B [redacted]
30106 000481084

WORKING PAPER 473

MIGRATION OF THE ELDERLY IN THE UNITED KINGDOM

PHILIP REES *

AND

TONY WARNES **

Paper presented at the Colorado International Conference on Elderly Migration, Aspen Lodge, Estes Park, Colorado, USA 1st 4th October, 1986

* School of Geography
University of Leeds
Leeds
LS2 9JT
United Kingdom

** Age Concern Institute of Gerontology
King's College London (KQC)
University of London
Chelsea Campus, 552 Kings Road
London SW10 OUA
United Kingdom

October 1986

UNIVER.
LIBRAR
LEEDS

CONTENTS

Contents
List of Tables
List of Figures
Abstract

Page

1. INTRODUCTION 1

2. AGEING 2

2.1 Ageing processes 2
2.2 The impact of demographic ageing 3
2.3 The ageing of the British population 4
2.4 The geographical distribution of elderly people 4

3. MIGRATION : DATA AND DEFINITIONS 11

3.1 Migration data from Censuses 12
3.2 Migration data from the National Health Service Central Register (NHSCR) 12
3.3 Migration data from the Longitudinal Study (LS) 13

4. MIGRATION : WHO MOVES? 13

4.1 The profile of migration rates by age 13
4.2 Migration rates for ages over 50 by sex, marital status and spatial scale 14

5. MIGRATION : HOUSEHOLD CHARACTERISTICS 17

6. MIGRATION : SPATIAL PATTERNS 20

6.1 The spatial system adopted 20
6.2 Profiles for specific migration streams 20
6.3 Net migration : revealed residential preferences 27
6.4 The struggle of migrants against distance 34
6.5 A components analysis 36

7. MIGRATION : CONSEQUENCES 42

7.1 The future elderly population of the UK, 1983-2053 43
7.2 Elderly life expectancies 44
7.3 Projections of the elderly population 49

8. CONCLUSIONS 52

REFERENCES 58

LIST OF TABLES

1. Summary statistics on the distribution of the elderly, 1951-81
2. Selected statistics on households, Great Britain
3. The rates of migration of different household types
4. Pensioner households and scale of migration
5. A classification of out-migration profiles
6. Net migration flows (internal) at late working and retirement ages, 1980-81, United Kingdom regions, males
7. Ratio of in-migration to out-migration flows at late working and retirement ages, 1980-81, UK, female
8. Origin-specific beta parameters (frictions of distance) for UK regions, 1980-81 migration, males
9. Shifts in the components of change
10. Life expectancies at birth, age 60 and age 75, 1976-81
11. Projected elderly population of the UK, 2006
12. The elderly population in UK regions, 1981 and 2006
13. Projected changes in percentage shares of the elderly population, UK regions, 1981-2006

LIST OF FIGURES

1. The ageing of the Great Britain population, 1851-1981
2. The distribution of the population aged 60-69 in 1981
3. The distribution of the population aged 75 or more in 1981
4. Migration rates by marital status and scale of move for ages 50 and over : Great Britain, 1970-71 and 1980-81
5. The United Kingdom study regions
6. Out-migration rates from UK zones, 1980-81, males
7. Migration rate by age schedules for migration streams and counter-streams between selected metropolitan zones and region remainders
8. Migration rate by age profiles for Great London, males
9. Net migration fields for selected UK regions, age group 65-69, persons, 1980-81
10. Mean migration distances and distance frictions for inter-region migration, 1980-81, UK, by age and sex
11. Population shift types, age transition 55-59 to 60-64, 1976-81
12. The growth of the elderly population of the UK, 1983-2053
13. Forecasts of the elderly population of the UK, 1983-2053, weighted by level of care needed
14. Relative change in zone populations, 1981-2006 by age group

ABSTRACT

The migration patterns of the elderly are examined for the United Kingdom using Census and Register data. The rates of migration at late age are computed by sex and marital status for 1970-71 and 1980-81, and for specific migration streams in 1980-81. Migration rates decline with age, but much less in 1980-81 than 1970-71, though they are lower. The declines are interrupted by retirement peaks, and evidence of a retirement slope for non-married persons. Although the elderly are becoming more of a population of solitary (single person) households there is evidence that the oldest ages join larger (family) households. The spatial pattern of elderly migration is one of loss from the nation's large metropolitan areas and gains to non-metropolitan regions, with these flows being much larger in the South and East than in the North and West. The mean distance covered by elderly migrants declines with age and the friction of distance increases. The consequences of the migration patterns are a future redistribution of the nation's elderly population out of the largest urban areas, exacerbated by considerable excess mortality in the most deprived metropolisesof Northern and Celtic Britain, although losses in the younger elderly age groups to 2006 are balanced by gain for the 80 and over group. The ageing of the aged population has considerable future welfare implications.

MIGRATION OF THE ELDERLY IN THE UNITED KINGDOM

Philip Rees, School of Geography, University of Leeds
Tony Warnes, Department of Geography, King's College London

Paper presented at a conference on Elderly Migration :
A Comparative Study, Boulder, Colorado, October 1-4, 1986.

"Age is a bad travelling companion."
(English Proverb)

1. INTRODUCTION

As the proverb hints, the elderly are less migratory than younger people. Why, then, do we study the characteristics of elderly migrants, the types of household units they migrate in or to, and the destinations they select, when it is known that their migrations are a minority activity which, in comparison with those of younger cohorts, have comparatively short-lived effects?

The interest and importance of the topic derives partly from the distinctive origins, flows and destinations of older migrants, or the redistributive effect of migration in later ages, and partly from the raw nature of our understanding of the factors, motivations and likely levels of migration.

In the second section of this paper, a general review is presented of the demographic and personal situations of elderly people in Britain. The following four sections concentrate on elderly migrants. In the penultimate section of the paper these two aspects are married together in order to examine the implications of elderly migration for the future spatial distribution of the elderly within the United Kingdom.

2. AGEING

2.1 Ageing processes

Fundamental cellular ageing processes determine a finite average human life span which, while more than the Old Testament's 'three score years and ten', may be anything between present Swedish life expectancy and 120 years. Most biologists accept that human ageing is poorly understood: this field of study is presently characterized by speculative, competing theories and a great diversity of experimental research (Bittles and Collins, 1986). The layman's images of human old

age often include disorders such as arthritis, mental confusion, immobility or sexual inactivity. Some are false descriptions and most are manifestations not of ageing but of disease, inappropriate life-style or misguided institutional and social policies. There are also social processes of ageing, some of which are inextricably linked to demography. A person's familial and generational position inevitably changes as they age. Other ageing processes are culturally determined or 'socially constructed'. A clear example in Western nations during the twentieth century has been the almost universal imposition of retirement from gainful employment as an attribute of later age. In many less developed nations, institutional retirement has not yet been adopted and in the West it is possible the next century may witness a dismantling of the present dichotomy between working and retirement ages (Phillipson, 1982; Stearns, 1977; Warnes, 1986a).

Since the Second World War the economic activity rate of males aged 65 years or more has fallen to a very low level. Notwithstanding the economic recession and labour surpluses of recent years, which have brought about earlier retirement and redundancy in late working ages, in the mid-1980s the elderly, as never before, are clearly differentiated by their inactive economic status. The age at which an individual becomes entitled to statutory or private retirement benefits is variable by sex, among nations and through time. There has been a general tendency during this past half-century for the age to be reduced, but signs of a reversal or of the introduction of greater flexibility have recently been seen in some countries (Fogarty, 1982; Rix and Fisher, 1982).

In the past decade and a half, age 65 has lost some of its earlier usefulness as a divide between working life and non-working life in the UK and other developed nations. For women, the retirement age in many occupations and the age of entitlement to a state pension is 60. Their economic activity rate has been increasing. On the other hand, men have increasingly been retiring before age 65 through a variety of labour shedding schemes in response to the reduction in labour demand in the UK over the 1979-83 period and the increase in labour supply. In many localities and industries workers leaving employment early have little prospect of future employment. Their socioeconomic position is thus akin to that of those who retire at 65.

The boundary between the retired and the working population is thus variable. For this reason, we will examine migration behaviour from age 50 years onwards, and population structure from age 60 onwards for both males and females. The internationally incomparable definition of the population of pensionable age (men aged 65+ and women aged 60+), used by the Office of Population Censuses and Surveys (OPCS) will be avoided.

It must also be recognized that the elderly are far from homogeneous

in their socioeconomic and health characteristics. Craig (1981) has shown how the use of health and social services rises exponentially with age after 60, and Gaymu (1985) demonstrates for the French population how living conditions deteriorate with increasing age. It will therefore be of interest to look at population trends andd migration activity in separate age bands within the elderly population.

2.2 The impact of demographic ageing

The ageing of a population normally implies not only the absolute growth of the older population but also an increase in its relative share of the total. Absolute increases can occur without relative shifts in populations of sustained high fertility, but they lead to no less additional demands for suitable housing and medical and social services. Relative increases in the elderly also imply an increase in the ratio of the elderly to the non-elderly population. The macro-economic consequences of this aspect of ageing are strongly influenced by the legislative and corporate frameworks which determine both the level and funding base for retirement benefits and health services. At the local level, however, rapid change in the size of the elderly population can place considerable strains on the provision of services and have strong cost implications for the working population (Clark and Spengler, 1980).

The global progress of demographic ageing has been closely related to the diffusion of fertility declines from more to less developed countries. Demographic ageing continues for several decades after the period of the demographic transition has passed and low, fluctuating fertility and mortality schedules have been established (Spengler, 1977; Warnes, 1986a). It will be in the less developed countries which have recently experienced sharp fertility declines, notably China, other South East Asian nations and some Latin American republics, that rapid increases in the absolute size and relative presence of elderly people will occur during the next quarter century (United Nations, 1985;; Warnes, 1986b). In more developed nations, such as Britain, the principal age structure impacts of demographic ageing have passed, but important socioeconomic consequences are in prospect from two causes. Firstly, the older population will itself age, with substantial increases in the population of extreme old age. Secondly, a combination of rising material and health expectations with progress in combatting the lethal effect of various degenerative disorders has led to substantially increased demands for housing, pensions, health care and specialised residential services. There is a vigorous debate at the present time about the present and prospective relationship between improving mortality and morbidity (Manton, 1982; Manton and Soldo, 1985). It is by no means clear that increasing life expectancy is being matched by an increase in healthy years and, until evidence to the contrary is available, we cannot assume a decreasing prevalence of

physical and mental disorders. Here lies the challenge and importance of the later stages of demographic ageing.

2.3 The ageing of the British population

The general path of demographic ageing may be illustrated by reference to the population of Great Britain, from 1851 to 1981 (Figure 1). Absolute gains in the elderly population before 1911 were relatively modest: the 65+ population increased from one million in 1851 to 2.1m in 1911 as the total population increased from 20.8 m to 40.8. The share of the 65+ age group grew from 4.8% in 1851 to 5.1% in 1911.

It was only in the twentieth century that the demographic ageing of the British population occurred, long after the onset of the demographic transition in mortality and fertility. The total population grew modestly from 40.8 m in 1911 to 54.3 m in 1981, but the 65+ population grew from 2.1 to 8.2 m, nearly quadrupling. The 65-74 age group grew 3.3 times, that aged 75-84 5.2 times, and the 85+ age group 6.0 times. Such absolute growth translated into substantial relative ageing with the percentage of the population aged 65+ rising from 5.1 to 15.1%. Within the elderly population the 75+ age group increased its share from 27.5 to 38.4%. There is, however, evidence that this process is coming to an end (Figure 1). The growth rates of all three elderly age groups peaked in earlier decades. Those for 65-74 year olds turned down after 1931, those for 75-84 year olds after 1951 and for the 85+ population after 1961. However, the relative ageing of the elderly population will continue for some decades ahead while differences persist in the rates of change of the various elderly age groups.

As the smaller cohorts born in the 1920s and 1930s move into the elderly population from 1986 to 2006, a cessation of the overall ageing of the British population is anticipated. The future levels and composition of the elderly population are discussed in detail later in the paper in section 7.

2.4 The geographical distribution of elderly people

Regional and local variations in age structure arise from variations in fertility and mortality and from the age characteristics of each area's in- and out-migrants over the previous half century. The most pronounced variations are normally found among the smallest areal units. Since the early decades of this century, the regional and local distribution of elderly people has changed considerably in association with the nation's changing economic and social geography.

In 1921 concentrations of the elderly were found in rural areas of declining population and depressed industrial areas as in central Wales, north Lancashire and west Durham (Allon Smith, 1982). By 1971, however,

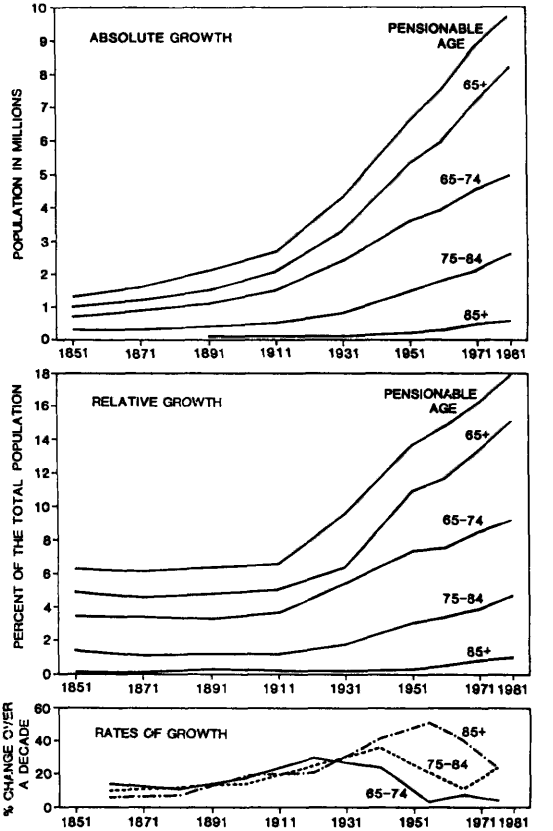


FIGURE 1. The ageing of the Great Britain population, 1851-1981

a different and clearer distribution had emerged. The areas of over-representation in England and Wales were all peripheral and mainly coastal counties. The only exception was north-east Lancashire, including Blackburn, Burnley and Colne, a continuing example of the age structure consequences of persistent employment decline and out-migration (Law and Warnes, 1976). Exceptionally low representations of the elderly were concentrated in a zone from the outer ring of the London metropolitan area to the West Midlands, the areas which had experienced the strongest employment and population growth during the 1960s. An analysis by local authority districts in 1971 showed a remarkably consistent coastal location of the areas with the highest concentrations of the elderly. In most of these areas there had been a strong net in-movement during 1961-71 of persons aged 60-69 in 1971 (Law and Warnes, 1976, figures 4 and 7). Between 1951 and 1971, the areas with the highest elderly shares tended to have the most substantial increases in their elderly population.

From 1951 to 1971 the variance among both regional sub-divisions (N = 59) and local authorities (N = 1295) in the elderly share of the population was increasing, indicating a general tendency for the elderly to dissociate from other age groups in their distribution. However, during the 1970s these trends appear to have reversed, although some caution must be applied because the areal units have changed (Table 1).

Clear features of distributional change during the 1970s included increases of the elderly share in many of the districts which in 1971 had shown very low representations of elderly people. This was particularly evident in some New Towns during the 1970s. For example, the pensionable population increased from 7.2 to 11.2% of the total or by 73% in Stevenage. Increases of between 53 and 58% occurred in Bracknell, Corby, Crawley, Cumbernauld and Harlow. Also contributing to the decreasing variance were declines in the absolute and relative elderly population in some of the districts with the highest elderly shares in 1971. Brighton's pensionable population decreased by 13% during the 1970s and, in Worthing and Bournemouth, also long-standing retirement resorts, pensionable populations decreased by 6%.

The changes during the 1970s in the post-1951 distributional trends had been anticipated, for the dispersal of the most popular destinations for retirement migration from the railway-linked retirement towns to both neighbouring inland and coastal rural areas and attractive inland rural areas such as the Cotswolds, Welsh Borders and Yorkshire Dales had been occurring during the 1960s. Encouraged by improved rural services and communications, the demographic ageing process was diffusing more widely throughout Britain as the decline in the rates of economic growth and fertility slowed down the creation of new residential growth districts dominated by young adults.

TABLE 1. Summary statistics on the distribution of the elderly, 1951-81

Areas and populations	Year	Mean percent	Coefficient of variation	skewness
England and Wales,	1951	16.7	14.0	0.8
Regional subdivisions	1961	18.1	17.4	1.4
Population 60+	1971	20.0	18.9	1.4
GB, Post-1974 Counties	1971	17.0	18.2	1.3
Pensionable population	1981	18.1	15.3	1.3

Source: Calculated from the Census reports.
There were 59 regional subdivisions and 65 counties.

Despite these interesting shifts in redistributional trends, the broad spatial patterns of the elderly were similar in 1981 (Figures 2 and 3) and 1971. The regions with the highest share of the elderly were the South West, East Anglia and Wales and those with the lowest were the West Midlands, East Midlands and Scotland. At the county district level, all districts along the south coast except those around the industrial ports of Plymouth and Southampton, had pensionable population percentages in the highest quintile of districts (20.2-35.3%), as did the coastal area of North Wales, Lancashire, Yorkshire, Lincolnshire and East Anglia and inland areas in the Cotswolds, Mid-Wales, Welsh Borders, Yorkshire Dales and the southern Lake District. In Scotland the areas with the highest representations of the elderly included the rural hill areas fringing the central, urban lowlands and parts of the north-eastern Highlands and Islands. At the other extreme, pensioners were under-represented in most of the Midlands, the outer ring of London and central Scotland (Figures 2 and 3).

The distribution of younger elderly people aged 60-69 years in 1981 (Figure 2) shows some detailed differences from that of all elderly people and some contrasts with the distribution of the older elderly or 75+ population (Figure 3). The young elderly are over-represented in northern Scotland and the shire counties between London and the Midlands of England. The older elderly are notably over-represented in north Yorkshire and Lancashire and the Scottish Islands, while being under-represented in west central Scotland, the north west Home Counties and from Cheshire to the West Midlands. These minor differences arise from intricate features of each area's population experience over the last eighty years including the longevity of their attractiveness for retirement settlement. On the other hand the repeated appearance of Sussex, south west England, Norfolk and the Scottish Borders as areas of concentration, and the similar persistence of the immediate peripheries of the largest metropolitan areas as regions of under-representation reveals the broad post-1950 stability of age-structure distributions in Britain.

2.5 Population numbers and service needs

The concern of Western governments with elderly population projections is related to their anticipation of burgeoning demands for welfare benefits and for social and medical services. These demands will be related not only to population numbers but also to both the morbidity and personal dependency of the elderly and to their expectations and political influence. It is worth pointing out that the predisposition to view the elderly as a 'burden' has its dangers. It is based on the pathological conception of old age as a period of life associated with severe physical, mental and social disorders. Commonly the view supports an exaggerated assessment of the prevalence of these problems

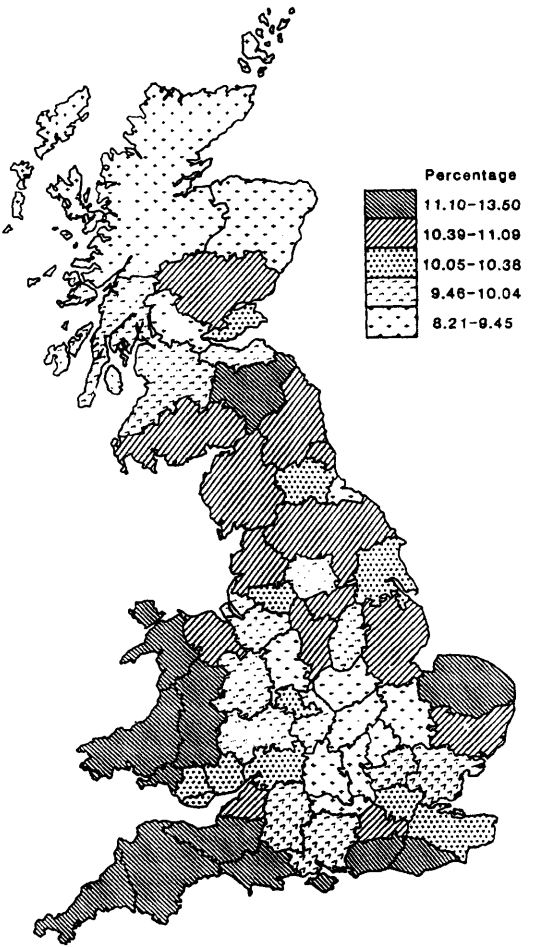


FIGURE 2. The distribution of the population aged 60-69 in 1981

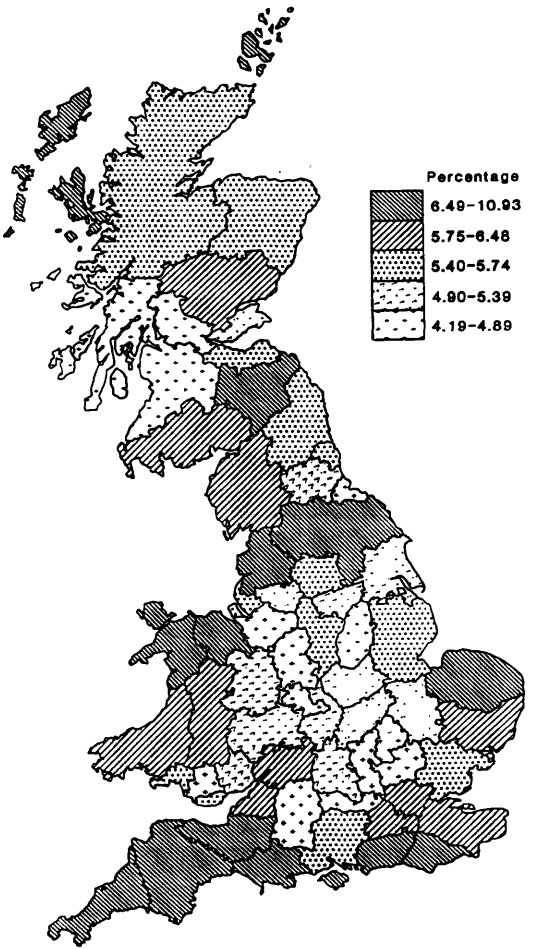


FIGURE 3. The distribution of the population aged 75 or more in 1981

and finds no room for an alternative, positive view, that the contemporary increase in life expectancy is a magnificent achievement of our societies and one welcomed by the vast majority of people. In fact, in most Western countries, no more than 5% of the elderly live at any one time in institutions. In Britain no more than one in twelve elderly people receive any form of domiciliary social service (Hunt, 1978). Nevertheless the high usage made by elderly people of medical and social services, and the fact that usage rates increase among people of extreme old age (Evans, 1981, Table 1.1, p.10), is of importance when assessing the impact of the ageing of our elderly population.

On the assumption that present age-specific rates of the incidence of disease and of service demands continue, the levels of demand for care and treatment will rise between 1983 and 2001 even though the total elderly population will not grow (see section 7). Craig (1983) has investigated likely levels of increased care needed for the England and Wales population using 1981 based projections. Plots of such indicators as the use of home helps, the propensity to be a resident in an institution, the rate of hospital admission and the mortality rate itself show exponential rises in care requirements with age. On average these indicators showed an eightfold increase in care needs between ages 60 and 80, Craig then constructed counts of the elderly care requirements by weighting the numbers in each age group by a care factor interpolated between that for age 60, set to 1, and that for age 80, set successively to 1, 2, 4, 8 and 16. This analysis is replicated for the UK in section 7 of the paper. Anticipating those results, it is clear that, whichever rates of increase of care needs with age you adopt, there is likely to be a greater rise in the resources needed by the elderly than their projected numbers alone would suggest.

The deficiency of these analyses is that no allowance is made for a declining age-specific incidence of diseases or of service demands. The question of whether such declines might occur has been central to the recent debate about morbidity trends in later age and whether there is increasing 'rectangularity' of the survival curve. Fries and Carpo (1981) forsee little further increase in life expectancy but a decline in the mean number of years of disablement. Other demographers have argued, however, that further considerable increases in life expectancy are possible and that an increase in the mean years of dysfunction is probable (Brody, 1985; Myers and Manton, 1985). There is an urgent need in Britain for more study of these topics.

3. MIGRATION: DATA AND DEFINITIONS

It is clear from the interpretation of the geographical distribution of the elderly at the regional, county and county-district scales that the places which house a higher proportion than average of the elderly are the preferred destinations of migrants on retirement. The

characteristics of the migration of the elderly can be investigated using three data sources: the Censuses, the National Health Service Central Register and individual survey or life history data sets. The first two types are used in subsequent sections, but a brief review of the nature of all three data sources is given here (see Stillwell, 1985 for more details on the first two sources and Brown and Fox, 1984 on the third).

3.1 Migration data from Censuses

Censuses that asked fixed interval retrospective questions about migration were held in the UK in April of 1961, 1966, 1971 and 1981. In 1961 and 1981 the only fixed interval was one year prior to the Census. In 1966 and 1971 both one year and five year interval questions were used. In 1981 the migration question was asked of 100% of the households and individuals in the Census whereas in 1961 only a sample of 10% were asked the question. In 1971 the two questions were asked of only a sample of 10% of the population. In 1966 only 10% of the population were contacted in the so-called "Sample Census". It is thus possible to compare migration over one year intervals in 1960-61, 1965-66, 1970-71 and 1980-81. The censuses are conducted and published separately for England and Wales, Scotland and Northern Ireland.

The age breakdowns available differ from census to census, and with the scale of geographical area. Generally speaking, the earlier the census and the smaller the areal unit, the more aggregated in terms of age the census variables are. A few other classifications are available besides age and sex to help characterize elderly migrants, including in 1981, migrant households classified by socioeconomic group of retired head. Census data on migration are used in sections 4.2, 5, 6.2, 6.3 and 6.4).

3.2 Migration data from the National Health Service Central Register (NHSCR)

Since 1971 OPCS have obtained from the National Health Service Central Register of Patients counts of the numbers of patients transferring between 97 Family Practitioner Committee areas (FPCs) in Great Britain. When people move they normally change in the NHS general practitioner with which they are registered. In 1981 the FPC boundaries coincided with those of counties and metropolitan districts. Age and sex detail is provided for total in- and out-migration to or from an FPC area for three month periods, but the inter-FPC area matrix is for all ages. Originally, the NHSCR data were collected on a 10% sample basis but are now collected on a 100% basis. The transfers recorded in the data set are thought to be lagged roughly three months after the actual migration, and there are age and sex differences in the interval between migration and transfer of registration. However, the elderly

re-register quite quickly after migration, along with young mothers and children.

The NHSCR data have been aggregated to cover the period 1976-81 for a system of 20 zones covering the United Kingdom (Figure 5) in previous work (Rees, 1986a; Stillwell, 1986), and this data set is analyzed in sections 6.5, 7.1 and 7.3 of the paper.

3.3 Migration data from the Longitudinal Study (LS)

OPCS has instituted a systematic and ongoing collection of life history data for a large sample of people in England and Wales (Brown and Fox, 1984). Four birthdays were selected (from 365) and the data for all persons with those birthdays were extracted from the 1971 Census. This sample has then been followed forward in time linking in other events recorded in the vital statistics records (mortality, widowhood, birth of a child, cancer incidence, marriage, divorce) with replacement of the population by new persons born on those birthdays or by new immigrants with those birthdays. Finally, the sample has been traced in the Census of 1981 to yield a set of about 400,000 life histories of persons present in both 1971 and 1981.

A subset of these data referring to the elderly has been extensively analyzed by Grundy (1986a, 1986b) and further analyses of the characteristics of elderly migrants are planned by the authors to improve on the rather meagre information available from published tables (section 5).

4. MIGRATION: WHO MOVES?

4.1 The profile of migration rates by age

Considerable research over the past decade into the rates of migration by age has revealed a number of interesting relationships (Rogers and Castro, 1981). The schedule of age specific rates of migration can be broken down, following Rogers, Raquillet and Castro (1978), into

(i) a general base level of migration activity characteristic of the society and spatial scale;

(ii) a labour force schedule which shows a rapid rise in migration activity as young persons either enter the labour force and establish an independent home or enter an educational institution away from home, peaking at ages in the early twenties, followed by a steady diminution of mobility over the rest of working life;

(iii) a pre-labour force schedule at ages 15 and younger that parallels that portion of the labour force schedule

contributed by parents (who are usually slightly less migratory than non-parents);

(iv) a secondary peak at the ages of retirement;

(v) a rise in migration rates at the very oldest ages, due largely to moves to long stay institutions for health reasons or to be near offspring after widowhood or widowerhood.

Not all migration schedules exhibit retirement peaks or an elderly rise in rates. The presence of a peak around retirement age appears to be spatially selective. It characterizes out-migration from metropolitan areas to amenity rich areas favoured for retirement (non-local migration) but is not normally as pronounced for short distance moves (Warnes, 1983). The rise in migration rates at the oldest ages, on other hand, is most clear for short distance moves. All elements of the migration rate profile are subject to change over time but insufficient evidence has yet been assembled to comment on their response to macroeconomic variables.

4.2 Migration rates for ages over 50 by sex, marital status and spatial scale

The characteristics of migration in the late working and retirement ages have been studied by Warnes (1983) for the 1970-71 period. Here we carry out the same analysis for 1980-81 and compare results. Migration rates were measured for sub-populations classified by sex and marital status and at different spatial scales. The sub-populations are married males, single or widowered or divorced males, married females, and single or widowed or divorced females. The scales are "migrants moving within Great Britain", "migrants moving within districts of Great Britain", and "migrants moving between counties in England and Wales and between regions and islands areas of Scotland".

The age range used is from 50 to 74 in single years of age with a single reading for 75+ years. Age is measured at the end of the interval of migration measurement. Thus, age 60 in the tables and in Figure 4 means persons who were age 59 on April 5/6 1980, were age 60 on April 5/6 1981, and who had migrated at least once in between at age 59 or 60. The average age at migration would be 59.5. The count of migrants (or "transitions") is divided by the population recorded at the census, and the resulting rate is thus an admission rate, that is, the proportion of the population of the destination which had migrated there over the previous year. A final point to note is that the 1971 Census data set derives from a 10% sample whereas the 1981 Census provides a full enumeration for migrants. Hence the 1971 graphs fluctuate more erratically (Figure 4).

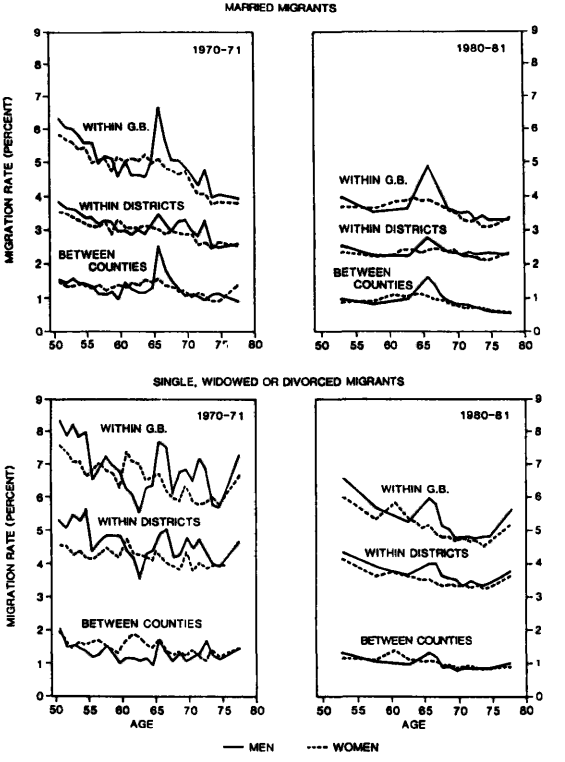


FIGURE 4. Migration rates by marital status and scale of move for ages 50 and over: Great Britain, 1970-71 and 1980-81

The largest variations in the two graphs are between the different scales: around 60% of migration is local in character (within county-districts) and perhaps 30% is long distance (between counties or their equivalents). The fraction not accounted for (not shown on the graphs) consists of migration between districts in the same county. Being married seems to depress migration rates for within district migration by about 0.5% in 1970-71 and 1% in 1980-81. For inter-county migration there is not much difference between the marital statuses.

The overall rates of male and female migration do not differ greatly in level, even for SWD migrants where they are not usually moving as couples, but they do differ in the exact timing with respect to age, and in the presence or absence of peaks around retirement age. For married migrants it is clear that it is male migrants who exhibit a marked retirement peak. In both 1970-71 and 1980-81 this peak is at age 65, the statutory and most common age of retirement, but the peaks are a little more pronounced in 1970-71. There is evidence in both years of a flatter rise in female rates between ages 60 and 65 years. This can be related to the female statutory retirement age of 60 and the distribution of the differences between husbands' and wives' ages. Among SWD males, migration rates peak at age 65 or 66 and among SWD females at age 60 or 61 reflecting their respective statutory retirement ages. The forms are much clearer for SWD persons in 1980-81 when 100% data are employed.

How do the migration rates compare between 1970-71 and 1980-81, after the oil shock, and in the middle of the severe contraction of the economy? On average overall migration rates have fallen by about 1.5%, perhaps by just under 1% locally and just under 0.5% for inter-county migration. Other evidence (Stillwell, 1979, 1986) suggests that, based on a comparison of the 1966 and 1971 Censuses, in the 1960s migration rates in the UK were rising substantially, but that from 1974, based on NHSCR migration evidence, migration rates have fallen substantially. Evidence from the Netherlands (Willekens and Baydar, 1986) suggests that 1974 was the year in which migration rates peaked. Since the reasons behind this rise and fall are essentially concerned with the job market, the fall in post-retirement migration rates should be less than that for pre-retirement rates. This does appear to be the case in most graphs. One consequence of this is that the strong association among married persons between migration rates and age between 50 and 74 noted for within district moves by Warnes, seems to have dissipated by 1980-81. On the other hand, the 1980-81 100% data make clearer the age relationships for SWD persons. The age relationship for between counties migration is weak for all eight graphs.

A final observation can be made with respect to migration at the oldest ages, here 75 and over. There is evidence that among SWD men and

women of an increase in the migration rate at 75 and over compared with the 70-74 age group in both 1970-71 and 1980-81, although the upturns are of doubtful validity statistically in 1970-71. Similar evidence is available from the United States (Warnes, 1983). Among the set of graphs for married persons there are small upturns in 1970-71 for between counties female migrants and in 1980-81 for within district female migrants, but these are much smaller than the upturns for SWD women. The differences between marital statuses lend credence to the association of the migration of the old with infirmity: such housing adjustments may not be necessary when a partner's spouse is alive but may become necessary on separation through death or divorce from one's spouse.

5. MIGRATION: HOUSEHOLD CHARACTERISTICS

So far the elderly have been considered as a population of individuals and of migrants. By implication in section 4 we have tended to assume the elderly migrate either as married couples or as single, widowed or divorced persons alone. To what extent is this true?

Table 2 sets out statistics on household type from the General Household Survey for Great Britain for 1971 and 1982, showing the growing importance of the two elderly household types referred to. Some 29% of households and 15% of persons in 1971 consist of either two adults, one or both of whom are 60 or over or one adult aged 60 or over. These figures rise to 34% and 20% by 1982. Table 2 shows that nearly 85% of the elderly live in such households, 56% in couple households and 29% live alone. The proportion of couple households steadily diminishes and the proportion living alone steadily auguments with increasing age. There is a slight tendency for the percentages living in other arrangements (for example, young families) to increase after age 70. This presumably reflects a small degree of reunion of an elderly parent with his or her offspring.

At what rates do these households migrate? Table 3 assembles the evidence on migration propensity of the different types of household. The household classification enables us to compute the migration rates of wholly pensioner households but not the migration rates of other types of household containing pensioners (although only 15% of those aged 60 and over live in such households). The average rate of household migration in Great Britain in 1980-81 was 7%. Households containing two or more adults of pensionable age have a 3.2% rate of migration, whereas pensioners living alone had a 4% migration rate. Overall households containing only persons of pensionable age had an intermediate migration rate of 3.7%. The rate for households of three or more adults (married man, married woman, no children) into which most of the rest of the pensioners fell was only 2.6%. Contrast these low rates with those for one adult (less than pensionable age)

TABLE 2. Selected statistics on households, Great Britain

A. Household type, 1971 and 1982

Household type	% households		% persons	
	1971	1982	1971	1982
1 adult aged 16-59	5	7	2	3
2 adults aged 16-59	14	14	10	10
Youngest person aged 0-4	18	12	27	20
Youngest person aged 5-15	21	20	31	31
3 or more adults	13	13	15	17
2 adults, 1 or both aged 60+	17	18	11	14
1 adult aged 60+	12	16	4	6
Base = 100 %	11,934	10,306	34,720	27,160

B. Household type by age (persons aged 60+), 1982

Household type	% persons living in different types					
	60-64	65-69	70-74	75-79	80+	60+
Youngest person aged 0-4	1.0	0.7	0.4	0.2	0.1	0.6
Youngest person aged 5-15	2.5	1.9	2.1	1.8	2.8	2.2
3 or more adults	20.6	10.8	7.1	9.6	10.3	12.5
2 adults, 1 or both aged 60+	60.7	63.2	56.8	48.5	35.4	55.6
1 adult aged 60+	15.1	23.4	33.7	39.9	51.3	29.2
Base = 100 %	1,553	1,363	1,203	854	686	5,659

Source: OPCS, Social Survey Division (1984), Tables 3.2, 3.21.

TABLE 3. The rates of migration of different household types

Household type	% private households wholly moving (1980–81)	Ratio to the average (=100)
1 adult of p.a., no children ≤ 16	4.0	57
1 adult under p.a., no children ≤ 16	17.8	254
1 adult any age, with children ≤ 16	15.0	214
2 adults (m.m. with m.f., no children)	6.2	89
2 adults (m.m. with m.f., 1+ children)	9.6	137
3+ adults (m.m.,m.f., no children)	2.6	37
3+ adults (m.m., m.f., 1+ children)	3.7	53
Other adults (2+) without children	5.2	74
Other adults (2+) with chidren	7.7	110
Containing persons of p.a. (inc.above)	3.7	53
Containing 2+ persons of p.a. only	3.2	46
All households	7.0	100

Notes: p.a. = pensionable age (females 60+ plus males 65+)
m.m. = married male m.f. married female

Sources: 1. Households: Table 39, p.224 in OPCS (1983b).
2. Wholly moving households: Table 7, pp.292-3 in OPCS and Registrar General Scotland (1983), Table 7, pp.292-3.

households or single parent households with rates of 17.8% and 15.0% respectively.

A final piece of evidence about the nature of elderly household migration is contained in Table 4, which gives the percentage contribution of pensioner households (any household containing a pensioner) to migration at different spatial levels. The data in the table are ordered from international migration to within district migration in descending order of scale of migration. Pensioner households are over-represented only at the local scale, within districts, although they are quite important in interregion and intercounty migration. They contribute far less that proportionally to international migration or migration across St.George's Channel or to migration between districts within counties.

6. MIGRATION: SPATIAL PATTERNS

Most of the discussion to date in the paper has concerned at the national population as a whole. In this section attention is focussed on the volume, direction and rates of elderly migration at sub-national scales.

6.1 The spatial system adopted

To describe the spatial patterns of elderly migration we adopt a system of twenty regions (Figure 5) that have proved more useful in capturing the pattern of population change (Rees and Stillwell, 1984; Rees, 1986a; Stillwell, 1986) than the standard region set used in an earlier analysis (Rees, 1979). The regions consist of nine highly urbanized areas with the largest cities of the country at their heart and eleven standard region remainders or standard regions which contain a mixture of smaller cities, towns and rural areas. The Office of Population Censuses and Surveys has prepared detailed migration tables, both in 1971 and 1981, for this regional system. Although there is a strong case for adopting a finer spatial disaggregation to look at the attractiveness of individual towns to elderly migrants, the scale of nine "metropolitan" areas and eleven "non-metropolitan" regions is probably the finest at which the full pattern of migrant flows can be studied for individual age-sex groups.

6.2 Profiles for specific migration streams

Potentially, a system of 20 regions generates some 400 migration streams and 40 migration totals for further investigation of the findings of section 4. Here, attention is restricted to the larger flows, as the small numbers of the other flows make conclusions rather tentative. The age profiles of within-region migration (the largest stream in all cases) are examined first. Then the schedules of total

TABLE 4. Pensioner households and scale of migration

Scale of migration	% of wholly moving households migrating 1980–81 that contain persons of pensionable age
Migrants moving into GB from abroad	3.2
Migrants moving into GB from N. Ireland	4.8
Migrants between regions	11.4
Migrants between counties, within regions	10.8
Migrants between districts, within counties	7.8
Migrants within districts	14.7
Migrants resident in GB	12.6

Notes: GB = Great Britain

Source: OPCS (1983b) and OPCS and Registrar General Scotland (1983)

FIGURE 5. The United Kingdom study regions

out-migration are described. Thirdly, the migration streams between metropolitan regions and their most important destination are investigated. Finally, the age profiles of each migration stream from Greater London are considered. Greater London provides the largest number of inter-regional migrants.

The migration rates described here are a compromise: each migrant count is divided by the appropriate region population as given in the 1981 Census. This method of rate calculation could lead to some biases in the oldest ages, as the population at risk being used was one of survivors, given that the rate of survival begins to drop quite quickly after age 60. Experiments using rates from a United Kingdom life table for 1980 suggested that in comparing migration rates between ages 70-74 and 75 and over only differences of more than 5 per cent should be regarded as indicating real differences in the propensity to migrate.

6.2.1 Within region profiles

The graphs of within region migration rates by age (see Rees and Warnes, 1986) afford little evidence of marked peaks or troughs in elderly migration over the short distances involved (most moves will involve less than 40 miles travel). The maximum rate tends to occur either at the oldest age group in 10 out of 19 regions or at the labour force ages 50-54. Slight local peaks are, however, discernible in eleven regions. There appears to be some tendency for within region migration rates to be higher in the most northern regions: otherwise the pattern is very varied.

So, retirement (at 65 for males) does not appear to stimulate much in the way of migration within regions, and there is relatively little difference between pre- and post-retirement migration rates. There does, however, appear to be a fairly general increase in migration activity at the very oldest age group at which a number of life cycle events death of a spouse, increasing infirmity may results in the necessity of residential relocation.

6.2.2 Out-migration profiles

Here we observe genuine surges of migration activity at retirement operating at the regional scale that were found at the national level in section 4. Figure 6 shows the male profiles (see Figure 16 in Rees and Warnes, 1986 for the female profiles).

Some regions show a much more vigorous retirement peak than others: the metropolitan regions in general exhibit pronounced retirement peaks, particularly Greater London, the Outer Metropolitan Area, Central Clydeside, the West Midlands, Greater Manchester and Merseyside metropolitan counties. These regions contain the nation's largest

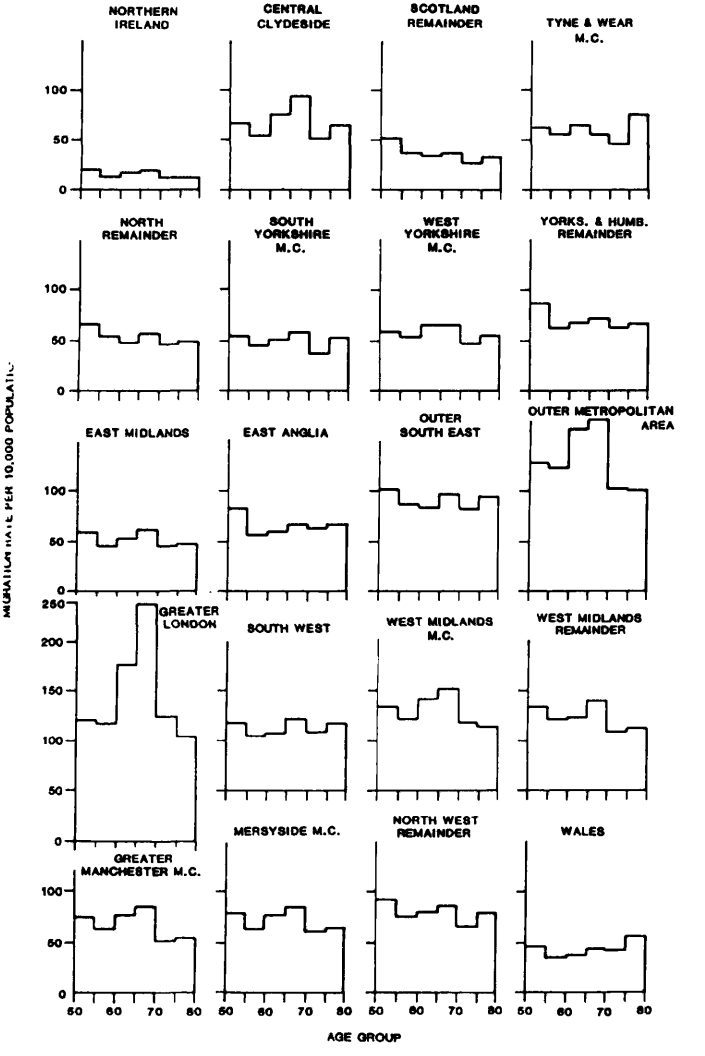


FIGURE 6. Out-migration rates from UR Zones, 1980-81, Males.

cities - London, Glasgow, Birmingham, Manchester and Liverpool respectively. Corresponding to these pronounced retirement peaks in migration rates in the principal outflow regions are concentrations of migrants at ages 60-64 and 65-69 in the main retirement areas, the South West, East Anglia and the Outer South East, although none of these regions show pronounced retirement peaks in their outflow schedules (Figure 6) Comparing the schedules for males and females, we see the displacement of the retirement peak to the 60-64 year old age group.

A second feature of the migration rate profiles is that most show a significant rise in the last age group, and for some regions this age group exhibits the highest rate across the late working and early retirement ages (Tyne and Wear males and females, North Remainder females and Outer South East females). In the latter two regions this may indicate some return migration from the area of retirement.

The nature of the retirement peak and the existence of a rise at the final age group can be used as a basis for classifying the out-migration profiles. This is done in Table 5. If a region is recorded in one of the "50+ peak" columns it means that the region's migration rate recorded for ages 65-69 (males) or 60-64 (females) is the highest after 50. If the region's migration rate appears in the "local peak" column this means that the rate is higher than the two rates immediately adjacent, but not the highest in the whole range. The rows of the table record the presence or absence of a peak at the 75 an over age group, that is, when the rate for this age group exceeds that for the 70-74 age group.

A peak for ages 50+ at retirement is characteristic of over half of the outmigration profiles (23 out of 40), although in only 9 of these is it a pronounced feature. A local peak is present in a further 12, and absent in 5. A peak at the oldest age group is present in all but 4 profiles. In 31 out of 40 profiles both a peak at retirement in the last age group are present. This has implications for the study of migration rate schedules using the model developed by Rogers, Raquillet and Castro (1978). In their initial statements the authors recognized that the retirement component of the model (a double exponential term) could be either significant or unnecessary. Subsequently, they have recognized (Rogers and Castro, 1986) that an alternative model of rising migration with age (a positive exponential term) could be either significant or unnecessary. What the classification of Table 5 suggests is that both elements may be needed in many models of the relationship between migration and age.

6.2.3 Migration between metropolitan and non-metropolitan region pairs

TABLE 5. A classification of out-migration profiles

A. MALES

Type of peak at ages 75+	Type of peak at ages 65-69			
	50+ peak		Local peak	No local peak
	High	Low		
Peak	CC GM ME	SY WY EM SW WR	SR NR YH EA OS NW WA	TW
No peak	OM GL WC		NI	

B. FEMALES

Type of peak at ages 75+	Type of peak at ages 60-64			
	50+ peak		Local peak	No local peak
	High	Low		
Peak	CC GL OM	WY WC YH WR EM GM SW ME NW	TW NR SY OS	NI SR EA WA
No peak				

Key to region abbreviations (see also Figure 5):

NI = Northern Ireland	OS = Outer South East
CC = Central Clydeside	OM = Outer Metropolitan Area
SR = Scotland Remainder	GL = Greater London
TW = Tyne and Wear	SW = South West
NR = North Remainder	WC = West Midlands Metro. County
SY = South Yorkshire	WR = West Midlands Remainder
WY = West Yorkshire	GM = Greater Manchester
YH = Yorkshire & Humb. Rem.	ME = Merseyside
EM = East Midlands	NW = North West Remainder
EA = East Anglia	WA = Wales

This contrast in migration level and profile form is repeated for each metropolitan region. Figure 7 plots the migration rate schedules for four metropolitan region to standard region remainder streams and counterstreams. The contrast between stream and counterstream profiles is particularly dramatic in Scotland. The counterstream rates are less than a fifth those of the stream out of Central Clydeside, and the profiles show no retirement peak. Migrants in retirement show a strong desire to quit the nation's largest urban areas, and little inclination to return.

6.2.4 Migration out of the nation's capital

It is interesting to examine a more detailed picture of the migration rate profiles out of the nation's capital, Greater London (Figure 8). The profiles can be divided into four sets: (1) within the London metropolitan region, (2) to the major retirement regions in the Southern half of the country, (3) to standard region remainders in the rest of the country and (4) to other metropolitan areas.

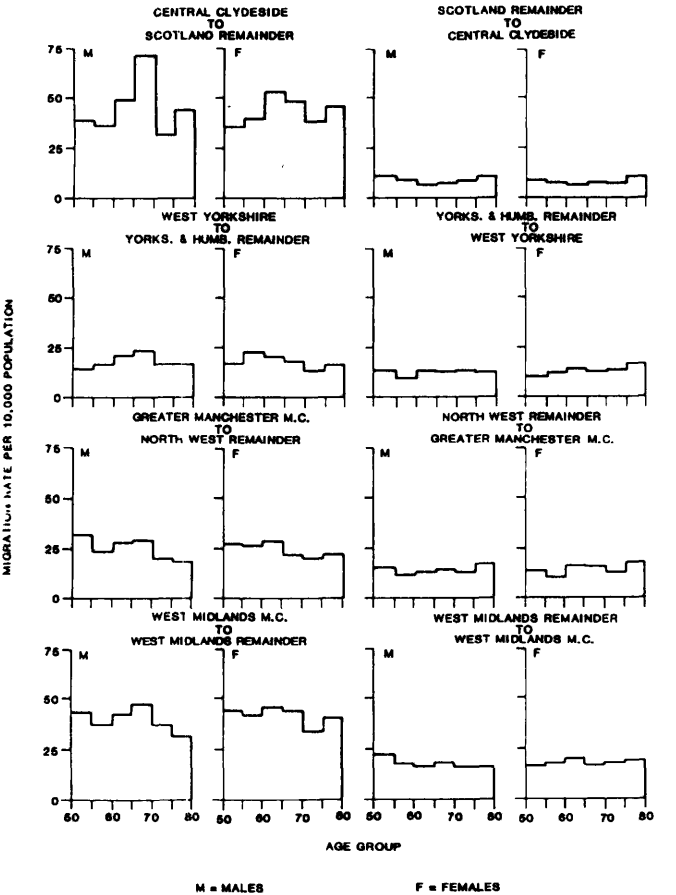
Migration flows within Greater London or to the Outer Metropolitan Area are characterized by migration rates at retirement ages generally lower than those at the late working ages, with a small local peak at age 65-69 (men) or no peak (women) at retirement and with a rise at age 75 and over.

Outflows to the Outer South East, East Anglia, the South West, Wales and the East Midlands all show pronounced peaks at 65-69 (men) or 60-64 (women). The migration rate in the retirement peak for East Anglia (260 per 100,000 males, 225 per 100,000 females) exceeds that of the labour force peak (210 and 218 respectively), as it does for males migrating to the Outer South East (839 compared with 831) and very nearly for females (721 compared with 855) and for males and females to the South West (348 and 369 compared with 301 and 400 in the labour force peaks). Similar observations have been made for other capital region to retirement area migration streams such as Paris Region to the Paris Basin, West, Mediterranean and South West ZEATs (Ledent with Courgeau, 1982, Figure 33) or New York to Florida (Watkins, 1986).

The third set of outflows, at much lower levels, are to non-metropolitan regions in the rest of the country which show retirement peaks, but at ages 60-64 rather then 65-69.

The final set of outflows to metropolitan regions in the rest of the country exhibit very low levels of migration and rather variable profiles, though most have a peak at ages 65-69.

6.3 Net migration: revealed residential preferences



MIGRATION RATE PER 10,000 POPULATION

FIGURE 7 Migration rate by age schedules for migration streams and counter streams between selected metropolitan zones and region remainders.

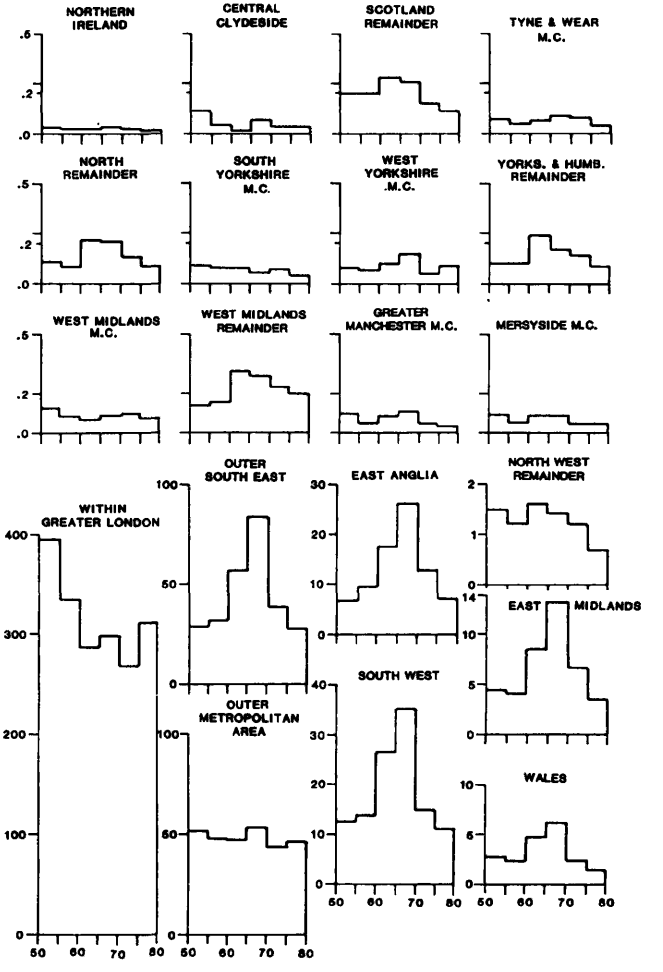


FIGURE 8. Migration rate by age profiles for Greater London, Males

6.3.1 Total net inflows

Table 6 reports the total level of net (internal) migration into each region across the retirement ages. The regions have been arranged in order of size of net inflow, and are divided into two sets: the gaining regions and the losing. The gainers are the non-metropolitan regions, and the losers are the metropolitan regions plus Northern Ireland.

At the head of the table are five regions Outer South East to East Midlands - which gain heavily from Greater London and the Outer Metropolitan Area. The second set of five gainers are region remainders from the West Midlands north to the Remainder of Scotland which gain most from their neighbouring metropolitan regions. The losers' section of the table is headed by four of the smaller metropolitan regions together with Northern Ireland, which has a very low level of migration exchange with mainland regions as well as a negative balance. The final set of five regions at the bottom of the table constitute the largest city regions in the UK.

The pattern of net migration flows shows general consistency across the late working and retirement ages. The volume of net migration rises from the 50-54 age group to an absolute peak in the 60-64 age group (13 regions) or 65-69 age group (7 regions). The only major exception to the general pattern of gain and loss occurs at ages 70-74 and 75 and over in the Outer Metropolitan Area where gains are recorded, perhaps reflecting a concentration of public or private institutions for the infirm elderly in this region or a result of the shortening of outflows from Greater London in these older ages.

Although this pattern of elderly migration closely resembles that of the population as a whole, there are differences, particularly with respect to the younger labour force ages. The final column in Table 6 records the net migrant inflows for 1980-81 for 20-24 year old migrants. Among non-metropolitan regions, Wales, and the Reminders of the North West, Yorkshire and Humberside and the North lose migrants. In part, this contrast with the elderly pattern reflects geographical variability within the regions, and in part contrasting opportunities for young and old.

In Wales, for example, the elderly migrate on retirement to the towns of the North and West Wales coasts, whereas young out-migrants leave from the depressed areas of industrial South and North East Wales. In the North West Remainder the industrial towns of North East Lancashire (Preston, Blackburn, Accrington and Burnley) lose young migrants while the coastal towns (Morecombe, Lancaster, Blackpool, Lytham St.Annes) and the Cheshire towns gain elderly in-migrants. In Yorkshire and Humberside Remainder the ports of Hull and Grimsby and

TABLE 6. Net migration flows (internal) at late working and retirement ages, 1980–81, United Kingdom regions, males

Regions	Number of net inflows	Late working age groups		Retirement age groups				Labour age group
		50–54	55–59	60–64	65–69	70–74	75+	20–24
Non-metropolitan regions								
Outer South East	11	685	811	1333	1534	470	191	1082
South West	14	567	714	1162	1063	270	85	101
East Anglia	19	205	355	555	694	213	114	145
Wales	17	186	194	374	364	41	-49	-976
East Midlands	14	146	162	213	322	135	104	594
Scotland Remainder	11	119	155	254	237	50	49	309
West Midlands Rem.	12	169	155	244	235	152	158	93
North West Rem.	11	114	143	107	129	19	-12	-199
Yorks. & Humb. Rem.	14	-17	102	151	125	23	1	-488
North Remainder	12	17	33	134	78	30	52	-338
Metropolitan regions								
Tyne and Wear	6	-70	-74	-63	-21	-22	-70	-911
Northern Ireland	0	-8	-26	-33	-27	-6	-15	-728
South Yorkshire	5	9	-53	-53	-71	7	-35	-402
West Yorkshire	7	-64	-98	-108	-78	-36	-35	-551
Merseyside	7	-146	-104	-143	-115	-46	-42	-1375
Central Clydeside	2	-129	-103	-205	-222	-62	-64	-1082
Greater Manchester	6	-252	-260	-295	-248	-82	-16	-796
West Midlands m.c.	3	-336	-326	-457	-391	-146	-92	-1230
Outer Metro. Area	8	-108	-341	-821	-539	77	376	729
Greater London	1	-1087	-1439	-2349	-3069	-1087	-698	6014

Notes: The regions have been arranged in order of their net in-migration flow in the principal retirement age group 65–69.

Source: estimated from migration tables in OPCS and Registrar General Scotland (1983), 1981 Census.

the industrial towns of Scunthorpe and Immingham lose young migrants while the resort towns of Scarborough and Bridlington and the market towns of York, Malton, Thirsk, Ripon and Northallerton gain older migrants. The London area (Greater London and the Outer Metropolitan Area) attracts these young in-migrants to its educational institutions, service industries and streets.

6.3.2 Net migration as revealed residential preference

There is a strong argument for regarding the net migration balances of the elderly as revealed residential preferences since the constraints of workplace location no longer affect those elderly with the resources and motivation to make long distance moves on retirement. Elderly migrants vote with their feet.

One method of indexing such residential preferences is to compute the ratio of in-migrants to out-migrants. Such ratios (multiplied by 100) are provided in Table 7 for female migrants. The values range from, at one extreme, 301 for 60-64 year olds in East Anglia to 17 for the same age group in Greater London. Just over three times as many people in the 60-64 age group migrate to East Anglia as leave it, but only 17 per cent as many people arrive in Greater London as leave it.

In the non-metropolitan regions these ratios rise sharply in the 60-64 and 65-69 year old age groups and are lower in the 50-59 and 70 and over ages. Conversely, the ratios fall sharply in the 60-69 ages in the metropolitan regions and are higher in the 50's and 70 and over ages. People are freest to migrate to satisfy their residential preferences in their 60's; in their 50's the constraint of current or potential jobs applies; in their 70's the constraints of lessened physical health and increased deprivation apply. In their 60's affluent elderly Britons vote against big cities and for smaller places in pleasant environs. They vote more for such places in the southern areas of the country than the northern.

6.3.3 The pattern of net migration flows

Among a set of 20 regions there are some 380 interregional migration streams. The first column of figures in Tables 6 and 7 indicate how many of the 19 net flows to a region from the others are net inflows (with zero balances being counted as inflows). The ordering of regions in terms of number of net inflows differs a little from that based on volume of net migration: major changes in rank affect the Outer South East (down 7 places), Northern Ireland (down 8 places) and the Outer Metropolitan Area (up 8 places). This new ranking provides a reasonable description of how the net flows are arranged: regions gain migrants from regions lower in rank and lose migrants to those higher in rank. Only 24 out of 190 of net migration streams (13%) depart from

TABLE 7. Ratio of in-migration to out-migration flows at late working and retirement ages, 1980-81, UK, females

Region	Net inflows	Age group 50-54	55-59	60-64	65-69	70-74	75+
Non-metropolitan regions							
Outer South East	14	154	204	231	186	140	118
South West	17	199	229	230	174	134	141
East Anglia	17	202	227	301	209	175	154
Wales	17	160	182	205	137	110	90
East Midlands	11	124	146	144	152	143	145
Scotland Remainder	13	138	153	198	151	137	131
West Midlands Rem.	10	129	133	144	165	159	160
North West Remainder	9	126	140	125	112	120	108
Yorks. & Humb. Rem.	11	130	154	128	136	85	104
North Remainder	13	116	135	141	122	105	111
Metropolitan regions							
Tyne and Wear	7	63	61	68	82	98	60
Northern Ireland	0	89	51	44	44	74	47
South Yorkshire	8	82	58	77	83	68	59
West Yorkshire	8	65	66	75	75	91	83
Merseyside	4	51	51	53	60	63	69
Central Clydeside	3	48	41	31	41	50	56
Greater Manchester	4	52	41	52	58	59	72
West Midlands m.c.	3	38	36	35	41	62	61
Outer Metro. Area	5	91	79	78	99	129	139
Greater London	2	42	25	17	24	32	41

Notes:
1. Net inflows = number of net in-flows in 60-64 age group.
2. The ratios = (in-migrants/out-migrants) x 100.
Source: computed from estimates based on migration tables in OPCS and Registrar General Scotland (1983), 1981 Census.

this hierarchical principle.

Selected examples of net migration fields for regions from different parts of the country and different points in the hierarchy are shown in Figure 9.

Maps 1 through 4 in Figure 9 show net migration fields in northern Britain. Central Clydeside loses to all regions except the West Midlands metropolitan county (greater Birmingham) and Greater London, though the volume of exchange with English and Welsh regions is low. The main net outflow is to the Rest of Scotland, the migration field of which shows many gains from English metropolitan regions as well as from Central Clydeside. West Yorkshire loses migrants to the Rest of Yorkshire and Humberside and other non-metropolitan regions but does gain a few migrants from the Glasgow, Newcastle, Liverpool, Sheffield and London metropolitan regions - hence its middle rank in the hierarchy of regions. The towns and villages of North Yorkshire and its coastal resorts have proved attractive to migrants from most parts of Britain with losses only to the South West, Outer South East and East Midlands to the south and Tyne and Wear to the North.

Maps 5 through 8 in Figure 9 show the much higher level of migration activity in southern Britain. Greater London (map 7) is the engine that drives the retirement migration system of southern Britain. Large net outflows go to the Outer South East (principally the South coast retirement towns of Hampshire, the Isle of Wight, West and East Sussex and Kent), the Outer Metropolitan Area, the South West, East Anglia and the East Midlands. Smaller losses occur to almost all other regions. The net migration field of the Outer Metropolitan Area (map 8) is similar to that of Greater London, except for the net gain from the capital, and some smaller gains from northern metropolitan regions. The region that gains most through net migrants through net migration (the Outer South East - map 6) itself loses elderly migrants to other southern regions East Anglia, South West, East Midlands and Wales. Finally, map 5 shows the migration field of the nation's most consistently preferred region for elderly migration: East Anglia gains from every region, though dominantly from the London regions, with only one minor exception.

6.4 The struggle of migrants against distance

One feature apparent on all Figure 9's maps is the decline of net migrants flows with distance from origin or destination. This feature can best be studied by using a spatial interaction model (Stillwell, 1984). Full details of this and other spatial interaction models applied to the analysis of interregional migration flows are discussed by Stillwell (1986) from which the distance matrix used is taken. Here the model is used as a descriptive device to measure the influence of

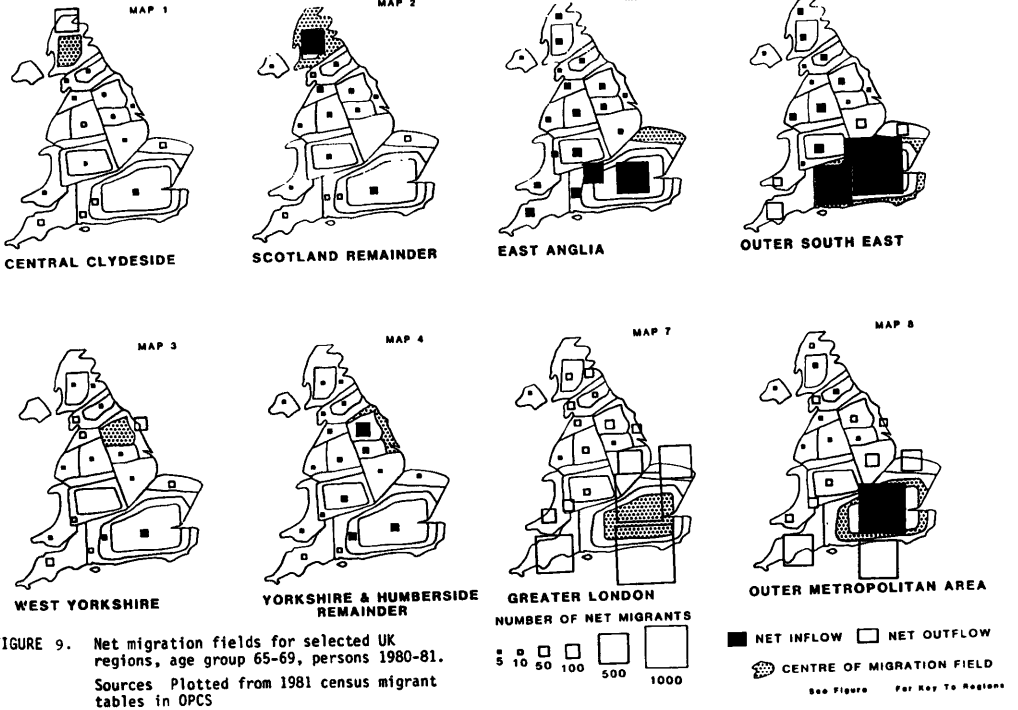


FIGURE 9. Net migration fields for selected UK regions, age group 65-69, persons 1980-81.

Sources Plotted from 1981 census migrant tables in OPCS

distance on particular sets of migrants rather than as an explanation of the migration flows (which would involve substituting models of the origin and destination totals). The data used are the 1980-81 migrant flows from the 1981 Census which have been analyzed extensively in this section. The models are calibrated using Stillwell's IMP program (Stillwell, 1984) in which the distance exponents (or beta values) are found when the mean migration distances of the predicted flows closely match those of the observed matrix to within one tenth of a mile.

The first question we can pose using this model is to ask what influence age has on the effect of distance. The model was calibrated for each age-sex group separately. The mean migration distance and distance friction (beta) values are plotted in Figure 10. There is a general gradient of decreasing migration distance and increasing distance friction with age. The elderly interregional migrant makes significantly shorter moves than a person in the labour force ages or in the childhood ages, and the friction effect of distance increases in the elderly ages. These are very similar to those of Stillwell (1986) for 1966-71 migration (Census 1971 transition data).

The second question to be asked is how are different regional groups of migrants affected by distance. Table 8 sets out the results for origin-specfic beta parameters for male migrants. Although the pattern is not a clearcut one, metropolitan regions exhibit higher beta values. Exceptions are Tyne and Wear, the Outer Metropolitan Area and Northern Ireland. In this last region, negative parameters characterizze 60-64 and 65-69 year old migration that is, the number of migrants tend to rise with distance, not fall, holding constant the effect of varying opportunities at different distances. Clearly, the outmigration stream from Northern Ireland is a special one: there is a barrier to migration from Ulster to the mainland which results in a very low rate of out-migration. However, once on the mainland, migrants from Northern Ireland seek out more attractive, distant places in the southern British regions.

6.5 A components analysis

So far we have considered the internal migration patterns of the elderly independently of the other demographic components of change such as mortality or international migration or the variation in the size of the cohort attaining age 60 (the elderly equivalent of the births component in an all ages analysis). In this last part of section 6 of the paper, elderly migration is placed in this wider context.

The data used in this analysis are drawn from a set of population accounts for 20 UK regions for the period 1976-81 constructed using NHSCR migration data (described in section 3), together with vital

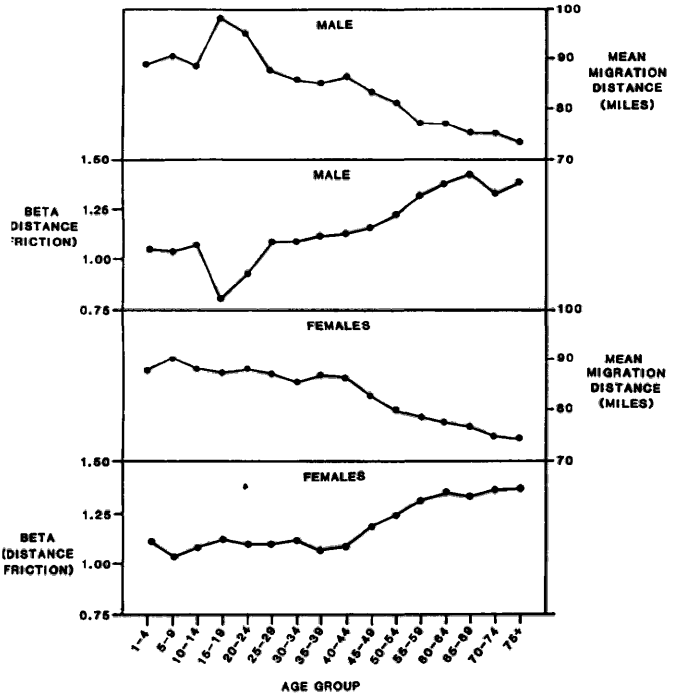


FIGURE 10. Mean migration distances and distance frictions for inter-region migration, 1980-81, UK, by age and sex

TABLE 8. Origin-specific beta parameters (frictions of distance) for UK regions, 1980-81 migration, males

Region	Age group					
	50-54	55-59	60-64	65-69	70-74	75+
Non-metropolitan regions						
Outer South East	1.06	1.13	1.12	1.04	1.14	1.09
South West	1.08	1.17	1.23	1.04	1.29	1.23
East Anglia	0.79	0.95	1.08	1.16	0.98	1.07
Wales	1.16	0.99	1.21	1.53	1.24	1.23
East Midlands	0.79	0.91	0.79	0.78	0.76	0.92
Scotland Remainder	0.64	0.69	0.82	0.71	0.70	1.01
West Midlands Remainder	1.66	1.61	1.68	1.43	1.74	2.05
North West Remainder	1.48	1.43	1.57	1.67	1.48	1.69
Yorks. & Humb. Rem.	1.77	1.75	1.96	1.68	1.77	2.06
North Remainder	0.96	1.10	1.04	1.18	0.92	1.29
Metropolitan regions						
Tyne and Wear	1.40	1.35	1.42	1.18	1.41	1.50
Northern Ireland	0.33	0.46	-0.42	-0.16	0.57	0.24
South Yorkshire	1.50	1.80	1.80	1.73	1.58	1.62
West Yorkshire	1.22	1.45	1.67	1.79	1.55	1.45
Merseyside	1.46	1.70	1.58	1.73	1.57	1.47
Central Clydeside	1.39	1.50	1.55	1.91	1.55	1.73
Greater Manchester	1.42	1.56	1.55	1.50	1.59	1.56
West Midlands m.c.	2.14	2.24	2.00	2.23	2.33	2.44
Outer Metropolitan Area	1.14	1.26	1.25	1.30	1.21	1.33
Greater London	1.39	1.59	1.64	1.76	1.51	1.50

Source: computed using the IMP program of Stillwell (1984) and migration data from the 1981 Census (OPCS and Registrar General Scotland (1983).

statisitics and external migration estimates. Details of the population accounts are given in Rees (1986a). Here the methods of component and component shift analysis are illustrated for one age to age transition, for persons who were 55-59 at mid-year 1976 and 60-64 at mid-year 1981.

The full arithmetic of the population accounts, components and shifts is set out in a sequence of tables (15 through 18) in Rees and Warnes, 1986). Here the procedures used are described briefly. A set of population accounts captures all the changes that occur to a regional population over a time interval. An initial regional population of 55-59 year olds in 1976 loses members through deaths, emigrations and internal out-migration, and gains through immigration and internal in-migration. The result of these flows at the end of the 1976-1981 period is the population stock aged 60-64 in 1981. Each of the components of change observed can be compared with the change expected in the region if that region experienced the same rate of mortality, emigration, internal out-migration, immigration and internal in-migration as the nation. If the expected components of change are subtracted from the observed, the shifts recorded in Table 9 are obtained.

Concentrating on the mortality and the two net migration components, we observe that 68% of the population decline in Central Clydeside, for example, is accounted for by the deaths shift, 28% by the net internal migration shift (which is by definition the same as the observed net internal migration) and 4% by the net external migration shift. All components work in a negative direction to depress population change. The opposite is the case in Yorkshire and Humberside Remainder and the South West, for example, where all three shifts work in a positive direction, lessening population loss for the cohort. The deaths shift accounts for a small percentage of the overall shift, 14% and 21% respectively in these two regions; net internal migration shifts contribute 9% and 4% respectively. For Greater London the shift components work in opposite directions. Greater London has less deaths than the national standard, but a severe net internal migration loss, and a small negative net external migration shift.

If we divide each of these three shift components into two categories of positive and negative, an eightway classification of population change for the region is obtained. Figure 11 plots the typology on a demographic map of the UK (the base is from Craig, 1977).

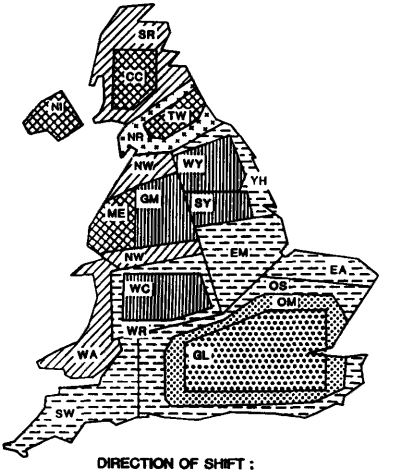
Some six regions on the periphery of metropolitan southern and eastern England locate in category A where mortality is lower than in the nation, where net gains occur from internal migration and where the net shift for external migration is positive (although small losses still occur). These are the regions most favoured by those in late

TABLE 9. Shifts in the components of change

Region	Pop	Deaths	Migration External Out	External In	Internal Out	Internal In	Net Ext	Net Int
Non-metropolitan regions								
Outer South East	10.8	-2.9	0.2	0.4	4.5	12.2	0.2	7.7
South West	12.5	-2.6	-0.3	0.2	-1.3	8.1	0.5	9.4
East Anglia	7.1	-1.5	-0.0	0.1	0.5	5.0	0.1	5.5
Wales	1.5	0.9	-0.4	-0.2	-3.7	-1.4	2.0	2.3
East Midlands	2.4	-0.5	-0.5	-0.4	-3.3	-1.5	0.1	1.8
Scotland Rem.	0.2	1.8	-0.2	0.1	-5.5	-3.7	0.3	1.7
West Midlands Rem.	2.8	-0.2	-0.3	0.1	0.1	2.2	0.4	2.2
North West Rem.	0.8	0.5	-0.2	0.0	-0.2	1.3	2.0	1.0
Yorks.&Humb. Rem.	2.0	-0.3	-0.2	0.0	-0.9	0.6	0.2	1.6
North Rem.	-1.0	1.4	-0.2	-0.2	-1.6	-1.2	-0.0	0.4
Metropolitan regions								
Tyne and Wear	-2.0	1.1	-0.1	-0.2	-1.0	-1.8	-0.1	-0.8
Northern Ireland	-1.3	0.7	-0.2	-0.2	-2.8	-3.3	-0.0	-0.5
South Yorkshire	-0.9	0.4	-0.2	-0.2	-1.8	-2.3	0.0	-0.5
West Yorkshire	-2.0	0.7	-0.3	-0.2	-1.7	-3.1	0.0	-1.3
Merseyside	-3.1	1.2	-0.1	-0.2	-0.0	-2.0	-0.0	-1.9
Central Clydeside	-3.1	2.1	0.0	-0.1	-2.1	-3.0	-0.1	-0.9
Greater Manchester	-4.1	1.5	-0.3	-0.3	-1.6	-4.2	0.0	-2.6
West Midlands m.c.	-5.7	1.1	-0.4	-0.3	-0.1	-4.8	0.0	-4.6
Outer Metro. Area	3.3	-3.2	0.8	0.4	11.2	11.7	-0.4	0.5
Greater London	-20.3	-2.3	2.8	1.2	12.1	-9.0	-1.6	-21.1
United Kingdom	0	0	0	0	0	0	0	0

Notes:

1. All figures are in 1000s.
2. All shifts are defined as:
   shift observed component - expected component.
3. The shifts are related thus: the shift in population change = minus shift in deaths minus shift in emigrations
   plus shift in immigrations minus shift in internal out-migrations
   plus shift in internal in-migrations
4. Source: computed from population accounts constructed using the MOVE program (Rees, 1984), emigration rates and immigration flows.



DIRECTION OF SHIFT :

TYPE	DEATHS	INTERNAL MIGRATION	EXTERNAL MIGRATION
A.	+	+	+
B.	+	+	−
C.	+	−	+
D.	+	−	−
E.	−	+	+
F.	−	+	−
G.	−	−	+
H.	−	−	−

FIGURE 11. Population shift types, age transition 55-59 to 60-64, 1976-81

working and early retirement ages and are the relatively prosperous parts of the country. Four regions in the north and west of the country (two are metropolitan areas) fall in category H in which mortality is higher than in the nation, in which the net shift in external migration is negative. These are the most depressed parts of the UK with regional economies which have suffered greviously from de-industrialization.

Another four regions - metropolitan counties in northern and midland England fall into category G in which worse than the nation population losses through excess deaths and net internal out-migration are only slightly mitigated by small positive shifts in net external migration.

Three regions (two standard region remainders and Wales) show net interanl migration gains and a positive net external shift together ith an excess of deaths (category E).

Types B, D and F have one member each. These are respectively: the Outer Metropolitan Area with positive shifts from mortality and internal migration but not external, Greater London with mortality shift gains but losses from both migration shifts, and the North Remainder with mortality and net external migration shift losses but internal migration gains.

The map (Figure 11) succinctly summarizes the complex pattern of population change in the late working and early retirement ages for this spatial division of the UK.

7. MIGRATION: CONSEQUENCES

In section 6 a detailed account of the spatial patterns of elderly migration was given using information from the 1981 Census and the NHSCR for 1976-81 for a 20 region division of the United Kingdom. In the current section of the paper the same spatial division is used to explore the consequences of the migration behaviour discussed previously. By "consequences" is meant essentially the contribution of migration to population change in the future. We ask to what extent the current migration patterns will effect a shift in the distribution of the elderly population. Any shift in the regional distribution brings both costs and benefits to the regions concerned. The costs are the service demands of care that an increasing elderly population implies; the benefits are the increased income flows that footloose pensioners can bring with them when they migrate. It may be very attractive for a region to increase its share of the more affluent young elderly (60-74 years of age), but these soon turn into older elderly (75 and over) who need much more in the way of public and private care. The official prognosis of national elderly population is

examined first in section 7.1. Then in section 7.2 the multiregional life table is employed to explore the consequences of current regional migration patterns. Finally projections of the elderly population at regional level are analyzed.

7.1 The future elderly population of the UK, 1983-2053

The Government Actuary, in collaboration with OPCS has recently carried out the thirteenth in the modern series of population projections for the United Kingdom and its constituent countries (OPCS, 1985). The elderly population projections are largely independent of the fertility assumptions of the projection, always the most volatile of the components of change in national projections. Only in the last decade of the projections (2043-2053) will the youngest elderly age groups (60-64 and 65-69) be survivors of cohorts born within the projection period. Thus, the principal influences on the population of the elderly up to 2043 will be the sizes of the cohorts attaining age 60 and the progress of mortality.

The projections assume that mortality rates will decrease with a negative exponential relationship with age, fastest at very young ages (below 10 years) and much more slowly, although at rates which reflect the recent acceleration in mortality improvement, for those aged 65 years or over. The improvements in life expectancy are assumed to continue until 2023 and thereafter to be constant. And the gains accumulate in the elderly ages rather than at younger ages. Gains of over two years for both sexes are projected at ages 60 and 65 and nearly two years at age 75.

The evolution of each quinquennial age group can be traced over the 1983-2053 period from the United Kingdom projections. The 60-64 cohort experiences a fall in size of some 15 per cent to 1996 followed by a rise to 2011 of 32 per cent, a slight fall to 2016, and then a renewed rise to 2026 when the 60-64 year old population reaches 3.992m., over a million more than in 1996. After 2036 the size of the age group falls to a low of under 3m. in 2041, followed by a rise to the end of the projection period.

This pattern of ups and downs reflects the pattern of births over the 1918-1983 period together with projected births over the 1983-1993 decade. The fluctuations are repeated, displaced successively by five years, in the other elderly age groups. The 80-84 age group continues to receive larger and larger cohorts until 2011, and, because of improving mortality rates, the 85 and over age group does not experience a check until 2036-41, after which growth is resumed.

When these quinquennial age groups are aggregated to yield elderly (60+) population trends, the projections are for decreases in the 1990s

but then a sustained increase until 2031 (Figure 12). The elderly who are 70 and over increase to 1996, decrease to 2006, resume growth to 2041, and decrease thereafter. The "very elderly" (those aged 80 and over) experience only two minor interruptions in their growth in numbers between 2011 and 2016 and between 2051 and 2053. The bottom graph emphasizes this phenomenon of ageing within the elderly population by expressing the projected figures as index numbers relative to the 1983 level. Within a national population experiencing zero population growth from 1983 to 2051 the share of the 60+ age group rises from 20.6 to 26.2% by 2031 (its peak), while the share of the 80+ age group moves from 3.0 to 6.3% in 2051 (its peak).

The implications of these forecast numbers of elderly and very elderly for the level of demand for services is considerable. Figure 13 shows the results of applying Craig's methodology (see section 2.5) to the 1983 based projections. The Craig (1983) figures differ slightly from the ones computed in this paper, being based on single years of age for the 1981 based projections rather than on five year age groups from the 1983 based projections. Let us use the most optimistic assumptions about morbidity and infirmity rates and follow the curve labelled 2 in the diagram (the one in which a person aged 80 is assumed to need only twice as much care as a person aged 60). Less than 5% need be added to the unweighted projected population to obtain an estimate of the likely service demands of the elderly up to 2031 but the gap widens thereafter with renewed ageing of the elderly population. But if a more realistic scenario (with a weight of 4 at age 80 or half current levels) is adopted, then the extra demand is 7 to 10% to 2031, widening to over 20% after then. The service needs of the elderly remain around their peak levels attained in the 2030's for the next 2 decades despite a fall in elderly numbers.

7.2 Elderly life expectancies

One useful way to examine the consequences for the elderly population of current migration and mortality patterns is to compute life expectancies and examine how those life expectancies will be distributed across regions, using the multiregional methods employed in an earlier comparative project (Rogers and Willekens, 1986). Table 10 reports a few key statistics from this analysis.

The first three columns of the table list conventional life expectancies for the regions, and the second three give the multiregional life expectancies by region of residence at the age indicated. The last three columns record the percentage of life beyond the age indicated in the column head that is likely to be spent in the region of current residence.

Column (1) reveals a 4.25 year difference in life expectancy at

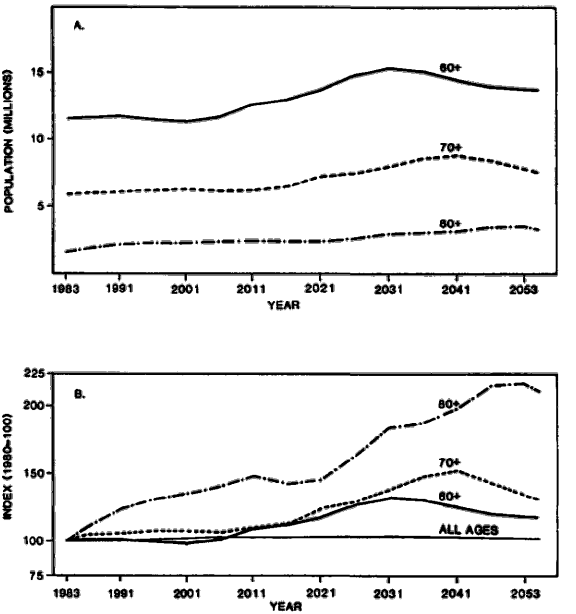


FIGURE 12. The growth of the elderly population of the UK, 1983-2053

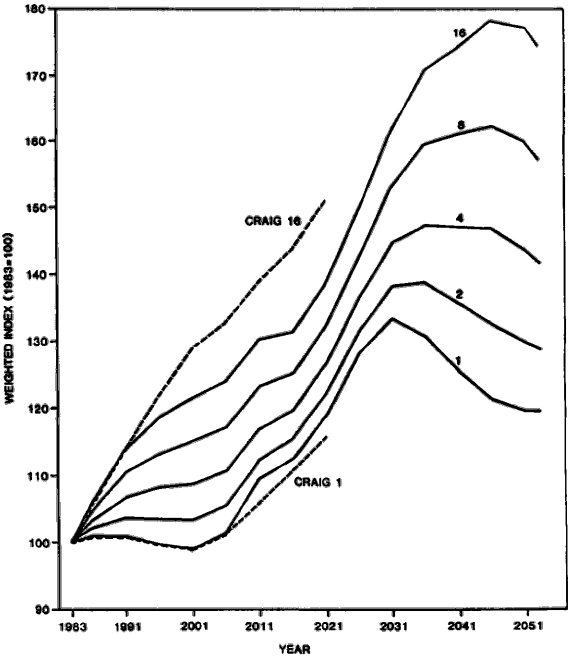


FIGURE 13. Forecasts of the elderly population of the UK, 1983-2053, weighted by level of care needed

TABLE 10. Life expectancies at birth, age 60 and age 75, 1976-81

Regions	Without migration			With internal migration			Retention %		
	Age 0 (1)	Age 60 (2)	Age 75 (3)	Age 0 (4)	Age 60 (5)	Age 75 (6)	Age 0 (7)	Age 60 (8)	Age 75 (9)
Non-metropolitan regions									
Outer South East	74.7	19.2	9.1	73.9	19.1	9.1	41.2	87.7	93.7
South West	74.5	19.0	9.0	73.8	18.9	9.0	45.3	90.1	94.1
East Anglia	74.8	19.1	9.0	73.9	19.1	9.0	41.9	90.0	94.5
Wales	72.6	17.8	8.5	73.2	17.8	8.5	52.8	93.3	95.5
East Midlands	73.4	18.3	8.6	73.4	18.3	8.7	47.2	92.2	95.8
Scotland Rem.	72.0	17.6	8.5	72.6	17.6	8.5	57.0	95.8	97.8
W. Midlands Rem.	73.3	18.1	8.6	73.4	18.1	8.6	41.5	89.4	94.3
North West Rem.	72.6	17.7	8.4	73.0	17.8	8.4	39.9	88.5	93.5
Yorks & H. Rem.	73.5	18.3	8.7	73.3	18.3	8.7	40.6	91.0	94.1
North Rem.	72.0	17.4	8.3	72.8	17.5	8.3	45.9	92.1	94.8
Metropolitan regions									
Tyne and Wear	71.9	17.4	8.4	72.8	17.4	8.4	44.2	92.5	95.2
Northern Ireland	71.2	17.1	7.9	71.8	17.2	7.9	72.2	96.9	98.6
South Yorkshire	72.7	17.7	8.5	73.1	17.8	8.5	49.1	93.8	96.2
West Yorkshire	72.2	17.7	8.5	72.9	17.7	8.5	46.2	92.2	95.5
Merseyside	71.9	17.4	8.5	72.9	17.5	8.5	42.3	89.9	94.1
Central Clydeside	70.5	16.8	8.1	72.2	16.8	8.1	44.6	93.6	95.9
Greater Manchester	71.9	17.4	8.3	72.8	17.4	8.3	46.1	91.6	95.2
W. Midlands m.c.	72.5	17.8	8.5	73.1	17.9	8.5	42.8	89.9	94.7
Outer Metro Area	74.4	18.8	8.9	73.8	18.8	8.9	36.5	81.4	88.6
Greater London	73.7	18.8	9.1	73.6	18.8	9.1	40.7	84.3	92.6
UK	73.2	18.2	8.7	73.1	18.2	8.7	45.9	90.8	94.7

Source: Computed using the internal migration flows, births, deaths and populations for 1976-81 described in Rees 1986a with the SPA program of Willekens and Rogers (1978) adapted for use with 20 regions. The probability computation option used is that for movement data (option 3). The life expectancies are all for persons and are in years.

birth between the worst-off region (Central Clydeside) and the most favoured (East Anglia), though this internationally large interregional range (Termote, 1986) undoubtedly covers up much larger discrepancies at county, district and ward level. Two gradients are apparent in the life expectancy columns: that between metropolitan areas and non-metropolitan regions, and that between the south and eastern areas of the country and the northern and western. The life expectancy in each metropolitan area is lower than that in its paired non-metropolitan region. The regional gradient between the seven regions south and east of the Severn-Wash line and the thirteen north and west of that line is, however, a little larger. The gradients are repeated for life expectancy at ages 60 and 75. The dispersion of values at these ages is less in absolute terms but wider in relative.

Comparison of the conventional and multiregional life expectancies reveals the strong regression to the mean effect of introducing migration into the calculations (cf. Rees, 1979 and Rees and Willekens, 1981). At age 60 this effect is still present but less marked, and at age 75 the effect is still present though weak, because very few years of life remain at age 75 for migration to play its role of averaging life chances. It should be stressed that this interpretation rests on the assumption that people adopt the mortality characteristics of the region that they currently reside in. Evidence from the Longitudinal Study (Fox and Goldblatt, 1982) suggests that inter-regional migration is selective of low mortalityy risk people but that short distance migration is associated with higher mortality risks. The greater longevity of the southern regions of the UK may, to a small degree, be associated with the selective inflow of migrants who experience lower mortality risks.

The final set of three columns yield a convenient summary of the likely effect of migration on cohorts born in a region, cohorts present there at ages 60 and 75. Three regions stand out as retaining high percentages of the life expectancies of their populations: Northern Ireland, Scotland Remainder and Wales, all with more than 50% of life years expected to be spent in the region of birth. At the other extreme less than 40% of life years are retained in the birth region by the Outer Metropolitan Area.

Retention percentages shoot up for ages 60 and 75 reflecting the greatly reduced migration activity at elderly ages and the short time left for migration. Scotland Remainder and Northern Ireland still retain most elderly life years while the Outer Metropolitan Area continues its role as a staging post to somewhere else.

Life expectancy patterns are based purely on current (1976-81) mortality and migration rates. The pattern of future regional population change is, however, also dependent on past population

history, and is worth separate consideration in the next subsection.

7.3 Projections of the elderly population

The shifts in the components identified in subsection 6.5 have clear implications for the future size of the elderly population in the regions. To examine trends in the elderly population we employ a set of multiregional projections carried out using the base period data for 1976-81 used in the components analysis. These projections assume constancy of mortality and migration rates, and enable us to assess the impact of those rates. However, a note of caution should be sounded about regarding these projection as forecasts as the rates of both mortality and migration are currently changing and will continue to change.

Table 11 compares the official OPCS 1981 based projections of the UK population, which incorporate decreasing mortality rates, with those used here (for further analysis of both sets of projections, see Rees, 1986b). For ages up to 75 the two projections show a measure of agreement but after that age the OPCS projections yield substantially more growth in the older elderly: 34% by 2006 for 80-84 year olds compared with 15% and 91% for 85 year olds compared with 19%. These differences are a consequence of assuming considerable improvements in mortality rates at the older ages for which there is recent evidence.

The changes in the elderly populations of the set of 20 UK regions over the 25 years 1981 to 2006 are set out in Table 12. The regions are divided into non-metropolitan and metropolitan categories as in previous tables, and into the component shift categories identified in the analysis of section 6.5.

The six non-metroplitan regions with all three shifts positive show above average increases in the elderly. Where the deaths shift is negative while migration shifts are positive (category E), the changes recorded are close to the UK average in the remaining non-metropolitan regions.

Metropolitan regions show decreases in the elderly below those of the nation, with two exceptions. The Outer Metropolitan Area exhibits an increase of 9%, principally a reflection of the attractiveness of the region to migrants 70 and over in age (reported in section 6). Northern Ireland also shows a growth in the elderly: this is undoubtedly due to the working through to the elderly ages of high fertility levels in earlier decades. Decreases in the elderly in the UK's largest city regions are likely to be substantial - 20% in London and Liverpool, 18% in Newcastle, 17% in Greater Manchster, 13% in greater Birmingham and 12% in greater Glasgow city regions.

TABLE 11. Projected elderly population of the UK, 2006

Age groups	OPCS projections			DIS projections		
	1981	2006	Ratio	1981	2006	Ratio
60-64	2980	3070	103	2980	3001	101
65-69	2807	2500	89	2807	2434	87
70-74	2407	2117	88	2407	2011	84
75-79	1706	1763	103	1706	1607	94
80-84	965	1294	134	965	1115	115
85+	592	1128	191	592	707	119

Source: OPCS = Office of Population Censuses and Surveys, mid-1981 based projections.
DIS = "demographic information system" projections described in Rees (1986a). The model used in these projections is an unconstrained forecast version of the accounts based model with emigration rates and immigration flows. The base period is 1976-81 with mid-1981 populations used as starting populations.

TABLE 12. The elderly population in UK regions, 1981 and 2006

Shift component class and region	Population aged 60 and over (1000s) 1981	2006	Ratio
Non-metropolitan regions			
A.			
Outer South East	1078	1083	101
East Anglia	403	453	112
South West	1023	1083	106
East Midlands	755	777	103
West Midlands Remainder	466	484	104
Yorks. & Humb. Remainder	321	317	99
E.			
Wales	601	553	92
Scotland Remainder	672	644	96
North West Remainder	480	451	94
F.			
North Remainder	382	360	94
Metropolitan regions			
B.			
Outer Metropolitan Area	902	1079	109
West Yorkshire	415	360	87
South Yorkshire	266	240	90
Greater Manchester	529	438	83
West Midlands m.c.	520	450	87
H.			
Northern Ireland	247	251	102
Tyne and Wear	240	196	82
Merseyside	308	246	80
Central Clydeside	312	276	88
D.			
Greater London	1448	1152	80
United Kingdom	11457	10875	95

Does this mean that the service demands of the elderly will lessen in the nation's major urban concentrations? The answer is probably not, for the overall decrease in the elderly as a whole masks, as was discussed in detail in section 7.1, decreases among the young elderly and increases among the older elderly, who need more care.

Figure 14 makes this point very clear. The graphs for the 20 regions and for the UK as a whole plot the ratio, for each elderly quinquennial age group, of the 2006 population to that of 1981. In virtually all metropolitan regions the age groups up to 80 show decreases, and the ages thereafter increases.

The non-metropolitan regions show the different pattern of lesser decreases or some increases in the younger elderly together with greater increases in the oldest ages. Contrast, for example, the two West Midland regions or Greater London with East Anglia, the South West or Outer South East.

The patterns of change revealed in the graphs of Figure 14 imply substantial shifts in the shares of the UK elderly across the 20 regions, which by and large reflect the pattern of metropolitan to non-metropolitan migration discussed in section 6. The Outer South East, South West, East Anglia, East Midlands and West Midlands Remainder add significantly to their share of all elderly ages. Prominent among the losing regions are Greater London, Greater Manchester, Merseyside and West Yorkshire. Exceptions to the pattern of non-metropolitan region gain and metropolitan region loss are Wales, Northern Ireland and the Outer Metropolitan Area. Here the influence of previous cohorts is at work that swamps the influence of current migration behaviour. In Northern Ireland larger cohorts, a product of higher fertility in earlier decades, move into the elderly age range and more than compensate for migration losses. In the Outer Metropolitan Area the larger cohorts moving into the elderly ages are probably a function of heavy migration from Greater London into the area at the working ages in earlier decades. For Wales, the decreases are probably due to heavy outmigration from industrial South Wales in earlier decades leading to smaller cohorts entering the elderly ages over the 1981 to 2006 period.

8. CONCLUSIONS

The size, relative numbers and spatial distribution of the elderly are a function of the past history of the population. The demographic transition of the UK population has resulted in its ageing over the years since 1911. Superficially, the remaining years of the twentieth century will see cessation of this ageing. However, this will apply only to overall elderly numbers, and the elderly population itself will age with considerable implications for the burden of care for families

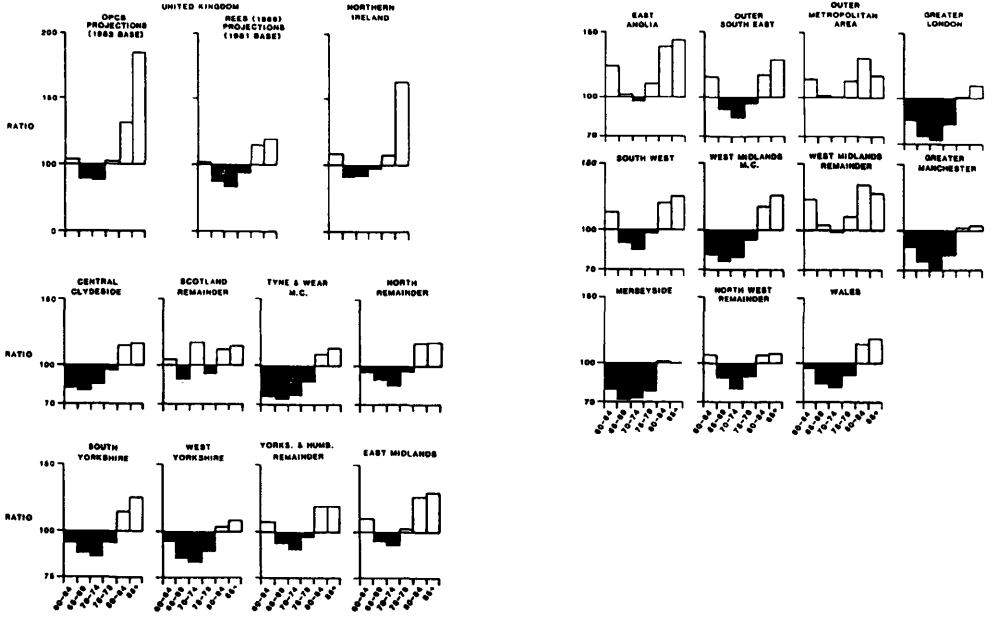


FIGURE 14. Relative change in zone populations, 1981-2006 by age group.

TABLE 13. Projected changes in percentage shares of the elderly population, UK regions, 1981-2006

Regions	% change in share of national population 1981-2006						
	60-64	65-69	70-74	75-79	80-84	85+	Cohort
Non-metropolitan regions							
Outer South East	1.19	0.48	0.05	0.06	0.15	0.83	3.64
South West	0.93	0.38	0.29	0.25	0.40	0.43	2.21
East Anglia	0.75	0.58	0.58	0.60	0.71	0.73	1.08
Wales	-0.25	-0.18	-0.11	-0.17	-0.02	-0.01	-0.47
East Midlands	0.64	0.49	0.54	0.56	0.62	0.49	0.11
Scotland Remainder	0.21	0.18	0.11	-0.07	-0.19	-0.26	-0.34
West Midlands Rem.	0.93	0.81	0.72	0.68	0.63	0.27	-0.26
North West Rem.	0.20	0.11	-0.15	-0.19	-0.35	-0.42	-0.43
Yorks. & Humb. Rem.	0.14	0.14	0.11	0.07	0.08	-0.02	0.14
North Remainder	-0.19	0.04	0.05	0.06	0.05	-0.06	-0.67
Metropolitan regions							
Tyne and Wear	-0.54	-0.28	-0.17	-0.15	-0.12	-0.10	-0.46
Northern Ireland	0.18	0.14	0.13	0.08	-0.12	0.56	-0.20
South Yorkshire	-0.22	-0.11	-0.08	-0.09	-0.04	0.09	-0.39
West Yorkshire	-0.32	-0.27	-0.29	-0.36	-0.42	-0.32	-0.43
Merseyside	-0.58	-0.35	-0.34	-0.30	-0.32	-0.44	-0.49
Central Clydeside	-0.53	-0.18	0.04	0.04	-0.02	-0.07	-0.74
Greater Manchester	-0.55	-0.52	-0.67	-0.63	-0.53	-0.52	-1.03
West Midlands m.c.	-0.91	-0.52	-0.21	-0.04	0.08	0.19	-1.00
Outer Metro. Area	1.09	1.42	1.68	1.53	1.03	-0.24	-0.14
Greater London	-2.19	-2.28	-2.28	-1.93	-1.61	-1.07	-0.08

Notes: cohort = change in share of 60-64 age group in 1981 compared with 85 age group in 2006.

and society. The first three decades of the twenty first century will see renewed ageing of the population as the births bulge of the 1960s moves into and through the elderly ages. Society will face considerable problems of resource transfer, and equity of welfare and taxation across the ages in those decades. These problems may force the reversal of the trend to earlier retirement characteristic of the late 1970s and 1980s.

Spatially, the map of the elderly population is characterized by two populations: those left behind in the country's metropolitan areas and those who have exercised the option of migration on retirement from the world of work. Although migration rates among the elderly are low relative to younger populations, a level of between 3 and 4% per annum, observed in 1980-81, applied over 18 years from age 60, means that a non-negligible proportion of the elderly will have migrated. Relatively small numbers move over great distances but these are selective in choosing their destinations, favouring the countryside and coastal resorts well outside the country's urban-industrial heartland. In the older metropolitan areas the elderly left behind will suffer from higher than average mortality, and higher than average deprivation. The fittest and wealthiest will opt to leave.

By looking at the relationship between migration and age in a set of regions, four interesting phenomena have been revealed.

Firstly, short distance migration (within regions) at the retirement ages continues at the same low or lower levels reached in the late working ages, although there is some evidence of a rise in migration activity among the older elderly, as a result of changes in family composition (death of spouse) and in degree of dependence on family or community care.

Secondly, migration between regions is characterized by a retirement peak, at 65-69 for men and 60-64 for women, but the size of the peak is much more pronounced for the nation's largest cities, is moderate for other metropolitan areas, and rather small for non-metropolitan areas. These latter areas exhibit much greater peaking of in-migration streams, being the locus of the nation's retirement towns and settlements.

Thirdly, the rates of migration from non-metroplitan to metropolitan regions are very low indeed and show very weak or no retirement peaks.

Fourthly, the level of long distance (inter-regional) migration activity at retirement ages is a good deal higher in the southern regions of the United Kingdom than in the northern, reflecting in part the greater affluence of the South and in part the greater push effect of London on elderly migrants than the provincial metropolises.

The analysis of the effect of distance on elderly migration has shown that the old move shorter distances and suffer greater frictional effects than the younger age groups. These effects vary, however, by a factor of three among mainland origin regions, with migrants from the West Midlands metropolitan county exhibiting distance frictions three times as great as those of the elderly in the East Midlands or Scotland Remainder. Migrants from Northern Ireland, although very few in number, were prepared to travel long distances to settle on the mainland.

The future implications of these migration patterns for the distribution of the elderly population are considerable. An examination of the components of elderly population change over the 1976-81 period produces an interesting classification of the regions studied (Figure 11). The southern and eastern non-metropolitan regions experience positive contributions to elderly population change from a better mortality record than the average, positive net internal migration and a positive net external migration shift. Non-metropolitan regions in other parts of the country show similar gains from the migration shifts but not from mortality experience, which is below average.

Metropolitan regions which suffer most losses, together with Northern Ireland, are to the north and west, experiencing negative shifts in mortality experience, internal and external migration. More central metropolitan regions balance some of the losses through positive external migration shifts. Finally, both London regions (Greater London and the Outer Metropolitan Area) show positive shifts due to better than average mortality experience and to better than average external net inflows. There is, however, a strong pattern of loss from Greater London to the neighbouring ring region.

This components classification explains most of the projected population change over a generation from 1981, although a past history of high fertility does mean higher than national average growth in the elderly in Northern Ireland. The national ordering of elderly age groups in terms of degrees of growth or decline by 2006 is that growth is highest in the 85+ age group, followed by the 80-84 and 60-64 age groups, with decreases in the 75-79, 65-69 and 70-74 age groups. This ordering is followed with very few exceptions in the 20 regions studied with the degree of increase or decrease being displaced according to the degree of migration gain and mortality shift experienced by each regional population. For some regions, nearly all elderly age groups show increases (Outer Metropolitan Area, East Anglia, West Midlands Remainder). For other regions, nearly all elderly age groups show decreases (Merseyside, Greater Manchester).

Although the analyses carried out in the paper have revealed many patterns and trends of great interest, they have raised almost as many questions as they have answered. We hope to pursue these questions further.

ECON Q 10·73 OLS
B.L MAIN. SOC CO·03 SJE

REFERENCES

OPCS Office of Population Censuses and Surveys, UK.
CSO Central Statistical Office, UK.
HMSO Her Majesty's Stationery Office, UK.

Allon-Smith, R. (1982) The evolving geography of the elderly in England and Wales. In A.M. Warnes (ed.) Geographical perspectives on the elderly. Wiley, Chichester.

Bittles, A.H. and Collins, K.J. (eds.) (1986) The biology of human ageing. Cambridge University Press, Cambridge.

Brody, J.A. (1985) Prospects for an ageing population. Nature, 315 (6 June 1985), 463-466.

Brown, A. and Fox, J. (1984) OPCS longitudinal study: ten years on. Population Trends, 37, 20-22.

Clark, R.L. and Spengler, J.J. (1980) The economics of individual and population ageing. Cambridge University Press, Cambridge.

Craig, J. (1977) Population scale mapping. Population Trends, 8, 18-19.

Craig, J. (1983) The growth of the elderly population. Population Trends, 32, 28-33.

Evans, J.G. (1981) Demographic implications for the planning of services in the United Kingdom. In J. Kinnaird, J. Brotherston and J. Williamson (eds.) Provision of care for the elderly. Churchill Livingstone, Edinburgh. Pp. 8-13.

Fogarty, M.P. (ed.) (1982) Retirement policy: the next fifty years. Heinemann, London.

Fox, J. and Goldblatt, P. (1982) Longitudinal study: socio-demographic mortality differentials. Series LS, no.1, OPCS, London.

Fries, J.F. and Carpo, L.M. (1981) Vitality and aging: implications of the rectangular curve. Freeman, San Francisco.

Gaymu, J. (1985) Les populations agees en France au recensement de 1982. Population, 40, 699-724.

Grundy, E. (1986a) Retirement migration and its consequences in England and Wales. Working Paper 34, Social Statistics Research Unit, The City University, London.

Grundy, E. (1986b) Household changes and migrations among the elderly in England and Wales. Paper presented at the Franco-British Symposium on the Geography of the Elderly, July 9-11, 1986, King's College London.

Hunt, A. (1978) The elderly at home. HMSO, London.

Law, C.M. and Warnes, A.M. (1976) The changing geography of the elderly in England and Wales. Transactions, Institute of British Geographers, NS, 1, 453-471.

SOC SOL K·08 BL.
SOC SOL KO·08

Ledent, J. with D. Courgeau (1982) Migration and settlement: 15. France. Research Report RR-82-28. International Institute for Applied Systems Analysis, Laxenburg, Austria.
Manton, K.G. (1982) Changing concepts of morbidity and mortality in the elderly population. Milbank Memorial Fund Quarterly, 60, 183-244.
Manton, K.G. and Sordo, B.J. (1985) A dynamic model of population aging and health status change: implications for the development and implementation of national health policy. Milbank Memorial Fund Quarterly, 63.
Myers, G.C. and Manton, K.G. (1985) Morbidity, disability and mortality: the aging connection. In C.M. Gaitz, G. Niederehe and N.L. Wilson (eds.) Aging 2000: our health care destiny. Springer-Verlag, New York. Pp. 25-39.
OPCS (1975) Census 1971. Great Britain. Migration tables. Regions and local authorities as constituted in 1974. HMSO, London.
OPCS (1983a) Census 1981. Persons of pensionable age. Great Britain. CEN 81 PEN. HMSO, London.
OPCS (1983b) Census 1981. National report. Great Britain. Part 1. CEN 81 NR(1). HMSO, London.
OPCS (1985) Population projections, 1983-2053. Series PP2, No.13. HMSO, London.
OPCS and CSO (1984) Britain's elderly population. Census Guide 1. Information Office, OPCS, London.
OPCS and Registrar General Scotland (1983) Census 1981. National migration. Great Britain. Part 1. (100% tables). CEN 81 NM(1). HMSO, London.
OPCS, Social Survey Division (1984) General household survey, 1982. Series GHS, No.12. HMSO, London.
Phillipson, C.R. (1982) Capitalism and the construction of old age. Macmillan, London.
Rees, P.H. (1979) Migration and settlement: 1. UK. Research Report RR-79-3, International Institute for Applied Systems Analysis, Laxenburg, Austria.
Rees, P.H. (1984) Spatial population analysis using movement data and accounting methods: theory, models, the MOVE program and examples. Working Paper 404, School of Geography, University of Leeds, Leeds, UK/ Working Paper no.50, Netherlands Interuniversity Demographic Institute, Den Haag, The Netherlands.
Rees, P.H. (1986a) Choices in the construction of regional population projections. Chapter 7 in R.I. Woods and P.H. Rees (eds.) Population structure and models. George Allen and Unwin, London. Pp.126-159.
Rees, P.H. (1986b) How many old people will there be in the United Kingdom and where will they live? Working Paper 465, School of

Geography, University of Leeds. Paper presented at the Franco-British Symposium on the Geography of the Elderly, July 9-11, King's College London.
Rees, P.H. and Stillwell, J.C.H. (1984) A framework for modelling population change and migration in the UK. In A. Boyce (ed.) Migration and mobility: biosocial aspects of human movement. Taylor and Francis, London. Pp.317-353.
Rees, P.H. and Warnes, A. M. (1986) Migration of the elderly in the United Kingdom. Working Paper, School of Geography, University of Leeds. Paper presented at the Elderly Migration Workshop, Catholic University of Nijmegen, The Netherlands, June 4-6, 1986.
Rix, S.E. and Fisher, P. (1982) Retirement-age policy: an international perspective. Pergamon, New York.
Rogers, A. and Castro, L. (1981) Model migration schedules. Research Report RR-81-30, International Institute for Applied Systems Analysis, Laxenburg, Austria.
Rogers, A. and Castro, L.J. (1986) Migration. Chapter 5 in A. Rogers and F.J. Willekens (eds.) Migration and settlement: a multiregional comparative study. Reidel, Dordrecht, Netherlands. Pp.157-206.
Rogers, A., Raquillet, R. and Castro, L. (1978) Model migration schedules and their applications. Environment and Planning A,10, 475-502.
Rogers, A. and Willekens, F. (eds.) (1986) Migration and settlement: a multiregional comparative study. Reidel, Dordrecht.
Spengler, J.J. (1977) Population change, modernization and welfare. Prentice Hall, Englewood Cliffs, N.J.
Stearns, P.N. (1977) Old age in European society, the case of France. Croom Helm, London.
Stillwell, J.C.H. (1979) Migration in England and Wales: a study of inter-area patterns, accounts, models and projections. Unpublished Ph.D. thesis, School of Geography, University of Leeds.
Stillwell, J.C.H. (1984) IMP, a program for inter-area migration analysis and projection: user's manual (revised edition). Computer Manual 12, School of Geography, University of Leeds, Leeds, UK.
Stillwell, J.C.H. (1986) The analysis and projection of inter-regional migration in the United Kingdom. In R.I. Woods and P.H. Rees (eds.) Population structure and models. George Allen and Unwin. Pp.160-202.
Termote, M. (1986) Mortality. Chapter 3 in A. Rogers and F. Willekens (eds.) Migration and settlement: a multiregional comparative study. Reidel, Dordrecht. Pp.61-108.
United Nations, Department of International Economic and Social Affairs (1985) The world aging situation: strategies and policies. United Nations, New York.

SOC POL K8 PH12

Warnes, A.M. (1983) Migration in late working age and early retirement. Socio-Economic Planning Sciences, 17, 291-302.

Warnes, A.M. (1986a) The elderly in less developed world regions. Ageing and Society, 6 (2), forthcoming.

Warnes, A.M. (1986b) Geographical locations and social relationships among the elderly in developing and developed countries. In M. Pacione (ed.) Progress in social geography. Croom Helm, London, forthcoming.

Watkins, J.F. (1986) A multiregional analysis of interstate elderly migration in the United States: patterns and consequences. Progress Report on the Multinational Study of Migration of the Elderly, Population Program, Institute of Behavioral Science, University of Colorado, Boulder, Colorado.

Willekens, F. and Baydar, N. (1986) Forecasting place-to-place migration with generalized linear models: an application to urbanization in the Netherlands. In R.I. Woods and P.H. Rees (eds.) Population structure and models. George Allen and Unwin, London. Pp.203-244.

Willekens, F., Por, A. and Raquillet, R. (1981) Entropy, multiproportional and quadratic techniques for inferring detailed migration patterns from aggregate data. In A. Rogers (ed.) Advances in multiregional demography. Research Report RR-81-6, International Institute for Applied Systems Analysis, Laxenburg, Austria. Pp.83-124.

Willekens, F. and Rogers, A. (1978) Spatial population analysis: methods and programs. Research Report RR-78-18, International Institute for Appiled Systems Analysis, Laxenburg, Austria.

Produced by
School of Geography
University of Leeds
Leeds LS2 9JT
From whom copies may be obtained