change in the composition of the neighbourhood's population occasioned by the addition of owner-occupiers who on average are likely to be wealthier, have more stable employment histories and be better educated than social renters (See also Ellen and Turner, 1997; Atkinson. & Kintrea, 2001; McCulloch, 2001; Sampson *et al*., 2002; Lupton, 2003)

Objectives, Data and Definitions

The data sources for our analysis were the 1991 and 2001 population censuses [5] of Great Britain and data derived from vital registration averaged for the three years around each census date. Though comprehensive in coverage, there are a number of limitations to using the census as a research tool. The confidentiality regulations associated with the publication of census information prohibits access to individual data (see Rees and Martin, 2002 p.29), only aggregate data was available for our analysis.[6] For 1991 the Enumeration District (ED) in England and Wales, and the Output Area (OA) in Scotland were the smallest spatial units for which data was available. In 2001 all three countries used the Output Area as a basic level of data aggregation. Reliance on the census also imposed crucial limitations on the variables that could be utilised in the analysis. The range of variables is effectively predetermined by the questions asked at the time of the census and by the tabulations for small areas made available by the census office. Of particular relevance was the absence from the census of certain crucial measures - such as income - that may be of primary importance when trying to account for varying levels of social well-being.

In exploring the question 'Is mixing housing tenures good for social well-being?' we employed a series of regression models which tested the association between mix and social well-being while controlling for a range of other

explanatory characteristics. Our methodology therefore required (i) the selection of outcome measures, the dependent variables in the regression modelling, (ii) the identification of independent variables, other than mixing, which might have an impact on outcomes and (iii) the derivation of a measure of tenure mixing.

Initially we identified 5 potential outcomes, derived from the census, which measure social well-being. In our preliminary analysis three of these measures – percent vacant housing, percent migrants (moved house in the year preceding the census) and percent without a car – proved unsatisfactory as small area discriminators and were discarded from the main analysis. We supplemented our remaining two census measures with two further measures on mortality. These were derived from vital registration for three years around each census and geo-coded to allow for derivation of small area statistics. The final set of outcome measures are identified in the upper part of Table 1 (upper part); these comprised the dependent variables in our modelling for both 1991 and 2001.

<Table 1 about here>

Each of these outcome measures relates to some of the most important themes developed in the mixed tenure literature. Health, it has been argued, can be affected by tenure mixing in several ways: improvements in the quality of residential environment, including service provision, can impact on health via reductions in levels of stress; a better image of an area may result in increases in self-esteem and hence a lowering of the risk of illness; behavioural effects of living among people with different attitudes to health risk behaviours may also have a beneficial impact. Similarly, it has been argued that welfare-related variables, such as unemployment, may also be affected by housing tenure as unemployment may be lower in more mixed areas that are less stigmatised and where there may be less of a 'culture' of unemployment (Ellaway *et al*, 1998; Easterlow *et al*, 2000; Macintyre *et al* 2000; Galster *et al* 2000; Smith *et al* 2003). The scope of outcome measures used in this study have been limited by the availability of national level data, we have clearly not exhausted the range of outcome effects that might be attributable to tenure mixing; other (e.g. educational achievement, crime reduction) and less easily measured benefits (e.g. increase in social capital) might be

apparent but undetected by our analysis. However, since our outcome measures are of a relatively 'high order' we might have expected any gains in, for example, social capital and education, to be reflected in our measures of social well-being. Such inter-associations between measures of social well-being are, however, an under-researched area.

Throughout this paper we argue that if mixing tenure has a beneficial effect it should be displayed in better than expected outcomes in wards and output areas were mixed tenure is present, once the effect of other neighbourhood and population characteristics are taken into account. The range of explanatory variables we used in our models, apart from tenure mix, are identified in the second part of Table 1; each model incorporates different combinations of explanatory variables.

We included tenure in our model because of the well known and established association between concentrations of social renting and deprivation. This is clearly demonstrated in Figure 1 which reveals a progressively negative, albeit uneven, gradient for our outcome measures that steadily increases as the proportion of social renting increases.[7] Percentage social renting is therefore included in our models to account for the impact of social renting concentration. Similarly housing quality has a clear impact on health (see, for example, Smith *et al* 2003). Tenure mixing almost without exception is accompanied by neighbourhood regeneration either in the form of renovation of existing properties or more drastically through demolition and replacement. Improvements in housing quality with the elimination of dampness, condensation, overcrowding and so forth are therefore an integral part of diversification

<Figure 1 about here>

programmes. Our models attempt to account for these improvements and their impact on our outcomes through the inclusion of a range of census-derived housing quality measures: percent without central heating, percent overcrowded and percentage of housing vacant. Population characteristics and composition have a complex relationship with health outcomes, with age structure, household

composition and perceived health as well as class and ethnic composition and income among the most powerful correlates (Graham *et al*, 2001; Boyle *et al*, 1999; Ellaway *et al*, 2001; Kawachi and Berkman, 2003). We were able to derive direct measures of some of these from the census: age structure (percentage of the population in specific age groups), household composition (percentage lone parents), perceptions of health (percentage reporting limiting long term illness), class (percent in social classes 1 and 2) and ethnicity (percent white); income, as noted above, is not recorded by the census and proxy measures had to be devised, we chose - following established practice - percentage without a car and percentage unemployed.[8]

Notwithstanding the adoption of mixed tenure policies and their extensive academic investigation, there has been very little consideration of how 'mix' can be identified and measured. One measure of mixed tenure suggested by Tunstall (2000), following Harvey *et al* (1997), is the absence of a dominant tenure, that is where no tenure category exceeds 50%. Given the relatively low level of private renting in Britain (9.8% in both 1991 and 2001, see Table 2) such areas will be few; indeed in 1991, according to Harvey *et al* (1997), only 8% of enumeration districts in Britain could be classed as mixed on that criterion. In both 1991 and 2001 the majority of British households were owner occupiers; together with social renters they accounted for over 90% of all households. In practice, with few exceptions, mixed tenure policies, as applied to deprived estates, are concerned exclusively with the mix of social renting and owner occupation.

<Table 2 about here>

The measure of mix we have used in the following analysis is based on the proportion of owners and social renters in an area (ward or output area), and excludes the small proportion of the population who rent privately. Thus, mixing in a locality is measured straightforwardly as the percentage social renting. The question remains, however, as to how we decide what balance of social renting / owner occupation defines a mixed community; clearly areas that are 100% mono-tenure would be excluded, while areas with a 50/50 split are clearly mixed, but how far either side of a 50/50 split do we extend the range? Tunstall and Fenton

(2006, p 25) following their review of literature from the USA note that different levels of mix may trigger different effects. This is a view supported by our ward analysis of the association between the percentage social renting and our chosen outcomes measures (Figure 1) where the gradient of association is shown to be different for different outcomes. For these reasons we adopted a pragmatic approach designed to examine the incremental effects of mixing on each of our outcome measures, from the extremes of those places that are dominated by a single tenure to those areas that have more equal proportions of the two main tenures. In operationalising this procedure we grouped social renting into eight percentage categories: 0-9, 10-19, 20-29, 30-39, 40-49, 50-59, 60-69 and 70-100, the last category spanning a larger range than the others because the number of wards with over 70% social renting is extremely small for both census periods (see Table 3). A strict definition might consider only wards in middle categories - 40%-49% and 50%-59% social renting - as mixed tenure wards. However, since data for our outcome measures reveal a gradient that increases more or less steadily from the group with the lowest percentage of social renting to the group with the highest (Figure 1), we decided to include all but the two extreme groups in our definition of mixed tenure wards (i.e. wards with 10%-19%, 20%-29%, 30%-39%, 40%-49%, 50%-59%, and 60%-69% social renting are considered 'mixed'). The two extreme groups, 0-9% and 70-100% social renting we refer to as 'mono-tenure' to mark the dominance of one tenure (owner occupation and social renting respectively); it should be borne in mind, however, that the wards in these categories are at either end of a continuum.

<Table 3 about here>

Between-ward, within-ward and output area analyses[9]

Our analysis involved three interrelated stages. First, using wards as our base spatial unit we conducted a national investigation of variations in social well-being in relation to tenure mix across Britain (England, Wales, Scotland). Recognising the limitations (detailed below) of this 'between-ward' level of analysis, we adopted a second 'within-ward' approach which involved the derivation of a measure of segregation/dispersal of tenure groups within wards. These first two analyses provide a systematic examination of ward-level data for the whole of Britain. In our

third stage, to test a potential limitation of using wards as the basic unit of analysis - namely that their populations are too large to capture the impact of tenure - we switched the scale of investigation from wards to output areas.

Throughout our analyses, the hypotheses which we seek to either confirm or reject are that for the four indicators of social well-being (unemployment, standardised limiting long term illness, standardised mortality and premature death), once the proportion of social renting, housing quality and the characteristics of the population have been taken into account, will be lower (i.e. better) for mixed tenure wards than that predicted by the models.

Between ward analysis

For the between-ward analyses, we used General Linear Modelling (GLM) to measure the level of association across all wards between our explanatory variables and our four social well-being outcomes (Table 1) and from these to calculate *predicted* outcomes for each group of wards. The identification of a mixed tenure effect relies on the comparison of the observed value of an outcome measure (as recorded in the census) with a predicted value derived from our model, across tenure groups defined by percent social renting: a positive mixed tenure effect is recorded where the observed value (e.g. for unemployment) is lower (i.e. better) than the predicted value.[10]

Tables 4 (a to d) present the GLM models used in the between ward analyses. They demonstrate that the models for unemployment and standardised limiting long term illness were relatively strong, whilst those for the mortality measures were less so. The results from the models are summarised by social renting deciles in table 5. This shows that the only group of wards to demonstrate a significant advantage across all four social well-being outcomes in both 1991 and 2001 are those with between 10% and 19% social renting (Table 5, top line of grey shaded area). While this is a consistent finding, it is notable that social renting is clearly the minority tenure in these wards, which contain up to 90% owner occupation. Whether wards within this group can reasonably be said to be of *mixed* tenure is a matter of debate.

<Table 4(a to d) here>

More convincing perhaps, in relation to the mixed tenure hypothesis, is the finding that wards with between 20% and 29% social renting also show a significant advantage in relation to levels of unemployment, standardised limiting long-term illness and premature death (but not standardised mortality, see table 5, lower shaded area). Nevertheless, in these wards the proportion of social renting remains under one third of all tenures.

<Table 5 about here>

Of equal significance, however, is another consistent finding from our analysis: wards with 30% or more social housing demonstrate little or no advantage over mono-tenure wards. For the 30-39% group there are no recorded significant differences between observed and predicted values on any of the outcome measures. For other mixed wards (between 40% and 69% social housing), over both census periods, there is a significant *dis*advantage (i.e. observed values are greater than predicted values) in relation to some outcomes. This is especially the case for unemployment in both 1991 and 2001. In wards which we have defined as mono-tenure (below 10% social housing and 70% and over social housing) a pattern of significant disadvantage is identified for most outcomes. The exceptions are the lack of any significant difference between observed and predicted values for 2001 unemployment and mortality in wards where social housing dominates, and 1991 and 2001 mortality in wards dominated by owner occupation. Across all four outcomes and for both census years, there is a clear indication of a *general* disadvantage for those living in wards where social renting is the majority tenure. Thus it appears that even wards with, for example, 50% social renting and 50% other tenures, do not confer a significant social well-being advantage to residents. In relation to the debate concerning the efficacy of a mixed tenure policy, this is would seem to be of crucial importance.

Our between-wards analysis considered the differences between wards that have a mixture of tenure types, and those that do not. Thus, the findings of this analysis rely on a particular approach to identifying a mixed tenure effect (advantage or disadvantage) which compares the value predicted by the model

with that observed in the primary data across groups of wards defined by the percentage of social renting. The rationale for adopting this particsular method is that any effect of *mixing* tenures in a particular area would be *additional to* the independent effects of tenure, housing quality and the socio-demographic characteristics of the population in the area. In terms of the models, this *additional* effect would thus be found in the residuals of unexplained variance in the model for each social renting group. It must be noted, however, that other factors not measured in the model might also contribute to unexplained variance. This is particularly the case in relation to standardised mortality and premature death. For these outcomes the proportion of variance (adjusted R^2 in Tables 4 (a) to (d), bottom row) explained by the models is significantly lower than for the other outcome measures and suggests that some caution needs to be exercised in interpreting these results.

Within-ward analysis

A limitation of our between-ward analysis is that it takes no account of the distribution of tenures within wards. Wards are often quite large areas, with a very large range of population from a few 100 to over 30,000; there is therefore scope for considerable variation in terms of the spatial distribution of social housing within each ward. A section of the literature on mixing tenure suggests that for a real mixing effect to be present social housing and owner occupied housing should be 'pepper-potted' and not segregated within the area under consideration. Using data collected for output areas (enumeration districts for England and Wales in 1991), wards with different internal geographical distributions of tenure can be compared. The Index of Dissimilarity (Dorling and Rees, 2003) measures the proportion of social renting households within a ward that would have to move from one output area to another output area to create an even (integrated) distribution of tenures across all output areas within the ward; a score of 0 for a ward indicates full integration – no movement is necessary; a score of 1 indicates total segregation – 50 percent of each tenure group would have to change output areas; these are, however, theoretical extremes. The calculation of the Index is as follows:

$$D_{ab} = \frac{1}{2}\sum\left|\frac{P_a^i}{P_a^*} - \frac{P_b^i}{P_b^*}\right|$$

Where D_{ab} is the index of dissimilarity between groups *a* (social renters) and *b* (owner occupiers). P_a^i is the proportion of the population of area *i* in group *a*, and * represents all areas. N is the number of areas under consideration.

In our within-ward analysis ordinary least squares regression (OLS) was used to model the relationship between our explanatory variables and our outcome measures, with the level of recorded dissimilarity within wards entered as an independent variable. This allowed a direct test of whether or not the level of tenure mix within a ward was associated with better social well-being outcomes, taking into account the proportion of social renting, housing quality and population characteristics. Two models were specified: [11]

(a) the Basic Model where the outcome is predicted by the percentage of social renting in a ward and the level of within-ward tenure integration/segregation as measured by the Index of Dissimilarity;
(b) the Full Model where the outcome is predicted by the percentage of social renting in a ward, the within-ward level of tenure integration/ segregation as measured by the Index of Dissimilarity, and the independent (explanatory) variables measuring housing quality and population characteristics.

These models were run for the same four social well-being outcomes as in our GLM analysis: unemployment, limiting long term illness, standardised mortality and standardised premature death. If a mixed tenure effect is present we would expect outcome values for mixed wards (measured by percent social renting) with low segregation, (measured by the Index of Dissimilarity) to be significantly lower (i.e. better) than for non-mixed wards with high levels of segregation. We report the results for each of the outcome measures below..

Results for unemployment: The Basic Model (outlined in table 6) explains 38% of ward-level variance in unemployment in 1991 and 42% of the variance in 2001. In both years, the Index of Dissimilarity is significant ($p \leq 0.05$) and positively associated with unemployment such that levels of unemployment tend to be higher

in segregated than in mixed wards once levels of social renting have been taken into account. The Full Model improves on the Basic Model by explaining 78% of ward-level variance in 1991 and 81% of the variance in 2001. However, with the inclusion of housing quality and population variables, the Index of Dissimilarity is no longer significantly related to unemployment in either 1991 or 2001. These results suggest that, in general, neither tenure mixing nor segregation within a ward is associated with levels of unemployment which are better predicted by housing quality and socio-demographic variables.

<Table 6 here>

Results for limiting long term illness: The Basic Model explains 32% of ward-level variance in LLTI in 1991and 39% of the variance in 2001. In both cases, the Index of Dissimilarity is significant and positively associated with LLTI such that levels of LLTI tend to be higher in segregated than in mixed wards once levels of social renting have been taken into account. The Full Model improves on the Basic Model by explaining 71% of ward-level variance in 1991and nearly 85% of the variance in 2001. With the inclusion of housing quality and population variables, the Index of Dissimilarity remains significantly related to LLTI. However, the association is negative in 1991, suggesting that levels of LLTI tend to be *higher* in wards with tenure mixing relative to segregated wards, once other factors have been taken into account. This contrasts with the Full Model findings for 2001 when the Index of Dissimilarity remains significantly and positively associated with LLTI, indicating a mixed tenure advantage once other factors have been taken into account. The OLS model for standardised limiting long term illness is summarised in table 7.

<Table 7 about here>

Results for mortality: The Basic Model explains only around 13% of ward-level variance in mortality in 1991 and only 12% of the variance in 2001 (see table 8) . In both cases, the Index of Dissimilarity is significant and positively associated with standardised mortality such that levels of mortality tend to be higher in segregated than in mixed wards once levels of social renting have been taken into account. The Full Model improves on the Basic Model and explains around 23% of ward-

level variance in 1991 and 25% of the variance in 2001. With the inclusion of housing quality and population variables, the Index of Dissimilarity remains significantly related to mortality in both 1991 and 2001. The association is positive in 1991, suggesting that levels of mortality tend to be *lower* in wards with tenure mixing relative to segregated wards, once other factors have been taken into account. However, this contrasts with the Full Model findings for 2001 where the Index of Dissimilarity is negatively associated with standardised mortality, indicating a mixed tenure *dis*advantage such that mortality tends to be higher in wards where tenures are more mixed than segregated, once other factors have been taken into account.

<Table 8 about here>

Results for premature death: The Basic Model explains only 12% of ward-level variance in premature death in 1991 and 13% of the variance in 2001, as shown in table 9. In 1991, the Index of Dissimilarity is significant and positively associated with premature death such that levels of premature death tend to be lower in mixed than in segregated wards once levels of social renting have been taken into account. However, in 2001 the Index of Dissimilarity is significant but negatively associated with premature death such that mixed wards, with more even distributions of social renting, record higher levels of premature death once levels of social renting have been taken onto account. The Full Model improves on the Basic Model by explaining 38% of ward-level variance in 1991 and nearly 40% of the variance in 2001 (table 9). With the inclusion of housing quality and population variables, the Index of Dissimilarity remains significantly associated with levels of premature death in both 1991 and 2001. Mirroring the results for mortality, the association remains positive in 1991 and negative in 2001, indicating a change from a mixed tenure advantage to a mixed tenure *dis*advantage such that, by 2001, premature death tends to be *higher* in wards where tenures are more mixed than segregated, once other factors have been taken into account.

<Table 9 about here>

Overall, the evidence from our Basic OLS Models for 1991 supports the hypothesis that the spatial integration of tenures within wards, as measured by the Index of Dissimilarity, has a positive effect on employment, LLTI, mortality and premature death; for 2001 there is support for the hypothesis in relation to three of the outcomes (unemployment, LLTI and mortality), but not for the fourth (premature death). The Full Models, however, present a rather different picture (Table 10).

When other factors such as housing quality and population composition are taken into account, in only three instances is a significant positive association identified: LLTI in 2001, mortality and premature death in 1991. In the two latter instances the significant positive association of 1991 was reversed to a significant negative association in 2001; further, for both mortality and premature death the independent variables accounted for only a small proportion of the variance – less than 15% in the Basic Model and less than 40% in the Full Model. Thus, it is only in relation to LLTI in 2001 that our models provide any support for the notion that 'pepper-potting' tenures has a positive effect on outcomes. Indeed, some of the findings (i.e. those that report a negative relationship between the Index of Dissimilarity and well-being outcomes) could be interpreted as indicating the overall disadvantages of such a policy for the ward population as a whole.

<Table 10 about here>

Limitations of the between-ward and within-ward studies

While the advantages of national coverage are considerable, the limitations of this research must also be recognised. First, the use of ward-level data from the national censuses necessitates an ecological study. Thus, although levels of unemployment, limiting long-term illness, standardised mortality and premature mortality can be calculated for ward populations as a whole, no information is available for tenure groups within a ward. We do not know, for example, whether social renters have higher levels of unemployment than owner occupiers within the same ward. When interpreting the results, care must therefore be taken to avoid the ecological fallacy. In other words, even where a mixed tenure advantage is reported, it cannot be concluded that the advantage is experienced by the social

renters in a mixed tenure ward. Equally, the advantage refers to the average outcome across the population of the ward. It might be, therefore, that social renters benefit considerably but that this is tempered by a disadvantage to owner occupiers, or *vice versa*. Only individual level data would allow further investigation of who benefits (or does not benefit) from tenure mixing.[12]

Secondly, the number of wards in Britain declined between 1991 and 2001 as a consequence of boundary changes. Changes in area boundaries can influence modelling results since the definition and therefore populations of the areas, and consequently the composition of both housing tenure and resident population, will also change (see Openshaw, 1984 and Manley *et al.* 2006). Census areas that are consistent through time are not currently available for England and Wales but further research into the consequences of boundary changes for the model findings would be a useful extension of this project.

Thirdly, the use of small area data from the national censuses allows only cross-sectional analyses for both 1991 and 2001. The disadvantage of a cross-sectional approach is that no inference can legitimately be drawn about causal direction. Thus, although mixed tenure wards may be associated with better outcomes (lower levels of limiting long-term illness, for example) in some of the findings, it cannot be concluded that mixing tenures in a local area will 'cause' reductions in self-reported morbidity. All that is known is that there is a significant statistical association between the two. Further longitudinal research would be needed to reveal the nature of the causal connection.

The final limitation which we would want to identify in our research is that related to the scale of the analysis. Tunstall and Fenton have recently reminded us of the importance of this issue,

> Research suggests that mix within areas of different sizes – in terms of numbers of homes or residents – may be important for different outcomes. Key levels of scale are the level of neighbouring homes, streets or blocks that are parts of a larger development, and neighbourhoods of several hundred homes, typically with an associated cluster of services and shops. Without pepper-potting of different tenures, or mix at least within the same street, it is hard to gain much interaction between residents of different tenures. However, mix at the level of a five-minute walk or the primary school catchment area may be more important for creating markets for local shops or mixing school peer groups. (Tunstall and Fenton 2006 p 26)

Our between-ward and within-ward analysis adopted the ward as the basic unit of investigation. The average population of wards in Britain was 5,020 in 1991 and 5,791 in 2001, with maximum values of 31,612 and 35,102 respectively. These are large areas in which the effects of mixing could be lost simply because of the scale of the analysis, even when we take account of levels of dispersion and segregation within wards. Output areas provide smaller and more compact areal units: the mean population of output areas in Britain in 1991 was 362 and 296 in 2001; the maximum population was 1,803 and 4,156 respectively. Arguably these areal units more closely approximate the neighbourhood scale at which mixing effects are claimed to operate (see Atkinson, 2005). In order to test this we replicated our GLM between ward analysis for output areas.

A question of scale

In testing the impact of scale we limited our investigation to output areas in Scotland and to one outcome measure, unemployment. Our choice of Scotland was partly influenced by the suggestion made by Tunstall and Fenton (2006) among others (e.g. Jones, 2002) that the context of policy application may determine outcomes. Notwithstanding recent convergence, for a considerable part of its history Scotland has had a significantly different housing profile, especially in relation to social housing, and a different legislative framework for housing from England and Wales (Adams, 1975; Newhaven Research, 2006). We also narrowed our analysis of OAs to focus on the categories of mixing between 30% and 70% social housing. The reasoning here was that our earlier ward analysis revealed no positive and some negative associations between mixing and outcomes in this range of mixed tenures. For the 42,604 Scottish OAs in 2001 we calculated the predicted values of unemployment using the same GLM model as employed for the between-ward analysis.[13] The results of this analysis are shown by Scottish Council Area in Table 11.

Fewer than 3% (1153) of all Scottish output areas record a significant departure ($p \leq 0.05$) of the observed from the predicted value of unemployment and for over three quarters of these the predicted value of unemployment was lower than the observed. These are listed in by Local Authority area in Table 11. Of these 1153 OAs only 414 (36%) can be classified as mixed tenure on the basis of the measure employed in this paper, that is between 10% and 69% social renting;

approximately two-thirds are classified as mono-tenure. Of these 414 mixed OAs, 356 (86%) fall within our target range of 30-69% social renting. When we examine the results for our target range of mixing only 82 OAs demonstrate a better than predicted outcome value for unemployment, for the remainder (274 OAs) predicted unemployment was significantly lower than the observed: that is, mixing at this level seemed to convey a *dis*advantage in relation to unemployment.

<Table 11 about here>

The overall distribution hides some local level detail. Aberdeen City, East Lothian, Edinburgh and Midlothian are the only council areas where there is a greater number of significantly better than significantly worse OAs across all levels of social renting and for our target group 30-69%. In contrast, Dundee City, Glasgow and East Ayrshire demonstrate a predominance of significantly worse than predicted Output Areas. From the above table, given that Dundee and Glasgow have today, as well as in the past, a higher percentage of social renting than other Scottish local authorities, it might reasonably be assumed that those areas with mixed tenure and worse outcomes had higher levels of social renting, and those that had better outcomes had lower levels of social renting. Table 12

<Table 12 about here>

demonstrates that this is not the case. The two most significant features of this table are, first, that the proportion of social renting for the 'mixed and better' and 'mixed and worse' areas are very similar (57% and 58% respectively). This suggests that, for mixed tenure, it is not the direct proportion of social renters to owner occupiers that is the most important aspect in determining the employment outcomes of people. Secondly, high levels of social housing mono-tenure (over 70% social renting) appear to be no bar to better than expected outcomes with regard to unemployment. A total of 165 mono-tenure social housing OAs record a better than predicted outcome indicating that a high level of social renting does not automatically lead to social well-being disadvantage. In summary, our GLM analysis of OAs presents no clearer evidence of mixing effects than ward level

analysis. Even making allowance for the scale of analysis, we have not been able to demonstrate an advantage of mixing at the 30% to 69% social renting level.

Conclusions

Overall our analysis has demonstrated little support for the hypothesis that mixing tenures is good for social well-being. The results from our ecological study are consistent with the results of other large scale quantitative studies (Musterd, 2002 and Musterd and Andersson, 2006) that have used individual level data to investigate the efficacy of mixed tenures. In our analysis, the clearest positive association was established in our between-ward analysis. However, only wards with a predominance of owner occupiers and a clear minority (less than 30%) of social renters revealed a beneficial association, and even here for two of our outcome measures (mortality and premature death) the level of association was weak with less than 40% of variance explained. This raises the interesting question – rarely explicitly discussed in the literature – of what constitutes an 'optimal' tenure mix. Few studies, or indeed development plans for tenure-mixed housing, identify an 'ideal' level of mixing, preferring to taking a pragmatic approach to the issue and effectively arguing that local economic circumstances and demographic trends should be the determining factors. The results of our national survey suggest that 'optimal' mixing can be found only in wards with relatively low levels of social renting, and this was consistent over both 1991 and 2001. Once the proportion of social renting rises above 30% beneficial effects are not observable, even when we change the scale of analysis (as shown in our modelling of Scottish unemployment outcomes) from relatively large wards to relatively small output areas. Indeed our results suggest that there is a significant disadvantage, with regard to the outcome measures considered, to living in wards and output areas with 60% or more social renters (i.e. where social renters comprise a clear majority of households). Our between-ward analysis demonstrated that for wards with between 30% and 59% social renting tenure diversification has no observable significant effect. To the extent that mixing-tenure policies have been developed as a way of tackling the social problems associated with concentrated areas of social housing, this study would suggest that only a wholesale dilution of the concentration of social renting (from 60% and above down to 30% and below) will bring about the requisite gains attributable to mixing tenures.

The within-ward analysis introduced the 'Index of Dissimilarity' in an attempt to refine our definition of mixing. The results are more complex and less consistent over time than for our between-ward analysis. Only in relation to mortality and premature death was a significant and positive association between mixing tenures within wards identified for 1991; however, by 2001 the relationship for both these outcome variables had been reversed, within-ward mixing now significantly associated with higher levels of mortality and premature death. For limiting long term illness, the relationship between within-ward mixing as measured by the Index of Dissimilarity was significant but negative (mixing associated with higher levels of reported LLTI) in 1991. By 2001, in a reversal of the association, it was significant and positive (mixing associated with lower levels of reported LLTI). Our modelling revealed no significant relationship between unemployment and the Index of Dissimilarity. A similar level of ambiguous and incongruent results were apparent from our third stage analysis of unemployment outcomes for Scottish output areas.

To a degree the absence of a strong and consistent relationship between tenure mixing and beneficial social well-being outcomes is rather surprising in that, as indicated in the introduction to this paper, the decade 1991-2001 has seen the promotion of homeownership (through right-to-buy, and a plethora of shared and equity ownership schemes) and the adoption of tenure-mix programmes by many local authorities and housing associations in Britain; throughout this decade government policy has focused on the promotion of the idea of mixing tenures and the associated strategies of mixed communities and the provision of affordable housing in areas dominated by market-led exclusive owner-occupied housing developments. Given this focus and the enthusiastic take-up of the concept of tenure mix and its delivery by housing development agencies, clearer evidence of the beneficial effect of mixing tenures might have been anticipated. We have been unable to demonstrate a consistent mixed tenure advantage for our four measures of social well-being and two definitions of tenure mix (between-ward and within-ward analysis) for either 1991 or 2001. In these circumstances we are forced to conclude that the policy of deliberately mixing tenures in housing developments in order to improve social well-being remains largely unsupported by the research evidence so far available.

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Table 1: Measures of 'social well-being' for 1991 and 2001 with explanatory variables.

Measures		
i.	Percent unemployed*	
ii.	Age and sex standardised limiting long-term illness, self reported	
iii.	Age and sex standardised mortality ratio	
iv	Premature death rate - deaths per 1,000 population under 65 years	
Explanatory Variables		
i.	Tenure	percent social renting*
ii.	Housing quality	percent without central heating*
		percent in overcrowded accommodation
		percent of vacant housing*
ii.	Population	age groups
		percent white (ethnicity)
		percent social classes I and II*
		percent lone parents*
		age-sex standardised limiting long-term illness
		percent no car*
		percent unemployed*

* Where necessary, the variables were transformed to meet the requirements of the models, including the criterion of normal distribution.

Table 2: Tenure in Britain: 1991 and 2001 (%)

	England		Wales		Scotland*		Britain*	
	1991	*2001*	*1991*	*2001*	*1991*	*2001*	*1991*	*2001*
Owner occupied	67.3	69.8	70.1	72.2	52.4	63.4	66.0	69.3
Social rented	22.9	19.0	21.2	19.1	40.2	29.9	24.2	20.8
Privately rented	9.8	10.2	8.2	8.7	7.1	6.7	9.8	9.8

Table 3: Number of wards by percentage of social renting, 1991 and 2001

% Social Renting	**1991**	**2001**	**Diff**	**% Diff**
0-9	3101	2737	364	11.74
10-19	3298	3173	125	3.79
20-29	1641	1356	285	17.37
30-39	935	828	107	11.44
40-49	629	418	211	33.55
50-59	407	183	224	55.04
60-69	227	63	164	72.25
70-100	184	30	154	83.70
Total	*10422*	*8788*	*1634*	*15.68*

Table 4 (a) Unemployment (logged) model

	1991			2001		
	Significance	Partial Eta Squared		Significance	Partial Eta Squared	
Corrected Model	0.000	0.784		0.000	0.814	
Intercept	0.000	0.003		0.038	0.000	
% social renters (logged)	0.001	0.001		0.111	0.000	
% without central heating (logged)	0.000	0.001		0.000	0.002	
Overcrowding (dummy 1 = > 1.5 people)	0.000	0.002		0.000	0.014	
% vacant housing (logged)	0.000	0.019		0.000	0.036	
% aged 16-29	0.000	0.002		0.000	0.002	
% aged 30-44	0.000	0.012		0.000	0.004	
% aged 45-64	0.000	0.009		0.000	0.011	
White (dummy 1 = over 90%)	0.000	0.041		0.000	0.059	
% social class 1 and 2	0.000	0.003		0.000	0.008	
% children with 1 adult (logged)	0.000	0.097		0.000	0.021	
Standardised LLTI	0.000	0.159		0.000	0.151	
% without car (logged)	0.000	0.059		0.000	0.057	
Adjusted R Squared			0.783			0.813

(b) Standardised limiting long term illness

	1991			2001		
	Significance	Partial Eta Squared		Significance	Partial Eta Squared	
Corrected Model	0.000	0.709		0.000	0.846	
Intercept	0.000	0.011		0.000	0.286	
% social renters (logged)	0.238	0.000		0.000	0.012	
% without central heating (logged)	0.000	0.013		0.000	0.022	
Overcrowding (dummy 1 = > 1.5 people)	0.000	0.012		0.000	0.005	
% vacant housing (logged)	0.711	0.000		0.000	0.007	
White (dummy 1 = over 90%)	0.000	0.023		0.000	0.002	
% social class 1 and 2	0.000	0.076		0.000	0.244	
% lone parent (logged)	0.000	0.004		0.000	0.022	
% without car (logged)	0.000	0.055		0.000	0.164	
% unemployed (logged)	0.000	0.171		0.000	0.083	
Adjusted R Squared			0.709			0.845

(c) Standardized mortality.

	1991			2001		
	Significance	Partial Eta Squared		Significance	Partial Eta Squared	
Corrected Model	0.000	0.224		0.000	0.248	
Intercept	0.000	0.035		0.000	0.051	
% social renters (logged)	0.001	0.001		0.068	0.000	
% without central heating (logged)	0.734	0.000		0.424	0.000	
Overcrowding (dummy 1 = > 1.5 people)	0.069	0.000		0.020	0.001	
% vacant housing (logged)	0.000	0.007		0.000	0.022	
White (dummy 1 = over 90%)	0.000	0.005		0.001	0.001	
% social class 1 and 2	0.000	0.001		0.000	0.003	
% lone parent (logged)	0.000	0.002		0.000	0.013	
% without car (logged)	0.000	0.011		0.000	0.002	
% unemployed (logged)	0.000	0.014		0.000	0.011	
Adjusted R Squared			0.223			0.247

(d) Premature mortality (below 65 years old).

	1991			2001		
	Significance	Partial Eta Squared		Significance	Partial Eta Squared	
Dependent Variable	Premature mortality			Premature Mortality		
Corrected Model	0.000	0.378		0.000	0.390	
Intercept	0.004	0.001		0.000	0.033	
% social renters (logged)	0.000	0.002		0.097	0.000	
% without central heating (logged)	0.004	0.001		0.000	0.002	
Overcrowding (dummy 1 = > 1.5 people)	0.035	0.000		0.000	0.002	
% vacant housing (logged)	0.000	0.007		0.000	0.010	
% aged 0 -15	0.000	0.003		0.000	0.025	
% aged 16-29	0.000	0.009		0.000	0.015	
% aged 30-44	0.000	0.002		0.023	0.001	
% aged 45-64	0.000	0.014		0.052	0.000	
White (dummy 1 = over 90%)	0.000	0.027		0.037	0.000	
% social class 1 and 2	0.000	0.020		0.000	0.030	
% lone parent (logged)	0.000	0.006		0.000	0.007	
Standardised LLTI	0.000	0.002		0.000	0.020	
% without car (logged)	0.000	0.015		0.000	0.004	
Adjusted R Squared			0.377			0.389

Table 5: Observed and predicted outcomes

	Unemployment		LLTI		Mortality		Premature Death	
% social renting	**1991**	**2001**	**1991**	**2001**	**1991**	**2001**	**1991**	**2001**
0 - 9	>	>	>	>			>	>
10 - 19	<	<	<	<	<	<	<	<
20 - 29	<	<	<	<			<	<
30 - 39								
40 - 49	>	>		>				
50 - 59	>	>		>		>	>	>
60 - 69	>	>	>	>	>	>	>	>
70 -100	>		>	>	>		>	>

< observed less than predicted ($p \leq 0.05$) : > observed greater than predicted ($p \leq 0.05$)

Table 6: Unemployed (logged)

	1991		2001	
	Beta	Sig	Beta	Sig
Model 1				
Constant	0.99	0.01	0.24	0.02
Social Renting (logged)	0.30	0.00	0.39	0.00
Dissimilarity Index (logged)	0.11	0.00	0.09	0.01
Adjusted R Squared		0.384		0.421
Model 2				
Constant	0.35	0.07	-0.13	0.06
Social Renting (logged)	0.01	0.00	-0.01	0.00
Dissimilarity Index (logged)	0.00	0.00	-0.01	0.00
% without central heating (logged)	0.01	0.00	0.01	0.00
Overcrowding (dummy 1 = > 1.5 people)	0.03	0.01	0.07	0.01
% vacant housing (logged)	0.09	0.01	0.09	0.00
% aged 16-29	0.00	0.00	0.00	0.00
% aged 30-44	-0.01	0.00	-0.01	0.00
% aged 45-64	0.01	0.00	0.01	0.00
White (dummy 1 = over 90%)	-0.21	0.01	-0.22	0.01
% social class 1 and 2	0.00	0.00	0.00	0.00
% children with 1 adult (logged)	0.24	0.01	0.13	0.01
Standardised LLTI	0.01	0.00	0.01	0.00
% without car (logged)	0.24	0.01	0.21	0.01
Adjusted R Squared		0.783		0.813

Table 7: OLS Regression Standardised Limiting Long Term Illness

	1991		2001	
	Beta	Sig	Beta	Sig
Model 1				
Constant	48.73	0.72	45.22	0.79
Social Renting (logged)	15.37	0.23	18.26	0.24
Dissimilarity Index (logged)	3.54	0.24	2.19	0.26
Adjusted R Squared		0.321		0.388
Model 2				
Constant	19.23	1.90	89.13	1.51
Social Renting (logged)	-0.56	0.22	-1.89	0.20
Dissimilarity Index (logged)	-1.47	0.18	0.54	0.16
% without central heating (logged)	-2.82	0.24	-1.92	0.14
Overcrowding (dummy 1 = > 1.5 people)	-3.39	0.39	-1.74	0.24
% vacant housing (logged)	-0.40	0.35	1.64	0.20
White (dummy 1 = over 90%)	8.83	0.59	1.53	0.38
% social class 1 and 2	-0.39	0.01	-0.78	0.01
% children with 1 adult (logged)	3.35	0.43	4.76	0.35
% without car (logged)	14.20	0.55	16.31	0.39
% unemployed (logged)	24.86	0.54	8.57	033
Adjusted R Squared		0.711		0.845

Table 8: Standardised Mortality

	1991		2001	
	Beta	Sig	Beta	Sig
Model 1				
Constant	74.19	0.63	59.07	0.74
Social Renting (logged)	6.91	0.21	7.92	0.23
Dissimilarity Index (logged)	3.11	0.21	1.27	0.24
Adjusted R Squared		0.128		0.123
Model 2				
Constant	47.68	2.42	59.13	2.73
Social Renting (logged)	1.24	0.28	-1.01	0.36
Dissimilarity Index (logged)	1.30	0.23	-1.62	0.30
% without central heating (logged)	-0.03	0.30	-0.37	0.26
Overcrowding (dummy 1 = > 1.5 people)	-1.54	0.49	-0.70	0.43
% vacant housing (logged)	4.14	0.45	4.94	0.37
White (dummy 1 = over 90%)	5.44	0.75	-2.14	0.69
% social class 1 and 2	-0.08	0.02	-0.10	0.03
% children with 1 adult (logged)	1.87	0.55	7.28	0.64
% without car (logged)	5.99	0.69	2.98	0.71
% unemployed (logged)	8.61	0.70	6.63	0.60
Adjusted R Squared		0.226		0.250

Table 9: Premature mortality under 65 years of age

	1991		2001	
	Beta	Sig	Beta	Sig
Model 1				
Constant	1.61	0.03	1.37	0.03
Social Renting (logged)	0.30	0.01	0.31	0.01
Dissimilarity Index (logged)	0.07	0.01	-0.06	0.01
Adjusted R Squared		0.117		0.128
Model 2				
Constant	0.79	0.24	2.84	0.17
Social Renting (logged)	0.06	0.01	-0.04	0.01
Dissimilarity Index (logged)	0.03	0.01	-0.09	0.01
% without central heating (logged)	0.03	0.02	0.03	0.01
Overcrowding (dummy 1 = > 1.5 people)	-0.05	0.02	-0.05	0.01
% vacant housing (logged)	0.16	0.00	0.10	0.01
% aged 0-15	-0.05	0.00	-0.04	0.00
% aged 16-29	-0.02	0.00	0.02	0.00
% aged 30-44	-0.02	0.00	0.00	0.00
% aged 45-64	0.04	0.00	0.01	0.00
White (dummy 1 = over 90%)	0.16	0.03	-0.04	0.02
% social class 1 and 2	-0.01	0.00	-0.01	0.00
% children with 1 adult (logged)	0.10	0.02	0.22	0.03
% without car (logged)	0.36	0.03	0.32	0.02
% unemployed (logged)	0.46	0.03	0.21	0.02
Adjusted R Squared		0.378		0.395

Table 10: Association between tenure mix (including the Index of dissimilarity) and social well-being

	Basic Model		Full Model	
	1991	2001	1991	2001
Unemployment	Sig. positive	Sig. positive	Not Sig. positive	Not Sig. negative
LLTI	Sig. positive	Sig. positive	Sig. negative	**Sig. positive**
Mortality	Sig. positive	Sig. positive	**Sig. positive**	Sig. negative
Premature death	Sig. positive	Sig. negative	**Sig. positive**	Sig. negative

Sig. p≤ 0.05

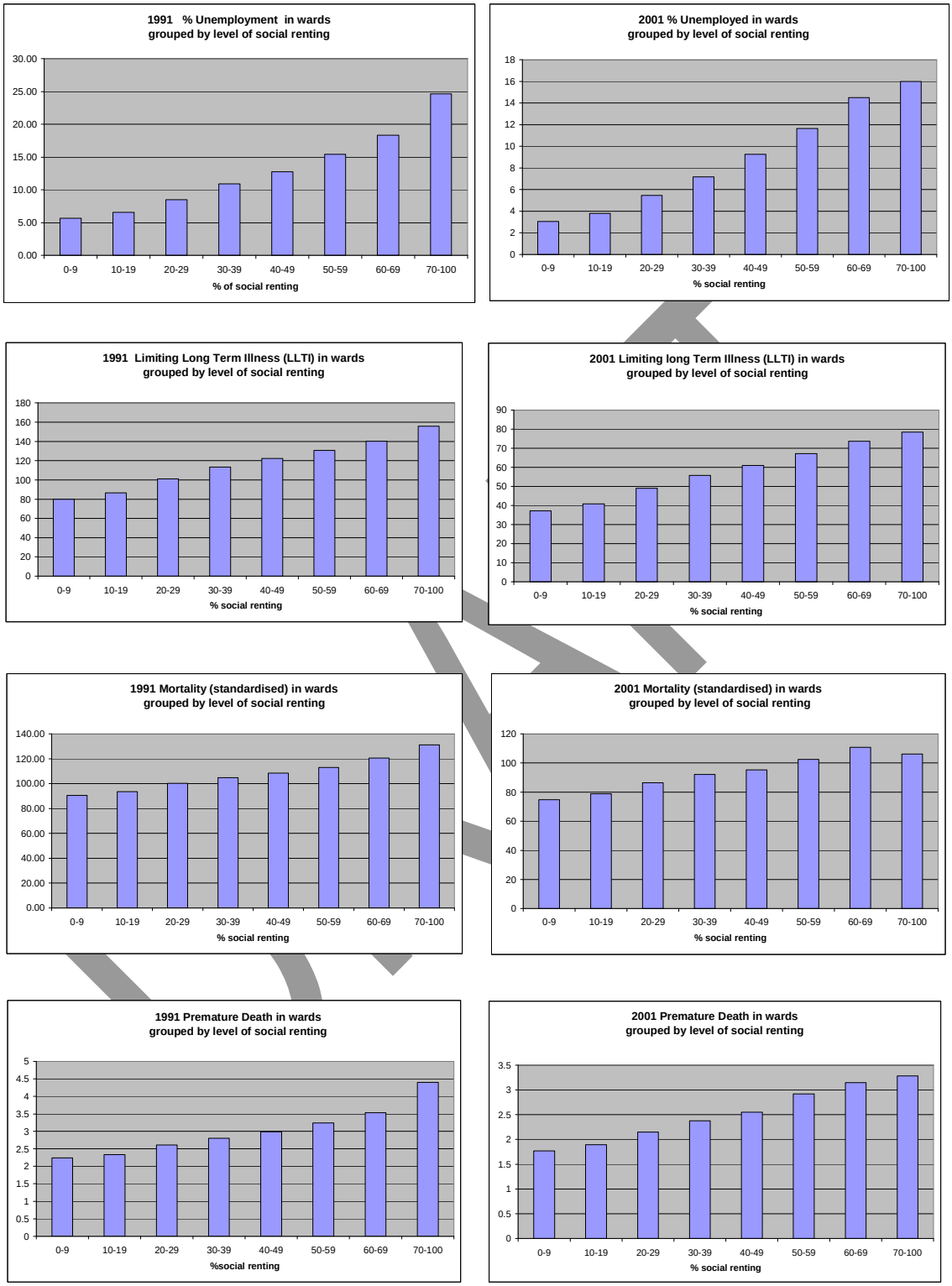
Table 11: Significantly better and worse Scottish OAs by Council Area

Council Area	Observed better than predicted	30- 69% social renting	Observed worse than predicted	30- 69% social renting
Aberdeen City	31	2	4	1
Aberdeenshire	3	0	8	1
Angus	1	1	18	7
Argyll & Bute	-	-	13	2
Scottish Borders	1	1	4	1
Clackmannanshire	2	1	2	2
West Dunbartonshire	7	1	32	10
Dumfries & Galloway	3	2	27	10
Dundee City	3	2	65	13
East Ayrshire	-	-	49	24
East Dunbartonshire	2	0	2	1
East Lothian	2	0	1	0
East Renfrewshire	2	1	5	2
Edinburgh	45	17	33	5
Falkirk	8	0	15	2
Fife	4	3	78	36
Glasgow City	71	29	300	71
Highland	1	1	29	5
Inverclyde	5	0	18	2
Midlothian	4	3	1	0
Moray	-	-	6	2
North Ayrshire	2	1	61	33
North Lanarkshire	16	3	55	17
Perth & Kinross	2	1	4	1
Renfrewshire	13	3	21	7
South Ayrshire	1	0	20	9
South Lanarkshire	16	9	18	9
Stirling	-	-	4	0
West Lothian	2	1	6	0
Eilean Siar	-	-	7	1
Total	247	82	906	274

Table 12: Average level of social renting by outcome.

Type	Social Renting %	Number of OAs
Mixed & better	58	82
Mixed & worse	57	274
Not mixed & better	84	165
Not mixed & worse	71	632

Figure 1: Social Renting against outcome measures.



Notes

[1] Sarkissian (1976; 1990) dates the origins of mixed tenure (social balance) policies to mid 19th century.

[2] The JRF has been a particularly strong and vociferous advocate of the policy and through the Joseph Rowntree Housing Trust (an established charity and registered social landlord) has implemented a mixed tenure programme on its own housing estates.

[3] Mixing tenures is also an accepted and encouraged practice in the development of new housing developments, Fitzpatrick (2004), for instance, identifies three mixing strategies : moving poorer people into wealthier areas, ; moving wealthier into poorer areas ; mixing poor and wealthy residents in new developments.

[4] Tunstall and Fenton (2006) are critical of research that merely reproduces what they label 'further quantitative measures'. Such measures they recognise are useful in evaluating policy interventions against their proclaimed objectives and are therefore able to demonstrate 'what works'. However, for Tunstall and Fenton, quantitative measures reveal little about how outcomes are produced; that is, about process. Instead, they favour detailed in-depth studies that track the experiences of individual households over time. These they argue 'could contribute to our understanding of how different types of household fare in different areas' (Tunstall and Fenton 2006, p 45). Undoubtedly such studies would yield important and revealing data. However, Tunstall and Fenton have perhaps, as we seek to demonstrate in this paper, been too hasty in dismissing the usefulness of the derivation of further appropriate 'quantitative measures'.

[5] The census is a questionnaire survey of the population of the United Kingdom. It has been carried out every year since 1801, with the exception of 1941, the most recent of which was carried out in 2001 on 29 April. It is the only comprehensive record covering the full population of the United Kingdom, where it is a legal requirement that it is completed accurately and on time. Thus, the Census is a prime resource for research on the UK population, and data from the decennial censuses are available to the academic community for research purposes.

[6] The Sample of Anonymised Records (SARs) provides access to individual level data. However, these data are only available for a small sample of the population. 2% for 1991 and 5% for 2001 and are released only with a geographic coding for areas containing more than 270,000 people.

[7] The only exception to this negative gradient is for the mortality rate recorded in 2001 for areas with the highest concentration of social housing.

[8] When modelling unemployment and limiting long term illness these measures were omitted from the independent explanatory dataset.

[9] For further detail on our between ward and within-ward analysis see Doherty *et al* (2005).

[10] Individual ward observed and predicted values were summed and averaged across each social renting group.

[11] Those wards (491 in 1991 and 7 in 2001) which contain only one output area (or enumeration district) were excluded from the analyses.

[12] We explored the use of data from the 1991 Sample of Anonymised Records (SARs) which allow the modelling of outcomes for individuals rather than population groups. However, the findings from these analyses are not reported here because the analyses for 1991 require generalised assumptions about the tenure mix of the ward in which individuals reside, and because equivalent model variables are not available in the 2001 SARs data. Moreover, these data are only available for a small sample of the population, 2% for 1991 and 5% for 2001 and are released only with a geographic coding for areas containing more than 270,000 people.

[13] Vital registration data with geocoding are not available at the OA level; consequently mortality and premature death were excluded from the set of independent variables.