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MIGRATION TRENDS AND POPULATION PROJECTIONS FOR THE ELDERLY AND THEIR IMPLICATIONS

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CONTENT

ABSTRACT

The paper examines patterns in inter-regional migration by the elderly in 1980-81, and compares them with patterns at other ages and in 1970-71, using a set of twenty British regions. The elderly are observed to be leading actors in the shift of population from metropolitan regions to the rest of the country, but the intensity of that shift is less in 1980-81 than in 1970-71. Migration gains and losses are then placed in a wider components framework in order to ascertain the degree to which internal migration contributes to population redistribution compared with differential mortality or external migration. Finally, the influence of ageing in place on the future population of the eldderly is assessed through an analysis of fluctuating cohort size.

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1. CONTEXT AND REVIEW

There is increasing recognition that the process of population change called the demographic transition, in which populations move from a regime of high mortality and high fertility to one of low mortality and low fertility via an intermediate stage of spectacular growth, has a long after-effect in which the age structure changes systematically. This after-effect is manifest in a dramatic ageing of the population, first because survival chances to and in the elderly ages improve and second because the elderly from earlier high fertility cohorts make up an increasing share of a population whose newest cohorts are either the same size or smaller than those that have gone before. Hence the interest in the development and demographic behaviour of the elderly population.

The British population, by and large, passed through this after-phase of the demographic transition in the 70 years from 1911 to 1981, when the percentage of the population aged 65+ rose from 5.1 to 15.1% (OPCS and CSO, 1984; Rees and Warnes, 1986). As the smaller cohorts born in the 1920s and 1930s move into the elderly population over the rest of this century, a cessation of the overall ageing process is anticipated with only 14.4% aged 65 or over in 2001 (projections reported in Rees, 1986). Other projections (OPCS 1985 and World Bank 1984) see continued improvement in the survival chances of the elderly and a small increase (+8%) is anticipated by the end of the century. Internationally, Britain is a member of small group of industrialized nations with projected increases over the years 1980-2000 in populations aged 65+ of less than 10%. The other countries are the GDR (-6%), Austria (-3%), Norway and Sweden (+3%), the FRG and Denmark (+4%).

This picture of relative stationarity in Britain's elderly population is misleading if we either look beyond the end of the twentieth century as we do in section 4 of the paper or look at ageing within the elderly population itself or look at the degree of spatial variation across the country in age composition at small or large scales. The spatial variation in the elderly population has been described in detail by Law and Warnes (1976), Warnes and Law (1984), OPCS and CSO (1984), Rees and Warnes (1986) and Champion et al (1987). We draw on these descriptions to build a picture of the geography of the elderly in the UK.

The areas with the greatest concentrations of elderly are found in all parts of the country in peripheral, rural and coastal locations away from the major metropolitan areas. Areas in which more than 20% of the population in 1981 was in the pensionable ages (65+ for men, 60+ for women) include coastal districts along the South Coast in Kent, East and West Sussex in the South East region; most of Dorset, Devon and Cornwall plus the Cotswold area in the South West region; coastal and inland Dyfed, southern Powys, the Dwyfor, Merionnydd and Aberconwy districts of Gwynedd and coastal Clwyd in Wales; the Southport, Blackpool, Morecambe and Kendal areas

of the North West and Cumbria; the Harrogate and Scarborough areas of North Yorkshire; Norfolk and East Suffolk in East Anglia; the Hexham area of Northumbria; the Borders, Tayside and Western Isles regions of Scotland (see Figure 3.1A in Champion et al, 1987, Figures 2 and 3 in Rees and Warnes, 1986). Pensioners are particularly underrepresented in the Midlands outside of the metropolitan cores, the Outer Metropolitan ring around London, and in the counties just to the North and West of London. This geography is reported to have broadly persisted over at least the last four decades and is interpreted as the product very largely of the residential preferences of the elderly expressed through migration at or just after retirement.

Commentators also refer to the process of ageing in place as explaining some of the most dramatic increases in elderly population over the 1971-81 decade (Champion et al, 1987, pp.36-37; Rees and Warnes, 1986, pp.4-8). These have been observed in new or expanded new towns with maturing populations such as Stevenage, Thetford, Bracknell, Harlow or Crawley. In these locations the in-migrants of the late 1940s, 1950s and 1960s have aged to become the elderly of the 1980s.

However, in very little of the analysis of the distribution of the elderly is attention paid to the exact contribution either of these processes of migrational selectivity or of ageing in place, and little attention has ben paid to the way in which the components of elderly population change might themselves be changing. It is also important to compare the patterns of the elderly with those of the non-elderly, in order to discover whether there are significant differences. In particular, to what extent does elderly migration contribute to the processes of population redistribution that have been identified by a careful comparison of the population numbers in labour market areas and constituent zones between the 1971 and 1981 censuses (Champion et al, 1987). Do elderly migrants constitute pioneers in these processes of change, given their relatively greater locational freedom after retirement from the world of work?

These are the questions which are addressed in the remainder of this paper using information on migration published in the 1971 and 1981 censuses for a set of 20 regions (see Figure 1). This set consists of the six former metropolitan counties - Tyne and Wear, Merseyside, Greater Manchester, West Yorkshire, South Yorkshire and the West Midlands - together with the former Greater London county area and the amalgam of local districts known as Central Clydeside. These eight regions constitute the main conurbation cores of the country. Added to these are the remainders of the standard regions in which the metropolitan cores are located together with the other standard regions of the country - Northern Ireland, Wales, East Midlands, East Anglia and the South West. The South East Remainder is divided into Outer Metropolitan Area and the Outer South East. Northern Ireland appears and disappears from the tabulations and graphs in the paper depending on the data source being used.

For a number of purposes it is useful to group these 20 regions into metropolitan zones (9) and non-metropolitan (11), and into Northerm (14) and Southern (6). The North-South divide is drawn roughly between the Severn and Humber estuaries (Figure 1).

In the next section of the paper we review the trends in elderly migration, first surveying the data sources available and existing attempts at analysis. Then the trends across ages and between time periods are reviewed using a variety of derived measures of migration. The third section of the paper addresses the contribution of migration to elderly population redistribution drawing on an analysis of shift components over the period 1976-81. The fourth section of the paper uses a set of population projections for the 20 region system to elucidate the ageing in place contribution to the projected redistribution over the period 1981 to 2031.

2. TRENDS IN ELDERLY MIGRATION

2.1 Data sources

Migration data are available from the 1961, 1966, 1971 and 1981 Censuses of Population. Because of boundary and question changes, exact comparisons can be carried out only between 1971 and 1981 using the tabulations based on the question "What was your address one year ago?". These data count all "transitions" between initial and current locations in the one year interval prior to the 1971 and 1981 Censuses. These data are used to establish trends in elderly migration.

Since 1975 further migration statistics have been made available by the Office of Population Censuses and Surveys (OPCS) using patient re-registrations recorded in the National Health Service Central Register (NHSCR). Comparable data are available for "moves" from 1975-76 to 1985-86 between Family Practitioner Committee Areas (95 units in England and Wales). The 1976-77 to 1980-81 data are used in the population projections reported in the paper, based on summary computer tabulations provided by OPCS. Work on extracting equivalent and more detailed data from computer tapes for 1982-83 to 1985-86 is in hand but not yet ready for analysis. The summaries of NHSCR re-registrations provided in OPCS Monitors, Series MN, are useful for gaining some idea of trends in total migration, but are of insufficient precision to say anything meaningful about trends in migration in specific age groups.

Before proceeding to a comparison of the migration patterns revealed by the 1971 and 1981 Censuses, note should be taken of the general trend in migration in Britain since 1960-61. Table 1 puts together selected measures and then uses them to produce a time series index (last column). Setting the overall level of migration activity in 1970-71 at 100 when 105 transitions were observed per 1000 population, the index starts at 92 in 1960-61, rises to 100 in 1970-71, probably continues to rise to a peak in 1973-74, falls back to 100 in 1975-76, falls gradually to 1978-79, then precipitously to 1980-81 to a value of 81, rising thereafter but not quite recovering by 1985-86 to the level observed in 1960-61. These fluctuations need to be borne in mind when comparisons of just two points in time are made.

Note from Table 1 also the effect that spatial scale has on the rate of migration. The scale (20 spatial units) that we adopt lies between that of region (11 units) and that of county (64 units), so that the inter-area crude migration rates lie roughly between 10 and 20 per thousand. They thus represent events as frequent in occurrence in the population as births or deaths.

2.2 The pattern of migration over age

Rees (1979) investigated the age profiles of inter-regional

migration rates for 1970-71 and came to the following conclusions about elderly migration

> "Retirement peaks in the migration schedules are evident only at muted scale in total out-migration or in-migration flows (7 out of 10 regions). They are pronounced features of only selected migration streams, such as South East to South West ..., West Midlands to South West ..., South East to East Anglia ..., East Midlands to Yorkshire and Humberside. The corresponding migration counter-streams ... fail to show marked retirement peaks." (Rees 1979, p.64)

In other words where an inter-region migration stream contained migration flows from major urban areas to retirement locations then a marked peak at ages 65-69 (males) or 60-64 (females) was observed in the migration rate schedule.

This observation was repeated and clarified for 1980-81 migration flows by Rees and Warnes (1986) using the 20 region set (Figure 1). Pronounced peaks at the retirement ages were present in only a small minority of migration streams: those between each metropolitan core and selected retirement regions (usually the nearest). Peaks were not present in the reverse flows, in flows between metropolitan regions or within regions. Figure 2 presents examples of each type of profile. Flows within Greater London exhibit a child dependant, a labour force and a constant component but no retirement component, although there is a rise in the migration rate in the final age group. The Greater London to East Anglia migration stream exhibits a retirement peak that is higher than that for the labour force. The reverse stream exhibits an early labour force peak but little migration outside the 15-35 age range. The same is true for the example of inter-metropolitan migration from the West Midlands metropolitan county (Greater Birmingham) to Greater London.

These migration rate schedules suggest that the different age groups exhibit different spatial patterns of migration between regions. To examine these different patterns we select four individual five year age groups - for males - young adults (aged 20 to 24 years), young middle aged (40 to 44 years), the retirement age group (65 to 69 years) and the older elderly (aged 75 and over).

2.3 Levels of migration in 1970-71 and 1980-81

Figure 3 compares the levels of in-migration in the four selected age groups across 19 of the 20 regions (migration to Northern Ireland for 1970-71 was not available). The number of in-migrants to a region in 1980-81 is divided by the corresponding figure for 1970-71 and multiplied by 100 to yield a time series index.

Levels of migration fell in virtually all instances (i.e. values are less than 100). The rates of migration (migration/population) fell further than the numbers indicated because each of the age

groups chosen grew in population over the decade, particularly the pensionable ages. The overall increase in Great Britain's population was only 0.6% between 1971 and 1981, but the pensionable age population grew by 10% and 75+ age group by 24%. Hence the higher index values for the 75+ age group, which probably disguise a fall in rates equivalent to those in the other age groups.

What do the figures tell us about the shifts in migration destinations between 1970-71 and 1980-81? For the 20-24 age group the main contrast is between the greater than average decreases in level for metropolitan and non-metropolitan regions in the North (except for Scotland Remainder where new oil jobs played a role) on the one hand, and Greater London on the other, which exhibits the least decrease. For 40-44 year old migrants, the pattern of decreases above and below the national mean is not systematic with reference to our four way classification of regions. For retirement age migrants, the principal contrast is between on the one hand three traditional regions of settlement at retirement - North West Remainder, Outer South East and the South West - where decreases are greater than average, and on the other hand many of the metropolitan regions where decreases are less than average, with three regions recording increases. The pattern for the 75+ age group is again unsystematic.

2.4 Shares of internal migration

Another way of looking at the changing migration patterns is to examine what shares of the national migration pool each region is able to capture. Shares of the national pool in 1970-71 can be compared with percentages achieved in 1980-81. Figure 4 displays these shares in graphical form for 19 Great Britain regions for the four selected age groups, and Table 2 summarizes the percentages for a fourway grouping of regions.

The Southern regions capture the lion's share of in-migration. Whereas the share of national population in the South was 47/49% (1971/1986), the share of in-migration was 60 to 70% depending on age group. There is a sharp contrast between metropolitan and non-metropolitan regions in the South across the age groups. Greater London absorbed 15.6% (1970-71) and 18.8% (1980-81) of Great Britain's internal migrants in the young adult ages (20-24) but only 3.1% (1970-71) and 4.1% (1980-81) of retirement age migrants. By contrast the non-metropolitan regions in the South attracted 30.0% (1970-71) and 30.6% (1980-81) of 20-24 year old male migrants compared with 55.5% (1970-71) and 51.1% (1980-81) of 65-69 year old male migrants. The shares for 40-44 and 75+ year olds in these two sets of regions are intermediate between these two extremes, but with the Outer South East absorbing higher percentages of the older elderly migrants (75+) than the other regions relative to retirement age migration (65-69).

The Outer Metropolitan Area is unique in that its shares of

in-migration are highest for the 75+ age group. Rees and Warnes (1986) suggest this may be due to the concentration of residential homes and care institutions for the elderly in this settlement ring around London.

In the North the metropolitan regions also fail to attract retirement age migrants, but the non-metropolitan regions prove most attractive to middle aged migrants rather than the elderly. This suggests that a proportion of the Northern metropolitan region migrants choose Southern non-metropolitan destinations.

For elderly migrants the picture is one in which the majority chose non-metropolitan destinations rather than metropolitan, and this preference is much more marked than for younger ages (Table 2). Elderly migrants could in this sense be said to be "leading" this aspect of the population deconcentration occurring in Britain over the past two decades. However, when we compare the 1970-71 pattern with that in 1980-81, we see that the non-metropolitan preference has increased a little for the 20-24 and 40-44 year old age groups, but has decreased for the two elderly age groups (79.3% to 76.3% for 65-69 year olds, and 63.5% to 62.5% for 75+ year olds), as has the preference for the South over the North (69.5% to 66.0%) for 65-69 year olds but not for 75+ year olds. Elderly migrants in 1980-81 were not quite so enthusiastic about moving to non-metropolitan retirement areas as they were in 1970-71. Among the younger migrants, the non-metropolitan share remains constant for 20-24 year olds and increase for 40-44 year olds.

2.5 Net migration patterns

A traditional way of looking at the contribution of migration to population trends is to compute the net balance of in- and out-migration streams. This is done in Table 3. The table displays four dimensions - time, age, broad region and metropolitan status.

Generally speaking, net migration levels are lower in 1980-81 than in 1970-71; the redistribution from metropolitan cores to non-metropolitan regions exceeds that from Northern to Southern; the contribution to the latter trend is predominantly in the retirement age group (65-69) rather than at older or younger ages. However, patterns in the young adult ages (20-24) do depart from those at the other ages. Metropolitan areas in the South gained in net terms in 1970-71 and 1980-81. In 1970-71 Greater London experienced net loss in 20-24 year old net migrants but this was compensated for by gains in the Outer Metropolitan Area (OMA). In 1980-81 OMA gains were much lower but Greater London switched to being a net gainer. This was a remarkable turnaround in Greater London's position given that 1980-81 saw massive job losses and rapidly rising unemployment in the national economy. Just as both metropolitan and non-metropolitan regions in the South gained migrants at ages 20-24, so both Northern region groups suffered net migration losses in 1980-81. So the pattern of net migration in the 20-24 year old age

group was one of Northern loss and Southern gain, rather than metropolitan loss and non-metropolitan gain. However, in this respect the age group is probably unique, as the next analysis shows.

2.6 Ratios of in-migration to out-migration

One worry with our analysis to date is that our selection of age-sex groups may be biased, and that the four selected age groups may not represent the full range of ages. To check this the next measure of migration to be employed was computed across all age groups for selected regions. The measure used is the ratio of in-migration to out-migration, which for convenience is multiplied by a constant of 100. A value of 50 means that there are only 50% as many in-migrants to a region as out-migrants from it. A value of 150 means that there are 50% more in-migrants than out-migrants.

In Figure 5 are plotted these ratios for all age groups for one region from each of the four (North/South, Metro/Non-Metro) groups, for both male and female migrants. The graphs reveal that the ratio value for ages 20-24 can be grouped with those for ages 15-19, and those for 65-69 with ages 60-64; those for ages 40-44 are representative of values from 25-29 to 50-54; ages 55-59 and 70-74 show values intermediate between the retirement ages and the older elderly. The graphs show that female migrant ratios reach peaks or troughs earlier than male migrants at young adult or retirement ages.

The ratios for all 19 regions for our selected age groups are displayed in Figure 6 for both 1970-71 and 1980-81. The ratios for the seven Northern metropolises are consistently below 100 (except for West Yorkshire's 75+ age group in 1970-71), but lowest in the retirement age group. Ratios are lowest in Central Clydeside, Merseyside and Greater Birmingham. The ratios in 1970-71 and 1980-81 are very similar except that they are all slightly higher for the retirement age group.

The ratios for the Northern non-metropolitan regions are generally close to 100 or above it, and well above it for ages 65-69.

These patterns are repeated for the Southern regions but with a more marked variation between the low ratios at the elderly ages for Greater London and the high ratios for East Anglia, the South West and the Outer South East. However, these high ratios are all reduced in 1980-81 compared with 1970-71, and the low ratios for Greater London and the Outer Metropolitan Area are raised.

2.7 Summary of findings

In this section of the paper the patterns of elderly migration have been compared with those in other age groups and over the past two

censuses. Although, in general, the elderly are not very migratory compared with younger people, there is a minority who undertake long distance migration (inter-region) around retirement (aged 65-69 if men, 60-64 if women). They show revealed residential preferences (as indexed by the ratio of in-migration to out) that are more pronounced than those of both younger and older migrants, who are constrained by the location of employment and of carers respectively. The exodus of retirement age migrants from the nation's metropolitan cores to peripheral regions is the dominant pattern - very few persons participate in the counterstreams in their 60's though a few may do so in their 70's. The young elderly have been pioneers in the process of population deconcentration.

However, the young elderly were more actively engaged in these processes some sixteen years ago than they were six years ago, when migration levels as a whole were depressed. Whether, with the moderate recovery of migration activity since 1981-82, the redistribution has continued to slacken or has intensified again, is a question being actively researching using NHSCR derived miigration data.

The paper now proceeds from an analysis of migration patterns in isolation to a consideration of how migration contributes along with other components to elderly population change.

3. ELDERLY MIGRATION IN A COMPONENTS FRAMEWORK

3.1 Introduction

Regional projections of the elderly consist of population stocks broken down into appropriate ages at successive points in time. Each regional elderly cohort (or group of people born in the same set of years) ages over a time interval and loses members through death, through out-migration to other parts of the same nation, and through emigration to other parts of the world. Each regional cohort gains members from other regions and other countries. Migration can result in gains to the regional cohort or loss; mortality represents, however, purely losses which eventually lead to the complete attrition of the cohort.

These gains and losses to each regional cohort can be viewed as composed of two parts: the national change on the one hand and on the other the regional shift or departure of the region from the national norm. The techniques of shift-share analysis are partially adopted here to describe the extent to which regional populations depart from national expectations.

Of course, the elderly population as a whole does not disappear. New recruits are provided in successive time intervals by persons attaining an elderly age, defined operationally to be age 60. The fluctuation over time in new recruits to the elderly population attaining their 60th birthdays will reflect both the fertility history of the regional population 60 years earlier and the processes of migration and differential mortality between birth and age 60. These fluctuations can be examined in relation to national trends, although a full decomposition into birth and subsequent components of change is not attempted here. It would require full knowledge of regional population accounts back to 1916!

The methods used for analysis of individual period-cohorts of the elderly population are now outlined and then used to examine the components of elderly population change across seven elderly period-cohorts for 20 United Kingdom regions (Figure 1) in a recent five year period (1976-81).

3.2 A components framework: theory for the period-cohort perspective

3.2.1 Gross and net components of population change

Adopting a projection viewpoint we work with the period-cohort framework (the stippled areas in Figure 7) for the observation of demographic events. The following variables are defined.

P(i,.,a) = population of region i at the start of the time interval in period-cohort a.

D(i,a) = deaths in region i to the period-cohort a in the time interval.

M(i,j,a) = (internal) migrations from region i to region j by persons in period-cohort a.

M(i,.,a) = total (internal) migrations from region i to all other regions by persons in period-cohort a

M(.,i,a) = total (internal) migrations to region i from all other regions by persons in period-cohort a

E(i,a) = emigrations from region i to other countries by persons in period-cohort a.

I(i,a) = immigrations to region i from other countries by persons in period-cohort a.

P(.,i,a) = population of region i at the end of the time interval in period-cohort a.

Initial and final populations in period-cohort a are linked by the following accounting identity

$$P(.,i.a) = P(i,.,a) - D(i,a) - M(i,.,a) - E(i,a) + M(.,i,a) + I(i,a) \qquad (1)$$

These components of change can be simplified into deaths plus net internal migration plus net external migration or just into deaths plus net total migration.

3.2.2 National components and regional shifts

Parallel to these regional relations we can define the equivalent national variables substituting the subscript N for i in the definitions above.

The average population is adopted as the population at risk

$$P(i,a) = (P(i,.,a) + P(.,i.a)) / 2 \qquad (2)$$

The national rates for each component are defined as

$$d(N,a) = D(N,a)/ P(N,a) \qquad (3)$$

$$m(N,a) = M(N,.,a)/ P(N,a) = M(.,N,a) / P(N,a) \qquad (4)$$

$$e(N,a) = E(N,a)/ P(N,a) \qquad (5)$$

$$i(N,a) = I(N,a)/ P(N,a) \qquad (6).$$

Each regional component can be decomposed into a national portion and a regional shift. The national parts consist of the regional population at risk multiplied by the national rate for the event concerned. The national part is that change for the component expected if the region reproduced national rates of change. Regional shifts represent the change peculiar to the region itself and are computed as residuals (R before the variable concerned):

$$RD(i,a) = D(i,a) - d(N,a)\,P(i,a) \quad (7)$$

$$RMOUT(i,a) = M(i,.,a) - m(N,a)\,P(i,a) \quad (8)$$

$$RE(i,a) = E(i,a) - e(N,a)\,P(i,a) \quad (9)$$

$$RI(i,a) = I(i,a) - i(N,a)\,P(i,a) \quad (10)$$

$$RMIN(i,a) = M(.,i,a) - m(N,a)\,P(i,a) \quad (11).$$

Another way of expressing these shifts is as differences between the national and regional rates. The ratio of regional to national rates when multiplied by 100 gives us sets of standardized rates:

$$\text{standardized rates} = 100\ (\text{regional rate} / \text{national rate}) \quad (12)$$

in which the national mean is 100, rates above 100 indicates greater than average rates and less than 100 indicates less than average.

The shifts for the gross components can be reduced to net shifts by subtracting the outward migration shift from the inward.

The net shift for the internal migration component reduces to the observed net internal migration. Each of these three net shifts can be expressed as a percentage of the total absolute value of the net shifts to yield an assessment of the contribution of mortality differentials, internal migration flows or external migration differentials to the observed departure of regional population change from the national norm.

Parenthetically, we may note that the structural shift identified in shift-share analysis is absent in this procedure because the "sectoral" dimension (age) is retained.

3.2.3 An illustration

Table 4 sets out the illustrative arithmetic of the components analysis described above for Greater Manchester. These components derive from sets of multiregional movement accounts described in Rees (1986).

One can see that the population of 60-64 year olds in Greater Manchester (GM) in 1981 is the result of a reduction of the 55-59

population there in 1976 of 153,500 by 12,326 deaths, 469 emigrations and 6,395 out-migrations to other parts of the UK, partially compensated for by the addition of 253 immigrations from abroad and 3,840 internal migrations from other British regions (Table 4A).

Table 4B shows that the population reduction of 15,097 in this period-cohort in Greater Manchester is made up of 12,326 deaths, a net external migration loss of 216, a net internal migration loss of 2,555 and therefore a net overall loss due to migration of 2,771.

Table 4C expresses both the gross and net components of change as annual equivalent rates per 1000 average population in the time interval (1976-81). Greater Manchester's death rate is 16.89 per 1000 in the 55-59 to 60-64 period-cohort and the internal migration rate is just over half this level at 8.76 per 1000. The internal in-migration rate is lower at 5.26 per 1000 and the external and net migration rates much smaller.

The standardized rates of Table 4D place Greater Manchester in relation to the nation. The rate of population decline is 36.7 per cent greater than that of the UK; the death rate is 13.9 per cent higher; all the migration rates are lower than the national norms but, because the in-migration rates are lower than the out-migration rates, migration loss contributes 22.8 per cent to the standardized population change rate.

The pattern of population change expected if each region exactly mirrored the nation is set out in Table 4E. By assumption all internal migration flows balance. In Greater Manchester's case there are many fewer deaths (10,826) under these utopian conditions than we actually observe (15,097).

Subtraction of the expected components in Table 4E from the observed components of Tables 4A and 4B yields the regional shifts (or departures from the national norm) of Table 4F. Greater Manchester has 1,500 more deaths, 320 less emigrations, 319 less immigrations, 1611 less internal out-migrations and 4,166 less internal in-migrations than it would have if it reproduced national demographic behaviour. The net shift of internal migration is a loss of 2,555, but a tiny positive shift in external migration is recorded (the region loses through external migration but slightly less strongly than the nation).

The percentage contributions of the net shifts to an absolute value sum of those shifts are set out in Table 4G. Some 63% of the depression of Greater Manchester's population below that of the nation is due to internal migration and 37% to higher mortality.

3.3 Shifts in components across the elderly ages

3.3.1 A classification of shifts in the components of change

In a previous analysis (Rees and Warnes, 1986), a simple classification of the pattern of elderly population change was developed based on the direction of shift (positive or negative) for the deaths, net internal and net external migration components. Eight types of change were distinguished in relation to the national norm (Table 5). The classification represents, in part, a gradation from most favoured region (in demographic terms) to least. For example, type A regions experience fewer deaths than the nation, gain through internal migration and show positive shifts in external migration (and often gains). For the period-cohort 55-59 to 60-64 in 1976-81 Table 6 shows the regions belonging to each type of shift combination.

To what extent is this picture of population change, based on the youngest elderly period-cohort, characteristic of other elderly period-cohorts in which most members will have retired? Table 7 sets out the population shift types into which each region's population falls for seven elderly period-cohorts. The classification of the first column has already been reported in Table 6. There is a fair measure of agreement across the age groups in the pattern of population shift. Eight of the 20 regions retain the same classification across all age groups, and five more show only one deviation from a common pattern. There are thus seven regions which show variation in population shift type across the age groups.

The East Anglian population moves from positive to negative shifts for net external migration from age 70-74 (in 1976), although the numbers involved are very small. The East Midlands population experiences a worse than national average risk of mortality for age groups 70-74 to 80-84 (in 1976), although the standardized mortality rates are only 1 per cent or so above the national average. The Welsh population exhibits a transition from net internal migration gains and positive external shift to net internal losses and negative external shift as more aged populations are considered. Around retirement the region is attractive to migrants but not beyond age 70. The North West Remainder's population shows variation in the internal migration component - gains from ages 55-59 to 60-64 (in 1976), losses from 65-69 to 75-79, and then gains again in the 80-84 and 85+ age groups. A somewhat similar pattern occurs for the North Remainder's population but along with a pattern of negative external migration shift. For Northern Ireland the deaths and internal migration shifts remain constantly negative but the relatively small external component varies between positive and negative. Finally, Central Clydeside shows positive external migration shifts in the 60-64 and 65-69 age groups (in 1976): the balance of external migration remains negative, however, in both these age groups.

Overall, the changes that take place are confined to one

component, and a majority involve the rather small and least reliably estimated external migration flows. The pattern of Table 6 (and Figure 11 of Rees and Warnes, 1986) is not greatly altered when we use all the elderly ages. The West Midlands Remainder moves to type E, the North Remainder to type H, but otherwise there is agreement.

To generalize, the pattern of mortality shift is one of a regional gradient from South and East regions (favoured) to North and West regions (unfavoured). The pattern of internal migration is one of a metropolitan (unfavoured) to non-metropolitan (favoured) gradient. The pattern of external migration is one of positive shifts for non-metropolitan regions and for the mid-northern metroplitan counties which have been important destinations for overseas immigration in the past.

3.3.2 The size of shifts in the components of change

The classificatory analysis disguises somewhat the systematic change in the absolute size of changes as the population ages, and the change in the relative contribution of the different components of change. The older cohorts are much smaller than the younger, and much more subject to the influence of mortality. Figure 8 illustrates these age effects for Greater London and the South West. The internal migration gains and losses are dominant in the first three age groups and are relatively unimportant after age 75. Mortality shifts rise to the 70-74 to 75-79 period-cohort as mortality rates rise faster than the populations at risk diminish but thereafter the shift diminish as the population reduces rapidly. External migration shifts contribute only marginally and only in the first three period-cohorts.

The relative contribution of the deaths shift to the absolute value of the deaths and net migration shifts added together is listed in Table 8. The sign indicates whether regional deaths are less than the national norm (negative) or more than it (positive). After age 70-74 the contribution of the deaths shift dominates but in the first three age groups the situation is very variable. In the "deepest north", in Central Clydeside, Scotland Remainder, Northern Ireland, Tyne and Wear and North Remainder, the greatest contribution (more than 50%) to greater than average population attrition comes from the regions' poor mortality performance. For most other non-metropolitan regions migration gains play the biggest role in redducing population losses below the national average. In Greater London and Birmingham the migration loss component is dominant, and in the Outer Metropolitan Area the deaths shift predominates. The picture varies in the other regions over the first three age groups.

4. AGEING IN PLACE

4.1 A components framework for the period-age perspective

The analysis described in the previous section involves semi-closed populations that do not replace themselves, but merely exchange populations among themselves. Elderly cohorts disappear quite quickly over time. An alternative perspective is to use an open system in which the elderly population is replaced by new recruits. The new recruits are persons attaining the starting age assigned to the elderly population. These new recruits are the elderly equivalent of new infants in the population as a whole. In this way we can estimate more precisely the contribution of "ageing in place" to elderly population change.

Here, the starting age is defined as a person's 60th birthday and attention is focussed on the elderly population as a whole across future years. In Figure 7 is shown the age-time plan used. The components of change for ages 60 and over are estimated by addition of the six oldest period-cohorts and half of the 55-59 to 60-64 period-cohort.

Table 9A sets these aggregate figures, adding a 60th birthdays column to those which appeared in Table 4. Note that for the Greater Manchester population the number of such new entrants exceeds the losses due to deaths but not those due to deaths and migration combined. Table 9B contains the net components of change for the population aged 60 and over. The new additional column is labelled "natural increase" and is computed as the difference between the numbers attaining their 60th birthdays and the numbers of deaths to persons aged 60+.

Over the 1976-81 period the surplus of new entrants over deaths was some 220 thousand for the United Kingdom as a whole. In only two regions was this surplus negative, and in only four regions were the natural surpluses exceeded by migration losses. Table 9C computes the annual equivalent rates per 1000 for both gross and net components.

It is necessary not to take the term "natural increase" too literally. The number of persons attaining their 60th birthdays in a region depends both on the number born there and the subsequent history of all regional cohorts. The task of linking the elderly back to their birth regions is not attempted in this paper. What it is possible to do, however, is to peer into the future through a projection exercise. This makes possible the assessment of the influence of past population history, as represented by the regional distribution of 60 year olds in 5 year periods from 1976-81 to 2026-31, on fluctuations in the regional elderly populations. These fluctuations, due in the main to temporal variation in the size of birth cohorts in the past, have a profound impact on the national aged population (see Rees and Warnes, 1986, section 7.1). In

section 4.2 the regional impacts are described, focussing on the balance of 60th birthdays and deaths. Since the projections used assume constant mortality and migration rates over the period of the projections, the patterns of such change replicate those described for the base period, 1976-81, in section 3.

4.2 The balance of 60th birthdays and elderly deaths to 2031

The "natural increase" rates or NIRs (named thus for the sake of convenience) for the 20 UK regions and the nation are graphed from 1976 to 2031 in Figure 9. The national pattern follows quite closely that of the projected population of 60-64 year olds (Rees and Warnes, 1986) - the deaths part of the "natural increase" calculation follows a much smoother trend as it involves the whole elderly population. Figure 7 enables us to match those fluctuations with earlier fertility phases. The fall from 1976-81 to 1991-96 matches the fertility drop from 1916-21 to 1931-36; low NIR levels in 1996-2001 match continuing low birth numbers in 1936-41; rising NIRs in 2001-06 and 2006-11 correspond with the increasing births of the later Second World War years and the post-war baby boom (particularly 1947); the fall in 2011-16 reflects the trough for births in the early 1950's; the rise to 2012-26 and high level in 2026-31 represents the sustained fertility rise of the late 1950's and high fertility of the 1960's (only in 1971 did the total fertility rate drop back to replacement).

The graphs for the regions have been arranged in groups corresponding roughly to the component shift groups identified in section 3, since the possibility exists of links between migration flow patterns and "natural increase" patterns. Here several links are suggested in interpreting regional departures from the national trends, although ideally all need further careful verification. There are also clearly links to past regional fertility history. The discussion focusses on the most extreme patterns of NIR fluctuation.

Northern Ireland. In 1976-81 the Northern Ireland elderly NIR is close to the UK figure, but it successively departs from it as time goes on, reflecting the arrival at their 60th birthdays of larger and larger cohorts. In the last 15 years of the projection period Northern Ireland elderly NIRs are double those for the UK as a whole.

Outer Metropolitan Area. This region exhibits NIRs well above the national norm but they tend to converge over time towards those of the UK. Here the explanation is not that regional fertility was higher than that of the nation but rather lies in the history of migration to the region. Persons attaining their 60th birthdays in the region in 1976-2001 were in their 20s and 30s in the period 1926-71 which saw massive expansion of suburbs, new towns, commuter settlements and industrial satellites in this peri-metropolitan belt

wwhich drew in large numbers of in-migrants. This bulge of in-migrants become the elderly of the region in the rest of the century and sustain the "natural increase" of the belt. The convergence of Outer Metropolitan and national NIRs in the 2001-2031 period reflects the lesser growth rate in the region in the 1970's and the migration pattern of the 1976-91 base period.

Outer South East. Until 2001 this region experiences negative NIRs. The number of deaths occurring in the region to persons 60 and over exceeds the numbers attaining age 60 in the region. This situation is fairly general in 1986-2001 but not in 1976-86. The excess of deaths probably reflects the considerable migration, after age 60, into the region making the 60+ population much larger than an "ageing in situ" of the population attaining age 60 would sustain.

Central Clydeside. Up to the end of the century, Central Clydeside's NIRs do not depart from the national trend by much, but after 2001 they all substantially below the UK average. Persons attaining age 60 in 2001-2031 will have been in their 20s and 30s in the 1961-2001 period, during which sustained out-migration from Greater Glasgow has occurred and is likely to occur. In part, this reflects suburbanization moving beyond the boundary of Central Clydeside, but also results from the process of abandonment of a devastated urban economy.

These remarks apply also, although in lesser measure, to Tyne and Wear, Merseyside and Greater Manchester, but not to the West Midlands metropolitan county where a history of higher past fertility and an attractiveness to migrants persisting into the 1950s plays a role in keeping the region's NIRs above those of the UK.

Greater London. The national capital exhibits higher NIRs than the nation throughout the projection period. Here the factor at work is probably the massive retirement migration stream out of the metropolis after age 60 which reduces the size of the elderly population well below that which an "ageing in situ" of those attaining their 60th birthdays would sustain.

5. CONCLUSIONS

The pattern of elderly migration has been shown to be one that favours non-metropolitan regions, particularly coastal areas and attractive inland countryside. In the decade around retirement a substantial minority of the elderly "vote with their feet" against continued metropolitan living. Beyond age 70, however, this preference is much less marked and is comparable to that exhibited in the late working ages (see Figure 5). The contribution of these patterns of elderly migration to population change is most important before age 75; beyond that age the influence of mortality differences between regions is more important (Figure 8). Even at the retirement ages the influence of mortality differences is more important in accounting for population change for Central Clydeside and Tyne and Wear. Elderly migration has its greatest influence in shifting population from the nation's capital to the other regions of the South.

A simple extrapolation of this pattern into the future is disturbed by the influence of ageing in place. The smaller cohorts that will become elderly in the next two decades ensure that, unless mortality decreases substantially, all regions (of our 20) will see a decrease in the number of 70-74 year olds compared in 2006 compared with 1981, and most regions will see decreases at ages 65-69 (Rees and Warnes, 1986, Figure 14). On the other hand every region will see substantial increases in their populations aged 75 or more, which, if mortality continues to decrease, will mean gains of between 50 and 100 % in these populations, with profound implications for the provision of care by the community for the infirm elderly.

Beyond 2006 the numbers of persons reaching their 60th birthdays increases substanially, leading to gains at all elderly ages compared with 1981 in all non-metropolitan regions together with South Yorkshire and the Outer Metropolitan Area (Rees, 1986, Figure 4). However, if the current migration patterns persist absolute decreases in elderly population should persist in most metropolitan regions.

Are current migration patterns likely to persist? Our comparison of 1970-71 flows with those of 1980-81 suggested that the "high tide" of counterurbanization had passed, and that perhaps we should expect further diminution of this process. On the other hand, migration activity was particularly depressed in 1980-81, and detailed analysis of more recent migration information is needed.

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TABLE 1. The crude migration rate 1960-61 to 1985-86, various measures

Year	Crude migration rate (per thousand)						
	Migration within England, Wales & Scotland	Migration within Great Britain				Migration in England and Wales	Synthetic index (1970-71 = 100)
	Total	Total	Inter-district	Inter-county	Inter-region	Inter-FPCA	
1960-61	95.8						92
1965-66	97.0						93
1970-71	104.5	108.8	46.1	28.6	15.5		100
1975-76						36.2	100
1980-81	84.0	89.8	34.6	22.5	11.6	29.3	81
1985-86						32.3	89

Source: adapted from Table 1 in Rees and Stillwell (1987) from OPCS Census migration and population tables and OPCS computer summaries and MN monitors.
Crude migration rate = (migrants/census population) x 1000

TABLE 2. The distribution of internal in-migrants in 1970-71 and 1980-81 for selected age groups (males)

Broad region & metropolitan status	Per cent of GB total Age group at end of year 20-24	40-44	65-69	75+
		1970-71		
North				
Metro.	17.2	14.8	6.8	13.7
Non-metro.	22.1	25.0	23.8	22.4
Sub-total	39.3	39.8	30.6	36.1
South				
Metro.	30.6	25.9	14.0	22.8
Non-metro.	30.0	34.5	55.5	41.1
Sub-total	60.6	60.4	69.5	63.9
Great Britain				
Metro.	47.8	40.7	20.8	36.5
Non-metro.	52.1	59.5	79.3	63.5
Total	100.0	100.0	100.0	100.0
		1980-81		
North				
Metro.	15.3	14.3	9.0	12.6
Non-metro.	21.6	26.2	25.2	23.0
Sub-total	36.9	40.5	34.2	35.6
South				
Metro.	32.5	24.9	14.9	25.0
Non-metro.	30.6	34.5	51.1	39.5
Sub-total	63.1	59.4	66.0	64.5
Great Britain				
Metro.	47.8	39.2	23.9	37.6
Non-metro.	52.2	60.7	76.3	62.5
Total	100.0	100.0	100.0	100.0

TABLE 3. Net internal migration into GB regions, 1970-71 and 1980-81

Broad region & metropolitan status	Per cent of GB total Age group at end of year 20-24	40-44	65-69	75+
		1970-71		
North				
Metro.	-6210	-1960	-2410	-470
Non-metro.	350	560	1810	160
Sub-total	-5860	-1400	-600	-310
South				
Metro.	810	-1380	-5790	-880
Non-metro.	5050	2780	6390	1190
Sub-total	5860	1400	600	310
Great Britain				
Metro.	-5400	-3340	-8200	-1350
Non-metro.	5400	3340	8200	1350
Total	0	0	0	0
		1980-81		
North				
Metro.	-6337	-1113	-1147	-355
Non-metro.	-1649	503	1167	198
Sub-total	-7986	-610	20	-157
South				
Metro.	6743	-946	-3609	-323
Non-metro.	1922	1558	3616	495
Sub-total	8665	612	7	172
Great Britain				
Metro.	406	-2059	-4756	-678
Non-metro.	273	2061	4783	693
Total	679	2	27	15

Note. The 1980-81 figures include net migration to and from Northern Ireland for GB regions.

TABLE 4. Components of change for the elderly population of the UK: illustration for age transition 55-59 to 60-64 for Greater Manchester, 1976-81

4A. GROSS COMPONENTS OF CHANGE

Initial population	Deaths	Emig-ration	Immig-ration	Internal Out-migration	Internal In-migration	Final population
153,500	12,326	469	253	6,395	3,840	138,403

4B. NET COMPONENTS OF CHANGE

Average population	Population change	Deaths	Net migration External	Net migration Internal	Net migration Total
145,952	-15,097	-12,326	-216	-2,555	-2,771

4C. RATES OF CHANGE (PER 1000 POPULATION)

Population change	Death	Emig-ration	Immig-ration	Internal migration Out	Internal migration In	NEM	NIM
-20.69	16.89	0.64	0.35	8.76	5.26	-.30	-3.50

4D. STANDARDIZED RATES OF CHANGE (UK = 100)

Population change	Death	Emigration	Immigration	Internal migration Out	Internal migration In
137	114	59	44	80	48

4E. EXPECTED COMPONENTS OF CHANGE

Population change	Death	Emig-ration	Immig-ration	Internal migration Out	Internal migration In	NEM	NIM
-11,043	10,826	789	572	8,006	8,006	-217	0

4F. SHIFTS IN THE COMPONENTS OF CHANGE

Population change	Death	Emig-ration	Immig-ration	Internal migration Out	Internal migration In	NEM	NIM
-4,054	1,500	-320	-319	-1,611	-4,166	1	-2,555

4G. PERCENTAGE CONTRIBUTION OF SHIFTS

Absolute value of shifts	Deaths	Net external migration	Net internal migration
4,057	37.0	0.0	-63.0

TABLE 5. Types of regional population shifts

Type	Deaths	Internal migrations	External migrations
A	fewer	gain	more
B	fewer	gain	fewer
C	fewer	loss	more
D	fewer	loss	fewer
E	more	gain	more
F	more	gain	fewer
G	more	loss	more
H	more	loss	fewer

TABLE 6. The 20 UK regions classified by population shift type, broad region and metropolitan status for age transition 55-59 to 60-64, 1976-81

Type	North		South	
	Metro.	Non-metro	Metro.	Non-metro.
A		Yorks.& Humb. Rem. W.Midlands Rem.		Outer South East South West East Anglia East Midlands
B			Outer Metro. Area	
C				
D			Greater London	
E		North West Rem. Scotland Rem. Wales		
F		North Rem.		
G	W.Midlands MC West Yorkshire South Yorkshire Greater Manchester			
H	Merseyside Tyne & Wear Central Clydeside	Northern Ireland		

Note: the country is divided into North and South along the line linking the Severn and Humber estuaries, approximately.

TABLE 7. Population shift type for 20 UK regions for 7 ages

Region	Age group in 1976 to age group in 1981						
	55-59 to 60-64	60-64 to 65-69	65-69 to 70-74	70-74 to 75-79	75-79 to 80-84	80-84 to 85-89	85+ to 90+
Non-metropolitan regions							
South							
Outer South East	A	A	A	A	A	A	A
South West	A	A	A	A	A	A	A
East Anglia	A	A	A	B	B	B	B
East Midlands	A	A	A	E	E	E	A
W.Midlands Rem.	A	E	E	E	E	E	E
North							
Yorks.& Humb. Rem.	A	A	A	E	A	A	A
Wales	E	E	E	F	H	H	H
Scotland Rem.	E	E	E	E	E	E	A
North West Rem.	E	E	G	G	G	E	E
North Rem.	F	E	H	H	H	H	F
Northern Ireland	H	G	G	G	H	H	G
Metropolitan regions							
South							
Outer Metro. Area	B	B	B	B	B	F	B
Greater London	D	D	D	D	D	D	D
North							
W.Midlands MC	G	G	G	G	G	G	G
W. Yorkshire	G	G	G	G	G	G	G
Greater Manchester	G	H	G	G	G	G	G
Merseyside	H	H	H	H	H	H	H
Tyne & Wear	H	H	H	H	H	H	H
Central Clydeside	H	G	G	H	H	H	H

Note: see Table 5 for definitions of the population shift types A-H.

TABLE 8. Percentage contribution of the deaths shift to the absolute value of shifts in three components

Region	Age group in 1976 to age group in 1981						
	55-59 to 60-64	60-64 to 65-69	65-69 to 70-74	70-74 to 75-79	75-79 to 80-84	80-84 to 85-89	85+ to 90+
Non-metropolitan regions							
South							
Outer South East	-26.9	-31.0	-44.9	-63.9	-71.4	-73.8	-87.4
South West	-21.0	-24.6	-41.1	-71.6	-79.1	-79.4	-80.5
East Anglia	-20.7	-21.0	-28.1	-53.1	-59.6	-62.7	-82.3
East Midlands	-19.1	-17.4	-11.3	7.7	53.5	57.7	-77.7
W.Midlands Rem.	-8.0	8.5	19.5	40.4	51.2	66.8	83.7
North							
Yorks.& Humb. Rem.	-13.6	-13.2	-5.3	52.7	-60.5	-78.8	-83.5
Wales	26.9	41.5	61.0	84.4	92.5	88.9	93.0
Scotland Rem.	47.3	60.2	68.4	81.7	89.3	89.7	-81.6
North West Rem.	27.4	46.9	96.6	93.3	97.1	98.4	99.2
North Rem.	75.9	75.8	95.8	94.4	95.8	97.0	99.5
Northern Ireland	58.5	72.7	83.2	90.2	83.8	95.2	98.5
Metropolitan regions							
South							
Outer Metro. Area	-77.1	-75.9	-71.1	-65.3	-69.1	3.9	-69.8
Greater London	-9.3	-14.8	-22.9	-45.5	-59.7	-64.1	-78.2
North							
W.Midlands MC	18.9	19.4	26.9	53.9	65.7	63.4	87.3
W. Yorkshire	33.2	43.9	59.2	79.0	78.0	60.9	81.9
Greater Manchester	37.0	42.1	61.2	82.8	87.5	86.7	96.3
Merseyside	37.5	46.8	64.6	72.4	70.6	66.3	88.2
Tyne & Wear	56.1	62.8	71.2	83.4	81.8	78.1	90.5
Central Clydeside	68.3	74.0	78.3	80.0	79.2	86.3	84.5

TABLE 9. Components of change for the population aged 60+: illustration for Greater Manchester, 1976-81

9A. GROSS COMPONENTS OF CHANGE

Initial pop.	Deaths	Internal out-migration	Emig-ration	60th birth-days	Internal in-migration	Immig-ration	Final pop.
521,100	139,642	18,735	916	145,952	12,255	516	520,530

9B. NET COMPONENTS OF CHANGE

Initial population	Population change	Natural increase	Net migration internal	external	total	Final population
521,100	-570	6,310	-6,480	-400	-6,880	520,530

9C. ANNUAL RATES OF CHANGE (PER 1000 POPULATION)

Death rate	Internal out-migration rate	Emigration rate	Birth rate	Internal in-migration rate	Immigration rate
53.6	7.2	0.4	56.0	4.7	0.2

Population change rate	Natural increase rate	Net migration rate internal	external	total
-0.2	2.4	-2.5	-0.2	-2.6

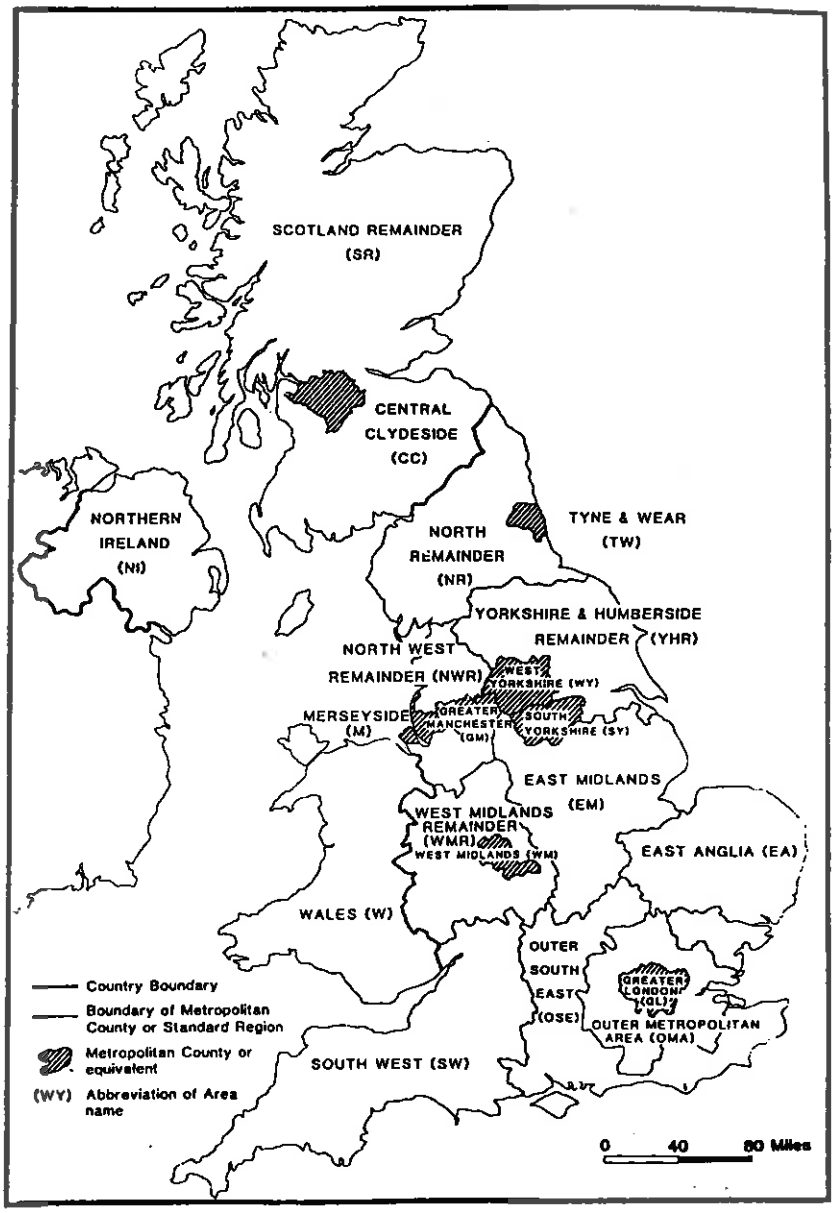

Figure 1 Metropolitan and non-metropolitan zones in the United Kingdom.

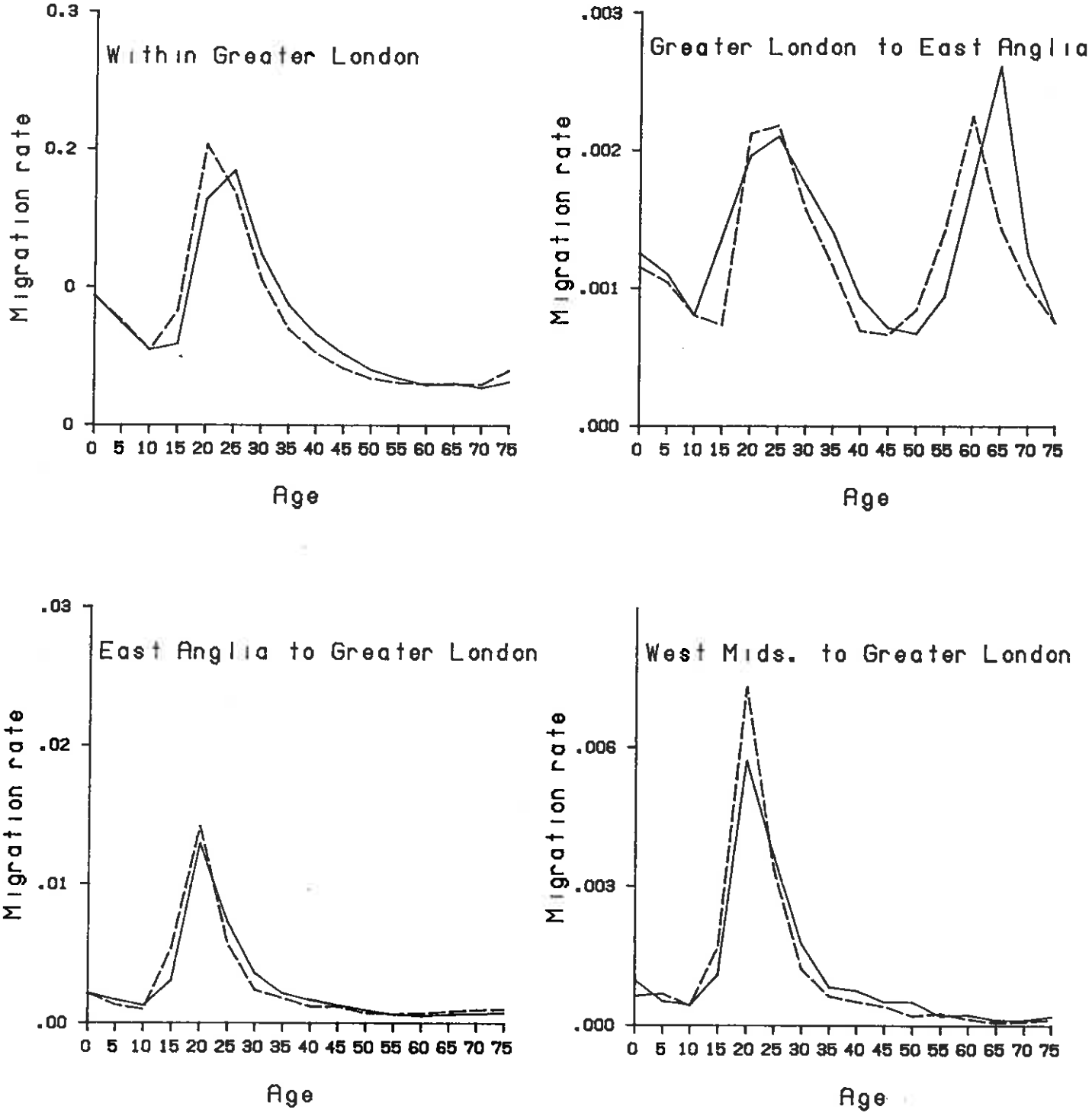

FIGURE 2. Examples of migration rate schedules, 1980-81

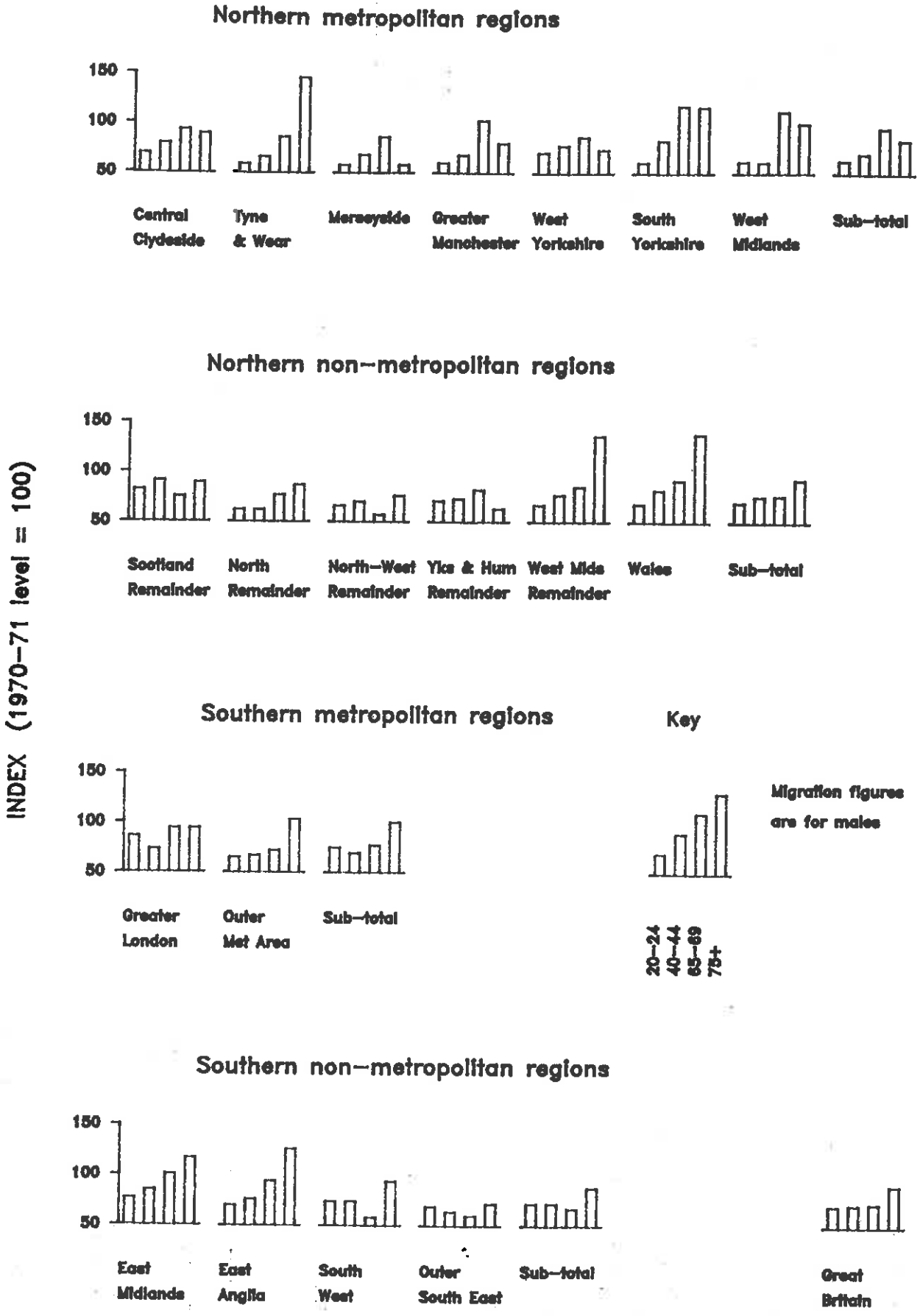

FIGURE 3. A comparison of migration levels in 1970-71 and 1980-81

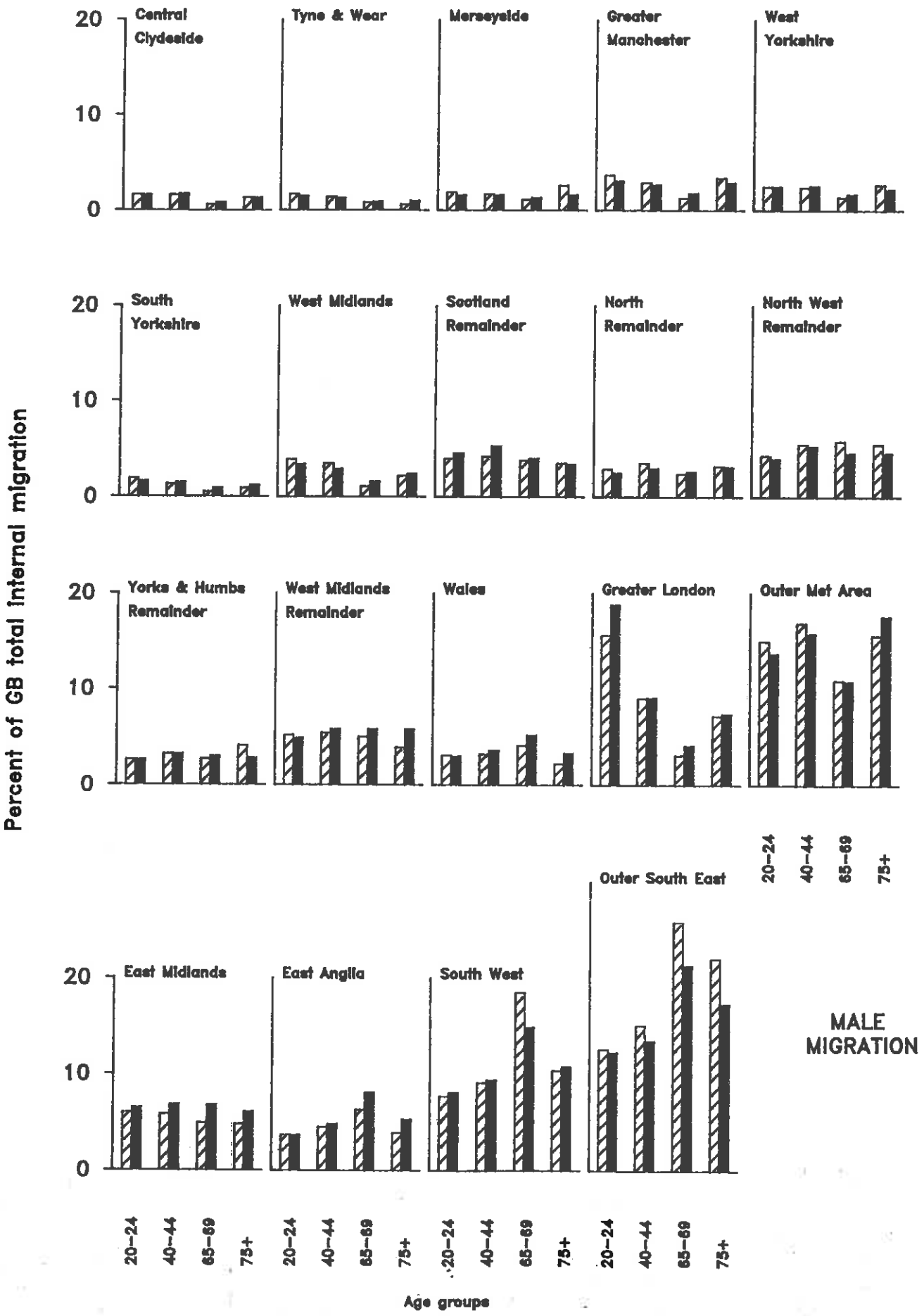

FIGURE 4. Shares of internal in-migration, 1970-71 and 1980-81

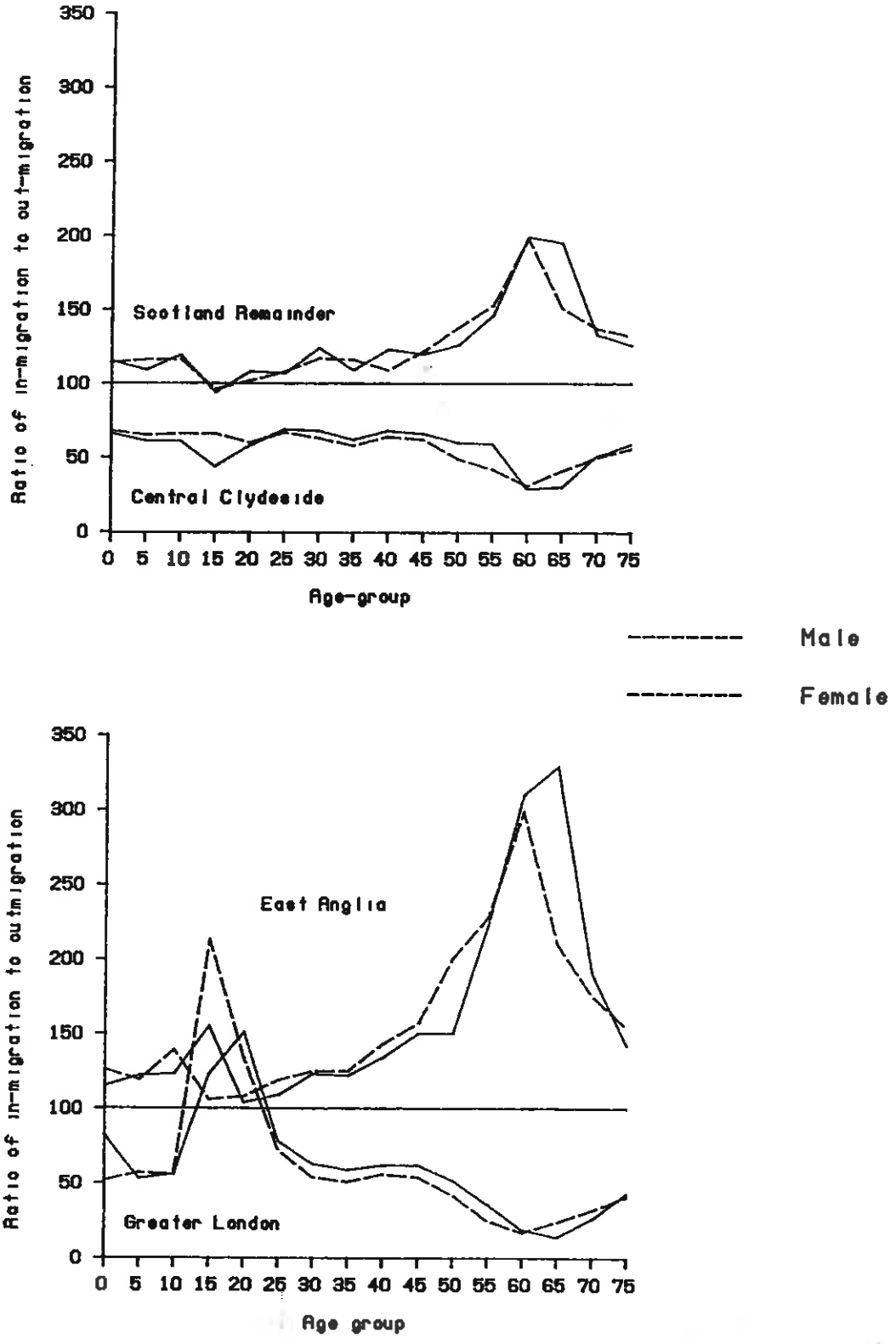

FIGURE 5. Ratios of in-migration to out-migration across all ages, 1980-81

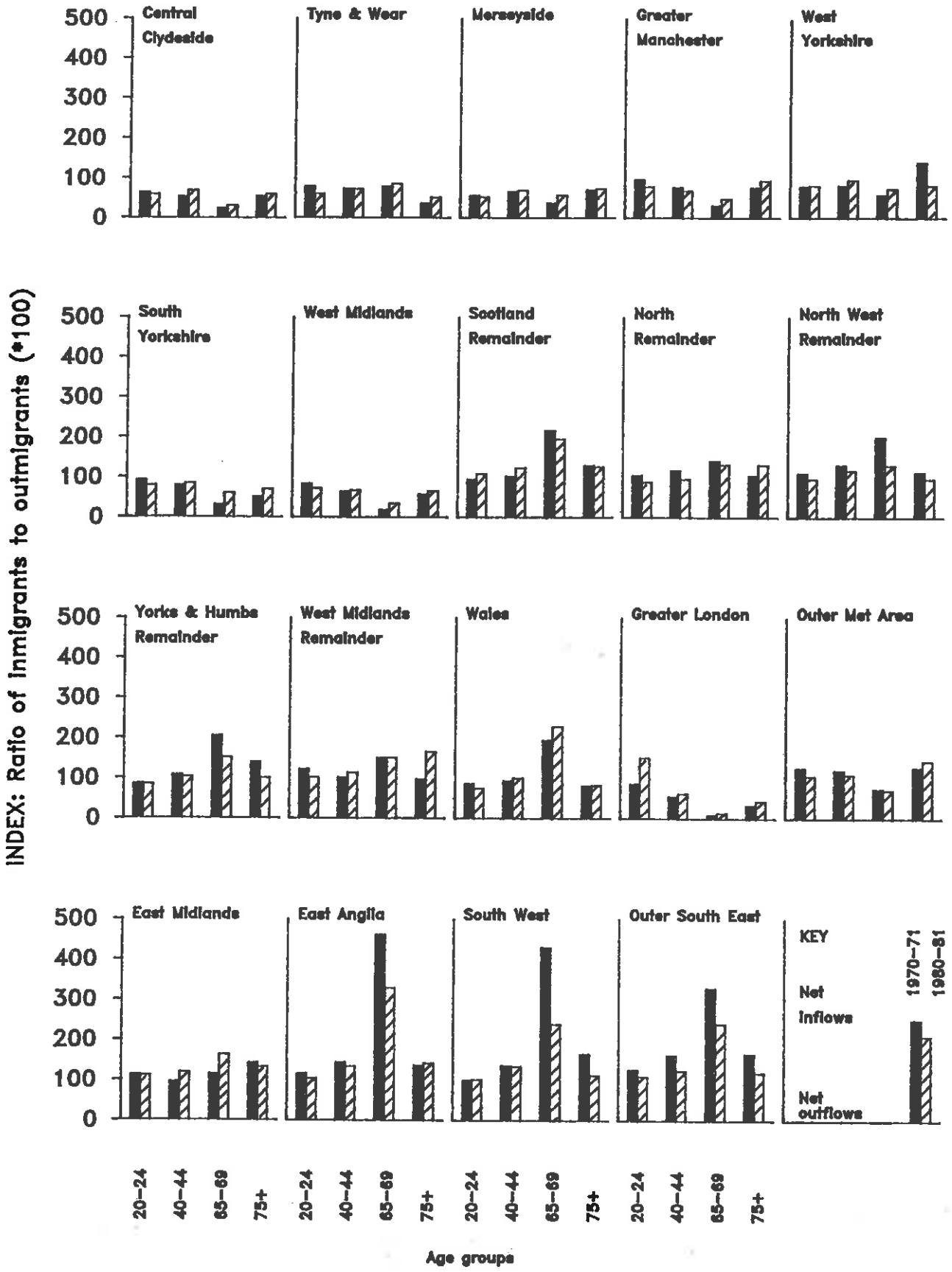

FIGURE 6. Ratios of in-migration to out-migration, selected age groups, 1970-71 and 1980-81

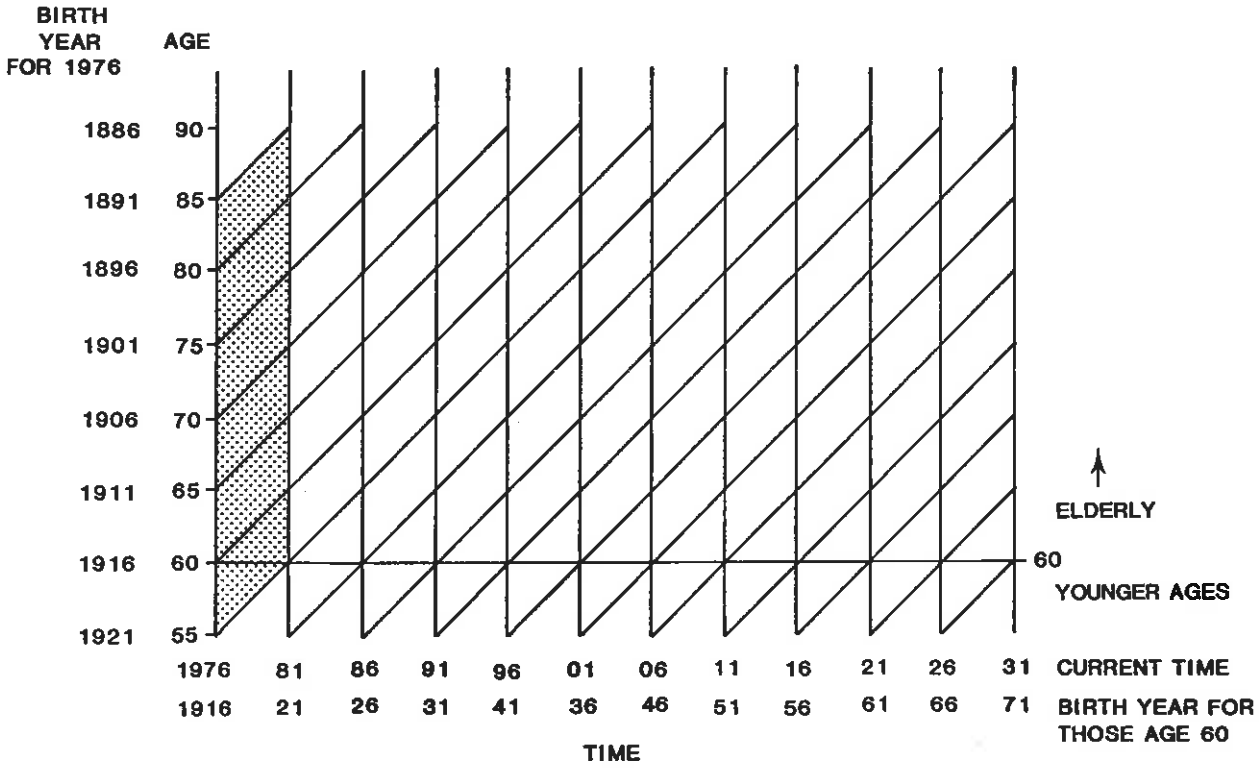

FIGURE 7. THE AGE-TIME PLAN FOR THE UK REGION PROJECTIONS

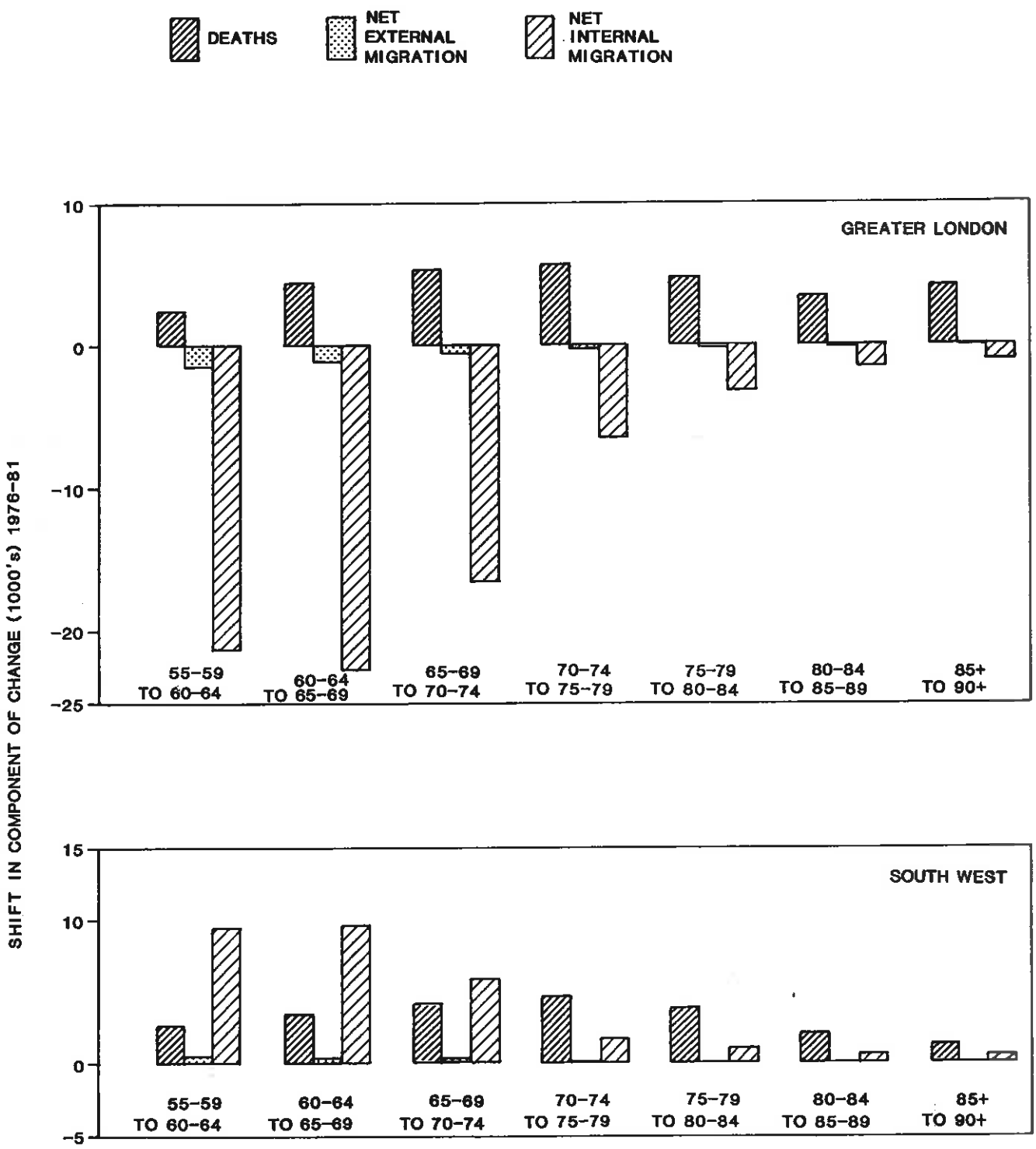

FIGURE 8. SHIFTS IN THE COMPONENTS OF GROWTH BY AGE, 1976-81, SELECTED REGIONS

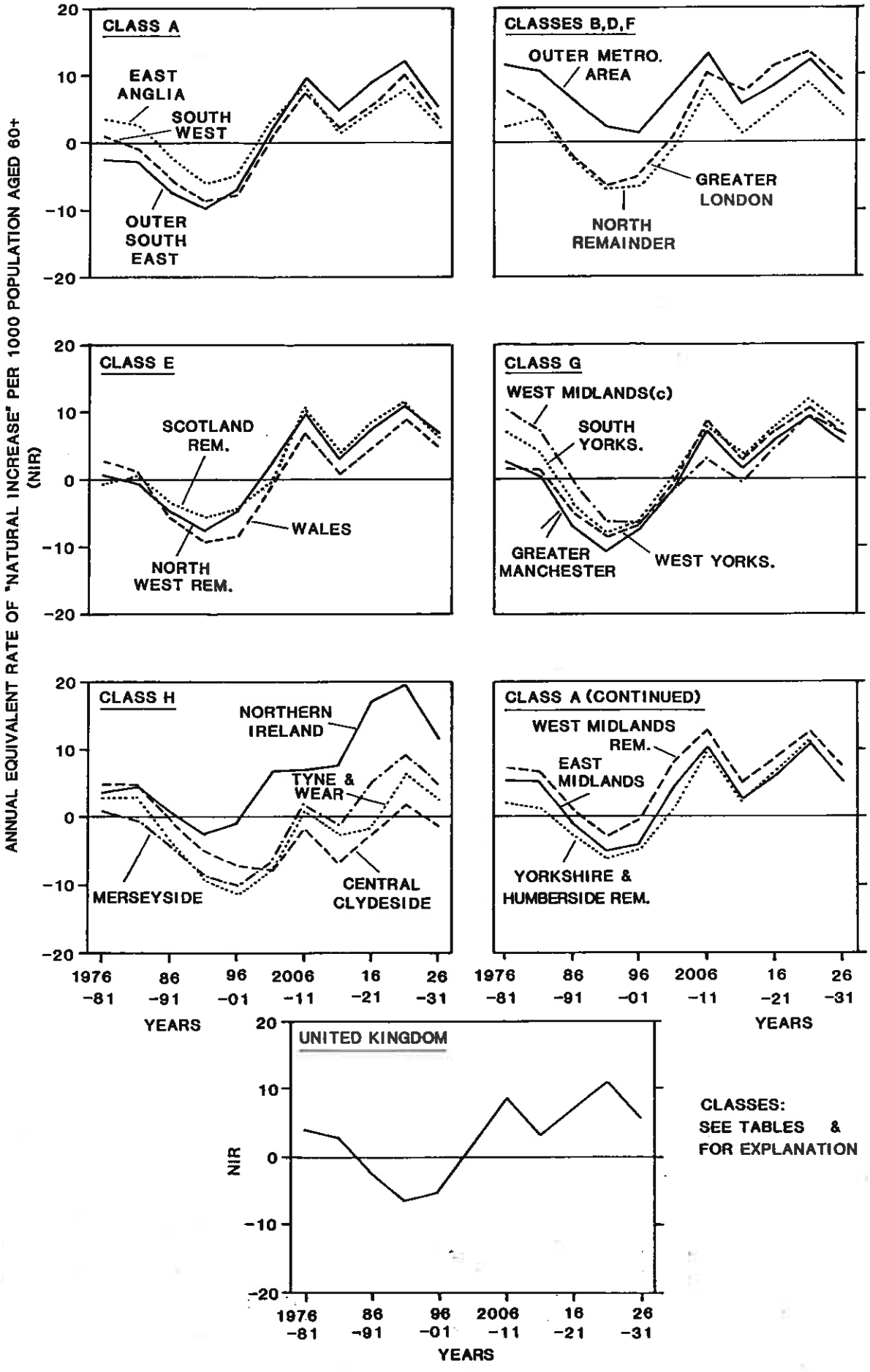

FIGURE 9. "NATURAL INCREASE" RATES, UK REGIONS, 1976–2031