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A Changing Demographic Regime and Evolving Polycentric Urban Regions: Consequences for the Size, Composition and Distribution of City Populations

A. G. Champion

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Summary. The demographic regime in western Europe and many other countries of the developed world is now very different from that of 30–40 years ago and is continuing to evolve. At the same time, settlement systems have been altering significantly in spatial structure, notably in terms of the emergence of polycentric urban configurations. This paper examines the nature of these two sets of changes and searches for linkages between them. First, it outlines the main features of the changing demographic regime. Secondly, it attempts to identify what constitutes 'polycentric urban regions' as opposed to traditional monocentric structures. Thirdly, it assesses how recent demographic developments relate to traditional urban structures and discusses whether they are more conformable with polycentric urban forms.

Introduction

Whether or not one subscribes to the notion of a 'second demographic transition' (van de Kaa, 1987; Cliquet, 1991), it is undeniable that in western Europe and in many other countries of the developed world the demographic regime is now very different from that of 30–40 years ago and is continuing to evolve (Champion, 1998). Among the main differences in patterns of population change are slower national population growth, higher life expectancy, markedly lower fertility, increasing cohabitation, rising levels of couple separation, surging net immigration and faltering net internal migration to the larger metropolitan centres (Hall and White, 1995). Alongside these changes and partly linked to them are the ageing of the population, the growth of ethnic diversity, the reduction of average household size, the decrease in numbers of traditional family households and the rise of other types of household (Coleman, 1996; Noin and Woods, 1993). Perhaps even more fundamentally, there would appear to have been a shift in people's lifestyle behaviour from altruistic attitudes towards more individualistic and self-gratifying behaviour (van de Kaa, 1987; Avramov, 1991).

At the same time, settlement systems, while subject to a considerable degree of inertia, have been altering in several ways. At the broadest level, in the 1970s, a switch from urbanisation to counterurbanisation was observed in many countries and, although

A. G. Champion is in the Department of Geography, University of Newcastle, Newcastle upon Tyne, NE1 7RU, UK. Fax: 0191 222 5421. E-mail: Tony.Champion@newcastle.ac.uk.

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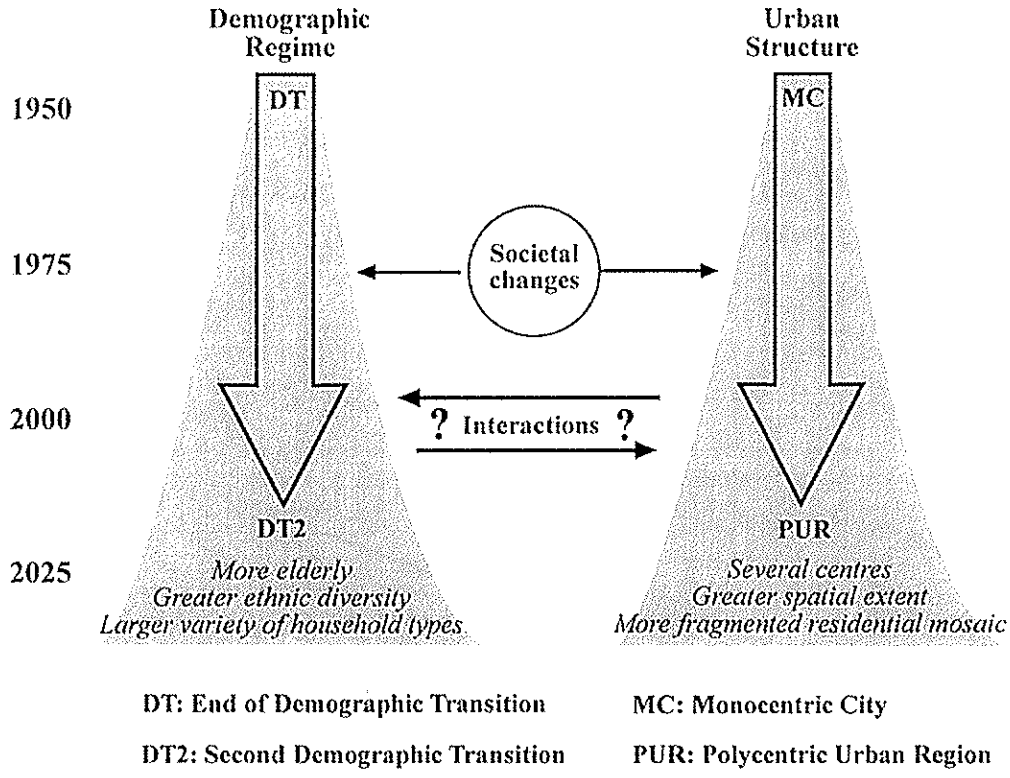

Figure 1. Schematic representation of changes in demographic regime and urban structure, 1950–2025.

subsequently the metropolitan migration turnaround has faded in most cases or even reversed itself again, debate continues about the relative role of the large, medium-sized and small settlements in accommodating future population growth (Champion, 1989, 1998). Secondly, even earlier, Gottmann (1961) had pointed to the emergence of a new type of urban phenomenon involving the interweaving of separate urban centres into a multinodal region or megalopolis. Thirdly, at the level of the individual metropolitan area, the dominance of the main commercial nucleus (or CBD) has increasingly been challenged by the growth of centres in the suburbs or in essentially exurban locations, exemplified most notably by Garreau's (1991) 'edge cities'.

The coincidence in time of these major changes in both demographic regime and settlement structure raises some intriguing possibilities concerning the nature and extent of any links between the two (Figure 1). One is that they are both elements of a broader shift in the organisation of society, with a move from the 'industrial era' to a 'post-industrial era'. Beyond this, one can question whether there is any causal relationship between the two. On the one hand, it might be the case that the new forms of demographic behaviour and the resultant changes in population composition are actively helping to promote the new forms of settlement, alongside the effects of economic restructuring and technological change. Alternatively, maybe the changes in settlement patterns produced by these latter factors are themselves causing, or at least reinforcing, the changes in population. Even if there is no direct causal link between the two, the new forms of settlement provide an altered spatial context within which the residential population must arrange itself.

This question is both of immense policy

interest and of great theoretical importance. Around the world, there are major concerns about the future of cities in terms of their economic competitiveness, social cohesion and environmental sustainability. On the one hand, cities have been so successful that they have imposed huge pressures on their surrounding areas, while at the same time threatening the viability of more distant places. On the other, partly as a result of the more negative impacts of growth, there has been a large-scale exodus of generally more wealthy city residents to smaller settlements and more rural regions, leading to socio-spatial polarisation and a weakening of cities' human capital. In the UK, for instance, policy-makers are very keen to learn more about how residential preferences are changing; in other words, "The people—where will they go?" (Breheny and Hall, 1996). Equally, they are striving to identify the policy measures that can produce an 'urban renaissance' (Urban Task Force, 1999). The 'polynucleated metropolitan region' has been adopted as 'planning doctrine' in the Netherlands and is being evaluated as a model for several other urban regions in north-west Europe (Dieleman and Faludi, 1998; Priemus, 1998). Questions about the degree of congruence between recent trends in urban patterns and people's housing choices are highly relevant to this debate. The academic credentials have been stated very clearly by Clark (1987), who argues the case for more detailed study of the "demographic drives" (p. 122) behind urban restructuring. The latter have in the past been given very little attention compared with the changing spatial division of labour and the role of the state, yet can be seen as intervening crucially between these higher-level theories and restructuring at the local level.

By necessity, this paper is essentially exploratory in nature. Despite Clark's (1987) call, there is a distinct lack of detailed research on the implications of changing demographic regimes for settlement patterns in general and, least of all, on the socio-spatial complexion of polycentric urban structures. First, therefore, the paper briefly reviews the main features of the changing demographic regime. Secondly, it attempts to clarify what constitutes 'polycentric urban regions' in terms of their distinctiveness from a monocentric structure. Thirdly, an assessment is made of the extent to which the recent demographic developments may place strains on the traditional models of urban residential patterns and discusses how far these strains might be alleviated by shifts towards polycentric urban forms. The paper concludes by revisiting the question of the linkages between the two sets of changes.

A Changing Demographic Regime

The first step is to examine the nature and extent of recent developments in demographic behaviour and population profiles. Over the past three decades or so, western Europe, in common with most other parts of the developed world, appears to have entered a new phase of demographic development. Some of the principal changes are highlighted in Table 1. This section briefly describes the demographic trends in order to provide a basis for discussing the implications for urban areas. It outlines the idea of the move to a new demographic regime, documents the principal trends in the components of population change and examines the three main impacts on population structures that bear upon the evolving composition of household types.

Changing Attitudes and Lifestyles

Recent changes in demographic behaviour have been viewed by many as a significant departure from previous patterns and as indicators of movement towards a new demographic regime. Epithets from various observers indicate their feelings on the fundamental nature of these developments, notably with Lesthaeghe and van de Kaa (1986) suggesting that the world has now begun a 'second demographic transition'. Faus-Pujol (1995) echoes this by arguing that 'Europe is at the beginning of a new demographic transition', while McLoughlin (1991) refers to the 'demographic revolution'. More gener-

Table 1. Selected features of demographic change in Europe

	Mid 1960s	Mid 1990s	Mid 2020s
Life expentancy (years)	69.8	72.6	77.5
Infant mortality rate (per 1000 live births)	37	13	8
Percentage population aged 65 +	9.4	12.6	20.2
Median age	30.9	36.0	44.0
Percentage households with one person (EU only)	13	26	?
Percentage families with lone parents (EU only)	7	16	?
Percentage non-white (Great Britain only)	1.5	6.0	?

ally, as reflected by White's (1993) views on international migration, there is a feeling that Europe has been moving into a 'post-industrial' era. These 'new times', however, involve changes not merely in economic structure and technology but also in attitudes and lifestyles.

The most fundamental feature of the move from the first demographic transition to the second, according to van de Kaa (1987), is a switch from altruism to individualism. Whereas the first transition to low fertility was dominated by concerns for family and offspring, the second emphasises the rights and self-fulfilment of individuals, the desire for people to realise more of their own potential and an increasing emphasis on equality of opportunity and freedom of choice. Alongside basic considerations concerning the economic cost of children, social and cultural changes play a crucial role in the move away from marriage and parenthood. As described by Avramov (1991), whereas a high fertility regime used to reduce the choice of domain and the need for survival used to limit variations in family form, progressively greater control over mortality has paved the way for the development of individualism.

This shift in attitudes is exemplified most conspicuously in references to 'alternative lifestyles' and 'new forms of family life'. Avramov (1991) points out that the term 'lifestyle' came into general use in the 1960s. According to her, this is associated with a reaction to the depersonalisation that was brought on trends towards mass production and consumption, although it was also facilitated by the extra security provided by the flowering of welfare provision around that time. According to Hopflinger (1991), the main feature is the sheer diversity of lifestyles that this new freedom is spawning, leading to higher instability in household patterns and an increasing disassociation between formal household structures and informal family structures. Meanwhile, Hoffmann-Nowotny and Fux (1991) identify the emancipation of women as the key development, arguing that the decline in fertility and the rise of non-traditional living arrangements and lifestyles can be linked directly to improvements in the societal position of women.

Moreover, the notion of a new demographic regime based on changing lifestyles is as relevant to migration as to fertility and household arrangements. At one level, of course, the two are directly related, since developments like increased childlessness and household instability will be associated with changes in the overall population's pattern of residential preferences and migration propensities. Beyond this, however, the migration literature is now replete with evidence of the growing importance of lifestyle and 'quality of life' factors in stimulating residential movement and influencing choice of destination (Boyle *et al.*, 1998; Findlay and Rogerson, 1993). In particular, this theme comes through strongly in the accounts of counterurbanisation and moves to the countryside, on the one hand, and just as clearly in the descriptions of gentrification and the 'back to the city' movement, on the other.

Changing Demographic Processes

Over the past three decades or so, Europe has seen remarkable changes in all three components of national population change—mortality, fertility and migration. These need only a brief description here, because more detail is readily available elsewhere (see, for example, Noin and Woods, 1993; Hall and White, 1995; Coleman, 1996; Champion, 1998). The main features are longer life expectancy, lower fertility and the emergence of net immigration as a significant element in national population growth.

Mortality rates have been subject to a remarkable decline over the past 40 years. Since the early 1950s, life expectancy at birth in the 12 pre-1995 European Union (EU12) countries has been lengthened by 9 years, representing an average gain in longevity of 1 year every 4 years (Noin, 1995). This progress was most rapid in the early post-war period, slowed in the late 1960s, but then resumed again in fairly steady fashion in the mid 1970s. As part of this, infant mortality has been falling by around 5 per cent a year on average, down from 49 per 1000 live births in the early 1950s to only 6 by the mid 1990s. Moreover, this period has seen a marked convergence of international experience in Europe, with the range in overall life expectancy across the EU12 down from 12.8 years to 3.4 years over the 40 years.

Even more remarkable, however, has been the decline in fertility rates, particularly if measured from the peak of the post-war baby boom in the mid 1960s. Whereas at that time the majority of EU countries were reporting total fertility rates of between 2.6 and 2.8, the rates for most countries were lying in the range of 1.4–1.8 by the later 1980s. Although an upturn in rate was recorded in the first half of the 1990s by a few countries (notably in Scandinavia), in most other parts of Europe rates have remained persistently low by historical standards, while those for eastern Europe have recently fallen into line. By the mid 1990s, therefore, all but northern Europe (including the British Isles) was averaging 1.3–1.4, just about half the level of 30 years ago.

With rates of natural increase falling back towards zero and indeed becoming negative in some countries, immigration has become increasingly significant as a source of national population growth. In the mid 1990s, net immigration was responsible for over half and over two-thirds of overall population growth in northern and western Europe respectively. The most notable development, however, has been the switch of southern Europe into net migration gain, breaking its long-established pattern of emigration to the New World and its post-war involvement in the European 'guest-worker' system.

The significance of this growth in international migration has been heightened by changes in its composition and origins. What White (1993) refers to as the 'third wave' of post-war migration comprises three essentially new elements: high-skill labour migrants, asylum-seekers and clandestine movers. Also, a much higher proportion of all these three are originating from outside Europe than was the case during the peak of the 'guest-worker' migration period in the 1960s and early 1970s (Castles and Miller, 1998). In particular, reflecting the huge economic and demographic gulfs between Europe and most of the Third World, there has been a steady increase in migration pressures from sub-Saharan Africa and Asia. Meanwhile, the collapse of the Communist regimes in eastern Europe at the end of the 1980s not only led to a major, if relatively short-lived, westward surge of residents from there, but has also opened up an alternative access route for migrants from further afield. The skilled migrants, being more cosmopolitan in culture and often on short-term postings, have sometimes been referred to as 'invisible migrants', yet they too can have significant local impacts.

Changing Population Profiles

Arising from these trends in the three basic components of population change, there have been marked changes in the composition of

population. Three aspects are most notable—the ageing of the population, increasing ethnic and racial diversity and major developments in household structure. Again, these are more fully documented in other sources (see below), at least at national level.

Population ageing is a direct outcome of trends in both mortality and fertility. In fact, in recent years, the biggest absolute changes have come at the lower end of the age spectrum, with a contraction in the proportion of under 15 year-olds by between 5 and 7 percentage points in most European countries during the 30 years leading up to 1990. The proportion of people aged 65 and over has grown progressively, partly as a mirror image of this, but also because of rising life expectancy and because of the large turn-of-the-century birth cohorts reaching old age. Currently, the proportion of elderly people is growing at a more modest pace in much of Europe, thanks to the smaller birth cohorts of the interwar years. Soon, however, it is likely to resume its steep upward track, with the ageing of the post-war baby-boom cohorts being magnified by the latest falls in fertility. For Europe as a whole, the proportion aged 65 and over, which grew from 8.7 to 11.4 per cent between 1950 and 1990, is expected to pass the 20 per cent mark by 2025 (Warnes, 1993; Grundy, 1996).

Secondly, the ethnic composition of European countries is becoming more diverse, notably through international migration but also as a result of subsequent family building by settlers. The 'guest-worker' system, labour recruitment from former empires and the 'post-industrial wave' of immigrants have all contributed to a significant growth in numbers of foreign residents (White, 1993; Salt, 1996). In 1990, the proportion of foreigners (citizens of other countries) was at least 5 per cent in a number of countries in 1990; for instance, Austria 5.3, France 6.4, Germany 8.2, Belgium 9.1, Switzerland 16.3 and Luxembourg 27.5 (OECD, 1995). These figures, however, tend to understate the effects of immigration, partly because they ignore newcomers who have been naturalised and also partly because in most countries children born to immigrants after arrival are not treated as foreigners in the statistics. In France, for instance, it is estimated that some 14 million people—one-quarter of the population—are of foreign nationality or have non-French ancestry no more than 2 generations back (Ogden, 1993). Britain's non-white population grew from under 200 000 in 1950 to over 3 million in 1991, when it comprised 5.5 per cent of total population and—with non-whites making up 9 per cent of 0–15 year olds in 1991—is destined to continue its growth, even without any further immigration (Champion, 1994).

Thirdly, household composition is now radically different from the past in many parts of Europe, although some countries are still characterised by more traditional patterns despite sharing recent fertility declines (Hall, 1995). The most impressive feature has been the rising numbers of one-person households, which by 1995 accounted for 26 per cent of all households in the EU15, twice the level of 1960 (CEC, 1996). An even bigger change in relative terms has been the increase in the proportion of lone-parent families as a proportion of all households containing dependent children, up from 7 to 16 per cent for the EU15 between 1960 and 1995. In the meantime, the standard nuclear family of a couple with dependent children made up only just over one-third (37.5 per cent) of all households there in 1995. Northern Europe appears to be leading the way, with 2 in 5 of Sweden's households comprising only 1 person by the early 1990s and with barely one-quarter containing dependent children (Champion, 1998).

These basic statistics mask several other important features of household change. Perhaps the most significant of these is the growing fluidity of household formation and fission. Nowadays, it is more common than in the past for young people to leave home for higher education, work reasons or merely greater independence and, with marriage and birth of first child coming later than in the past, they spend a considerable time in relatively unstable household groupings (Lesthaeghe and Moors, 1996). Even follow-

ing marriage, instability is quite high and certainly much higher than in the past, with the divorce rate running at 30 or more per 100 marriages in over half the EU15 countries (Council of Europe, 1996). For cohabiting couples, the incidence of separation can be expected to be higher than this. With a significant proportion of separation and divorce leading to the formation of new partnerships, the number of families experiencing periods of lone-parenthood at some stage is much larger than the levels indicated at any one time, while the proportion of children with a step-parent has been growing steadily (Kiernan, 1996). Beyond this, there are important implications in socioeconomic terms, with the rise of one-person and lone-parent households being a major force behind the increase in households with no earner present—a trend that contrasts starkly with the even greater increase in the numbers of households with two or more people in work.

In sum, therefore, there would seem to have been something of a revolution in demographic behaviour across most of Europe in the past three decades. While superficially looking like a continuation of the original demographic transition experience associated most strongly with falling mortality and fertility, the emerging regime differs in several respects. Most notably, these relate to new patterns of partnership behaviour, including increasing cohabitation before marriage, rising average age of childbearing and higher levels of partnership dissolution—all seemingly underpinned by the growth of new social norms linked to individualism and female emancipation. Beyond this, the switch of these countries from net emigration to net immigration, or at least from immigration with mainly European origins to inflows principally from Africa and Asia, has been leading to a much greater degree of ethnic and cultural diversity in the population. Along with the process of population ageing, these trends can be linked to the development of new types of lifestyle that have different needs and aspirations from more traditional ones. Given their links to attitudes towards city life and to residential preferences more generally, the question therefore arises as to how they may be affecting the distribution and composition of population across national settlement systems and within urban regions.

The Emergence of Polycentric Urban Configurations

Before exploring the potential impacts of these demographic developments on urban structures and vice versa, it is important to be as clear as possible about the changes taking place in urban-region structures. As already sketched out in Figure 1, the task is to draw on the existing literature to try and envisage the outcome of the observed shift away from a traditional 'monocentric city' (MC) towards some form of 'polycentric urban region' (PUR). The central questions concern the form and character of the emerging new structure, including its spatial extent, the number and size of its centres and the extent to which local conditions vary across it. Only by clarifying these aspects will it be possible to speculate on how the simultaneously changing demographic regime is interacting with this process, either by passively fitting in with the new settlement forms or by actively helping to fashion them. Unfortunately, as noted by Hall (1997), the new metropolitan dynamics have not yet been adequately captured by urban theory and models, so for present purposes it will be necessary to put forward a rather hypothetical conception of a 'pure' PUR.

Problems in Identifying PURs

The most problematic issues would appear to be spatial scale, the degree of interaction between centres and the variety of origins out of which a PUR can emerge. As regards spatial scale, it is possible to identify at least two versions of polycentric configuration from the literature. One is that of the individual metropolitan area, or 'city' in the broad sense including suburbs and commuting hinterland. This has been most fully articulated in the North American context, with wide-

spread observations of employment sub-centres rivalling the CBD in size (see, for instance, Berry and Kim, 1993; Anas *et al.*, 1998). The main alternative is the concept of a region containing a number of cities, none of which is dominant—what Dieleman and Faludi (1998, p. 365) refer to as the "polynucleated metropolitan region". The principal origins of this approach lie within Europe, notably the Netherlands with its planning vision for the Randstad, or 'ring city' (Dieleman and Musterd, 1992; Lambooy, 1998; Priemus, 1998).

To complicate matters further, there have been suggestions that a third, even broader, polycentric pattern of settlement is evolving. Dieleman and Faludi pose the question:

> Is it likely that, in the foreseeable future, the Rhine–Ruhr Metropolitan Region, the Randstad, the Flemish Diamond and the less urbanized areas now interspersed between them will develop into one *polynucleated urban field* at the macro level?' (Dieleman and Faludi, 1998, p. 374; italics added).

Even if this does not happen, there is already a precursor in the north-eastern seaboard of the US, identified as 'Megalopolis' four decades ago by Gottmann (1961).

The second challenge in defining a PUR concerns the degree of interaction and interdependence that is needed before urban centres can be considered to be part of a single larger urban region. Drawing essentially on first principles but with an eye on the examples of different scales just mentioned, it is possible to develop a range of definitions varying in degree of restrictiveness:

- At the most general end of the spectrum, it is possible to conceive of a polycentric urban patterning that could merely refer to the fact that the urban population of any region or country lives in several urban areas rather than being concentrated in a single one.
- The middle-range position is one in which there is some minimum degree of interaction between urban centres, this being used to identify which centres form part of the PUR and which are 'free-standing' or form part of another PUR.
- Perhaps the most restrictive definition would be a region in which each centre specialises in providing a distinctive set of 'city-level' functions for the whole region. In this case, each centre contains a much larger presence of these functions than its own population could justify, while moreover these functions are provided exclusively by that centre and by no other within the region.

Thirdly, in addition to issues relating to spatial scale and level of interaction, the ease of identifying a PUR will also be affected by the manner in which it evolves. Drawing on the literature cited above, it can be suggested that there are at least three ways in which a PUR can emerge, as follows (see Figure 2):

(1) *The centrifugal mode.* From a monocentric city, where the continuing growth of the city imposes such severe strains (for example, escalating land rents in the CBD and growing problems of access to the central area from the ever more distant outer residential areas) that the most affected production and service activities are squeezed out to alternative centres that in due course may, in combination or indeed separately, come to rival the original centre in size.
(2) *The incorporation mode.* From a large urban centre expanding its urban field so that it incorporates smaller centres in the surrounding area that had previously been largely self-sufficient in terms of both employment and services, with these other centres then forming a more powerful catalyst for attracting extra non-residential activities than the centres emerging through the centrifugal mode and perhaps providing an even stronger challenge to the main original centre.
(3) *The fusion mode.* From the fusion of several previously independent centres of similar size, as a result of their own separate growth both in overall size and

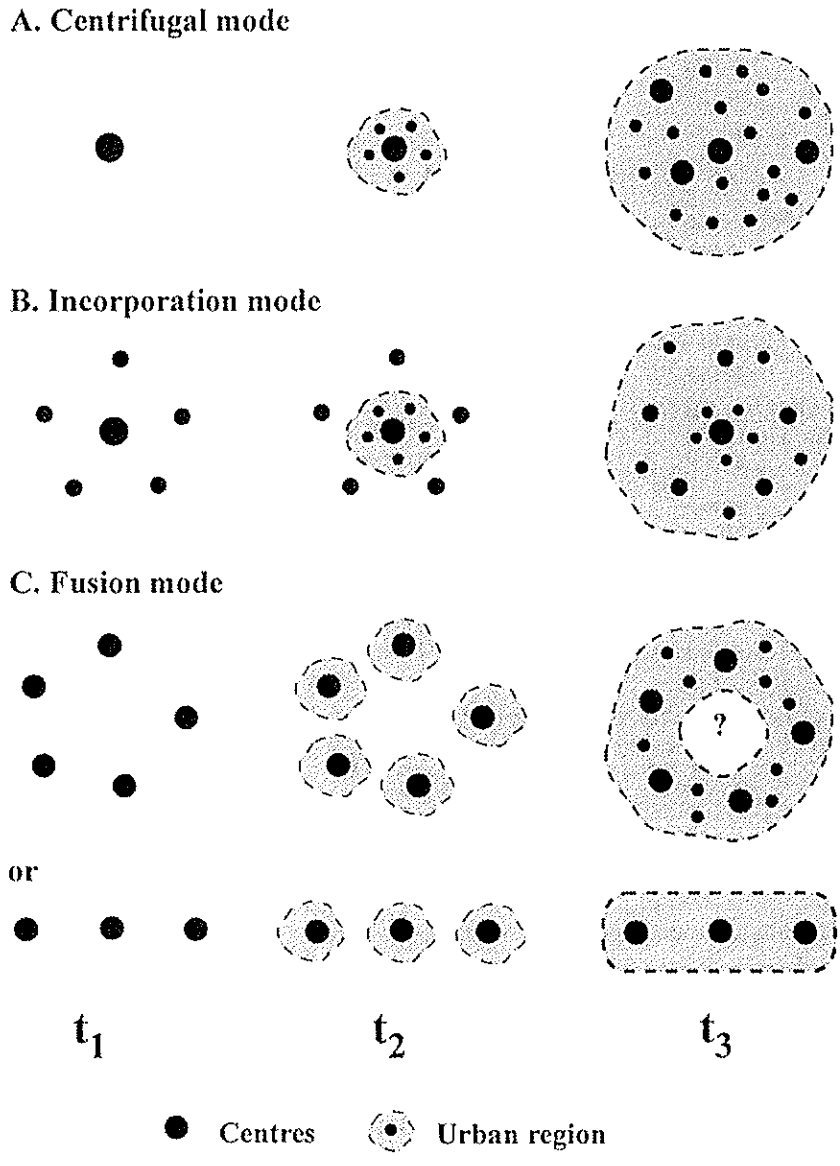

Figure 2. Alternative paths for the evolution of polycentric urban regions.

lateral extent and particularly because of the improvement of transport links between them.

In this way, pre-existing forms of settlement can influence subsequent patterns of development. However different are the new processes of urban change compared with the traditional ones, their effects will normally be superimposed on inherited physical structures, property rights and network linkages. In particular, notably in the fusion mode but also to some extent with the incorporation mode, the centres added to the form the PUR will already have a nucleus of high-level services and jobs. This provides a major additional source of potential differentiation among emerging PURs.

Distinctive Features of a Pure PUR

Drawing on the preceding review, it would seem that the 'pure PUR' is most likely to arise out of the following three conditions:

(1) it will be most fully developed at the most localised of the three scales identified;
(2) it will possess a high degree of interaction between the constituent parts of the urban region; and
(3) it will be evolving through the centrifugal mode, growing out of a monocentric urban structure within a broader region with no previous history of urban settlement.

What, then, are the principal characteristics of the pure PUR that set it apart from the traditional MC, as typically represented at its simplest by Burgess's concentric-zone model (Knox, 1994)?

The most obvious distinction between the PUR and MC models concerns, by definition, the spatial patterning of employment and services. In the MC, the functions needed both to service the urban region and to provide its 'export base' are located in what is essentially a single centre, comprising the CBD and the 'factory zone' around it. In the pure PUR model, by contrast, these functions are distributed across a number of centres. More importantly, the latter are distinguished from the local suburban centres of the MC model by their possession of high-order services and 'basic sector' employment, making them little different in complexion from the traditional CBD (Hartshorn and Muller, 1986; Cervero, 1989).

What is less clear about the PUR's centres, however, is their size and number. Studies of recent urban restructuring in the metropolitan US have thrown up examples of new centres that are beginning to rival the downtown areas, such as some of Garreau's (1991) 'edge cities' and the case of the airport-centred employment zone in Los Angeles documented by Gordon *et al.* (1986). Nor is this phenomenon exclusively American. For instance, Dieleman and Faludi note that:

> The historic core of Amsterdam now provides fewer jobs than the burgeoning employment centre in Amsterdam South East and the scattered office parks around Schiphol airport (Dieleman and Faludi, 1998, p. 365).

At the same time, however, it has also been shown how scattered the distribution of employment can be. Waddell and Shukla (1993) point out that in the 'Dallas–Fort Worth Metroplex' jobs are now found in myriad minor clusters as well as in a variety of concentrations and corridors, while for the Los Angeles region Gordon and Richardson (1996b) observe that under one-fifth of jobs are in the main centres, new as well as old. In the words of Waddell *et al.* (1993, p. 15), the evolving urban landscape is "multinodal, multiaxial and multiformal". This suggests a multiplicity of points at which services and jobs can be accessed by residents, even although there may be some underlying pattern.

This shift from an urban region with a single centre to one with multiple centres will be accompanied by changes in the geography of land prices and, thus, of residential areas. The MC model was predicated on the basis of the need for access to the single centre, with a pronounced peaking of land values at this point and with better-off people taking advantage of the lowest land prices at the metropolitan periphery to live on large lots. With the pure PC model, by contrast, there will be no single overarching 'cone' of land prices, but instead a set of peaks, each with their own separate cones extending outwards until intersecting with those of other centres. Thus, Waddell *et al.* (1993) have observed multiple house price gradients in Dallas, Texas, while it has also been noted that nodes other than the CBD are now exerting greater influence on apartment rents than the CBD itself (Hoch and Waddell, 1993).

Following this reasoning through, it can be deduced that a PUR will have less variation in land values than in the MC model. With less pressure on each separate centre, it would be expected that nowhere would land

prices in a PUR reach as high a level as in an equivalent-sized MC. Equally, the larger the number of centres, the flatter the overall land-price surface will be. This has been verified by Gordon and Richardson for the Los Angeles region, where the wide dispersion of jobs has produced a surface characterised more by "low-rise bumps" than by "spikes" (Gordon and Richardson, 1996a, p. 291). Less clear is whether land prices within a PUR could fall as low as in the outer zones of the MC. Probably not, except at the very edge of the PUR, which would presumably be located further away from the geometrical centre of the PUR than the edge of the MC from its CBD.

Also to be considered, however, even within the context of a pure PUR, is the fact that the multiple centres will not be identical. For one thing, they will vary in size, if only reflecting that some nodal points in a PUR are more accessible than others. More importantly, they will vary in their nature and image. The main driving-forces behind the development of these centres are competition and specialisation in the world economy, producing a very different outcome from a 'central place' solution to the efficient provision of local services. It is therefore to be expected that each part of the PUR will have its own distinctive *raison d'être*, just as separate cities and towns have elsewhere except for combining this with residential specialisation. According to Kunzmann (1996), in the European city-region of the 1990s, these include international finance and service centre, global tourist circuit, airport city, R&D technopole, modern production complex, edge city and gentrified urban island. As noted by Archer and Smith (1993), suburban offices tend to cluster in a particular location principally in order to benefit from the perceived benefits of its prestige.

Overall, therefore, the urban landscape of even a pure PUR is much more complex, and in a sense more fragmented, than in the simple MC model. Indeed, it has much more in common with the multiple-nuclei model originally put forward by Harris and Ullman (1945). As such, it is important to note that, just as with businesses, residential areas have their own sorting processes. Within the MC, it was life-stage factors that largely differentiated the concentric rings of the Burgess model and economic status the radial sectors of the Hoyt model (Short, 1984). Interestingly, the other principal dimension of the contemporary North American residential mosaic—ethnicity—was found to display a more punctiform pattern akin to the multiple-nuclei model (Murdie, 1969). In the PUR context, this can be expected to be the norm for all population sub-groups, as sub-groups of better-off people search for their particular niches in terms of locality image and those with less market power compete for what is left. This sorting process will probably have a much greater influence on the PUR's housing landscape than the trade-offs between land prices and transport costs that powered the MC model.

Residential Decision-making in a PUR

Clearly, the context for residential decision-making in a PUR is very different from that in the MC model. In the pure version of the latter, all residents have the same single reference point for journeys from their homes. By contrast, in the pure PUR with each of its multiple centres having a relatively specialised role, people will need to travel to different places to reach different types of job and amenity. They will therefore try to locate their homes according to the importance that they attach to these various types of facilities.

At the same time, however, it must be acknowledged that the pure PUR is no more likely to materialise on the ground than has been the case for the simple MC model. For one thing, the city is a dynamic phenomenon and, even if not undergoing a transition from one distinctive type to another, will see changes in its landscape as a result of the growth and decline of its various activities. Beyond this, as shown above, there are different types of PUR, notably in terms of their

origins. In particular, PURs formed through the fusion mode will be taking on board a number of large, previously independent centres with a wide range of services and jobs and with a considerable amount of local tradition and loyalty (see, for instance, Blotevogel, 1998, and Knapp, 1998, in relation to Rhine–Ruhr metropolitan region). In these PURs, therefore, the majority of opportunities to which people need access will be available at a large number of alternative locations rather than at just one or two. All other things being equal, this would mean that people would have a wider choice of place to live than in a pure PUR.

On the other hand, other things are not necessarily equal, and among these is the fact that residential decision-making can be an active force in the shaping of the urban landscape, interacting with and often reinforcing the changes produced by other players in the market place. If personal mobility is relatively restricted, it is likely that the other players will have most influence on the residential patterning of the PUR. For example, if one centre in the PUR emerges as the R&D technopole, as envisaged by Kunzmann (1996), it will draw to it people working in this activity. Alternatively, if people are very mobile on a daily basis, then it will be their local neighbourhood preferences that will dominate the choice. Whichever is the case, the fact that the changing demographic regime is producing an altered population profile will also contribute to the reshaping of the residential mosaic.

In sum, this section has aimed at setting up the geographical context for studying the impacts of demographic change on urban regions, as MC gives way to PUR. It has been trying to identify the distinctive features of a PUR in order to develop 'expectations' of how current trends in demographic behaviour and population structure may relate to it. The underlying aim of the rest of the paper is to discover whether or not the new demographic regime is conformable with this new type of urban configuration and whether indeed it may be helping to produce it.

Assessing the Conformity between Demographic Developments and Emerging Urban Configurations

In exploring the links between the changing demographic regime and the evolving nature of urban regions, this section aims to address two main questions. In the first place, are some people more likely to remain in a PUR, or to move into it to live, than they would do in a MC-based urban region? Secondly, where in a PUR context would different types of people be most likely to live in a PUR and how would the residential landscape compare with that of a traditional MC? Because of the variety of forms of PUR, the 'pure' form sketched out above will be taken as the principal reference point, with comparisons being made with the simplified models of the MC. The task is approached through the eyes of the households that form the decision-making units for choosing a place to live.

Attention is focused on three broad types of household that between them account for a substantial proportion of all households under the new demographic regime. These are households containing older people only, households with children of school age or below and households comprising only adults of working age. This last group is defined broadly to include individuals living alone (single, separated, divorced, widowed), cohabiting partners and groups of two or more individuals sharing their dwelling unit. While this typology is essentially life-stage based, reference will also be made to the effect of differences in socioeconomic status and cultural background. Even so, the following treatment cannot be exhaustive; rather, it uses these three broad household types to make the case for a fuller and more detailed investigation. The approach is illustrated in Figure 3, using the first of the household types as the example.

Households Containing Only Older People

This group comprises all households containing only people who no longer wish to par-

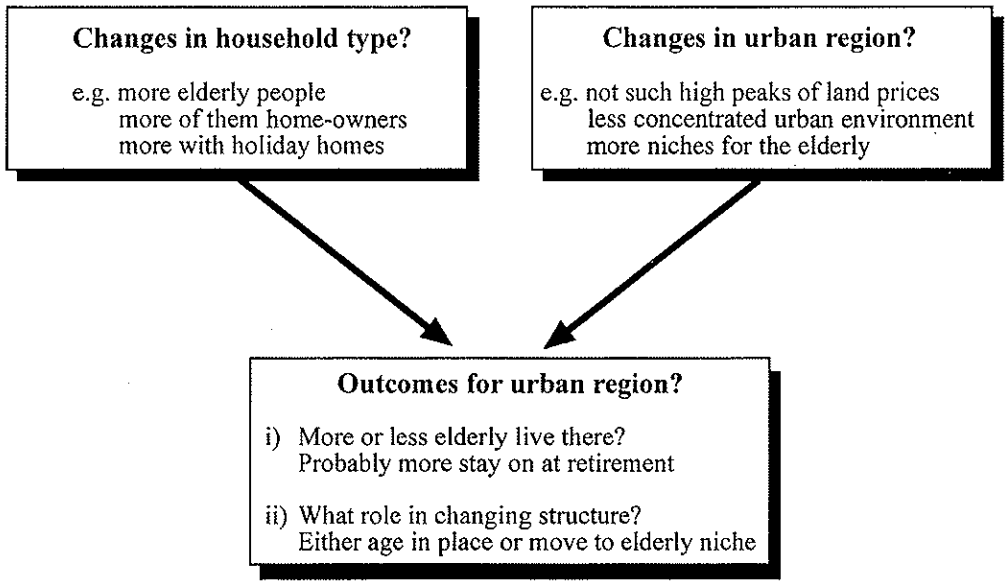

Figure 3. Framework for assessing relationships between the changing demographic regime and the evolving nature of urban regions: the example of elderly-only households.

ticipate in the labour force, although at the margins it might include people who have retired from employment to become self-employed and work from home. As such, it is a very varied group, ranging from people who have taken 'early retirement' through fit and healthy pensioners to very elderly people who, although continuing to live by themselves, are relatively immobile and need access to social support and health care. As a single group, however, it has grown hugely in size over the past 30 years for several reasons: people are living longer, people are retiring earlier and older people are more likely to be living by themselves rather than with a grown-up child. This group barely features in the traditional models of urban structure, presumably partly because of their small number at that time and no doubt partly also because of their passive nature, merely being left behind in the older residential areas (Knox, 1994). Does the growth of retirement migration in recent decades mean that this group will remain only a minor force inside the emerging PUR?

The key decision facing this group at or near retirement concerns whether or not to move completely out of the urban region, once daily trips to work are no longer necessary. If they do choose to move to another area, they will hopefully select a type and size of house appropriate to their needs for the remainder of their lives. If they exercise less foresight, they will sooner or later have to make another move, which could either be a local adjustment or involve moving back to the previous urban region (or another one if family or friends have moved). By contrast, people who do not indulge in retirement migration are likely to stay put in their existing home for many years, until they or the surviving partner need to move to a more manageable house or more convenient setting. Furthermore, whether retirees leave the urban region or choose not to move will not only directly influence the age composition of the urban region but will also affect the speed with which their home can be occupied by a younger family.

Two questions need to be tackled when assessing the impact of this dimension of the changing demographic regime on urban structure. One is the future number of elderly-only households, and the other is

whether this group is more or less likely to engage in retirement migration out of a PUR context than from a traditional MC. The former is relatively straightforward to deal with. As outlined earlier in the paper, the numbers retiring from the labour force in the UK and many other countries are currently at a low point but will rise strongly over the next two decades, as the post-war baby-boomers move into their fifties and sixties. Moreover, there is unlikely to be any reversal of the trend for older people to live separately from their grown-up children.

The second question—whether retirees are more or less likely to move away from a PUR than a MC—is more difficult to answer. Research in the US and in the UK (see, for example, Longino, 1992; Warnes, 1992) reveals a mixture of motives behind retirement migration. There, this migration is normally the privilege of home-owners, who are able to realise substantial equity by selling their family-sized house in a more expensive metropolitan area and buying a smaller house in a cheaper area well away from large-city commuters. Retirement migrants tend to seek out areas with warmer winters, more attractive landscapes, good services and a slower pace of life. According to the Glasgow Quality of Life team's surveys (Rogerson, 1997), the aspects that are most highly valued by British people aged 65 and over are (in rank order) quality of local health care provision, absence of both violent and non-violent crime, low cost of living and low pollution.

How does the PUR compare with the MC on these accounts? As regards house prices, it was suggested in the previous section that there will not be such high peaks in a PUR as in a MC. If this is the case, then the equity gain from moving away from the urban region on retirement could be smaller in a PUR context. The benefit of a move would be further diminished if the emergence of PURs was part of a wider decentralisation process that raised house prices in the traditional retirement areas. As regards quality of life considerations, the picture seems less clear. While the weather can be treated as not varying with type of urban region (apart perhaps from a slightly warmer microclimate in the middle of a MC), it is less clear how PURs would shape up on such features as physical attractiveness, health care, crime and pollution. On the one hand, the more fragmented nature of the PUR could mean that there is generally less congestion and a lesser presence of the other negative features associated with the MC. On the other, these features might be spread more widely across the urban region and be found closer to the 'nicer' neighbourhoods than in a MC context where the wealthy can live far away from the typical inner-city problem areas. Much depends on how the PUR is structured. In particular, if the better-off live by themselves in physically discrete localities, then their older members may be happy to stay put in their retirement. The latter is probably the more likely and, indeed, it may well be that a PUR will develop its own specialist 'complex' for older people alongside all the other types of area sketched out by Kunzmann (1996).

The tentative conclusion, therefore, is that the incentives for retirement exodus will be lower in a PUR than in a MC context. This, combined with the growth in numbers of older people over the next few decades, would suggest that PURs will have considerably larger proportions of elderly people than MCs have traditionally contained. Indeed, the elderly might well build up a critical mass sufficient to make them a significant force in shaping the way in which the structure of the PUR evolves. Admittedly, this brief account ignores other trends such as the growth of home-ownership at the expense of renting and the increasing numbers of people who own second homes, both of which would be expected to facilitate retirement migration. There is clearly scope for further work on this. Much clearly depends on the effects of other changes taking place, not least among which is the residential behaviour of other types of household.

Households with Children of School Age

This is the group that in the past has largely

driven the physical growth of residential areas and dominated the urban structure of cities, both through the private market and through the priority given to families with children in the public provision of housing (Robson, 1969). This group has also formed the primary force in counterurbanisation for, although the latter was pioneered by retirement migrants, the majority of the households leaving the larger urban regions for smaller settlements and more rural regions were headed by people of family-rearing age. The group was particularly numerous in the 1960s and 1970s because this was the high point of family-raising, as the baby-boomers moved into their childhood years and increased the need for larger houses in appropriate settings (Champion, 1992). As noted above, the demographic situation has altered hugely since then—a transformation that cannot be separated from the revolution in the role of women. Together, these constitute a major factor in the emergence of the PUR.

First, it is worth recalling the background to the traditional behaviour of this group. Within the MC, the outer areas have traditionally been viewed as the ideal place for mothers to bring up children and for the whole process of social reproduction, away from the congestion and pressures of the central core to which the household's sole breadwinner commutes daily (Knox, 1994). Countless surveys of their neighbourhood preferences stress the importance of access to good schools and health care facilities and of avoidance of violent crime, along with employment-related considerations (Rogerson, 1997). The counterurban shifts can be seen as highly conformable with these preferences, particularly as living conditions in the larger cities deteriorated (Findlay and Rogerson, 1993). Many people were able to find such neighbourhoods in smaller settlements, while taking advantage of the parallel urban–rural shift in job opportunities and of the major improvements in commuting links to the larger cities (Champion, 1989).

Much has altered since those not-so-far-off days, and it can be argued that many of these changes can be linked directly or indirectly to the increasing emancipation of women and especially to their greater participation in the workforce. For one thing, as described earlier, fewer women are having children. Secondly, those women that do have a family now tend to have fewer children than 30 years ago, often only one, and continue working during their family-building years apart from the statutory period of maternity leave. Thirdly, the fact that these households will have two earners rather than one—and increasingly two professional workers—means that they will have higher incomes and be more mobile on a daily basis. Fourthly, with women working and thus having some degree of independent means, the incentive to stay with an errant or abusive husband is smaller, reinforcing the general trend towards partnership breakdown and increasing the number of lone-parent families.

A range of implications flow from these changes, all pointing in broadly the same direction—towards the eclipse of the 'suburb' and 'dormitory town'. The increase in the proportion of women who have no intention of becoming mothers means a reduction in the number of households seeking out suburban-type environments containing houses with gardens, good state schools and other community services. The trend towards mothers continuing to work through their family-building years reduces the lure of the traditional suburb because there is less time for gardening and because the extra income helps families to access the private sector for nursery care and primary schooling. Because of their other commitments in a less than equal society, more women than men tend to prefer part-time work closer to home, the latter partly forced on them if the male breadwinner uses the sole family car for work.

Clearly, the increasing involvement of women in the world of work imposes fundamental strains on the traditional MC model. In particular, within the latter, it means a 'tug of war' between mothers in their suburban homes and employers located in the city core. Until now, so highly valued has the female contribution to the workforce become

and so great has been the momentum of suburbanising migration behaviour that this 'war' has largely been won by the working mothers, leading to a massive decentralisation of work for women. The PUR is the logical outcome of this process because, with employment distributed between a number of dispersed centres, most of its residential areas will be closer to a concentration of jobs than in the MC. Even within the original central city of a PUR, the pressures will be lower than in the MC model, encouraging the development of 'urban villages' and suburban-type housing in these previously high-density areas. This will be building on the gentrification of inner areas by young childless professionals, who indeed will reinforce the process if they choose to remain after starting a family.

The effect on the counterurbanisation process is perhaps not quite so straightforward to gauge, but the following suggestions can be made. First, the reduction in the number of families with dependent children has one clear effect: it will reduce the stock of households living in the urban region from which potential counterurbanisers are drawn. All other things being equal, the result will be that the urban region will not lose as many people through counterurbanisation as would be expected on the basis of the continuation of the previous demographic regime.

Secondly, however, it is not easy to determine whether the overall propensity of families with children to move out of the urban region will change with the shift from the MC to the PUR context. Much depends on the type of household. The growth in the number of lone-parent families will act as a brake on counterurbanisation, except to the extent that they may be attracted to cheaper housing outside the PUR. For family households where both partners are in work, it can be argued that the urbanisation of the suburbs (which is essentially what the shift to the PUR involves) provides the greater access to local jobs that formed one of the great advantages of the smaller but self-sufficient free-standing town over the MC suburb. This is especially the case for the increasing numbers of dual-career family households, where the range of high-level jobs is likely to be poorer in the counterurban setting than within the urban region. On the other hand, there is the question of how highly these two-parent families rate quality-of-life and cost-of-living factors and how far the PUR can meet their expectations and needs.

In sum, it would seem that a higher proportion of households with children will prefer to live within a PUR than the MC, because the restructuring of the urban region is producing more of the conditions that counterurbanisers have been seeking. This trend is reinforced by the changes in the nature and behaviour of households containing young families. Indeed, just as this group formed the main driving-force behind suburbanisation, so too it seems to be playing a major role in the shift from MC to PUR, despite its smaller share of all households in the new demographic regime than in the old.

Households Containing Working-age Adults Only

Of the three broad types of household recognised here, this is the one that reflects most strongly the 'new' of the changing demographic regime and, undoubtedly, is also the most diverse. As well as a great variety of people living on their own, it includes cohabiting or married heterosexuals who have never had children, couples whose children have left home, homosexual partners, couples or lone parents living with grown-up children and groups of two or more people who are not linked by birth or sexual behaviour, either equal in occupancy status or in some form of household head/lodger status. The list seems almost endless and would appear to pose a huge challenge to understanding the evolving size and shape of urban regions. There is not space here to examine every type of household within this category, so we focus on two examples: two-earner couples without children and households containing one person of working age and no others.

Two-earner couples without children, who

have earned the epithet 'dinky' in the Anglo-American literature (dual income, no kids yet), have grown astronomically in number over the past three decades primarily as a result of the increased labour force participation of women and the greater availability and use of contraceptives. Although even in the new demographic regime most of the people in this group will be expecting to start families at some point in their lives, this stage may well be postponed until women reach their thirties, making the 'dinky' state a significant part of the life-course for many people. It is a period during which the household is likely to have 'wants' more similar to those traditionally sought out by young single people than those of families with children. They are drawn to the large metropolitan centre with its job prospects and bright lights and, in the MC context, will be attracted by the greater accessibility to these things provided by an inner-city location.

Have 'dinkies' contributed to the switch from the MC type of urban region to the PUR type? The likelihood is that they have not constituted a highly active agent in this trend. As long as the original MC core remains the principal location of jobs and urban-based recreational activities, it is still going to provide the greatest attraction for this group. As a PUR configuration becomes more fully developed, however, things may well change. As jobs disperse to rival centres and more suburban areas, these households will seek out residential locations that maximise the accessibility of the two partners to a range of places with jobs. Since the development of the PUR depends on good communications between its constituent parts, this group may feel that location on the doorstep of 'theatreland' may no longer be so essential. A lot must depend on whether the former MC core can continue to provide neighbourhoods with the preferred social ambience or, alternatively, will see social and cultural changes associated with the exodus of wealthier residents and the growth of poorer and ethnically diverse communities.

As regards working-age people living alone, this is the household type that might be expected to be producing a major change in urban structure. As noted earlier in the paper, it is the fastest-growing category of households in many countries. In the UK at least, this is seen by many as the salvation of both city and countryside, believing that these people will occupy small flats in high-rise blocks within existing built-up areas ('brownfield land') and relieve the pressures that rising household numbers would otherwise impose on greenfield sites (Urban Task Force, 1999). If this was the case, then it would greatly reinforce the centrality of the MC core at the expense of the suburbs.

This interpretation, however, is based on a false idea of the types of one-person household that are growing most rapidly. It derives from images of the archetypal young adult moving to the 'bright lights' of the city. In reality, the latter is drawn from an age-group that has shrunk markedly in size, following the passage through it of the 'baby boomers'. Even without this, one might speculate that in the emerging PUR configuration it would be less common than in the MC model for young adults to move away from the parental home. With colleges and jobs being more evenly distributed across the urban region, there would be less need to do so, while with no one centre acting as such a big magnet as the traditional MC core, the 'lights' will probably not be as 'bright' at any one place in the PUR.

Instead, over the next quarter of a century the main source of the increase in working-age people living alone is likely to be middle-aged men, notably the divorced but also never-marrieds and weekly commuters. According to UK research, this group is much more evenly distributed across the urban system than are 16–29 year-olds living alone. It is well represented both in the smaller free-standing towns and cities that have gained from the big-city exodus and in the suburbs of larger cities (Hall *et al.*, 1997). Part of the reason for this seems to lie in the past histories of these people and in what they hope for in their future life-courses. Many wish to maintain contact with their children follow-

ing family breakdown and may also hope to begin a new relationship, while others who have not yet become parents may aspire to do so. For these people, there will be advantages of staying in or moving into family-sized housing (Hooper *et al.*, 1998). Moreover, surveys of this age-group of one-person households have revealed a profile of neighbourhood preferences that quite closely resembles that of other middle-aged people with or without children—namely, quiet leafy residential areas free from violent crime and pollution (Hedges and Clements, 1994).

This final section has explored the potential linkages between demographic trends and the changes currently taking place in the size and structure of urban regions. The overwhelming impression gained from the three different household types examined is one of general conformity between the two sets of developments. The transformation of the urban region from MC to PUR would seem to be producing an environment that is more conducive to the retention of retirees at the expense of traditional retirement areas and the wider counterurbanisation process, leading to a swelling of the urban-region population or at least a reduction in the rate of any previous decline. The growth in the number of elderly-only households could help to shape the evolving PUR if it provided enough critical mass to allow one or more of its centres to specialise in facilities for the older people. Families with young children are seen as maintaining their strong influence on shaping the urban region, but whereas in the past they were the dominant force in generating the suburbs of the MC, nowadays—notably with increased participation of mothers in the labour force—they find a city with multiple centres much more attractive. The diverse group of households comprising working-age people without children send out more mixed messages. The projected fall in the number of young adults suggests less movement towards the 'bright city lights' of the traditional MC core, but the effect could be offset by the greater length of time that they remain there, arising from the growth of the 'dinky' lifestyle. On the other hand, the largest single element in household growth over the next couple of decades—middle-aged men living on their own—is more likely to boost suburban areas rather than city cores, because these people favour the combination of lower housing costs and easier access to jobs and services that a PUR configuration may be able to provide in the long term.

Concluding Comments

The primary purpose of this paper has been to set down a marker challenging the research community to pay more attention to the potentially important role of demographic developments in reshaping the urban region. It has documented the major changes arising from the shift towards a new demographic regime, notably the rising numbers of older people, ethnic minority members and non-family households. It has provided an impression of the way in which current literature suggests that the urban region is evolving away from its traditional monocentric form, although being forced to conclude that for various reasons a variety of polycentric configurations seem to be emerging. Finally, by reference to simplified models of monocentric and polycentric urban regions, it has tried to assess the extent to which the new demographic regime fits in with the changes in urban-region structure. Partly for reasons of space, however, this assessment has been merely a partial one, and even the results summarised in the previous paragraph are put forward only tentatively.

The assessment has been partial in at least two respects. In the first place, the paper has not presented any empirical analysis of the changing spatial distribution of the household types covered, but has merely referred to their traditionally recognised positions within the basic MC model and has drawn upon what is known about the considerations that influence their choice of place to live. In carrying out such analysis, however, there is, as has been shown above, a big challenge to be addressed in identifying a PUR model

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against which to judge the significance of any altered patterns. Secondly, the paper has examined only one dimension of residential differentiation—namely, a life-stage perspective based very largely on age. While this was adopted as the central feature of the urban models of the 1920s and 1930s and was subsequently given renewed prominence in life-cycle models of residential mobility, its role is probably much less important now. For one thing, with the new demographic regime has emerged a much greater of variety of life-course trajectories. At the same time, the other main components of the traditional residential mosaic—economic status and ethnicity—have been growing more important, as increasing social polarisation and the growing size and diversity of racial and cultural 'minorities' have led to more intense spatial segmentation within urban areas.

Further work is also required on the underlying processes at work and the relationships between them. The underlying purpose of this paper has been to suggest that the demographic trends and the changes in the structure of the urban region are causally linked. There is therefore a need to go beyond merely noting the degree of conformity between some of the demographic trends and the evolving structure of the urban region. For instance, to what extent is it the case that the growth of new centres within a previously monocentric urban region has been prompted by employers wanting to get better access to 'suburban' sources of labour, especially the pool of working mothers that has expanded there? Or is this better access essentially an extra bonus reaped by firms that have other, more important, reasons for locating in these centres? Similarly, with the increasing numbers and wealth of elderly population, what evidence is there that they have generated extra services around themselves and thereby altered the geography of jobs or, alternatively, that they have moved to be closer to relevant facilities and altered the residential complexion of the urban region? Partly linked to this, is there evidence that the new urban configurations are influencing demographic processes, not just in terms of households' residential choices but also by affecting who lives with whom for how long and perhaps even through impacts on fertility behaviour and life-chances?

Clearly, this paper has raised many more questions than it has been able to answer. Nevertheless, it will have served its purpose if it draws attention to the potential importance of demographic developments in urban change. Hopefully, too, it will help to stimulate debate about the most appropriate approach for further investigation of the evolving nature of urban regions, the role of the changing demographic regime in this and the extent to which the changing urban environment in its turn may affect demographic behaviour.

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