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Internal migration in Great Britain – a district level analysis using 2001 Census data

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Abstract

This paper makes use of the Special Migration Statistics (SMS) from the 2001 Census to explore the magnitude, composition and pattern of population migration within Great Britain. Age and sex differentials are examined through the use of migration schedules, whilst spatial patterns of net migration balances and rates are explored using other graphic and cartographic techniques. Much of this analysis is bound within a district classification framework; the use of which, in conjunction with these techniques, has helped reveal new characteristics and patterns. In addition, rates of 'turnover' and 'churn' have been used to assess population stability for districts and area classification aggregations thereof within Britain – analysis which helped overcome some of the limitations inherent in standard net rate calculations.

Our findings are that at an aggregate level, familiar past trends such as counterurbanisation can still be identified, but by using the Vickers *et al.* classification, these aggregate migration patterns can been deconstructed, revealing spatially varied trends of both counterurbanisation and urbanisation across Britain. Population stability, defined by turnover and churn analysis, is broadly reduced in urban areas and increased in rural areas, although stability varies greatly across age groups. Following these findings it is useful to conceptualise a two-tier 'rural' in Britain; a rural Britain with a relatively stable population, characterised by some in-migration, and a rural Britain with a far less stable population featuring migrants with characteristics similar to those found in London. Finally we find that the effect of age and sex on the propensity to migrate is key, however these attributes interact with the particular socio-demographic, economic and environmental characteristics of places (as characterised by the Vickers *et al.* classification) to produce specific migration profiles for different areas.

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1. Introduction

The importance of studying internal population migration within the UK has long been recognised. Internal migration is a major contributing factor to population change in almost all areas of the country. This involves not only change in the numbers of people (although this is important in itself), but also the change in the composition and structure of local populations which can have implications for issues such as service provision, social cohesion, the physical environment and local economic development. Detailed knowledge of intra-national movements of the population has been important for a long time. Recognising this, various studies have been carried out over the years – all of which have enhanced our knowledge and understanding of the trends in internal population movements at a range of spatial scales and over different periods of time.

This paper is a further addition to our understanding of internal population migration. Whilst there are a number of defining characteristics of migrants, such as their age, sex, ethnicity, socio-economic status, religion or family status, the focus here is on the major demographic variables of age and sex, principally because some of the most interesting variations in the propensity of a person to migrate can be ascribed to these attributes. The paper aims to provide a detailed account of internal migration in Britain in 2000-2001 for these variables, using a number of different descriptive techniques. To begin, in order to establish the context for what follows, the next section contains a short review of some of the historical work that has been carried out on internal migration in the UK.

2. *Recent studies of internal migration in the UK*

A number of authors have considered aggregate internal population migration trends in the UK. Stillwell and Boden (1986) used Census and National Health Service Central Register (NHSCR) data to examine aggregate national (British) patterns of migration between the 1961 and 1981 Censuses. They showed that, on a national level, the rate and level of migration increased throughout the 1960s before entering into a noticeable decline during the 1970s from 5.8 million migrants in 1970-71 to 4.7 million in 1980-81. Over the two decades, the majority of migrants were female, although rates were higher for males. Stillwell and Boden acknowledge the limitations of decennial census data, especially where there is a desire to understand inter-censal movements. To address this they use annual movements estimated from the NHS Central Register between 1975 and 1983, focusing specifically on age-related migration schedules. They conclude that whilst a decline in the level of mobility can be seen in the 1970s when compared to the previous decade, the age and sex characteristics of migrants remained relatively stable.

Rees and Stillwell (1987) extend this national aggregate picture of internal migration through examining internal migration in regional and metropolitan/non-metropolitan contexts. Again the principal data sources are the census and NHSCR re-registration data, this time from the mid-1960s to the mid-1980s. The regional pattern over this twenty year period is one of the northern periphery (including Northern Ireland, and Scotland), the Industrial Heartlands (including the North West, Yorkshire and the Humber, the West Midlands) and Greater London all experiencing net out-migration, with the south (including the East Midlands, East Anglia, the East and South West) experiencing net in-migration. This north-south shift has also been identified by authors including Champion (1989b) and Owen and Green (1992). A regional perspective on migration at this time was also taken by Ogilvy (1982) using the NHSCR data. As might be expected, comparable findings were presented, although Ogilvy placed emphasis on the drop in out-migration from the South East during the 1970s rather than the increase in in-migration as the reason for continued net gains.

Whilst these regional patterns add detail to the national scene depicted by Stillwell and Boden (1986), it is recognised by Rees and Stillwell (1987) that the examination of trends at a regional scale can mask important movements between metropolitan and non-metropolitan areas. During this time period, the dominant trend is one of a decentralisation of population, with movements from the ‘core’ of metropolitan areas to the ‘fringe’, and more generally from metropolitan areas to non-metropolitan areas. Indeed, the process of ‘counterurbanisation’ in Britain at this time has been reported elsewhere by Kennett (1980), Champion (1989a, 1994) and Cross (1990).

The loss of population from metropolitan to non-metropolitan areas recognised throughout the 1970s did not abate in the 1980s. Stillwell *et al.* (1992) note the continuing trend of metropolitan out-migration throughout this decade. In volume terms, the last three years of the 1980s saw counterurbanising moves account for 37% of the total internal migration movements (according to NHSCR patient re-registration data) when compared to north-south moves accounting for only 27% of total internal migration movements. It is further demonstrated that, in the 1980s, the metropolitan areas were only gaining population from the student and immediately post-student quinary age-groups. Whilst an overall trend of counterurbanisation in Britain is identified here, when examined closely, the trend is highly region-specific. It is noted that in the north, whilst there was a net out-migration from metropolitan areas, there was not a noticeable corresponding net in-migration to non-metropolitan areas. The trend in the north of Britain was more likely to be the movement from north to south, than the movement from urban to rural. Certainly whilst this north-south movement pattern is the important trend for most of the 1980s, one significant point of interest occurs at the end of the 1980s. Whereas the net flow had been into the south from the north since the mid 1970s, Stillwell *et al.* (1992) show that an increase in the movement of migrants northwards had in fact tipped the balance slightly in the favour of a net gain to the north in 1989.

Rees *et al.* (1996) used data from the 1991 Census to show a continuation of the trend of depopulation from urban areas that had been revealed in previous decades. This applied both to the largest metropolitan areas as well as the smaller cities. It was further shown that resource regions associated with much of Britain’s dwindling primary industry (such as mining and fishing) were losing population, whilst new ‘resource frontier’ regions (broadly associated with offshore industry) were gaining migrants.

Other trends identified were associated with the predominance of the 1-15 and 30-44 year old age groups in the overall patterns of migrant redistribution, and with lower mobility but clearer patterns of redistribution at retirement and post-retirement ages. There was a noticeable urbanisation of the 16-29 age group, associated with student movements to higher educational institutions which were often found in large urban areas – a trend familiar from previous decades. Rees *at al.* (1996) highlight that there was a ‘downward and outward’ redistribution of population from cities, meaning that population was redistributed both down the urban hierarchy from larger to smaller urban centres, and out from urban centres into rural fringes. The latter did not necessarily indicate the return of a desire by people to live rural lifestyles, but rather was the result an expansion of pre-existing urban systems into areas otherwise identified as rural.

Looking into these patterns in more detail it was noted that there appeared to be a propensity within the migrant population to move from higher to lower density areas on the whole; this was coupled with a shift from areas suffering from above average unemployment to areas with below average unemployment. Indeed, all of the findings by Rees *et al.* echo and bolster the regional level work of Stillwell *et al.* (1995) for the same period. Subsequent work by Kalogirou (2005) on England and Wales, lends further weight to these findings.

A further overview of internal (and international) migration in this period is provided by Champion *et al.* (1998). As would be expected, the aggregate patterns recounted are no different from those already covered in this review. Where this latter overview differs is that it brings into focus the issue of scale. Work already mentioned has examined migration at different spatial scales; however, here the effect of scale on results is discussed explicitly. Due to the preponderance of short distance moves over longer distance moves, inter-area flows become more important when the scale of analysis is smaller. In addition, regional level analysis will, for example, emphasise the importance of international migration as the major component of population change, whereas analysis at more disaggregate scales will promote the importance of internal migration.

One key conclusion made by Champion *et al.* (1998) is that at the regional level, the traditional drivers of flows between areas such as the availability of employment have at this time been replaced by the determinants more commonly recognised as influencing shorter distance moves, such as housing or environmental factors. This assertion is backed up by the evidence that the largest inter-regional moves are between adjacent regions, and perhaps more importantly, adjacent counties on either side of regional boundaries. Of course, migration influencing factors such as employment opportunities, housing supply/demand and population density will differentially affect migrants at different stages of the life course, and so the conclusions of Rees *et al.* (1996) that place emphasis on the role of employment in migration, as well as environmental factors such as population density, should not be discarded in the light of these new findings. Indeed, work elsewhere by Fielding (1992) (which places central importance on employment as an explanatory factor for internal migration), and Cameron *et al.* (2005) (which turns its attention to housing), each offer persuading evidence of the influence of employment and housing respectively on regional level internal migration.

Thus far we have reviewed work which has drawn on data available before the 2001 Census. Despite internal migration data from the 2001 Census being available since 2003, there has been relatively little work carried out on internal migration patterns in the new millennium. Standing out from this relative dearth is a study published as part of the ONS (2005) 'Focus On' publication in which Champion (2005) provides a wide ranging overview of internal migration in the UK, drawing principally (although not exclusively) from the 2001 Census.

Champion indicates that, in 2000-2001, there were around 6.7 million internal migrants nationally, but comments that little difference is evident in the migration propensities of males and females; at least at an aggregate level (propensities vary much more with age). Where age (the other key demographic indicator often mentioned with sex) is concerned, however, the situation is somewhat different. The trend in 2001 (as in previous years) is that young adults have the greatest propensity to migrate. This coincides with the now familiar movement of many in their late teens to university, and then away from these locations as students move on to their first jobs after completing higher education courses. The tendency to migrate reduces with age after young adulthood until around the age of 75. As in previous years, age-specific migration follows a familiar pattern with a reduction in the propensity to migrate from the mid-twenties to the mid-thirties, corresponding with family raising and the desire for settled child rearing. This decline in migration propensity continues until around pensionable age. From here there is a noticeable increase in the rate of migration and this can be attributed to the 'defensive' moves of older individuals as dependency and insecurity increases with age. Migration at this age can readily be attributed to moves associated with a greater need for care or to be within proximity of family.

Champion outlines the broad national trends for other demographic variables featured in the 2001 Census. The migratory patterns of individuals classified by marital status, family type, health, housing tenure, economic activity, industry of employment, occupational level, qualifications and ethnicity are all summarised briefly in relation to the whole country, with the overall (highly generalised) picture being that single or childless adults, those who did not own their own homes or individuals who were more qualified or in a higher socio-economic group were generally more likely to migrate. Home owners, parents or lower socio-economic groups were generally less likely to migrate. The white ethnic group also had marginally lower migration tendencies than non-white groups.

Champion examines some of the sub-national migration patterns that are displayed by the results of the 2001 Census. At the district and ward level, the salient point is that districts and wards with the highest proportions of people living at a different address one year ago tend to be those with highest student populations. Unlike the 1991 Census, when students were recorded at their parental domiciles, the 2001 Census recorded students at their term-time addresses and therefore contain counts of student 'migration'. At the other end of the scale, those districts and wards with the lowest proportions of their populations consisting of people who lived at a different address one year previously were frequently located in Northern Ireland. Mapping reveals the relative importance of coastal and rural retirement areas where higher migratory rates are present.

Another key feature of internal migration from the 2001 Census picked out by Champion is the pervasiveness of net urban-rural migration across the whole of the UK – not just where London is concerned. Using a classification of districts adapted from work carried out in the early 1980s, he demonstrates that metropolitan areas are continuing to lose migrants to rural areas. The validity of using a classification for areas devised in the 1980s should be questioned to some extent, especially when considering the amount of change that has taken place in the socio-demographic and physical characteristics of many of these areas since then. However, one might suspect that, under scrutiny, these broad patterns are likely to be more-or-less accurate at this aggregate level.

Finally Champion takes a somewhat more detailed look at the geographical variations in the interaction flows of four specific population characteristics: age, student status, ethnic grouping and higher managerial and professional occupations are examined at a regional scale. He concludes that there is a rural/urban association with age, in that younger age groups may be influenced by the 'bright lights' of urban areas with the opposite being true of older age groups. Unsurprisingly, students are identified as being attracted to those districts containing educational establishments, with the inner and outer boroughs of London showing some of the most noticeable in-migration and out-migration flows respectively. It is also London which shows the most significant migration patterns in relation to non-white migrants, with the largest absolute increases and decreases of this group occurring here. It is also shown that the south, specifically districts in and around London, recorded significant net gains of people in the highest socio-economic groups, with areas to the south-west and east of the country recording the lowest net gains.

As this selective review has shown, a series of studies have enhanced our knowledge of internal population migration between 1961 and 2001. There have been themes of changing rates and directions of migration, of counterurbanisation and of a general move from north to south over this period. Recent work by Champion updated earlier work and provided a basic analysis of internal migration at the start of the 21st century. There are, however, still gaps in current knowledge about internal population migration from 2001. The work reported in this paper will attempt to explore in detail age/sex specific differences in migration propensities, unpacking some of the features that present themselves at an aggregate level (i.e. that there are no real differences in migration based on sex), and will attempt to move away from the dichotomous urban/rural split that has tended to find favour in much of the work in this field to date. It aims to offer new insights into internal population migration in 2000-2001 that have hitherto been unexplored. It does so by looking at migration through the lens of a district classification and through the use of non-standard rate calculations.

3. *Research framework*

This paper can be further set within a two component theoretical framework out of which the principal research questions arise. One of the central strands of migration research has always attempted to tackle the external causal influences affecting migration behaviours. This provides the first component of our framework. Since Ravenstein's seminal papers (Ravenstein, 1885; 1889) where the employment related economic attractions of urban areas were recognised in partnership with the relative dearth of employment opportunities in rural areas, the former resulting in a migration flow from the latter, research on the factors influencing migration behaviour and flows between particular places has been abundant. A variety of empirical analyses including those offered by Fielding (1992), Champion *et al.* (1998) Cameron *et al.* (2005) Norman *et al.* (2005) and Finney and Simpson (2007), examine the differing effects of the social, economic and environmental characteristics of places on particular migration behaviours. These kind of empirical analyses with observations regarding the influences on migration have served as the foundation for variety of models used both to increase understanding of the processes influencing internal migration and to project migration behaviours into the future; the most ambitious of these probably being the migration model for the UK developed by Champion *et al.* for the then Office of the Deputy Prime Minister (ODPM, 2002). All of this work, however, has helped confirm the idea that migration behaviours are heavily influenced by the particular characteristics of both origins and destinations, and it is partially within this framework that this paper positions itself. A large section of this work will be devoted to answering the question of what particular influence area types, and implicitly the characteristics of these areas, have on the volume and direction of internal migration experienced.

Another key strand of migration research has focused on the attributes of the individual migrant, and how these may affect migration behaviours. Age, sex, ethnicity, socio-economic status and family status are all attributes which can affect a person's propensity to migrate. This provides the second component of our framework. Of these attributes, perhaps the most work has been carried out in relation to the effect of age and life course on migration behaviours. Work by Rogers and Castro (1981) and Bates and Bracken (1982) as well as much more recent work by Rogers *et al.* (2002) and Raymer *et al.* (2006) has all shown the heavy influence that age and life course stage has on aggregate migration patterns. With this in mind another large part of this paper will be given to exploring the age/life stage specific aspects of internal migration in

2000-01, and answering the question of what particular age related features of internal migration exist at this time.

Whilst the external influences on migration behaviour and the internal attributes of migrants can be treated separately, these two components are also interdependent. One obvious example might be young or retirement age migrants being influenced differentially by the same socio-demographic or environmental characteristics of urban areas. For former the frenetic, crowded, built-up environment with opportunities for capital accumulation could be an attraction, for the latter a repellent. Whilst this is a rather simplistic example, the underlying principal is very important and much more complex. It is for this reason, therefore, that this paper will seek to unpack these ideas and find answers to the question of what interdependencies exist between the migrant and the origins and destinations between which they move at this time.

4. *Data sources and issues*

The data used in this analysis are principally the 2001 Census Special Migration Statistics (SMS). These data are derived from the question pertaining to place of usual residence one year before the Census. More specifically, the data used have been taken from the SMS level 1 tables containing flows between ‘districts’ (which are comprised of London Boroughs, Unitary Authorities, Metropolitan and Non-Metropolitan Districts, Scottish Council Areas and other Local Authority Districts) in the UK. Data at this level are likely to be more accurate than the same data at level 2 (ward level) and level 3 (output area level) due to the effect of the small cell adjustment method (SCAM) on values of 1 and 2 in the tables. Essentially, the larger the spatial scale of study, the less likely it is for small values to be recorded and subsequently adjusted by SCAM. Stillwell and Duke-Williams (2007) provide a more detailed explanation of the effects of SCAM.

In addition to the effects of SCAM, whilst ward and output area level data would give a much higher spatial resolution in the analysis, the additional resolution may in fact reduce clarity and make the identification of patterns more problematic when presenting a national overview. The issue of the Modifiable Areal Unit Problem (MAUP) should be acknowledged (Openshaw, 1984). The MAUP highlights the issues of scale and aggregation when presenting results for discrete geographical areas. One way to deal with this problem would be to carry out analysis at a variety of different scales, but this would create an overly extensive analysis that would then also run into problems with small cell adjustment. At this stage the use of rates standardised by populations for discrete geographical units should minimise the problem of the MAUP. It is important, however to acknowledge that the use of districts may affect the outcome of the analysis to some degree.

The analysis of districts will be carried out for Great Britain, rather than the whole UK. Northern Ireland has been omitted from the analysis for a variety of practical reasons. Firstly, there are no interaction data available for Northern Ireland at level 1 (the district scale) for district areas – Northern Ireland data at level 1 are only available for Parliamentary Constituencies. Whilst these areas are broadly comparable with districts in terms of size, their geographical boundaries are different, thus causing a set of harmonisation problems.

Why then restrict the study to the level of districts? If analysis were to be carried out at the scale of ward or output area, this problem would not exist as data for wards and output areas are available for the whole of the UK. As previously noted, the effect of small cell adjustment at any level below district is especially marked for interaction data due to the higher proportions of small numbers of migrants in each area. Furthermore, output areas and wards are too small to allow the easy identification of national patterns and trends through cartographic techniques. These reasons in themselves should be enough to justify the use of districts for a national study, thereby necessitating the omission of Northern Ireland as data are not available at this level. In addition though, a robust district level classification has been developed by Vickers *et al.* (2003) which will enable the study of interaction flows both at district level, and at the three subsequent levels of aggregation in the classification. Whilst Northern Ireland features in the classification, Northern Ireland *districts* rather than parliamentary constituencies are used. Thus, it follows that if the data for Northern Ireland were to be used at all, it would need to be at the district level. A full justification for the use of the Vickers *et al.* classification in this study is given later on.

Why not aggregate up ward level data for Northern Ireland to the level of district? In theory, this aggregation should be possible and doing so would enable an analysis for the whole of the UK to be carried out. In practice, however, this is not a straightforward task. The main problem here is that wards in Northern Ireland do not aggregate perfectly into districts. There are 37 instances of Census Area Statistics (CAS) wards not aggregating into districts perfectly in Northern Ireland. Look-up tables provided through the Geo-Convert facility (http://geoconvert.mimas.ac.uk/) give the precise proportions of each ward that feature in each related local authority district. For easy data aggregation, it would be desirable that each ward would fit 100% into a related district. Table 1 exemplifies the relative proportions of each ward that feature in each district, where a ward does not fit wholly into one district. Whilst in all cases, one district tends to feature the majority of each ward (well over 90% in all cases), it is impossible to know precisely how to weight the data to assign the correct proportions of the ward data to each district.

Table 1. Example of the proportions of each ward assigned to each associated district in Northern Ireland

Ward Code	Proportion of Ward in District	District Code
95AA01	0.9487	95AA
	0.0513	95SS
95AA12	0.9904	95AA
	0.0096	95WW
95AA14	0.9894	95AA
	0.0106	95DD
95BB02	0.9906	95BB
	0.0094	95II
95BB10	0.9987	95BB
	0.0013	95XX
95BB16	0.9935	95BB
	0.0065	95II

Source: http://geoconvert.mimas.ac.uk/

There are two issues here. The first issue relates to the geographic location of addresses within the ward. For example, it could be the case that there are no addresses featured in the small proportion of the ward associated with one district. Where this is the case, there would be no need to reallocate a proportion of the data to this district. On the other hand, this very small portion of the ward could contain a considerable proportion of the addresses, requiring the allocation of a considerable proportion of that ward's data to the district. The second issue is that even if the proportion of addresses allocated from a ward to districts is known (something that is feasible, if not practically possible for large areas through the address counts available in the all fields postcode look-up directory tables), it is almost impossible to allocate appropriately the correct data to the correct addresses – especially for a large amount of areas where many calculations would be needed. Furthermore, address counts will include communal establishments (such as student halls of residence, hotels, hospitals and prisons) as well as households which more commonly accommodate smaller numbers of residents, making data allocation even more difficult.

Even if an appropriate way of allocating the correct flow from wards to districts was devised, another hurdle would need to be cleared if Northern Ireland data were to be included. UK analysis would require an understanding of the total flows to and from all of the districts in Northern Ireland. As these districts are not available via the Web-based Interface to Census Interaction Data (WICID), all of the data from Northern Ireland would need to be downloaded as wards for Northern Ireland, for both origins and destinations; this would also need to be accompanied by the information for every district in the rest of the UK. This means that for each of the 990 origins (408 districts in England, Wales and Scotland and 582 wards in Northern Ireland) there would also be 990 destinations. This would be a pairwise list of some 980,100 rows of data if one were downloading a list of every variable by every origin/destination pair. Alternatively it would be a 990 by 990 matrix for each variable selected. Whatever the format used for downloading, the flow data for every Northern Ireland ward would need to be weighted appropriately and then assigned to a new district. This would be a considerable task!

A national classification of districts has been developed by Vickers *et al.* (2003) using the 2001 Census Key Statistics (KS) which assigns each district in the UK to a different Family, Group or Class based on a range of socio-economic and demographic characteristics. Figure 1 to Figure 3 reveal the different family, group and class categories assigned to each district in Britain.

Figure 1. Vickers *et al.* District Classification: Family categories, Britain

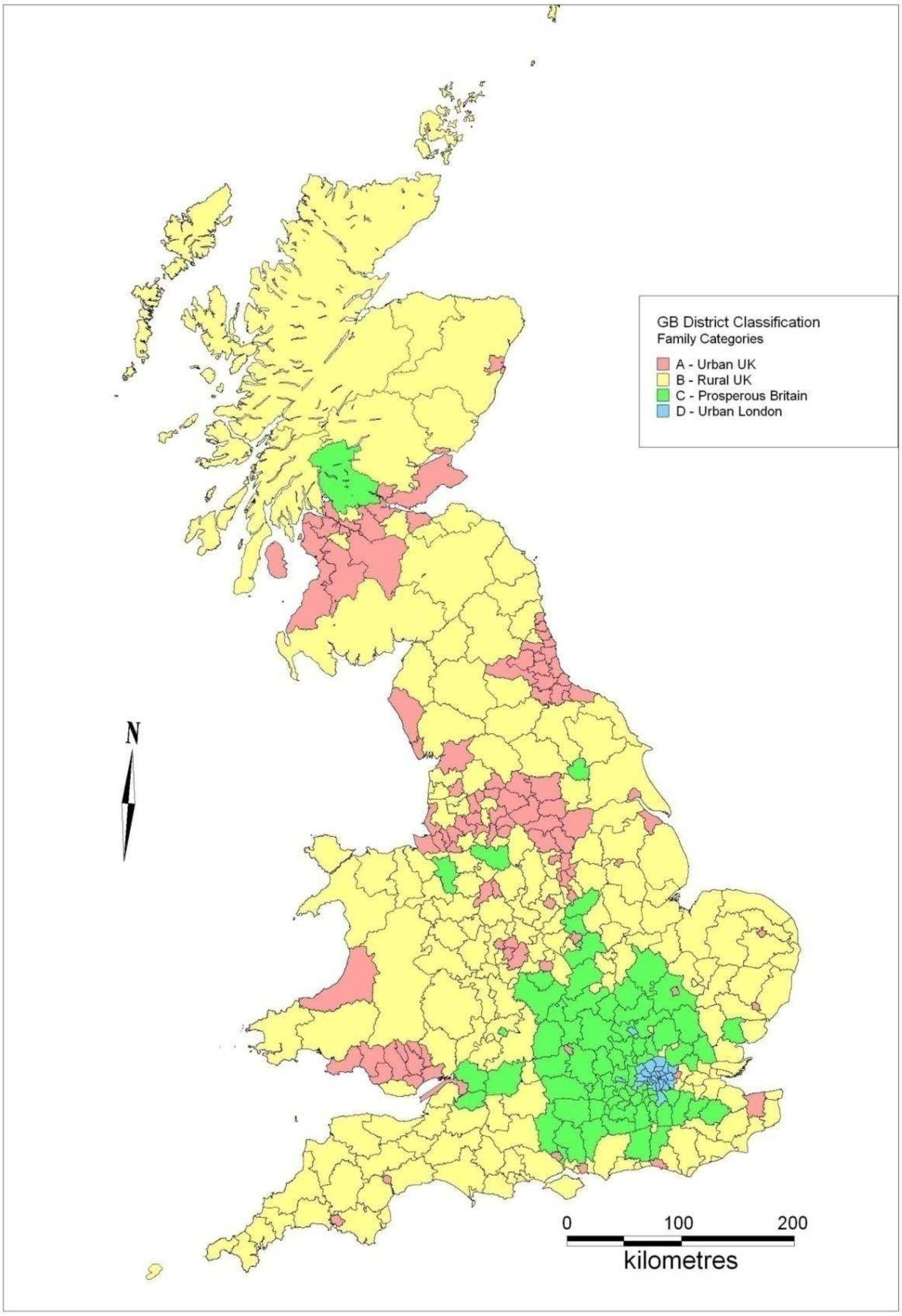


Figure 2. Vickers *et al.* District Classification: Group categories, Britain

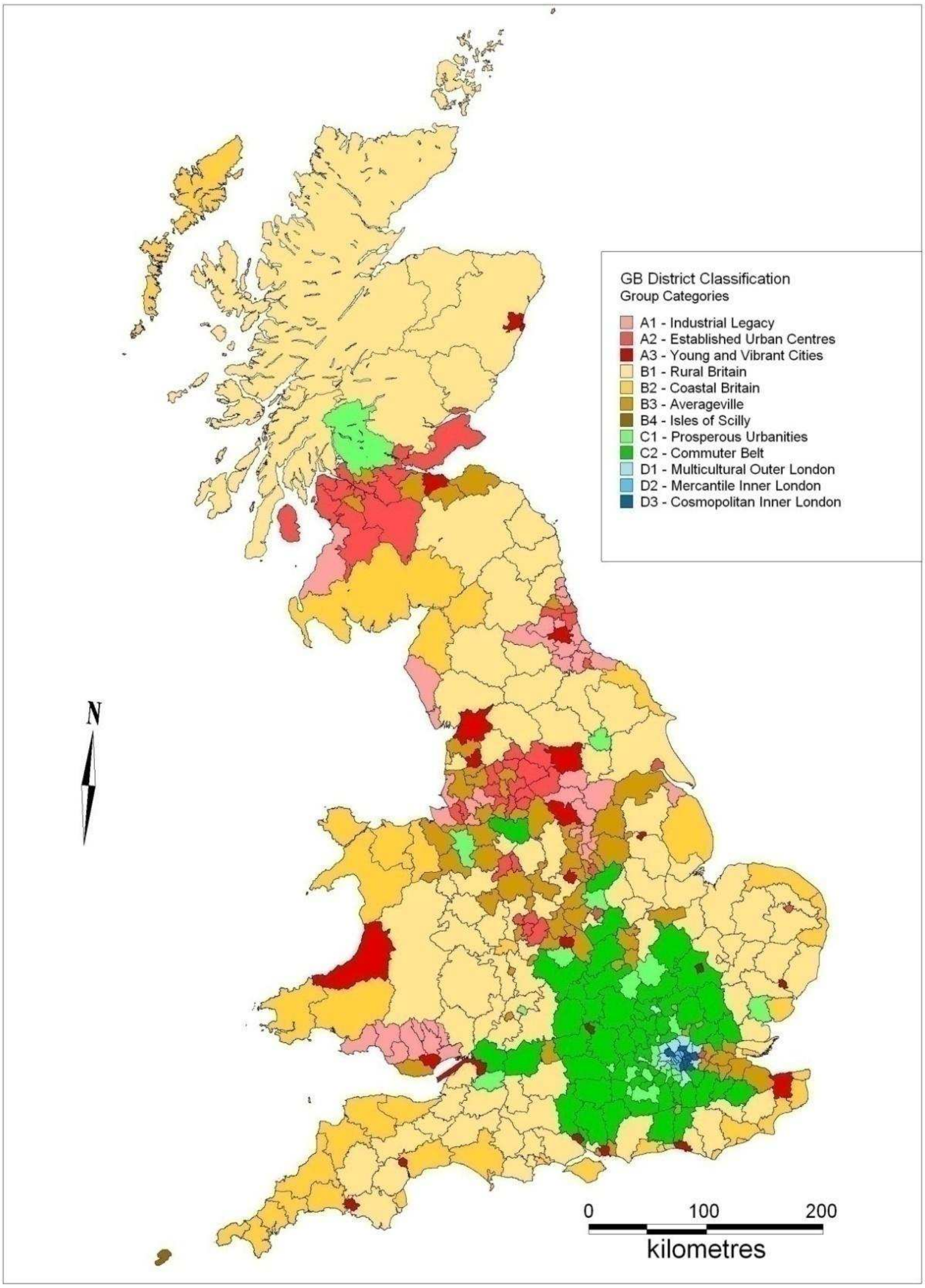
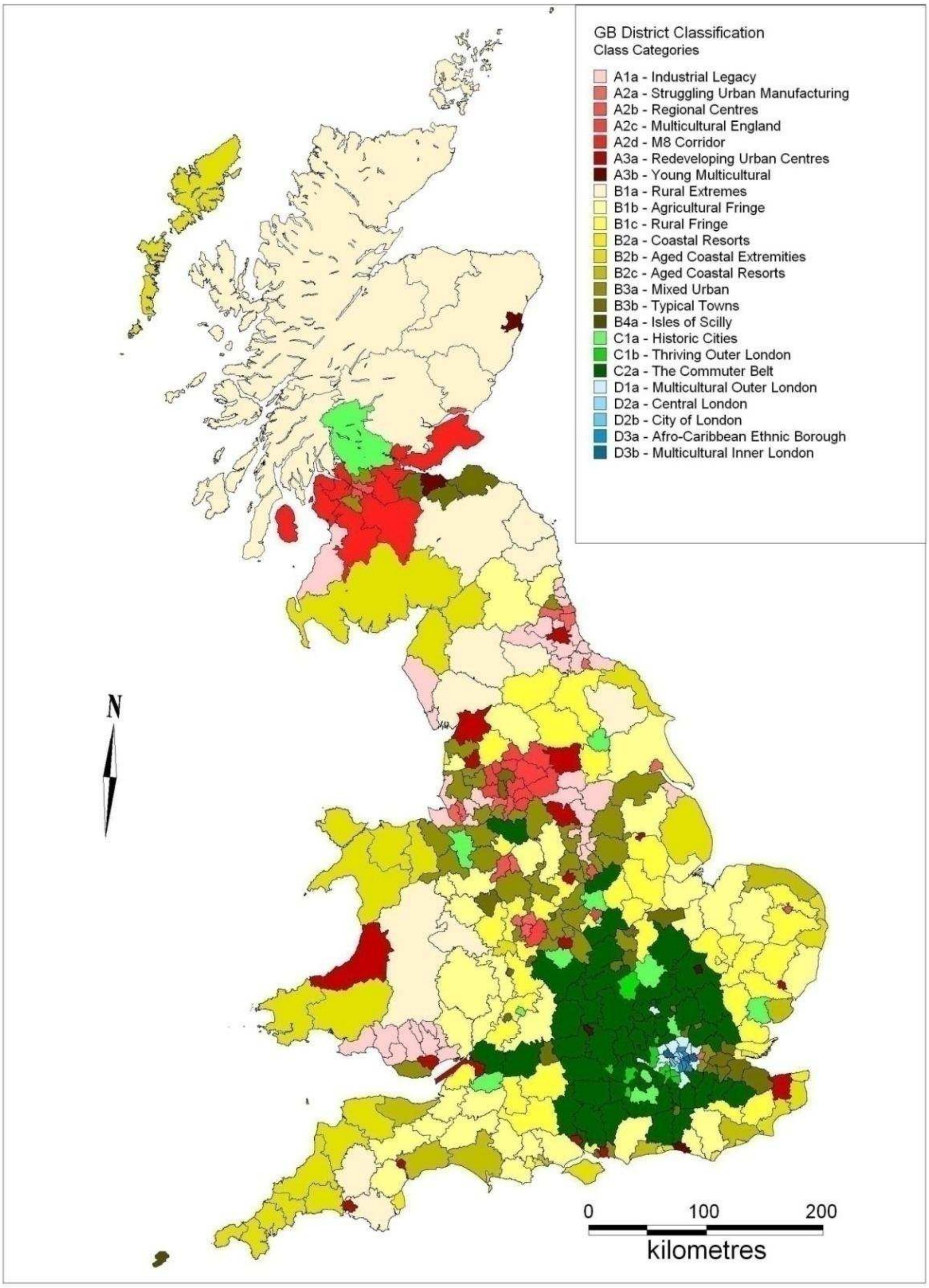


Figure 3. Vickers *et al.* District Classification: Class categories, Britain



What use can classifications be in the study of population flows in Britain? Classifications are effective ways of summarising areas in terms of their key characteristics and, as such, provide a useful backdrop upon which to project other information, such as population migration flows. It is then possible to see if areas with similar socio-demographic characteristics have similar migration characteristics. The Vickers *et al.* classification does not incorporate data on migration and so provides a framework for the migration analysis which is independent of the influence of migration variables.

Studies in the past by authors such as Champion (2006, 1989a) and Fielding (1992) have sought to identify trends in migration between 'urban' and 'rural' or 'London' and the 'rest of the UK'. Studying migration in the context of this classification allows for the identification of migration trends and patterns in relation to these traditional binaries, but in addition, the sub-classifications (Families, Groups, Classes) mean that movements can be further broken down into migration into or out of types of rural and urban area, or very specific parts of London. This is of significant benefit as binary definitions may be masking certain types of flow. For example, a general pattern of counterurbanisation in Britain could be obscuring patterns of urbanisation in relation to some key urban areas. By using the Vickers *et al.* classification, there is scope to study migration at a more detailed level.

It should be acknowledged that the Office for National Statistics (ONS) has also created an area classification for local authorities (districts) (http://www.statistics.gov.uk/about/methodology_by_theme/area_classification/la/default.asp). So why has the official classification used by the ONS has not been used in this analysis? The methodology outlining the selection of variables and clustering techniques used in the Vickers *et al.* classification is more comprehensive, robust and transparent than the methodology behind the ONS classification. As such, one can be more assured that the ascribed characteristics in the Vickers *et al.* classification accurately reflect the character of the districts classified in that way.

It may be that the selection of variables and clustering techniques in the ONS classification of districts was as equally rigorous and scientific as in Vickers' classification. However, the accompanying methodology published does not lead one to believe this. For example, the stated method of variable selection for the ONS classification was that they were selected *"via a series of team meetings using a rigorous and logical approach, designed to gain an efficient representation of the Census data"* (http://www.statistics.gov.uk/ about/methodology_by theme/area_classification/la/methodology.asp). The exact nature of the 'rigorous and logical approach' is not disclosed and, as such, leaves some questions unanswered. How can one be entirely sure of exactly how rigorous and logical the approach actually was? Without full explanation, one is not entirely sure that the decision did not come out of a subjective discussion in an ONS 'team meeting'.

In contrast to this rather unclear justification in the ONS methodology, Vickers *et al.* (2003) describe in detail the methodology that was used in the selection of variables to build their classification. A list of 129 variables was assembled from the 2001 Census, using variables from previous classifications as a baseline, and adding new variables that appeared for the first time in 2001. These variables were then assessed in terms of the information they could provide about an area (for example, if every area in a country contained exactly the same number and proportion of males and females, a sex variable would probably not tell you an awful lot about that area. If, however, these numbers and proportions were wildly different for every area in a country, then a sex variable would probably tell you quite a lot). In order to assess these variables in terms of the information they contained, a suite of methods were employed by Vickers *et al.* Firstly, principal components analysis was used to assess the relative importance of the different components of a variable (for example, different age groups within an age variable). Secondly, highly correlated variables were discarded. Thirdly, the variance of the variables across the study area was examined, with the higher variance variables being preferred (Vickers *et al.* 2003).

After the implementation of this rigorous selection methodology, 56 variables were selected in the Vickers *et al.* classification in comparison to the 42 variables used in the ONS classification. Whilst one cannot be completely certain that these 56 variables help constitute a more accurate classification of districts in the UK, the methodology behind selection is fully explained and is logical, backed up with statistical evidence. In the absence of a comparatively detailed ONS methodology, justification for choosing the ONS classification (despite its assumed superiority as an 'official' classification) over the Vickers *et al.* classification cannot be made.

Finally, it should be noted that there are distinct similarities between the two classifications, meaning that the choice of one over the other is unlikely to yield strikingly different results in an analysis. Whilst ONS does not clearly outline the method for selecting variables, it does describe the technique to determine clusters in more detail. It is revealed that Ward's clustering method, in combination with the K-means method was used to define the clusters in the classification. The Vickers *et al.* classification also used Ward's clustering method to define its clusters.

Furthermore, upon examination of the final variables used in each classification, there are a number of similarities, with similar demographic, household, health, housing, socioeconomic and employment variables being used in both classifications.

The use of an area classification in the analysis of migration data does present some problems. Care needs to be taken when using classifications in conjunction with the calculation of rates based on net flows: inflows, outflows inter-zone and intra-zone flows. Particular care and attention should be paid to the way that these flows are calculated once analysis moves to a geographical level above that of the basic building block. If care is not taken, it is easy to double count or undercount flows between or within areas identified by the classification. Exemplification of this issue is given below.

Figure 4. District level flow matrix including an example hierarchical geo-demographic classification

Destination j

				Family A								Family B								District Outflow	Class Outflow	Group Outflow	Family Outflow	District Inter	Class Inter	Group Inter	Family Inter
				Group A1				Group A2				Group B1				Group B2											
				Class A1a		Class A1b		Class A2a		Class A2b		Class B1a		Class B1b		Class B2a		Class B2b									
Origin i				District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8	District 9	District 10	District 11	District 12	District 13	District 14	District 15	District 16								
Family A	Group A1	Class A1a	District 1	154	0	9	3	9	15	44	6	16	3	17	70	25	16	3	3	239	2038	11034	17693	442	3890	24266	34603
			District 2	0	6844	24	29	52	18	29	15	28	42	63	59	3	31	21	1385	1799				3448			
		Class A1b	District 3	19	46	15168	33	1161	88	1174	93	278	1380	120	251	221	1178	890	37	6969	9164			15235	20712		
			District 4	0	38	25	8524	21	657	39	44	28	16	1217	44	8	29	6	81	2253				5593			
	Group A2	Class A2a	District 5	11	80	1383	66	13198	75	837	150	1269	217	119	266	379	408	2252	25	7537	9947	14681		13719	19219	26381	
			District 6	12	44	62	560	53	13123	84	959	59	66	438	40	41	48	47	25	2538				5756			
		Class A2b	District 7	65	45	1909	52	1174	77	10966	90	296	279	185	689	464	1662	206	34	7227	9222			12266	16138		
			District 8	0	32	128	108	73	1134	131	17798	88	105	143	60	79	61	56	18	2216				4314			
Family B	Group B1	Class B1a	District 9	7	25	302	23	1005	79	285	111	15068	137	88	253	830	206	861	13	4225	8004	14274	16910	8881	18762	29519	34603
			District 10	3	97	1269	76	158	61	242	82	114	13850	78	280	65	1347	100	58	4030				10383			
		Class B1b	District 11	3	68	102	2168	58	709	130	75	77	61	11102	104	60	86	49	68	3818	7961			6762	14139		
			District 12	31	352	325	53	243	72	493	110	161	693	125	9658	124	1405	48	137	4372				7835			
	Group B2	Class B2a	District 13	31	37	222	32	505	93	444	133	1529	62	112	211	8444	205	133	18	3767	11747	15387		6389	20756	30586	
			District 14	12	97	1793	52	377	70	893	144	254	3166	162	1040	215	10795	81	44	8400				15207			
		Class B2b	District 15	9	18	662	9	1281	42	204	60	430	86	46	69	90	97	8453	6	3109	4149			7883	10848		
			District 16	0	670	51	76	12	28	10	26	29	40	31	27	18	28	21	8231	1067				3019			
			District Inflow	203	1649	8266	3340	6182	3218	5039	2098	4656	6353	2944	3463	2622	6807	4774	1952								
			Class Inflow	1852		11548		9272		6916		10758		6178		9009		6699									
			Group Inflow	13232				11700				15245				15199											
			Family Inflow	16910								17693															
			District Intra	154	6844	15168	8524	13198	13123	10966	17798	15068	13850	11102	9658	8444	10795	8453	8231								
			Class Intra	6998		23750		26449		28985		29169		20989		19659		16711									
			Group Intra	30916				59922				51849				36879											
			Family Intra	98860								101479															

Total Migrants

234942

Figure 4 helps to understand the problem of calculating inflows, outflows, intra-zonal and inter-zonal flows for the various zones within a geodemographic classification hierarchy using an example system of two Families of district (A and B), each containing two Groups (A1, A2, B1, B2) which in turn contain two Classes (A1a, A1b, A2a, A2b, B1a, B1b, B2a, B2b). The numbers in the cells within the matrix represent the flows between the smallest or primary geographical areas – in this case districts. Each district in the matrix can be further identified as part of the area classification at each of three levels. For example, District 1 is part of Class A1a, Group A1 and Family A. Analysing the flows at the primary geography is straightforward, however, calculating the flows for the other levels in the hierarchy is not just a case of summing the primary geography marginal values for each higher level in the hierarchy. This would result in under-counting for intra-zonal flows, over-counting for inflows and outflows and some double counting for inter-zonal flows. The problem is that flows intra-area flows at one level (e.g. district) may become inter-area flows at another level (e.g. Family).

To explain this problem in a little more detail, take the example of districts 3 and 4, which are part of Class A1b. The intra-district flow of districts 3 and 4 are 15,168 and 8,524 people respectively. Summing these two flows to calculate the intra-zonal flow for Class A1b (which would result in a figure of 23,692) would be incorrect as at the Class level, flows between districts 3 and 4 now count as intra-Class flows. Therefore, as highlighted by the blue square, these flows (of 25 and 33) need to be included in the calculation. The true intra-Class flow would be 23,750 individuals. Taking the inflows and outflows, the same theory applies. Just summing the district level inflows and outflows for districts 3 and 4 to create a Class level inflow and outflow, would include these cells of 25 and 33 – consequently over-counting the flows. This problem is compounded if the inflows and outflows are combined to calculate an inter-zonal flow. Doing this would result in the double counting of the flows of 25 and 33.

As Figure 4 shows, this problem increases as one moves up the classification hierarchy. The green square (which highlights the intra-Family B flows), reveals that if just the sum of the intra-district flows within Family B (districts 9 to 16) were taken as the intra-Family B count, this would be a massive under-count. The corresponding inter-Family B flows would be hugely over-inflated due to double counting.

This may all appear very obvious when examining the flows in matrix form, however, when total flows are disaggregated by a range of other variables (such as age or sex), for analysis purposes it is tempting to arrange marginal totals for each variable together into one location at the level of the primary geography. This is fine if the primary geography remains the only level of analysis. Problems arise when the marginal totals might be summed to different levels in the geodemographic classification. Under counting and double counting will happen, adversely affecting the results produced.

This issue is important when we come to compute rates of migration. In this paper, we focus on the two key demographic characteristics, age and sex; for which the migration data comes from SMS level 1, Table MG101. Populations at risk (PAR) for this table have been obtained from Standard Table ST001. It is common practice when studying patterns of migration to calculate standardised rates of movement, as these rates give a measure of migration that is independent of the population size in any given area. Given the previous discussion, the generic net migration rate calculation for any area in the hierarchy can be written as follows:

$$NM_i = \left(\frac{D_i - O_i}{P_i}\right) 1000$$

where:

NM_i = the net migration rate per 1,000 population in area *i*
D_i = the in-migration to area *i*
O_i = the out-migration from area *i*
P_i = end of period population of area *i*

and the age-sex specific calculation is:

$$NM_i^{as} = \left(\frac{D_i^{as} - O_i^{as}}{P_i^{as}}\right) 1000$$

where:

NM_i^{as} = net migration rate per 1,000 population for those in age group *a* and sex *s* for area *i*
D_i^{as} = in-migrants in age group *a* and sex *s* to area *i*
O_i^{as} = out-migrants in age group *a* and sex *s* from area *i*
P_i^{as} = end of period population in age group *a* and sex *s* of area *i*

We should acknowledge that the end-of-period population denominators used in the analyses are not ideal since they contain those individuals who migrated into the area or who were born in the area during the period and exclude those who moved out or who died during the period. A more accurate PAR denominator might be an average of the populations at the start and end of the period, but since populations twelve months before the 2001 Census are unavailable and would have to be estimated, final populations are used.

5. *Aggregate patterns of internal migration*

In this section, the spatial patterns of internal migration for the year preceding the 2001 Census, for different age-sex groups, will be examined. A summary of all flows at each level of the Vickers *et al.* classification is given in Table 2. It can be seen from Figure 5 that patterns of net gain and loss for migrants of all ages tend to be associated with areas generally recognisable as rural and urban respectively. The majority of Greater London and its surrounding districts, (including those stretching out along the M4) is experiencing net out-migration. Other areas, including Birmingham, Liverpool, Manchester and their surrounding areas, the North East and Glasgow are all experiencing net out-migration. In contrast, the areas covering large parts of East Anglia, the South West, Wales, the Midlands, the North and Scotland are all experiencing net in-migration.

Table 3 provides a summary of the net balances displayed on the map using the Families, Groups and Classes from the original Vickers *et al.* classification. This explains the continued use of 'UK' in this analysis, when technically only Britain is being studied. Note the consistency between the summed net balances at each level indicating that the balances at Group and Cluster level refer to flows between districts in different Families. The balances in each column of the Net Migrants section of the table therefore sum to zero. The patterns revealed on the map are summarised at the most aggregate Family level with Urban UK and Urban London exhibiting net out-migration and out-migration rates, and Rural UK exhibiting net in-migration. Of the four Families, Rural UK gains the largest number of net migrants; however, a with a larger population at risk, its net in-migration rate of 2.7 people per 1,000 population is considerably lower than the net out-migration rate of 8.5 people per 1,000 population for London.

Inspection of the Groups and Classes within each Family reveals that whilst Urban UK as a whole is losing migrants, some areas within Urban UK are gaining significant numbers of migrants and exhibiting positive net migration rates. For example, the Young and Vibrant Cities Group, (made up of districts in the Redeveloping Urban Centres Class and the Young Multicultural Class), is experiencing net in-migration of over 17,000 people, and has a net in-migration rate of 3.4 people per 1,000 population. Other examples of flows masked at the broad Family level include the net out-migration and net out-migration rates of districts in the Averageville Group within Rural UK which is experiencing general net gain. There are also net gains experienced by districts classified as Historic Cities within the Prosperous Britain Family – a Family which is experiencing overall net out-migration. A similar example can be found within the Urban London Family where the City of London is the only Class within the family to be experiencing net in-migration (albeit very small) – all other areas are experiencing net out-migration.

Table 2. Summary of flows for areas at Family, Group and Class level of Vickers *et al.* Classification

	Inflow	Outflow	Intra flow	Inter flow	Total flow
A: Urban UK	684527	689369	1567495	1373896	2941391
B: Rural UK	885735	827788	1256411	1713523	2969934
C: Prosperous Britain	509954	514937	496172	1024891	1521063
D: Urban London	366769	414891	284323	781660	1065983
A1: Industrial Legacy	133502	138765	369465	272267	641732
A2: Established Urban Centres	304942	321771	730421	626713	1357134
A3: Young and Vibrant Cities	246083	228833	467609	474916	942525
B1: Rural Britain	398253	367600	480035	765853	1245888
B2: Coastal Britain	188565	159269	300907	347834	648741
B3: Averageville	298754	300794	475328	599548	1074876
B4: Isles of Scilly	163	125	141	288	429
C1: Prosperous Urbanities	181474	179630	196202	361104	557306
C2: Commuter Belt	328480	335307	299970	663787	963757
D1: Multicultural Outer London	130264	151211	130521	281475	411996
D2: Mercantile Inner London	107842	119547	60082	227389	287471
D3: Cosmopolitan Inner London	128663	144133	93720	272796	366516
A1a: Industrial Legacy	133502	138765	369465	272267	641732
A2a: Struggling Urban Legacy	86135	94427	201591	180562	382153
A2b: Regional Centres	80539	77344	143639	157883	301522
A2c: Multicultural England	97511	108775	269649	206286	475935
A2d: M8 Corridor	40757	41225	115542	81982	197524
A3a: Redeveloping Urban Centres	179846	164451	354426	344297	698723
A3b: Young Multicultural	66237	64382	113183	130619	243802
B1a: Rural Extremes	60530	59463	102258	119993	222251
B1b: Agricultural Fringe	156581	141819	192793	298400	491193
B1c: Rural Fringe	181142	166318	184984	347460	532444
B2a: Coastal Resorts	46205	38974	74884	85179	160063
B2b: Aged Coastal Extremities	104609	90622	183149	195231	378380
B2c: Aged Coastal Resorts	37751	29673	42874	67424	110298
B3a: Mixed Urban	184092	186403	282967	370495	653462
B3b: Typical Towns	114662	114391	192361	229053	421414
B4a: Isles of Scilly	163	125	141	288	429
C1a: Historic Cities	90420	84814	108962	175234	284196
C1b: Thriving Outer London	91054	94816	87240	185870	273110
C2a: The Commuter Belt	328480	335307	299970	663787	963757
D1a: Multicultural Outer London	130264	151211	130521	281475	411996
D2a: Central London	106827	118552	59928	225379	285307
D2b: City of London	1015	995	154	2010	2164
D3a: Afro-Caribbean Ethnic Borough	87837	95001	57682	182838	240520
D3b: Multicultural Inner London	40826	49132	36038	89958	125996

Legend:

Inflow = Inflow to Family, Group or Class from all other Families, Groups or Classes. *Not sum of inflows for districts within Families, Groups and Classes.*

Outflow = Outflow from Family, Group or Class to all other Families, Groups or Classes. *Not sum of outflows for districts within Families, Groups and Classes.*

Intra flow = Flows within individual Families, Groups or Classes. *Not sum of flows within districts for each Family, Group or Class.*

Inter flow = Sum of inflow and outflow for each Family, Group or Class.

Total flow = Sum of intra and inter flows for each Family, Group or Class.

Figure 5. District net migration rates (per 1,000 population) – all ages, 2000-01

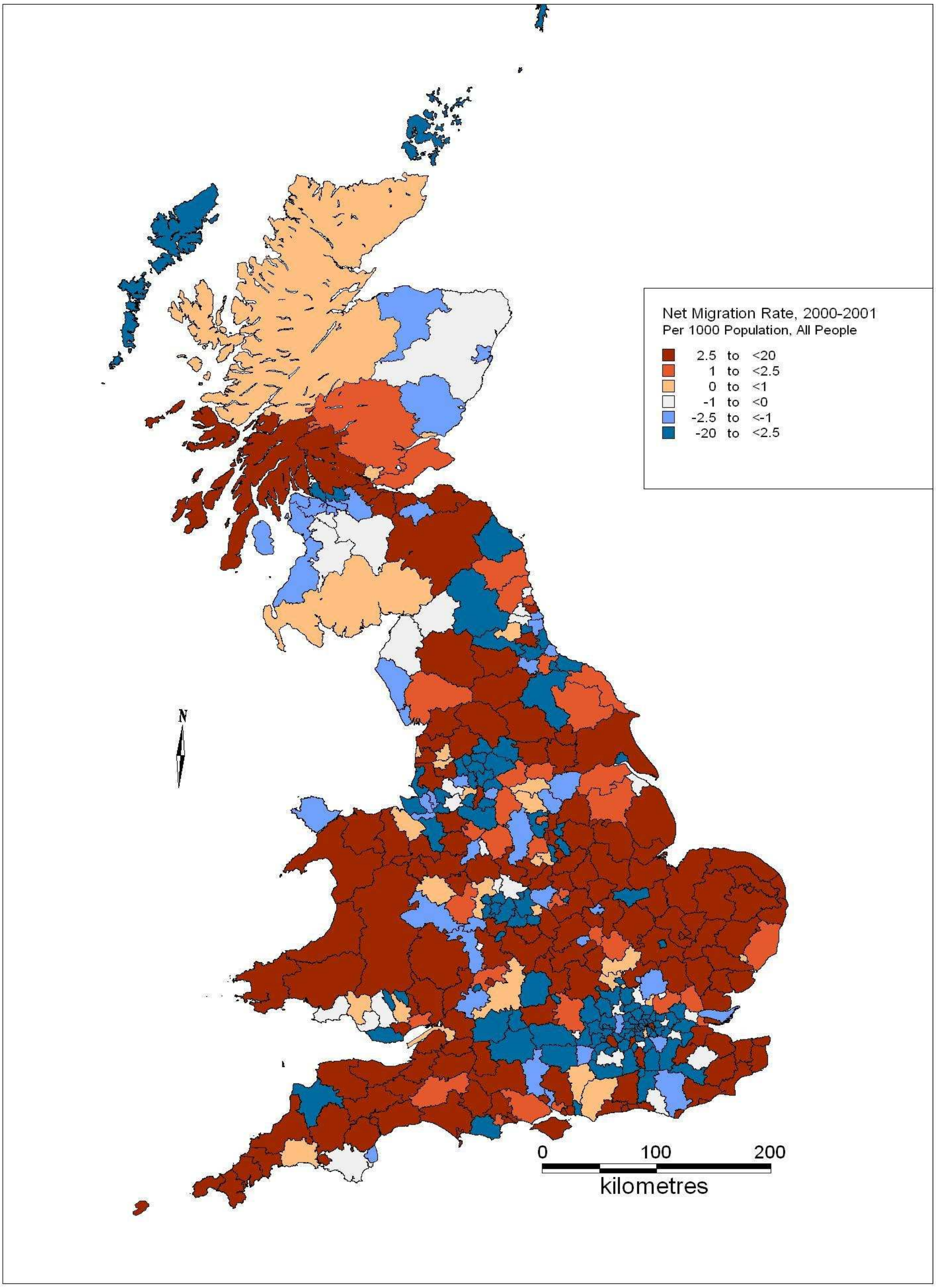
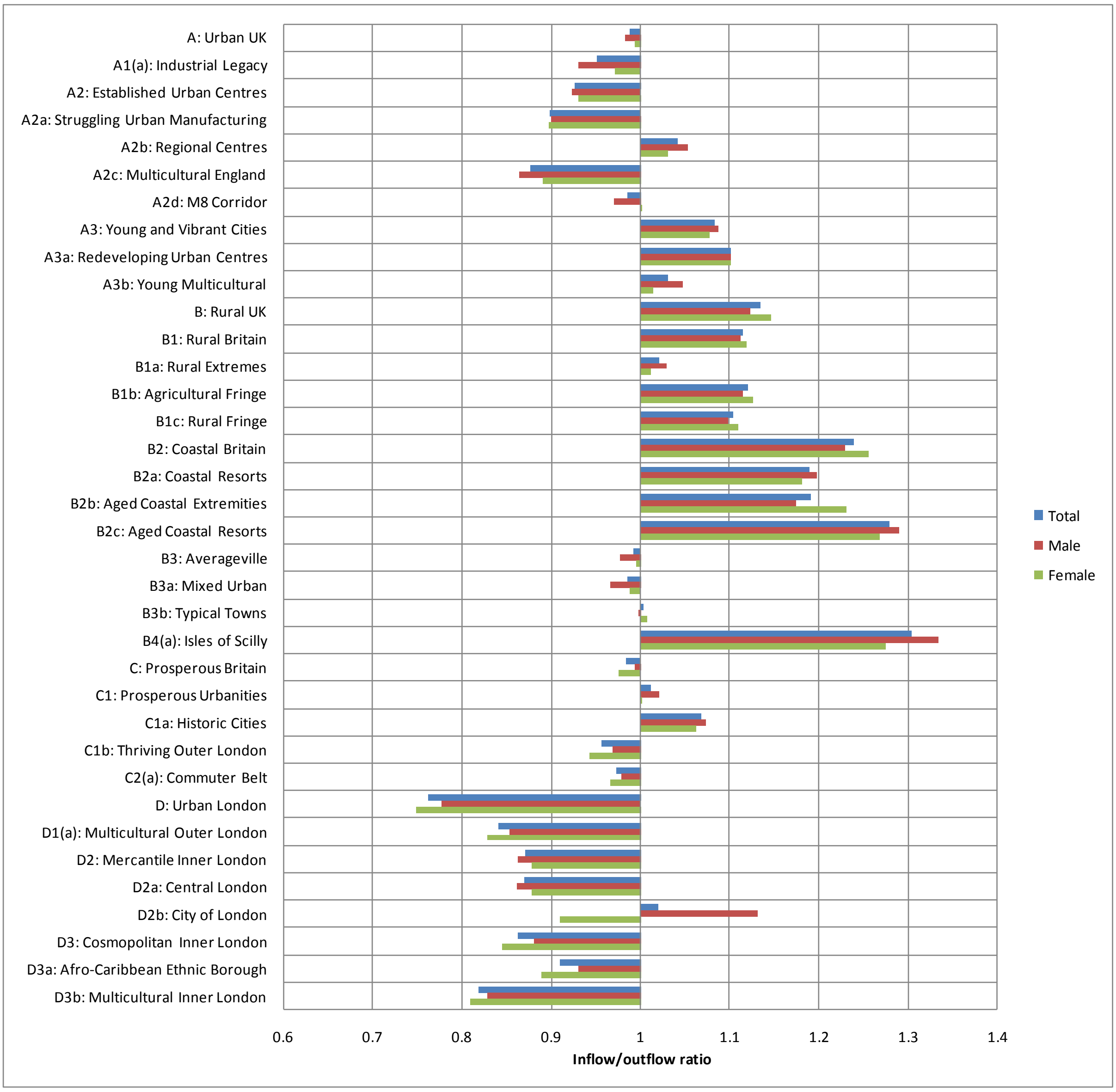


Table 3. Net migrants and net migration rates by district classification – all ages, 2000-01

District Classification (**Family**, Group, *Class*)	Net Migrants			Net Migration Rate (per 1000 population)		
Family/Group/*Class*	**Family**	Group	*Class*	**Family**	Group	*Class*
A: Urban UK	**-4,842**			**-0.23**		
A1: Industrial Legacy		-5,263			-0.95	
A1a: Industrial Legacy			*-5,263*			*-0.95*
A2: Established Urban Centres		-16,829			-1.69	
A2a: Struggling Urban Manufacturing			*-8,292*			*-2.78*
A2b: Regional Centres			*3,195*			*1.96*
A2c: Multicultural England			*-11,264*			*-3.13*
A2d: M8 Corridor			*-468*			*-0.26*
A3: Young and Vibrant Cities		17,250			3.38	
A3a: Redeveloping Urban Centres			*15,395*			*3.89*
A3b: Young Multicultural			*1,855*			*1.61*
B: Rural UK	**57,947**			**2.72**		
B1: Rural Britain		30,653			3.55	
B1a: Rural Extremes			*1,067*			*0.67*
B1b: Agricultural Fringe			*14,762*			*4.32*
B1c: Rural Fringe			*14,824*			*4.09*
B2: Coastal Britain		29,296			6.59	
B2a: Coastal Resorts			*7,231*			*7.27*
B2b: Aged Coastal Extremities			*13,987*			*5.20*
B2c: Aged Coastal Resorts			*8,078*			*10.62*
B3: Averageville		-2,040			-0.25	
B3a: Mixed Urban			*-2,311*			*-0.45*
B3b: Typical Towns			*271*			*0.09*
B4: Isles of Scilly		38			17.79	
B4a: Isles of Scilly			*38*			*17.79*
C: Prosperous Britain	**-4,983**			**-0.52**		
C1: Prosperous Urbanities		1,844			0.58	
C1a: Historic Cities			*5,606*			*3.48*
C1b: Thriving Outer London			*-3,762*			*-2.41*
C2: Commuter Belt		-6,827			-1.07	
C2a: The Commuter Belt			*-6,827*			*-1.07*
D: Urban London	**-48,122**			**-8.53**		
D1: Multicultural Outer London		-20,947			-8.01	
D1a: Multicultural Outer London			*-20,947*			*-8.01*
D2: Mercantile Inner London		-11,705			-10.21	
D2a: Central London			*-11,725*			*-10.29*
D2b: City of London			*20*			*2.79*
D3: Cosmopolitan Inner London		-15,470			-8.22	
D3a: Afro-Caribbean Ethnic Borough			*-7,164*			*-6.07*
D3b: Multicultural Inner London			*-8,306*			*-11.81*

A further graphical representation of these patterns can be seen in Figure 6 which graphs the in-migration/out-migration ratios by sex for each Family, Group and Class of district in Britain.

Figure 6. In-migration/out-migration ratios for district types in Britain by sex, 2000-01



In much the same way that the areal aggregations discussed above can mask migration patterns, so too can the aggregate nature of the variables. Whilst there are any number of individual attributes exhibited by a migrant, historically age and sex have provided some of the more interesting insights into migrant behaviour.

6. Inflow/outflow by sex

One may not necessarily expect to find many differences in the migration propensities of males and females in Britain. Certainly, by ignoring the effect of age, this hypothesis could be confirmed: Figure 6 shows that, in most cases, the inflow/outflow ratios for males and females in Families, Groups and Classes of district are very similar; the only real exception to the rule being the City of London where the ratio for males is significantly positive compared to females where it is significantly negative. However, as with many other statistics for this area, the total numbers of migrants to and from the City of London (as with the Isles of Scilly) are extremely low.

Other areas where differences in inflow/outflow ratios between males and females are clearly apparent are in Averageville (more specifically the Typical Towns settlements in Averageville) and the M8 corridor, where males have a marginally negative balance and females have a marginally positive balance. The ratios in all of these cases, however, are very close to 1, and so should perhaps be viewed less significantly than larger differences where the direction of movement is the same.

7. Migration schedules by age and sex

To fully appreciate differences in internal migratory behaviour between males and females, however, it is important to examine in detail how differences in migration propensity fluctuate with age. In addition, it will also be helpful to look at how sex differences in migratory behaviour change with the distance of migration. Whilst precise distances of migration movements cannot be accurately measured, the proxy of inter-zone and intra-zone flows is a useful substitute. Of course the levels of inter/intra-zone movements will depend completely on the scale of analysis, with the majority of flows for small areas such as output areas being inter-zonal and the majority of flows for large areas such as regions being intra-zonal (for a more detail discussion on the issues of scale, see Gober-Meyers (1978)). Where the scale of analysis remains constant, however, this should not be an issue. This next section will look at the age-specific migration propensity schedules for districts in Britain and will do so for both inter and intra-zonal flows.

Figure 7 and Figure 8 show the comparative age-specific migration propensities in Britain for the year leading up to the 2001 Census, with the former revealing the total number of migrants in each age group and the latter indicating the rate of migration. The general form of these migration schedules is a familiar one (Rogers and Castro, 1981) but there are subtle differences between the schedules for males and females. In order to standardise the data, five year age groups have been used across the schedules up to age 89 with a final 90+ category. It was not possible to obtain data for single year age groups. Where quinary age groups might be obscuring interesting features of the data (such as at the lower end of the age scale), reference will also be made to Figure 9 which features sex-specific rates of migration for the original age groups available from the 2001 SMS (which vary in size from single year of age to five year groups).

It can be seen in Figure 7 and Figure 8 that both the numbers and the rates of migration for males and females remain similar until the age of 10-14. In these early years there is a reduction in the number of migrants from around 25,500 migrants (15% of the population) at the ages of 0-4, to around 14,500 migrants (7.75% of the population) at the ages of 10-14 for both males and females. This corresponds with the ages at which children are still dependent on their parents for support. Indeed the downward curve corresponds closely to the downward curve of adults beginning at the age group 30-34 (Figure 8) – thirty being the approximate average age in 2001 at which parents have children (ONS, 2006).

Figure 7. District level internal migration schedule for Britain, 2000-2001

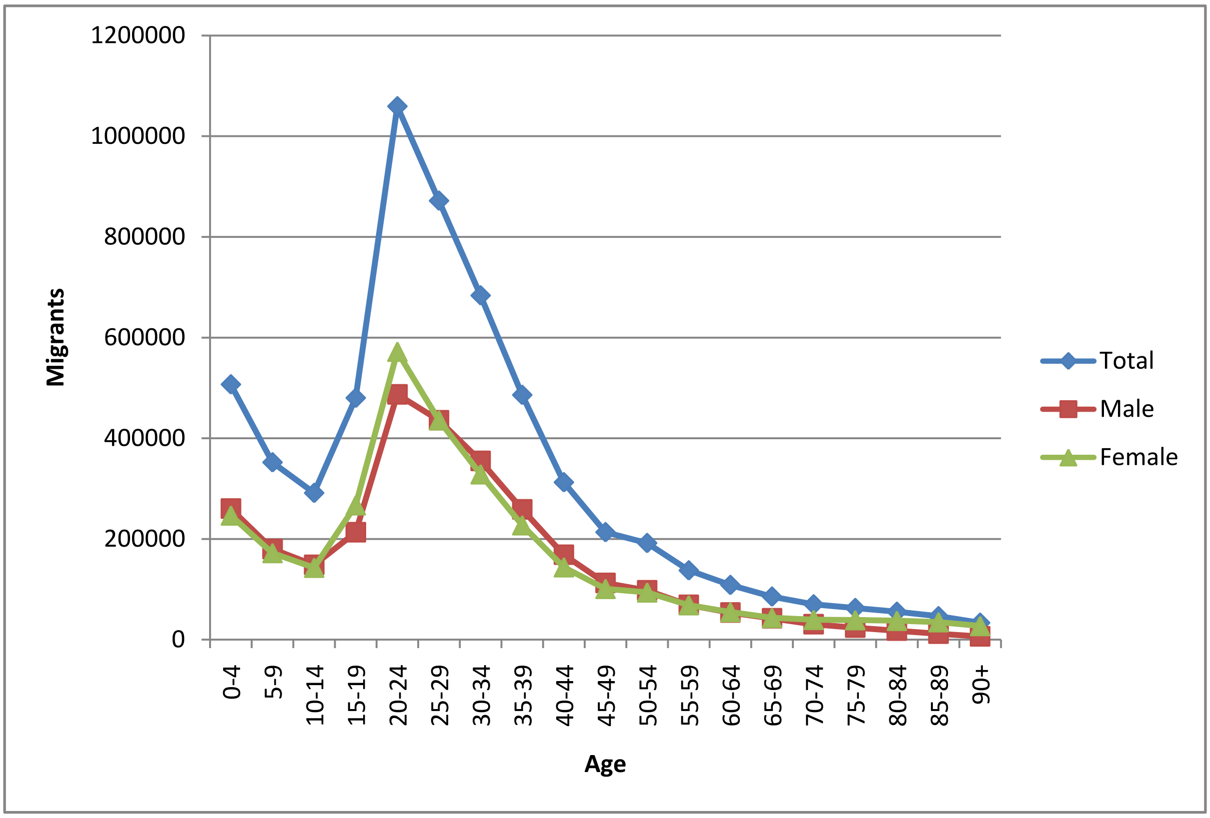
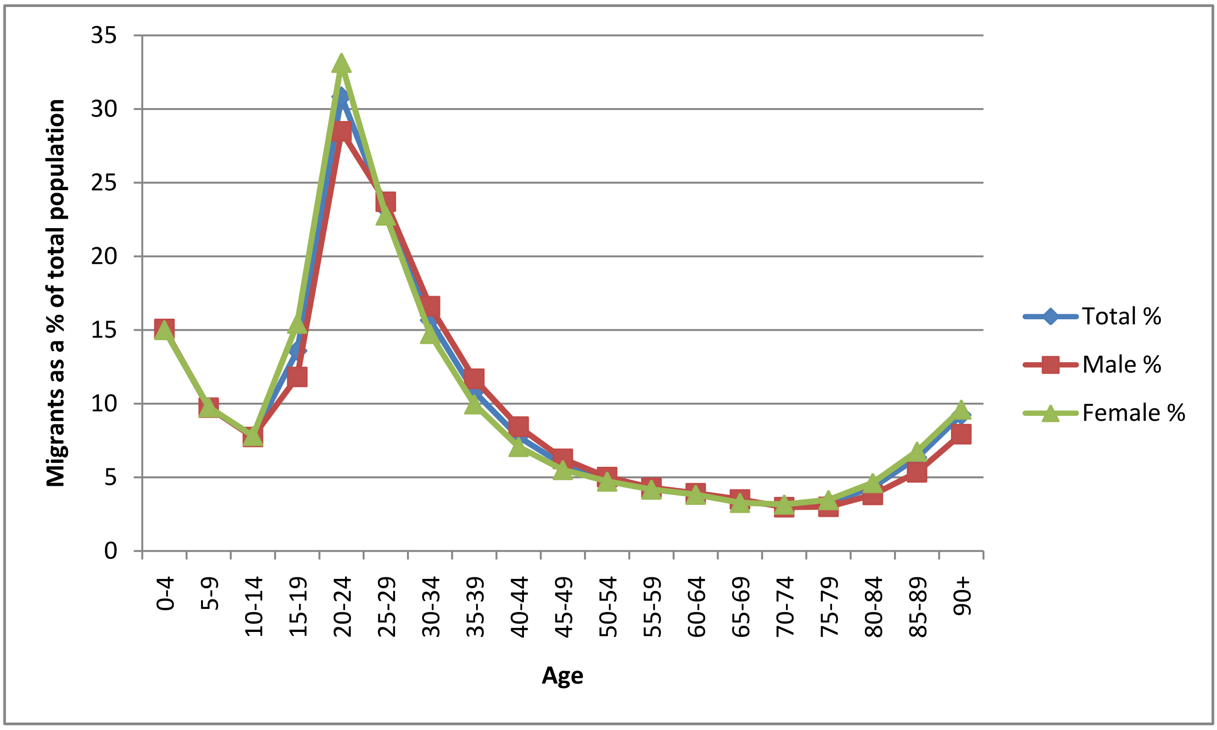
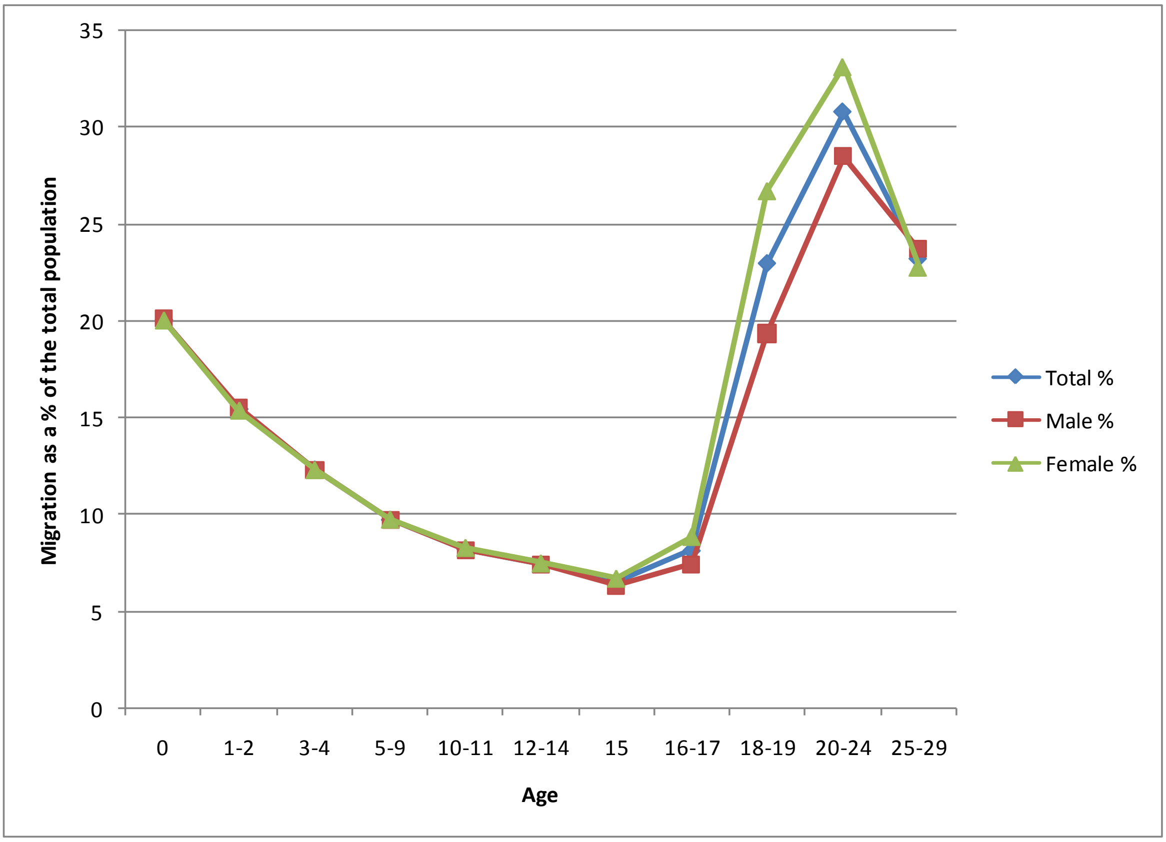


Figure 8. District level internal migration rate schedule for Britain, 2000-2001



At the 15-19 age group, there is a sharp change in this downward trend and a divergence between males and females coinciding with the change in the dependency status of children and the move out of the family home, either to college or university or to a first job. The details of this change are examined in more detail in Figure 9. Here it is possible to see that the downward trend continues until age 15 before rising slightly at 16-17 (corresponding to a first wave of school leavers) and then more rapidly at 18-19. The divergence in the propensities of males and females to migrate at the 15-19 stage is marked. Almost 54,000 more females than males are migrating in this age group. This is even more significant when one realises that there are in fact around 75,000 more males in this group of the population. This difference is confirmed when examination of the rates shows that this equates to 15.4% of females compared to only 11.8% of males.

Figure 9. District level internal migration rate schedule for Britain, 2000-2001, by smallest possible age groups, 0 to 29 years



The gap in the propensities of males and females to migrate is maintained for the next age group. Again, females of this age are considerably more likely than males to be migrants, with over 85,000 more females than males migrating – a difference in the proportions of migrants of around 4.7%. As mentioned previously however, the broad categories of 15-19 and 20-24 mask some of the finer nuances of age and sex-specific migration patterns. Figure 9 shows that a gap of 4.7% is eclipsed by a gap of 7.4% in the 18-19 age group.

The rates and numbers of migrants decrease at a steady and relatively sharp rate from a peak of migration (both in terms of proportions and total numbers) in the 20-24 age group, until around the 40-44 age group. From this peak, however, where females comprise the largest proportions and numbers of migrants, males take over as being more likely to be involved in migration. In age groups 25-44, around 1-2% more males than females are involved in internal migration.

From age group 45-49 until the age group 70-74, the numbers and rates of migration for males and females become more equivalent, with only negligible differences between both measures. For both sexes the numbers of migrants and rates of migration continue to decrease until 70-74, but the rate of decline is considerably lower than it has been between earlier age groups.

From age group 70-74 upwards, there are further changes in the migration schedule. Migrants as a percentage of the total population begin to increase from this age group, with the proportion of migrants continuing to increase until the last (90+) age group in the schedule. Females again overtake males as the group with the highest proportion of the total population comprising of migrants in this old age range. This gap continues to widen as age increases. In terms of actual migrant numbers, from the 70-74 age group onwards, there is a continued decrease, as might be expected, with the total populations within the progressively older age groups decreasing. The rate of decrease is much lower for females, however, with a drop of only around 12,000 migrants from 70-74 to 90+ for females, compared to around 24,000 for males.

Taking the migration propensities at all ages into consideration, it has been shown that the age range where the greatest differences, and therefore most interest occurs, is between 18 and 24. The evidence points towards a greater propensity for females than males to migrate in their late teens and early twenties, so one may ask why this is the case. Some explanation is offered by Faggian *et al.* (2007), whose work using data from the Higher Education Statistics Agency (HESA) student leavers' questionnaire concludes that evidence of increased female migration in the 21-25 age group must be related to women moving in order to maximise their employment potential in a market that discriminates in favour of males. Certainly this is a plausible explanation for at least some of the increased female propensity to migrate. It does not, however, explain the differences in male/female migration rates at age group 18-19. For this, examination of HESA statistics (2002) relating to new undergraduate students for 2000-2001 may give some clues. These data revel that for all first year students under 21 years of age in UK Higher Education institutions, there were 18,685 more females than males; this certainly accounts for at least part of this phenomenon. Whilst being a student does not necessarily automatically mean that an individual is also going to be a migrant, with a large proportion of students leaving the family home to go and study, it will increase the likelihood of this being the case.

Other possible explanations for the higher intensities of migration among women in this age group might be associated with migration flows involving communal establishments as origins and/or destinations, including prisons, since flows between communal establishments as well as between households are included in the 2001 data. However, data from the Home Office (2003) for 2001 reveals that the migration of female prisoners is relatively insignificant: there were only 810 females living in prisons compared with 15,152 males aged between 18 and 24.

One final possible explanation for the differences between male and female migration propensities at these ages could be to do with the average age differentials within male/female couples. It may well be that many moves are by individuals who are part of a couple, and that in many cases the female member of the couple is younger than the male, thus accounting for some of the difference at each age group.

The broad patterns of age-related migration propensity fluctuation described here from Figure 7 and Figure 8 remain when the migration flows are disaggregated by inter-district and intra-district flows. Figure 10 and Figure 11 show that, for all age groups, intra-district flows are the dominant flows. In the early part of the life course (until the 15-19 age group), intra-district flows account for around 5% more flows than inter-district flows. This holds until the age at which many students leave home to go to university. At this point in the schedule, inter-district flows increase almost to the level of intra-district flows. From this age group onwards, however, the gap between intra- and inter-district flows is once again established and is more or less maintained until around the 50-54 age group, when total inter- and intra-district migration flows are relatively low, and broadly comparable, with intra-district flows predominating slightly. This trend is maintained until the post-pensionable age years where there is a noticeable increase once again in intra-district flows as a proportion of the total population.

Figure 10. Inter and intra-district migration schedules, 2000-01

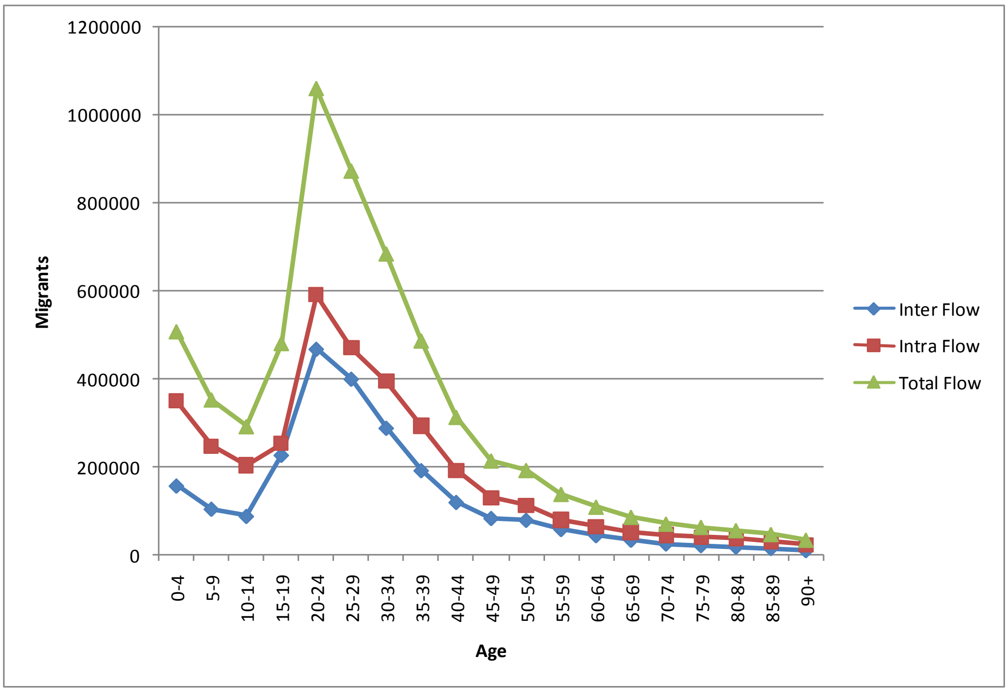
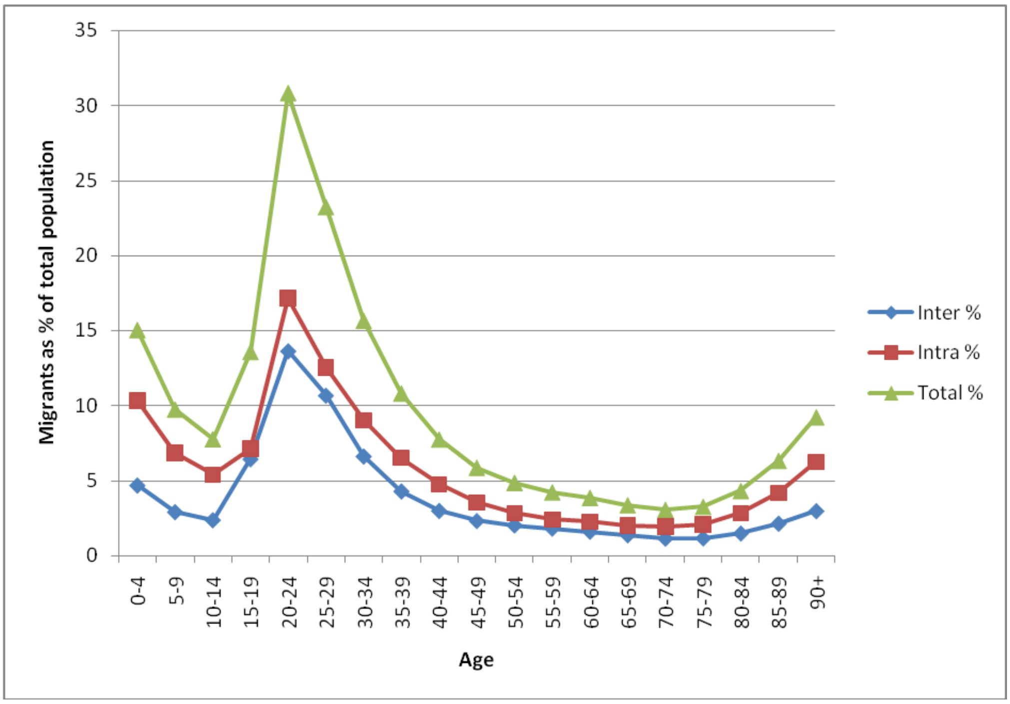


Figure 11. Inter and intra-district migration rate schedules, 2000-01



Disaggregation of these age-specific migration schedules by both sex and intra/inter-zonal flows is shown in Figure 12 and Figure 13. One of the interesting points of note here is that whilst intra-district flows almost always account for more movements than inter-district flows, there is one exception. In the 15-19 age group, male inter-district migrations are greater than male intra-district migrations, perhaps suggesting that, whilst males may be more reluctant than females to migrate in this age group, when they do migrate there is a desire to move further away from the parental domicile.

Figure 12. Inter and intra-district migration schedules by sex, 2000-01

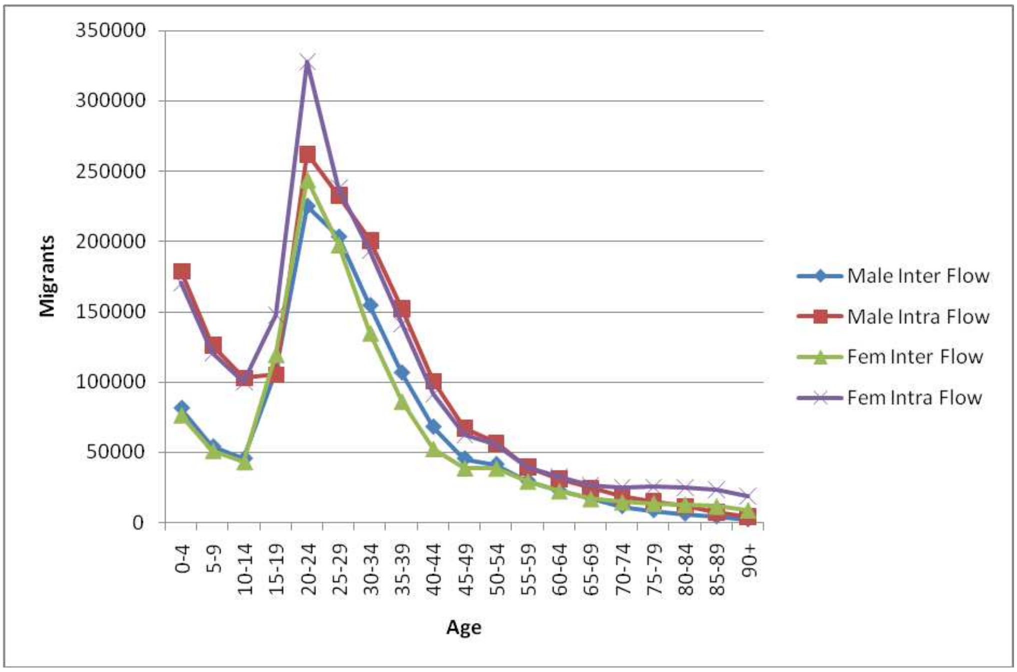
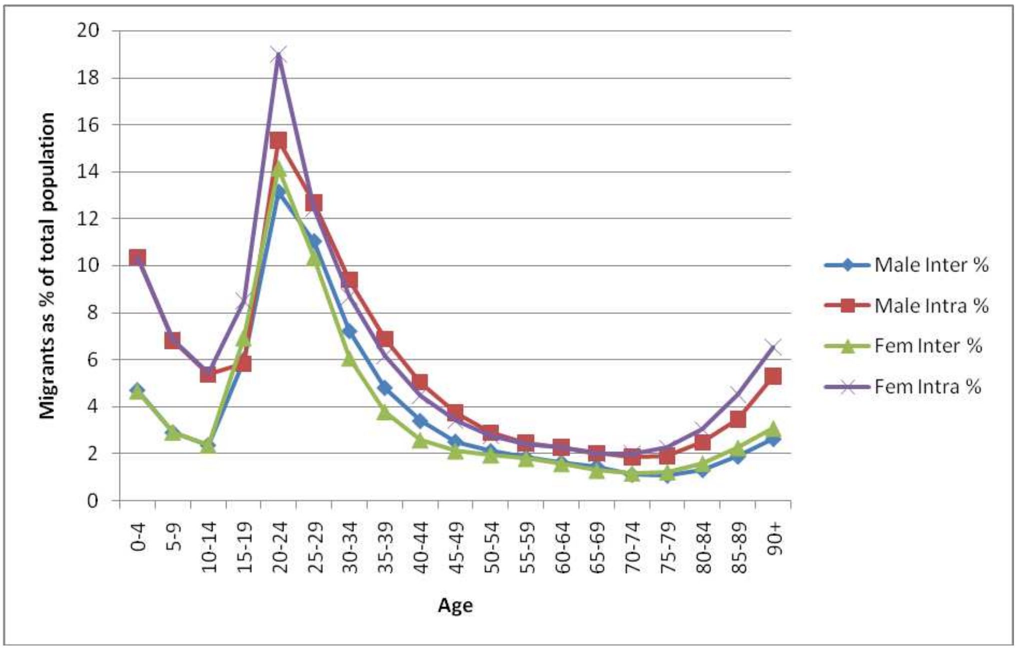


Figure 13. Inter and intra-district migration rate schedules by sex, 2000-01



8. Migration patterns for districts by broad age group

The preceding figures and discussion reveal in some detail the proportion of the total population of each defined age group that were internal migrants in Britain, in the year prior to the 2001 Census. In this section, the spatial patterns of migration are investigated.

In the case of the migration schedules for the whole of Britain, five year age groups have been used. However, for much of the remaining analysis in this paper the following age groups are used: 0-15, 16-29, 30-44, 45-pensionable age (pensionable age in this case defined as 65 for males and 60 for females) and pensionable age and above. These groups were chosen as they represent groupings of around 15 years, making it possible to draw comparison with the relative numbers of migrants present in each group. These bands also represent recognisable stages in the life course (with one notable exception) – ages 0-15 are the dependent child years; ages 30-44 are the family rearing years; ages 45-pensionable age are the years after the children have left home; and pensionable age and above are the retirement years. The one exception is the 16-29 age group. It could be argued that there are a number of key life stages within this age group: leaving home to study or take a first job; graduating and moving to a first job; moving through the early stages of a career; starting a young family. By choosing a single 15 year grouping for this period (despite its usefulness for comparing with other 15 year groupings), some of the most interesting migration peaks, such as those present for the 18-19 age group, will be obscured. Nevertheless, the age-specific migration schedules in Figure 7-Figure 9 reveal that throughout this 15 year age group migration is consistently high, and so despite some smoothing of the peaks, it is still useful to look at this group as a single entity. By way of compromise, the 16-29 age groups will be disaggregated further where appropriate in this analysis and smaller age groups within this larger group will be looked at separately.

Table 4 briefly summarises the proportions of each of the chosen age groups that are comprised of internal migrants. Perhaps the most striking feature is that almost one quarter of the 16-29 age group are internal migrants. This is by far the largest proportion of the total population for any group in any of the age categories, and is perhaps not surprising in the context of what one might expect given the previous trends shown in the age-specific schedules and knowledge about migration as a result of moving to and from higher education institutions and migrations to find a first job.

Table 4. Percentage of age group population who are migrants

Age group	%
0-15	10.46
16-29	23.65
30-44	11.50
45-PA	4.89
PA+	3.88

The flows for 0-15 and 30-44 year olds are broadly comparable to the 10.7% observed in the total population, where as the flows for the two oldest age groups (45-pensionable age and pensionable age and above) are considerably lower than the average. Again, the low proportions of migrants in these two groups is not something that should cause surprise. Figure 14 to Figure 18 and Table 5 to Table 9 summarise these patterns for the five different age groups.

Beginning with the youngest age group, 0-15 year olds, there is a clear pattern of net out-migration from urban areas – London especially (Figure 14 and Table 5). In the year preceding 2001, Urban London lost almost 23,000 individuals aged 0-15. This was a rate of over 20 people per 1,000 of the 0-15 year old population. This net out-migration from London also included a movement from the area identified as Thriving Outer London, part of Prosperous Britain. In all but the Industrial Legacy and M8 Corridor areas of Urban UK, there was also net out-migration of this age group. Net in-migration of this age group can be found across most of Rural UK and Prosperous Britain, with the highest rates found in the south west of Britain, and outside of the London Commuter Belt area. Paradoxically the highest rates of gain are to be found in the Aged Coastal Resorts.

In contrast to the 0-15 age group, the 16-29 age group pattern of net migration is virtually the opposite (Figure 15). The pattern of individuals in their late teens and twenties moving from rural to more urban areas is not a new one. Indeed this pattern was identified in the 1991 Census by Rees *et al.* (1996). The high rate of more than 25 out-migrants per 1,000 of population from rural areas noted in 1991 appears to have continued in 2001. Table 6 shows that in Classes within the district Groups classified as Rural Britain and Coastal Britain (with the exception of the Coastal Resorts Class), net out-migration rates are around 25 people per 1,000 of population. In fact, it appears that rates of net out-migration increase with increasing rurality, with Rural Extremes experiencing almost double the rate of net out-migration than the Rural Fringe (with the exception of the Scilly Isles which exhibit unusually high in-migration rates due to the very small PAR). Net in-migration rates are high for the urban areas one may expect; namely vibrant urban districts with universities which are likely to attract significant numbers of student migrants and young economic migrants, and London which has always offered education and employment opportunities for young migrants. Figure 15 shows the spatial pattern of migration from the larger (in area) rural districts to the generally more spatially concentrated urban districts of Britain.

Figure 14. District level migration rates (per 1,000 population) – 0-15 age group, 2000-01

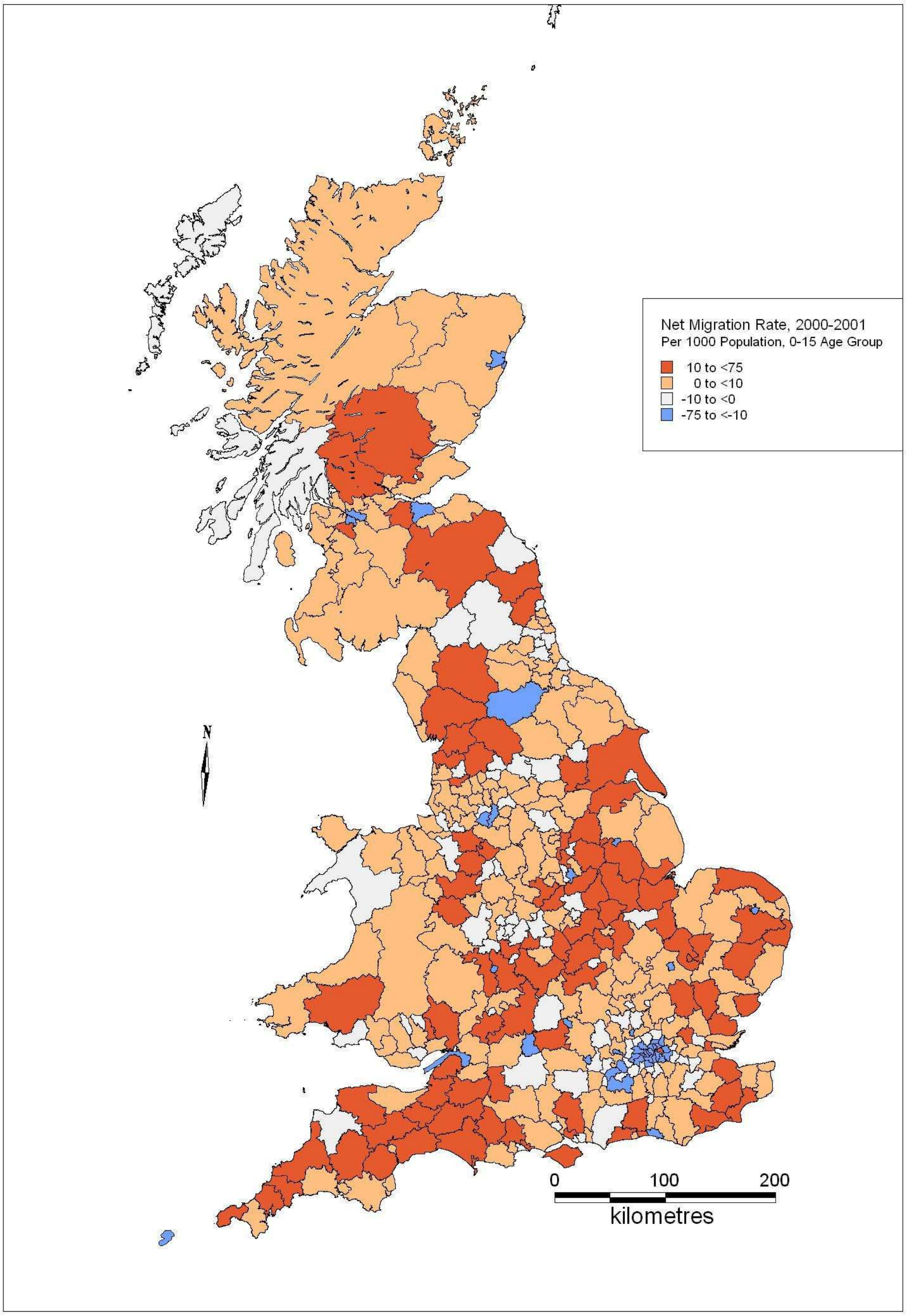


Table 5. Net migrants and net migration rates by district classification – 0-15 age group, 2000-01

District Classification (Family, Group, Class)	Net 0-15 Migrants			Net 0-15 Mig Rate (per 1000)		
Family/Group/Class	Family	Group	Class	Family	Group	Class
A: Urban UK	**-10,293**			**-2.45**		
A1: Industrial Legacy		3,508			3.10	
A1a: Industrial Legacy			*3,508*			*3.10*
A2: Established Urban Centres		-8,401			-3.98	
A2a: Struggling Urban Manufacturing			*-3,083*			*-4.92*
A2b: Regional Centres			*-4,122*			*-13.22*
A2c: Multicultural England			*-2,279*			*-2.78*
A2d: M8 Corridor			*1,083*			*3.08*
A3: Young and Vibrant Cities		-5,400			-5.61	
A3a: Redeveloping Urban Centres			*-3,192*			*-4.12*
A3b: Young Multicultural			*-2,208*			*-11.82*
B: Rural UK	**30,076**			**7.19**		
B1: Rural Britain		17,547			10.54	
B1a: Rural Extremes			*2,272*			*7.46*
B1b: Agricultural Fringe			*7,438*			*11.50*
B1c: Rural Fringe			*7,837*			*11.00*
B2: Coastal Britain		8,047			9.76	
B2a: Coastal Resorts			*1,094*			*5.85*
B2b: Aged Coastal Extremities			*4,873*			*9.58*
B2c: Aged Coastal Resorts			*2,080*			*16.21*
B3: Averageville		4,488			2.64	
B3a: Mixed Urban			*4,764*			*4.57*
B3b: Typical Towns			*-276*			*-0.42*
B4: Isles of Scilly		-6			-16.76	
B4a: Isles of Scilly			*-6*			*-16.76*
C: Prosperous Britain	**3,200**			**1.66**		
C1: Prosperous Urbanities		-2,956			-4.74	
C1a: Historic Cities			*299*			*0.99*
C1b: Thriving Outer London			*-3,255*			*-10.13*
C2: Commuter Belt		6,156			4.71	
C2a: The Commuter Belt			*6,156*			*4.71*
D: Urban London	**-22,983**			**-20.08**		
D1: Multicultural Outer London		-6,027			-10.89	
D1a: Multicultural Outer London			*-6,027*			*-10.89*
D2: Mercantile Inner London		-6,932			-37.52	
D2a: Central London			*-6,890*			*-37.43*
D2b: City of London			*-42*			*-62.69*
D3: Cosmopolitan Inner London		-10,024			-24.67	
D3a: Afro-Caribbean Ethnic Borough			*-6,533*			*-26.63*
D3b: Multicultural Inner London			*-3,491*			*-21.70*

Figure 15. District level migration rates (per 1,000 population) – 16-29 age group, 2000-01

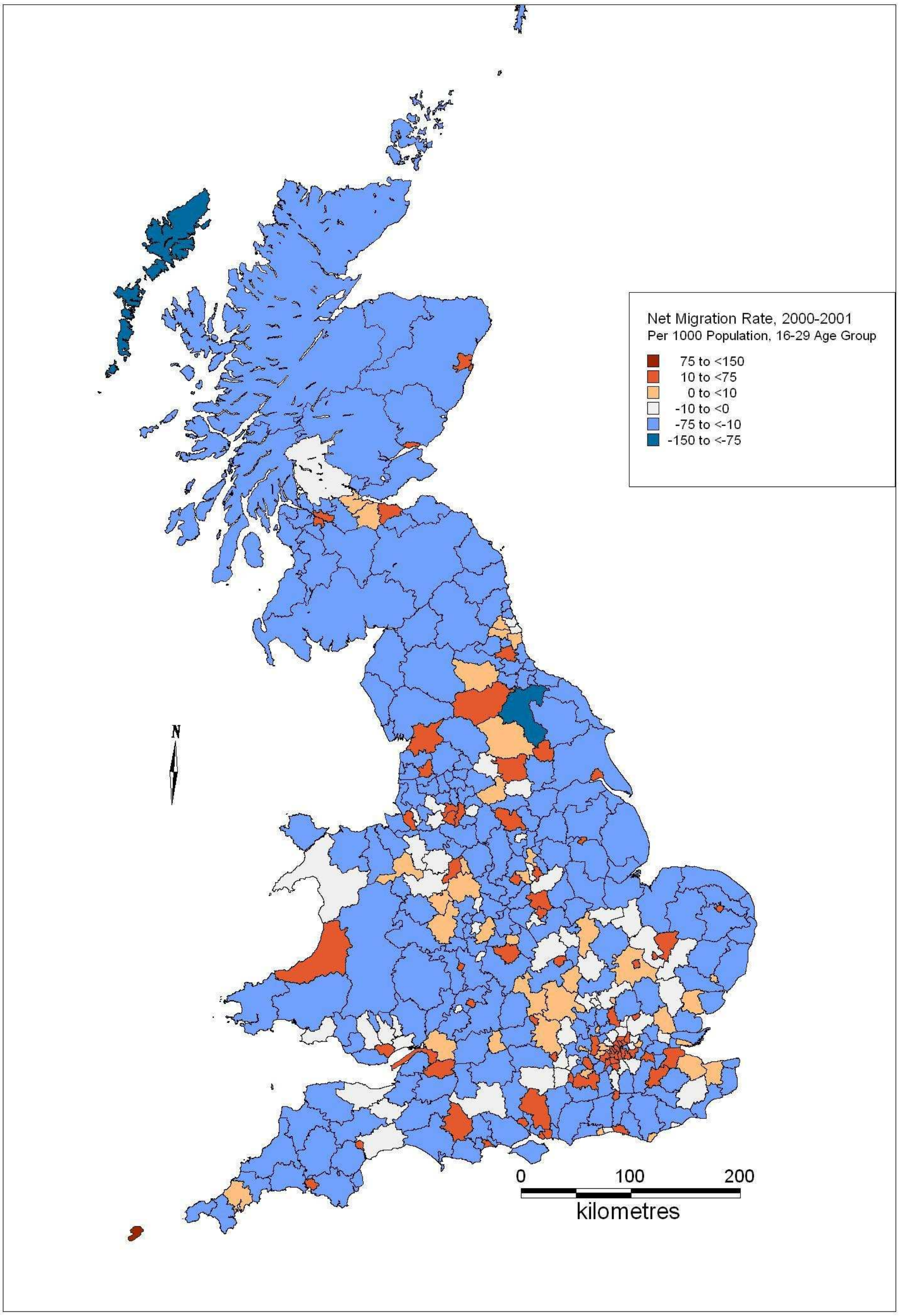


Table 6. Net migrants and net migration rates by district classification – 16-29 age group, 2000-01

District Classification (Family, Group, Class)	Net 16-29 Migrants			Net 16-29 Mig Rate (per 1000)		
Family/Group/Class	Family	Group	Class	Family	Group	Class
A: Urban UK	**36,864**			**9.44**		
A1: Industrial Legacy		-14,010			-15.92	
A1a: Industrial Legacy			*-14,010*			*-15.92*
A2: Established Urban Centres		13,259			6.98	
A2a: Struggling Urban Manufacturing			*2,379*			*4.31*
A2b: Regional Centres			*15,929*			*42.41*
A2c: Multicultural England			*-957*			*-1.42*
A2d: M8 Corridor			*-4,092*			*-13.74*
A3: Young and Vibrant Cities		37,615			33.40	
A3a: Redeveloping Urban Centres			*27,372*			*32.49*
A3b: Young Multicultural			*10,243*			*36.13*
B: Rural UK	**-59,853**			**-18.70**		
B1: Rural Britain		-35,853			-29.41	
B1a: Rural Extremes			*-9,173*			*-41.41*
B1b: Agricultural Fringe			*-14,839*			*-31.88*
B1c: Rural Fringe			*-11,841*			*-22.25*
B2: Coastal Britain		-11,019			-17.44	
B2a: Coastal Resorts			*1,095*			*7.02*
B2b: Aged Coastal Extremities			*-9,885*			*-25.82*
B2c: Aged Coastal Resorts			*-2,229*			*-23.94*
B3: Averageville		-13,024			-9.65	
B3a: Mixed Urban			*-13,254*			*-16.14*
B3b: Typical Towns			*230*			*0.43*
B4: Isles of Scilly		43			126.84	
B4a: Isles of Scilly			*43*			*126.84*
C: Prosperous Britain	**-2,545**			**-1.60**		
C1: Prosperous Urbanities		13,839			22.58	
C1a: Historic Cities			*6,774*			*22.18*
C1b: Thriving Outer London			*7,065*			*22.96*
C2: Commuter Belt		-16,384			-16.71	
C2a: The Commuter Belt			*-16,384*			*-16.71*
D: Urban London	**25,534**			**19.71**		
D1: Multicultural Outer London		293			0.55	
D1a: Multicultural Outer London			*293*			*0.55*
D2: Mercantile Inner London		11,799			38.93	
D2a: Central London			*11,765*			*39.03*
D2b: City of London			*34*			*20.62*
D3: Cosmopolitan Inner London		13,442			29.18	
D3a: Afro-Caribbean Ethnic Borough			*11,202*			*39.74*
D3b: Multicultural Inner London			*2,240*			*12.53*

Figure 16 and Table 7 reveal the patterns of migration for the 30-44 age group. Unsurprisingly this pattern is very similar to that of the 0-15 group, principally because the majority of 0-15 year old migrants will be migrating with parents who are very likely to fall into the 30-44 age category. As with the 0-15 age group, net out-migration is experienced from virtually all Urban UK (except Industrial Legacy areas), and net in-migration can be observed in all areas defined as Rural UK. Significantly there is also net in-migration to areas defined as Commuter Belt, as individuals no-doubt wishing to keep city jobs move out to areas perceived more appropriate for raising their families.

The pattern of migration changes for the 45 to pensionable age group (Figure 17 and Table 8). Whilst there is still a noticeable net out-migration of individuals in this group from London, the rates of net out-migration are lower (12.1 persons per 1,000 population for this age group compared to 20.2 at 30-44 for the Urban London Group). Similarly the rate of net in-migration to Rural UK is lower at around 5.9 persons per 1,000 population, although rates are noticeably higher for the Coastal Britain group. Within this Group, the Classes of Aged Coastal Extremities and Aged Coastal Resort exhibit in-migration rates of 14.4 and 22.0 persons per 1,000 respectively. The other key change is in the commuter belt. In the 30-44 age group, there was a net in-migration rate of around 7.6 persons per 1,000. This net in-migration has changed to a net out-migration of around 4.5 persons per 1,000 for the 45 to pensionable age group. The change can be seen clearly when comparing the maps in Figure 16 and Figure 17. Districts around London, Birmingham and Manchester all show a clear shift to negative net migration flows for the older working ages.

Figure 16. District level migration rates (per 1,000 population) – 30-44 age group, 2000-01

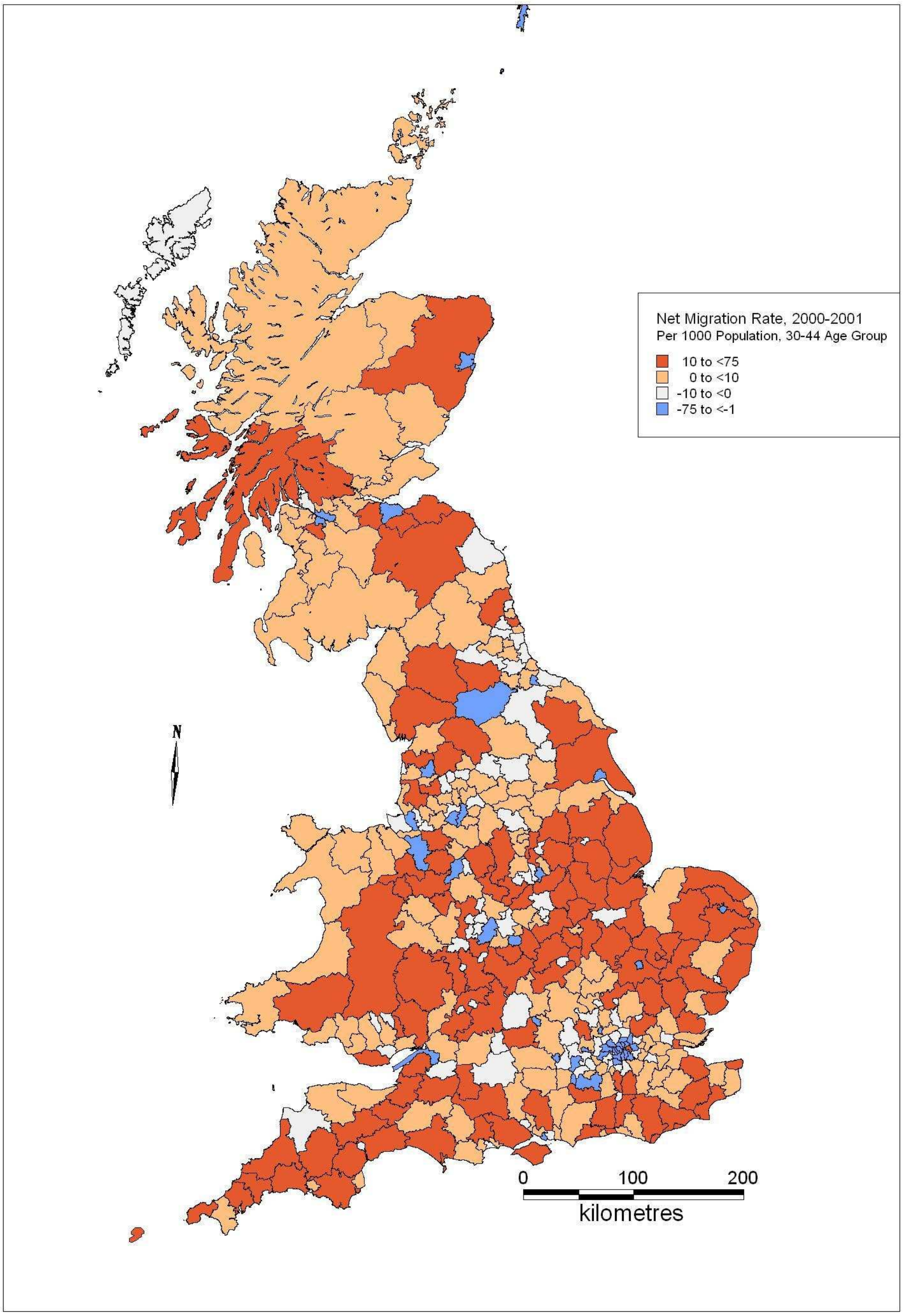


Table 7. Net migrants and net migration rates by district classification – 30-44 age group, 2000-01

District Classification (Family, Group, Class)	Net 30-44 Migrants			Net 30-44 Mig Rate (per 1000)		
Family/Group/Class	Family	Group	Class	Family	Group	Class
A: Urban UK	**-17,463**			**-3.83**		
A1: Industrial Legacy		3,145			2.58	
A1a: Industrial Legacy			*3,145*			*2.58*
A2: Established Urban Centres		-11,988			-5.41	
A2a: Struggling Urban Manufacturing			*-4,069*			*-6.18*
A2b: Regional Centres			*-5,481*			*-15.22*
A2c: Multicultural England			*-3,876*			*-4.93*
A2d: M8 Corridor			*1,438*			*3.51*
A3: Young and Vibrant Cities		-8,620			-7.69	
A3a: Redeveloping Urban Centres			*-5,119*			*-5.99*
A3b: Young Multicultural			*-3,501*			*-13.14*
B: Rural UK	**39,581**			**8.58**		
B1: Rural Britain		23,437			12.63	
B1a: Rural Extremes			*3,321*			*9.67*
B1b: Agricultural Fringe			*9,755*			*13.82*
B1c: Rural Fringe			*10,361*			*12.86*
B2: Coastal Britain		9,051			10.34	
B2a: Coastal Resorts			*1,451*			*7.09*
B2b: Aged Coastal Extremities			*5,646*			*10.57*
B2c: Aged Coastal Resorts			*1,954*			*14.29*
B3: Averageville		7,087			3.76	
B3a: Mixed Urban			*6,033*			*5.17*
B3b: Typical Towns			*1,054*			*1.47*
B4: Isles of Scilly		6			13.95	
B4a: Isles of Scilly			*6*			*13.95*
C: Prosperous Britain	**7,582**			**3.36**		
C1: Prosperous Urbanities		-3,957			-5.28	
C1a: Historic Cities			*-263*			*-0.74*
C1b: Thriving Outer London			*-3,694*			*-9.36*
C2: Commuter Belt		11,539			7.64	
C2a: The Commuter Belt			*11,539*			*7.64*
D: Urban London	**-29,700**			**-20.24**		
D1: Multicultural Outer London		-7,276			-11.32	
D1a: Multicultural Outer London			*-7,276*			*-11.32*
D2: Mercantile Inner London		-11,402			-35.77	
D2a: Central London			*-11,396*			*-35.98*
D2b: City of London			*-6*			*-3.05*
D3: Cosmopolitan Inner London		-11,022			-21.79	
D3a: Afro-Caribbean Ethnic Borough			*-6,982*			*-20.98*
D3b: Multicultural Inner London			*-4,040*			*-23.34*

Figure 17. District level migration rates (per 1,000 population) – 45-pensionable age group, 2000-01

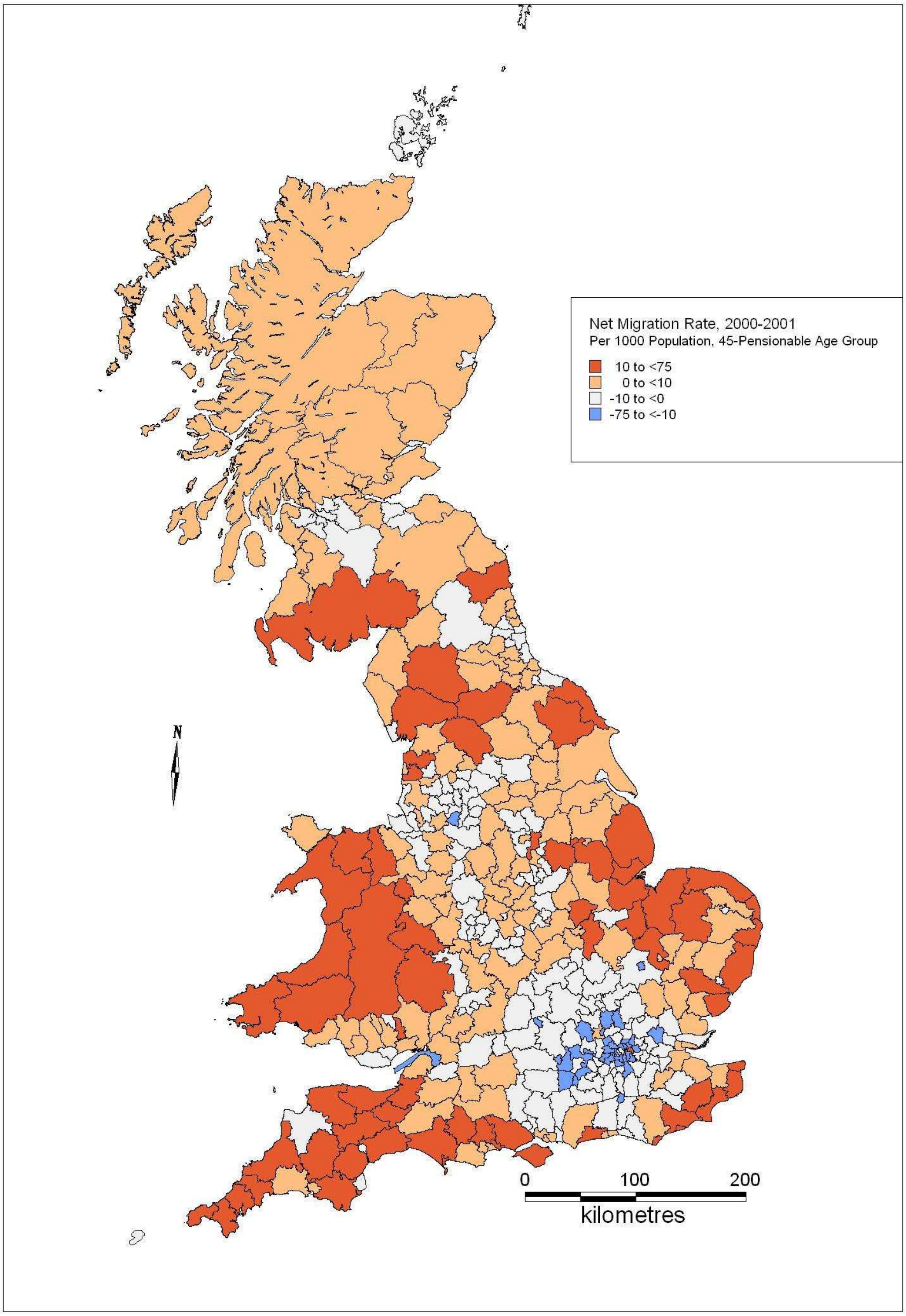


Table 8. Net migrants and net migration rates by district classification – 45-pensionable age group, 2000-01

District Classification (Family, Group, Class)	Net 45-PA Migrants			Net 45-PA Mig Rate (Per 1000)		
Family/Group/Class	Family	Group	Class	Family	Group	Class
A: Urban UK	**-6,762**			**-1.61**		
A1: Industrial Legacy		1,407			1.15	
A1a: Industrial Legacy			*1,407*			*1.15*
A2: Established Urban Centres		-4,974			-2.49	
A2a: Struggling Urban Manufacturing			*-1,673*			*-2.80*
A2b: Regional Centres			*-1,541*			*-5.25*
A2c: Multicultural England			*-2,374*			*-3.32*
A2d: M8 Corridor			*614*			*1.57*
A3: Young and Vibrant Cities		-3,195			-3.24	
A3a: Redeveloping Urban Centres			*-1,618*			*-2.10*
A3b: Young Multicultural			*-1,577*			*-7.30*
B: Rural UK	**28,787**			**5.88**		
B1: Rural Britain		15,243			7.41	
B1a: Rural Extremes			*3,281*			*8.54*
B1b: Agricultural Fringe			*7,609*			*9.32*
B1c: Rural Fringe			*4,353*			*5.08*
B2: Coastal Britain		15,270			14.89	
B2a: Coastal Resorts			*2,175*			*10.32*
B2b: Aged Coastal Extremities			*9,210*			*14.44*
B2c: Aged Coastal Resorts			*3,885*			*22.01*
B3: Averageville		-1,725			-0.95	
B3a: Mixed Urban			*-1,012*			*-0.86*
B3b: Typical Towns			*-713*			*-1.12*
B4: Isles of Scilly		-1			-1.78	
B4a: Isles of Scilly			*-1*			*-1.78*
C: Prosperous Britain	**-10,235**			**-4.83**		
C1: Prosperous Urbanities		-3,687			-5.65	
C1a: Historic Cities			*-972*			*-2.81*
C1b: Thriving Outer London			*-2,715*			*-8.87*
C2: Commuter Belt		-6,548			-4.46	
C2a: The Commuter Belt			*-6,548*			*-4.46*
D: Urban London	**-11,790**			**-12.11**		
D1: Multicultural Outer London		-4,685			-9.50	
D1a: Multicultural Outer London			*-4,685*			*-9.50*
D2: Mercantile Inner London		-2,819			-14.69	
D2a: Central London			*-2,855*			*-15.02*
D2b: City of London			*36*			*20.04*
D3: Cosmopolitan Inner London		-4,286			-14.85	
D3a: Afro-Caribbean Ethnic Borough			*-2,761*			*-15.23*
D3b: Multicultural Inner London			*-1,525*			*-14.20*

The final age group includes those of pensionable age and above (Figure 18 and Table 9). Essentially the overall migration patterns of this group are very similar to that of the 45 to pensionable age group. These are characterised by net out-migration from Urban London and other built up areas in Urban UK and Prosperous UK, and net in-migration to Rural UK, especially the Coastal Resort areas. Indeed it is noticeable that the only areas of relatively high in-migration for this age group are districts along the south coast, Norfolk and Lincolnshire (Figure 18). One other noticeable pattern is that whilst there is still an overall net out-migration from Commuter Belt areas, this is lower (1.4 people per 1,000 population) than the rate for the preceding age group. Careful examination of the map in Figure 18 reveals further that for a number of Commuter Belt districts in the Home Counties the rate of migration has switched from negative in the 44 to pensionable age group, to positive in the pensionable age and above group.

An overview of the migration patterns of each age group by district type for the whole of GB is shown in Figure 19. Using in/out ratios, as might be expected the same broad patterns of counterurbanisation are apparent for all groups, only with the exception of age group 16-29. A summary of the count of districts falling within each net-migration range used in Figure 14 to Figure 18, for each broad age group is given in Table 10.

Figure 18. District level migration rates (per 1,000 population) – pensionable age and above age group, 2000-01

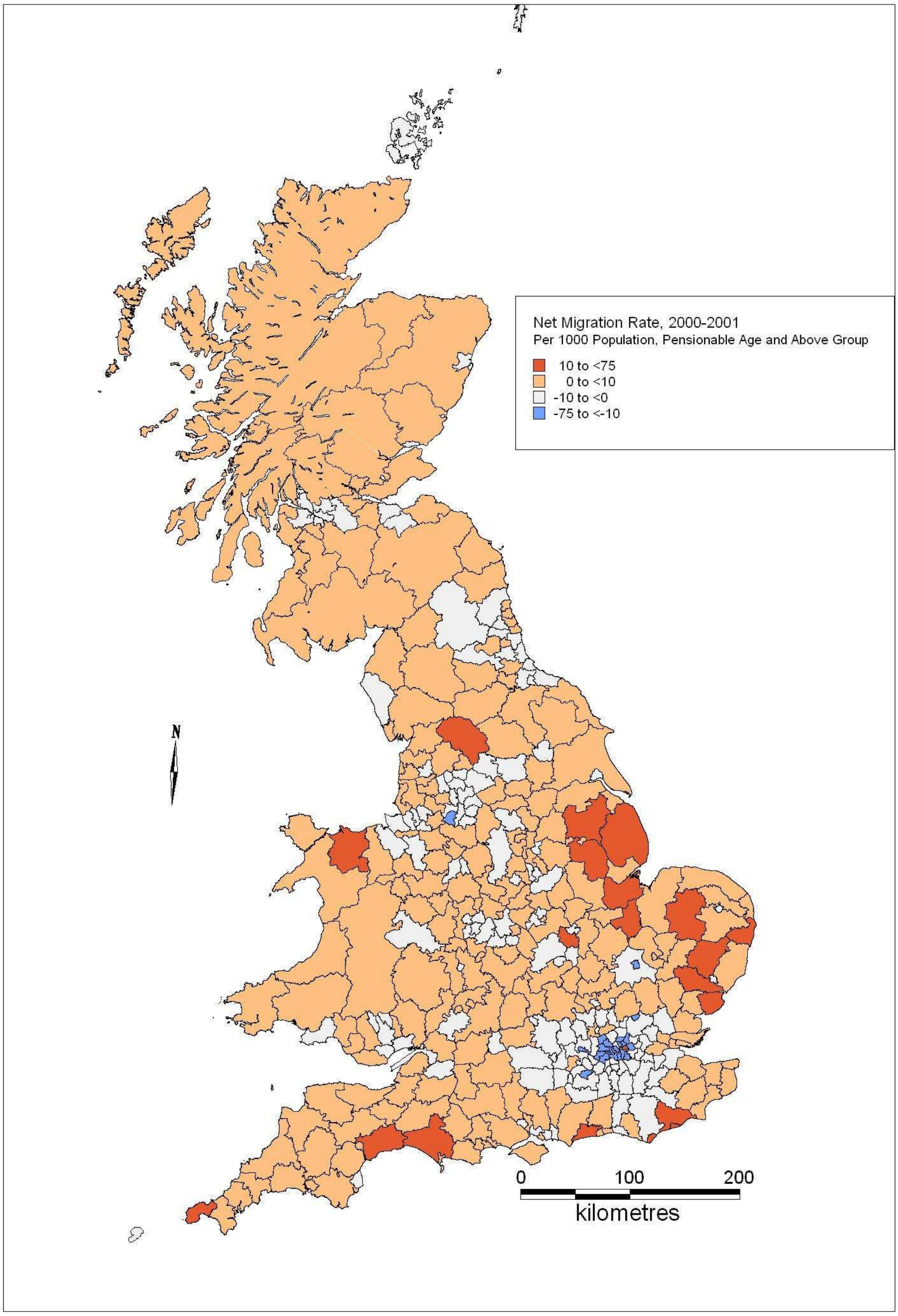


Table 9. Net migrants and net migration rates by district classification – pensionable age and above age group, 2000-01

District Classification (Family, Group, Class)	Net PA+ Migrants			Net PA+ Mig Rate (Per 1000)		
Family/Group/Class	Family	Group	Class	Family	Group	Class
A: Urban UK	**-7,188**			**-1.92**		
A1: Industrial Legacy		687			0.65	
A1a: Industrial Legacy			*687*			*0.65*
A2: Established Urban Centres		-4,725			-2.68	
A2a: Struggling Urban Manufacturing			*-1,846*			*-3.35*
A2b: Regional Centres			*-1,590*			*-5.56*
A2c: Multicultural England			*-1,778*			*-2.93*
A2d: M8 Corridor			*489*			*1.52*
A3: Young and Vibrant Cities		-3,150			-3.45	
A3a: Redeveloping Urban Centres			*-2,048*			*-2.87*
A3b: Young Multicultural			*-1,102*			*-5.54*
B: Rural UK	**19,356**			**4.42**		
B1: Rural Britain		10,279			5.63	
B1a: Rural Extremes			*1,366*			*4.09*
B1b: Agricultural Fringe			*4,799*			*6.16*
B1c: Rural Fringe			*4,114*			*5.76*
B2: Coastal Britain		8,785			8.07	
B2a: Coastal Resorts			*1,416*			*5.99*
B2b: Aged Coastal Extremities			*4,981*			*7.96*
B2c: Aged Coastal Resorts			*2,388*			*10.56*
B3: Averageville		296			0.20	
B3a: Mixed Urban			*320*			*0.33*
B3b: Typical Towns			*-24*			*-0.05*
B4: Isles of Scilly		-4			-8.93	
B4a: Isles of Scilly			*-4*			*-8.93*
C: Prosperous Britain	**-2,985**			**-1.79**		
C1: Prosperous Urbanities		-1,395			-2.63	
C1a: Historic Cities			*-232*			*-0.77*
C1b: Thriving Outer London			*-1,163*			*-5.04*
C2: Commuter Belt		-1,590			-1.40	
C2a: The Commuter Belt			*-1,590*			*-1.40*
D: Urban London	**-9,183**			**-12.05**		
D1: Multicultural Outer London		-3,252			-8.29	
D1a: Multicultural Outer London			*-3,252*			*-8.29*
D2: Mercantile Inner London		-2,351			-15.84	
D2a: Central London			*-2,349*			*-15.95*
D2b: City of London			*-2*			*-1.82*
D3: Cosmopolitan Inner London		-3,580			-16.17	
D3a: Afro-Caribbean Ethnic Borough			*-2,090*			*-15.14*
D3b: Multicultural Inner London			*-1,490*			*-17.87*

Figure 19. In-migration/Out-migration ratios for district types in Britain by broad age group, 2000-01

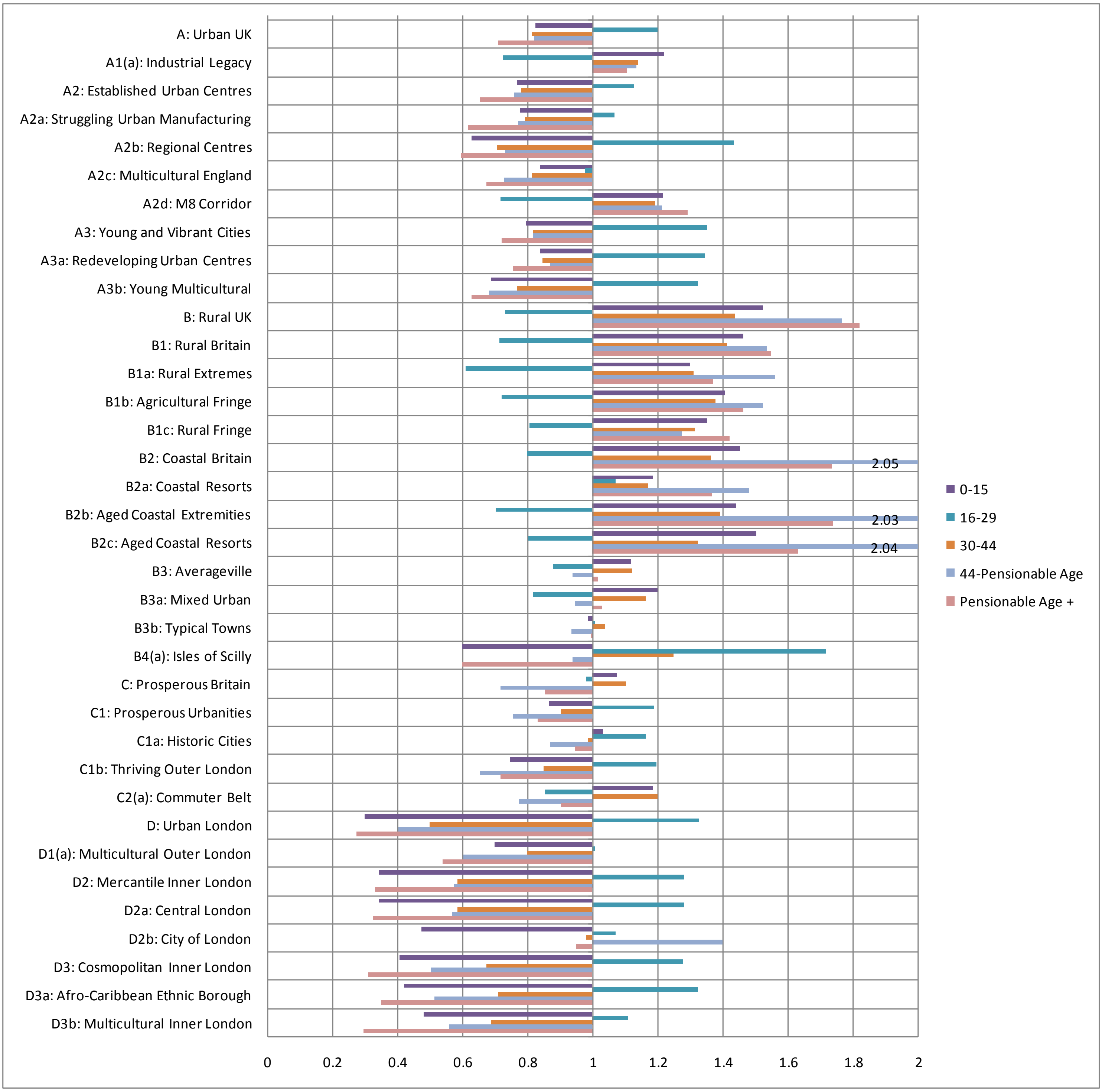


Table 10. Summary of the count of districts falling within each net-migration range by broad age group

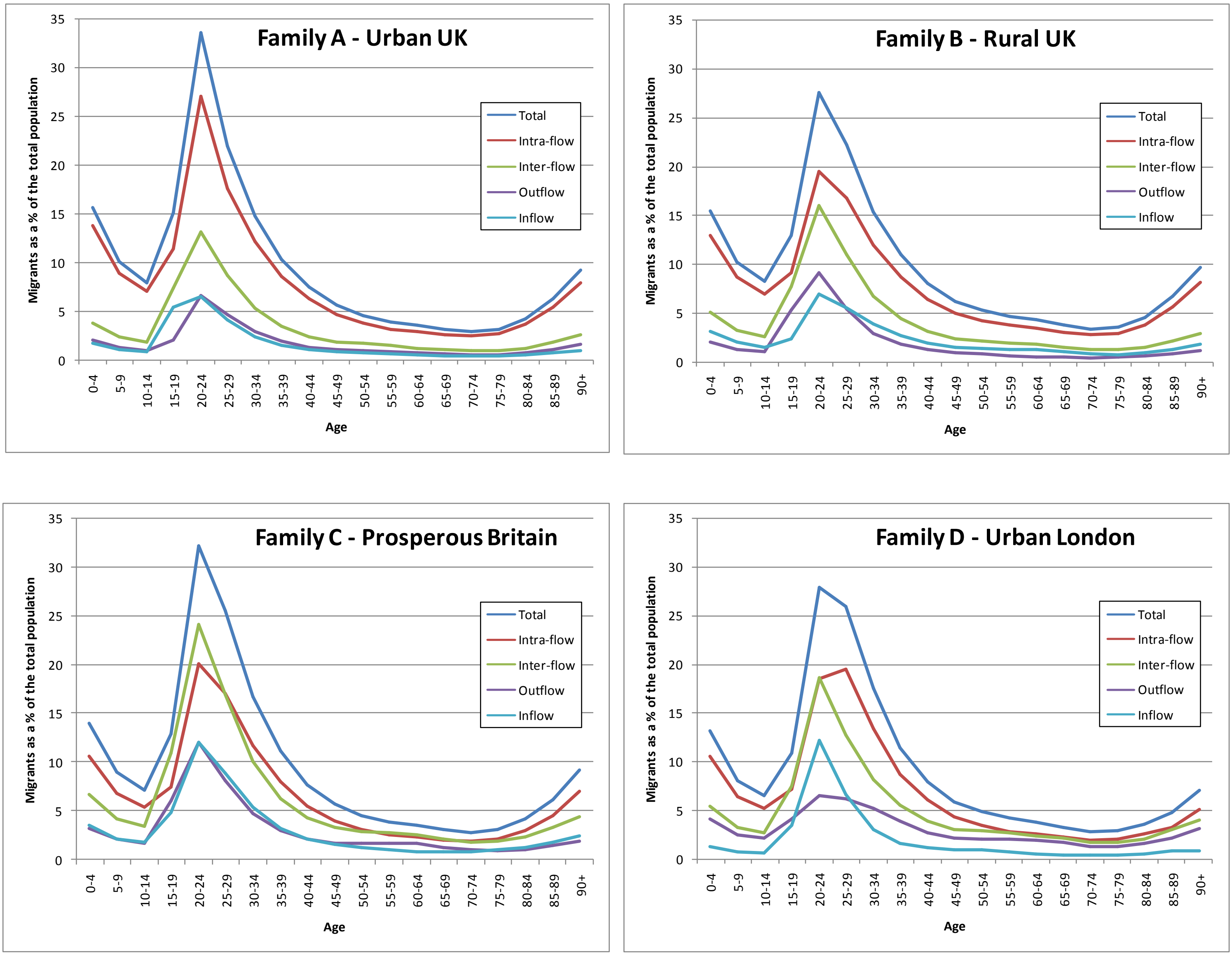
Migration rate per 1000 people	Age group				
	0-15	16-29	30-44	45-PA	PA+
75 - <150	0	1	0	0	0
10 - <75	103	74	139	78	25
0 - <10	180	45	144	149	226
-10 - <0	83	58	83	152	135
-75 - <-10	42	228	42	29	22
-150 - <-75	0	2	0	0	0
	408	408	408	408	408

9. Migration schedules by district classification

Having examined age-specific migration schedules for the whole of Britain in Section 6 and having looked at flows and rates for migration for districts in the Vickers *et al.* classification in Section 7, it is logical to combine the two by considering age-specific migration schedules for migrants to, from and within the different classifications of district. By doing this a full understanding of how migration propensities change with age by types of migration (inter/intra district), and sex can be gained for the different Families, Groups and Classes of district within the Vickers *et al.* classification.

Figure 20 reveals some interesting patterns exhibited by the different district Families. Pre-age 15, migrants between Families make up around 5% or less of the total population. Intra-zonal migrants of this age make up a larger proportion of the total population of all Families (around 5-10% more on average). Age group 15-19 is where the first change in the hitherto downward trend in migration occurs. For all Families there is a rise in the inter-zonal rates as migrants begin to comprise a larger percentage of the total population. There is also a rise in the intra-zonal rates of migrants, however in all cases, this rise is not as steep. The rise in inter-zonal rates is attributed differentially to in-migration and out-migration in the case of each Family. For Family A (Urban UK) there are significantly more in-migrants than out-migrants, for all other Families, there are more out-migrants than in-migrants, however for Family B (Rural UK) this difference is more pronounced. This pattern is understandable, given that all of the major university towns in Britain can be found in Family A.

Figure 20. Age-specific migration rate schedules for total inflow, outflow, intra-Family, inter-Family and total flows, for the four Vickers *et al.* classification district Family categories

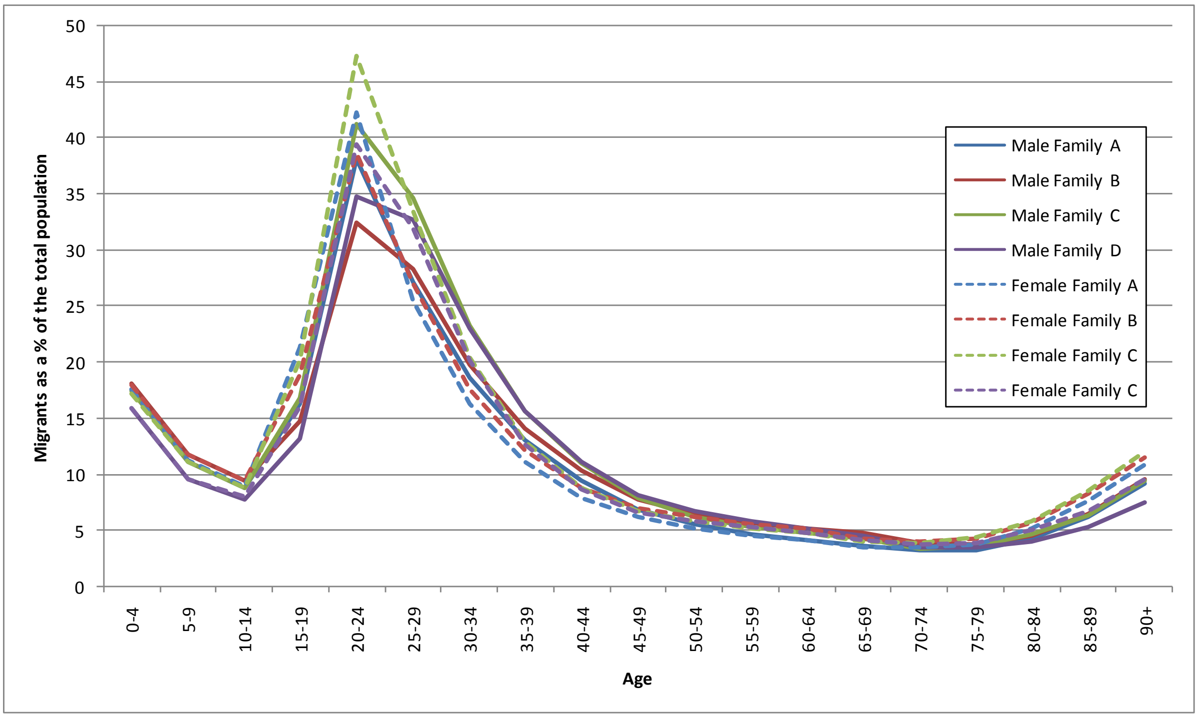


Moving on to the age group of peak flow (20-24), differences are exhibited between inter-zonal and intra-zonal migration propensities between district Families, as well as differences between inflow and outflow propensities. For Families A and B, intra-zonal rates are more important, whereas for Families C and D (Prosperous Britain and Urban London), inter-zonal rates are more (or equally) important. These patterns can again be explained by what is known already about the migration patterns of young (often immediately post-university) migrants. For example, many of the intra-zonal flows for Family A could be attributed to young people moving between Britain's larger cities in search of employment opportunities. This same phenomenon could explain the much higher rates of inflow to Family D. Similarly the increased outflow peak for Family B makes sense in this context.

After age group 20-24, migration rates decrease for all flow types and all Families, except for the intra-zonal flow in Family D. Much of this slight increase is likely to be attributed to the inter-zonal migrants at age-group 20-24 increasing in affluence and/or changing personal status and being able to move from their first job residential locations as well as moves associated with first jobs following university. From age group 25-29, there is a continued decline and levelling off of migrants as a percentage of the total population until pensionable age. Interestingly, for Family A, in and out-migration rates remain broadly similar. For Urban London, out-migration becomes more significant, and for Rural UK, conversely (but unsurprisingly) in-migration is more important.

Focusing differences by sex, Figure 21 reveals that until age group 10-14, both male and female migrants to, from and within district Families A, B, C and D all comprise similar amounts of the total Family populations. There is a decline in migrants from just below 16-18% of the population at 0-4 to around 10% of the population at 10-4. At this stage the largest proportion of migrants are found in Family B and smallest proportion migrants in Family D, although the difference is very small between lowest and highest. Age group 15-19 is where there is the first noticeable divergence in the migration propensities of males and females and of those in different Family categories. Here, females moving to, from and within Families A and C (Urban UK and Prosperous Britain) comprise between 20% of all of the Family populations. This compares with males of the same age in Families B and D comprising less than 15% of the Family populations. At the peak age group (20-24) where migrants form the largest percentage of the population, females moving in, out and within Family C comprise almost 50% of the total 20-24 year old population for this Family. This compares with male migrants in Family B who only make up around 32% of the total 20-24 year old population for this Family. From this point in the age schedules, in nearly all cases there is a sharp decline in migrants as a percentage of total age group populations, in both males and females for Families of district. The exception is males in Family D. Here the decline in migrants as a percentage of the total age group population is less pronounced. Overall, however, the point of most note is that at the age group of peak migration, for all Families of district, female migrants comprise higher proportions of the underlying population than male migrants. Males only become more active in migration than females in their late 20s.

Figure 21. District level migration rate schedule disaggregated by Family category of district and sex for Britain, 2000-01



Finally, whilst Family level disaggregation of migration schedules is revealing, disaggregating the flows by Group of district offers even greater insight into area specific internal migration patterns. Figure 22-Figure 24 disaggregate the flows in this way and uncover some of the differences in age-specific migration propensities within Families. In Figure 22, Family A and Groups A1 (Industrial Legacy), A2 (Established Urban Centres) and A3 (Young & Vibrant Cities), large differences are shown at the peak migration age group of 20-24. Here, in Group A3, migrants make up almost 60% of the population of the Group. This compares with migrants comprising only just over 30% of the population of Group A1, and just under 40% of Group A2. This is a huge variation, masked at the Family level. When examined though, it makes sense that

Industrial Legacy areas are experiencing less migration than Young and Vibrant Cities, even at this peak age group. At the 20-24 age large variations occur in Families C and D. Family B experiences much smaller variations between Groups, although when the total flow is disaggregated by inflows and outflows, outflow propensity is greater than inflow in all cases.

Other points of interest are the continuation of Group D2 (Mercantile Inner London) as an area with a comparatively high proportion of internal migrants from age group 20-24 until age group 55-59. Figure 24 shows that this is mainly the result of a much higher outflow rate than any other group. From age group 60-64 until age group 75-79, Group B2 (Coastal Britain) becomes the Group with the highest proportion of internal migrants, Figure 23 revealing that this is attributable to inflated in-migration rates. Both of these patterns make sense with knowledge about the continued importance of inner London as an employment centre and the attraction of coastal areas to the retirement population. This greater degree of disaggregation at the Group level allows one to tease out these patterns.

Figure 22. District level migration rate schedules, disaggregated by Group category of district, 2000-01

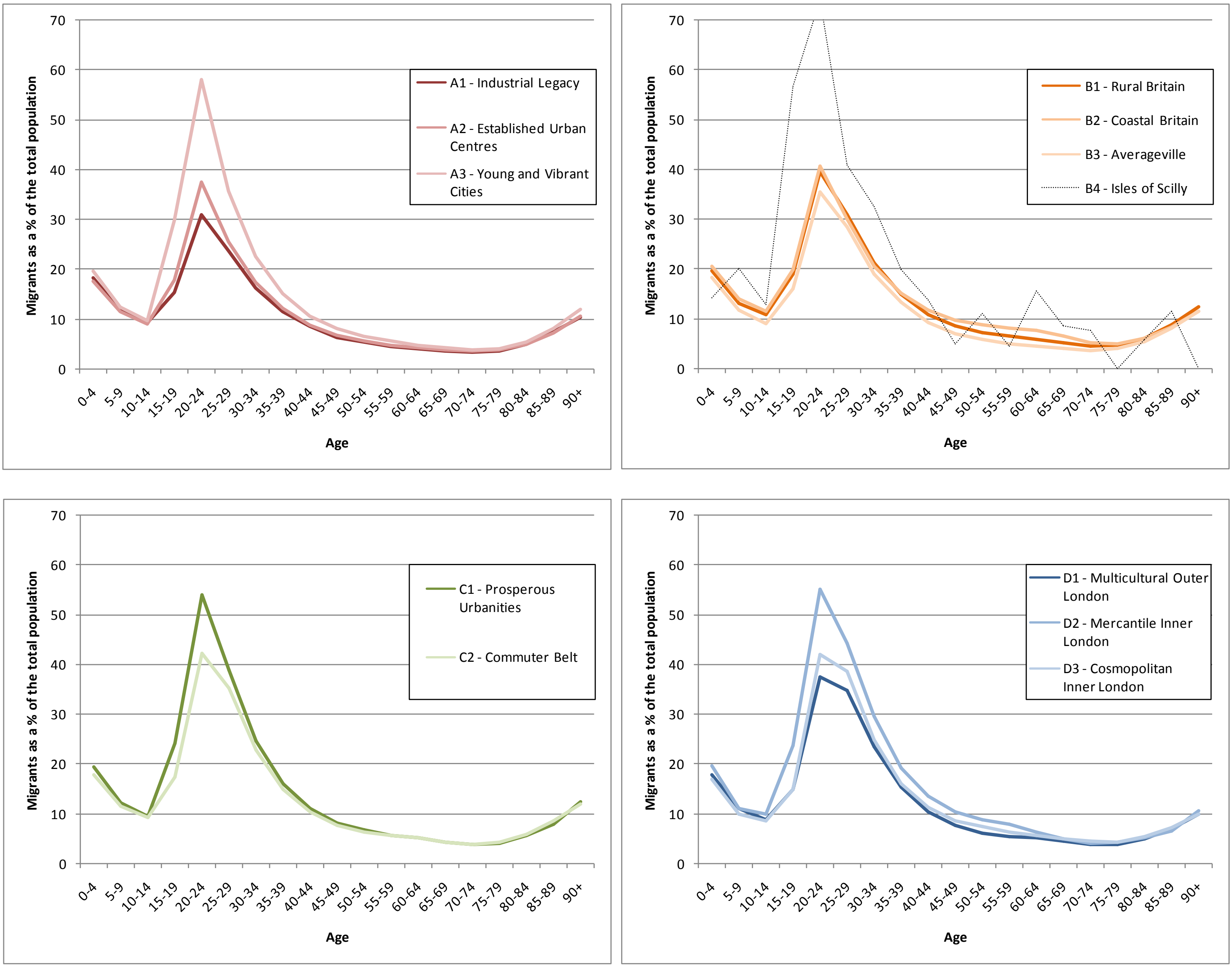


Figure 23. District level in-migration rate schedule, disaggregated by Group category of district, 2000-01

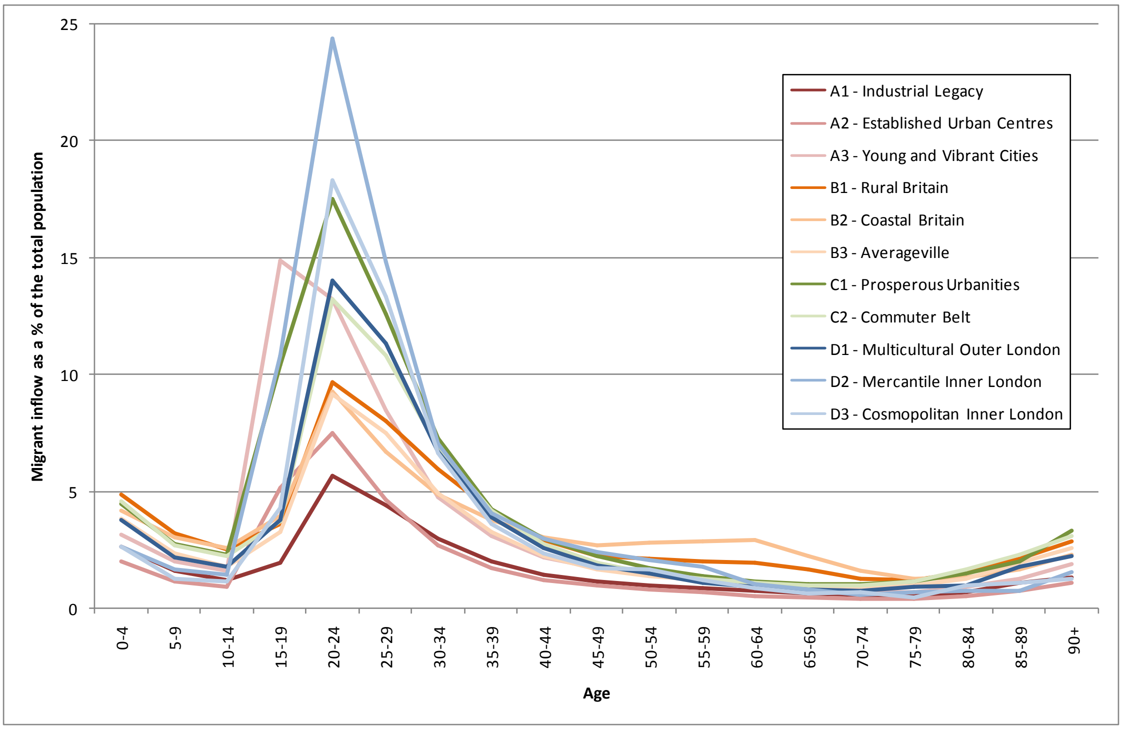
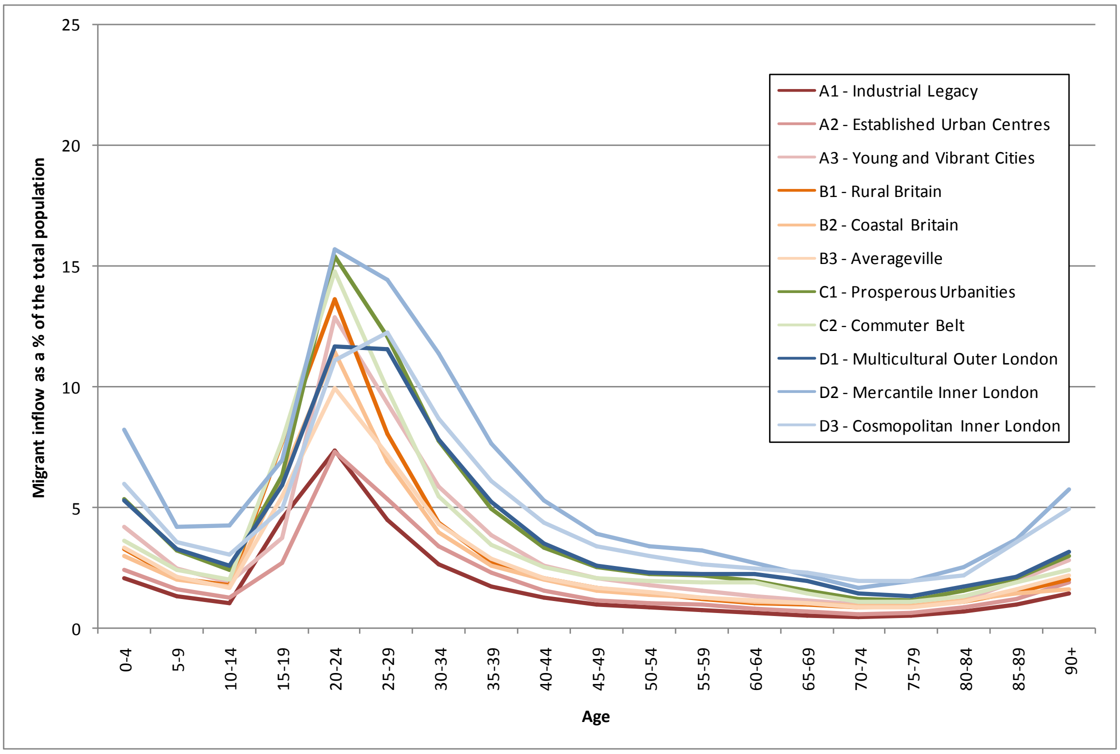


Figure 24. District level out-migration rate schedule, disaggregated by Group category of district, 2000-01



10.Population stability: ‘turnover’ and ‘churn’

The study of net migration and net migration rates only tells a part of the internal migration story. Net migration is useful for understanding the actual and relative movements of groups *between* areas, however as was outlined by Ravenstein (1885, 1889) in his seminal work on migration, and as has also been noted frequently by subsequent works on migration over the years including Westefeld (1940), Zipf (1946) and Lawton (1968), distance plays a very important role in migration. Shorter-distance moves are far more common and frequent than longer-distance moves. In the context of this study the spatial scale is that of the local authority district. The average area of the districts in Britain is 567 sq km. Since districts cover relatively large units of space, moves between districts are likely to be of a longer distance, and thus in all probability less frequent than moves within districts. Within zone moves are of even more significance when one takes into consideration the district classification hierarchy used in this analysis. Classes, Groups and Families of district create successive geographical areas of increasing size, such that intra-zonal moves also increase in importance at each level. This is confirmed by examining the intra/inter district migration schedules shown in Figure 10, Figure 11 and Figure 20. The results shown here confirm the relative importance of intra-zonal flows compared with inter-zonal flows, both at the level of district and Family. By only studying net migration and net migration rates between districts and classifications of district, and not including the flows within, one can be certain that much of the story of migration within Britain is being overlooked.

In addition to the omission of distance, the net migration variable that we have used so far gives only one measure of the stability of a population within any given area. The term stability is used here to describe the extent to which a population is comprised of the same people from one year to the next. A stable population in an area will feature much the same individuals one year as it will in the next. An unstable population may have either more or less people in total, but perhaps more importantly will have *different individuals* in the area. Of course births and deaths will have an impact as well as migration, and certainly there will be some areas that feature above or below average birth or death rates. Births and deaths, however, do not feature in the data being used here, so account of these will not be taken in measuring stability. Moreover, migration is likely to be the more important factor driving population change in most areas.

It is an easy assumption to make that a low level of net in- or out-migration means a relatively stable population, but this is not necessarily the case. For example, a hypothetical area with 1million residents at the end of a year that had seen 100 residents move into the area and 101 residents move out over that period, would have a net migration rate per 1,000 people of -0.001. This rate would be identical if, for the same area, 10,000 residents had moved in and 10,001 residents had moved out. Obviously in this example an identical rate is obscuring a hugely different turnover of population for the area and a massive change in the composition of the resident population. The limitations of net migration as a measure have been recognised before. One alternative to net migration has been migration effectiveness or efficiency. This has been used in previous research both as an alternative to and in conjunction with net migration rates (Stillwell *et al.*, 2000, 2001). Indices of migration effectiveness standardise rates of migration by using gross migration flows as the denominator rather than PAR. The direction of flow is standardised by the magnitude of the flow rather than the population of an area, but in doing so, the direction or symmetry of the flow is still of central importance. Consequently, the nature of the migration effectiveness measure does not make it the most suitable option for assessing the relative stability of underlying areal populations.

To address these issues, attention will be turned to the concepts of population 'turnover' and 'churn'. Population turnover is defined as:

$$TO_i^{as} = \left(\frac{D_i^{as} + O_i^{as}}{P_i^{as}}\right)1000$$

The ONS (2007) (http://neighbourhood.statistics.gov.uk/dissemination/Info.do?page=Population_Turnover.htm) calculates the rate of turnover (for small areas) by averaging turnover over a three year period. This is to avoid the possible distorting effects that might be caused by localised phenomena, such as the building of a new housing estate. When calculating turnover for larger areas, there is less of a need to account for these possible distorting factors. As such, and fortunately so considering there are only data available for one year from the Census, turnover in this analysis will be calculated from only one year of data. Turnover is useful as it takes account of both the inflow and outflow and gives a measure of how the population of an area has changed in a way that standard (inflow *minus* outflow over population) rate calculations do not. However, turnover does not take account of the more localised migrations that happen *within* an area.

A measure of population 'churn' can be calculated by including within area migration together with inflows and outflows as follows:

$$CH_i^{as} = \left(\frac{D_i^{as} + O_i^{as} + W_i^{as}}{P_i^{as}}\right)1000$$

where: W_i^{as} = total migrants of age group *a* and sex *s* within area *i*.

As outlined by Bailey and Livingston (2007), churn is a particularly important aspect of population flow as it is associated more closely with deprivation, especially when small areas are involved. Specific local factors which may agitate local populations at the small scale cease to be important at larger scales. Despite this, measuring population churn is important for ascertaining an even more accurate measurement of the relative stability of the population in different areas. It could be easily argued that where two areas with the same levels of population turnover are compared, it would be the area with the higher levels of internal movement relative to the population size that would have the less stable population.

Figure 25 and Figure 26 plot rates of net migration against turnover and churn for all districts in Britain. For both turnover and churn there is a relatively even distribution between positive and negative net migration, however, in both cases there is a positive skew with the frequency of districts with higher rates of turnover and churn tailing off as rates increase. Figure 27 plots turnover against churn and reveals an apparent linear relationship between the two. In this figure the outliers are more easily identifiable, and represent districts with high scores for both measures of population (in)stability. All of the numbered outliers are located in central London, with the exception of 54 and 251 which are Oxford and Cambridge. Much of this linear relationship, however, is likely to be due to in-migration and out-migration being included in both turnover and churn calculations. Figure 28 plots intra district flows against turnover and reveals a random distribution, suggesting that there is no relationship between the rates of flow within districts and between districts, thus justifying the use of both turnover and churn in this analysis.

Figure 25. Net migration rate against turnover rate for all districts in Britain, 2000-01

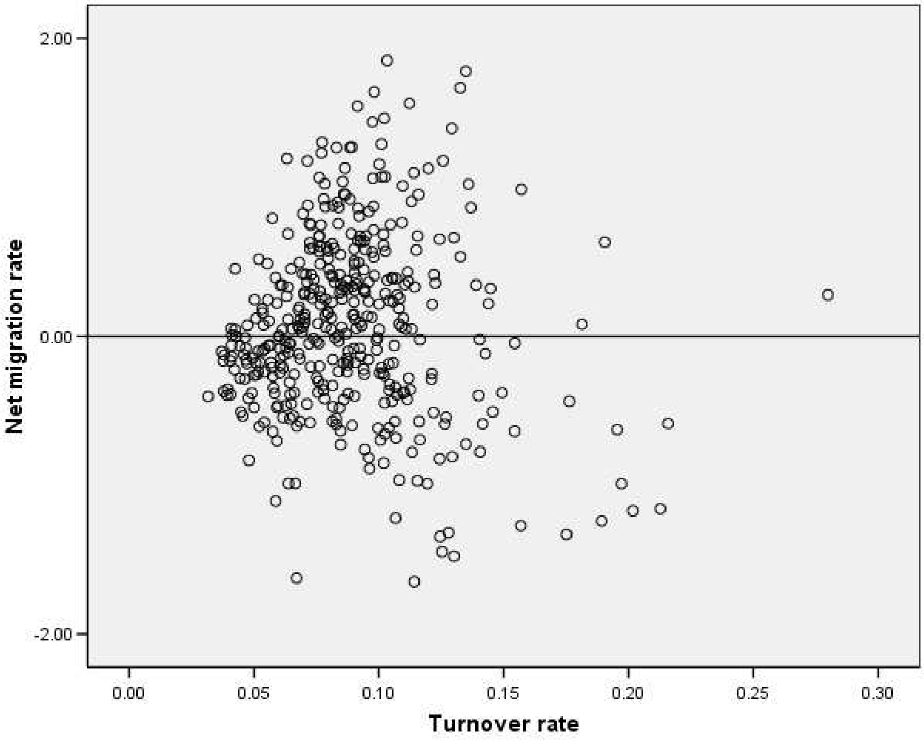


Figure 26. Net migration rate against churn rate for all districts in Britain, 2000-01

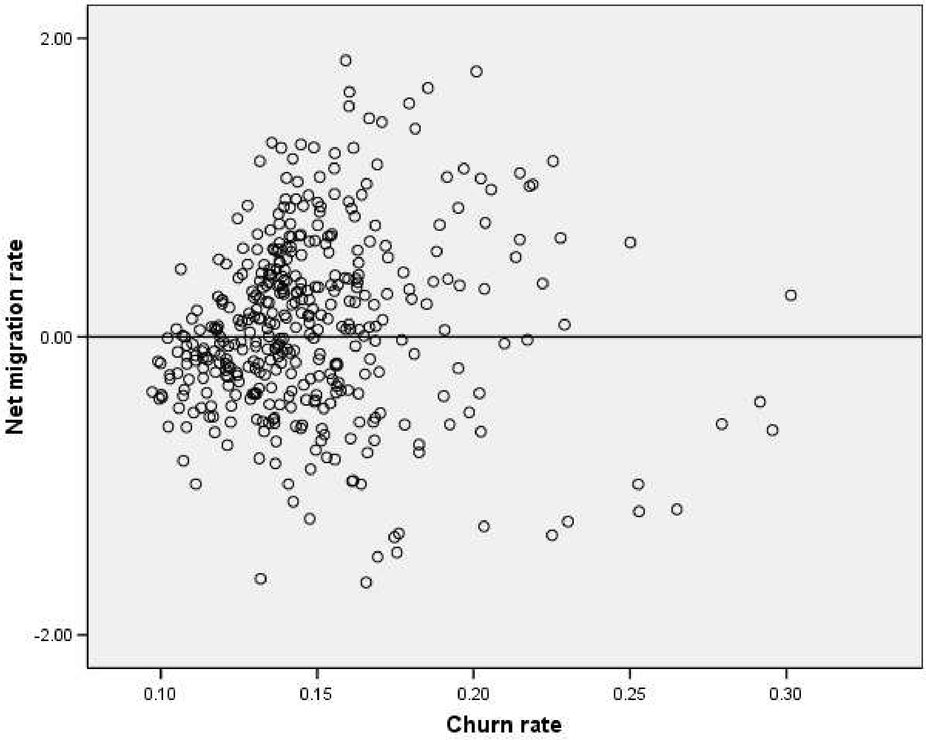


Figure 27. Turnover rate against churn rate for all districts in Britain, 2000-01

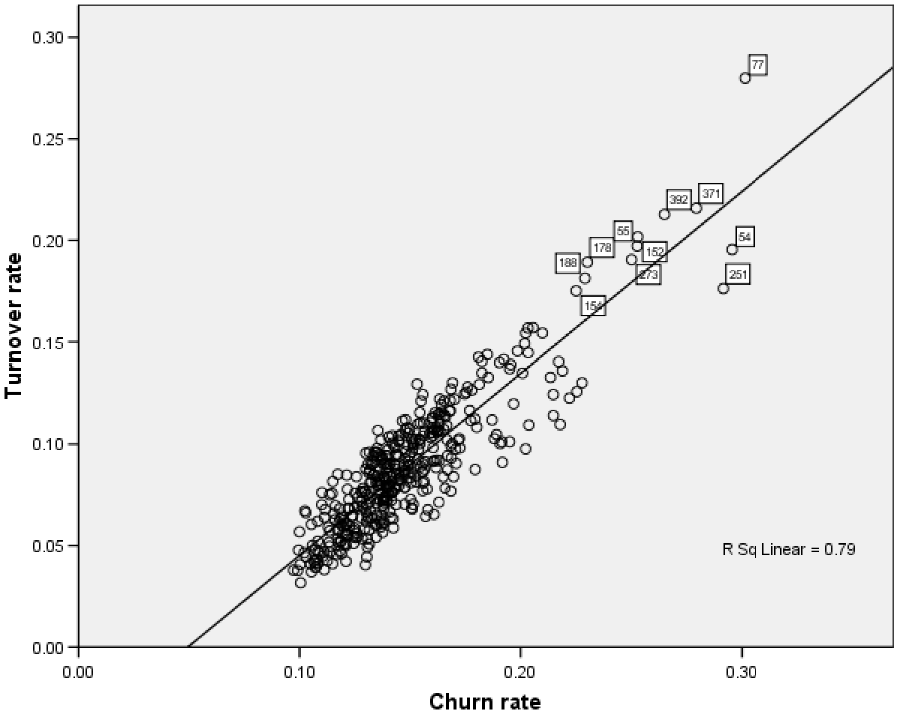
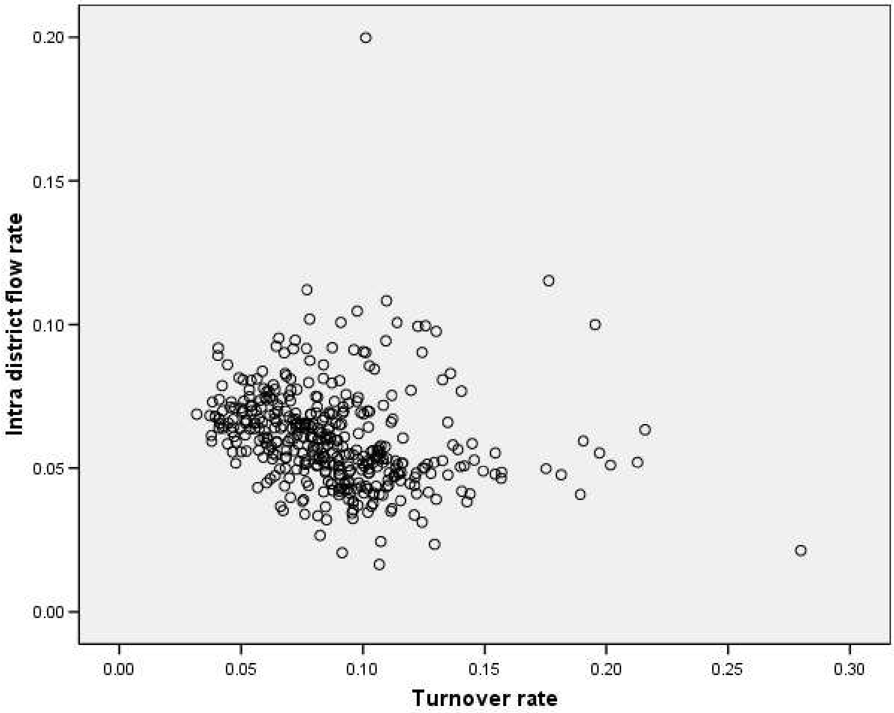


Figure 28. Intra district flow rate against turnover rate for all districts in Britain, 2000-01



Comparison of the aggregate population turnover and churn statistics with the net migration statistics for districts in Britain shows that these additional measures of population interaction reveal something about the stability of population that cannot be inferred from the standard net migration figures. Table 11 gives a comparison of these statistics for total migrants as well as for males and females by Family, Group and Class of district. It has already been mentioned earlier that the highest net migration rates for district Families in Britain are Urban London and Rural UK, with considerably more people moving in than out, and out than in respectively for these two Families than for the other two Families. As was also noted earlier, examination of the total numbers of migrants would appear to confirm the importance of Urban London and Rural UK in the internal migration story with by far the highest total numbers of migrants moving in and out of these areas.

Where population stability is concerned, however, the vast size of the underlying PAR for Rural UK in comparison with the other district families means that, despite the very large volume of in-migrants and the correspondingly high in-migration rate, the populations within Rural UK are relatively stable compared to other Families. Looking at the aggregate population turnover and churn statistics for the four Families and comparing them to both the averages for all Families, Groups and Classes and each other (Table 11), it is clear to see that Rural UK has much greater stability.

From examining Table 11 it is apparent that Urban London remains a very important location for internal migration in Britain when turnover and churn are taken into consideration along with net migration. With scores of 63 and 151 persons per 1,000 for turnover and churn respectively, it has the second highest turnover score for Families, and the highest churn score, indicating that not only does it have very significant net out-migration, but with high turnover the change in population is also significant (or at least more significant than for all other Families except Prosperous Britain). The high level of churn suggests that movement of population within districts in the Urban London Family is also more significant than it is for other categories of Family. Taking all of these measures into consideration it can be concluded that Urban London has the most dynamic population of all Families in the Vickers *et al.* classification. It is a population with high rates of net out-migration, but also a very unstable population that is distinctly more transient in nature than the other Families. Only one Family scores slightly higher for population turnover.

Table 11. A comparison of net migration, population turnover and population churn statistics for classifications of district in Britain, 2000-01

District Classification (**Family**, Group, *Class*)	Total net migration rate	Total turnover rate	Total churn rate	Male net migration rate	Male turnover rate	Male churn rate	Female net migration rate	Female turnover rate	Female churn rate
A: Urban UK	**-0.23**	**38.50**	**128.65**	**-0.35**	**40.25**	**130.40**	**-0.13**	**36.86**	**127.00**
A1: Industrial Legacy	-0.95	37.58	110.50	-1.41	39.36	111.44	-0.52	35.91	109.62
A1a: Industrial Legacy	*-0.95*	*37.58*	*110.50*	*-1.41*	*39.36*	*111.44*	*-0.52*	*35.91*	*109.62*
A2: Established Urban Centres	-1.69	43.92	126.48	-1.85	46.06	128.11	-1.53	41.93	124.96
A2a: Struggling Urban Manufacturing	*-2.78*	*52.03*	*123.74*	*-2.88*	*54.70*	*125.14*	*-2.68*	*49.53*	*122.42*
A2b: Regional Centres	*1.96*	*95.40*	*184.51*	*2.58*	*100.13*	*189.55*	*1.40*	*91.00*	*179.83*
A2c: Multicultural England	*-3.13*	*47.63*	*127.37*	*-3.60*	*49.09*	*127.99*	*-2.69*	*46.25*	*126.78*
A2d: M8 Corridor	*-0.26*	*35.34*	*105.99*	*-0.58*	*37.51*	*107.86*	*0.03*	*33.36*	*104.26*
A3: Young and Vibrant Cities	3.38	84.92	180.47	3.70	87.99	184.19	3.07	82.01	176.94
A3a: Redeveloping Urban Centres	*3.89*	*81.13*	*173.63*	*4.03*	*84.27*	*177.44*	*3.76*	*78.15*	*170.01*
A3b: Young Multicultural	*1.61*	*108.79*	*209.38*	*2.56*	*112.24*	*213.17*	*0.71*	*105.54*	*205.81*
B: Rural UK	**2.72**	**43.25**	**120.92**	**2.59**	**44.97**	**122.83**	**2.85**	**41.62**	**119.11**
B1: Rural Britain	3.55	65.34	132.74	3.60	67.94	135.46	3.51	62.87	130.14
B1a: Rural Extremes	*0.67*	*65.31*	*134.88*	*0.99*	*67.34*	*136.68*	*0.37*	*63.37*	*133.16*
B1b: Agricultural Fringe	*4.32*	*76.02*	*138.18*	*4.32*	*79.34*	*141.18*	*4.33*	*72.88*	*135.33*
B1c: Rural Fringe	*4.09*	*82.99*	*140.53*	*4.07*	*86.69*	*144.16*	*4.11*	*79.42*	*137.04*
B2: Coastal Britain	6.59	61.82	137.73	6.90	67.32	141.57	7.04	62.20	136.55
B2a: Coastal Resorts	*7.27*	*84.09*	*160.15*	*7.84*	*87.34*	*163.81*	*6.75*	*81.14*	*156.82*
B2b: Aged Coastal Extremities	*5.20*	*59.96*	*134.37*	*5.28*	*66.22*	*138.10*	*6.35*	*61.51*	*133.97*
B2c: Aged Coastal Resorts	*10.62*	*86.84*	*144.07*	*11.51*	*90.82*	*147.73*	*9.81*	*83.24*	*140.77*
B3: Averageville	-0.25	59.77	124.28	-0.76	63.55	126.88	-0.16	59.32	123.59
B3a: Mixed Urban	*-0.45*	*61.85*	*121.33*	*-1.17*	*66.34*	*124.21*	*-0.39*	*62.39*	*121.30*
B3b: Typical Towns	*0.09*	*67.87*	*135.17*	*-0.06*	*70.39*	*137.22*	*0.23*	*65.46*	*133.20*
B4: Isles of Scilly	17.79	134.83	200.84	19.74	138.16	202.07	15.86	131.53	199.63
B4a: Isles of Scilly	*17.79*	*134.83*	*200.84*	*19.74*	*138.16*	*202.07*	*15.86*	*131.53*	*199.63*
C: Prosperous Britain	**-0.52**	**66.56**	**138.67**	**-0.22**	**68.83**	**141.75**	**-0.81**	**64.38**	**135.70**
C1: Prosperous Urbanities	0.58	101.67	169.70	1.10	105.60	174.08	0.09	97.90	165.51
C1a: Historic Cities	*3.48*	*105.79*	*175.09*	*3.89*	*109.75*	*179.22*	*3.10*	*102.00*	*171.14*
C1b: Thriving Outer London	*-2.41*	*106.56*	*168.72*	*-1.77*	*110.99*	*173.62*	*-3.03*	*102.30*	*164.01*
C2: Commuter Belt	-1.07	76.14	136.78	-0.87	78.94	139.92	-1.26	73.45	133.75
C2a: The Commuter Belt	*-1.07*	*76.14*	*136.78*	*-0.87*	*78.94*	*139.92*	*-1.26*	*73.45*	*133.75*
D: Urban London	**-8.53**	**63.23**	**151.26**	**-8.17**	**65.15**	**153.93**	**-8.86**	**61.42**	**148.74**
D1: Multicultural Outer London	-8.01	92.18	149.87	-7.51	94.50	152.13	-8.49	89.98	147.75
D1a: Multicultural Outer London	*-8.01*	*92.18*	*149.87*	*-7.51*	*94.50*	*152.13*	*-8.49*	*89.98*	*147.75*
D2: Mercantile Inner London	-10.21	147.24	225.15	-11.12	151.25	229.36	-9.36	143.54	221.25
D2a: Central London	*-10.29*	*147.35*	*225.14*	*-11.31*	*151.40*	*229.42*	*-9.34*	*143.62*	*221.20*
D2b: City of London	*2.79*	*279.91*	*301.35*	*16.95*	*276.14*	*294.65*	*-13.45*	*284.22*	*309.03*
D3: Cosmopolitan Inner London	-8.22	111.47	177.96	-7.31	114.94	182.16	-9.08	108.17	173.97
D3a: Afro-Caribbean Ethnic Borough	*-6.07*	*127.47*	*190.17*	*-4.74*	*131.44*	*194.68*	*-7.33*	*123.74*	*185.93*
D3b: Multicultural Inner London	*-11.81*	*118.44*	*174.39*	*-11.23*	*119.49*	*173.90*	*-12.04*	*113.91*	*169.74*

Where London remains important however, Rural UK loses importance (at least at this aggregate level). The figures for turnover and churn for this Family are 43 and 120 persons per 1,000 respectively. Not only are these significantly lower than the equivalent figures for Urban London, but they are also lower than the figures for Prosperous Britain (with scores of around 67 and 139 persons per 1,000 for turnover and churn respectively). This means that despite far fewer people moving in and out of districts in Prosperous Britain, the movement is more perturbing than it is for Rural UK. Prosperous Britain has more people moving in and out in relation to the total population, and also a far greater proportion of people moving within and between districts in this Family.

To complete the aggregate analysis at the Family level, Urban UK as well as having the lowest rate of net migration, also has the lowest levels of population turnover: a rate of around 38.5 people per 1,000 of population. Levels of population churn are higher than they are for Rural UK but still lower than the mean for all Families, Groups and Classes of district. The districts of Urban UK therefore can be seen to have far more settled or stable populations than the rest of Britain.

It can be seen in the comparison of nearly all Family, Group and Class categories that males generally have higher rates of population turnover and churn than females, but lower rates of net migration (both in and out). This may seem counter-intuitive and needs explanation. Turnover and churn are measures that take into account *total* population movements in relation to the underlying population at risk in a way that net migration does not. Net migration will only indicate the balance of movement (either in or out) in relation to the population; this allows one to see if an area is gaining or losing population, and the relative level of this gain or loss. Population turnover and churn will not give an indication of the balance of movement, but will give a standardised measure of the *amount* of movement in relation to the population at risk. Higher levels of turnover and churn mean that there will be greater numbers of people moving *in total* in relation to the underlying population, whereas higher levels of net migration just show that there are more people moving in a particular direction. The evidence here suggests that when females move in or out of Family, Group or Class categories, the balance of movement leans more heavily to either in or out. The direction of flow is more asymmetric, but total turnover and churn rates are comparatively low. The net rate of male movement is higher (in the context of nearly every Family Group or Class), but these movements are more balanced in either direction than those of females.

Focusing on specific Groups and Classes, it becomes clear that (ignoring the Isles of Scilly and the City of London) Classes of district within Urban London, as well as those urban areas defined by associations with large student populations and dynamic economies (Regional Centres, Young Multicultural, Redeveloping Urban Centres, Historic Cities, etc.) have the highest levels of population turnover and churn and correspondingly least stable populations. Groups and Classes within the Rural UK Family have relatively low levels of turnover and churn, with districts within the Industrial Legacy and M8 Corridor Classes having the lowest levels overall, thus signifying relatively stable populations.

Table 12. Turnover and churn calculations for Vickers *et al.* classification families, standardised by age

	Total Turnover rate		Total Churn rate	
	Standardised by original age groups	Standardised by 15 year age groups	Standardised by original age groups	Standardised by 15 year age groups
A: Urban UK	36.95	37.29	124.41	125.19
B: Rural UK	46.76	46.11	128.85	127.37
C: Prosperous Britain	67.61	67.37	140.16	139.90
D: Urban London	54.41	55.67	129.55	133.68

Before moving on, a brief caveat should be given in relation to the interpretation of turnover and churn statistics shown in Table 11. It has already been demonstrated in this paper that age has a significant impact on migration behaviours. Thus far, however, turnover and churn statistics have not taken the effect of age into consideration. It is to be expected that the population compositions of districts and Families, Groups and Classes of district will differ. Urban London, for example, may have a younger age structure than Rural UK. This will necessarily affect the rates of migration associated with these areas.

To deal with these population composition effects it is possible to standardise rates by the age structure present in the total population. A method of 'direct standardisation' is proposed by Rowland (2006), and is used here to produce the standardised rates for turnover and churn shown in Table 12. Following the notation proposed by Rees *et al.* (2000) and taking turnover as the example:

$$STO_i = \frac{\sum_a (to_i^a P_*^a)}{\sum_a P_*^a}$$

Where STO_i is the standardised turnover rate for area i, and the turnover rate for age group a in zone i is:

$$to_i^a = \left(\frac{O_i^a + D_i^a}{P_i^a}\right) 1000$$

Where:

$$O_i^a = \sum_j Mi_j^a = the\ total\ outflows\ in\ age\ group\ a\ from\ zone\ i\ to\ other\ zones$$

and:

$$D_i^a = \sum_j Mj_i^a = the\ total\ inflows\ in\ age\ group\ a\ to\ zone\ j\ from\ other\ zones$$

and:

$$P_*^a = \sum_i P_i^a = the\ population\ in\ age\ group\ a\ in\ all\ zones\ in\ the\ system$$

Calculating the age standardised rate of churn follows the same form but we add the term W_i^a to represent within zone moves so that the churn rate for age group a in zone i is:

$$ch_i^a = \left(\frac{O_i^a + D_i^a + W_i^a}{P_i^a}\right) 1000$$

This method of direct standardisation produces the set of age standardised rates shown in Table 12. For both turnover and churn, the rates have undergone two methods of standardisation. In the first method, the rates were standardised by the age groups contained in the original data. In the second the rates were standardised by the 15 year age groups used in the majority of this analysis. These new rates allow for the effect of differing age structures between the Families. Comparing these with Table 11, it is possible to see some age effects, although these are more pronounced with churn than turnover. Taking turnover first, the relationships between the Families does not change. Highest rates of turnover are found in Prosperous Britain and Urban London, with the lowest rates found in Urban UK and Rural UK. The importance of Prosperous Britain and Rural UK increases slightly, whilst for Urban UK and Urban London, the importance decreases – in the case the latter by a relatively large margin. There is little difference between the two methods used to standardise turnover.

In contrast, age standardisation affects the churn rates more noticeably, especially for Urban London. Where, with the non-standardised rate calculations, Urban London experienced the highest rates of churn, once standardised the rate is only the second highest. This suggests that much of the churning of the population in London could be down to a younger age structure. Similarly, where Rural UK experience the lowest rates of churn with the non-standardised calculations, once standardised the rate become the second lowest. This suggests that the lower degree of churning noted in Rural UK before could be partially down to an older age structure in this Family.

Whilst standardising of turnover and churn rates by age produces a small caveat, the standardisation does not dramatically reduce or increase turnover and churn statistics for district Families in most cases. Where differences are more pronounced, as in the case of Urban London, What it does suggest is that much of the population instability demonstrated here is down to the movement of young, labour force age population. Whilst significant, this does not necessarily mitigate the importance of the characteristics of the Urban London Family in explaining migration patterns, but rather helps stress the interactions between age/life course and the environmental, social and economic characteristics of places.

The maps shown in Figure 29-Figure 40 reveal exactly how these general trends of turnover and churn present themselves spatially for the five main age groups used in this study. Before discussion of the patterns shown, a brief note needs to be made on the map scales for both turnover and churn. In order to compare the relative levels of turnover and churn between age groups, the same scale was adopted for all maps for each measure, thereby allowing one to observe which age groups have the higher and lower rates for each measure. With the average rate for churn being around 60 people per 1,000 higher than turnover, slightly different scales were adopted for each measure. With this in mind, direct comparison of maps for turnover and churn should be made with caution.

Analysis of the spread of the data (for both measures) reveals that balances are skewed to the lower end of the scale, such that at this lower end the differences in the rates are much smaller and at the upper end the differences are much larger. This causes problems when plotting a series of maps on one scale with these data. For example, if maps were plotted on a scale with equal increments, maps at the lower end of the scale would not reveal much, as the scale increments (being standardised to the whole range of the data) would be of a size that the small changes in data values would be obscured. Conversely at the other end of the scale, with the range in the data being larger, the scale increments would be too small and would result in a large number of scale categories – again producing a map that would not be as clear as it could be. A logarithmic transformation of the data (to the base 10) would correct the skew and create a smooth scale on which to plot the data, standardising the data throughout the range and producing clear maps at both ends of the scale. Transforming the data in this way though would make the interpretation of the results extremely difficult as the log would bear little resemblance to the original data value.

To overcome the scale problem, a bespoke range was created for both turnover and churn that featured smaller increments at the bottom end of the scale, and larger increments at the top end. A scale of 15 values was created in both cases, with the first five cases in each scale increasing by equal, small values. The second five cases increase by the equal, slightly larger values, with the final five cases following the same pattern. By doing this, it is now possible to plot maps for all age (and sex) groups on the same scale, and for the ranges within maps at both ends of the scale to be visible. The full range of values is not used in the subsequent maps as only broad age groups are shown.

Figure 29. District population turnover rates (per 1,000 population) – total population, 2000-01

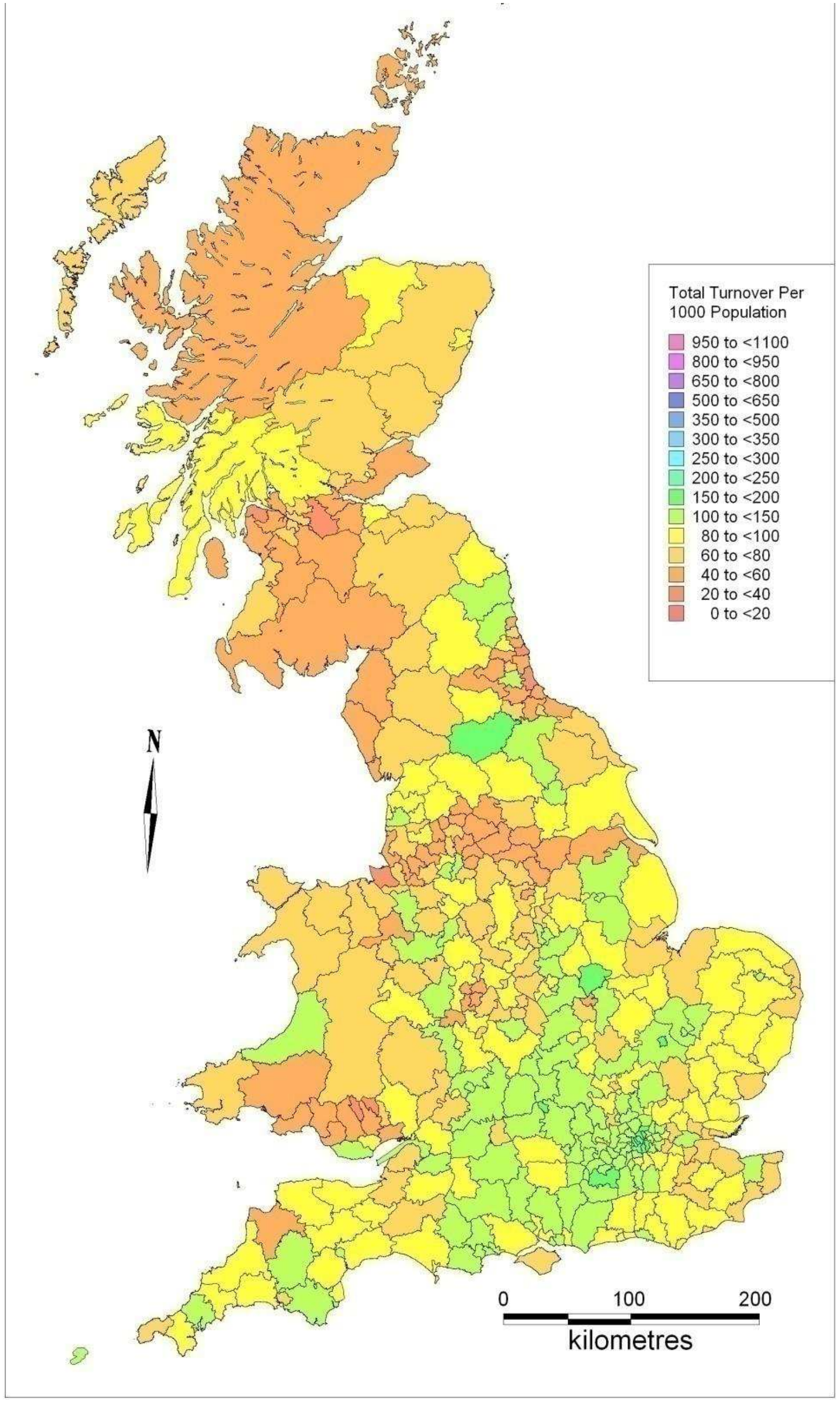


Figure 30. District population churn rates (per 1,000 population) – total population, 2000-01

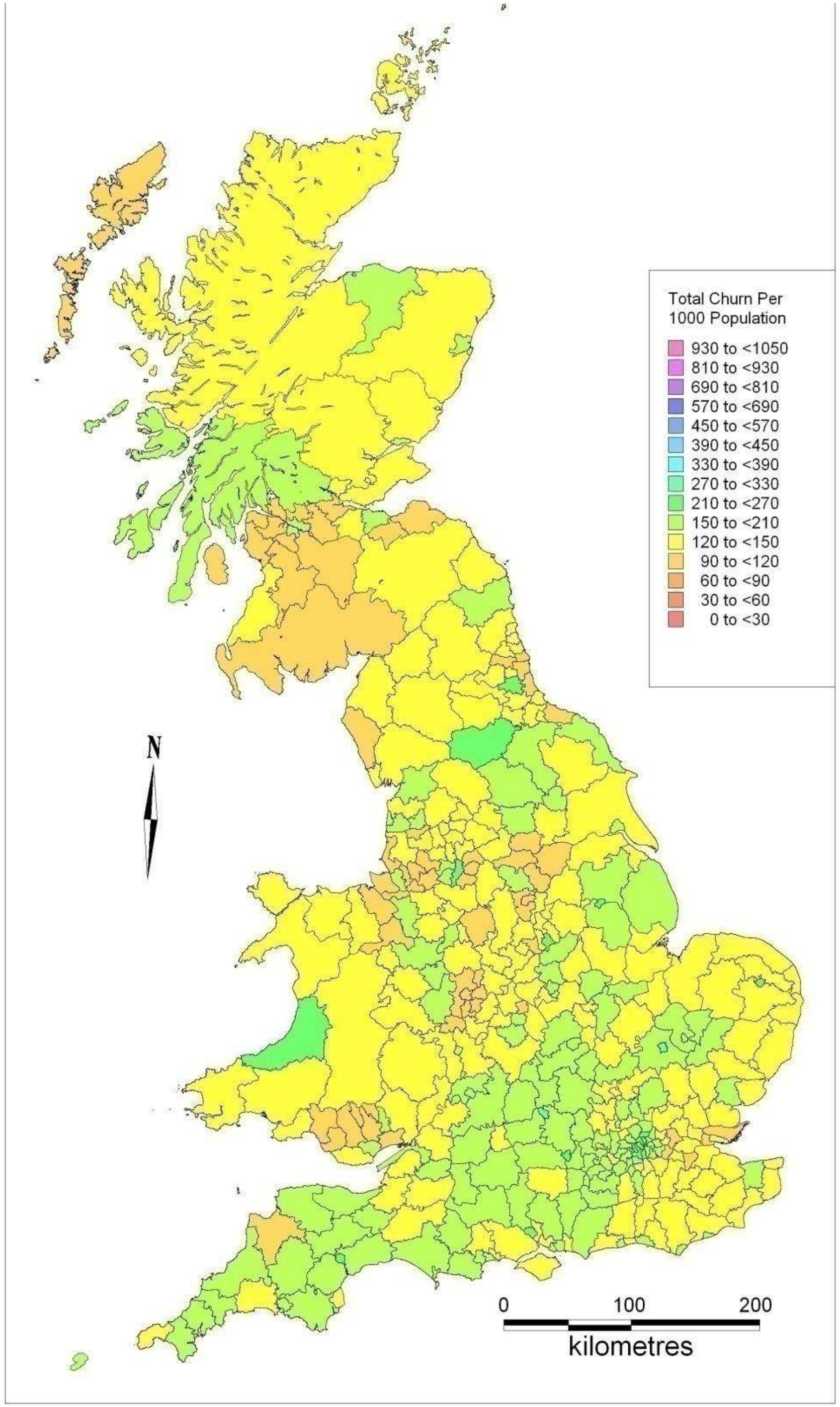


Figure 31. District population turnover rates (per 1,000 population) – 0-15 age group, 2000-01

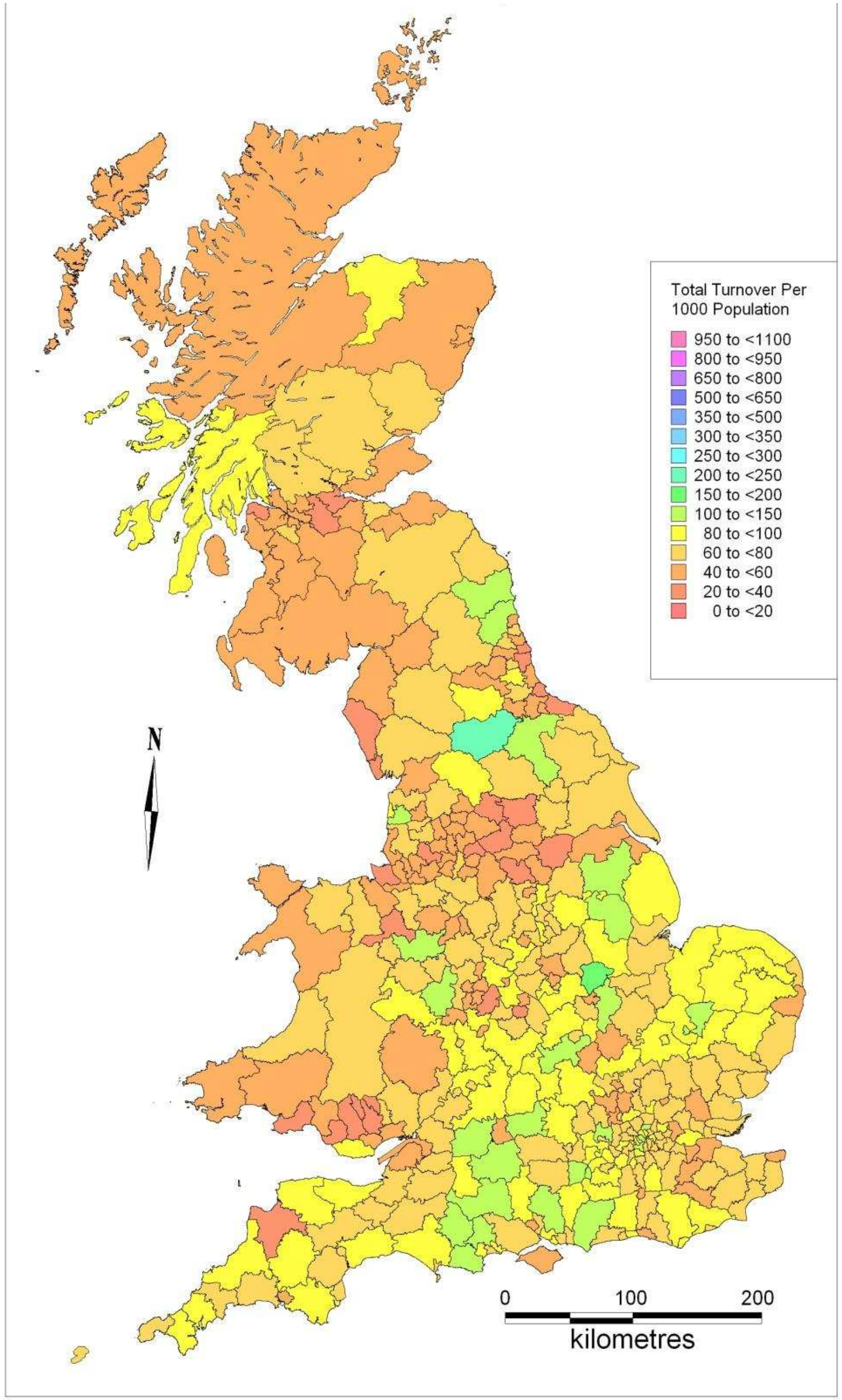


Figure 32. District level population churn rates (per 1,000 population) – 0-15 age group, 2000-01

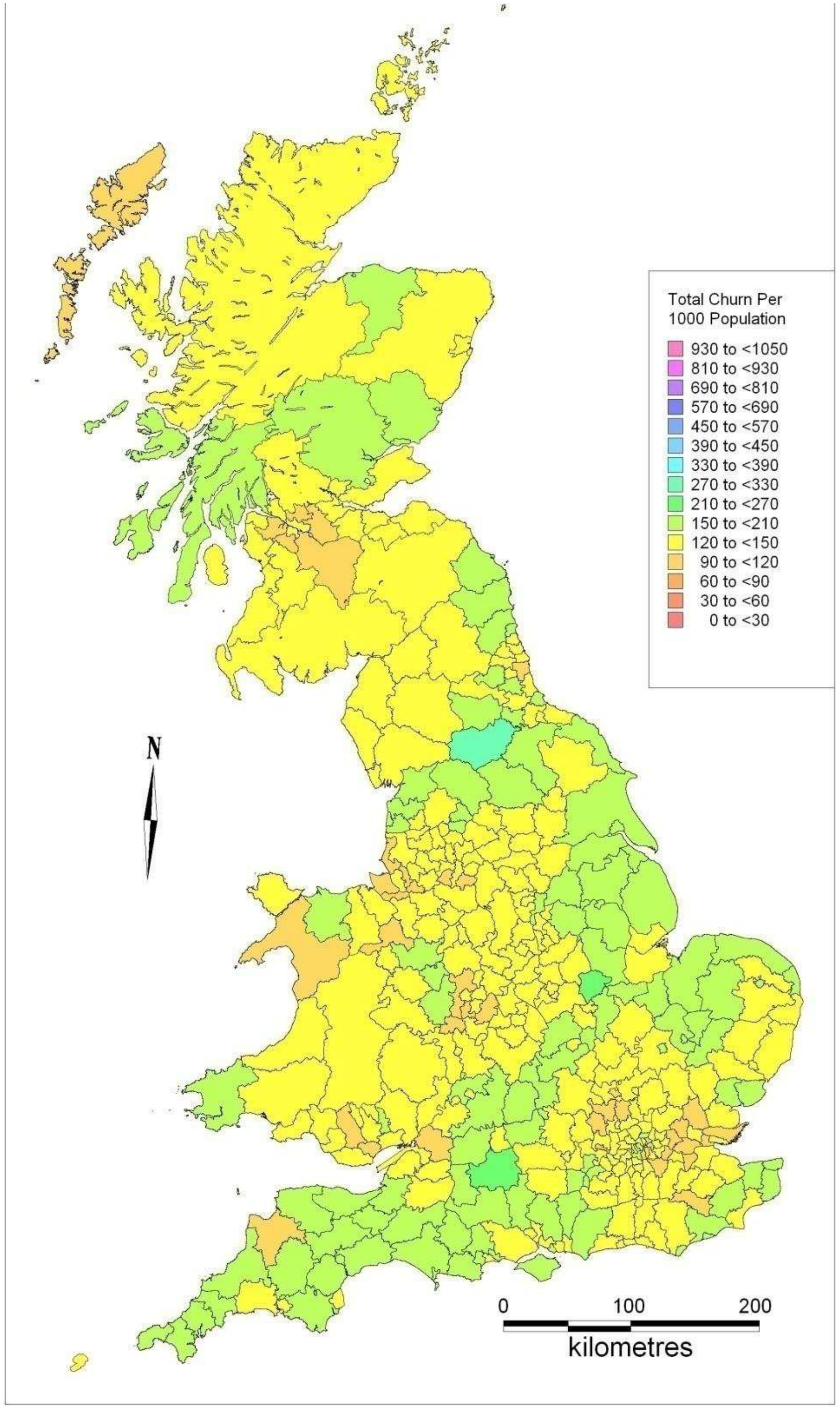


Figure 33. District population turnover rates (per 1,000 population) – 16-29 age group, 2000-01

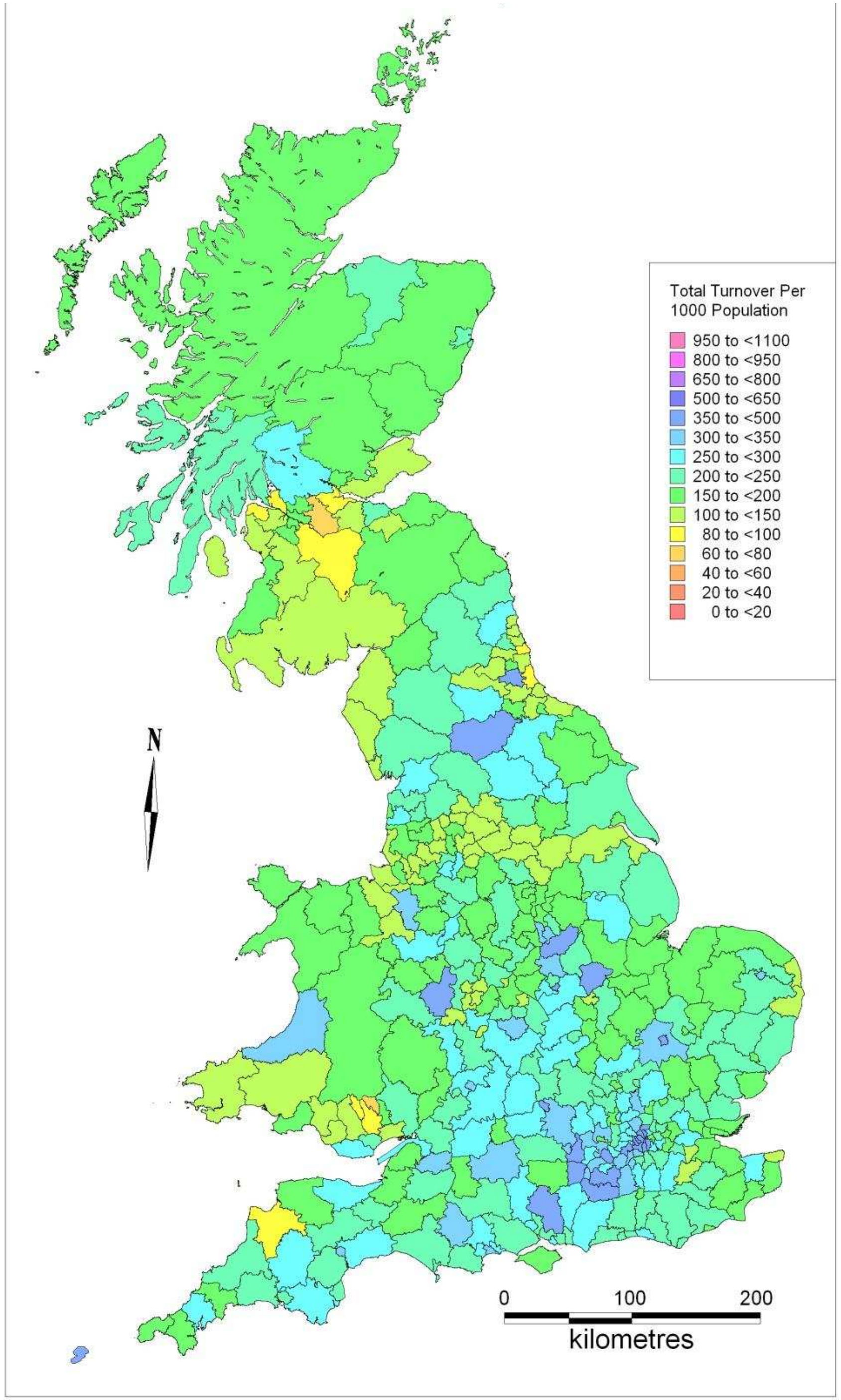


Figure 34. District population churn rates (per 1,000 population) – 16-29 age group, 2000-01

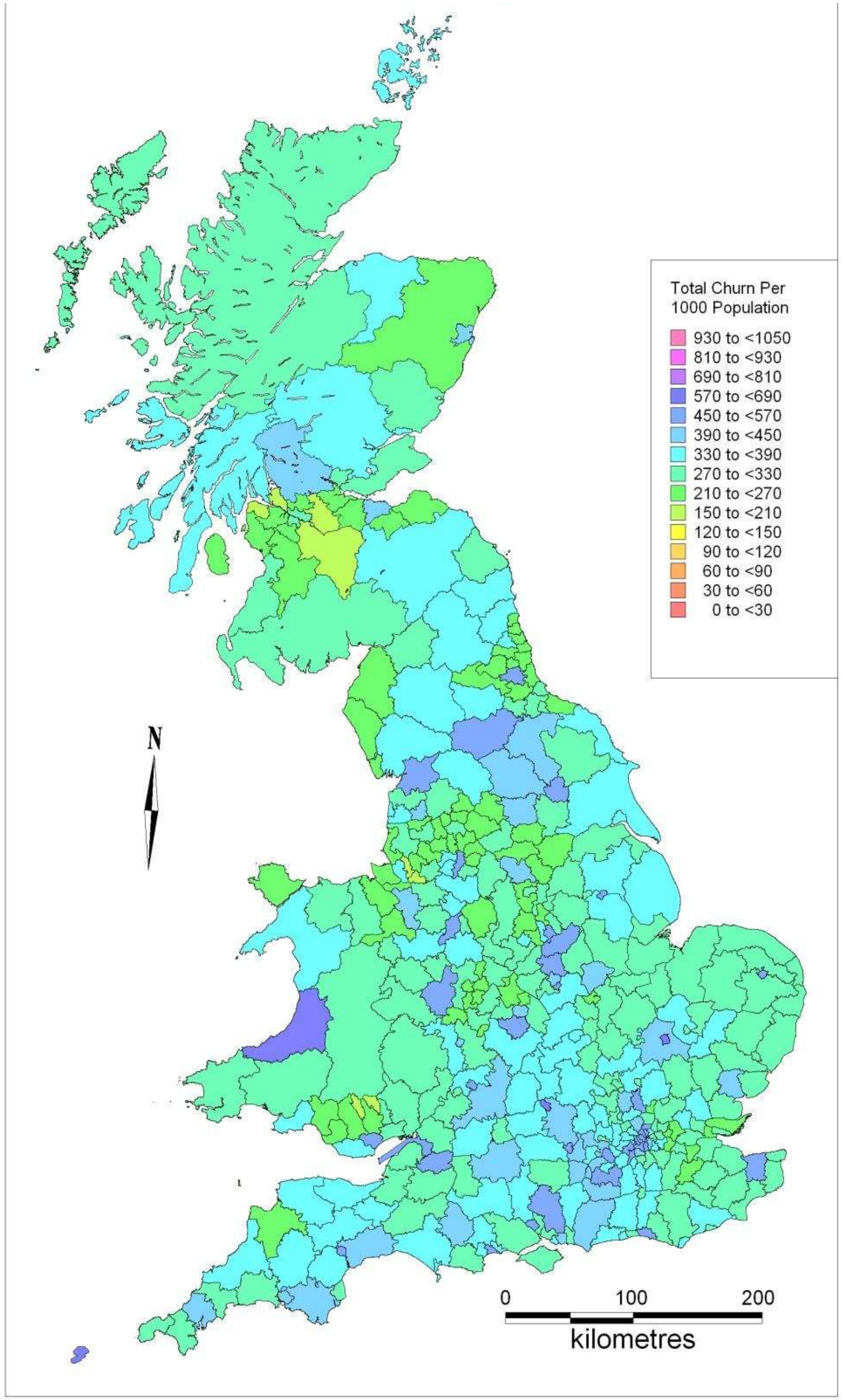


Figure 35. District population turnover rates (per 1,000 population) – 30-44 age group, 2000-01

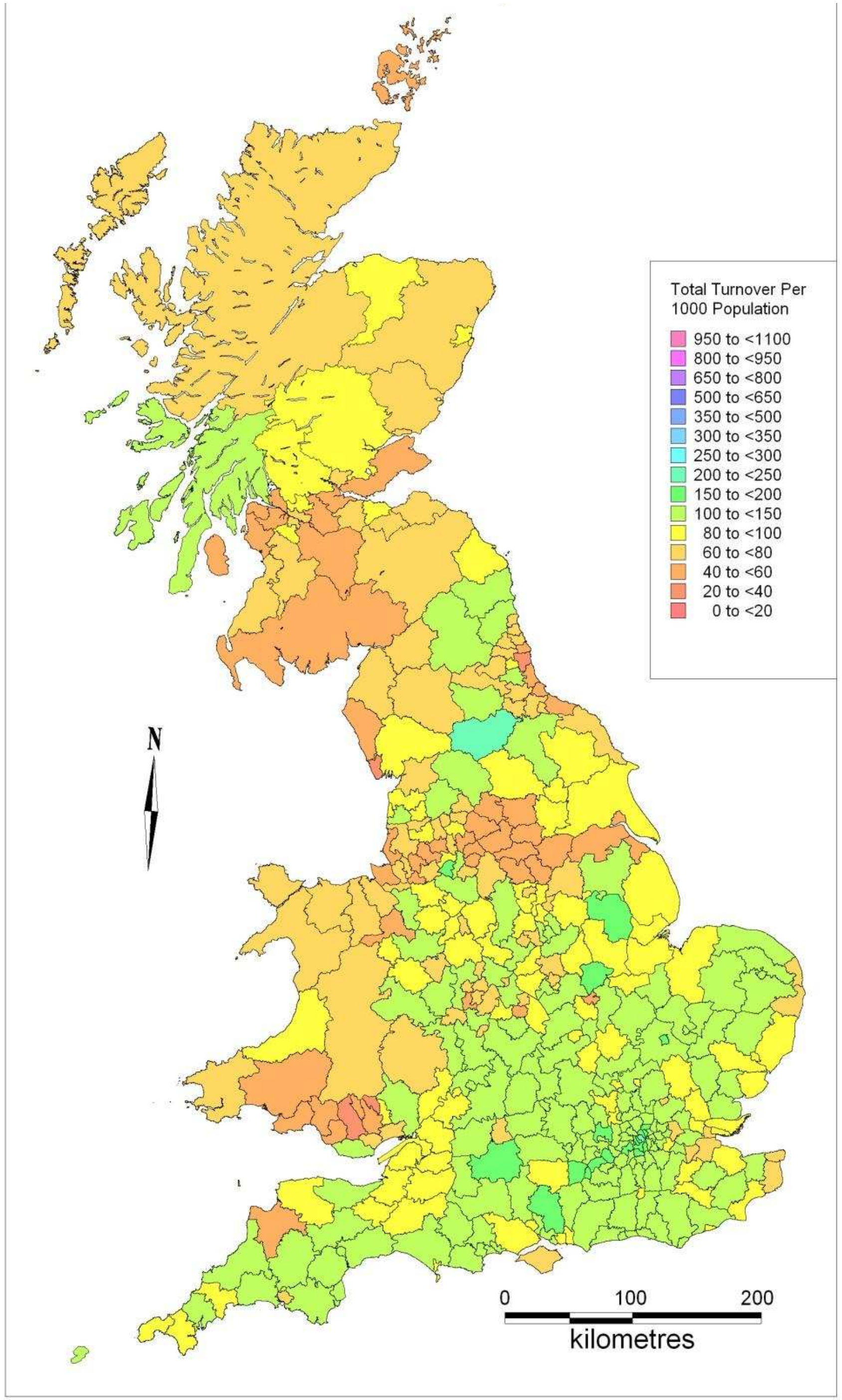


Figure 36. District population churn rates (per 1,000 population) – 30-44 age group, 2000-01

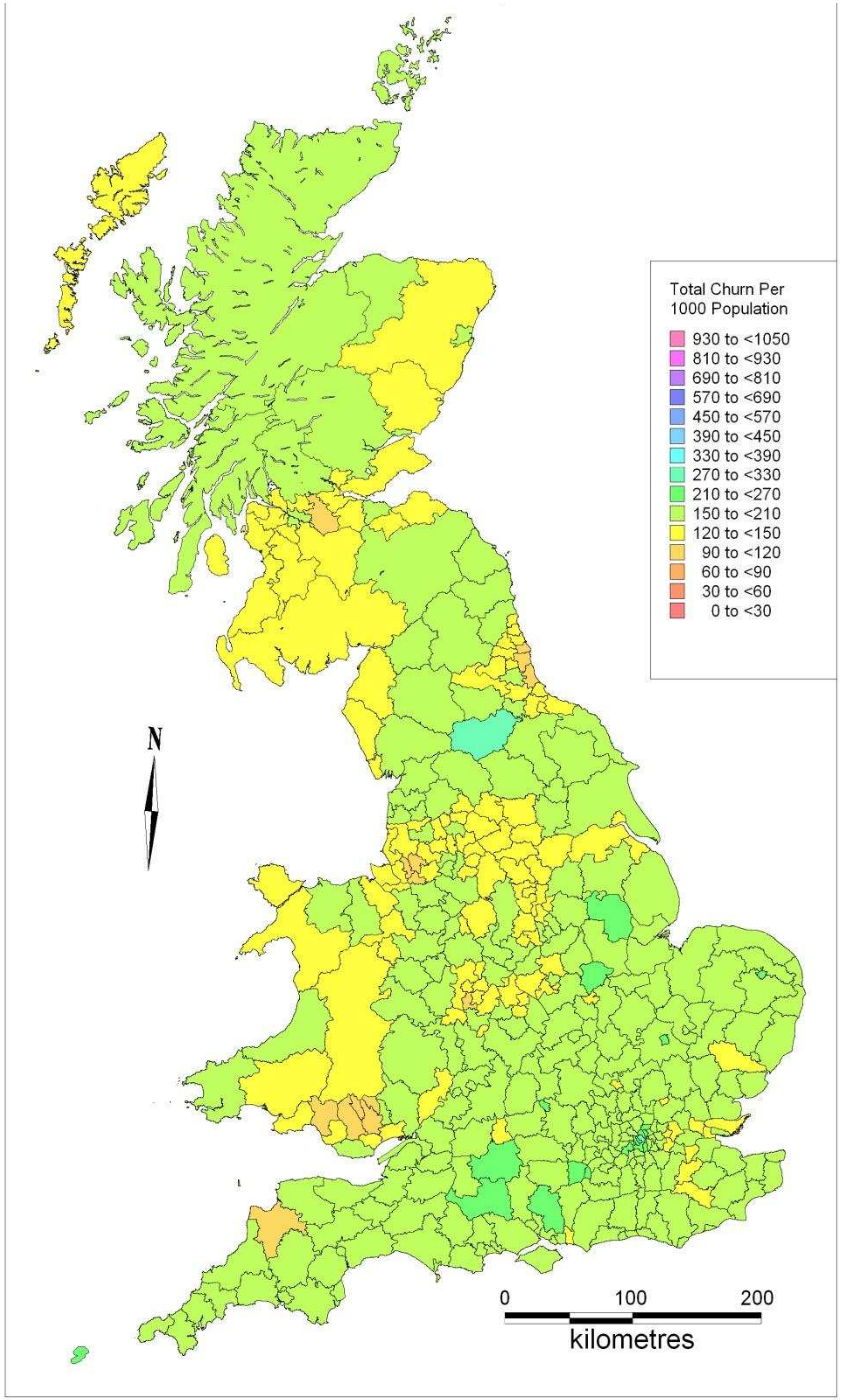


Figure 37. District population turnover rates (per 1,000 population) – 45 to pensionable age group, 2000-01

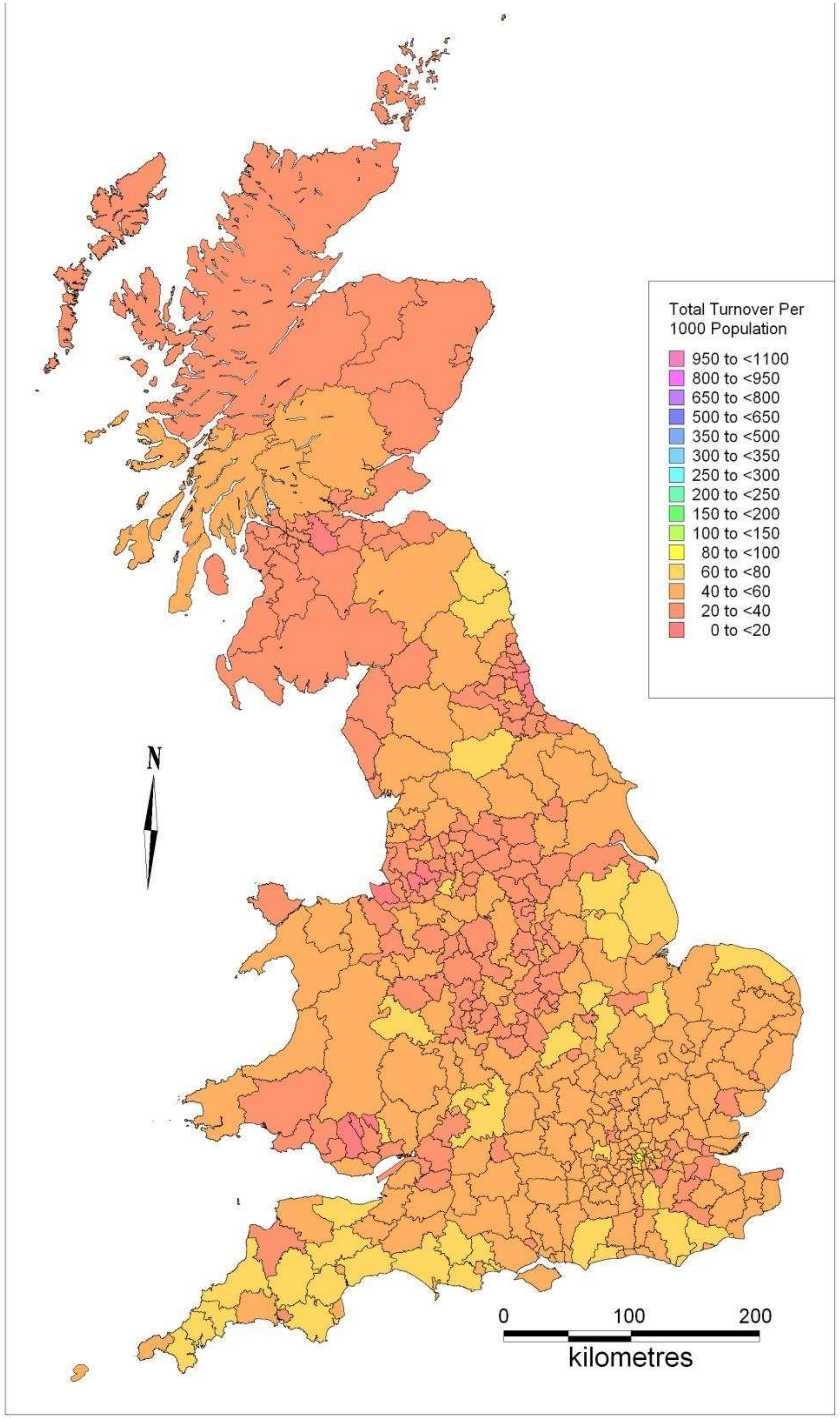


Figure 38. District population churn rates (per 1,000 population) – 45 to pensionable age group, 2000-01

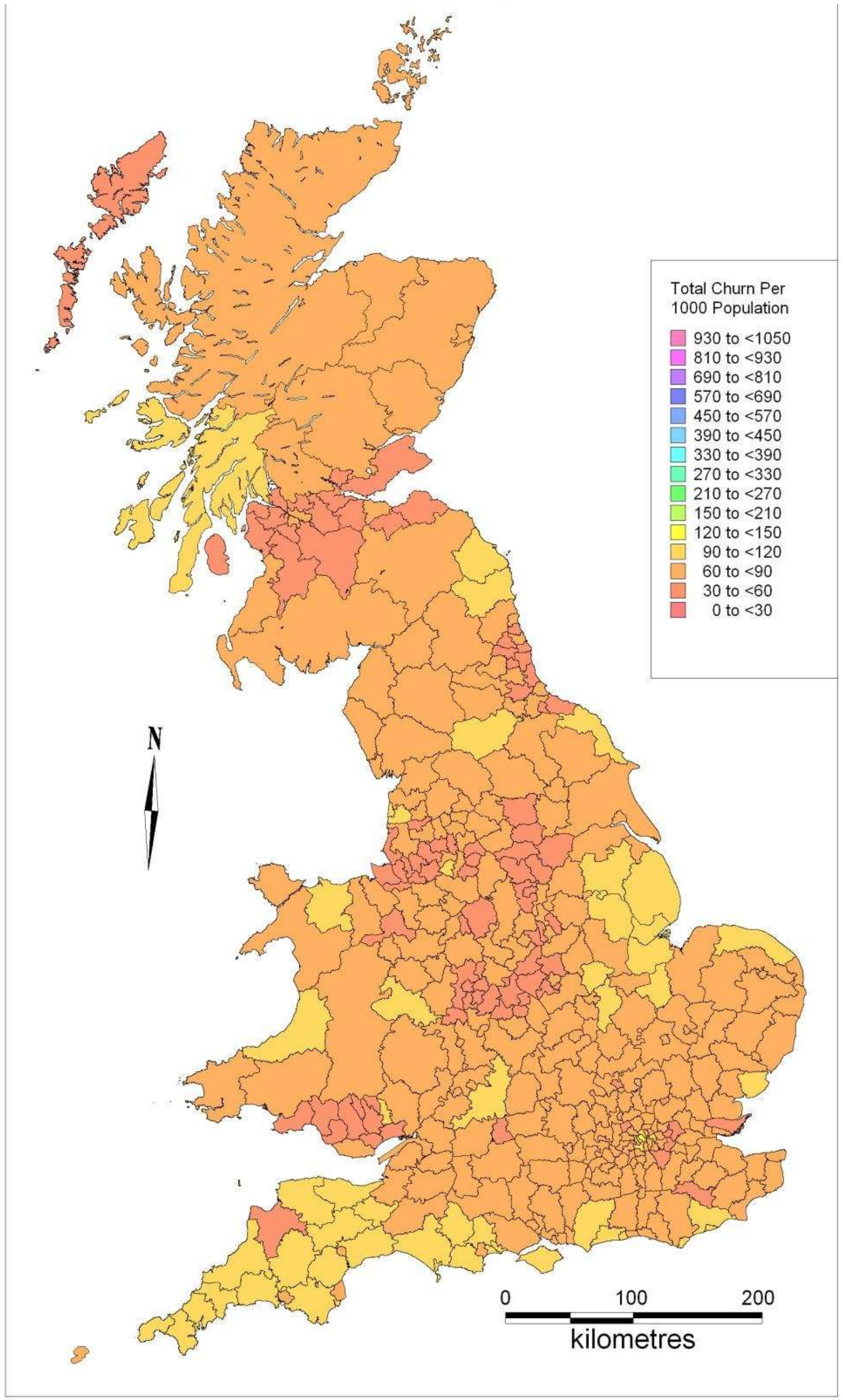


Figure 40. District population turnover rates (per 1,000 population) – pensionable age and above age group, 2000-01

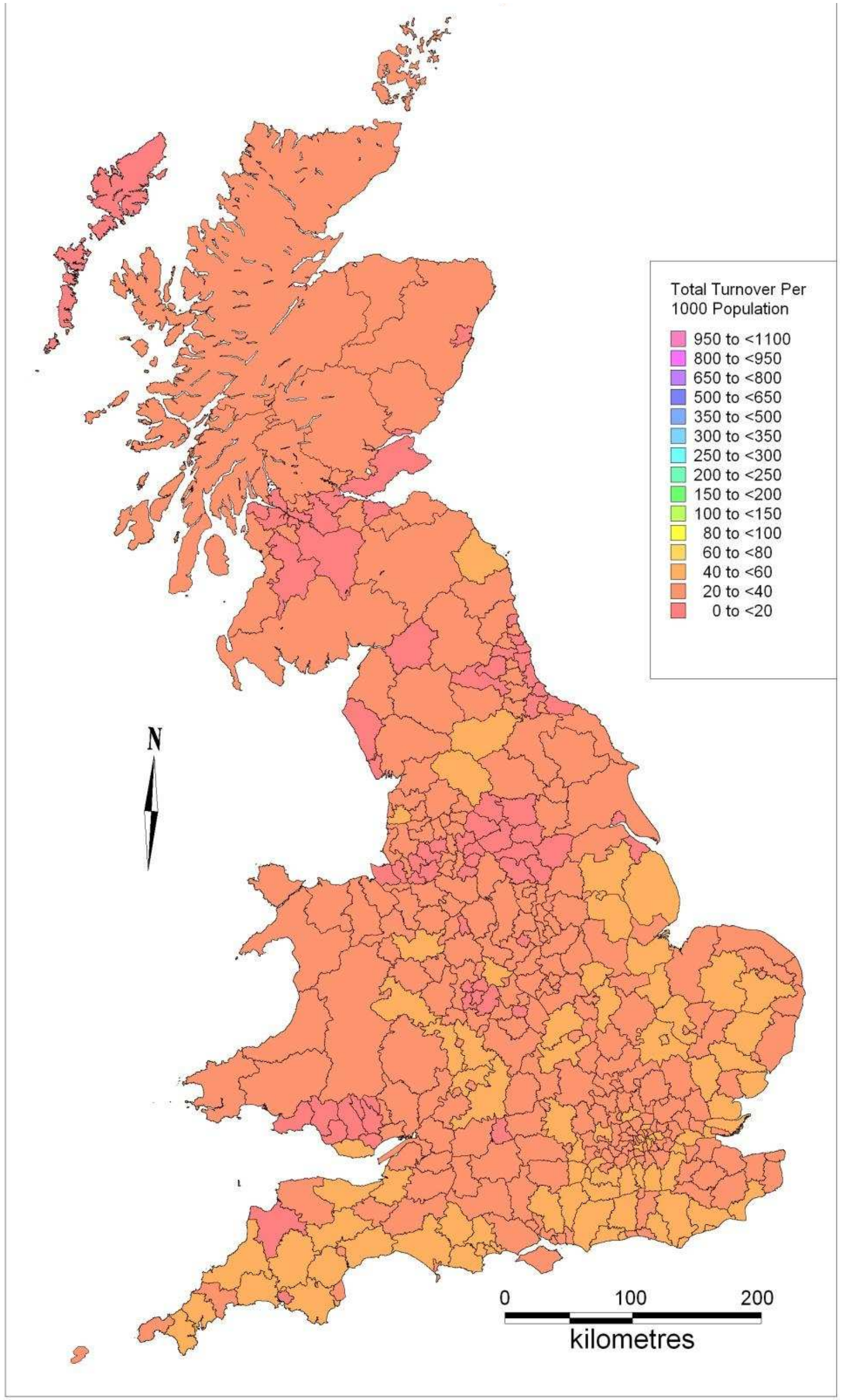


Figure 39. District population churn Rates (per 1,000 population) – pensionable age and above age group, 2000-01

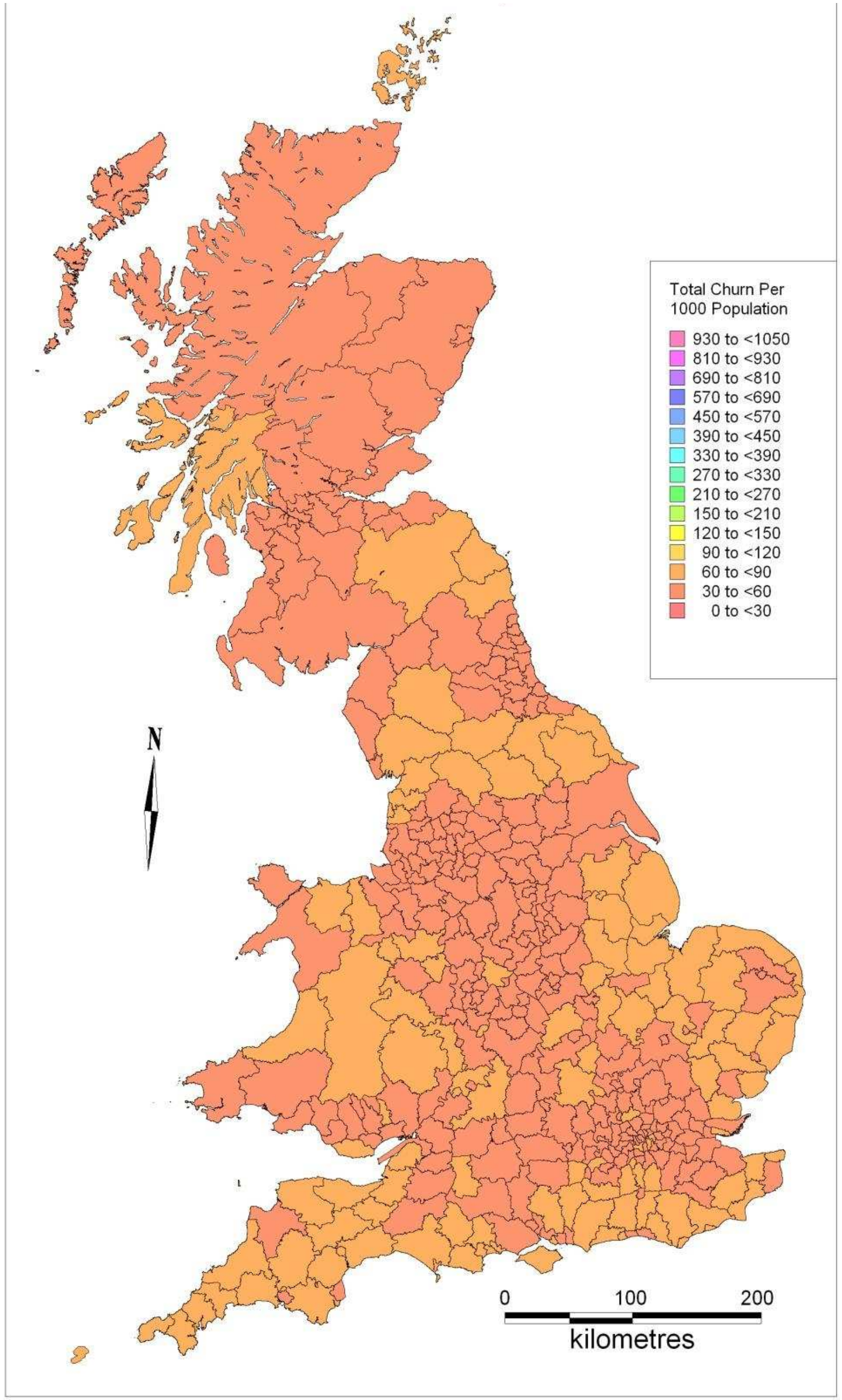


Table 13. Summary statistics for population turnover and churn for districts in Britain: by broad age group and by breakdown of the 16-29 age group, 2000-01

Summary turnover statistics for individual GB districts																				
	Total	Male	Female	0-15	16-29	30-44	45-PA	PA+	16-17	M16-17	F16-17	18-19	M18-19	F18-19	20-24	M20-24	F20-24	25-29	M25-29	F25-29
Max	279.91	276.14	284.22	221.14	613.71	299.64	120.27	67.46	615.38	666.67	545.45	818.18	750.00	1000.00	743.40	748.73	847.46	572.34	548.98	597.78
Min	31.65	32.85	30.51	29.46	75.62	34.53	14.48	10.86	22.92	22.43	18.62	56.42	37.39	77.38	87.91	79.22	90.10	76.59	77.11	76.05
Mean	88.21	91.54	85.02	70.17	216.58	97.03	43.85	31.12	63.74	64.40	62.53	253.66	229.76	277.55	274.64	262.10	287.35	210.68	218.21	203.30
Median	84.71	88.37	82.23	69.78	205.52	94.98	43.61	31.72	56.85	54.11	58.13	237.00	210.50	266.53	264.35	250.89	275.16	196.74	203.68	191.46
Range	248.26	243.29	253.71	191.67	538.09	265.12	105.79	56.59	592.47	644.24	526.83	761.76	712.61	922.62	655.49	669.51	757.36	495.76	471.87	521.72
Without Isles of Scilly/City of London																				
Max	215.88	224.78	213.08	221.14	459.85	211.44	97.25	57.23	291.70	420.51	210.62	641.47	616.65	666.67	638.26	748.73	689.14	432.98	462.14	436.51
Min	31.65	32.85	30.51	29.46	75.62	34.53	14.48	10.86	22.92	22.43	18.62	56.42	37.39	77.38	87.91	79.22	90.10	76.59	77.11	76.05
Mean	87.63	90.97	84.42	69.91	214.96	96.46	43.64	31.02	61.89	62.48	60.82	251.42	228.49	274.37	272.62	260.59	284.74	209.66	217.10	202.35
Median	84.65	88.35	81.97	69.78	205.41	94.94	43.58	31.61	56.81	53.91	58.00	236.49	209.33	266.36	263.23	250.50	275.08	196.49	203.50	190.98
Range	184.23	191.92	182.56	191.67	384.23	176.91	82.77	46.37	268.78	398.08	192.00	585.05	579.26	589.28	550.35	669.51	599.04	356.40	385.03	360.46
Summary churn statistics for individual GB districts																				
	Total	Male	Female	0-15	16-29	30-44	45-PA	PA+	16-17	M16-17	F16-17	18-19	M18-19	F18-19	20-24	M20-24	F20-24	25-29	M25-29	F25-29
Max	301.35	302.33	309.03	298.87	638.57	326.05	141.43	88.05	615.38	666.67	545.45	909.09	750.00	1333.33	818.53	795.85	966.10	596.81	563.27	633.33
Min	97.26	96.85	97.14	100.96	181.75	103.84	42.23	31.96	62.21	57.15	65.37	136.71	96.99	180.48	206.89	173.23	240.32	192.68	183.80	201.67
Mean	148.08	150.90	145.37	141.39	334.40	164.08	72.25	54.93	116.05	109.49	122.55	348.93	300.12	399.52	423.74	391.67	456.56	333.38	341.52	325.42
Median	141.66	144.68	139.32	138.62	319.97	162.56	70.33	54.04	109.71	101.57	117.71	329.20	278.78	379.43	413.54	378.87	447.50	326.17	335.53	316.93
Range	204.09	205.48	211.88	197.91	456.82	222.21	99.19	56.08	553.17	609.52	480.08	772.38	653.01	1152.85	611.64	622.61	725.78	404.13	379.46	431.67
Without Isles of Scilly/City of London																				
Max	295.47	302.33	288.65	298.87	617.45	278.58	128.48	88.05	346.57	449.26	267.40	703.40	667.84	857.14	818.53	795.85	850.95	553.09	548.15	559.02
Min	97.26	96.85	97.14	100.96	181.75	103.84	42.23	31.96	62.21	57.15	65.37	136.71	96.99	180.48	206.89	173.23	240.32	192.68	183.80	201.67
Mean	147.57	150.42	144.83	141.24	333.00	163.54	72.05	54.84	114.46	107.79	121.14	346.87	299.02	396.12	422.10	390.43	454.44	332.54	340.68	324.57
Median	141.62	144.48	139.07	138.58	319.79	162.48	70.29	54.01	109.63	101.39	117.44	328.85	278.49	379.22	412.65	378.38	447.34	325.69	335.29	316.84
Range	198.21	205.48	191.50	197.91	435.70	174.74	86.25	56.08	284.36	392.11	202.03	566.69	570.86	676.66	611.64	622.61	610.63	360.41	364.35	357.36

In terms of the aggregate patterns of turnover and churn, we already know from studying the figures in relation to the district classification, that highest levels of turnover and churn are found in London and some of the more dynamic urban areas in Britain. It is also noticeable that other areas of relatively high turnover and churn tend to be more concentrated in the south, around London, and moving towards the South West. This is evident on both maps shown in Figure 29 and Figure 30. We also know that areas defined as Industrial Legacy and M8 Corridor have particularly low levels of turnover and churn, and by looking at these maps, it is easy to identify areas close to South Wales, Birmingham, Manchester, Liverpool, West and South Yorkshire, the North East and the M8 corridor between Glasgow and Edinburgh as fitting into the patterns shown in the classification analysis.

Whilst direct comparison of the turnover and churn maps is difficult, it is evident that the gap (in terms of numbers of people moving) between areas of lowest turnover and other higher turnover areas is proportionally greater than when looking at the same gap in churn statistics for the same areas. Put another way, areas of low turnover also have low churn, but the lower turnover is more noticeable than the lower churn when compared with other higher scoring areas. Essentially the range between lowest and highest is greater for turnover than churn. As churn takes into account intra-district migrations and turnover does not, it can be concluded that compared with districts in the rest of the country; when migrations occur in these low turnover/churn areas, they are more likely to be shorter distance, intra-district migrations than longer distance, inter-district migrations.

This is confirmed by looking at the average relationship between turnover and churn for all districts. On average, there are around 60 more people per 1,000 moving for each district when intra-district migrations are taken account of. For districts where the figure is greater than average it can be said that there are relatively more intra-district migrations taking place. For the majority of the low turnover districts (those in South Wales, the North East, the Industrial North), the gap between turnover and churn is greater than 60. In these areas of low turnover and churn, if migrations take place they are more likely to be local, within-district movements.

Moving on to an age-specific analysis, the maps (Figure 31-Figure 40) show clearly the relative levels of turnover and churn for each age group, with (as expected) the highest levels in the 16-29 age group and the lowest levels in the pensionable age and above age group. Firstly, whilst there are no immediately apparent spatial patterns in the 16-29 age group, closer inspection of the maps reveals the highest levels of turnover and churn are in the spatially diffuse but characteristically homogenous (as confirmed by Vickers’ classification) urban areas previously described – the dynamic, growing university towns and urban areas fringing London.

Secondly, there is more clarity in the spatial patterning related to higher levels of mobility in the groups with lowest overall levels of turnover and churn (the two oldest age groups), with coastal areas, with the South West in particular showing higher levels of these measures of stability for these older groups. Low levels of turnover and churn are apparent for the ex-industrial areas identified in the aggregate analysis, for *all* age groups. These low levels are however particularly pronounced at the ‘family’ centred age ranges (0-15 and 30-44), less so with the other age ranges. Table 13 provides summary statistics for the main age groups, as well as a more detailed breakdown for the 16-29 age group. Of note here (as with net migration) are the continually higher mean rates of population turnover and churn for females when compared to males for the post-16 age groups. The assertion made by Champion that there is relatively little difference in the migration propensities of males and females is clearly less accurate when age is taken into consideration. This difference is especially pronounced when looking at the late teen and early twenties age ranges. Aside from this sex difference, the highest mean rates of turnover and churn for both males and females are found in the 20-24 year old age group, and are around 70 and 121 migrants per 1,000 people higher respectively than the averages for the 16-29 age group.

11.Discussion of findings and conclusions

This analysis has sought to enhance our knowledge of internal population migration in Britain using migration data from the 2001 Census. New insights into population movements have been gleaned from the use of the Vickers *et al.* classification of districts. Flows have been assessed, not just in terms of whether they are between rural and urban areas, or London and other areas, but in terms of a more detailed classification which retains these core divisions but also further classifies them; in the process creating a more detailed picture of movements. Furthermore, account has been taken of the types of movement and the affect this has had on the stability of populations in different areas. An understanding of not just the direction of movement has been achieved, but also the magnitude of movement in relation to the underlying population of an area – whether the movement is likely to have a perturbing affect on the resident population. Within this, account has also been taken of movements within districts and Families, Groups and Classes of district in Britain; something that is not routinely done in studies of this type, but something that provides new insights, especially when one considers the volume of this intra-zone movement when compared to inter-zone migration.

The study has shown that firstly, in relation to net migration, some of what has been discovered in past studies of internal migration remains constant. Generally speaking, London and urban areas in general are net losers of migrants, whereas rural areas are net gainers. At an aggregate level, the process of counterurbanisation can be said to be continuing. The use of the Vickers *et al.* district classification, however, has enabled us to deconstruct this rather simplistic analysis of population flows. Young, Vibrant Cities (including major settlements such as Bristol, Canterbury, Cardiff, Derby, Durham, Exeter, Lancaster, Leeds, Lincoln, Plymouth, Portsmouth, Sheffield, Southampton, and Brighton and Hove); Regional centres (such as Manchester, Norwich, Nottingham and Edinburgh), and Historic Cities (Colchester, Warwick and York) are all significant net gainers of population through migration in 2001. This certainly runs counter to the trend expected from the aggregate analysis. Further counter-evidence to the counterurbanisation hypothesis is supplied when one examines the decline of areas categorised as 'Averageville' in Rural UK. Admittedly, the areas in Averageville would be recognised by most as actually being urban rather than rural, as they tend to be smaller towns, surrounded by rural areas, but this in itself exposes the flaws in broad generalisations such as 'Rural' which inevitably obscure important patterns. Further exemplification of this issue can be found with the definition of a London hinterland, described in the Vickers *et al.* classification as 'commuter belt'. Much of this area, including large swathes of the Home Counties and beyond, would normally be described as rural (especially if, for example, the predominance of agriculture as a land use were taken to signify rural). However the net out-migration characteristics of this area certainly do not fall into the counterurbanising norm we have come to expect.

Understanding internal migration has been advanced further by the introduction of turnover and churn analysis. These two measures help to quantify the stability of a population in an area; the latter developing the concept of stability slightly further than the former by taking account of intra-zonal as well as inter-zonal flows. The definition of stability we use here is based upon the proportion of residents living at an address in an area, who remain there from one year to the next. Generally speaking, the areas with the least stable or most transient populations are the urban districts. The most stable or least changing populations are found in rural and previously industrial districts. Levels of stability vary greatly between different age groups with the 16-29 age group (and more specifically within that group the 18-19 and 20-24 age ranges) being the least stable, and the older age groups being inherently more stable. Within each age group though there are specific areas within Britain that have more or less stable sections of these populations.

Analysis of turnover and churn statistics for Britain at the Vickers *et al.* Classification Family level has shown that whilst London retains its importance in the national internal migration system, the role of rural Britain becomes less important, even when the distorting effect of differential age profiles across the district classifications is taken into consideration. The vast size of the underlying rural population in Britain means that despite the apparently large net in-migration to rural areas, the disturbing effect that this has on the resident population is relatively low. Rural areas tend to have, on the whole, much more stable populations than areas in Prosperous Britain, though the naming of Prosperous Britain may in this case be misleading. Commuter Belt makes up much of Prosperous Britain, and as previously discussed, can in many ways be regarded as rural. There appears to be continuation of the trend recognised by Rees *et al.* (1996) of Urban London populations with the relatively footloose Urban London migratory characteristics, occupying space that would otherwise be re recognised as rural. In effect, it could be argued that there is an identifiable two-tier ‘rural’ in Britain. The ‘traditional rural’ Britain, with a generally stable population, perhaps experiencing some in-migration from more classically urban areas, and the ‘new rural’ Britain, which may outwardly exhibit many of the same environmentally rural characteristics as the traditional rural Britain, but that features this 'prospering' population with some of the migratory characteristics associated with the population of Urban London. To complete the narrative at this Family level, turnover and churn statistics have helped reinforce the idea of Urban UK (which should perhaps more accurately be described as 'ex-industrial urban Britain') as being an area where populations are more stable; migrations if they do happen tend to be short distance; and longer distance migrations are more rare.

This research has further reinforced the importance of looking at age when studying migration. Net migration, turnover and churn rates and spatial patterns all vary dramatically when age is taken into consideration. Not only does age affect the rates, direction of flow and specific origins and destinations of internal migrants, but it also has an effect on the sex specific elements of these patterns. At the beginning of the paper, we noted that at an aggregate level there is little difference in the propensities of males and females to migrate. Whilst this is true, disaggregating propensities by age reveals notable differences in sex specific migration patterns. Despite starting life with similar propensities to migrate, females are significantly more likely than males to be migrants (both within and between districts and Vickers' classification aggregations thereof) in their late teens and early twenties, and that after this time, males have a slightly higher propensity to migrate until the post-pension ages. This phenomenon, which is certainly at its peak in these early adulthood years, is not as easy to explain as it is to identify. Possible explanations relate to larger numbers of female students and age differentials between males and females in migrating couples, although these hypotheses are unlikely to be comprehensive in their account.

The use of a three tier district classification in this paper has proved a useful tool in the interpretation of internal migration patterns. It has become clear that districts grouped with similar characteristics within the classification do exhibit particular attributes in relation to internal migration. For example districts, Classes and Groups within the Urban London Family tend to feature higher levels of population turnover and churn, and tend to have increased proportions of younger migrants. Districts and Classes in Coastal Britain tend to feature low rates of net migration when compared to other districts, and what migrants these districts do have, tend to be in the post-retirement age groups. Unpacking exactly which variables used to define the Families, Groups and Classes within classification have most influence on the migrants and their direction of movement would be interesting, but carrying out this kind of analysis was not the intention of this paper. Regression analyses on dependent the age and sex specific variables of inflow, outflow, intra-flow, inter-flow, turnover and churn with independent variables such as population density, unemployment, and tenure would throw some light, and would no doubt be a revealing follow-up to this paper. Here, however, our concern was with what use the classification could be as an exploratory tool and to this end we have demonstrated its value.

Despite some clear migration-specific characteristics being exhibited by districts in Britain, both the Vickers *et al.* classification and the classification of local authorities produced by the ONS do not include migration variables. Whilst patterns of migration are emerging for areas defined by the classification outside of the influence of any migration variables, it might be the case that some areas could be more appropriately classified in terms of the migrants they attract, produce or retain. Certainly, some areas already find themselves being informally classified by their migrants. The phrases 'student ghetto' or 'retirement resort' which have entered the lexicon of certain localities already show the importance of definitions based upon the migrants living within these areas.

It is because of this, therefore, that we finally suggest that development of an area classification based upon migration statistics would prove extremely useful, both for those with an interest in population dynamics, and for decision makers. Knowing if an area is likely to feature a transient or stable population, a population that churns but is characterised by similar people moving in or out, or a population that has low turnover, but a turnover that contains specific types of migrant, would be extremely useful. The nature of changing migration patterns within the UK would mean that a temporally flexible classification would probably prove even more useful than a static, time-specific one. Care would also be needed in the selection of variables, with decisions being made about the types of variable, that, if included would benefit such a classification. For example, would the variables relate just to internal migrants, or would a truly useful migration classification also incorporate information on international migrants coming to the UK? It is these issues and questions which should provide a fruitful avenue of future research following on from this paper.

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