WORKING PAPER 543

GEOGRAPHICAL PATTERNS OF MIGRATION IN BRITAIN

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Paper presented at the Annual Conference of the Institute
of British Geographers, University of Sheffield,
January 2-5, 1991

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Acknowledgements

The authors are grateful to the Office of Population Censuses and Surveys for the provision of mid-year population estimates on floppy disk and NHSCR data in the form of either computer summaries or Primary Unit Data on magnetic tape. The costs incurred in purchasing NHSCR data have been partly covered by funds from the Limited Life Working Party on 'Migration in Britain' which is itself supported by the Institute of British Geographers, the Economic and Social Research Council and the Joseph Rowntree Memorial Trust.

Abstract

It is possible, using statistics of patient re-registrations produced by OPCS from the NHS Central Register, to track changes in population movement within Britain at the scale of metropolitan districts and shire counties (with which the boundaries of areas administered by Family Practitioner Committees largely coincide). We no longer have to wait up to ten years for the next census to be informed about population redistribution through migration.

This paper reviews changes that have occurred in population movement using a broad regional perspective (North versus South; Periphery versus Industrial Heartland versus Greater London versus the Rest of the South) and in terms of the metropolitan nature and population density of areas. What is abundantly clear is that the progress of the economy influences the overall level of migration and the rate of net loss from the North to the South, from metropolitan centres to region remainders and from high to low density areas.

The rates of net loss from the North to the South, for example, were highest in the 1983-87 period when the South was emerging rapidly from the slump of the early 1980s but when the recovery of the North was slower. In the 1987-89 period, overheating in the South's economy (house price inflation and cost of living increases) meant reductions in the net gain from the North. So much so that in 1988-89, the South suffered net losses to the North.

After slowing down during the recession years of the early 1980s, the pace of counterurbanisation (interpreted here as a net movement from metropolitan to non-metropolitan areas) has risen again to 1970s levels, although differences in the nature and intensity of the process are apparent in the north and south of the country.

The paper also contains a number of insights into changing migration activity at more disaggregate spatial scales during the 1980s and describes a classification of FPC areas based on mid-decade age-specific inmigration rates.

1. Introduction

Internal migration has become largely responsible for the sub-regional population changes occurring in Britain as the national rate of population growth has ground to a halt. Inevitably there are localities where differences in fertility, mortality or international migration have made significant contributions to population dynamics, but generally speaking, it is the internal migration component which is determining the changing geography of Britain's zero-growth population (Champion 1989).

This paper outlines the major trends in migration activity in Britain during the 1980s, drawing on a time series of National Health Service (NHS) patient re-registration statistics commencing in 1975-76. Studies of internal migration in the UK based on this type of data were initially undertaken in the 1950s (Newton and Jeffery, 1951; Rowntree, 1957), but most analysis to data has been focused on the 1970s and early 1980s (including Ogilvy, 1979; 1982, Devis, 1984; Stillwell, 1985; Stillwell et al., 1990, for example). The value of the NHS Central Register (NHSCR) has been recognised by the Office of Population Censuses and Surveys (OPCS) and the Department of the Environment (DOE) as a source of very useful information. In particular, the data is being used for updating census migration figures in the procedures for generating the net migration assumptions that are used in the subnational population projection model (reviewed in Boden et al. 1991).

The problems and limitations of the NHSCR data such as the omission of short distance moves where no re-registration takes place, or the undercounting of young adult males, are now well documented (Ogilvy, 1980; Devis and Mills, 1986; Bulusu, 1988, Boden, 1989). Doubts about the reliability of the data have stimulated comparative studies with 1981 Census data (Devis and Mills, 1986, Boden et al., 1987, 1988) and the conclusions from this work suggest that the data does have credibility as an indicator of inter-area population redistribution, although clearly its interpretation must be handled with due regard to the features that distinguish it from transition data.

The time series has been compiled from computer summaries of a 10% sample of re-registrations from 1975 to 1983 and from 100% Primary Unit Data (PUD) for subsequent years, made available on a quarter year basis by OPCS. A detailed explanation of the extraction of NHSCR data from magnetic tape at Leeds and the construction of the data files is available in Boden (1989).

The paper begins with an examination of the fluctuating trends in migration activity at the national level over the last three decades, based on both census and NHSCR information. Trends in the geographical redistribution of the population through migration are

described in sections 3 and 4, using a hierarchy of selected spatial frameworks which begin with the division of the country into two parts (North and South) and end with a much larger system of 97 zones (including the 94 Family Practitioner Committee (FPC) areas in England and Wales). At different scales, the analysis considers aggregate net migration exchanges, gross migration outflows or inflows, or origin-destination interactions. Some insights into age variation in the propensity to migrate are provided and in section 4, a classification is proposed which groups FPC areas on the basis of the characteristics of their inmigration rate profiles. The final section of the paper contains some concluding comments.

2. Variations in the national migration level

The propensity to migrate within Britain has fluctuated appreciably over the last thirty years. Transition data from the 1981 Census of Population indicates that nearly 8.5% of the population were migrants in the year preceding the census. This level of migration is lower than that occurring in the equivalent period prior to the census ten years previously, when 10.5% of the population changed address. At that time, the internal migration rate was well below comparable rates in the USA, Canada and Australia, and above rates in France, the Netherlands and Japan (Long and Boertlein, 1975). Census evidence shows substantial variation over time in the migration rates at all spatial scales. Total female migration between the British standard regions, for example, declined by 28% whereas male intra-district migration fell by 14% between 1970-71 and 1980-81. Overall, the level of internal migration activity in the country fell by 21.2% during the 1970s after having increased by 9% during the 1960s (Stillwell and Boden, 1986; 1989).

The gross migraproduction rate (gmr), which measures the number of migrations that a person makes over a lifetime if exposed to observed age-specific migration rates, provides a more refined measure of migration which avoids the age structure bias inherent in aggregate migration rates. The gmr computed on the basis of transitions in the year before the 1981 Census indicates that males and females both move around 6.5 times during a lifetime; four of these transitions occur over relatively short distances within local authority districts in Great Britain and the remaining moves are equally distributed between transitions between districts in the same county (or region in the case of Scotland), between counties in the same region, or between regions. The gmr in 1980-81 had declined from nearly 8 transitions per lifetime in 1970-71 (Rees and Stillwell, 1990). However, these census-based migration figures are likely underestimates since they do not allow for underenumeration, differences in populations at risk or multiple movements.

The NHSCR data allows a continuous time series of movements to be

assembled from mid-year 1975 to mid-year 1989 (Table 1). It is clear that the level of movement between FPC areas declined from 1.91 million in 1975-76 to a low of 1.59 million in 1981-82 before rising to 2.05 million in 1987-88. The time series indices plotted in Figure 1 illustrate the temporal fluctuations in movements between FPC areas and between regions. Linkage between the NHSCR time series indices and the census figures is achieved by relating values around a common year, 1980-81, where the index value for all data series is set to 100. The time series are most reliable and smoothest from 1983 onwards when annual figures from a 100% count of the NHSCR reregistrations became available.

There seems little doubt that the explanation for the reduced rate of migration activity in the 1970s is to be found in the effects of changes in the economy on employment, incomes and housing. Ogilvy (1979) has identified the turning point from General Household Survey data as taking place in 1973 and it can be argued that the oil crisis and heavy economic recession after 1973 had a dampening influence on internal migration in the United Kingdom, in a manner similar to that evident in the Netherlands (Scholten and van de Velde, 1989).

It was during the 1979-83 period that the British economy experienced its severest post-war recession with large increases in unemployment and widespread redundancy. The NHSCR data indicates that migration activity was at its lowest ebb in 1981-82. Since then, total migration has risen steadily up to 1987-88 when it reached a level of over 2 million before dropping back to around 1.95 million in 1988-89. Thus the 1980s was a decade in which the migration level increased by 28.5% between 1981-82 and 1987-88, a period which was also saw the increase in national unemployment decline annually to 1985-86 and be followed by increasing reductions in the unemployment level thereafter.

Migration rates exhibit considerable age variation, reflecting the different stages in the life cycle through which individuals pass and at which migration becomes a more or less probable event. The elements of the migration rate schedule which define its familiar shape, described schematically by Rogers and Castro (1981), are evident in the schedules of observed rates for inter-FPC area migration by single year of age (up to age 79) for 1980-81 and 1985-86 (Figure 2). The first part of each schedule represents the migration propensities of children, usually dependent on the moves undertaken by their parents. This part of the schedule therefore slopes downwards with a gradient slightly lower than that of the corresponding section of the adult curve. Migration rates in the parental ages are higher because they also contain non-family adults with higher propensities to move in the first place.

The child dependent component of the schedule ends at age 16 and is followed by a steeply rising migration rate which reflects the movement into new households by late adolescents and young adults in the process of entering the labour force or moving to institutions of higher

Table 1: Yearly movement totals and rates, 1975-89

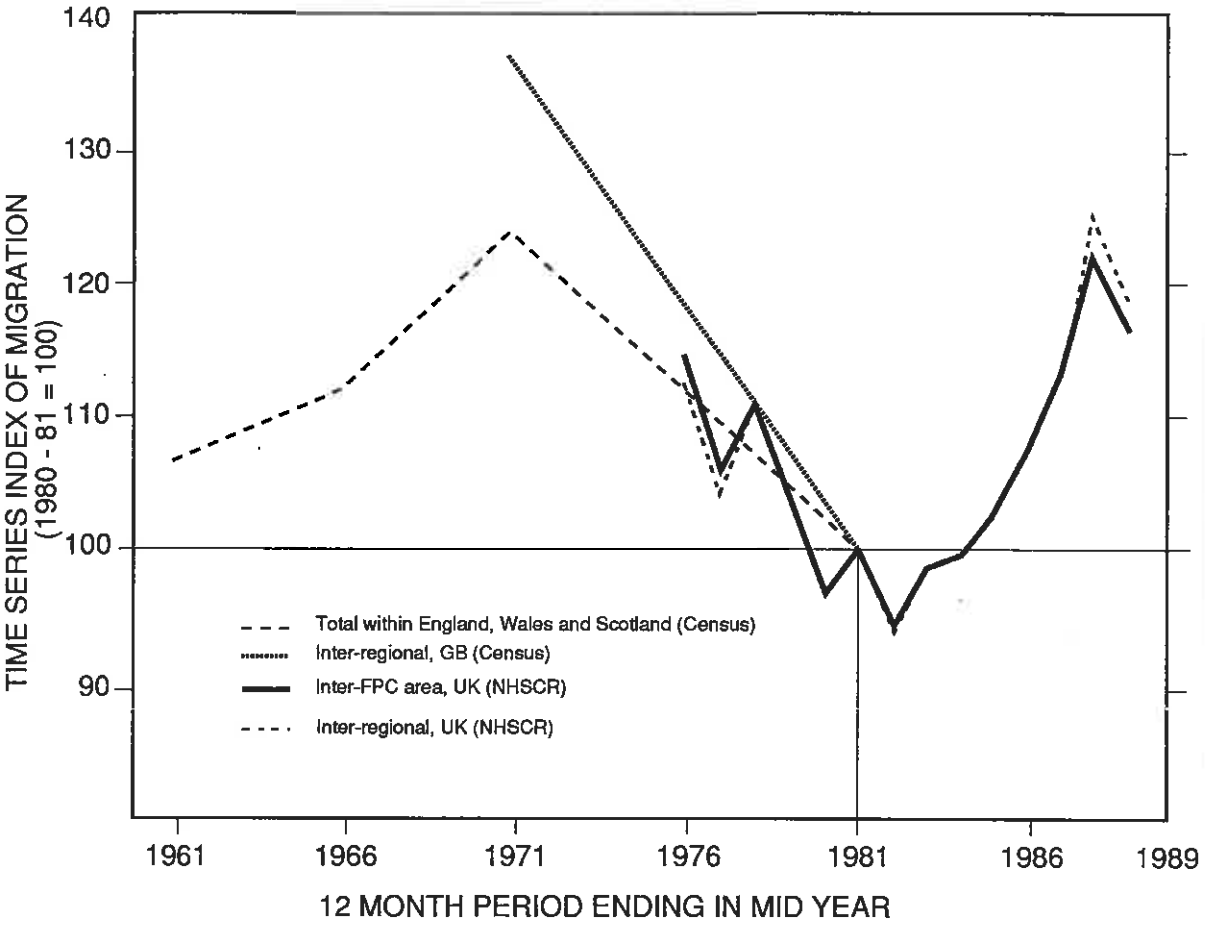
Period	Inter-FPC area Total (000)	Inter-FPC area Rate (/000)	Inter-region Total (000)	Inter-region Rate (/000)
1975-76	1914	34.4	1175	20.9
1976-77	1789	31.8	1088	19.4
1977-78	1879	33.4	1151	20.5
1978-79	1762	31.3	1091	19.4
1979-80	1633	29.0	1018	18.1
1980-81	1691	30.0	1048	18.6
1981-82	1595	28.3	984	17.5
1982-83	1658	29.4	1030	18.3
1983-84	1677	29.7	1038	18.4
1984-85	1725	30.5	1066	18.9
1985-86	1806	33.9	1124	21.1
1986-87	1900	37.9	1183	23.6
1987-88	2049	40.7	1295	25.7
1988-89	1949	38.7	1231	24.4

Notes: (i) The FPC area set includes 93 FPC areas in England and Wales, plus Northern Ireland, Isle of Man and Scotland as single units.

(ii) The region set includes Greater London, Rest of the South East, plus the remaining UK regions.

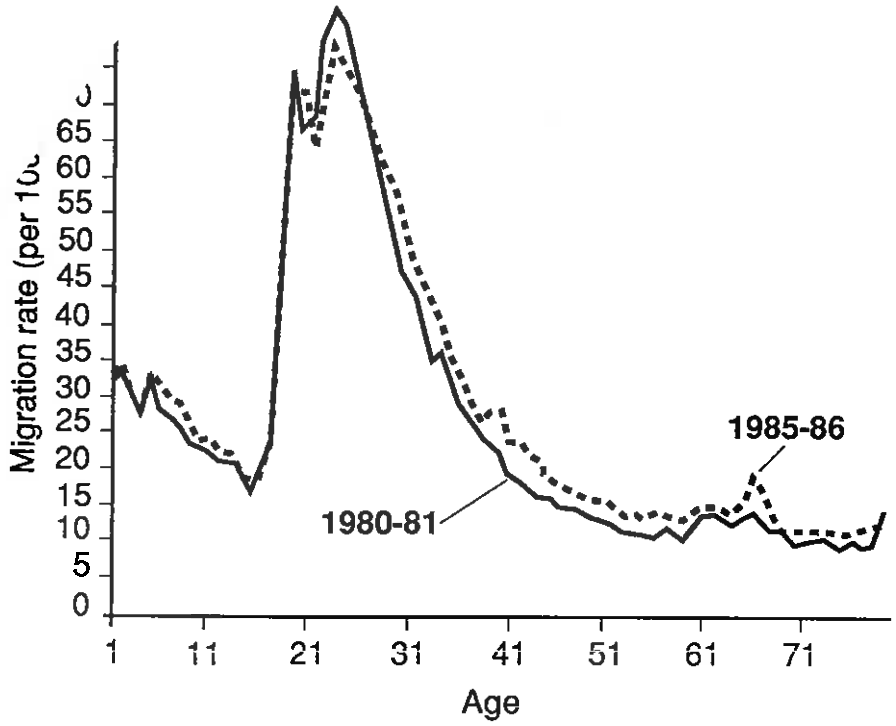
(iii) Rates computed using mid-year population estimates.

(iv) Source: Computer summaries and PUD supplied by OPCS.



Sources: (i) Census data from Stillwell and Boden (1986, Tables 1 and 2)
(ii) NHSCR data from Table 1
(iii) Adapted from Rees (1989)

Figure 1: The changing level of migration, 1960-89



Source: PUD (OPCS)

Figure 2: National migration rate schedules, 1980-81 and 1985-86

education. One idiosyncratic feature of each of the schedules depicted in Figure 2 is the kink in the upward curve of what Rogers et al. (1978) call the labour force component. This feature is likely to be associated with the fact that NHSCR data includes student transfers, with the result that a local peak in the migration rate schedule appears at age 19, followed by a drop for ages 20 and 21. A second peak at a higher level than the first reflects movements between jobs of those already in employment, boosted by moves of students away from higher education and into their first jobs. The NHSCR data for 1987-88 shows that 42% of males and 46% of females re-registering in a different FPC area were aged between 20 and 24, compared with 48% and 51% respectively in 1980-81. The relative decline between 1980-81 and 1985-86 in the migration rates of those with the highest propensities is evident in Figure 2. In contrast, the rates of those aged above 25 have increased since 1980-81. A retirement component is apparent in the migration flows occurring at this spatial scale in both 12 month periods and migration activity at age 66 is particularly noticeable in 1985-86. The migrant sex ratio has remained fairly constant during the 1980s with females constituting around 52% of the total movement between FPC areas.

3. Spatial variations in migration activity

The geographical analysis of migration can be undertaken at a variety of spatial scales. In the case of NHSCR data, the basic system of spatial units is equivalent to the set of FPC areas in England and Wales which correspond with provincial metropolitan districts, London borough groups and shire counties, together with Scotland and Northern Ireland as single regions (Figure 3 and Table 2). However, it is convenient to aggregate the data in order to describe the characteristic patterns and important trends occurring in the 1980s. Our spatial analysis therefore begins by dividing the country into two parts, North and South, whose experiences of changing economic fortunes have differed during the decade.

3.1 Across the main divides

Aggregate flows between the North and the South of the country are set out in Table 3 for five time periods: 1975-78 and 1978-81, when the migration level nationally was falling, 1981-1984, when the decline was reversed, and 1984-87 and 1987-89, when the migration propensity increased substantially. The annual volume of migration across the North/South divide declined to 407 thousand per year in the earlier years before rising to 536 thousand by the end of the decade. The total net loss from the North to the South increased steadily during the first four periods, widening the migration 'gap' to over 60 thousand moves per year in 1984-87. Since then, the net loss from the North has fallen back to the extent that a net gain of 7 thousand was recorded for the final year, 1988-89. The time series indices of gross flows plotted in Figure 4(a) illustrate that whilst the greater job opportunities in the

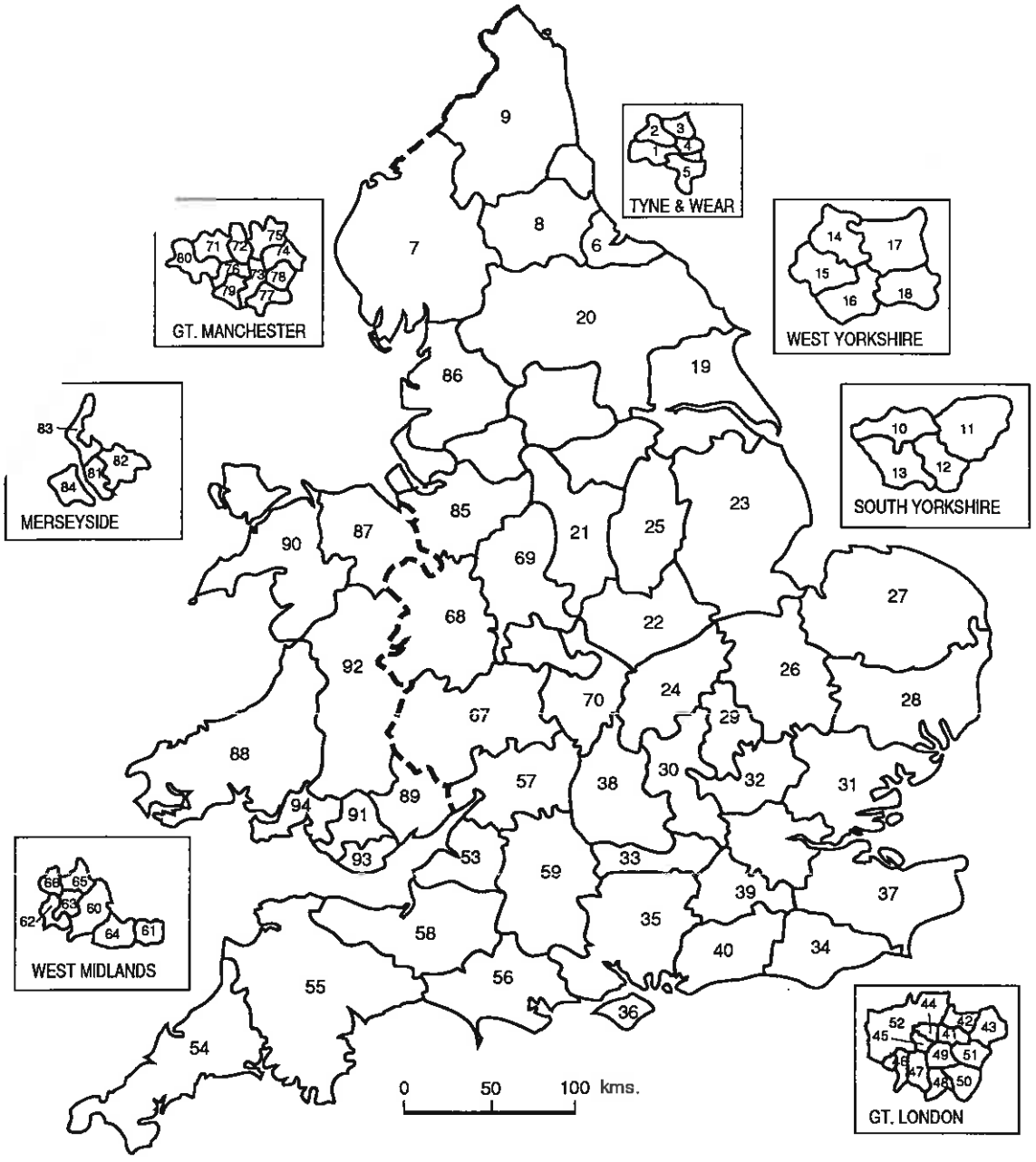


Figure 3: Family Practitioner Committee areas in England and Wales

Table 2: Family Practitioner Committee areas in England and Wales

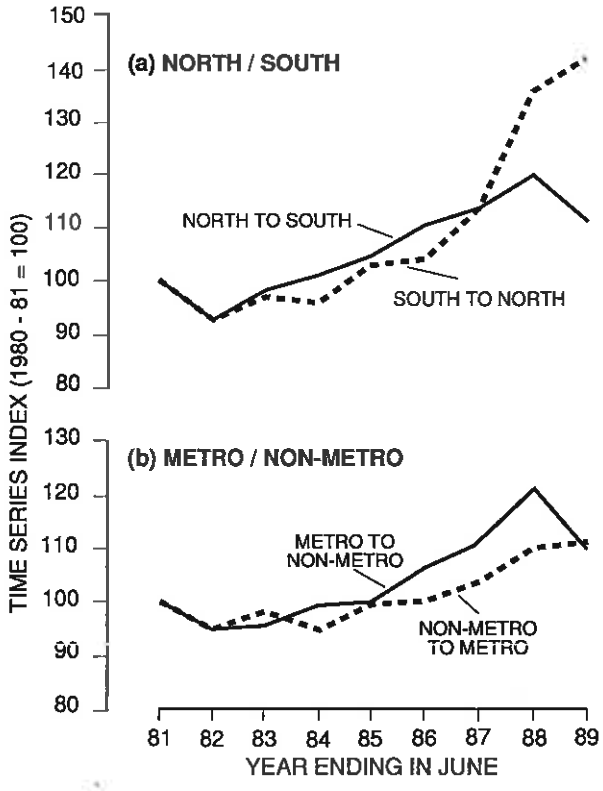
Code	FPC area	Code	FPC area	Code	FPC area
1	Gateshead	36	Isle of Wight	61	Coventry
2	Newcastle	37	Kent	62	Dudley
3	North Tyneside	38	Oxfordshire	63	Sandwell
4	South Tyneside	39	Surrey	64	Solihull
5	Sunderland	40	West Sussex	65	Walsall
6	Cleveland	41	City, Hackney, Newham & Tower Hamlets	66	Wolverhampton
7	Cumbria			67	Hereford & Worcestershire
8	Durham				
9	Northumberland	42	Redbridge & Waltham Forest	68	Shropshire
10	Barnsley			69	Staffordshire
11	Doncaster	43	Barking & Havering	70	Warwickshire
12	Rotherham			71	Bolton
13	Sheffield	44	Camden & Islington	72	Bury
14	Bradford			73	Manchester
15	Calderdale	45	Kensington, Chelsea & Westminster	74	Oldham
16	Kirklees			75	Rochdale
17	Leeds			76	Salford
18	Wakefield	46	Richmond & Kingston	77	Stockport
19	Humberside			78	Tameside
20	North Yorkshire	47	Merton, Sutton & Wandsworth	79	Trafford
21	Derbyshire			80	Wigan
22	Leicestershire	48	Croydon	81	Liverpool
23	Lincolnshire	49	Lambeth, Southwark & Lewisham	82	St Helens & Knowsley
24	Northamptonshire				
25	Nottinghamshire	50	Bromley	83	Sefton
26	Cambridgeshire	51	Bexley & Greenwich	84	Wirral
27	Norfolk	52	Middlesex	85	Cheshire
28	Suffolk	53	Avon	86	Lancashire
29	Bedfordshire	54	Cornwall	87	Clywd
30	Buckinghamshire	55	Devon	88	Dyfed
31	Essex	56	Dorset	89	Gwent
32	Hertfordshire	57	Gloucestershire	90	Gwynedd
33	Berkshire	58	Somerset	91	Mid Glamorgan
34	East Sussex	59	Wiltshire	92	Powys
35	Hampshire	60	Birmingham	93	South Glamorgan
				94	West Glamorgan

Note: Middlesex consists of the London boroughs of Barnet, Brent, Harrow, Ealing, Hammersmith, Hounslow, Enfield, Haringey and Hillingden

Table 3: Migration flows across the North/South divide, 1975-89

Period	North to South		South to North		Total flow		Net flow from North	
	No. (000)	Annual	No. (000)	Annual	No. (000)	Annual	No. (000)	Annual
1975-78	714	238	617	206	1331	444	-97	-32
1978-81	708	236	558	186	1266	422	-150	-50
1981-84	689	230	531	177	1220	407	-158	-53
1984-87	779	260	597	199	1376	459	-182	-61
1987-89	548	274	523	262	1071	536	-25	-13

Notes:
(i) North contains Northern Ireland, Scotland, North Wales, Yorkshire & Humberside, North West and West Midlands.
(ii) South contains East Midlands, East Anglia, South West and South East.
(iii) Figures are rounded to nearest thousand.
(iv) Source: Computer summaries and PUD (OPCS)



Source: Computer summaries and PUD (OPCS)

Figure 4: The tempo of North/South and metropolitan/non-metropolitan migration, 1980-89

South kept stimulating increased inmigration in the first half of the decade, the tempo of movement northwards quickened relative to that in the opposite direction after 1986. It was only in the final year that outmovement from the North experienced its first downturn since 1980-81. Shortages of housing, house price levels, pressures of congestion and increased commuting distances are all factors likely to be responsible for this dramatic trend reversal, in addition to the effects of the downturn in the economy being felt earlier in the South than in the North.

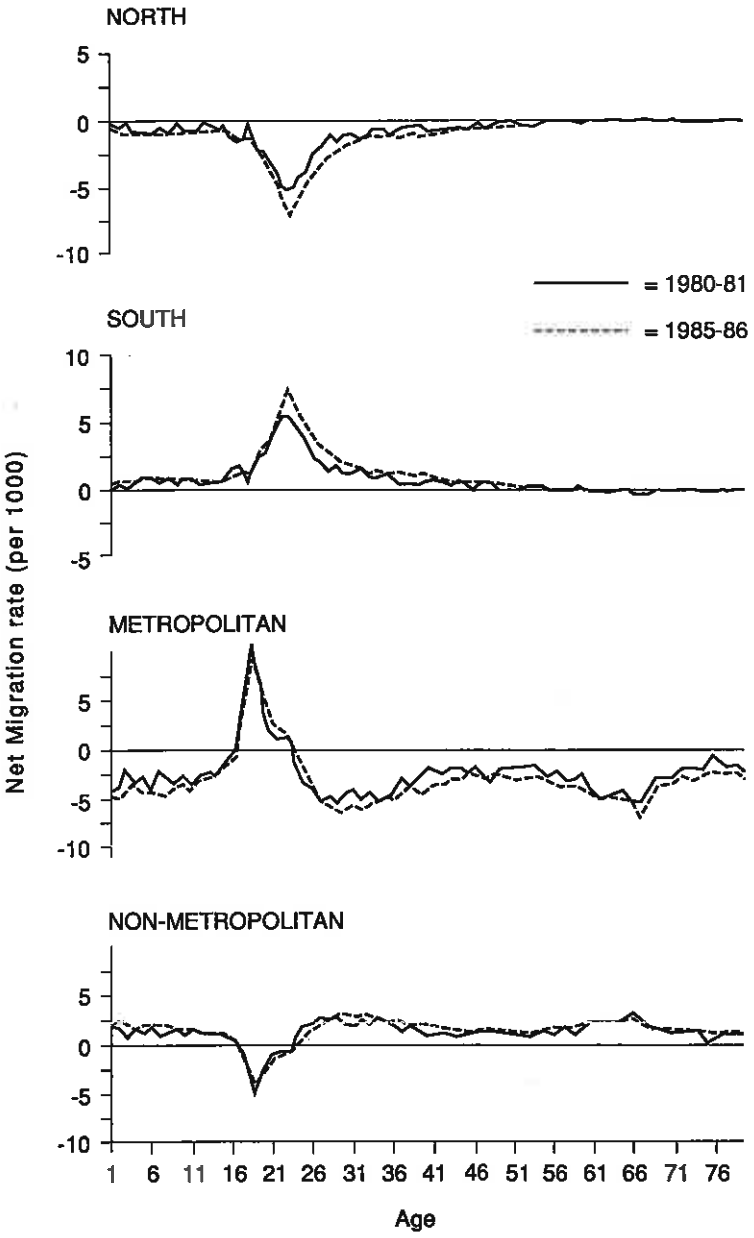
Rather more significant in the 1971-81 intercensal period than the North/South divide was the distinctive pattern of net migration losses from each of the old metropolitan counties (containing the big cities) and net gains in the areas outside those cities (containing smaller cities, towns and rural areas) (Rees and Stillwell, 1984). The evidence of migration flows between metropolitan and non-metropolitan areas contained in Table 4 suggests that the metropolitan areas have continued to lose migrants in net terms, in numbers that have not been diminishing in the later 1980s, after the reduced losses during the recession years of the early decade. The last two years, 1987-89, saw a net loss of 116 thousand per year from the metropolitan areas. In volume terms, the North/South movements occurring during this latter period account for 27% of all NHSCR inter-FPC area moves, whereas metropolitan/non-metropolitan movements represent 37% of the total. The time series indices in Figure 4(b) confirm that the tempo of movement from metropolitan to non-metropolitan areas has exceeded that in the opposite direction, except in the final year, when a downturn in migration away from the metropolitan areas occurred.

The graphs illustrated in Figure 5 summarize the age structure of net migration rates for FPC areas classified into these aggregate spatial divisions. The graphs depict single year of age net migration rates for 1980-81 and 1985-86. The North/South profiles show net losses from the North of persons in all age groups apart from those around retirement age. The peak in the age schedule comes at age 23 in both the 12 month periods selected and the difference between the schedules in 1980-81 and 1985-86 demonstrates the growing attraction of the South to this particular section of the population between these years. The metropolitan/non-metropolitan classification shows that it is only in the age range 17-23 that the metropolitan areas as a whole gain migrants. The peak of these schedules is at age 19, partly reflecting the importance of student movement to higher education establishments as well as movement into and between jobs. The highest rates of migration loss from the metropolitan areas occur in the late twenties/early thirties and also around retirement age. These patterns are mirrored by the non-metropolitan area profiles, although the rates are lower in the case of the latter.

Table 4: Migration flows across the metropolitan/non-metropolitan divide, 1975-89

Period	Metro to Non-metro		Non-metro to Metro		Total flow		Net flow from Metro	
	No. (000)	Annual	No. (000)	Annual	No. (000)	Annual	No. (000)	Annual
1975-78	1255	418	864	288	2119	706	-391	-130
1978-81	1124	375	798	266	1922	641	-326	-109
1981-84	1047	349	789	263	1836	612	-258	-86
1984-87	1151	384	830	277	1981	660	-321	-107
1987-89	838	419	607	304	1445	723	-231	-116

Notes: (i) Metro contains Tyne & Wear, West Yorkshire, South Yorkshire, Greater Manchester, Merseyside, West Midlands, Greater London.
(ii) Mon-metro contains Northern Ireland, Scotland, North Remainder, Yorkshire & Humberside Remainder, North West Remainder, West Midlands Remainder, Wales, East Midlands, East Anglia, South West, South East Remainder.
(iii) Figures rounded to nearest thousand.
(iv) Source: Computer summaries and Primary Unit Data (OPCS).



Source: PUD (OPCS)

Figure 5: Age-specific net migration rates by North/South and metropolitan/non-metropolitan divisions, 1980-81 and 1985-86

3.2 Macro regions and density classes

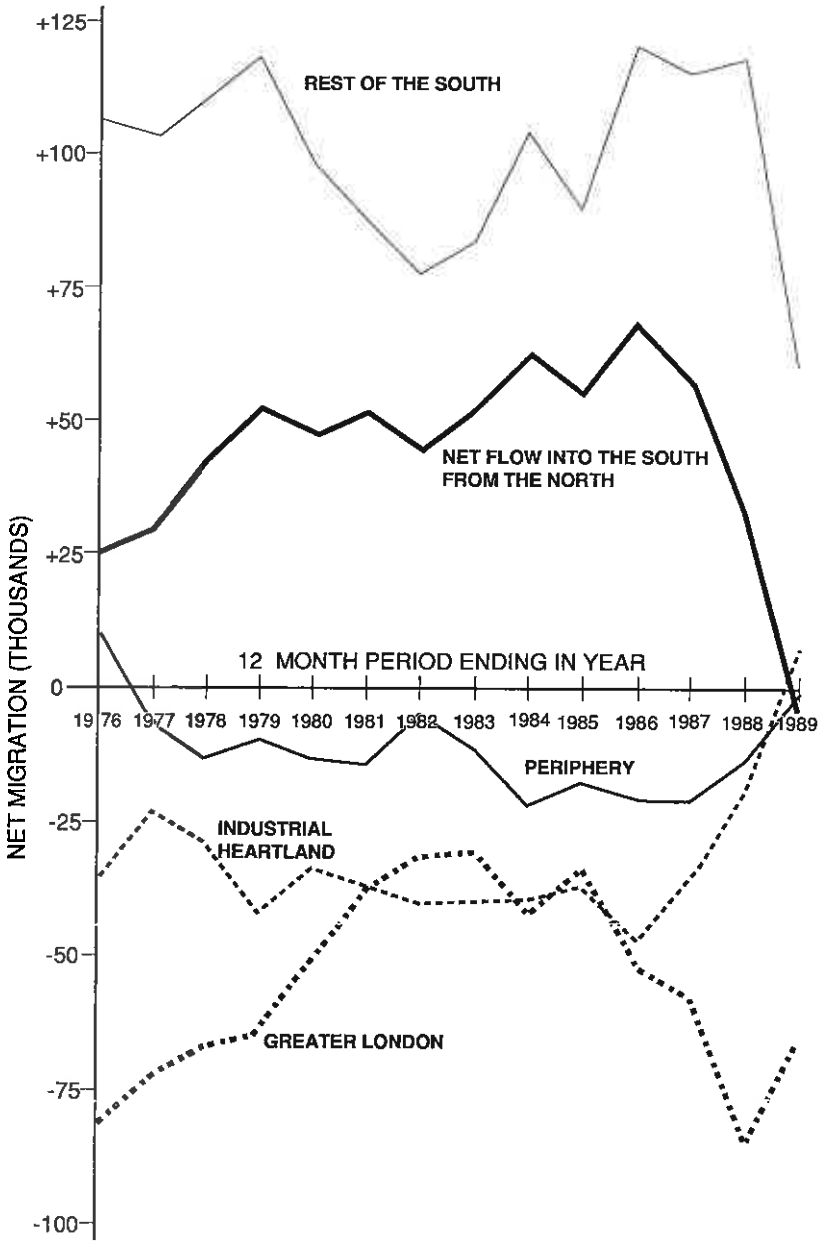
Trends in the geography of net migration can be investigated using two further aggregate spatial classifications. The first of these divides the country into four macro regions: the periphery (Northern Ireland, Scotland and Wales), the industrial heartland (North, North West, Yorkshire and Humberside, West Midlands), Greater London and the Remainder of the South. Figure 6 illustrates the importance of the migration system operating within the South, with Greater London losing large numbers of migrants to its surrounding regions. Although the capital city's net loss declined from over 80 thousand in 1975-76 to around 31 thousand in 1982-83, it subsequently increased to exceed 85 thousand in 1987-88.

Migration losses have also been experienced by the periphery and to a greater extent by the industrial heartland during the 1980s, but the last 2-3 years have seen significant reductions in the negative balances of both these regions, which together with the decline in net losses from Greater London in 1988-89, has resulted in the reversal of the North/South balance also plotted in Figure 6.

The second classification allows us to examine whether there are differences in the migration characteristics of metropolitan and non-metropolitan areas in the North of the country compared with the South. Density is considered a proxy for urbanisation and FPC areas have been ranked on the basis of their usually resident populations in 1981. The ranking is divided into quartile groupings of areas labelled as high, medium-high, medium-low and low density. The net migration schedules for each of these density groupings in the North and South are presented in Figure 7. In the South, the low density FPC areas have experienced a sustained increase in the level of net inmigration from 1980-81 to 1988-89 which is of a similar order of magnitude to the net outflows from London. Counterurbanisation has continued to extend to the most rural areas in the southern half of Britain, whilst the annual volume of net inmovement into the medium-low density areas has fluctuated around a mean of 35 thousand in the last ten years.

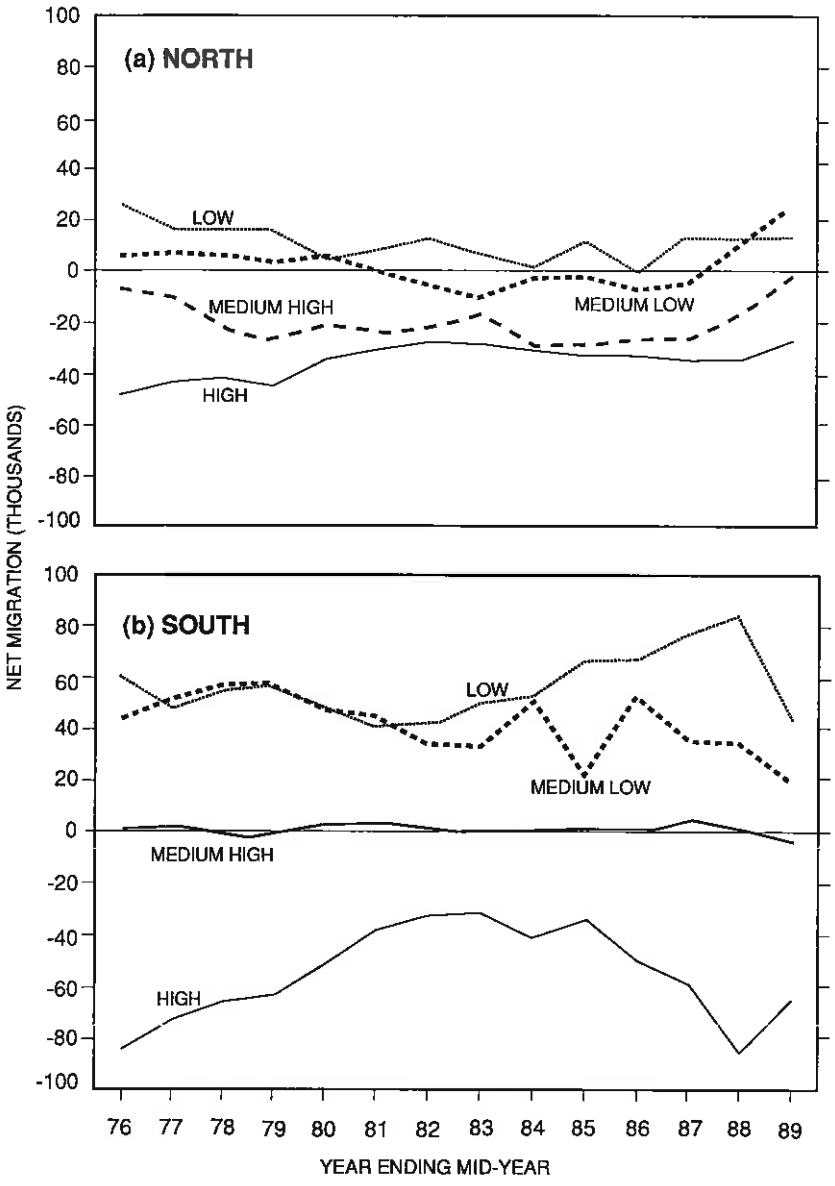
In the North, the picture is somewhat different. Medium-high as well as high density FPC areas have been losing migrants consistently throughout the time series, but these losses are not reflected in comparable gains by areas categorized as low or medium-low density in the North. Apart from the upturn in 1987-88, the latter group lost migrants on balance during the 1980s, whilst the low density areas continued to show relatively small gains. Counterurbanisation in the North appears to have been less important than the movement of people from the North to the South.

Rees (1989) has confirmed differences in counterurbanisation trends by combining the North/South and metropolitan/non-metropolitan classifications used in the previous subsection. The NHSCR data from



Source: Computer summaries and PUD (OPCS)

Figure 6: Net migration for broad regional divisions, 1975-89



Source: Computer summaries and PUD (OPCS)

Figure 7: Net migration flows for FPC area density categories in the North and South, 1975-89

1975 to 1986 indicate that, on average, 55% of outflows from northern metropolitan areas have northern non-metropolitan destinations, whilst 81% of flows out of southern metropolitan areas are to non-metropolitan areas in the same region. The non-metropolitan South also attracts 50% of northern non-metropolitan outmigrants as well as an increasing share (34% on average) of those leaving large northern cities, whereas the metropolitan South (Greater London) also attracts an increasing share of the outflow from northern metropolitan (11%) and non-metropolitan (13%) areas (see Rees, 1989, Table 6.14).

3.3 Regional trends

To what extent are the migration trends described above for the different broad divisions of the country mirrored in their constituent regions, metropolitan counties or region remainders? The migration rates outlined in Table 5 confirm the differing importance of net migration as a component of population change in the North and the South of the country. Rates of net loss from Greater London have tended to increase. This has resulted in higher rates of net gain in the East Midlands, East Anglia and the South West during the second half of the decade, rather than in the rest of the South East, where rates of gain have, if anything, fallen over the period. In contrast, the net migration rates in the North of the country have been of a lower order of magnitude. Wales is the only region to have benefited from a positive migration balance throughout the 1980s, with rates increasing substantially in the last two years. The increased attractiveness of the North, Yorkshire and Humberside and the North West is reflected in the shift from negative to positive balances in the last couple of years.

Figure 8 presents the net migration rates over the complete time series from 1975 to 1989 for metropolitan counties, region remainders and other regions, grouped by their broad divisions. The first set of graphs in Figure 8 are the net migration rates for the metropolitan areas in the North, characterised by losses in the majority of cases. Merseyside and the West Midlands have experienced the most severe rates of loss, although in comparing these profiles it is necessary to recognise that the metropolitan district boundaries may not necessarily reflect the functional urban areas in the same way in each case. Greater Manchester has the most stable net rate profile; South Yorkshire the least stable. Reductions in the net losses are evident in each of these conurbation areas in the last two years but are most significant in South Yorkshire, West Yorkshire and Merseyside.

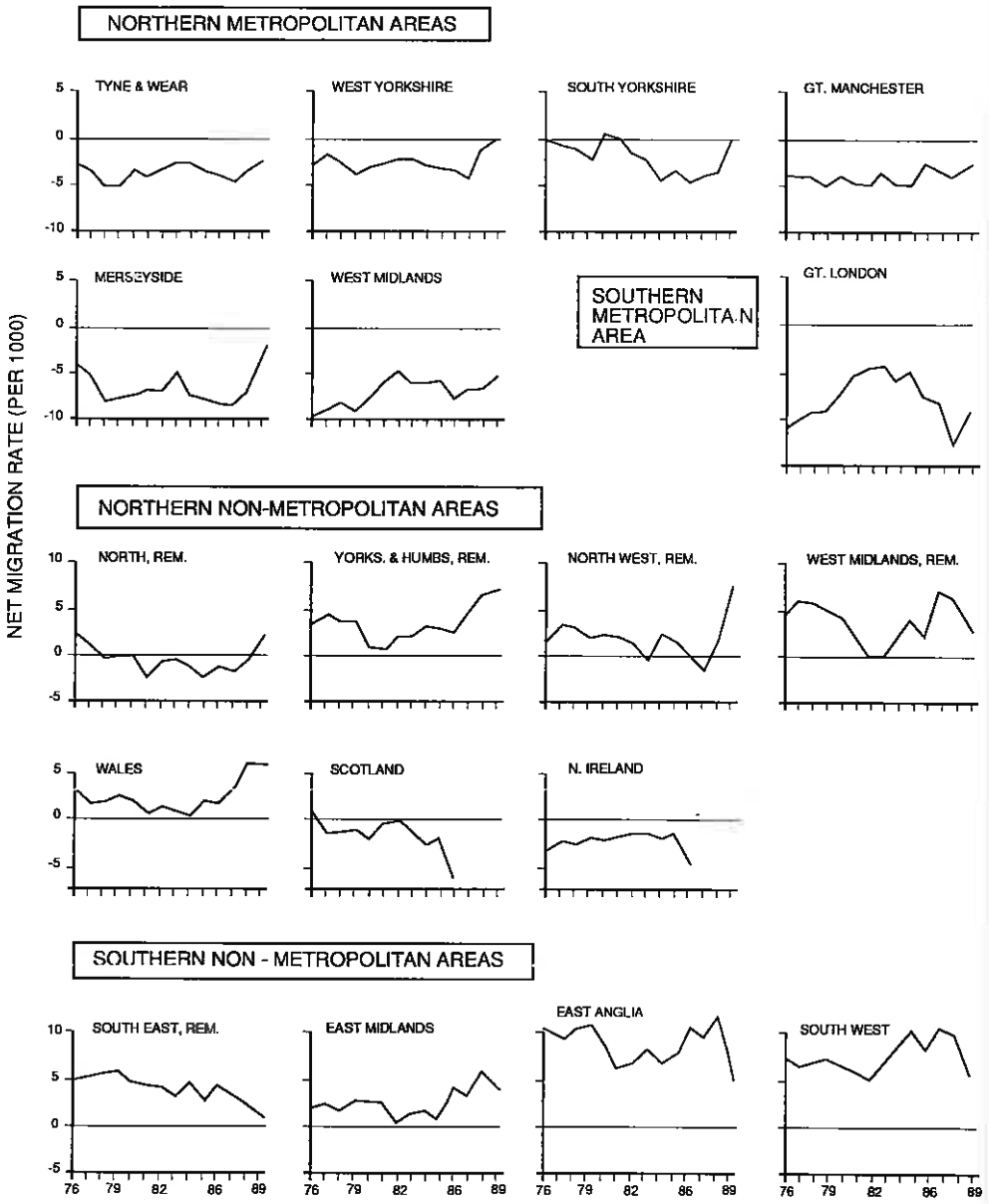
The pattern of net outmigration from FPC areas in Greater London has been commented on already. The remaining graphs are for non-metropolitan areas. The profiles of those areas in the North show much less consistency. Scotland, Northern Ireland and the Remainder of the North exhibit negative rates whereas Wales and non-metropolitan Yorkshire and Humberside, North West and West Midlands are characterised by net inmigration rates, although net losses were recorded

Table 5: Regional net migration rates, 1980-89

	NORTHERN REGIONS				
	North	Yorks & Humbs	North West	West Midlands	Wales
1980-81	-3.3	-1.1	-3.0	-2.2	0.6
1981-82	-1.8	-1.1	-3.3	-2.5	1.2
1982-83	-1.4	-1.1	-3.1	-2.7	0.7
1983-84	-1.9	-1.7	-3.1	-2.2	0.4
1984-85	-2.8	-1.6	-3.5	-1.4	1.7
1985-86	-2.3	-2.0	-3.2	-3.2	1.8
1986-87	-2.9	-1.6	-4.0	-0.2	3.2
1987-88	-1.8	0.5	-2.9	-0.5	6.2
1988-89	0.1	2.1	0.9	-1.6	5.6

	SOUTHERN REGIONS				
	East Midlands	East Anglia	Greater London	Rest of South East	South West
1980-81	2.0	6.2	-5.5	4.4	5.7
1981-82	0.4	6.7	-4.8	4.0	4.9
1982-83	1.2	8.2	-4.6	3.4	6.3
1983-84	1.5	6.6	-6.2	4.7	8.1
1984-85	0.9	7.5	-5.0	2.5	10.0
1985-86	4.0	10.5	-7.6	4.7	7.7
1986-87	3.2	9.7	-8.6	3.4	10.4
1987-88	5.7	11.5	-12.6	2.6	9.8
1988-89	3.5	4.8	-9.8	1.0	5.5

Source: Computer summaries and PUD (OPCS)



Source: Computer summaries and PUD (OPCS)

Figure 8: Net migration rates for metropolitan and non-metropolitan regions, 1975-89

in the Remainder of the North West in 1983 and 1987. The final set of graphs in Figure 8 show how the rates of net migration vary for non-metropolitan regions in the South. East Anglia and the South West continue to have the highest rates although with significant falls taking place in 1988-89. Rates of net gain in the Remainder of the South East have declined over time whereas movements into the East Midlands have increased during the decade.

Net migration, of course, only indicates the difference between the gross flows into and out of each area, which themselves vary spatially (Table 6). The most noticeable increases in gross migration rates between the low point in 1981-82 and the high point in 1987-88 are associated with the rates of migration from Greater London, South Yorkshire and the Rest of the South East, and rates of migration into the East Midlands, Wales, West Midlands Remainder, Yorkshire and Humberside Remainder, East Anglia and the South West.

To examine the relationship between changes in outflows and inflows over time, it is convenient to compute time series indices of generation and attraction following Willekens and Baydar (1986). The generation component for zone i can be defined as the proportion of total outmigration which occurs from that zone, whereas the attraction component involves inmigration to that zone expressed as a proportion of total migration. Time series indices of each component are derived by dividing annual figures by the respective component for a base year (1975-76 in Figure 9). Thus the indices show changes taking place in the zonal shares of out- and inmigration. The generation component tends to be more stable than the attraction component and consequently fluctuations in net migration tend to follow changes in inmigration shares.

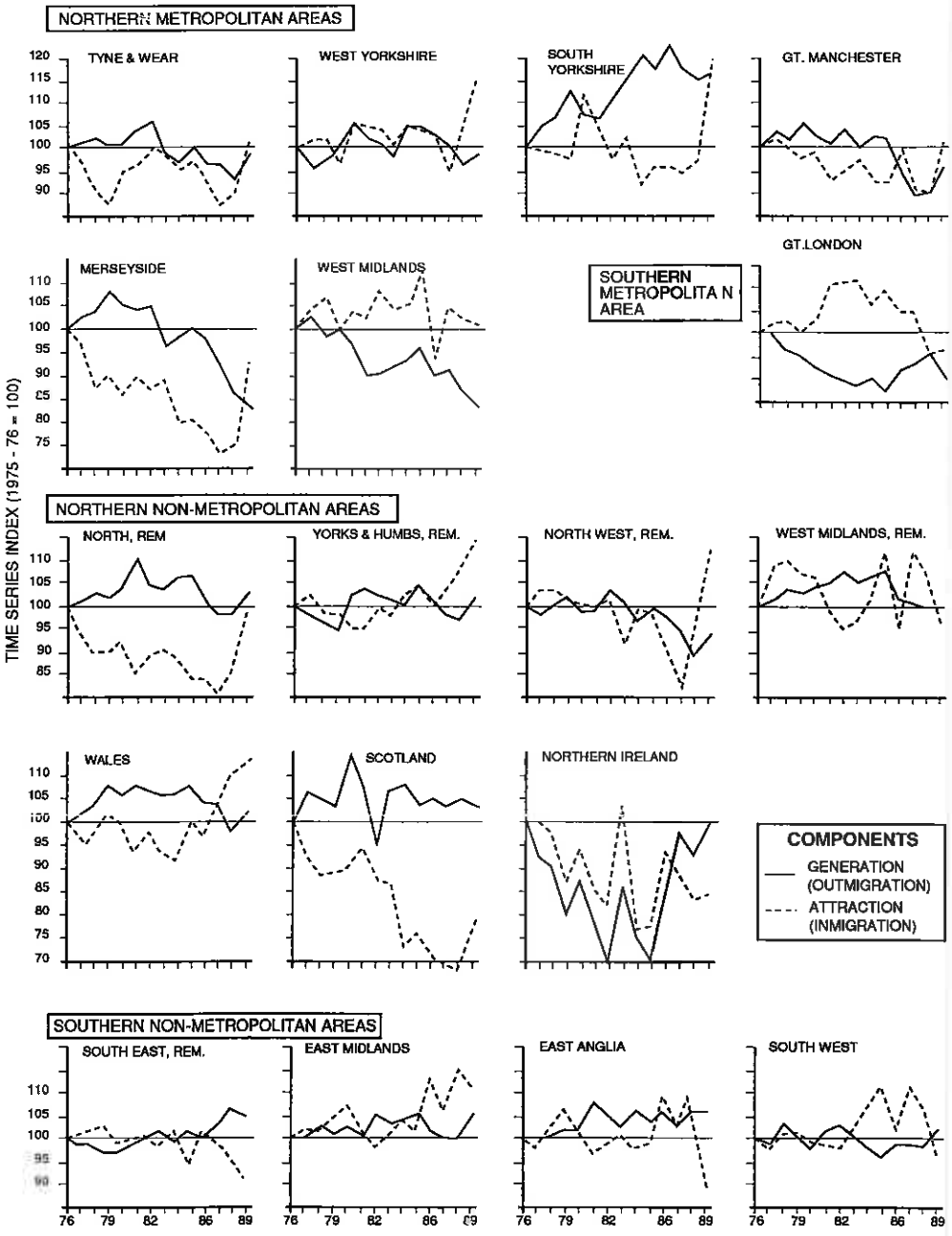
Particular features of the schedules in Figure 9 deserve comment. Among the metropolitan regions, Merseyside and the West Midlands exhibit marked declines in their generation components whereas South Yorkshire has increased its share of total outmigration over the period. Merseyside's share of total inmigration declined by 25% between 1975-76 and 1986-87 although it has pulled back closer to the base line in the last two years. Temporal variation in net migration losses from Greater London reflects both declines in the generation component and increases in the attraction component during the first part of the time period. This was followed by a reversal of the trends in both components after 1985. In the so-called non-metropolitan areas, features of significance include: the drop in Scotland's share of total inmigration, the decline also apparent in the attraction component for the Remainder of the North up to 1987, the improved attraction components for each of the northern region remainders in the last two or three years of the time series, the unstable nature of both of Northern Ireland's components and the relative similarity and stability of both components in the southern non-metropolitan areas.

Table 6: Metropolitan and non-metropolitan gross migration rates

	1981-82		1987-88		1982-88 change	
	Out	In	Out	In	Out	In
	(per 1000)		(per 1000)		(%)	
Metropolitan region						
Greater London	27.1	22.3	38.2	25.6	41.0	14.8
Merseyside	22.0	15.0	24.5	17.4	11.4	16.0
Tyne and Wear	20.7	17.3	24.1	20.5	16.4	18.5
West Midlands	20.6	15.6	26.4	19.5	28.2	25.0
Greater Manchester	19.6	14.5	22.7	18.3	15.8	26.2
West Yorkshire	18.8	16.3	22.9	21.7	21.8	33.1
South Yorkshire	17.0	14.9	23.4	19.5	37.6	30.8
Non-metropolitan regions						
North West, Rem.	24.4	25.5	27.7	28.8	13.5	12.9
West Midlands,Rem	23.7	23.9	27.9	33.8	17.7	41.4
Yorks & Humbs,Rem	22.5	24.3	27.2	33.5	20.9	37.9
East Anglia	21.9	28.6	27.3	38.8	24.7	35.7
South East,Rem	20.6	26.2	27.8	30.4	35.0	16.0
South West	19.7	24.6	24.0	33.7	21.8	37.0
North, Rem.	19.0	18.1	23.5	22.8	23.7	26.0
East Midlands	18.8	19.2	22.9	28.5	21.8	48.4
Wales	14.9	16.1	17.8	23.9	19.5	48.4

Notes: (i) Regions ordered on the basis of their outmigration rates in 1981-82

(ii) Source: Computer summaries and PUD (OPCS)



Source: Computer summaries and PUD (OPCS)

Figure 9: The generation and attraction components of migration for metropolitan and non-metropolitan regions, 1975-89

Changes in the volume of gross in- and outmigration for any single area are determined by fluctuations in the migration flows taking place between that zone and other origin or destination areas. Detailed analysis of the interaction flow matrices is not attempted here, but it is possible to gain some insights into the pattern of directional movements between the zones in our metropolitan/non-metropolitan system by counting the number of net migration inflows into each zone from the other zones in the system. In Table 7, the counts for 1980-81 have been used to arrange the regions in rank order, with the South West at the top of the hierarchy gaining from all other regions. Merseyside, at the bottom, loses to all regions bar two. Generally, the ranking represents a hierarchy in which an individual zone loses migrants to regions above it and gains from those below it in the league table.

What changes in the regional ranking are evident over the 1980s? Table 7 also contains the numbers of net inflows for each of the regions in 1985-86 and 1988-89. Between 1980-81 and 1985-86, little changed at the top of the hierarchy, with the South West and East Anglia gaining from virtually all regions. The East Midlands improved its position to third place. Only three of Scotland's net migration balances with other regions remained positive in 1985-86 so Scotland moved several places down the ranking. Furthermore, Northern Ireland registered no net gains in 1985-86 and therefore dropped to occupy bottom position. Differences in the net inflow counts between 1985-86 and 1988-89 serve to emphasise the emergence of the non-metropolitan North West and Yorkshire and Humberside, together with the Remainder of the North (and the Isle of Man) as regions gaining in net terms from at least 13 other regions. Similarly, metropolitan South and West Yorkshire also registered gains with 13 and 12 other regions respectively in 1988-89. In contrast, the southern non-metropolitan regions and Greater London all moved down the hierarchy with East Anglia maintaining a positive balance with only seven other regions. The pattern of directional net migration has therefore undergone quite a considerable transformation in the latter years of the 1980s.

4. Migration at the FPC area scale

4.1 Aggregate patterns

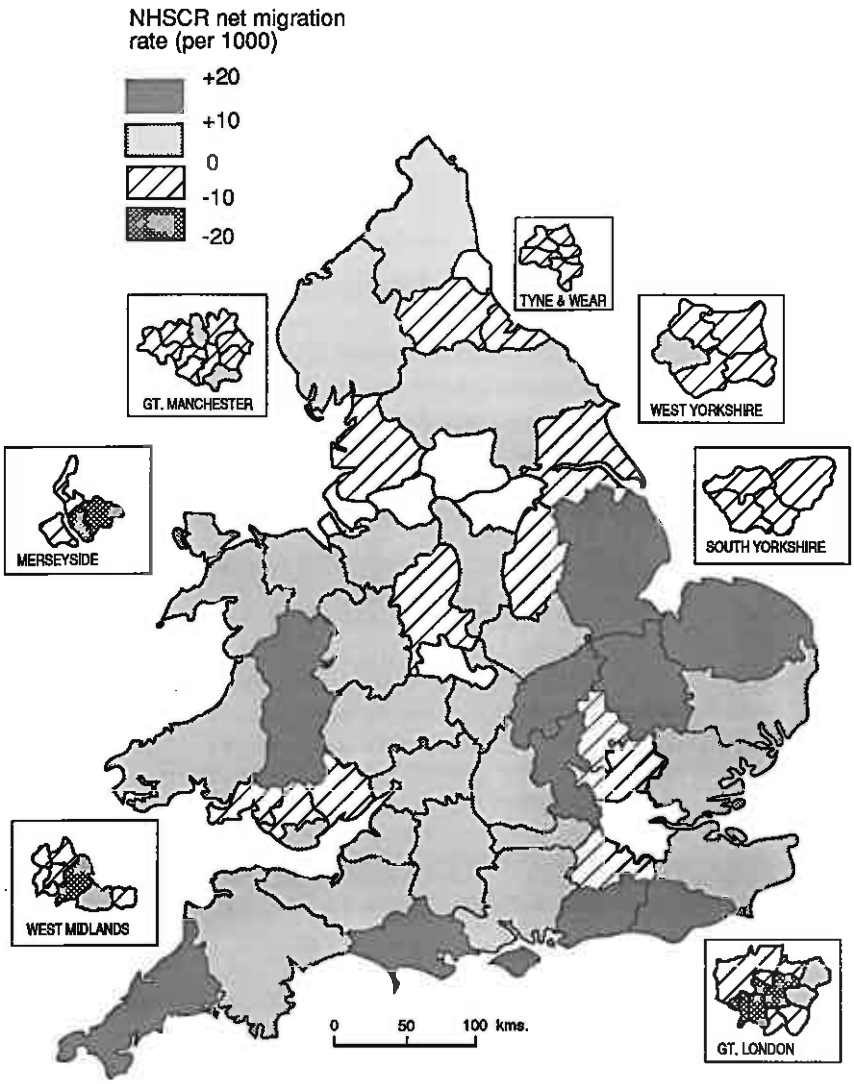
The spatial pattern of aggregate net migration at the FPC area scale in England and Wales has remained dominated by the losses from metropolitan districts and boroughs and gains by the majority of shire counties. The mid-decade map of net migration balances (Figure 10) shows that positive rate values were recorded for only six metropolitan areas. The shire counties which experienced net losses included some of those that are part of the outer metropolitan area surrounding Greater London; Cleveland and Durham in the North; West Glamorgan, Mid Glamorgan and Gwent in South Wales; and Humberside, Staffordshire and Nottinghamshire. All of these northern areas suffered major

Table 7: The ordering of metropolitan and non-metropolitan areas by the number of net inflows from other areas

Region	Number of net inmigration flows 1980-81	1985-86	1988-89
South West	18	17	10
East Anglia	15	17	7
Greater London	14	14	10
Isle of Man	14	12	17
East Midlands	13	16	11
South East, Rem	13	14	7
Scotland	11	3	2
South Yorkshire	10	6	13
Wales	10	11	14
West Midlands, Rem	8	9	6
North West, Rem	8	10	15
Yorks & Humbs,Rem	7	12	14
Tyne and Wear	6	6	9
Northern Ireland	5	0	0
West Yorkshire	5	7	12
West Midlands	5	2	2
North, Rem.	3	7	13
Greater Manchester	2	6	5
Merseyside	2	1	4

Notes: (i) The ordering is based on the number of net immigration flows during 1980-81

(ii) Source: Computer summaries and PUD (OPCS)



Source: PUD (OPCS)

Figure 10: The spatial pattern of net migration rates in 1985-86

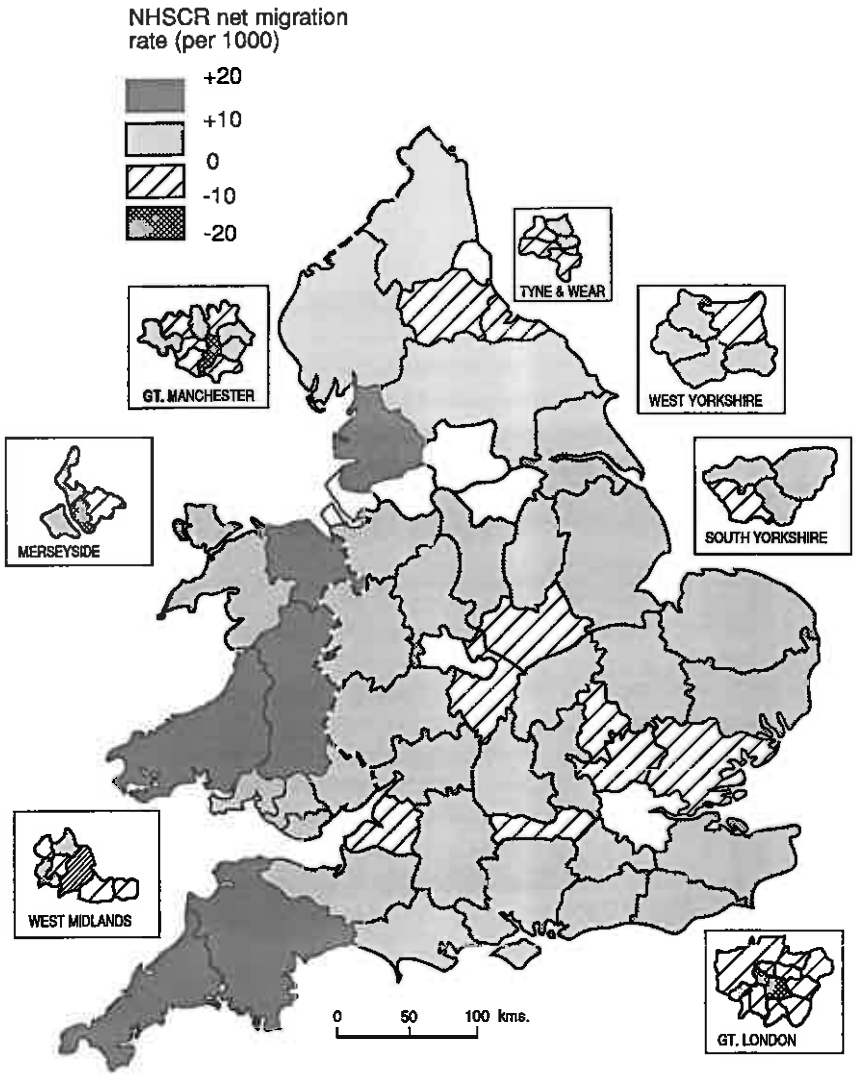
manufacturing declines in the 1980s. The counties with the highest rates of net gain were the rural areas of Powys, Lincolnshire, Norfolk, Suffolk, Cambridgeshire and counties on the south coast where retirement inmigration is likely to be particularly important.

By 1988-89 (Figure 11), the focus of high net inmigration rates had shifted to Wales and the west of England, with fewer shire counties having rates above 20 per thousand. Many more of the districts in northern metropolitan areas registered positive net migration balances. In Greater London, where all the FPC areas recorded negative balances, losses were particularly severe from central areas. Net migration outflows from Greater London are the residual flows resulting from much higher rates of outmigration and inmigration than rates for zones in the rest of the country, as indicated in Figue 12 where the gross rates for 1988-89 for each FPC area are plotted against one another.

4.2 Age group patterns

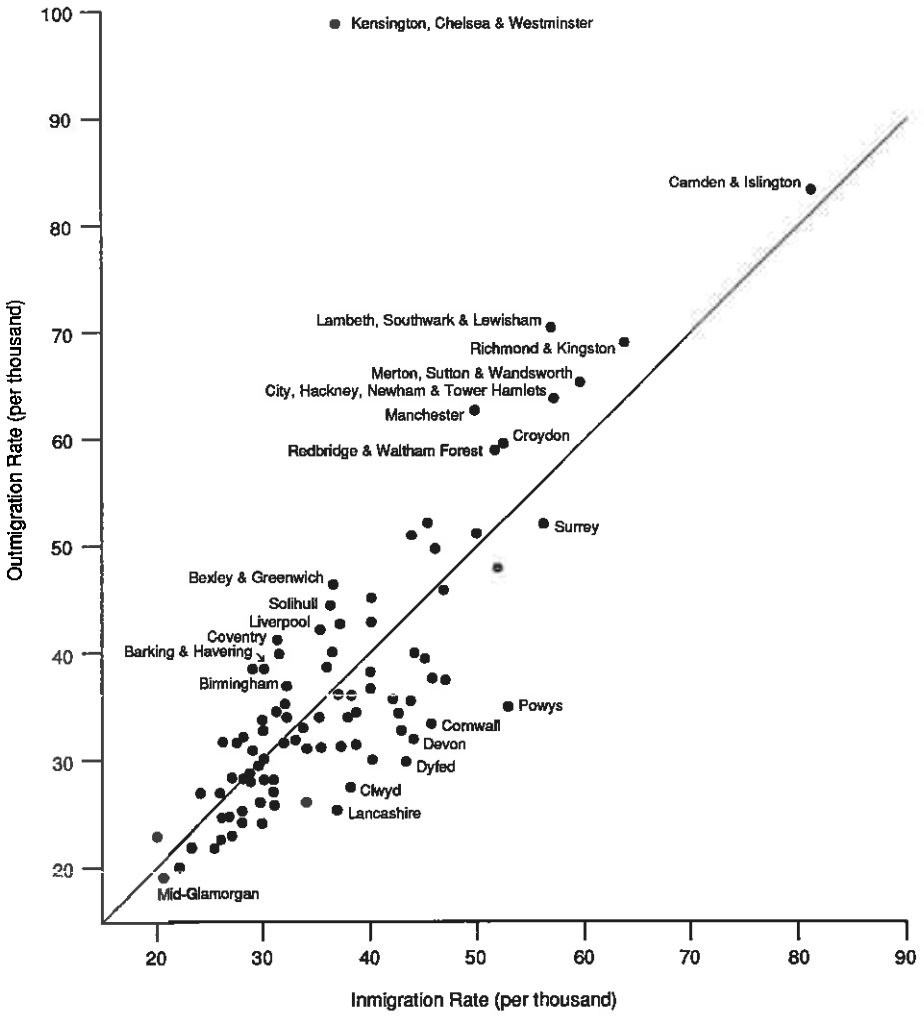
Inevitably the patterns of age-specific net migration differ appreciably from the aggregate distribution. The 20-24 year age group comprises approximately 20% of total inter-FPC area migration and the changing distribution of this group during the 1980s is indicated in Figure 13. Between 1980-81 and 1985-86, the pattern of net gains became more concentrated in the south of the country with the negative balances being recorded in almost all the northern metropolitan and non-metropolitan FPC areas (with the exception of Greater Manchester). Moves undertaken by this most mobile age group became increasingly directed towards the high density areas of the South East at the expense of the rest of the country. Between 1985-86 and 1988-89, the pattern became even more focused on Greater London and the rest of the South East, although certain districts in West and South Yorkshire and in Greater Manchester registered rates of net gain.

It is perhaps not surprising to discover that migrants in this age group are the least affected by the distance over which they have to move. This is demonstrated by the calibration of distance decay parameters associated with doubly constrained spatial interaction models using age-specific data on moves between FPC areas in 1985-86 (Stillwell, 1990). Mean distances of movement and parameters representing the frictional effect of distance on migration in 16 different age groups (0-4, .. 75+) are illustrated in Figure 14. The schedules reflect some of the characteristics of individuals in particular life course groups. In the early age groups (0-14), distance exerts considerable influence on the general propensity to move. The lowest parameters are associated with those in the first part of the labour force age range. Thereafter, as the parameter value increases, the propensity to move declines until around retirement age. The average distance moved varies from nearly 140km for those aged 15-19 to 120 km for those in their early 50s and below 120km for those aged over 75.



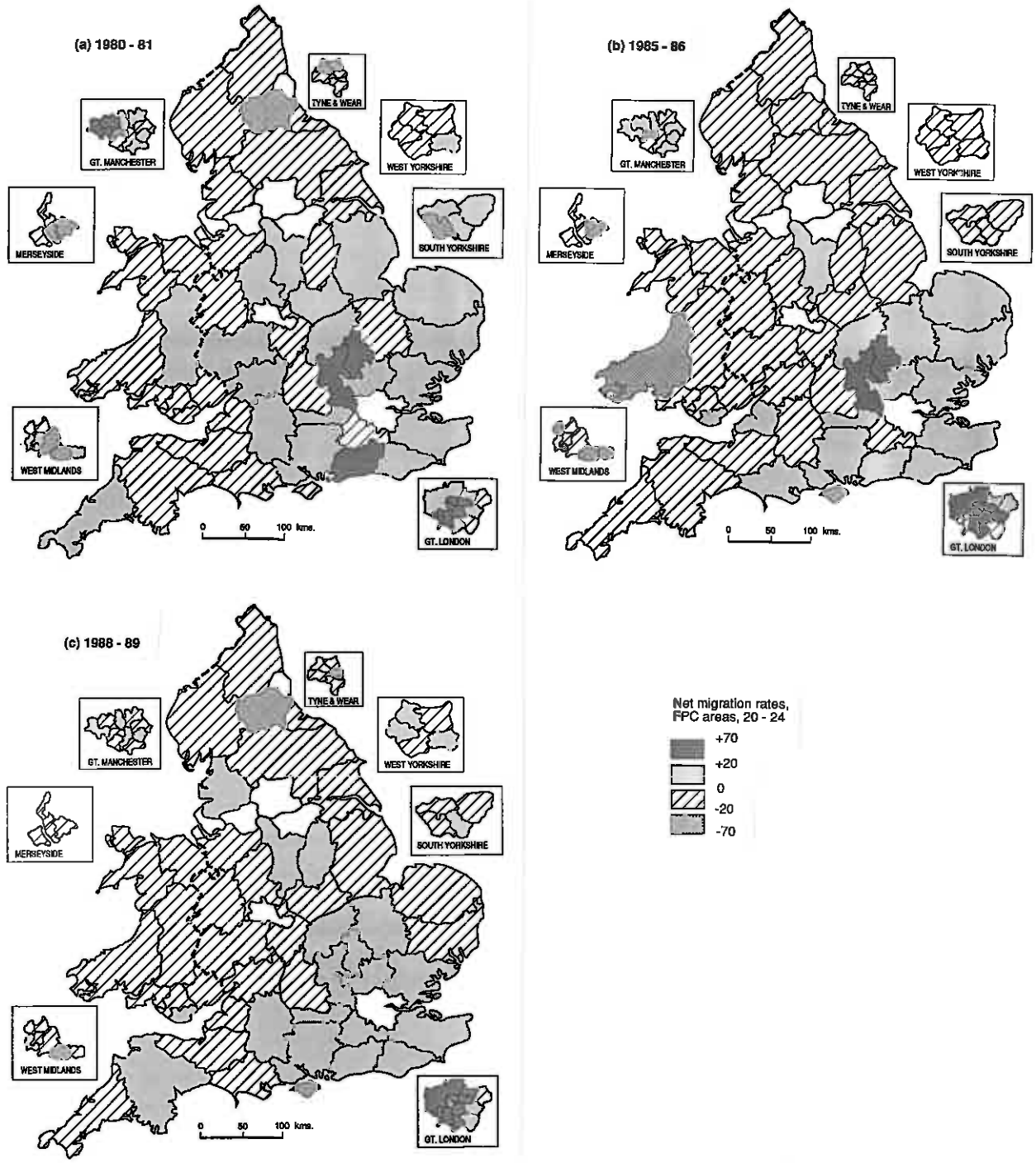
Source: PUD (OPCS)

Figure 11: The spatial pattern of net migration rates in 1988-89



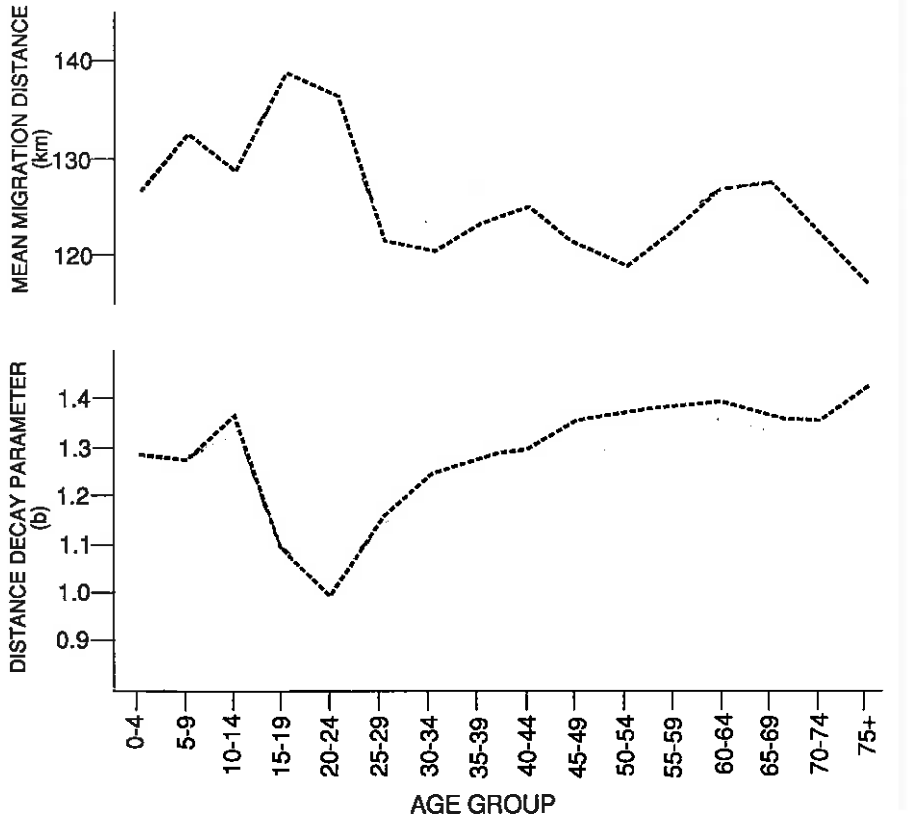
Source: PUD (OPCS)

Figure 12: The relationship between gross migration rates for FPC areas, 1988-89



Source: Computer summaries and PUD (OPCS)

Figure 13: The changing pattern of net migration rates for those aged 20-24



Source: Parameters generated using IMP (Stillwell 1984)

Figure 14: Spatial interaction model distance decay parameters and mean movement distances for inter-FPC area migration, 1985-86

A statistical comparison of the inter-FPC area movement matrices for broad age groups between 1980-81 and 1985-86 using dissimilarity indices has been reported in Boden et al. (1991) which suggests that, in relative terms, changes in population distribution patterns are most marked for the 70+ age group. Most FPC areas recorded increases in outmovement and inmovement of the over seventies during the decade and the pattern of metropolitan losses and non-metropolitan gains for those aged 75 and over is emphasised in Table 8 which identifies the five FPC areas with the highest positive and negative net migration rate balances in 1988-89. The range of values is wider in 1988-89 when compared with that in 1980-81.

4.3 Area classification

To what extent are the FPC areas in England and Wales similar in terms of their age-specific migration rate profiles? This question necessitates a method of comparing migration rate schedules for FPC areas in order to generate a classification. The issue is important in the context of subnational population projection. The OPCS/DOE migration projection model involves the grouping of model migration schedules calibrated for standardized out- and inmigration rate profiles for each FPC area in England based on 1981 Census data (Martin, Voorhees and Bates, 1981; Bracken and Bates, 1983; Bates and Bracken, 1987)

An alternative methodology is employed here which derives groupings of areas on the basis of observed NHSCR single year-of-age movement rates for 1985-86 and fits model schedules to the profiles of the clusters which emerge. The derivation of a classification based on inmigration is used here to exemplify the procedure which is described in more detail in Boden et al. (1991). The initial step in the process is the computation of the Squared Euclidian Distance (SED) between the standardized age-specific rates for two areas:

$$SED_{ij} = \sum_{a} (m^{a}_{i} - m^{a}_{j})^2$$

where m^{a}_{i} and m^{a}_{j} are the standardized inmigration rates by age group a for areas i and j. The 'average linkage between groups' method is used where the distance between the clusters I and J, D_{IJ}, is the average distance between all pairs of FPC areas in which one member of the pair is from each cluster:

$$D_{IJ} = \sum_{i \in I} \sum_{j \in J} SED_{ij} / n_I \, n_J$$

where n_I and n_J are the number of areas in clusters I and J.

A break in the agglomeration schedule produced in the clustering of inmigration profiles indicates that 15 is the optimum number of groups. Fewer groups results in much larger increases in the distance

Table 8: Highest and lowest net migration rates of 75+ age group

FPC area	1980-81	1988-89
	(per thousand)	
Highest gainers		
Powys	-2.7	18.6
Hereford & Worcestershire	14.1	11.3
North Yorkshire	2.4	10.7
Northumberland	2.3	10.4
Dyfed	-1.9	9.0
Highest losers		
Lambeth, Southwark & Lewisham	-13.1	-23.2
Kensington, Chelsea & Westminster	-23.7	-22.8
City, Hackney, Newham & Tower Hamlets	-15.7	-19.8
Manchester	-10.7	-18.5
Liverpool	-5.6	-17.5

Source: PUD (OPCS)

coefficient. The FPC areas which comprise each of the 15 clusters are indicated in Table 9 and the observed age-specific rates for each cluster are aggregated to produce a cluster profile. In the final stage of the procedure, model migration schedules are fitted to each of the cluster profiles using a version of the MODEL package developed by Rogers and Planck (1984) and operationalised at Leeds by Stillwell et al. (1987). Figure 15 illustrates the model migration schedules superimposed on the observed rates of inmigration for the 15 clusters. Most E values fall below 10.0, indicating satisfactory goodness-of-fit.

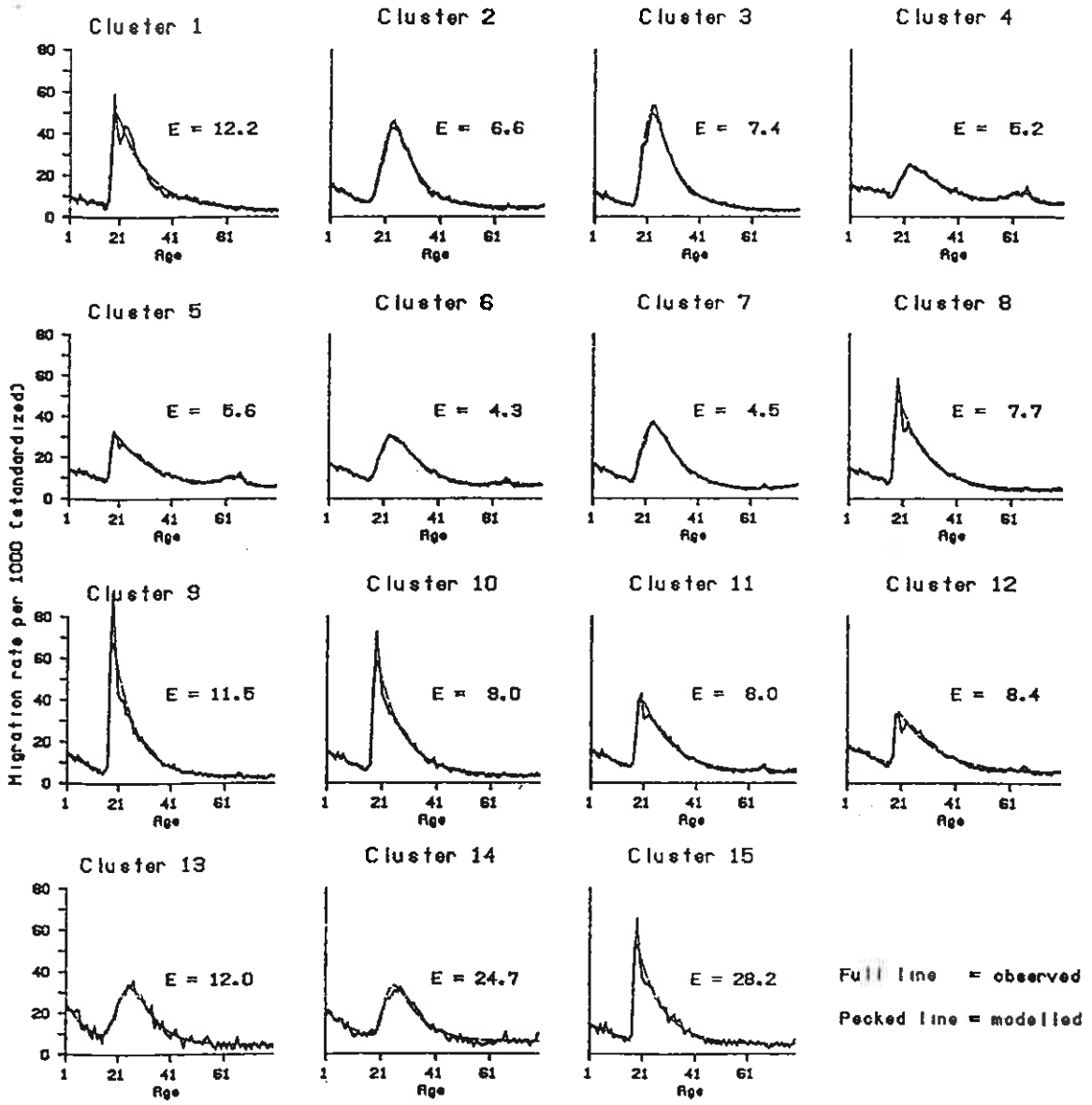
The first three clusters contain groups of London FPC areas. Camden and Islington and Kensington, Chelsea and Westminster, with a double peaking in the observed rates, form the first cluster. The model (without a retirement component) smoothes the curve and the shape of the schedule is characterised by a high measure of asymmetry in the labour force component, emphasised by the sharp increase in the rate of inmigration age 18. The other two groups of London FPC areas have schedules with a high but later labour force peak. The labour force curves are rather more symmetrical with a less dramatic jump in the rate of inmigrationon the upward slope. Schedules of clusters 4,5 and 6 are very different in shape in comparison with the previous schedules. Most of the FPC areas are non-metropolitan counties and since all the observed rates show some evidence of retirement, full model schedules (i.e. with retirement components) are constructed. The labour force peaks for these schedules are at a lower level than for the Greater London clusters and, significantly, these clusters exhibit a higher child dependency index. Cluster 7 includes several provincial metropolitan districts as well as the remaining London boroughs and four of the counties in the South East. Its schedule, which includes an upward retirement slope, indicates a labour force component less pronounced than in clusters 1-3 but more so than in clusters 4-6.

The schedules of clusters 8, 9 and 10 are dominated by very high peaks in their labour force curves at an early age and no retirement component. The dramatic increase in the rate of inmovement around age 18 suggests that the student factor may be important in determining the shape of the schedule for these three groups, which turn out to contain FPC areas that all have major institutions of higher education located within their boundaries. Clusters 11 and 12 contain rather unusual combinations of areas, whilst the only areas failing to combine are South Tyneside, which has a relatively late labour force peak, Solihull and West Glamorgan.

The classification and modelling procedure outlined above provides a summary of the main types of migration schedule evident at the FPC area scale. It would also provide a systematic method of incorporating more up-to-date age-specific information from the NHSCR into the model used by OPCS for projecting sub-national migration.

Table 9: FPC area classification based on 1985-86 inmigration rates

Group	Constituent FPC areas
1	Camden & Islington; Kensington, Chelsea & Westminster
2	Redbridge & Waltham Forest; Croydon; Bexley & Greenwich
3	City, Hackney, Newham & Tower Hamlets; Richmond & Kingston; Merton, Sutton & Wandsworth; Lambeth, Southwark & Lewisham; Middlesex
4	Lincolnshire; Suffolk; Isle of Wight; West Sussex; Cornwall; Dorset; Somerset; Hereford; Salop; Clwyd; Powys
5	Humberside; Norfolk; East Sussex; Devon; Lancashire; Dyfed; Gwynedd
6	Cumbria; Northumberland; Rotherham; Calderdale; Wakefield; Derbyshire; Northamptonshire; Buckinghamshire; Essex; Kent; Gloucestershire; Wiltshire; Warwickshire; Bolton; Oldham; Rochdale; Tameside; Sefton; Wirral; Cheshire; Gwent
7	Gateshead; North Tyneside; Barnsley; Bedfordshire; Hertfordshire; Berkshire; Barking & Havering; Bromley; Dudley; Sandwell; Walsall; Bury; Stockport; Trafford; Wigan; St. Helens
8	Durham; Leicestershire; Nottinghamshire; Oxfordshire; Avon; Birmingham; Wolverhampton; Manchester; Salford; South Glamorgan
9	Newcastle; Sheffield; Coventry
10	Leeds; Liverpool
11	Sunderland; Cleveland; Bradford; Kirklees; Cambridgeshire Staffordshire; Mid Glamorgan
12	Scotland; Doncaster; North Yorkshire; Hampshire
13	South Tyneside
14	Solihull
15	West Glamorgan



Notes (i) $E = 100 \sum_a | m^a_I \text{ (mod)} - m^a_I \text{ (obs)} | / \sum_a m^a_I \text{ (obs)}$

where m^a_I (mod) and m^a_I (obs) are the predicted and observed migration rates for single year age group a for cluster I

(ii) Source: Model parameters calibrated using MODEL (Rogers and Planck, 1984)

Figure 15: Observed and modelled inmigration schedules for optimum clustering

5. Conclusion

Despite its shortcomings, data from the NHSCR represents a wealth of valuable information on how migration propensities and patterns are changing from year to year. One of the most emphatic changes during the latter years of the 1980s has been the reversal in the pattern of net loss from the North to the South of the country which had been increasing steadily since the mid-1970s. Faster growth in the tempo of migration northwards since 1985-86 has resulted in the North/South aggregate net migration balance turning positive in 1988-89. Migration across the metropolitan/non-metropolitan divide during the 1980s has also gathered pace as rates of loss from Greater London accelerated after 1983.

Since marked shifts have taken place in the distribution as well as in the volume of internal movement, it becomes increasingly important to use up-to-date information such as that available from the NHSCR more effectively to generate improved projections of future migration and population change.

This paper has been written as part of a research initiative undertaken in connection with the IBG Limited Life Working Party on 'Migration in Britain'. It provides some national perspectives on the volume, structure and geography of internal migration and a context for more detailed analysis of migration behaviour at the regional scale.

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