MONITORING MIGRATION BETWEEN CENSUSES

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WORKING PAPER 92/17

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Paper presented at a UK/USA Seminar on
'Migration in Post-industrial Society'
at the University of Southern California
in Los Angeles, 3-4 August, 1992

Abstract

Whilst it is acknowledged that each individual's migration propensity is the outcome of a complex interacting mesh of conflicting and reinforcing motivations, it is also recognised that there are frequently data constraints which limit national migration research and analysis to an investigation of macro or aggregate flows of population redistribution occurring at various subnational spatial scales. This is certainly the case in the United Kingdom where micro data sets with which to monitor contemporary trends in migration behaviour are uncommon.

This paper is presented on the eve of the publication of the 1991 Census results and therefore draws on non-census data sources to provide a picture of how overall migration levels have risen and fallen during the course of the decade since 1981, how the composition of aggregate migration flows and the migration propensities of particular groups have altered and how the geographical patterns of net and gross migration taking place within selected systems of spatial units have also changed. These changes have taken place over the course of a decade which has seen widening socio-economic divisions between north and south and in which, according to the preliminary report of the 1991 Census (Office of Population Censuses and Surveys, 1991), significant population increases in non-metropolitan areas have occurred.

The paper aims to highlight the need for a system with which to monitor and analyse the changing volume, composition and spatial pattern of migration flows in the the United Kingdom.

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1 Introduction

The Census of Population is particularly important in the UK - where no population registration system exists - for it provides detailed and accurate information on the enumerated and usually resident populations of small areas. It also provides valuable data on change of usual residence and is the nation's primary source of migration data in the form of published tables and Small Area Statistics (SAS) as well as lesser-used Special Migration Statistics (SMS) and the Longitudinal Study (LS).

But censuses are only taken at the beginning of each decade and provide snapshots of population redistribution for discrete periods of time; they do not permit the continuous monitoring of migration over time. In this context, it is necessary to look for alternative sources of data that will enable migration, the most important and least predictable component of population change, to be monitored between census dates. The need for more effective monitoring of migration is becoming increasingly recognised as national agencies and local government authorities seek to improve their population and household estimates and the future projections upon which public sector planning for housing, social services, schools, etc., is based.

This paper argues that data from the National Health Service Central Register (NHSCR) should be used as the cornerstone of an information system for monitoring migration trends in the UK; and suggests that data from additional sources, such as the Labour Force Survey (LFS), should be used to provide further evidence of change for particular sub-groups of the population. The paper discusses several of the issues that have to be confronted in monitoring migration: how reliable is the data?; which spatial scales should be used to identify trends?; what measures should be used to illustrate migration patterns and trends?

Section 2 of the paper introduces various aspects of the NHSCR data series, considers the choice of spatial units that are available and explains the rationale and method of data verification. In Section 3, a variety of measures are used to identify and illustrate the changing patterns that have characterised internal migration in the UK in the 1980s. Section 4 briefly suggests that progress towards model-based explanations of migration trends remains relatively limited despite the availability of a wide range of modelling techniques. The final section concludes with some general recommendations for the construction of a migration information and modelling system (MIMS).

2 Data sources, spatial systems and data verification

2.1 Sources of migration data

There are a number of sources from which it is possible to extract data on the migration activity within Britain occurring in the years intervening between censuses. Conventionally, these sources are divided into registers and surveys (Nam et al., 1990). A recent review of migration data sources in the UK (Bulusu, 1991) has identified the variety of alternatives and exposed the shortcomings of the data sets involved. New sources of data, such as the results of the Gallup surveys reported by Halfacree and Johnson (1992), continue to emerge.

It is apparent that, from amongst the potential sources, the most important for the provision of information on a regular, continuous basis is the National Health Service Central Register (NHSCR), a register designed to help Family Practitioner Committees (FPCs) maintain up-to-date lists of NHS patients registered with a doctor and resident in their areas. The NHSCR for England and Wales at Southport, together with registers in Scotland and Northern Ireland, provide a comprehensive system to assist the administration of the NHS throughout the UK. Since 1990, the FPC areas in England and Wales have been renamed Family Health Service Authorities (FHSAs).

Over the past 20 years, the Census Offices have recognised the value of the patient re-registration data as an indicator of migration. During the period from 1975 to April 1984, OPCS extracted a 10% sample of moves from the Southport register and produced quarterly computer summaries of the transfers taking place during each previous 12 month period. Since April 1984, 100% counts of movements have been obtained. This computerised information has been used to prepare summaries of recorded movements taking place between the standard regions of England and Wales plus Scotland and Northern Ireland for quarterly publication in Population Trends and annual publication in Regional Trends.

Shortcomings associated with the NHSCR data have been well documented (Ogilvy, 1980; Devis, 1984; Devis and Mills, 1986; Boden et al., 1988; Bulusu, 1991). Deficiencies include the following: the data is classified by age and sex but by no other attribute; the spatial units to which the data applies are relatively large (metropolitan districts, shire counties and groups of London boroughs in England and Wales) and no data on intra-zonal movements are available; there are a variety of concerns about the reliability of the data in terms of the differing propensities of particular population sub-groups to register with a doctor in the first place or to re-register once a move has been made; there are questions about the 'official' assumption of a three month time lag between a move and a subsequent re-registration.

Despite these problems, data from the NHSCR has been used to examine changes taking place in the volume, composition and

spatial patterns of population redistribution by a number of researchers (including Ogilvy, 1979; Devis, 1984; Stillwell, 1985; Stillwell et al., 1990; Bulusu, 1989, 1990; Rosenbaum and Bailey, 1991). Furthermore, a major project based on the NHSCR data set was undertaken as part of the activities of a Limited Life Working Party on 'Migration in Britain' which was supported by the Institute of British Geographers (IBG), the Economic and Social Research Council (ESRC) and the Joseph Rowntree Memorial Trust. The findings of the research are reported in Champion and Stillwell (1991) and Stillwell et al. (1992).

The quarterly NHSCR data should therefore be regarded as the basic information component of a potential migration monitoring system. The OPCS hold the data in Primary Unit Data (PUD) files in which each re-registration is represented by two records: one as an in-move and one as an out-move. Each record consists of nine fields of coded information relating to origin FPC, destination FPC, sex, year of birth, type of move (within or between regions of England, Wales and Scotland), age, date of move (number of months elapsed between January 1970 and move), direction (in- or out-migration) and an a events field (containing a +1 for an in-migration and a -1 for an out-migration and used by OPCS to obtain signed net migration counts).

Each PUD file therefore contains around one million records of moves registered in the previous three months. Thus, assuming a three month lag, NHSCR data for the quarters ending 31 March, 30 June, 30 September and 31 December each year refer respectively to moves taking place in the previous three month period in each case. Migration data for the calendar year of 1990 is therefore be represented by PUD for the four quarters ending 30 June 1990, 30 September 1990, 31 December 1990 and 31 March 1991 respectively.

Administrative delays at the FHSAs and the NHSCR which have been partially responsible for the average lag of three months were effectively eliminated by the computerisation of the system which took place in 1989-90. Since computerisation, estimated dates of migration are derived from the date of acceptance of the new patient by the FHSA. This information was not previously available. An interval of one month is assumed between a patient moving residence and the date of acceptance by the FHSA. Commencing with the fourth quarter of 1990, the NHSCR quarterly data sets are adjusted for this lag. Data for this one quarter have also been produced using the former assumption. As a result of this changed basis on which migration dates are estimated, there is a discontinuity in the time series between data for the third and fourth quarters of 1990. OPCS also point out that, for administrative reasons, the NHSCR data for these two quarters of 1990, especially the flows between the constituent countries of the UK, may be imperfect.

In order to provide some indication of the relative importance of migration involving particular zones or age groups or gender groups, it is necessary also to assemble information on the

appropriate populations at risk of migration. OPCS produce mid-year population estimates which are suitable for use in migration rate calculations and these have been used in the analyses reported in Section 3.

Quarterly NHSCR migration data and mid-year population estimates can be obtained from the National Online Manpower Information System (NOMIS) at the University of Durham. The system is valuable insofar as it provides immediate access to the data and users can extract information they require for selected quarterly time periods and five year age groups, or aggregations of these time and age units. NOMIS also allows the user to generate data on flows between individual FHSAs or between individual FHSAs and 'target areas' defined as aggregates of FHSAs. However, NHSCR data from NOMIS has limitations: the time series commences in March 1984 and therefore does not cover the full intercensal period; no information is available on internal movements within Scotland and Northern Ireland; and apart from single year of age 15, the data is only available for five year age groups.

The NHSCR therefore provides the basic data ingredient of a system for monitoring migration over time. Unfortunately it provides no information on migration characteristics beyond age and gender. Other sources, such as household or individual sample surveys, have to be used to obtain information on occupational or motivational characteristics, for example. Probably the most well used source has been the LFS, a survey which provides a range of information about the economically active population of Great Britain (Employment Gazette, 1991). The LFS has been used quite extensively in recent migration research in the UK (see, for example, Owen, 1992; Owen and Green 1992; Green, 1992) to provide data on job-related migration. The fact that the LFS has been carried out anually since 1984 and from this year onwards will be conducted each quarter with the same sample size as the former annual survey, suggests that despite its shortcomings, it should be used for monitoring changes both in the character of labour mobility and in spatial patterns at the standard region scale.

2.2 Spatial units

The basic spatial units for which consistent NHSCR data are available are the 94 Family Health Service Authorities in England and Wales shown in Figure 1 which conform with shire counties, metropolitan districts and aggregations of London boroughs. Middlesex FHSA was split into 5 areas from April 1986 (Barnet; Brent and Harrow; Ealing, Hammersmith and Hounslow; Enfield and Haringey; and Hillingden) but the single unit has been retained for consistency with data prior to 1986.

It is essential to be able to aggregate data spatially so as to identify changes and summarise patterns occurring at alternative spatial scales. A number of systems of spatial units have been used with aggregations of this data which include:

(i) metropolitan counties, their region remainders and other

standard regions (Rees and Stillwell, 1984; Stillwell and Boden, 1986);

(ii) standard regions (Ogilvy, 1982; Bulusu, 1990; Rosenbaum and Bailey, 1991);

(iii) London, the rest of the South East, counties adjacent to the South East, the rest of the South and the West Midlands, and the rest of the UK (Champion and Congdon 1992);

(iv) Greater London, the rest of the South, the 'industrial heartland', and the 'periphery' (Champion et al., 1987; Stillwell et al., 1992);

(v) the North and the South (Stillwell et al., 1992);

and a research project on 'Migration and the European Community' is now underway at Leeds which will use FHSAs in the UK aggregated to EC Level II regions.

As well as these classifications of contiguous spatial units, the aggregation of national territory into metropolitan and non-metropolitan UK (Stillwell et. al, 1992) or categorisation on the basis of density as a proxy for the level of urbanisation, enable summary statistics to be generated, for example, on the phenomenon of counterurbanisation whose magnitude can be judged vis a vis North-South migration.

2.3 Data verification

It is evident from what has been said previously that the NHSCR data has limitations which necessitate an attempt to verify whether the data is sufficiently reliable to be used as an indicator of migration change. Several studies have been undertaken which compare NHSCR data with Census data for a comparable time period (Ogilvy, 1980; Devis and Mills, 1986; Boden et al., 1988). These studies have provided a much clearer understanding of the characteristics of the two data sources and of the features which distinguish the phenomena they measure. Essentially, there are three types of difference: conceptual, population coverage and operational measurement.

There are several approaches to migration measurement but a fundamental conceptual distinction can be drawn between the migrant, the unit the Census of Population counts, and the move or migration, the unit counted by the NHSCR. The Census 'transition' approach thus involves counting the number of person transitions between locations over a period of time (12 months prior to Census date) whereas the NHSCR 'movement' approach is a count of movement events. The most important implication of this difference is that multiple and return migrations are handled differently by the two sources. But there are additional population coverage differences: for example, the Census (until 1991) excludes students, the NHSCR includes this group; the recording of movements made by armed forces personnel and their dependents differs between the two sources; moves by prisoners

and long-term psychiatric patients are included in the Census but excluded from the NHSCR. The operational measurement factors to be considered relate to the problems of sampling, underenumeration and mis-reporting that affect the respective sources.

In a study comparing the Census and NHSCR counts for 1980-81, Boden et al. (1988) show that the NHSCR records significantly more moves than the Census. Table 1 sets out the migration statistics from the two sources assembled for 12-month periods differing by only a few days and using the same spatial definitions and age-time plan (see Boden et al., 1988, for a description of the age-time plan conversion procedures). The NHSCR data in the table contains re-registration records for which origin, destination, age and sex are known, together with estimated re-assignments of records with missing information. The ratios between Census and NHSCR flows increase as the spatial scale becomes more aggregate. At the FHSA scale within metropolitan and non-metropolitan areas, the NHSCR count exceeds the Census count by 18.5% whereas the NHSCR is more than double the Census count for moves between regions.

Table 1: Migration counts estimated for 1980-81 from the NHSCR and the Census

Migration between:	NHSCR moves	Census migrants	Difference	NHSCR/Census ratio
Standard regions	967	630	337	1.536
Metropolitan/non-metropolitan areas	1,289	882	408	1.462
Metropolitan/non-metropolitan areas within regions	322	252	59	1.279
FHSAs within metro-politan/non-metropolitan areas	525	443	57	1.185

Note: Migration figures are in 1000s, rounded.
Source: Boden et al. (1988).

Although level differences are clearly appreciable, statistical analysis indicates strong and significant relationships between Census and NHSCR data when rates of in-migration, out-migration and net migration are correlated for standard regions, metropolitan/non-metropolitan areas and FHSAs. Important differences do exist between the two data sets when data is disaggregated spatially and by age and gender: metropolitan area NHSCR/Census outflow ratios are relatively low whereas inflow ratios are relatively high; ratios values are highest for those aged 15-19 and 75+.

The results of this data verification exercise suggest that, although NHSCR data should be interpreted with due caution, it does represent a valuable means with which to monitor change. The forthcoming availability of the results of the 1991 Census will enable a further comparison with the NHSCR data to be undertaken although the discontinuity brought about by computerisation of the re-registration system in the 12 month period prior to the Census adds a yet another dimension of uncertainty. The 1991 Census results also provide an opportunity to assess the LFS, research which has not been undertaken since Ogilvy's comparison of data for the early 1970s (Ogilvy, 1980).

3 Monitoring change

The purpose of this section of the paper is to illustrate the changes that have taken place in UK internal migration in the 1980s and to demonstrate the type of outputs that are required from a monitoring system.

3.1 The level of migration

It is important to recognise that the exercise of monitoring migration requires a number of decisions to be made about the definition of the migration variable as well as the method of measuring change. At any spatial scale, it is helpful to determine in the first instance, the number of migrations taking place in the system. For example, we observe that between mid-year 1980 and mid-year 1990, there were 17.8 million patient transfers between FHSAs in England and Wales and from and to Scotland and Northern Ireland. This represents an average annual migration flow of 1.78 million, but, as Figure 2 shows, the propensity to migrate has fluctuated quite considerably over time from a low of 1.59 million in 1982-83 to a peak of 2.05 million in 1987-88. This growth of 28.5% was then followed by a fall of 16.4% in the last two years of the time series.

These annual fluctuations in migration propensity reflect the aggregation of the migration behaviour of individuals whose propensities vary by age, gender, marital status, position in life cycle, motivation, distance moved, occupation, education, social class, labour market position, housing market status and ethnicity.

3.2 Age and gender variations

The NHSCR data only gives information about variations in migration by age and gender. Figure 3 illustrates the familiar age-specific migration rate schedule for movements between FHSA areas in England and Wales and changes in age group propensities between the low and high points during the decade. The age groups are quinary and therefore it is not possible to establish precisely at which teen age the schedule turns upwards or at which ages the labour force and post-labour force peaks occur. However, the relative magnitude of movement of those aged 20-24 is such that the group represented 19% of total movement in 1981-

82 at a rate of just over 75 per thousand. The rate increased to 87.5 per thousand by 1987-88, with over 365 thousand moves taking place. Whilst the population at risk aged 20-24 increased by over 10% over this period, the corresponding population aged 15-19 fell by nearly 9%. As a result, the 15-19 age group was the only one to record a migration rate in 1987-88 that was marginally lower than the rate in the earlier twelve month period.

Changes taking place in the total numbers of each quinary age group and in the age range of 75 and over during the 1980s can be assessed using a time series index where 1980-81 data takes the value of 100 (Figure 4). For example, the index of migration (M) for mid-year 1985-86 in any one age group is calculated as:

$$[\ M(85\text{-}86)\ /\ M(80\text{-}81)\ ]\ *\ 100$$

The time series index maps out temporal fluctuations in age-specific migration and Figure 4 shows that, in absolute terms, the numbers of teenagers migrating in England and Wales declined during the 1980s whereas the declines in the child ages and in the adult age range from 20 to 34, which occurred at the beginning of the decade, were reversed by mid-decade and were followed by increases.

The most appreciable increases in the volume of migration involved those aged 35-44 and 75+. The volume of the elderly (75+) transfers increased by over 50% between 1982-83 and 1987-88, for example. In terms of gender, the 75+ age group is dominated by female migrants as the NHSCR data for 1988-89 demonstrates (Figure 5). Females also outnumber males substantially in the labour force ages 15-19, 20-24 and 25-29 as well as in the ages over 55 where the at risk populations of males are smaller. The profile of male:female ratios by age also shown in Figure 5 indicates little variation between the beginning and end of the decade.

3.3 Occupational characteristics

The age-specific migration rates discussed in the previous section draw attention to the importance of employment-related migration (the labour force component) within the matrix of aggregate migration flows. However, the migration propensities of job-related movers will also vary according to economic, household, occupational and other circumstances. The extent to which mobility rates vary by SOC major group is exemplified using data from four Labour Force Surveys (Figure 6). Managers and administrators, professionals, associate professional and technical, and personal and protective services are the occupations which exhibit the highest mobility rates with appreciable increases occurring between 1980-81 and 1983-84 in each case, followed by declines between 1983-84 and 1989-90. In contrast, craft and skilled manual, plant and machine operators, and 'other' occupations display lower mobility rates but have experienced small but consistent increases throughout the decade.

3.4 Spatial variations between macro regions

Whilst changes in the composition of migration streams are of interest to those concerned with the provision of particular services or facilities, fluctuations in the volume of migration to and from different parts of the country are of major importance in the estimation of usually resident populations. In this paper, the analysis is confined to two sets of spatial units: (a) the four macro regions of Greater London, the rest of the South, the industrial heartland, and the periphery; and (b) the 94 FHSA areas of England and Wales.

The total net losses from the North to the South which were a feature of the 1970s continued to increase in the first half of the 1980s, widening the 'migration gap' to over 60 thousand moves a year between 1984 and 1987 (Stillwell et al., 1992). In the period from mid-year 1986 to mid-year 1989, a dramatic turnaround took place to the extent that by the end of the period, the South had become a net loser of migrants to the North, whose industtrial heartland experienced net gains unprecedented in the last 30 years. In the following year, whilst the traditional balance of net loss from the North was reinstated and the industrial heartland reverted to losing migrants, the periphery registered a net gain of 9 thousand.

Figure 7 illustrates that the performance of Greater London as a net loser is mirrored in the net gains recorded by the rest of the South. Greater London's net losses increased steadily from 1982-83 to a peak in 1987-88 before dropping sharply in the last two years of the time series. The rise and fall in net loss is reflected by the fluctuation in net gain in the rest of the South. However, changes in the gross migration components of these balances (Figure 8) show some interesting features. It has been out-migration change that has been responsible for determining the net migration fluctuation in Greater london during the 1980s and the tempo of change is coincident with that of in-migration into the rest of the South. But out-migration from the rest of the South has been equally impressive from 1983-84 to 1988-89. The tempo of out-migration from both southern regions has been responsible for the rise in in-migration to the industrial heartland and the periphery of nearly 40% and 30% respectively of the in-migration volumes in 1980-81. Thus, in both regions of the North, in-migration has dominated out-migration since 1987-88 as the ripple effect from London and the South has spread out.

3.5 Spatial variations by FHSA area

The changes that have been monitored at the macro region scale conceal a variety of patterns that become evident with greater spatial disaggregation. Amongst the most important is the distinction between net losses sustained by most metropolitan districts and London FHSAs and the net gains experienced by many of the shire counties, as illustrated in Figure 9. Comparison of the average net balances for FHSAs for the two years at the start of the decade (1980-82) and at the end of the decade (1988-90)

indicates that whilst greater London boroughs have all become net losers, net balances for several provincial metropolitan districts have turned positive (Stillwell, 1990).

However, the most striking change between 1980-82 and 1988-90 (Figure 10) is in the pattern of net gains in non-metropolitan England and Wales. In 1980-81, gains were concentrated in the South East counties and to a lesser extent in adjacent counties in the South West and East Anglia. By the end of the decade, the pattern of gain had become far more dispersed with Devon, Lancashire and North Yorkshire registering the largest positive balances, with each of the counties of South Wales gaining migrants, and with Essex, Kent, Hertfordshire and Berkshire all losing migrants in net terms.

The in-migration and out-migration components of net migration, expressed in rate form, are presented in Figures 11-14 for the years of lowest and highest overall propensity to migrate. Comparison of the 1980-81 gross rates reveals a degree of similarity in the spatial patterns with Greater London and the South East counties generally having high rates of both in-migration and out-migration. By 1987-88, the highest out-migration rates remain concentrated in Greater london whereas the highest in-migration rates include Powys in Wales, Cornwall, Dorset and Somerset in the South West and Cambridgeshire in East Anglia, as well as several of the South East counties and most London FHSAs.

3.6 Spatial variations by FHSA area for selected ages

In this section, the spatial variation in net migration rates across FHSA areas is examined for four age groups selected from Figure 4: 15-19, 20-24, 40-44 and 75+.

One feature of the NHSCR data is that it contains student re-registrations at their higher education institutions. This factor is partially responsible for explaining the patterns of net migration for 15-19 year olds. The 1980-81 map (Figure 15) illustrates that FHSAs containing major universities and polytechnics who recruit their students from beyond their localities have positive net migration rates whereas the remaining FHSAs record losses. It is not surprising to observe a pattern at the end of the decade (Figure 16) which is similar in almost every respect to that in 1980-81 apart from in Greater London whose central boroughs appear less attractive.

The temporal stability which characterises the student age group is less evident for migrants in the other age groups. Figure 17 presents the net migration rates for the peak mobility age group, the 20-24 year olds. All but one of the Greater London FHSAs experienced sizeable net gains in 1980-81 as did several of the South East counties, including Bedfordshire, Buckinghamshire, West Sussex and Northamptonshire in the East Midlands. However, the primary provincial cities of Newcastle, Leeds, Sheffield, Manchester, Liverpool and Birmingham were all net losers. This is likely to be due in part to the exodus of students after

graduation. The pattern for 1988-89 (Figure 18) is one of greater concentration of higher net in-migration within Greater London and lower rates of net gain in the surrounding southern shire counties than in 1980-81.

Those aged 40-44 appear to make up a substantial quota of the counterurbanisation movers in England and Wales, leaving the metropolitan counties and heading for areas of lower density and less urbanisation. The contrasting distributions of net rates at the beginning (Figure 19) and end (Figure 20) of the decade show that several of the shire counties of the North had emerged with high rates of net gain during the decade and all the Welsh counties had become net importers of migrants in this age group by 1988-89. A more widely distributed pattern of net gains across non-metropolitan England and Wales in 1988-89 (Figure 22) than in 1980-81 (Figure 21) is also characteristic of the 75+ age migration rates , with only four shire counties showing net losses in the final year.

Secton 3 of the paper has used a number of different measures of migration to monitor change: total migration, net migration flows, net migration rates, gross migration rates, and time series indices. Series of maps have been used to facilitate the identification of trends. It is reasonable to conclude that in the construction of a computer-based migration information system, considerable thought should be given to providing the user with a menu of standard migration measures, including those used in this paper. But, in addition, a facility for users to define their own variables within the constraints of the data should be provided. Furthermore, a set of procedures for the systematic analysis of a time series of migration matrices should be available which might include, for example:

(a) a components of migration analysis (following Baydar, 1983) which separates aggregate migration flows between origins and destinations into four components: (i) a level component, (ii) a generation component, (iii) an attraction component, and (iv) a distribution component (see Stillwell et al., 1988, for an application at the metropolitan/non-metropolitan region scale in the UK); and

(b) a shift-share analysis (following Plane and Rogerson, 1989) which decomposes migration change into (i) a systemwide component, (ii) a proportional-shift component, and (iii) a differential-shift component (see Green, 1992, for an application at the standard region scale in the UK).

4 Explanation and modelling

Empirical investigation of time series migration data permits a range of insights into the measures which are used to assess stability and change. It exposes trends which require causal explanation and this is one part of rationale for the construction and use of migration models; the other part being concerned with the need to project and forecast migration in the

future. There has been considerable progress in recent years in the development of a variety of approaches for modelling migration at both macro and micro levels (Stillwell and Congdon, 1991). Yet despite the availability of more sophisticated techniques, there remains a requirement for more satisfactory explanations and models of the processes that are occurring which determine the patterns and trends that are identified by our monitoring activities.

How does one explain, for example, the changing migration propensity in the UK illustrated in Figure 2? The effects of changes in the economy on employment opportunities and unemployment levels may well have been influential. During the early 1980s, the British economy experienced very severe recession; migration levels were at their lowest ebb in 1981-82. As the country drew out of recession, led by London and the South East, unemployment growth weakened and was followed by decline, with migration levels rising quite rapidly. It is likely that renewed demands for labour perpetuated increased migration until the start of the current recession in 1989 when unemployment began to rise again and migration levels began to fall.

The relationship between conditions in the labour market and migration levels is assumed to be crucial in the hypothesis outlined above - but the explanation is complicated by the effect on migration of changes in the housing market. House prices boomed in the 1980s as Britain moved out of recession, as incomes rose and as the demand for houses increased. Financial institutions other than building societies entered the mortgage market and bolstered the volume of funds available for house purchase (Leyshon et al., 1992), resulting in a doubling of house prices between 1983 and 1989 in all regions of England and Wales except the North. The boom in house prices which occurred initially in the South was transmitted to the provinces, with migration being the mechanism through which large capital gains made on house sales in the South were used to fuel house price increases elsewhere. Prices began to fall in 1989 and trends in national house price change thus show a direct correlation with overall migration propensities. Rosenbaum and Bailey (1991) show that changes in migration correspond inversely with the mortgage interest rate.

Aggregate migration patterns therefore represent the summation of movement streams which result from complex interactions between changes in job and housing markets, some of which are reviewed by Forrest and Murie (1992). More spatial model-based research is required to link migration with specific explanatory variables and to earmark the key indicators of regional change appropriate for inclusion in a migration information system. Such an information system might contain facilities to calibrate certain types of model (e.g constrained spatial interaction models) or to output relevant data sets in formats suitable for standard modelling packages (e.g. GLIM, SPSS).

5 Conclusion

This paper has drawn attention to certain issues and questions which confront those seeking to identify and understand UK internal migration during the 1980s. It has demonstrated the character and extent of some of the changes that have taken place.

The paper calls for the development of a computer-based national migration information and modelling system (MIMS) which would be used by researchers and planners for the extraction, analysis and display of time series migration and related data. In summary, the system would have the following features:

* NHSCR data from the primary unit data files would be used as the main data base, requiring a management system to allow the extraction of information at a fine level of age disaggregation for FHSAs or for user-defined FHSA-based spatial units;

* populations at risk plus additional migration and socio-economic data would be incorporated into the data base;

* empirical analysis of the data would be facilitated through menu-driven options although some flexibility would be required to allow user-defined variables to be created;

* tabulation, graphics and mapping facilities would be required to present the contents of the information system in a variety of alternative output forms; and

* modelling analyses would be encouraged through either the provision of modelling procedures within the system or through the output of data in formats suitable for analysis in freestanding modelling packages.

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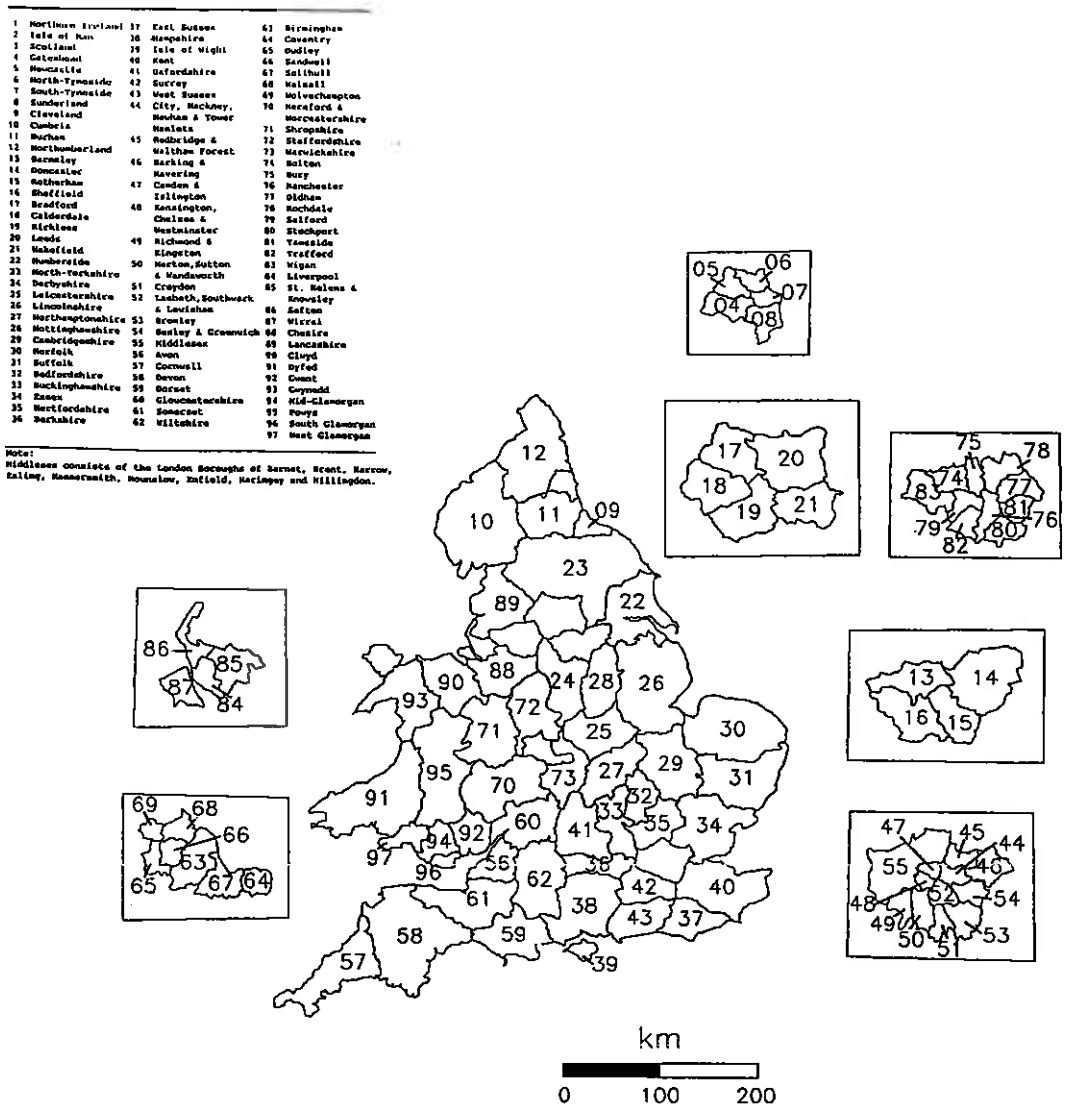


Figure 1: Family Health Service Authority areas in England and Wales

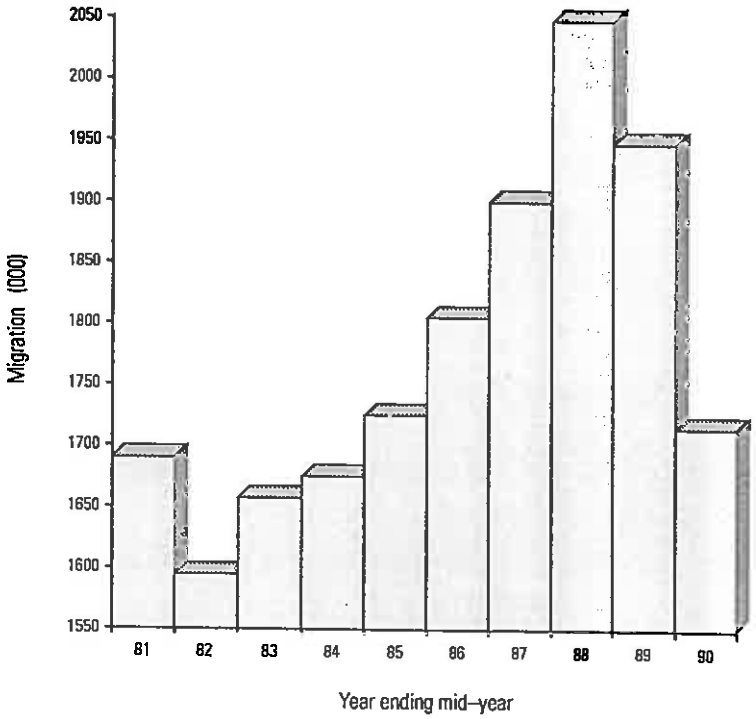


Figure 2: Total movements between FHSAs in England and Wales (and Scotland and Northern Ireland), 1980-81 to 1989-90

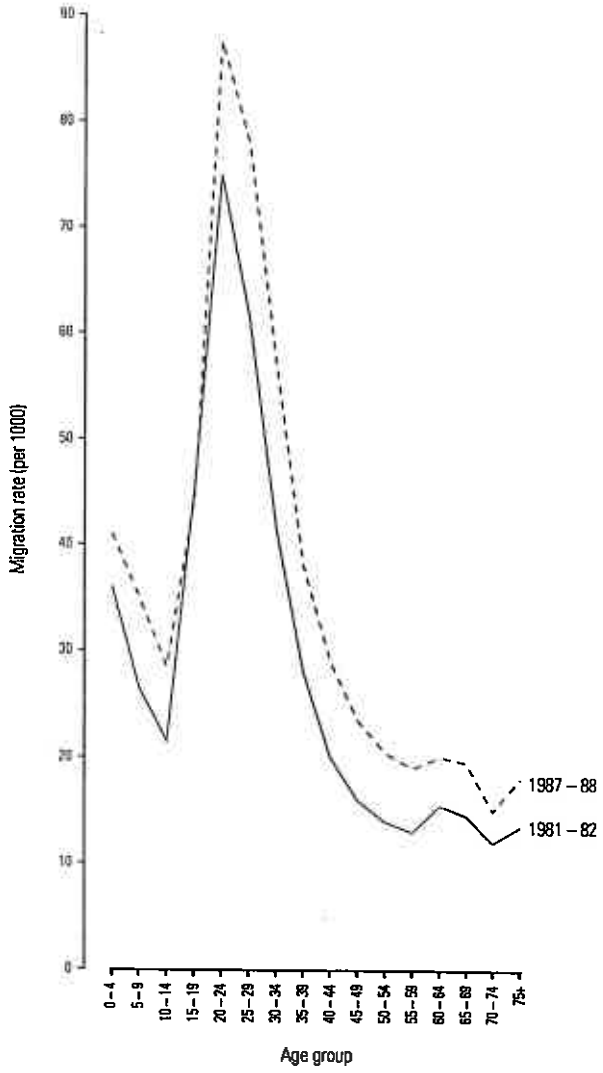


Figure 3: Rates of total movement between FHSAs in England and Wales, by age group, 1981-82 and 1987-88

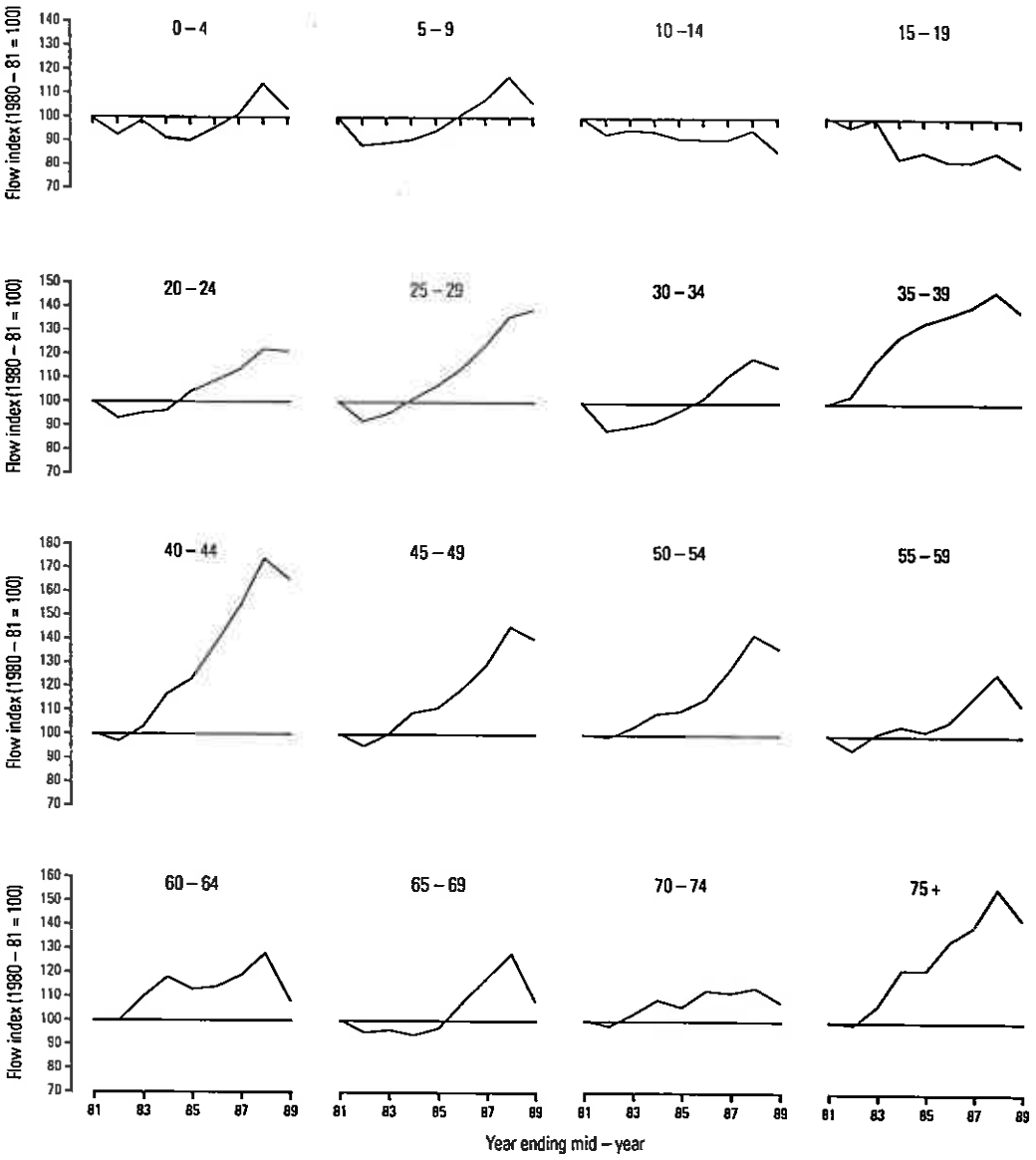


Figure 4: Age-specific migration between FHSas, time series indices, 1980-81 to 1988-89

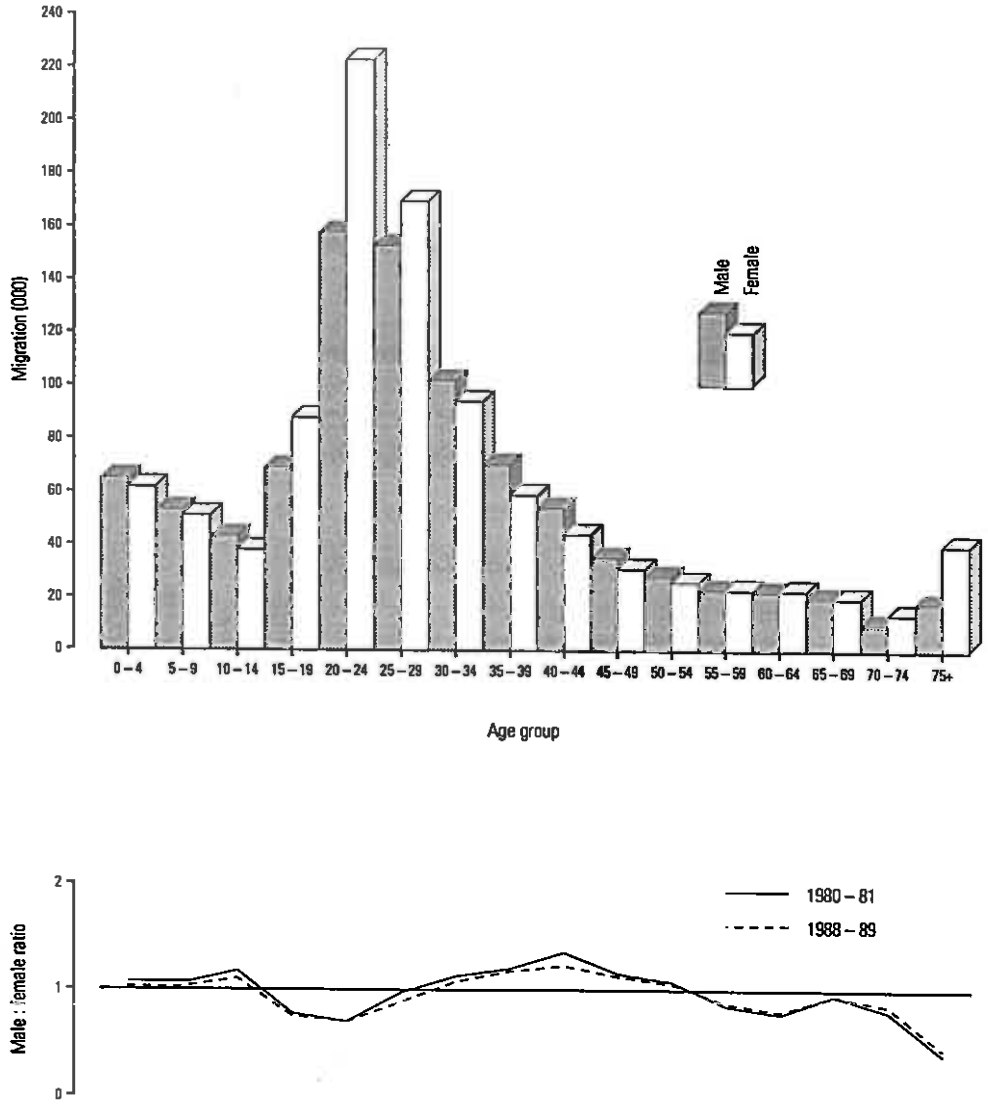
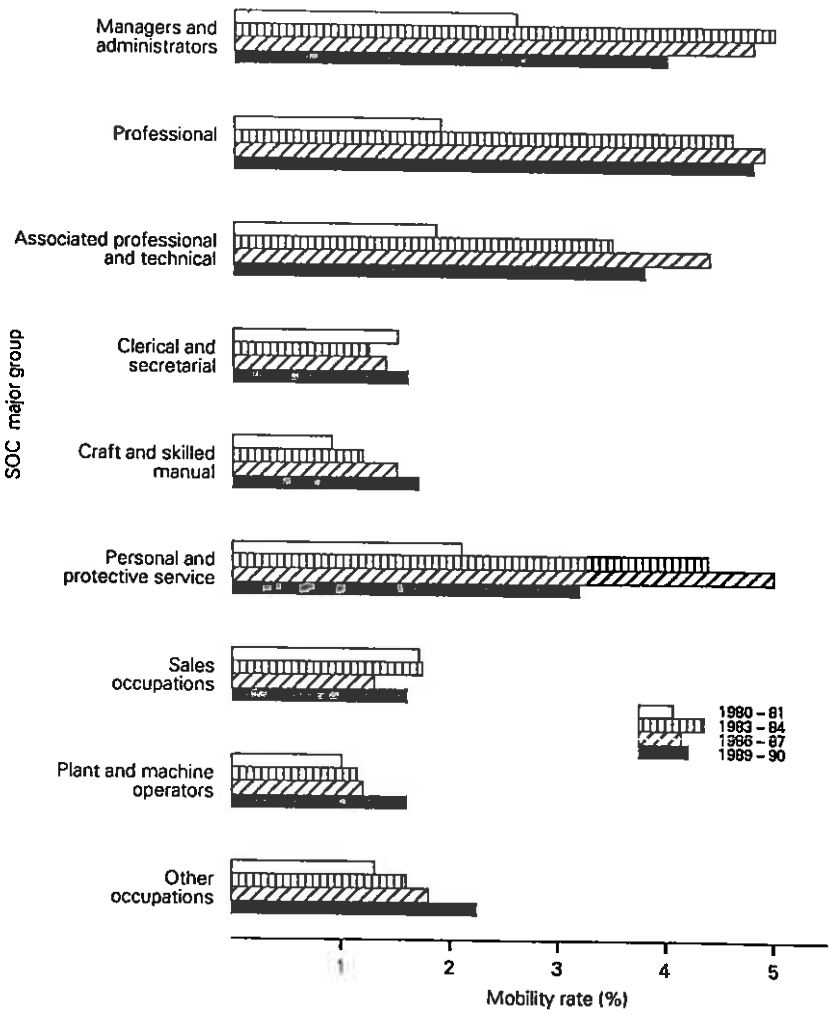


Figure 5: Migration between FHSAs by gender, 1988-89 and sex ratios, 1980-81 and 1988-89



Source: 1981, 1984, 1987 and 1990 Labour Force Surveys as quoted in Owen (1992) and Green (1992)

Figure 6: Mobility rates for SOC major groups, 1980-1990

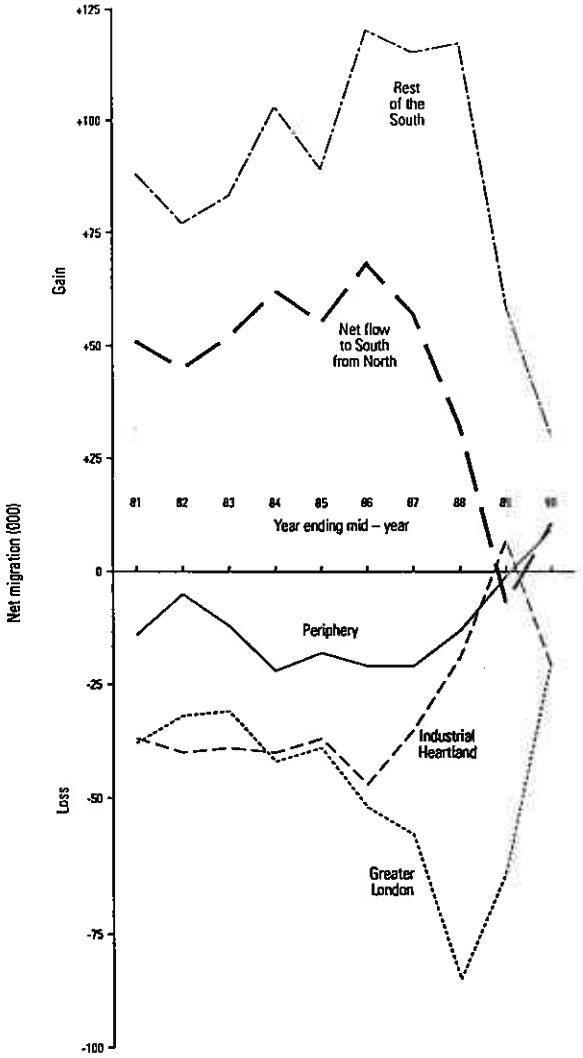


Figure 7: Net migration balances for macro regions, 1980-81 to 1989-90

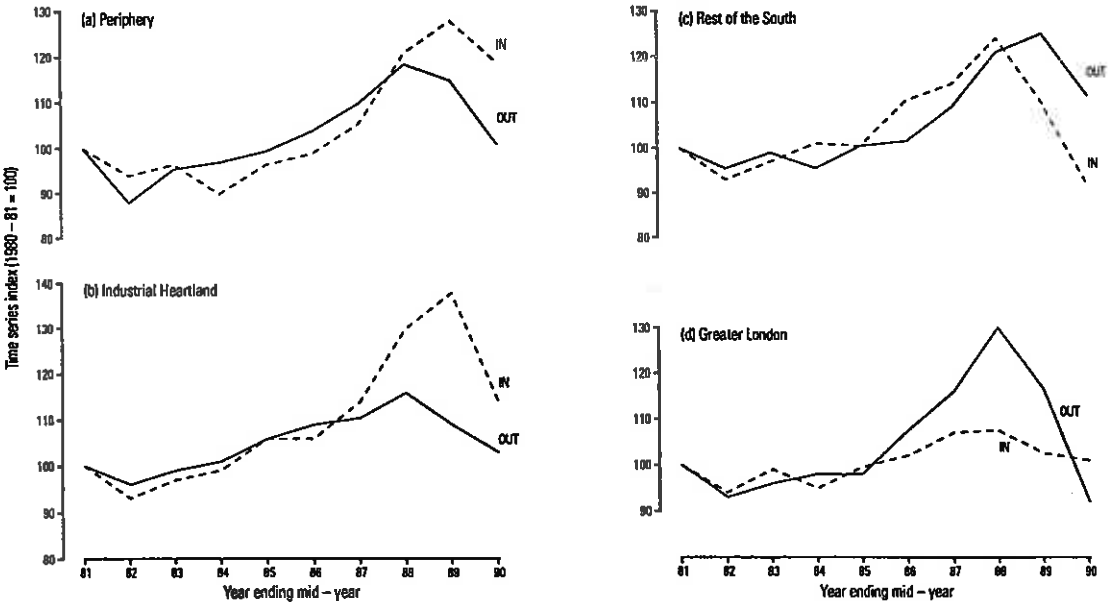


Figure 8: Time series indices of gross migration rates for macro regions, 1980-81 to 1989-90

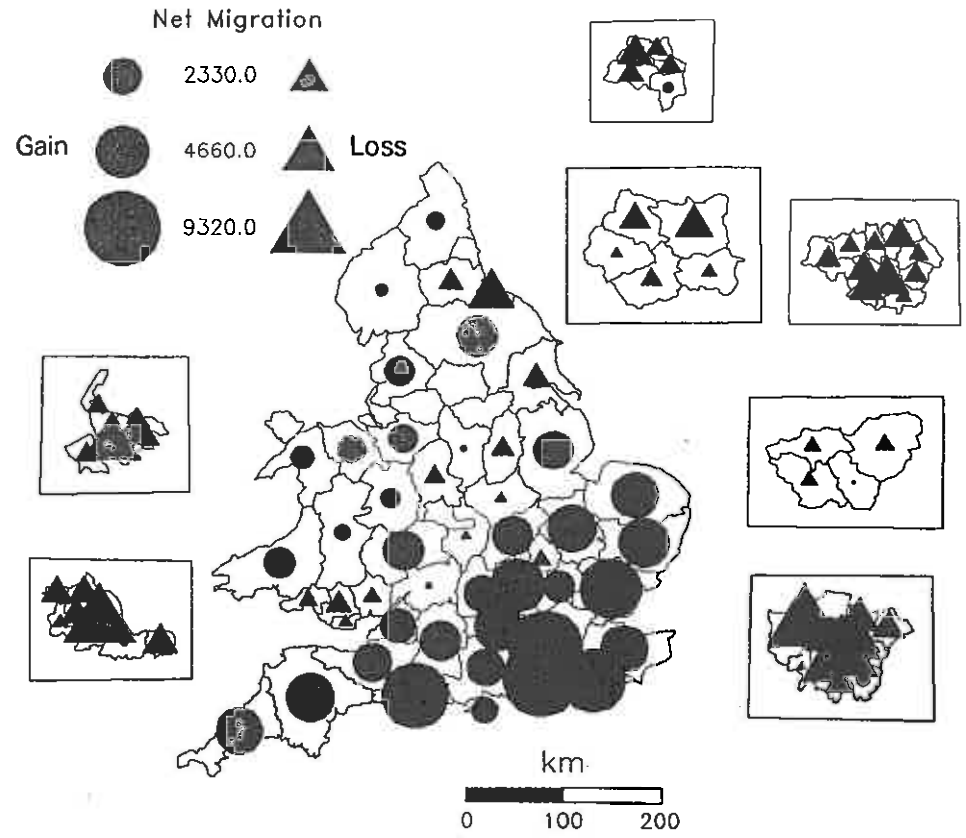


Figure 9: Average annual net migration balances of FHSAs, 1980-82

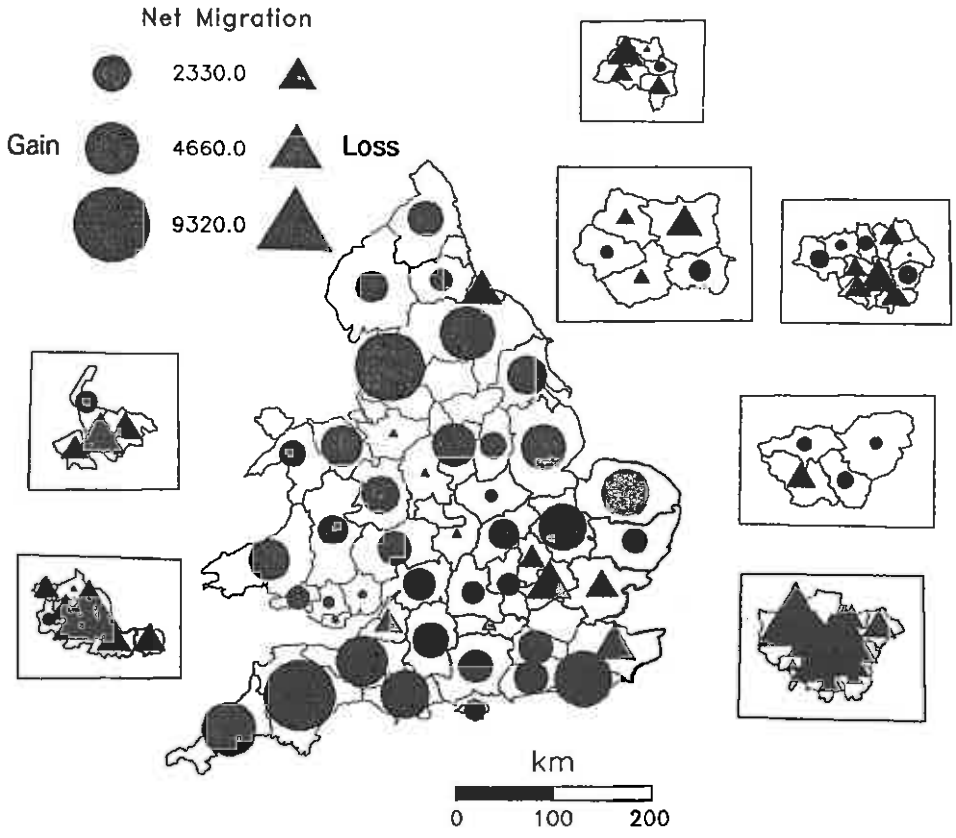


Figure 10: Average annual net migration balances of FHSAs, 1988-90

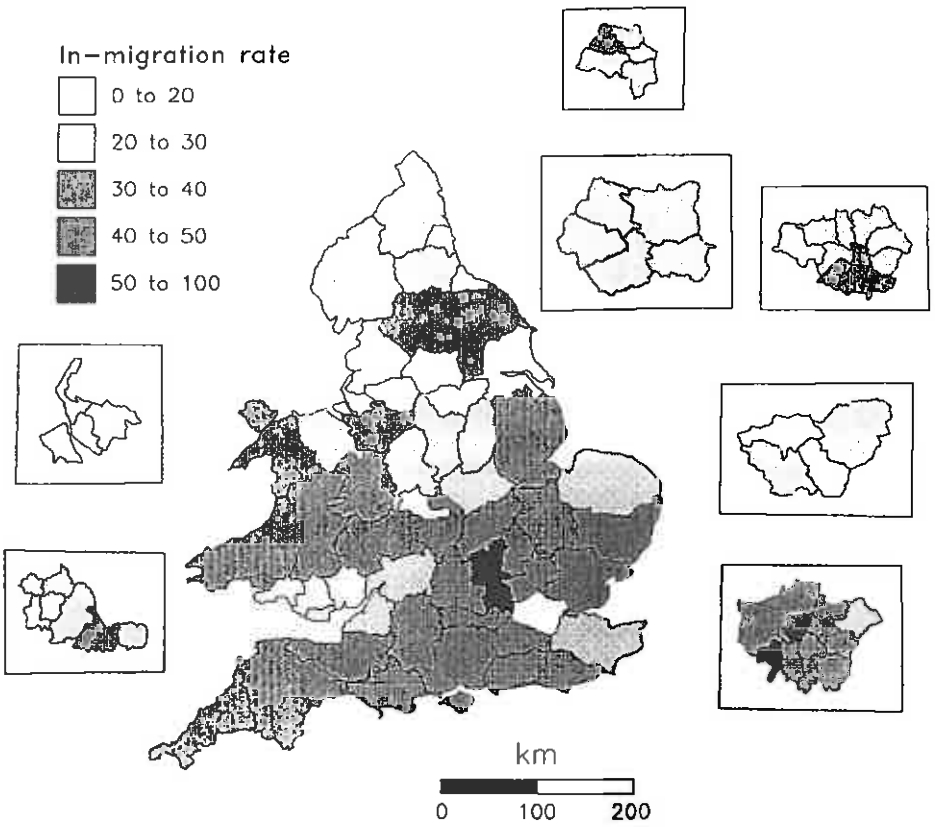


Figure 11: FHSA in-migration rates, 1981-82

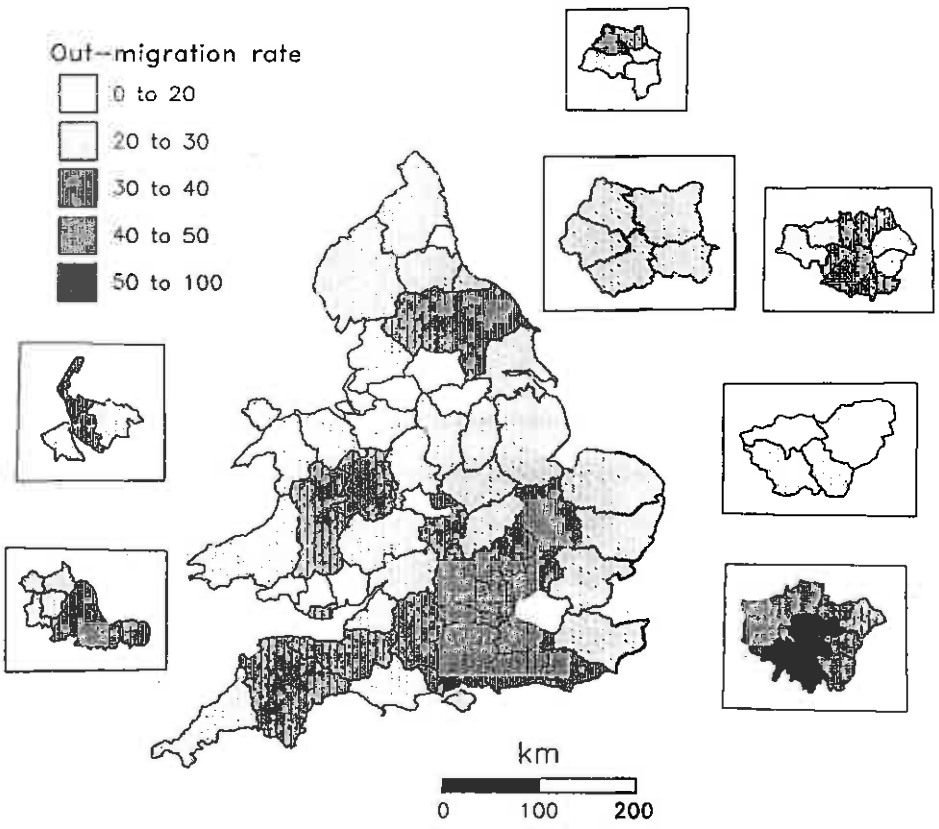


Figure 12: FHSA out-migration rates, 1981-82

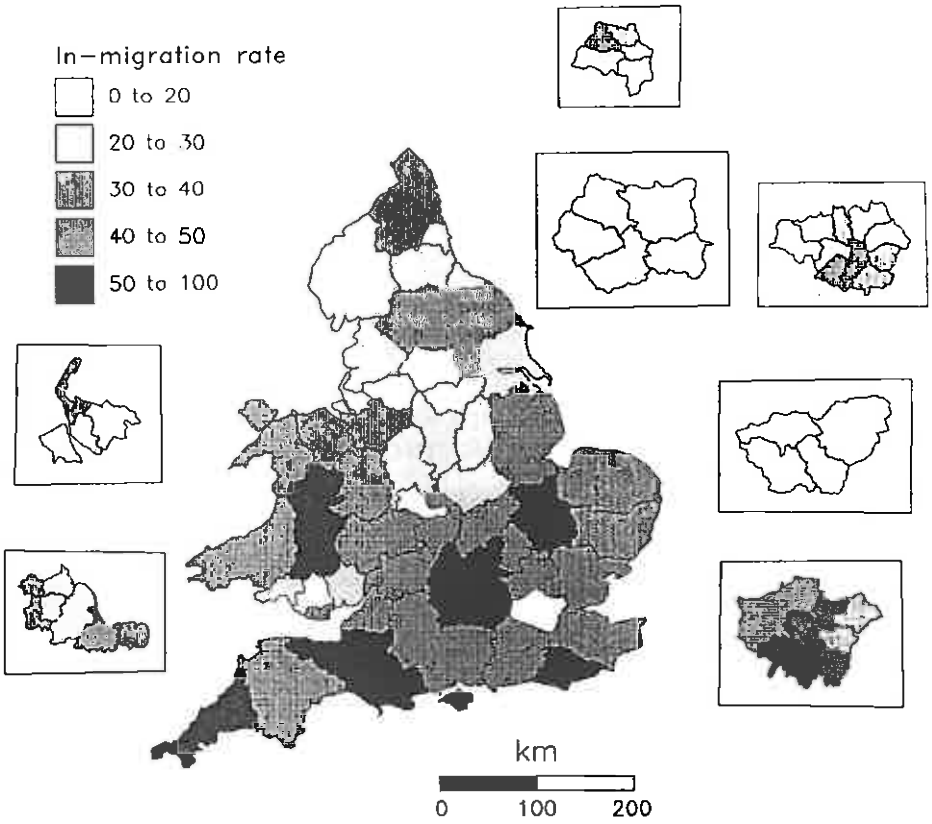


Figure 13: FHSA in-migration rates, 1987-88

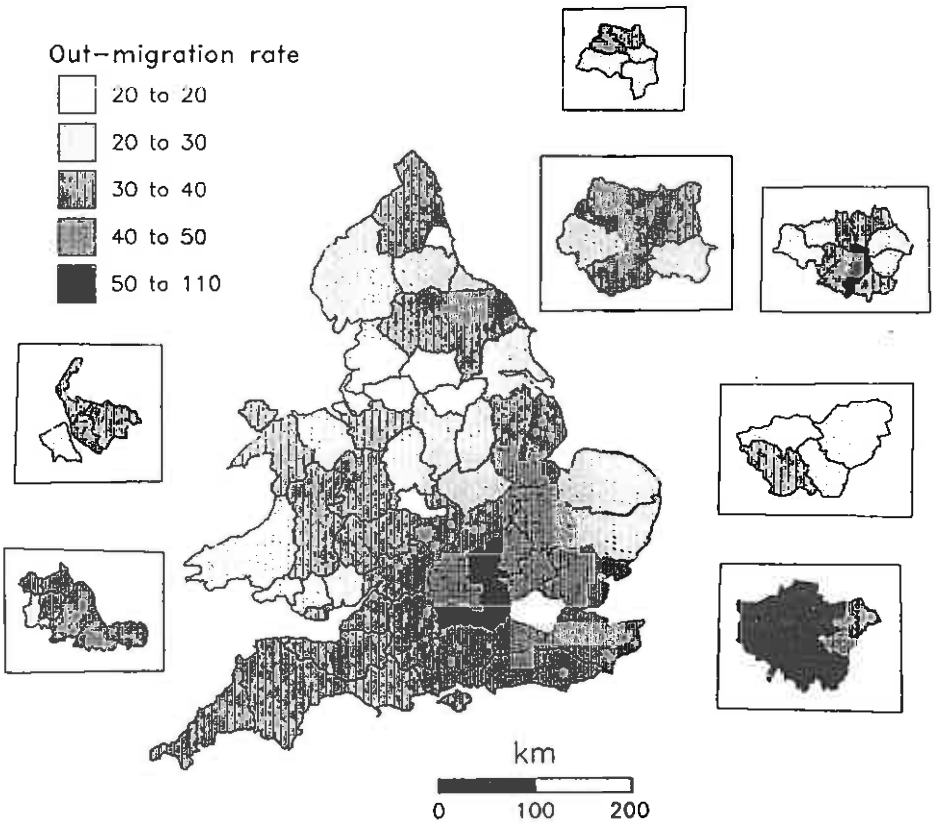


Figure 14: FHSA out-migration rates, 1987-88

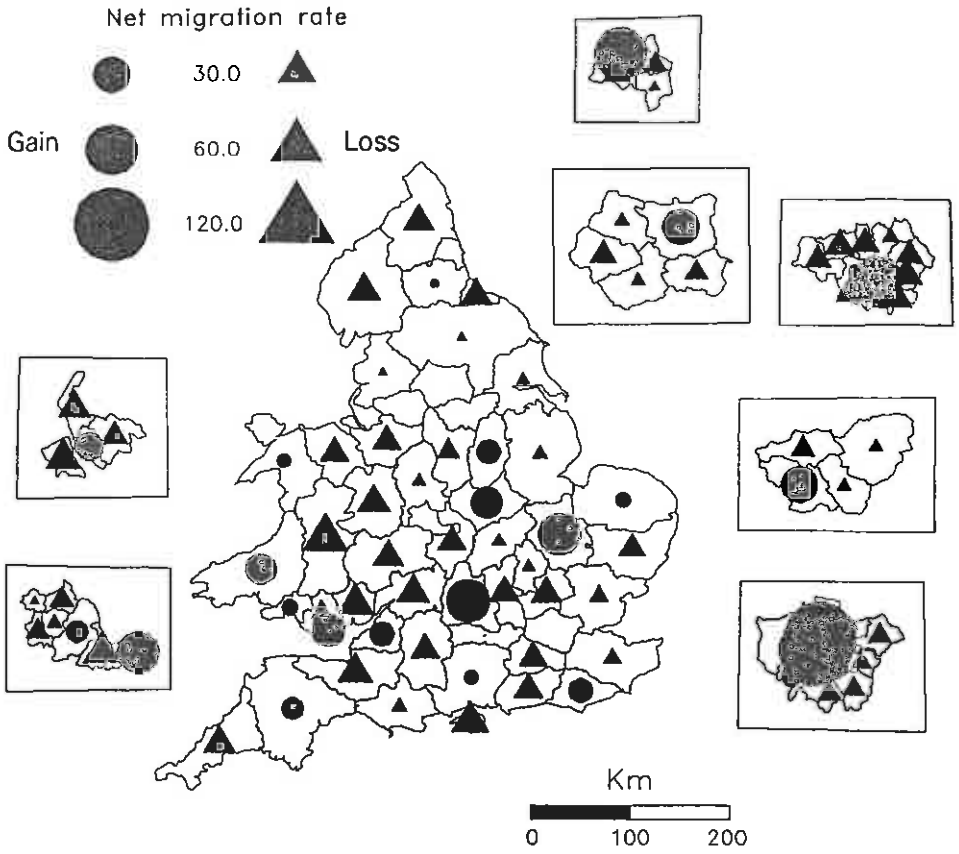


Figure 15: FHSA net migration rates for age group 15-19, 1980-81

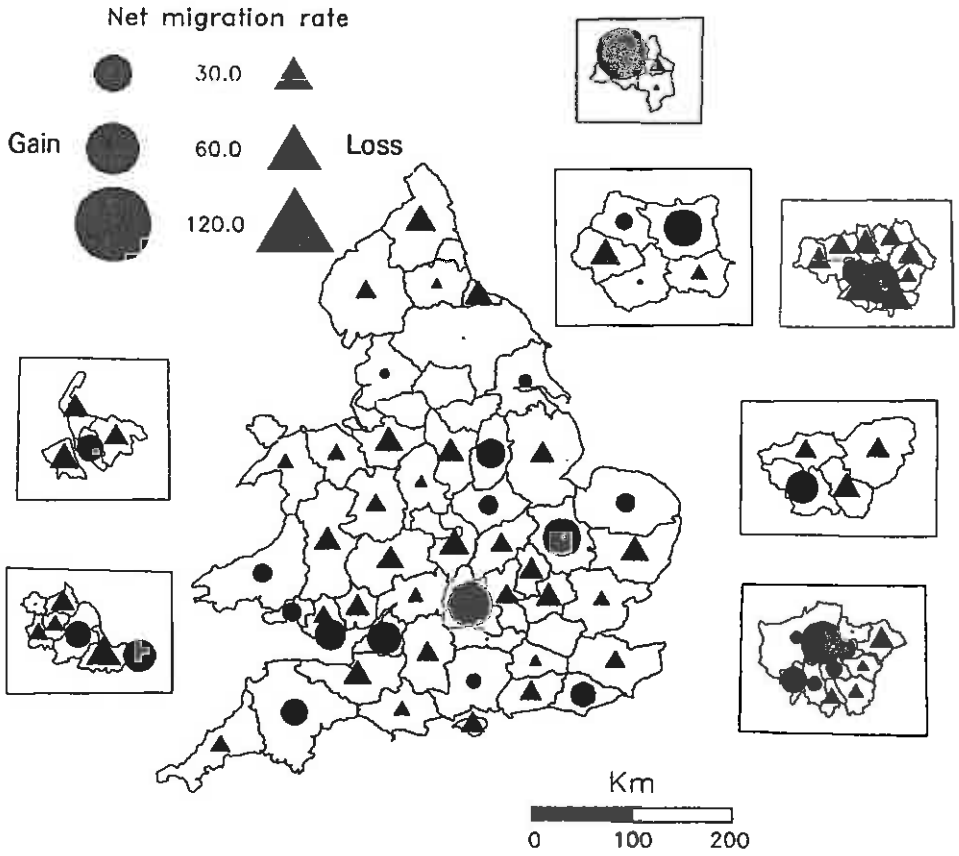


Figure 16: FHSA net migration rates for age group 15-19, 1988-89

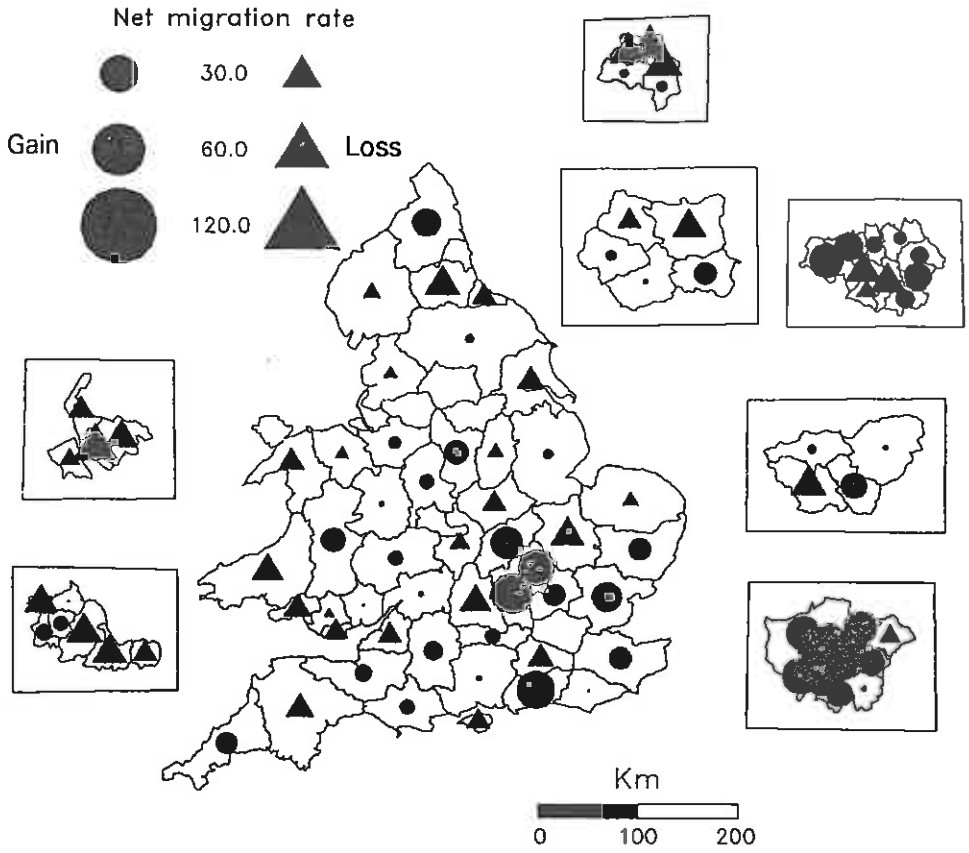


Figure 17: FHSA net migration rates for age group 20-24, 1980-81

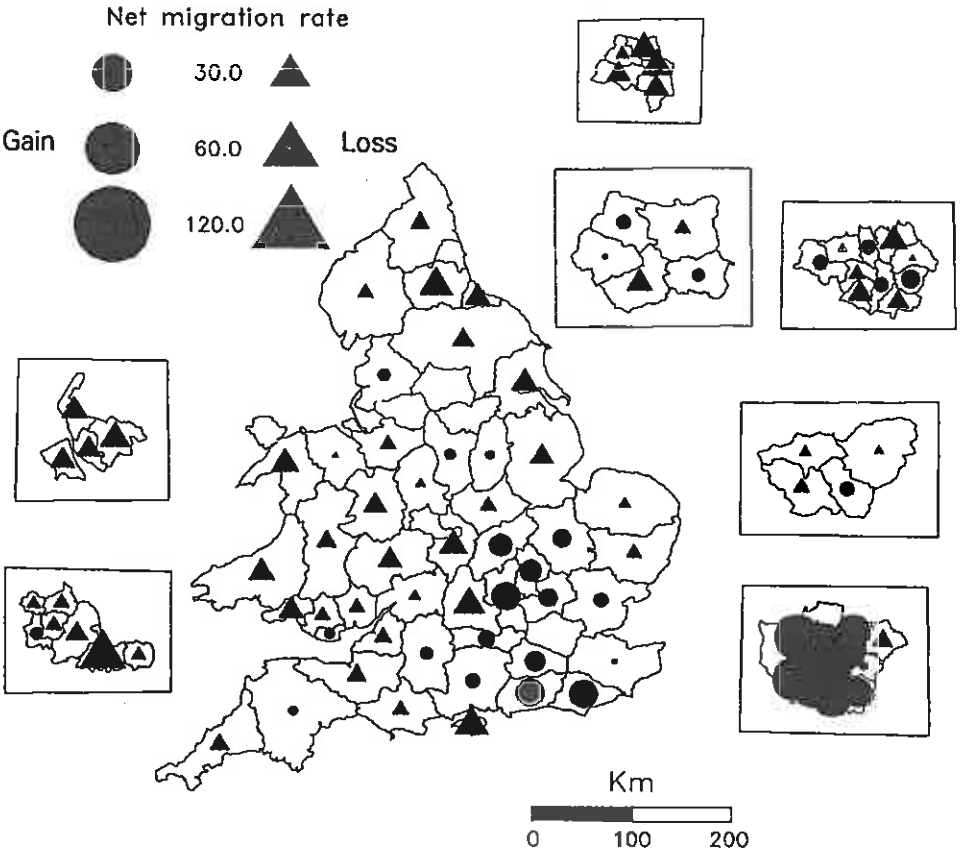


Figure 18: FHSA net migration rates for age group 20-24, 1988-89

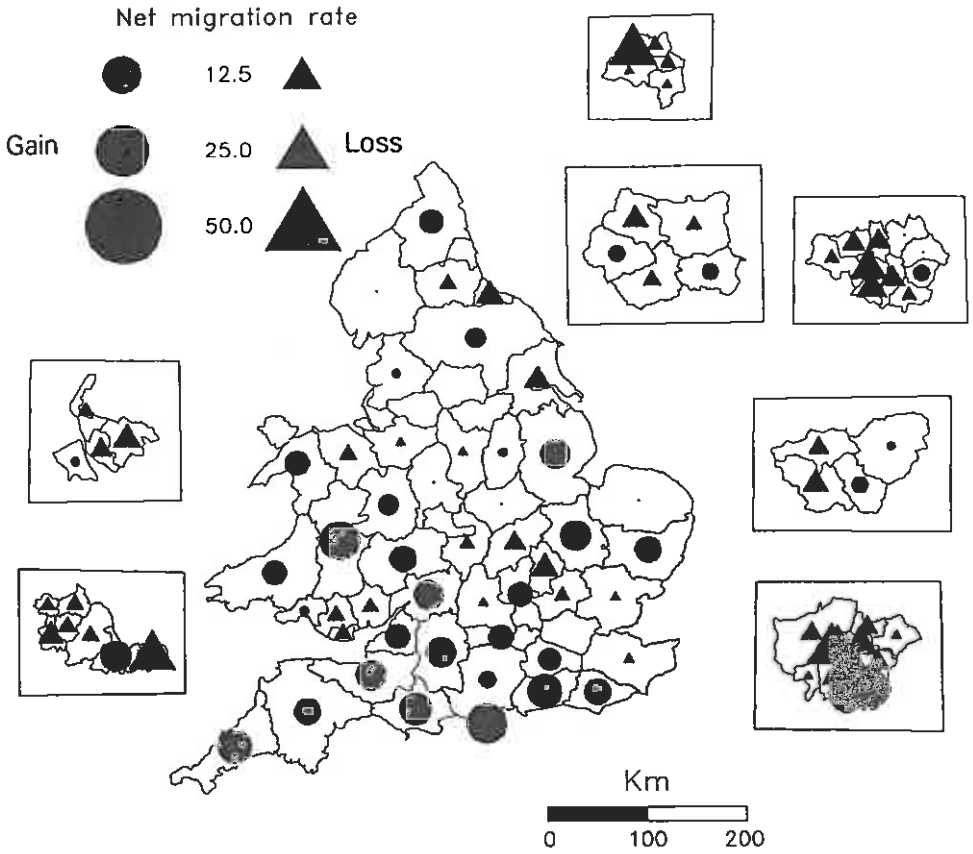


Figure 19: FHSA net migration rates for age group 40-44, 1980-81

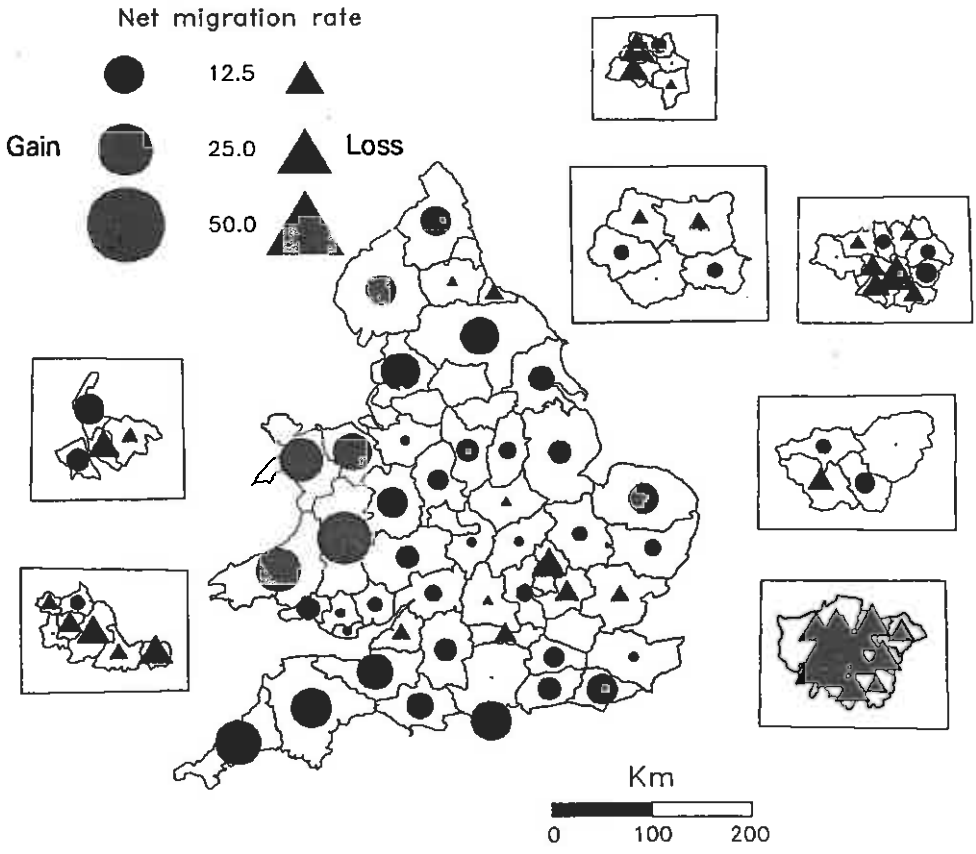


Figure 20: FHSA net migration rates for age group 40-44, 1988-89

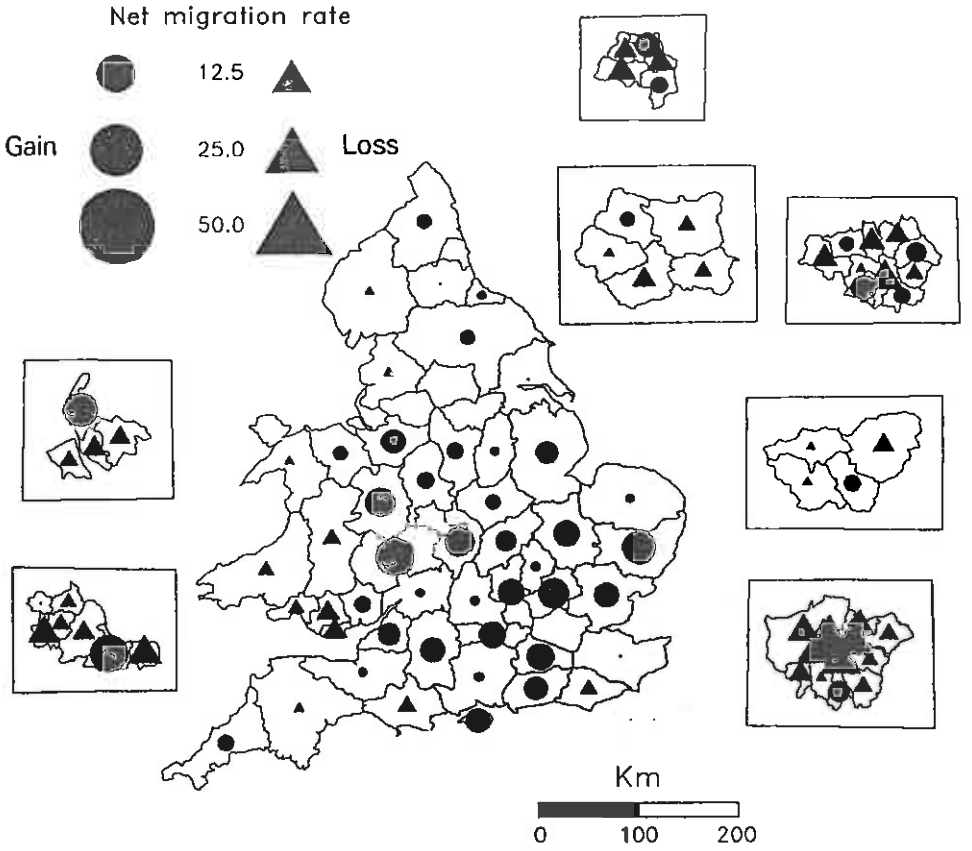


Figure 21: FHSA net migration rates for age group 75+, 1980-81

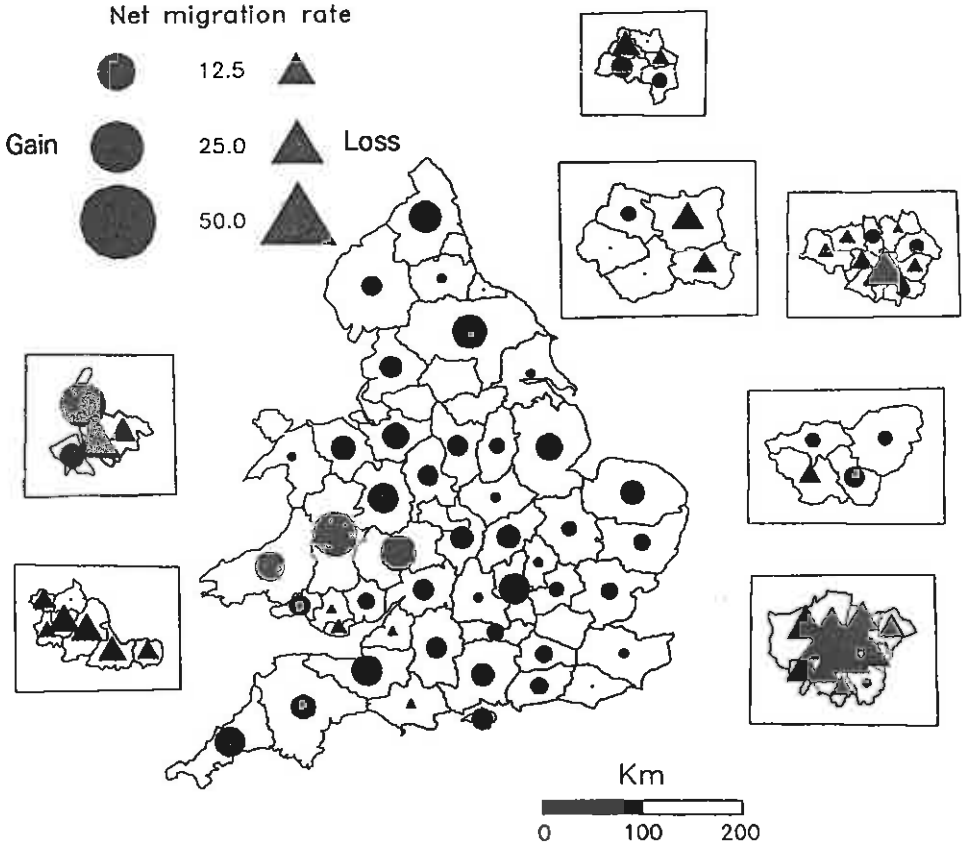


Figure 22: FHSA net migration rates for age group 75+, 1988-89