MIGRATION BETWEEN EURO-REGIONS IN THE UNITED KINGDOM

John Stillwell, Philip Rees and Oliver Duke-Williams

WORKING PAPER 95/19

SCHOOL OF GEOGRAPHY • UNIVERSITY OF LEEDS

ABSTRACT

The geographical characteristics of internal migration in the United Kingdom have been studied by previous researchers at a variety of spatial scales. In this paper, we choose to examine redistribution patterns using a less popular system of interest of 'Euro-regions', the 35 regions of the UK designated by the European Commission as NUTS Level 2 regions.

The paper is in three parts. In the first part, time series data from the National Health Service Central Register (NHSCR) for a sequence of consecutive 12 month periods from mid-1983 to mid-1992 is used to demonstrate how the level of migration in the UK has fluctuated over the 1980s and early 1990s and to explore the spatial pattern associated with this redistribution of the population. Migration coefficients which measue the ratio between the gross in- and out-migration rates for each region are computed and directional net migration flows the between the regions are mapped according to their volume to distinguish primary, secondary and tertiary level exchanges.

The second part of the paper reports a comparison of interaction flow matrices obtained from the NHSCR and the 1991 Census of Population. Despite the dissimilarities in the concepts and measurement of migration recorded by the data from each of these sources, the analysis indicates that there is close correlation between the aggregate matrices and that correlation coefficients vary appreciably by age group for males and females.

In the final part, use is made of the 1991 Census Special Migration Statistics (SWS) to investigate the age and gender characteristics of migration at different spatial scales and to propose a sevenfold classification of the Euro-regions on the basis of the net exchange of migrants between each region and all others.

The research reported here has been undertaken as part of a collaborative project aimed at identifying the major features and dynamics of migration in the European Union and involving a network of researchers from each of the member states. It represents one of of series of national studies of internal migration which will appear together with further contributions on international migration, policy issues and migration projections in an edited volume (Rees, Stillwell, Convey and Kupiszewski, 1995) in due course.

1 INTRODUCTION

Internal migration has been a key component in shaping the geographical distribution of the population of the United Kingdom. The concentration of eighteenth and nineteenth industrial growth was fuelled by the willingness of large numbers of people to migrate from the countryside to the emerging provincial towns and cities. The process of suburbanisation which characterised most metropolitan areas in the pre- and post-war years involved massive population shifts as the motor car became a popular mode of transport to and from work for the majority of the workforce. More recently, the extended deconcentration of the population beyond the commuting distance to many urban centres has resulted in the massive net migration losses sustained by Greater London and the other large provincial conurbations. There is some evidence to suggest that the rate of counterurbanisation is slowing down (Champion, 1994) but the big cities are still continuing to lose population in net migration terms.

Analyses of these processes have been reported extensively in the literature together with interpretations of migration occurring at county, standard region and macro region scales. However, virtually no analysis of migration patterns in the UK has been conducted hitherto at the scale of the European Commission's NUTS Level 2 regions. There are 35 of these regions (Figure 1), of which four are in Scotland, two in Wales and 28 in England. Northern

Figure 1: NUTS 2 regions in the UK

Ireland is treated as a single NUTS 2 region. The boundaries of the English NUTS 2 regions are defined to conform with the former metropolitan counties (apart from Tyne and Wear which is aggregated with Northumberland) and either single shire counties or groups thereof. In Scotland, the Glasgow conurbation is part of a large NUTS 2 region that contains Dumfries and Galloway as well as Strathclyde.

This second tier in the spatial hierarchy which Eurostat has established to collect and publish statistical information is particularly important because NUTS 2 regions are the primary territorial units used in the assessment of areas requiring assistance through the Structural Funds. This spatial scale is therefore important in the European policy context, despite the fact that in the UK, most NUTS 2 regions have no administrative credibility or planning function other than that their boundaries are the aggregated boundaries of groups of metropolitan districts or shire counties. The exceptions to this generalisation are found in North Yorkshire, Humberside, Cumbria, Lancashire, Cheshire, Lincolnshire, Essex and Kent, where the NUTS 2 boundaries are consistent with the boundaries of these large shire counties.

In order to identify the patterns of migration that are associated with this system of spatial units, data from two particular sources are used. Initially, data on the transfer of patients between doctors in different Family Health Service Authorities (FHSAs) in England and Wales and Area Health Boards (AHBs) in Scotland are used to present a description of annual aggregate migration trends between 1983 and 1992. The FHSA and AHB areas can be aggregated to be consistent with NUTS 2 regions. Thereafter, a comparison of aggregate migration data from the NHSCR is made with data from the 1991 Census Special Migration Statistics (SMS) and the age and gender characteristics of migration at this spatial scale are investigated using migration data for 1990-91 from the latter source.

2 MIGRATION PATTERNS BETWEEN 1983 AND 1992

2.1 NHSCR data

The major sources of information about the volume and pattern of population redistribution through internal migration in the UK in the years between population censuses are the National Health Service Central Registers (NHSCRs) of NHS patient re-registrations in England, Scotland and Northern Ireland. The re-registration data contained in these registers provides useful information on a quarterly basis about changing migration behaviour and has been used to conduct a detailed analysis of internal migration in the UK during the 1980s (Stillwell, Rees and Boden, 1992).

Since the NHSCR is a register of individual moves that are made by each migrant, the measure of the migration count is different from that used to record migration in the 12 month period prior to the Census. Since Census 'transition-based' migration is a count of migrants rather than migrations, it is to be expected that, for any particular zonal flow, the NHSCR measure will exceed the Census count. However, this is not always the case because the composition of the two migration counts is different with respect to a number of population subgroups that are included in the aggregate data (infants, students, armed forces, for example). The conceptual and compositional differences between the two data sets are spelt out in detail in Stillwell, Rees and Boden (1992), together with a review of the

advantages and shortcomings of the NHSCR data and a comparative analysis of NHSCR versus Census data for 1980-81. The latter suggests that whilst differences in the levels of migration measured by each source are considerable for certain population subgroups and spatial units, there is a strong association between the aggregate patterns (Boden, Stillwell and Rees, 1992). Certainly the NHSCR data is considered by the Census Office and the Department of the Environment to be of sufficient value to be used in the methodology for generating the net migration assumptions that feed into the main population projection model as summarised by Capron and Corner (1990).

NHSCR time series data from the registers for England and Wales and Scotland have been assembled together with mid-year population estimates from 1983 to 1992. Data relating to the NUTS 2 regional system can be extracted from this integrated database using a software package called TIMMIG (Duke-Williams and Rees, 1993). This enables aggregate movement counts between NUTS 2 regions to be generated for 12 month periods between mid-1983 and mid-1992, a time series of nine years of data. This aggregate data is used in the following sections to undertake an analysis of year-on-year migration which provides an important context for understanding the more detailed age and gender characteristics which can be identified from the Census data for 1990-91.

2.2 Indicators of migration

The empirical analysis of large migration data sets relies on the researcher selecting from a variety of migration indicators those measures which enable particular behavioural features to be clarified. In the following sections of the paper, we identify changes in the overall migration propensity, to describe the spatial patterns of net migration, to examine the in-migration and out-migration components that determine net migration balances and to consider particular features of the net zone-to-zone flows. In certain cases, absolute counts are used to emphasise the comparative sizes of the flows concerned; in other instances, flows are expressed as proportions of appropriate populations at risk of migration. Migration coefficients are computed which establish the ratio between gross migration flows. Migration rates and time series indices provide standardised measures of migration that can be used for comparative analysis.

2.3 Level of migration

Data collected from the NHS registers and extracted through TIMMIG indicates that between mid-1991 and mid-1992, approximately 1.44 million people moved between the 35 NUTS 2 regions of the UK. This total includes students who registered with new doctors at their higher education institutions but excludes armed forces personnel and their dependents who moved between regions, those who might have moved on recruitment to or discharge from the armed forces, and those who were committed to or released from prisons and psychiatric hospitals. Expressed as a percentage of the average population at risk during this 12 month period, the total represents a move by 25 in every 1,000 persons. The total is some 148,000 or 11.4% more than the previous year, but approximately 223,000 or 13.4% less than in 1987-88 when the overall propensity to migrate was at its decadal peak. It is well known that migration levels generally declined following a peak in 1973 (Ogilvy, 1979) to a low in the early 1980s (Stillwell, Rees and Boden, 1992). The time series index of yearly migration between NUTS 2 regions, expressed as a percentage of the 1983-84 base figure (Figure 2), highlights the rise and fall of the migration level during the 1980s and suggests that the 1991

Census migration data will reflect migration behaviour at a time when the propensity to move over longer distances was at its lowest level for several years.

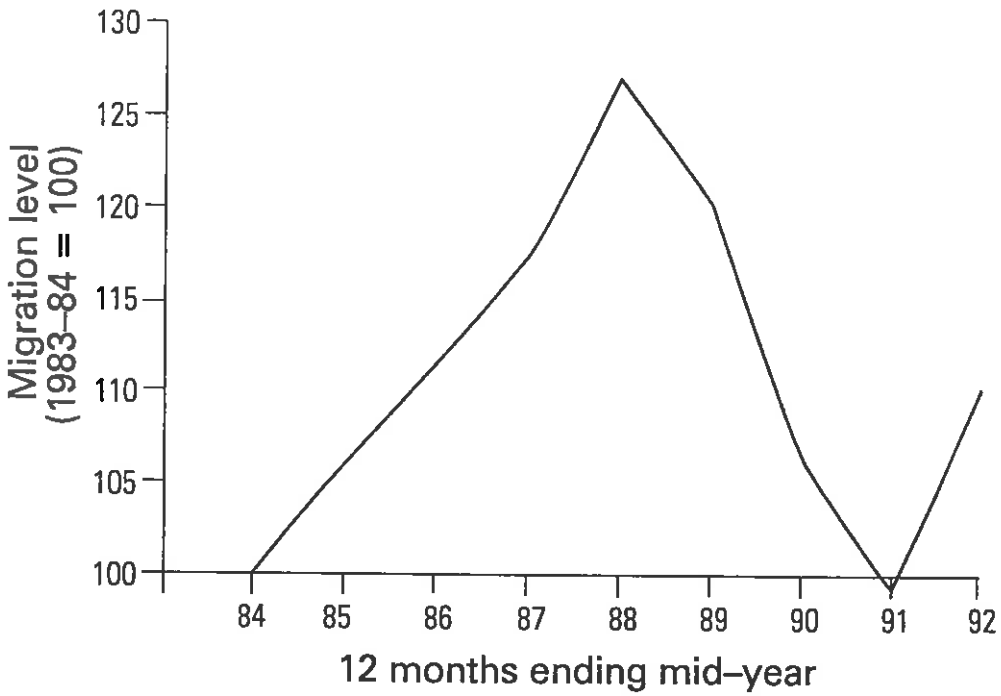

Figure 2: Migration level, time series index, 1983-92

Explanations of these fluctuations are likely to be associated with complex changes in labour and housing markets in different parts of the country. In general terms, the nation experienced an economic upswing from the recession of the early 1980s which peaked in the late 1980s. Unemployment differentials had widened and house prices rose rapidly, particularly so in the South East. The migration rate was highest in 1987-88 but then fell rapidly as the boom burst, as unemployment differentials converged and as house price declines after 1988 meant that many people were no longer able to profit from their residential mobility.

2.4 Net migration patterns

The redistribution of the population through migration between NUTS 2 regions between 1983 and 1992 involved over 13 million moves and the net results of this inter-regional activity can be summarised by the computation of net migration balances for each region (Figure 3). In aggregate terms, 12 NUTS 2 regions gained population and 23 regions lost population through net migration. The net redistribution involved over 1 million moves and there were some major 'winners' and 'losers' amongst the region set. The most emphatic patterns evident from the NHSCR data were the losses sustained by all the major metropolitan regions and the gains recorded by virtually all other regions. In addition to the major metropolitan regions, only Cleveland-Durham, and Bedfordshire-Hertfordshire

recorded net losses in England and Wales. In Scotland, Dumfries and Galloway-Strathclyde and Borders-Central-Fife-Lothian-Tayside, the two NUTS 2 regions encompassing urban central Scotland, were both net losers. In addition, Northern Ireland lost nearly 30,000 net migrants during the period.

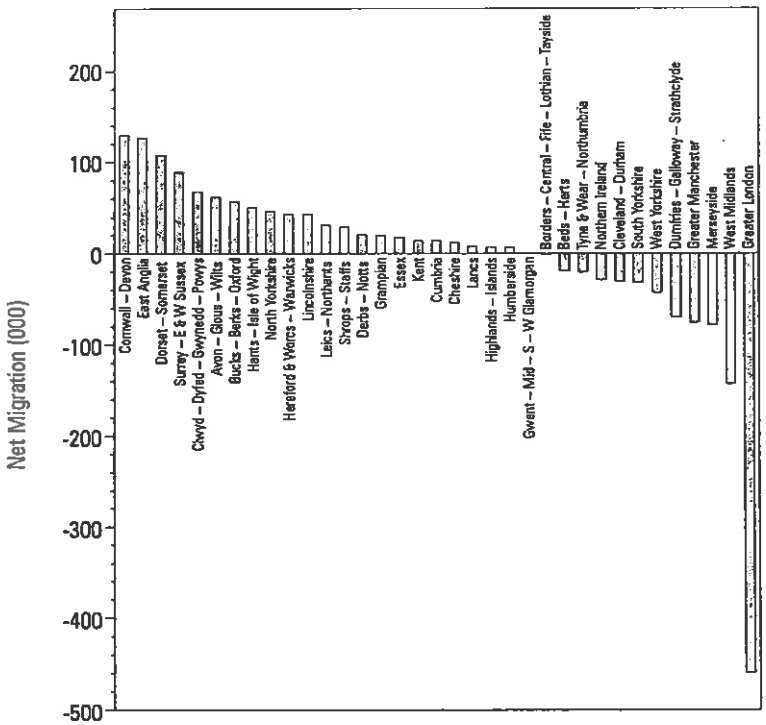

Figure 3: Net migration balances, NUTS 2 regions, 1983-92

The role of Greater London is of fundamental importance in the operation of the national migration system. The capital region was responsible for generating 14.5% of all outmigrants and for attracting 11% of all in-migrants at the NUTS 2 region scale during 1983-92. In net terms, Greater London exported nearly 460,000 people during the period. This compares with net out-migration of 142,000 from the West Midlands, 78,000 from Merseyside and 76,000 from Greater Manchester. At the other end of the net migration spectrum, net gains of over 100,000 were experienced by Cornwall-Devon (130,000), East Anglia (127,000) and Dorset-Somerset (108,000).

An indication of the stability of yearly net migration balances during the period is evident from Figure 4, where the time series schedules of the four highest gainers and losers are graphed. Greater London has experienced considerable variation with net losses doubling between 1984-85 and 1987-88 and then falling from 85,000 in 1987-88 to 20,000 in 1988-89. These changes are mirrored by the net in-migration to Surrey-East and West Sussex whose net balance actually turned negative in 1987-88, when losses from Greater London were at their lowest. Losses from the West Midlands, Merseyside and Greater Manchester have tended to diminish over time, whilst gains by the largest gaining regions have also declined, representing a convergence in NUTS 2 regional net migration balances.

Although net migration flows are essential data for central government and local authority planning, the spatial comparison of migration is better undertaken using net migration rates which standardise for the effects of variations in population size between regions. The computation of net rates per thousand population for 1991-92 (Figure 5) confirms that Greater London (-7.9 per 1,000), West Midlands (-4.9), Merseyside (-3.5) and Greater Manchester (-2,7) remain the prime losers, but Grampian (11.0) and Lincolnshire (8.1) record the highest rates of net migration gain. The rural regions of Dorset-Somerset (6.6) and Cornwall-Devon (5.9) both have high rates of net gain, and the Highlands and Islands of Scotland (5.8), together with North Yorkshire (5.0), are also important in this respect.

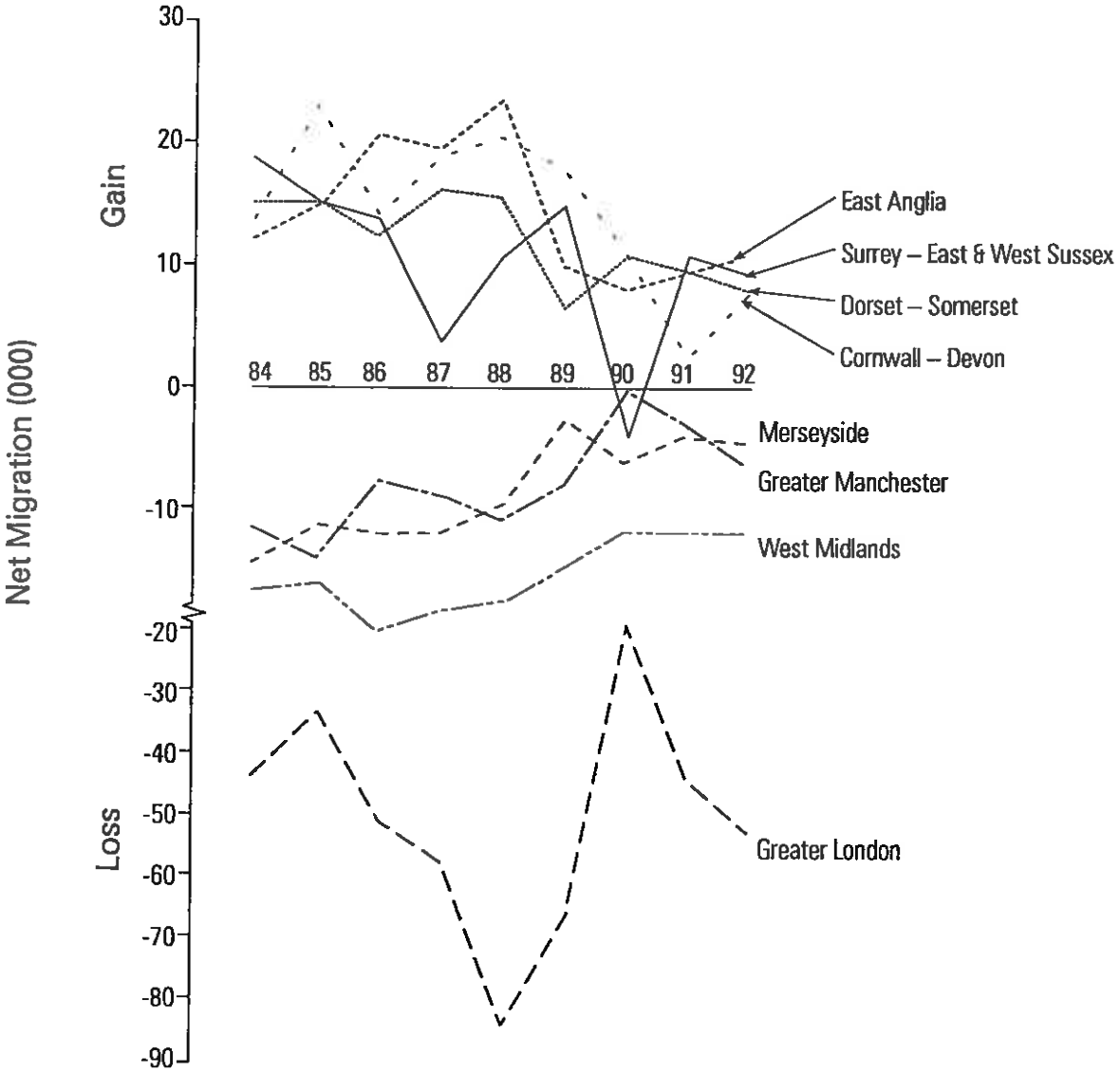

Figure 4: Net migration balances, main gaining and losing regions, 1983-92

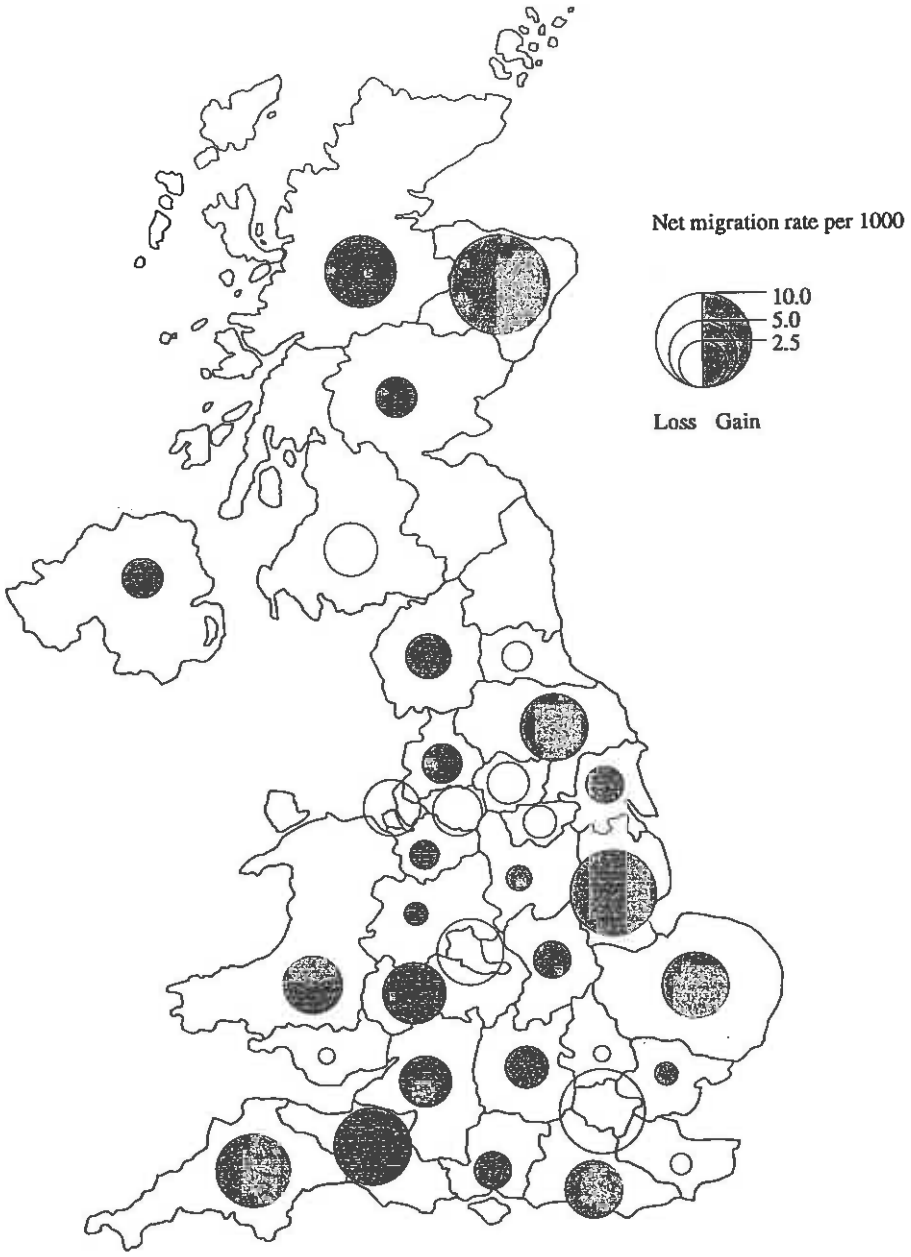

Figure 5: Net migration rates, NUTS 2 regions, 1991-92

2.5 Gross in-migration and out-migration

Net migration data is problematic in that, by definition, it conceals the volume of migration taking place into and out of a region. Consequently, a region like Northern Ireland which remains relatively isolated from the rest of the UK, records a net migration rate gain of 1.8 per thousand in 1991-92 as a function of the difference between relatively low rates of gross out-movement (5.2 per thousand) and in-movement (7 per thousand) (Figure 6), where the

total migration in both directions is less than 20,000. On the other hand, Buckinghamshire-Berkshire-Oxfordshire recorded a rate of net gain of 2 per thousand as a result of the exchange of over 150,000; people left the region at the rate of 37.2 per thousand and entered at the rate of 39.2 per thousand.

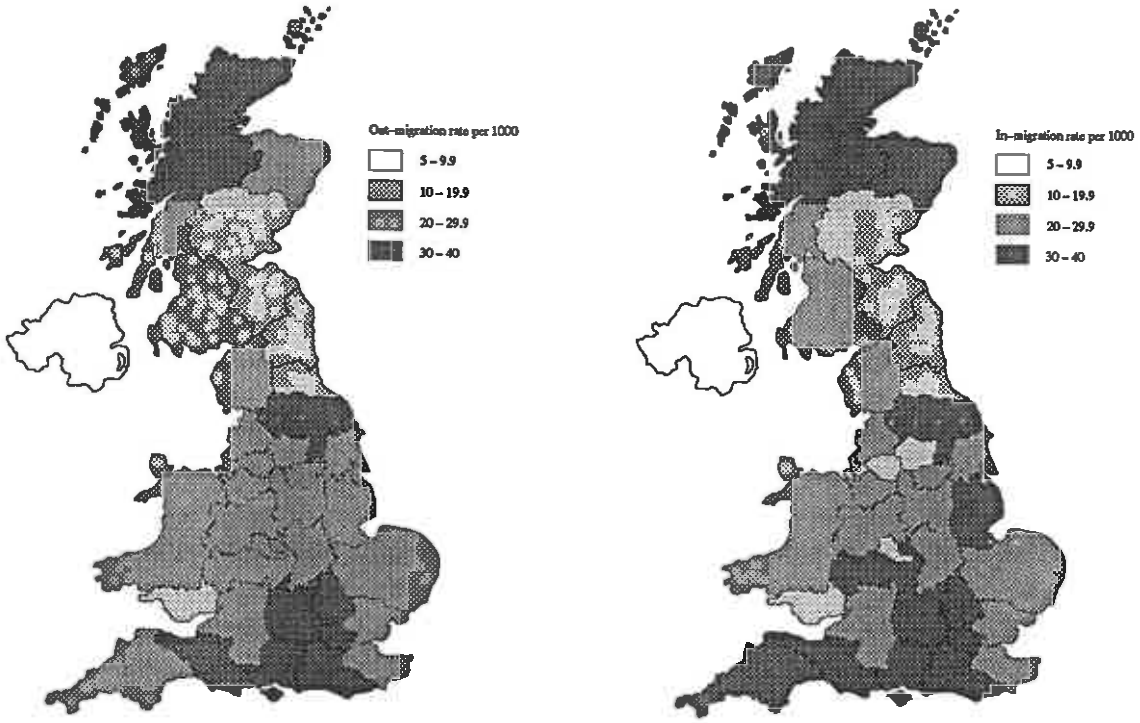

Figure 6: Out-migration and in-migration rates, NUTS 2 regions, 1991-92

In addition to Buckinghamshire-Berkshire-Oxfordshire, the highest rates of out-migration were evident North Yorkshire (34.7 per thousand), Bedfordshire-Hertfordshire (33.3) and Surrey-East and West Sussex (32.2), whereas the lowest rates, other than Northern Ireland, were recorded in Borders-Central-Fife-Lothian-Tayside (14.0), Tyne and Wear-Northumberland (18.7) and Gwent-Mid-S-W Glamorgan (16.2). In-migration rates were highest also in North Yorkshire (39.7), Buckinghamshire-Berkshire-Oxfordshire (39.2) and the Highlands-Islands of Scotland (36.9), and lowest for Gwent-Mid-South-West Glamorgan (16.0) and Merseyside (17.2). As identified in numerous previous studies of migration in the UK and elsewhere, there is a close positive association between the rates out-migration and in-migration for the NUTS 2 system of spatial units.

The relationship between a region's gross out-migration and in-migration can be captured by computing a migration coefficient, the ratio of in-migration to out-migration. This statistic provides a measure of the relative difference between the two flows concerned (Table 1); thus, a coefficient of 1.25 indicates that the in-migration flow is 25% greater than the out-

migration flow, whilst a coefficient of 0.75 shows that the in-migration flow is 25% less that the out-migration flow.

Table 1: Migration coefficients, NUTS 2 regions, 1991-92

Region	Coefficient > 1	Coefficient < 1	Region
Grampian	1.47		
Northern Ireland	1.36		
Lincolnshire	1.28		
		0.74	Greater London
Dorset-Somerset	1.22		
Cornwall-Devon	1.22		
East Anglia	1.21	0.79	West Midlands
Highlands and Islands	1.18		
		0.83	Merseyside
Hereford-Worcester-Warwickshire	1.15		
Clwyd-Dyfed-Gwynedd-Powys	1.15		
North Yorkshire	1.14		
Borders-Central-Fife-Lothian-Tayside	1.13	0.87	Greater Manchester
		0.88	Dumfries-Galloway-Strathclyde
Surrey-E&W Sussex	1.11		
Avon-Gloucestershire-Wiltshire	1.11		
Cumbria	1.09	0.91	West Yorkshire
Humberside	1.07		
Lancashire	1.07		
		0.94	South Yorkshire
Leicestershire-Northamptonshire	1.05	0.95	Cleveland-Durham
Hampshire-Isle of Wight	1.05		
Buckinghamshire-Berkshire-Oxfordshire	1.05		
Cheshire	1.03		
Derbyshire-Nottinghamshire	1.03		
Shropshire-Staffordshire	1.03		
Essex	1.02	0.98	Kent
		0.98	Gwent-Mid-South-West-Glamorgan
		0.99	Bedfordshire-Hertfordshire
Tyne & Wear-Northumberland		1.00	

Source: From unpublished NHSCR data

The coefficients indicate that for Grampian, the in-migration flow is 47% of the size of the out-migration flow and that there are nine regions where in-migration is over 15% of out-migration. Of the regions recording net losses in 1991-92, Greater London's out-migration

exceeds in-migration by over 25%, whilst the ratio is greater than 15% also in the West Midlands and Merseyside.

2.6 Interregional net migration

Whilst the above indicators of net and gross migration provide valuable summaries of migration 'stock' patterns for each region relative to others, they do not enable a full understanding of the directional 'flows' of migration taking place. In order to achieve a concise summary of where the important interregional exchanges have occurred, the net migration flows between the NUTS 2 regions between 1983 and 1992 exceeding 5,000 re-registrations can be identified and 'primary' flows (over 25,000 moves) distinguished from 'secondary' flows (10,000-25,000 moves) and 'tertiary' flows (5,000-10,000 moves). The pattern of large net movements (Figure 7) is dominated by the exodus of migrants to the regions of the south whose boundaries are contiguous with that of Greater London. The net flow from the capital to Surrey-East and West Sussex exceeded 130,000 moves during the nine year period. Further short distance deconcentration is evident in the south of England from Essex and Bedfordshire-Hertfordshire to East Anglia and from Bedfordshire-Hertfordshire to Berkshire-Buckinghamshire-Oxfordshire. In the rest of the country, the major net migration flows include those from the major metropolitan regions of the West Midlands and West Yorkshire. In the case of the West Midlands, large net losses occur to both Hereford and Worcester-Warwickshire and Shropshire-Staffordshire, whereas West Yorkshire loses primarily to North Yorkshire. In Scotland, the major net exchange is in an eastward direction from Dumfries and Galloway-Strathclyde to Borders-Central-Fife-Lothian-Tayside.

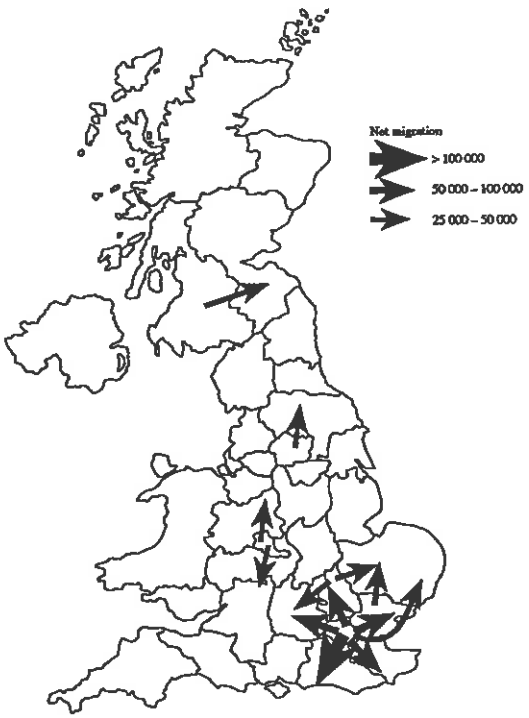

Figure 7: Primary net movements, 1983-92

Certain interesting features of interregional migration in the UK emerge from the patterns of 'secondary' net movement (Figure 8). Firstly, there is clear westward counterurbanisation drift, involving flows from Greater London to Cornwall-Devon, Dorset-Somerset and Hampshire-Isle of Wight in particular, but also from other regions of the South East. Secondly, longer distance net migration flows into Greater London from several of the larger provincial metropolitan regions can be identified which illustrate the relative importance of inter-urban migration in the inter-regional system. There is further evidence from the patterns of tertiary net migration flows (Figure 9) that movements across the north-south divide are predominantly from the urban areas of the north, as well as from Northern Ireland. Whilst the order of magnitude of the net exchanges decreases, the complexity of the flow pattern increases when we consider flows of 5,000-10,000 people. However, the streams apparent in Figure 9 reinforce the trends of decentralisation which are also evident in Figure 8 and illustrate the predominance of westward movement, not only from the South East to the South West, but also from the West Midlands to Wales and the South West and from regions of the North West into Wales.

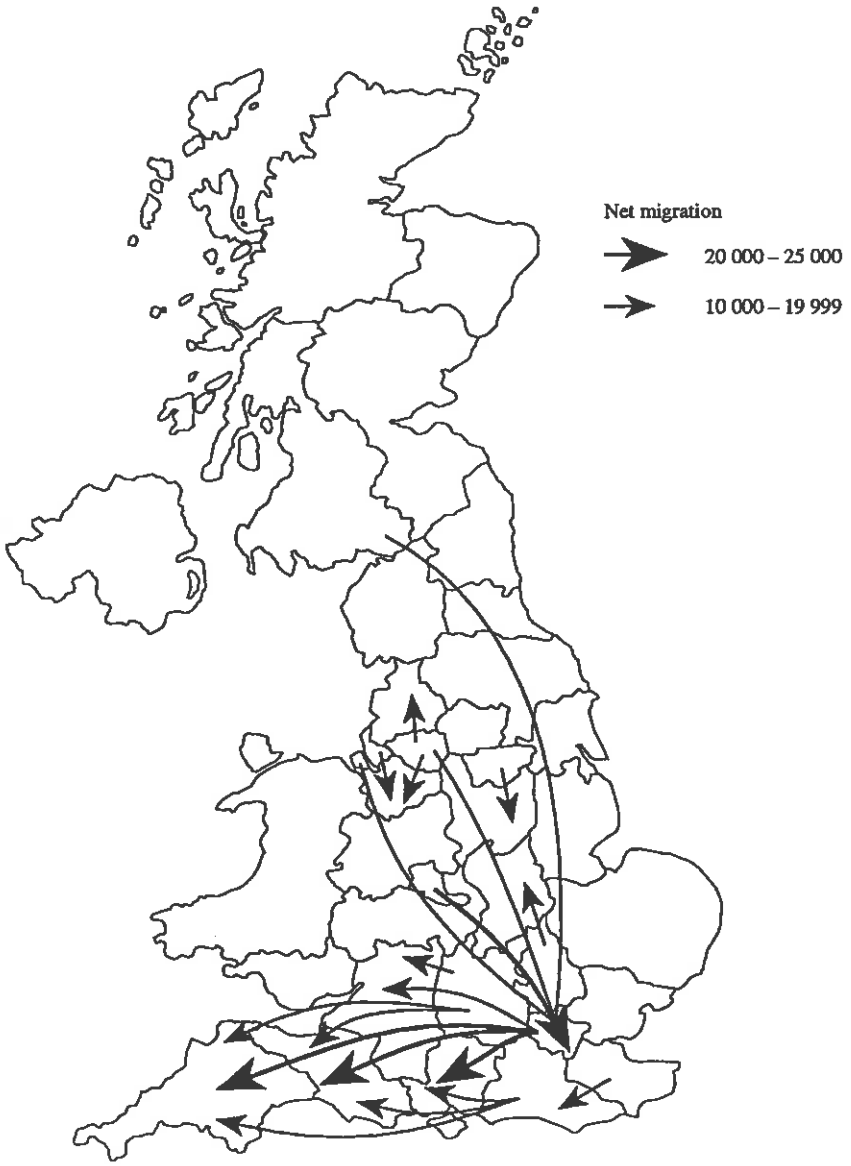

Figure 8: Secondary net movements, 1983-92

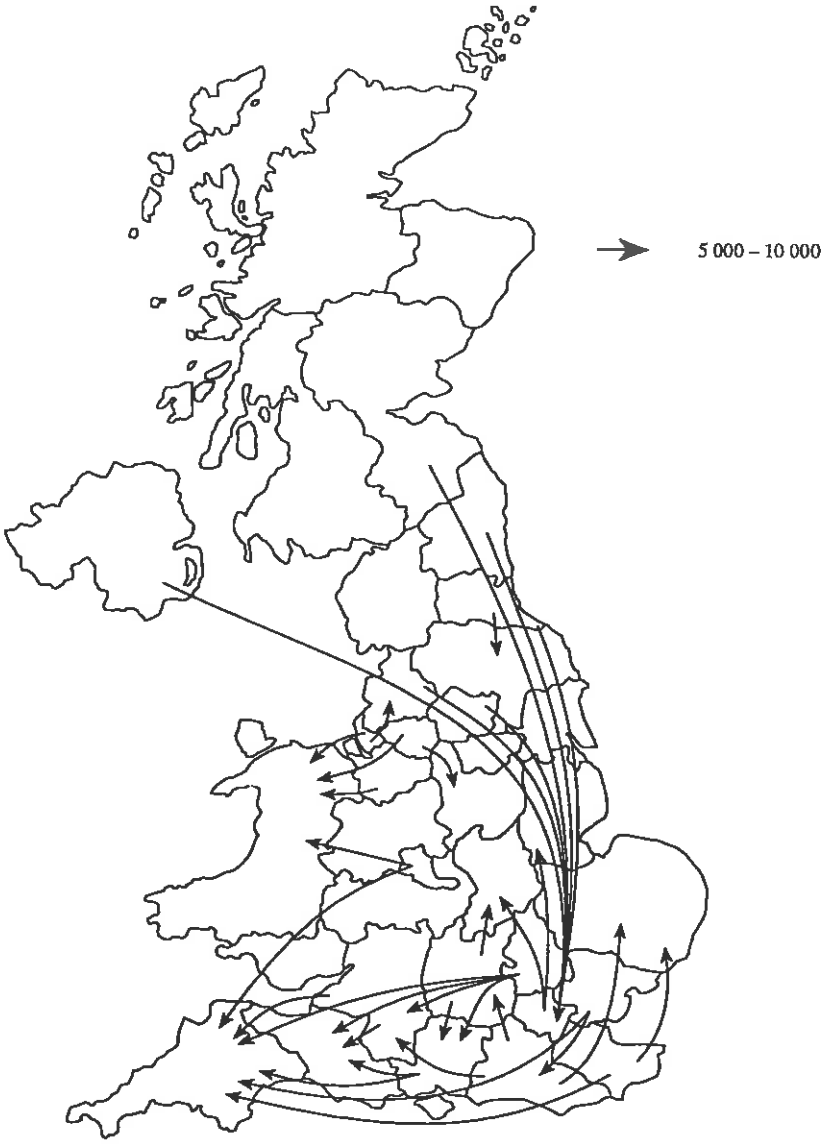

Figure 9: Tertiary net movements, 1983-92

Does the pattern of internal migration during the whole period represent what is happening in the early 1990s? Net migration balances above 500 persons during 1990-92 are distinguished at four levels in Figure 10. Large flows of over 9,000 individuals are confined to Greater London and its surrounding NUTS 2 regions. Net exchanges of 2,000-9,000 follow the pattern of secondary movements in Figure 8 except that inter-metropolitan area flows from the North West to Greater London are less conspicuous. Net flows in the south of the country at this level are dominated by westward moves from Greater London whereas the flows between 1,000 and 2,000 demonstrate the westward pattern of migration from other southern regions together with northward flows from the capital and from Kent. The pattern of directional net flows of between 500 and 1,000 move illustrates further the longer distance exchanges between the northern and soutern parts of the country as well as westward losses from Kent and Essex. This not to say that flows between contiguous areas have disappeared and Leicestershire-Northamptonshire appears as a region which at this level, is decanting eastwards to neighbouring regions whilst gaining from its adjacent neighbours in the south and west.

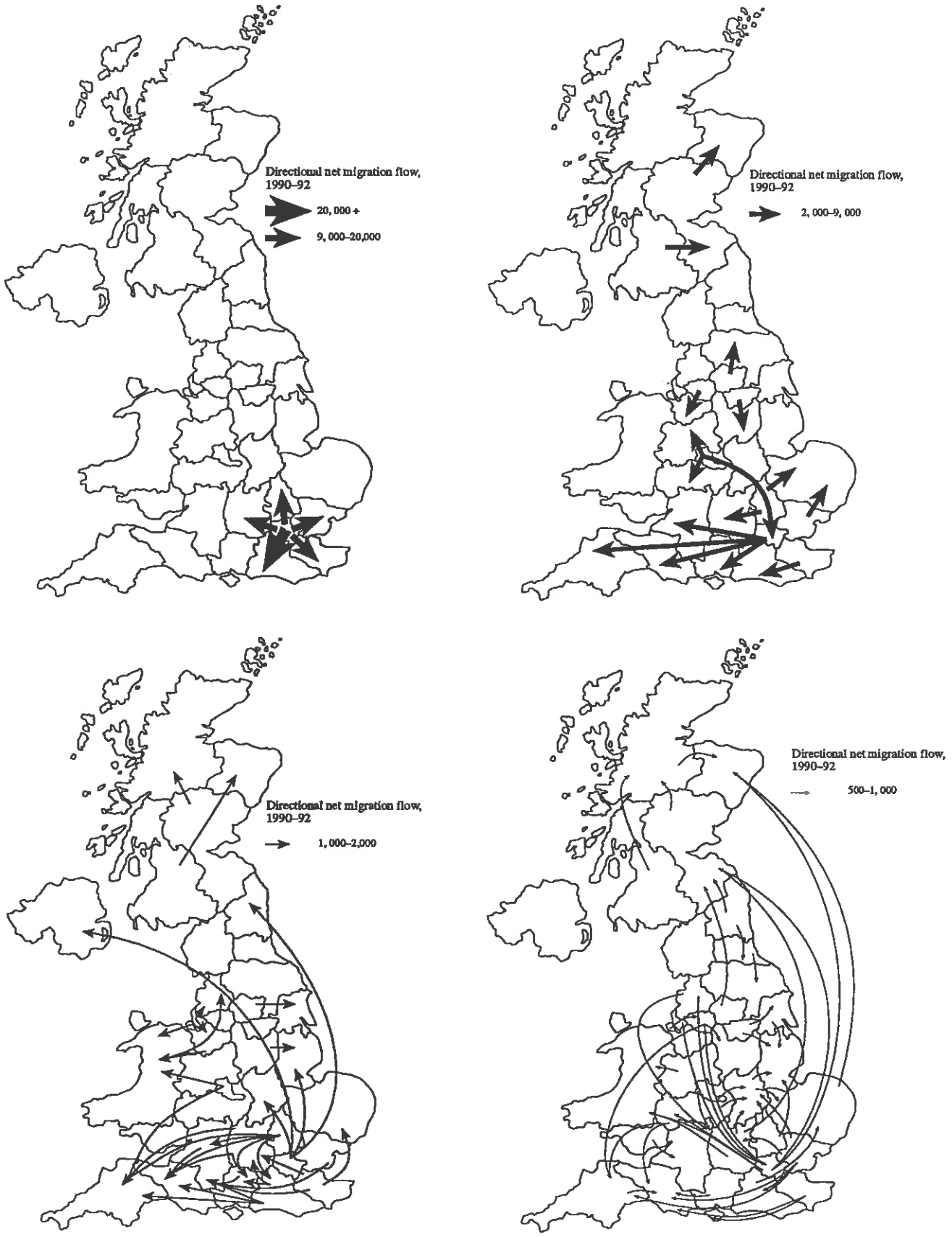

Figure 10: Directional net migration, NUTS 2 regions, 1990-92

3 COMPARISON OF NHSCR AND CENSUS INTERACTION DATA FOR 1990-91

3.1 Differences between Register and Census migration measures

So far, our analysis of the spatial patterns of migration between NUTS 2 regions in the UK has used data derived from an administrative register. In Section 4, migration data from the 1991 Census is used to provide an overview of how migration varies by age. However, before we embark on the analysis, it is useful to examine the relationship between migration flows measured using the data from the NHSCR and the 1991 Census. Should we expect them to tell the same story, and do they?

Previous research (Devis and Mills 1986; Boden, Stillwell and Rees, 1992) has established that the two data sources differ in the concept used and the target populations covered. As indicated in Section 2, the NHS data represent 'events'; that is, instantaneous 'jumps' from one spatial location to another. Individuals can make more than one jump in a year and each of these is counted. The retrospective census question, however, measures 'transitions'; that is, differences between the current spatial location and the location at the prior time (one year ago). Individuals can make only one transition per time interval. Other things being equal we would expect the NHS data to record more migration events than the census records migrants making transitions. However, this may not always be the case because of the different population coverage in the two sources. The NHSCR covers the whole civilian population but not the military, while both are included in the Census. Entries and exits to the armed forces are included in the NHS migration counts but not by both origin and destination. No migrations by persons remaining in the armed forces are counted. The NHSCR covers two categories of migrant - those who die in the time interval and those born in the time interval - which are excluded from the census counts.

A final important difference in the two sources is the treatment of students. Students are recorded at their place of term-time residence in the NHSCR if they have changed the medical practitioner with whom they are registered. Many higher education institutions require students to re-register with the NHS so that the institution linked health service can be funded, but institutions that do not provide such a service leave it up to the individual student. Censuses record students at their parental home as usual residence, change in which is the basis for identifying migrants. The 1991 Census, however, did ask for student's term-time address and provides information on usual and term-time address. Stillwell, Duke-Williams and Rees (1993, Table 6) showed that when net student in-migration was added to migrant counts, this could produce dramatic increases in migration in the ages 15-19 and 20-24 to areas with large higher education institutions and losses to the areas without. For example, the in-migration rate per 1,000 population for Oxfordshire for 1990-91 was 71 for the 15-19 age groups and 95 for the 20-24 age group using NHS data but 243 and 273 respectively if the Census in-migrant count is supplemented by net student inflow. This is a topic worthy of much further detailed investigation, utilising a special table published by the Census Offices that cross-classifies students by parental and term-time locations at district scale.

3.2 A comparison of interaction matrices

Because of the problems of assessing the differences in level of migration reported in NHS and Census migration tables, we concentrate here on the degree of similarity of pattern. In

previous analyses comparisons were made between total inflows, outflows and net flows at different spatial scales (Stillwell, Rees and Boden, 1993, Stillwell, Duke-Williams and Rees, 1995). Here we examine similarity between NHS and Census matrices of origin-destination flows for NUTS 2 regions.

Both NHS and Census migration data can be aggregated to NUTS 2 regions but a small number of flows must be excluded from the analysis. Intra-region flows have a different meaning in the two data sets and are set to zero in the analyses. Flows to Northern Ireland are not available in the Census migration tables and therefore we exclude all flows to and from that province. The comparison is therefore based on 34 of the 35 NUTS 2 regions yielding a total of 1,156 flows of which 34 intra-regional flows play no part, being set to zero in both datasets.

Table 2: Correlations between NHS migrations and Census migrant flows between NUTS 2 regions by age and gender, 1990-91

Age groups	Persons	Males	Females
0-4 (1-4 for Census)	.9372	.9358	.9334
5-9	.9137	.9091	.9111
10-14	.8987	.8810	.8989
15-19	.8638	.8235	.8729
20-24	.9462	.9358	.9488
25-29	.9478	.9369	.9535
30-34	.9523	.9477	.9526
35-39	.9516	.9482	.9505
40-44	.9583	.9537	.9562
45-49	.9583	.9537	.9522
50-54	.9567	.9517	.9490
55-59	.9594	.9529	.9555
60-64	.9710	.9642	.9705
65-69	.9753	.9742	.9671
70-74	.9696	.9571	.9662
75-79	.9622	.9502	.9589
80-84	.9715	.9427	.9704
85+	.9695	.9431	.9667
Total (N=1156)	.9517	.9501	.9524

Source: Computed from NHS movement counts for quarters 2, 3, 4, 1990 plus quarter 1, 1991 and the migrant counts from the 1991 Census, Special Migration Statistics. All data are Crown Copyright. The Census data are from the ESRC/JISC Purchase.

NHS data re-counted in period-ages, while Census data are in period-cohorts (1 year time, 5 year age intervals). Table 2 sets out the correlation coefficients between the 1,156 origin-destination flows based on NHS and Census data respectively, for five year ages and the two sexes. The correlations are high but not perfect. They are higher than those reported in Stillwell, Duke-Williams and Rees (1995) for inflows to 95 Family Health Service Authorities. This is probably a result of using a coarser spatial scale in this analysis.

The pattern of correlation across the sexes and ages can be interpreted as follows: male coefficients are lower at most ages than female because of greater registration lags in the NHS and more undercounting in the 1991 Census; coefficients for age groups beyond age 40 are above the average of 0.95 while below age 25 they are all below this figure. This reflects the different treatment of students and boarding school pupils in the two statistical systems and the greater difficulties of producing a complete and accurate record for these groups, particularly between ages 10 and 19.

In Table 3 are reported more detailed statistics about the relationships between the two migration measures. The first column gives the crude ratio of NHS count to Census count. Overall the former is 23% higher than the latter; in 1980-81 the comparable figure was 24.5% (Boden, Stillwell and Rees 1992, Table 2.3). The highest ratio is for age group 15-19 (as in 1980-81), the age group at which students leave home and when the maximum discrepancy between the populations covered in the two datasets occurs. Ratios are below average from ages 25 to 45 but then rise above the mean to age 65, after which they follow the average level. The next two columns in Table 3 set out the parameters of regression equations linking NHS migration (the dependent variable) to Census migration (the independent variable). To predict an origin-destination movement flow from a census migrant count for the age group 20-24, for example, one needs to multiply the census count by 1.02 and add 37 moves. For 85 year olds it is necessary just to multiply by 1.41. Slope parameters vary by age in roughly the same way as the crude ratios though they are mostly lower. On average female slopes and ratios are higher than those for men. This probably indicates that males are even more under-represented in the NHS migration data than they are in the Census data.

To conclude, our comparison of the two sources of migration data suggests that they give very closely comparable pictures of migration, but do differ sufficiently to warrant use of both sources to give a more comprehensive view of UK migration. Neither, however, provides the full 'truth' and, in particularly, a more detailed analysis of student migration is needed.

Table 3: Ratios and regression parameters for NHS versus Census flows for NUTS 2 regions, by age and gender, 1990-91

Age Group	Ratio NHS/ Census	Person Regression Constant	Person Slope	Male Slope	Female Slope
0-4	1.29	6	1.11	1.11	1.11
5-9	1.23	5	1.09	1.10	1.06
10-14	1.32	-1	1.37	1.40	1.30
15-19	1.78	21	1.26	1.08	1.37
20-24	1.30	37	1.02	0.86	1.15
25-29	1.20	22	1.02	0.94	1.11
30-34	1.18	9	1.04	1.01	1.07
35-39	1.17	4	1.07	1.05	1.08
40-44	1.16	2	1.06	1.01	1.11
45-49	1.26	2	1.09	1.07	1.09
50-54	1.39	1	1.19	1.16	1.21
55-59	1.39	2	1.18	1.20	1.15
60-64	1.32	1	1.14	1.13	1.14
65-69	1.23	0	1.18	1.19	1.15
70-74	1.26	0	1.23	1.21	1.23
75-79	1.22	0	1.24	1.28	1.20
80-84	1.22	0	1.35	1.30	1.35
85+	1.25	0	1.41	1.50	1.37
Total	1.23	111	1.09	1.03	1.15

Source: as for Table 2

4 AGE AND SPATIAL CHARACTERISTICS OF MIGRATION IN 1990-91

In this section we examine the way in which migration varies by age for the two sexes and at different spatial scales, drawing on the fine age classifications which census data provides. Since Northern Ireland data is excluded, the migration schedules refer to Great Britain rather than the UK.

4.1 National age profiles of migration

Migration rates at different spatial scales for GB (Figure 11) have been calculated by dividing the number of migrants in a single year age group by the 1991 Census population of GB at that age, which, although not the ideal population at risk, is the only available one The top curve shows the migration rate for all residents in GB who reported a different address one year before the Census (on 21st April 1990). These include migrants from outside GB, as well as those with origin not stated. The curve below shows the migration profile for residents moving within GB. The bottom three curves plot the migration rates between areas of steadily rising spatial extent: between the 459 districts of GB (NUTS 4 regions), between the 66 county/Scottish region units (NUTS 3 regions) and between the 11 standard regions (NUTS 1 regions).

The variation of migration rates for all ages (between 1 and 90 and over) at different spatial scales recorded in the 1991 Census are set out in Table 4. Nearly 10 % of the GB population reported a change of address from the 21st April 1990. Some 88% of migrants originate within the country (GB) from known origins, with 6% coming from outside Great Britain and 6 % failing to state their origins. Just over half of migrants (54%) move locally within districts with just over a third moving between districts (459 units). Of these two thirds move between counties/Scottish regions (66 units) while one third move between standard regions.

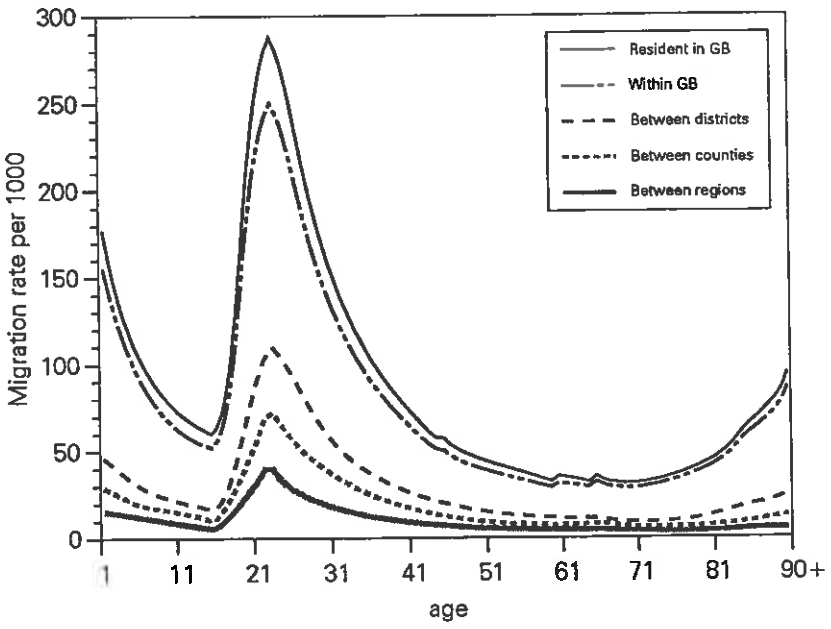

Figure 11: Migration rates by age at different spatial scales, 1990-91

Table 4: Migration rates at different spatial scales in GB, 1990-91

Migration type	Migration rate per 1000 population		% of total migrants
Resident in GB	98.8		100.0
Within GB	86.6		87.6
Between regions		11.6	11.8
Between counties		21.7	21.9
Between districts		33.6	34.0
Within districts		53.0	53.6
From Outside GB	6.2		6.3
From Northern Ireland		0.2	0.2
From outside UK		6.0	6.1
From Origin Not Stated	6.0		6.1

Source: OPCS (1994) 1991 Census Migration Tables. Crown Copyright

The age profiles displayed in Figure 11 show the familiar features of migration rate schedules, distinguished by Rogers and Castro (1981): *a childhood slope,* in which migration steadily declines from age 1 to age 15; *a labour force peak,* starting with a rapid rise from age 16 to a peak at age 23 followed by steady falls to age 59; *small retirement peaks* at age 60 and 65 (corresponding to official retirement ages for women and men respectively); *a retirement slope* starting at age 68 and continuing until age 90 and over; and *a constant component* across all ages at a level of roughly 30 per 1000 for migrants resident in GB.

These components are associated with significant events during the life course. The childhood slope is closely associated with the declining slope of the labour force curve, showing the link between child and parent migration. The gap between the two slopes is about 28 years, corresponding to the mean age of mothers at birth of their children. The rising slope of the labour force curve represents the migration of persons into their first non-parental homes (in part associated with a migration to higher education for students recording their term-time address as their usual residence). The peak is associated with rapid changes of status and jobs at the start of adult careers. The retirement peaks are a familiar feature of migration schedules but in the 1991 Census schedule the peaks are relatively minor features, compared with the retirement slope. Less attention has been paid to the retirement slope in previous work because data are normally reported for five year age groups, and often truncated well before age 90.

The migration curves for men and women shown in Figure 12 are very similar but the small differences reflect different timings of key life course events.

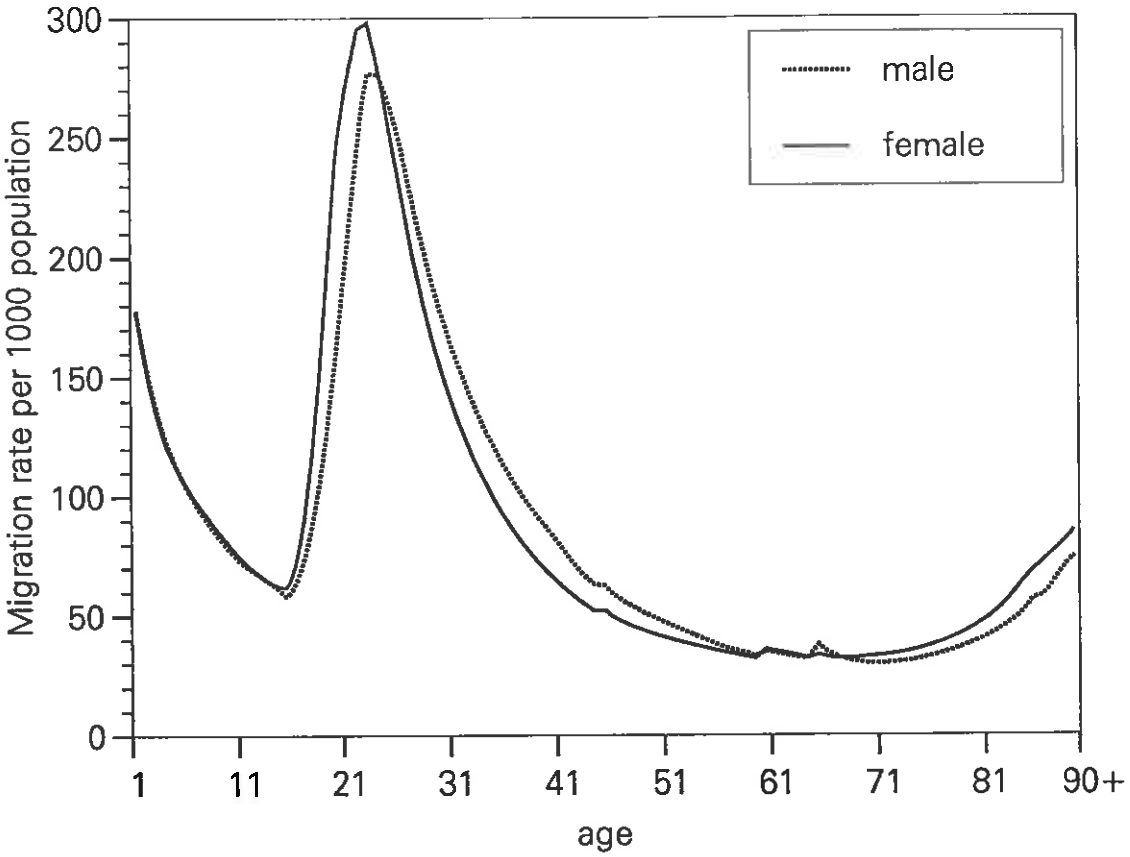

Figure 12: Migration rates by age and gender, 1990-91

At the childhood ages there is no difference between males and females. Females then begin the rise to the labour force peak earlier than men, starting at age 16. The peak ages for women are 22 and 23, while those for men are 23 and 24. The gap between the curves widens after the early adult years reflecting the age gap between men and women forming married or cohabiting unions. The small retirement peaks occur, as noted above, at ages around respective official retirement ages. We can anticipate some changes by 2001 in the timing of the female peak as women's retirement age has recently been moved up to 65 for those aged less than 50 in 1994. Overall the differences between the gender curves make little difference to overall measures. The average male migration rate in 100.7 per thousand, while the female rate is 97.1; on the other hand, summing the migration rates average yields a gross migraproduction rate (GMR) of 7.7 for males and 7.8 for females.

Although the migration curves in Figure 11 are very similar in shape and timing, there are more subtle relationships between the level of migration at different ages and the spatial scale of migration. To observe these relationships it is necessary to look at migration rates within districts, between districts within counties, between counties within regions and between regions. The average distance of migration steadily increases from the first category to the last. It is also necessary to standardise each migration schedule by dividing each rate by the total of all age specific migration rates (the GMR), and to express the standardised rate at each scale as a percentage of the total standardised migration rate in the corresponding age

group. Formally, we define the ratio of the standardised scale migration rate to the GB standardised rate for age a as:

$$r_k(a) = 100\ [m_k(a)/\Sigma_a m_k(a)) / (m_g(a)/\Sigma_a m_g(a)]$$

where $m_k(a)$ is the scale k migration rate for age a. These ratios for each spatial scale fluctuate around a national norm of 100 and are plotted in Figure 13. The age profile for all migrants resident in GB would be a straight line across the graph at value 100.

The four spatial scales display quite distinctive variations around this line. *Within district* migration (incorporating the shortest distance migrations) exhibits above average migration in the childhood ages up to age 17 when there is a sharp dip to age 23. The ratio then remains below 100 through the labour force ages to age 55, though a steady rise begins from age 50. The ratio is well above average in the older ages (67 and older). *Between region* migration (incorporating the largest distance migrations) shows an opposite pattern of below average migration at the youngest ages with highest migrations in the early twenties. After below average migration for ages 25 to 29, migration ratios are above average until after the retirement ages, with a minor peak between ages 60 to 66. After age 70 there is a steep fall in the ratio. The elderly do not take as much part in long distance migration as other age groups. Migration *between districts within counties* is below average in the childhood ages but then climbs to a local peak around age 27 and stays above average until age 53. The migration ratio is then below average in the retirement ages until the very oldest age. Finally, migration *between counties within regions* has a similar profile to inter-region migration with above rates in the labour force years but below average in the childhood and post-retirement ages. To summarise, longer distance migrations are emphasised in the young adult, the middle adult and retirement ages, while at childhood and elderly ages, shorter distance migrations are more important.

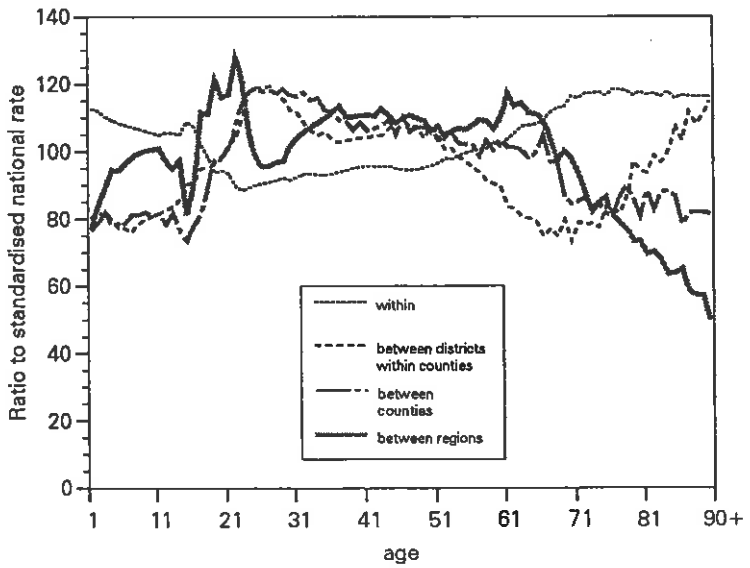

Figure 13: Comparison of migration rates at various spatial scales with the GB standard, 1990-91

4.2 Net migration patterns by age, 1990-91

In earlier sections of the paper we examined in detail the spatial pattern of migration flows between NUTS 2 regions over the 1983-92 period. As one might expect, there are, however, major departures from the average all age pattern between one age group and the next. Past research (Boden, 1989; Rees, Stillwell and Boden, 1989, Stillwell, 1994) has suggested that significant differences exist between the pattern of origins and destinations at different ages. The context of some of this earlier work was a desire to test whether the age groupings for age-destination interactions used in the official subnational population projection model could be justified or needed revision. The method used was to group detailed five year age groups into large clusters using inter-FHSA migration.

Here we use a similar technique to aid description of the patterns of migration by age. The SMS (Table M03) provides flow data between NUTS 2 regions for 2 sexes and 19 ages. Could these 38 age/sex groups be reasonably clustered into a smaller number that described most of the variation? The shares across destinations and origins were used as the clustering variables. Four clustering analyses (using the default options in the SPSS Cluster procedure) were carried out for males and females, destinations and origins. The five cluster solution in each case provided a reasonable grouping in each of the four analyses. While the clusters were not exactly the same, the following age groups always formed cluster cores which are clearly associated with life course stages:

(I) ages 1-15 and 30-54: the family ages;
(ii) ages 16-19: the ages of leaving home;
(iii) ages 20-24: the ages when work careers start;
(iv) ages 60-69: the ages of retirement; and
(v) ages 75-85+: the elderly ages (of widowhood and declining health).

The missing ages (25-29, 55-59 and 70-74) joined different clusters depending on whether males or females or origins or destinations were examined. For example, male migrants aged 55-59 were placed in the family cluster when both destination and origin pattern were considered, while 55-59 year old female migrants joined the retirement age cluster. Here, in order to examine net migrant patterns, the male-destination clustering is adopted as follows: the family ages (1-15 and 30-59); the leaving home ages (16-19); the starting career ages (20-29); the retirement ages (60-74); and the elderly ages (75+). Each of these age clusters had a distinct pattern across destinations and origins. Using this age clustering, Table 5 organises the net migration flows for NUTS 2 regions reported in the 1991 Census. To provide some structure to the set of NUTS 2 regions they have been grouped into 'metropolitan' and 'non-metropolitan' categories and divided into northern' and 'southern', matching earlier analyses (Stillwell, Rees and Boden, 1992).

Table 5: Net migration flows by broad age group, 1990-91

Region	Family 1-15 30-59	Leaver 16-19	Joiner 20-29	Retirer 60-74	Elderly 75+	Total 1+
SOUTHERN	-2,992	3,728	12,649	-29	613	13,969
Metropolitan (Greater London)	-40,303	2,158	-512	-8,037	-3,811	-50,505
Non-metropolitan	37,311	1,570	13,161	8,008	4,424	64,474
East Anglia	6,779	442	1,919	1,991	522	11,653
Surrey, E & W Sussex	5,702	493	1,604	730	420	8,949
Avon, Gloucs, Wilts	4,319	584	2,218	420	211	7,752
Dorset, Somerset	4,610	184	549	1,519	331	7,193
Cornwall, Devon	5,680	210	-699	1,413	354	6,958
Hereford & Worcs, Warks	3,941	-383	1,453	593	440	6,044
Hants, Isle of Wight	1,852	1,154	751	669	339	4,765
Lincolnshire	2,394	-76	435	1,026	263	4,042
Berks, Bucks & Oxon	1,558	218	1,951	-399	403	3,731
Derby, Notts	1,142	-221	701	33	201	1,856
Essex	-525	-187	814	460	283	845
Leics, Northants	1,136	-97	-624	101	150	666
Beds, Herts	-1,147	-240	2,038	-710	201	142
Kent	-130	-511	51	162	306	-122
NORTHERN	7,012	-2,884	-7,528	220	-531	-3,711
Metropolitan	-12,450	-1,360	-8,782	-2,975	-2,022	-27,589
Tyne & Wear, Northumb	654	128	-704	106	-120	64
S Yorkshire	-672	-173	-1034	-105	-37	-2,121
Dumfries & Gall, Strathclyde	-1,392	-207	-794	-112	-190	-2,695
W Yorkshire	-1,724	-158	-1,085	-482	-248	-3,697
Merseyside	-1,713	-451	-1,412	-374	-293	-4,243
G. Manchester	-2,869	-335	-573	-825	-347	-4,949
W. Midlands	-4,734	-164	-3,180	-1,183	-687	-9,948
Non-metropolitan	19,462	-1,524	1,254	3,195	1,491	23,878
Grampian	2,270	278	1,065	175	76	3,864
N. Yorkshire	2,372	524	168	346	239	3,649
Borders, Tayside	2,815	-233	249	395	206	3,432
Clwyd, Powys	2,977	-325	-266	834	194	3,414
Shrops, Staffs	1,735	-249	385	312	311	2,494
Cheshire	1,688	-194	528	93	143	2,258
Highlands & Islands	1,410	-151	521	316	98	2,194
Cumbria	875	-70	173	210	70	1,258
Humberside	1,327	-192	-197	212	80	1,230
Lancashire	1,025	-219	-168	47	21	706
Cleveland, Durham	316	-478	-258	79	49	-292
Gwent, Mid, S, W Glamorgan	652	-215	-946	176	4	-329
Northern Ireland	-4,020	-844	-5,121	-191	-82	-10,258

Source: 1991 Census Special Migration Statistics. Crown Copyright. ESRC/JISC Purchase

The migrant flows in Table 5 include inflows from Northern Ireland but not out-flows to Northern Ireland, which were not captured in the GB SMS. There is a small bias upwards in the net migration gains to GB regions. The Northern Ireland figures record just the outflows from Northern Ireland.

The story is a familiar one for all age migration (the right most column of Table 5) already tracked in our NHSCR migration analyses of metropolitan losses and non-metropolitan gains, and of a smaller northern losses and southern gains in aggregate. The dominant pattern is loss of migrants from the largest metropolitan areas and gains in other regions in all sections of the country. Particular heavy losses are experienced by Greater London of twice the magnitude of the other metropolitan areas in total. Note that at NUTS 2 level some non-metropolitan regions (Cleveland-Durham-Gwent-Mid-South-West Glamorgan; Kent) also experience net outflows, while one metropolitan region (Tyne and Wear-Northumberland) just achieves a positive balance.

This aggregate pattern is repeated for the *family ages* except that two other regions close to London (Essex and Bedfordshire-Hertfordshire) experience net losses. The *leaving home* age group, 16-19, shows a markedly different pattern from the aggregate. Greater London experiences positive inflows for this age group while a majority of non-metropolitan regions record net migrant losses, and the other metropolitan regions record smaller net losses. The interpretation of this pattern is straightforward; it represents the channelling of a widely dispersed population of students (beginning higher or further education at ages 17, 18 and 19) to a more concentrated set of destinations containing the principal educational institutions. For example, the Lincolnshire region loses 76 migrants at this age even though it is one of the most attractive areas for in-migrants. No major higher education institution is located in Lincolnshire. The *starting career* ages show some of the directional features of the previous age group, with only a small loss of migrants from Greater London and continued losses among some metropolitan regions. The *retirement ages* show a return to the sharp division between metropolitan and non-metropolitan regions and more selectivity with respect to destinations than at other ages. The *elderly age* numbers of net migrants reflect the increase in migration towards the end of life and the sharpest match of net gains and losses with the metropolitan/non-metropolitan classification. At and after retirement migrants are freer to choose destinations than when constrained by job opportunities and they clearly opt for the pleasanter environments and lower population density of non-metropolitan regions.

A clear idea of directional preferences in migration can be gained by using the in-migration/out-migration ratios employed earlier in our analysis of NHS migration in 1991-92. Table 6 sets out these ratios for the broad age groups and region types. The southern metropolitan profile (i.e. Greater London) shows dramatic swings from one age cluster to the next, and particularly low migration ratios after retirement. The non-metropolitan regions have ratios well above one (e.g. 2.48 in East Anglia) indicating their attraction to older migrants

Table 6: Migration coefficients for broad ages and macro-regions, 1990-91

Macro-region	Broad age group				
	1-15, 30-59	16-19	20-29	60-74	75+
Southern	0.99	1.11	1.05	1.00	1.04
Metropolitan	0.43	1.46	0.99	0.19	0.26
Non-metropolitan	1.17	1.05	1.07	1.37	1.37
Northern	1.04	0.89	0.95	1.01	0.95
Metropolitan	0.85	0.88	0.88	0.65	0.62
Non-metropolitan	1.21	0.90	1.02	1.38	1.31

4.3 The spatial pattern of net migration

The overall gains and losses of migrants for a region are made up of complex fields of net in-migration and out-migration flows. Only one region, Grampian, has a field consisting only of net gains. Space precludes presentation of the large number of in-, out- and net migration fields that are present in the NUTS 2 migration system, but is useful to attempt a summary of their key features. All three types of migration exhibit rapid distance decay. The largest net gains and losses (as well as inflows and outflows) are to nearby, usually contiguous, regions, as shown in Section 2. The only exceptions are the large long distance migration streams from Greater London to southern non-metropolitan regions outside the South East.

Based on analysis of the 34 GB net migration fields, we propose a sevenfold classification of regions in terms of the extent and spatial structure of those fields. The classification is mapped in Figure 14 and summary statistics are provided in Table 7, including the net migration rate and account of the number of gaining and losing net migrant streams within Great Britain. The regions within each grouping are placed in ascending order of the net migration rate, which ranges from a loss of 7.6 per thousand for Greater London to a gain of 8.0 per thousand for the Highlands and Islands.

A Large metropolitan regions

Each of these regions loses migrants to two thirds or more of the NUTS 2 regions of GB. Merseyside gains only from Essex and the West Midlands only from Merseyside and Essex. The other northern metropolitan regions largely gain from other metropolitan regions (e.g. Greater London) and from Essex and Kent. Only Dumfries and Galloway-Strathclyde departs from this pattern, attracting small surpluses from such areas as East Anglia or Dorset-Somerset, probably to the more attractive rural areas in the region rather than to the Central Clydeside conurbation.

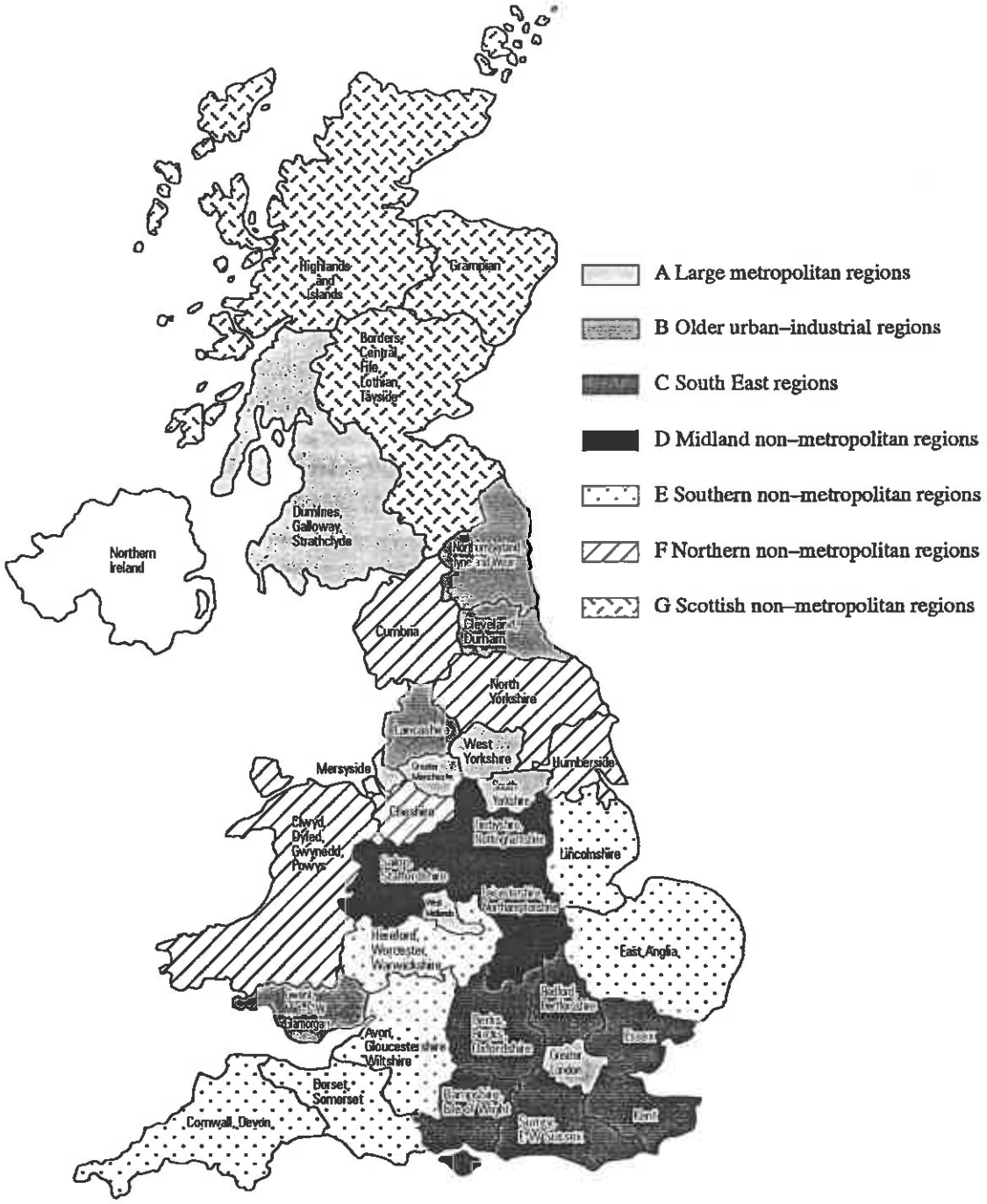

Figure 14: Interaction pattern groupings, 1990-91

Table 7: Grouping of NUTS 2 regions by interaction pattern, 1990-91

	Grouping	Net migration rate (/1000Pop)	Net flows Gains	Losses
A	LARGE METROPOLITAN REGIONS			
	Greater London	-7.56	3	30
	West Midlands	-3.90	2	31
	Merseyside	-3.02	1	32
	Greater Manchester	-1.98	6	27
	West Yorkshire	-1.84	7	26
	South Yorkshire	-1.68	9	24
	Dumfries & Galloway, Strathclyde	-1.12	11	22
B	OLDER URBAN-INDUSTRIAL REGIONS			
	Cleveland, Durham	-0.26	14	19
	Gwent, Mid-, South-, West-Glamorgan	-0.19	12	21
	Tyne & Wear, Northumberland	0.05	14	19
	Lancashire	0.51	9	24
C	SOUTH EAST REGIONS			
	Kent	-0.08	4	29
	Bedfordshire, Hertfordshire	0.09	10	23
	Essex	0.55	3	30
	Berkshire, Buckinghamshire, Oxford	1.95	14	19
	Hampshire, Isle of Wight	2.86	15	18
	Surrey, East-West Sussex	3.71	13	20
D	MIDLAND NON-METROPOLITAN REGIONS			
	Leicestershire, Northamptonshire	0.46	16	17
	Derbyshire, Nottinghamshire	0.97	19	14
	Shropshire, Staffordshire	1.73	15	18
E	SOUTHERN NON-METROPOLITAN REGIONS			
	Avon, Gloucester, Wiltshire	3.83	23	10
	Cornwall, Devon	4.71	26	8
	Hereford & Worcester, Warwickshire	5.21	22	11
	East Anglia	5.75	27	6
	Dorset, Somerset	6.51	23	10
	Lincolnshire	6.91	29	4
F	NORTHERN NON-METROPOLITAN REGIONS			
	Humberside	1.43	20	13
	Cheshire	2.36	21	12
	Cumbria	2.60	21	12
	Clwyd, Dyfed, Gwynedd, Powys	3.09	19	14
	North Yorkshire	5.20	27	6
G	SCOTTISH NON-METROPOLITAN REGIONS			
	Borders, Central, Fife, Lothian, Tayside	1.88	23	10
	Grampian	7.67	33	0
	Highlands & Islands	7.96	30	3

Source: 1991 Census Special Migration Statistics. Crown Copyright. ESRC/JISC Purchase

B Older urban-industrial regions

Four of the NUTS 2 regions can be characterised as containing smaller cities and towns with long industrial histories. A majority of the net migrant exchanges of these regions are negative (Table 5) but more of them are positive than in group A. These regions gain from some of the group A regions and also from regions in the South East (group C) but lose to the other groups of regions. Their overall net migration rates are close to zero.

C South East regions

These regions form a concentric ring around Greater London and experience very large net inflows from the capital, from some of the large metropolitan regions and older urban-industrial regions and from some of the other South East regions. Berkshire-Buckinghamshire-Oxfordshire gains from the other South East regions, for example, but then experiences net losses to most non-metropolitan regions in other parts of the country, and the number of losing exchanges exceeds the number of gaining. Within the remainder of the South East there is a distinction between the eastern and western regions. Essex, Kent and Bedfordshire-Hertfordshire experience a majority of net outflows, balanced only by the net gains from Greater London. The western three NUTS 2 regions experience bigger gains from Greater London and smaller losses to regions beyond. What these migration patterns reflect is the dynamic development of the rest of the South East through continued suburbanisation of both employment and residence, but the concentration of the most successful development to the west of London.

D Midland non-metropolitan regions

This cluster of regions contains a number of smaller cities (Leicester, Northampton, Derby, Nottingham, Stoke, Telford) and associated towns containing a wide spectrum of industrial and service industries. These regions gain most from the West Midlands metropolitan conurbation, but also from the other metropolitan regions, the older urban industrial regions and most of the South East. They experience about the same number of inflows as outflows and occupy a truly intermediate position in the country's migration system.

E Southern non-metropolitan regions

This grouping contains the NUTS 2 regions in England which showed themselves to be most attractive to migrants in the year before the 1991 Census. Note that Hereford and Worcester has been included in this grouping despite its location in the West Midlands standard region. Each of these regions has net in-migration rates of 3.8 per 1000 or above, ratios of in-migration to out-migration of 1.18 or above and two thirds of their interactions involving migrant gains. As we have seen earlier these gains come predominantly from the Greater London and West Midlands metropolitan regions (Figures 7-10) but also from the South East regions, the older urban-industrial regions and other large metropolitan regions. The migrant streams involve all the life course stages (Table 5) but the retirement and elderly ages contribute 21% to total net gains. The lack of opportunities for young people in some of these regions mean that losses are experienced at the leaver ages (16-19) in Hereford and Worcester-Warwickshire, for example, and in Cornwall-Devon in the joiner ages (20-29). These regions have proved attractive for new enterprise moving out of the more crowded South East and to a lesser extent to long distance commuters to London, as a result of the improvement of rail links (e.g. the East Coast main line electrification which has made it possible to commute from southern Lincolnshire towns to Central London).

F *Northern non-metropolitan regions*

These regions serve as the most important destinations of outflows from the large metropolitan regions in northern England, and from the older urban-industrial regions. They experience net in-migration and migration ratios are above one though the rates are lower than for their southern cousins. In-migration results again from a mixture of better employment growth than the metropolitan areas, of the growth of commuting and of migration at retirement. North Yorkshire, for example, plays an important role in nurturing new companies, in providing homes for people who work in the Leeds-Bradford conurbation and on providing attractive urban (Harrogate, Ripon, Northallerton), rural (the Dales, the North York Moors) and coastal (Scarborough-Bridlington) environments for retirees. North Wales plays a similar role for Merseyside, Greater Manchester and the West Midlands. Improved road communications (such as the A55 North Wales coastal route or York southern bypass) make these linkages possible.

G Scottish non-metropolitan regions

These regions play roles in Scotland analogous to their England counterparts, attracting migrants from Central Clydeside and other West Central Scotland towns and cities. The two northern most regions, however, play a wider role, attracting migrants from the whole of the UK. Only three of the 66 migrant streams between the Grampian and Highlands and Islands regions and other NUTS 2 regions show a net outflow, and one of these is a loss from Highlands and Islands to Grampian region. Jones (1992) demonstrates for the 1980s the importance of place-specific oil related developments in creating these flows. Workers from West Central Scotland and other English regions have moved to provide the labour for the North Sea oil industry, both in construction and in servicing activities. Aberdeen in the Grampian region and the Shetlands Isles in the Highlands and Island regions are the centres of oil industry activity. Retirement migration (Table 5) contributes only 11% to the gains in these two regions and extended daily commuting is not an important generator of net in-migrants.

5 CONCLUSIONS

This chapter has described the principal features characterising the migration flows between the important policy-related NUTS level 2 regions used by the European Commission in the allocation of regional development funds. The time focus has been twofold: the nine years from mid-1983 to mid-1992 for which a time series of movement data is available and the individual years 1990-91 and 1991-92, the latest for which Census data and Register data were available respectively.

The principal points to emerge from this analysis are as follows. Some are reaffirmations of earlier findings and some offer fresh insight:

1. The migration system is still dominated by flows to and from Greater London. Internal migration continues to empty the UK's capital of population, leaving room for its replacement through immigration.

2. The South East as a whole has taken on some of these London characteristics. The regions within the South East continue to gain massively from the capital but are themselves losing migrants to non-metropolitan regions further out.

3. Non-metropolitan regions throughout the UK gain through internal migration, in large measure from the metropolitan regions. Although this has been a longstanding pattern (though probably more subdued in early 1990s than in the previous decade), it still governs the UK migration system. What is perhaps surprising is the long distance attraction exerted by the two northern Scottish regions which gain migrants from virtually everywhere in the UK. Scotland has continued to experience the net internal migration gain that first appeared in 1989, which was then regarded as simply an end feature of the late 1980s economic upturn and something that was unlikely to persist in harsher economic conditions which have occurred in the 1990s.

4. Stages in the life course have long been regarded as influential in determining migration intensities and in explaining the complex variation of migration by age. It has also been observed that the general age profile can vary considerably with region of origin and destination and with origin-destination pair. What is perhaps new is the realisation that this reflects different patterns of destination selection at the various life course stages and that at least five of these patterns need to be recognised: family/labour force origination (ages 1-15, 30-59) leaving home migration (ages 16-19), starting a career migration (20-29), retirement migration (60-74) and elderly migration (75 and over).

5. The most dramatically different of these patterns is that associated with the 16-19 age group when individuals leave home to form new households and increasingly to enter higher education. The participation of this age group in education rather than work has increased dramatically over the past 15 years. Neither of the data sources used in this study adequately capture the migration behaviour of this group, but, if we are to develop a capability for projecting migration into the future by means other than simply assuming constancy in migration rates, then further research using new data sources (1991 Census Small Area Statistics Table 100 and the statistics of the University and Colleges Admission System) must be carried out.

Although opinion on European integration remains divided in the UK, there is little doubt that the European dimension has become important for those concerned with regional policy-making. The expansion of the Structural Funds has certainly helped focus attention in this respect and the European Commission's periodic reports and strategic planning documents have begun to be taken seriously. The analysis reported in this paper represents one of the first attempts to explore the characteristics of migration occurring at the EU NUTS 2 scale. Further work has been undertaken recently (Rees, 1995) using the NHSCR time series data to 1992 to examine the time variance of out-migration and in-migration, to explore the linkages between migration and the key indicators of regional development, and to suggest migration scenarios for population projection modelling. Data will soon be available to monitor migration trends in the UK for this system of interest throughout the first half of the 1990s.

Acknowledgements
The migration data described here are produced by the OPCS from the National Health Service Central Register and the 1991 Census of Population. Both sets of data are Crown Copyright. The work has been partly funded by a grant (A507 26 5019) under the ESRC/JISC 1991 Census of Population Programme. The authors are grateful to the Graphics Unit in the School of Geography, University of Leeds for producing the figures.

References

Boden P. (1989) *The analysis of internal migration in the United Kingdom using Census and National Health Service Central Register data.* Unpublished PhD thesis, School of Geography, University of Leeds, Leeds.

Boden, P., Stillwell and Rees, P.H. (1992) How good are the NHSCR data? Chapter 2 in Stillwell, J.C.H., Rees, P.H. and Boden, P. (eds) *Migration Processes and Patterns: Volume 2: Population Redistribution in the United Kingdom.* Belhaven Press, London, pp 13-27.

Capron, D. and Corner, I. (1992) Subnational population and household projections by Central Government, in *OPCS Occasional Paper 38*, BSPS Conference Papers 1990 Population projections: trends, methods and uses, HMSO, London, pp 55-63.

Champion, A.G. (1994) Population deconcentration trends in the 1980s and their policy implications, Paper presented to the British-Swedish-Dutch Conference on 'Population Planning and Policies', Laxon, Sweden (15-18 September).

Devis, T. and Mills, I. (1986) A comparison of migration data from the National Health Service Central Register and the 1981 Census. *OPCS Occasional Paper 35*, OPCS, London.

Duke-Williams, O. and Rees, P.H. (1993) TIMMIG: A program for extracting migration time series tables, *Working Paper 93/13*, School of Geography, University of Leeds, Leeds.

Jones, H. (1992) Migration trends for Scotland: central losses and peripheral gains. Chapter 6 in Stillwell, J.C.H., Rees, P.H. and Boden P. (eds) *Migration Processes and Patterns: Volume 2: Population Redistribution in the United Kingdom.* Belhaven Press, London.

OPCS (1994) *1991 Census Migration Great Britain. Part 1 (100% tables).* Volume 2 of 2. HMSO, London.

Rees, P.H. (1995) Migration trends and scenarios in the United Kingdom for NUTS-2 regions, *Technical Report*, Netherlands Interdisciplinary Demographic Institute, The Hague.

Rees, P., Stillwell, J., and Boden, P., (1989), Migration trends and population projections for the elderly. Chapter 12 in Batey, P. and Congdon, P. (eds) *Developments in regional demography*. Belhaven, London. Pp 205-226.

Rees, P.H., Stillwell, J.C.H., Convey, A.L. and Kupiszewski, M. (1995) *Population Migration in the European Union*, Wiley, London (Forthcoming).

Rogers, A. and Castrol, L. (1981) *Model migration schedules*. Research Report RR-81-30, International Institute of Applied Systems Analysis, Laxenburg, Austria.

Ogilvy, A.A. (1979) Migration - the influence of economic change, *Futures*, 11, 5, 383-94.

Stillwell, J.C.H. (1994) Monitoring intercensal migration in the United Kingdom, *Environment and Planning A*, 26, 1711-1730.

Stillwell, J.C.H., Duke-Williams, O. and Rees, P.H. (1995) Time series migration in Britain: the context for 1991 Census analysis, *Papers in Regional Science*, 74, 4, 1-19.

Stillwell, J.C.H., Rees, P.H. and Boden, P. (eds) (1992) *Migration Processes and Patterns: Volume 2: Population Redistribution in the United Kingdom*, Belhaven Press, London.