City Regions and Polycentricity: the East Midlands Urban Network

A report prepared for *emda*

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Acknowledgements

1   Introduction

Cities are the centre of much debate at present, both in policy and academic arenas. The scale of the cities attracting attention varies markedly, from discussions about the world city of London to the idea of a 'liveable' city which is more likely to be the size of Lincoln or even smaller. In the present report, the focus is on cities and other major urban centres ranging in scale from the Core Cities (Charles et al 1999) such as Nottingham to the other cities and principal towns of the region.

City regions have recently joined cities as the focus for much British policy debate, with the recognition that the combination of their positive and negative attributes makes them central to processes of economic change and dynamism, and hence critical for developing levers of policy intervention. Cities contain the biggest concentrations of ethnic minorities, the majority of more disadvantaged people and pools of high unemployment, and so have been a focus of area-based regeneration policies. Yet partly as a result of some of these policies, cities have also been the focus for spectacular new physical and cultural developments in recent years that have transformed their central areas into places that are attractive to business and visitors, enabling them to act as magnets for investment within their regions. Dialogue between the Core City Group and government (Core Cities Group 2004) have placed city regions — particularly in policies such as the Northern Way — at the heart of new thinking on regeneration and the rebalancing of regional development. Cities are thus seen as both the means for change as well as the areas where change is most needed. The wider shift in economic activity away from manufacturing towards knowledge based services also plays to this agenda, with cities not only the focus for most advanced services but also able to provide the kind of cosmopolitan milieu demanded by firms and talented workers in these sectors.

What is meant by a *city* here is an identifiably separate settlement, a built-up area which is recognisably a single area from the briefest of looks at a topographic map. Thus a reference to Nottingham is, at least in principle, a reference to what has sometimes been called Greater Nottingham because it includes not only the areas within the administrative city but also contiguous suburbs (e.g. Arnold and Beeston) which have never been within the city's boundary.

This report is concerned, in its empirical content, with the East Midlands region. Government Office Regions such as the East Midlands are creations of central government and these regions' boundaries have been defined — and then changed

quite often — with relatively little rationale in terms of evolving economic and cultural characteristics within the areas involved (Dury 1963). In practice the East Midlands is a *given* for this research although, due to the relative 'porosity' of the region's boundaries, the empirical analyses will also consider links with the larger nearby centres in other regions. This recognition of inter-regional links chimes with current policy developments (Advantage West Midlands and the East Midlands Development Agency 2005). That said, it is not these administrative regions which are the primary concern here: instead the report is investigating the ***city region*** which, in its simplest form, is the area which is orientated towards a single given city to a greater degree than to other cities (as illustrated in Scotland by Derek Halden Consultancy 2002).

The final point of clarification needed at the outset concerns the urban hierarchy. Cities and towns relate to each other in complex ways, with hierarchical relationships only very clear where the scale difference is very great (e.g. London's dominance over all other British centres). As already noted, this report is essentially concerned with cities and towns of a certain size, but it is *not* thereby assumed here that these cities are all of equal status. Some may be best seen as subsidiary centres within a region dominated by another city, others may be rival cities of similar status. The empirical analysis later in this report will look at the urban hierarchy in the East Midlands after an examination of what the key term ***polycentricity*** means, with the emphasis on distinguishing it from the monocentric pattern that is the familiar form of urban-centred region in this country.

This report is organised around a series of core themes.
- Cities and the knowledge economy
- Multiculturalism and diversity
- Polycentricism and the urban hierarchy
- The development of city regions in the East Midlands

The treatment of the first theme will primarily be through the review of recent literature − starting with recent policy developments − but will then provide some selected evidence on the East Midlands together with relevant experience elsewhere. The next two themes will begin with conceptual discussions but then pull together the strands of evidence on the East Midlands cities in particular. The last theme will consider possible implications of the research for the region's distinctive urban system and its potentialities as an urban network.

2 Cities and the knowledge economy

Cities and city regions have become fashionable in economic development policy in recent years, with a shift in emphasis from regional development based on incentives for factories and freight transport infrastructure to urban renaissance and the attraction of talent in creative industries. Does this reflect a real sea change in the nature of the economy, a knowledge economy replacing a production economy? If the focus is on the city as an attractor of talent, through its collection of cultural facilities and high level services, what are the most promising strategies for bringing economic growth and which kinds of city regions will be the winners? Is it better to be a large core city with a dynamic city centre, or might polycentric city regions be more likely to thrive? The brutal fact is that most of these questions have yet to be answered with real conviction, so it will not be possible to be dogmatic about the prospects for the cities in the East Midlands in particular.

The rediscovery of cities as economic drivers

The attention placed on cities as centres of knowledge and knowledge production, contrasts with a view in the 1970s that cities were the focus of economic problems and the source of weakness in their regions. At that time the manufacturing base that had enabled the growth of major industrial cities was in terminal decline as old factories in cities were associated with negative characteristics: multi-storey premises inappropriate for modern manufacturing, heavily unionised inflexible working practices, a focus on skills that were no longer appropriate to new generations of products and manufacturing technologies, inadequate transport access and no adjacent room to expand into. Growth at that time was in the urban fringe or smaller freestanding towns where new factories and new workforces were available. The shift away from cities was linked to the replacement of old industrial capital with new, largely overseas-owned multinational production. Distribution facilities moved to motorway junctions beyond the city and inner city unemployment soared.

So why is it that "Our Cities Are Back" (Core Cities Working Group 2004)? It seems the 1970s trends have shifted, in that manufacturing has continued to decline but now it is the branch plant factories of the 1980s and 1990s that are closing and being replaced by more service sector jobs. The buoyancy of the economy has led to a general growth in jobs which has disguised the loss of manufacturing. It is true that there is still a move to edge city locations and smaller towns – now as business parks

rather than factory units – with the industrialisation of services such as call centres. At the same time, there is a parallel growth in certain services that are dependent on, or desirous of, a city centre location. This is the sea change from the 1980s, a trend towards what is termed the knowledge economy.

It is important to recognise at the outset that the knowledge economy is not homogenous but includes a wide range of knowledge based activities. For example, it includes the advanced business services and multimedia firms in the city cores, but also the back offices and call centres. It includes knowledge in the form of design and creative industries as well as niche consumer services, restaurants and art galleries. In addition, it also includes large swathes of what used to be seen as the public sector and which now may be either the public or the private delivery of public services.

The elements of the knowledge economy

Many commentators (e.g., Florida, 1995; Lundvall, 1992; Knight, 1995) have focussed upon the role of successful cities as pools of knowledge, where technological spillovers occur and where business can benefit from place-specific tacit knowledge. Knight argues that cities are the places where knowledge as a 'strategic resource' is created and achieved, and indeed throughout history cities have tended to be the focus for knowledge activities whether in the form of universities (Bender, 1996), entrepreneurial networks, or the knowledge centres of firms (Hall, 1998). Because of the high concentration of higher education and public institutions in major cities, they can be considered as knowledge centres, but we need to view knowledge more broadly than in terms which only refer to science and technology and their application to manufacturing.

Knowledge may also be considered critical to the success of some of the service industries, be they high value-added sectors such as financial and business services, or other urban-centred services like tourism, cultural industries and media. The continued success of a city depends on the strengthening of the knowledge base for all dynamic growth industries, whether they are manufacturing or service, addressing local or national/international markets (Toronto Economic Development, 2000). What is relatively under-researched in general is the way in which local service provision and external markets are linked in the generation of knowledge assets: can cities within weakening regions contrive to pull away from their local base or does

the move to export orientation face diminishing returns? How far, and in what ways, does a region benefit from having located within it a centre of knowledge generation if that knowledge is increasingly externally orientated?

Economic success and specialisation depends to a large degree of two kinds of agglomeration economy, given wider macroeconomic, regulatory and locational contexts. **Urbanisation economies** can be attributed to the benefits shared by all firms due to the local presence of a large population and market. Larger cities have larger demand which can support a larger, more diverse, and more finely segmented service base. Firms thus benefit from easier access to choice and to better matched suppliers. Labour markets are larger and more diverse, so firms can recruit specialised skills more easily. These benefits are shared by all firms in a city to some degree. However in the very largest cities diseconomies may emerge due to congestion, high land values, poor quality environment and long commuting times.

Cluster economies arise from advantages that are specific to firms within particular production or innovation systems. Here the critical mass of interactions between firms within production chains, their competitors, firms in associated markets and local institutions enable advantages based on more rapid processes of innovation, adaptation and learning. Market information circulates more rapidly, labour is more productive and firms in the cluster gain an edge on firms elsewhere. Clusters are not necessarily based in larger cities, but do imply a degree of critical mass that might be easier to achieve in larger cities. Thus large cities are more likely to have several clusters than are smaller cities which might either be specialised around one or two clusters, or lack critical mass in any cluster.

Current economic development theory on **knowledge-intensive competitiveness** stresses the interaction between access to global sources of knowledge (often represented as "best practice") and localised knowledge arising from the concentration of sectorally or cluster specific tacit knowledge (Malmberg et al 1996, Porter, 1998). Such local knowledge is developed and shared within a socialised process involving groups of knowledgeable workers learning-by-doing, moving between firms, and learning through firm-to-firm interactions (Lundvall, 1992). The local specificity of the knowledge and associated customs and practices does not mean it is parochial however, as the cases of Silicon Valley and other high technology complexes demonstrate (Saxenian, 1994). Indeed it is the ability to derive global advantage from highly localised knowledge that is the cornerstone of

competitiveness (Scott, 1988). Sustaining such competitiveness implies that the city or region should be aware of the need to modify behaviour to retain advantage: a process termed reflexivity. One leading theorist puts reflexivity at the centre of his understanding of the relationships between cities, their regions, and their wider context.

> "Cities thus contain communities of reflexivity workers who insert geographically generic skills into geographically (and otherwise) specific conventional and relational contexts, such that they are made effective under conditions of uncertainty. These groups of actors engage in a kind of cognitive "translation" between geographical levels: national-regional, national-international, and city regional hinterland." (Storper, 1997, 248)

Given the needs for scale of expertise and knowledge, for dense interactions between firms and their supply chains, the need for knowledge infrastructure such as universities, research centres, and the need for connectivity, whether by ICTs or air transport, cities are the logical places where knowledge-based clusters of expertise can emerge. But only some cities are successful in creating and then combining the mix of assets in a way that creates a growth dynamic.

There are three different perspectives we can examine here which give alternative explanations for the success of particular types of cities (Isaksen and Aslesen, 2001). One explanation derives from the importance of cities in interconnected global flows of finance and information and examines the centrality of cities in global networks. Global cities are said to be re-asserting their dominance, often pulling away from the secondary cities within their countries. Such cities gain fast and early access to global flows of knowledge and establish first mover advantages through that access, combined with access to finance. Research by Taylor et al (2003) on global networks of leading international business service companies emphasises the benefits available to those cities able to attract the decision-making centres of the leading firms in such sectors as accounting, consultancy, law and finance. A second perspective is that cities are breeding grounds for innovation as a result of the interactions between firms and other agencies at a local scale, building local advantages in clusters, as already outlined above. The third perspective sees cities as key nodes in national innovation systems, and emphasises the role of knowledge organisations in cities as hubs within national innovation networks.

All these perspectives tend to emphasise the benefits of being a relatively large city, or at least of having a critical mass of knowledge infrastructure. It is a real disadvantage according to these theories to be a smaller city without a strong knowledge infrastructure because it is then difficult to develop the critical mass in innovation networks, or the demand for advanced services which then provides the base from which external markets can be served. However some smaller cities may 'borrow size' from neighbours, taking advantage of spillover effects from successful places nearby.

Knowledge and urban hierarchy

Taking one specific form of urban size, we can examine the extent to which the cities in the East Midlands have been able to construct successful positions in the knowledge economy. In an earlier section we examined some of the ways in which cities can be seen as developing positions of competitiveness in the knowledge economy. One perspective is to examine the development of the leading sectors of the knowledge economy and the ability of cities to grow such sectors and develop a high share of such sectors in local employment. This can be compared with the position of cities in global networks of business service firms and hence the characterisation of cities as global cities. An alternative view is to look at the existence of key knowledge infrastructures such as universities and research centres.

Starting with the growth of knowledge economy based sectors, we can examine the growth of business services in city regions during the last decade to see how competitive cities have been. Business services have been among the fastest growing sectors in the national economy over this period and they employ many highly qualified professionals, some of whom are among the creative classes emphasised by Florida (1995). Comparing the East Midlands city regions with some of the core cities we can see there seems to be a more rapid growth of business services in larger cities as well as a London overspill effect (Table 1), leading to a concentration in the bigger cities. Setting aside London and its region, Leeds has been the biggest success over this period: both saw around 90% growth in these sectors over ten years. Birmingham is the exception and despite a significant concentration in the centre, has perhaps suffered due to the focus of the wider city region on manufacturing.

The East Midlands cities have performed highly variably during this period. Derby and Leicester have performed very poorly, growing more slowly than the bigger provincial cities and with a low concentration of business services in overall

employment. Lincoln has performed a little better, but as a very small city is the kind of place that would not be expected to thrive on this measure as many of the larger business service firms concentrate their activities in the major cities and close smaller branch offices in places such as Lincoln. Nottingham sits among its core city partners with similar performance to Sheffield and Merseyside, showing good levels of growth and a degree of concentration of service employment, but not one of the real winners. Northampton though has seen quite spectacular growth based on its greater proximity to the dynamic South East economy and its ability to capture overspill investment from London and the South East.

## **Table 1 Employment in business services in selected City Regions 1993-2003**

Region	Total employment in business services (including post and telecoms) 2003	Growth 1993-2003	% change 1993-2003	Total employment 2003	Business services 2003 as % of total employment
Nottingham	**49638**	**20494**	**70.32**	**232369**	**8.82**
Leicester	**33053**	**9064**	**37.78**	**175651**	**5.16**
Northampton	**27498**	**12081**	**78.36**	**100490**	**12.02**
Derby	**15949**	**4981**	**45.41**	**92776**	**5.37**
Lincoln	**7543**	**2728**	**56.65**	**42021**	**6.49**
London	1359505	647838	91.03	3865809	16.76
Manchester	192934	84285	77.58	741898	11.36
Birmingham	186399	60520	48.08	893459	6.77
Leeds	97797	45528	87.10	337717	13.48
Bristol	91390	38316	72.19	301826	12.69
Merseyside	57286	23460	69.35	280952	8.35
Sheffield	55127	22977	71.47	279203	8.23

Source: Annual Business Inquiry 2003 (and 1993 predecessor)

This evidence reinforces the view that professional business services are growing rapidly outside the wider London area, but are doing so in a set of core city regions that are able to deliver services over a regional hinterland, often at the expense of smaller cities within that hinterland, hence whilst Nottingham grows to serve the East Midlands, Derby is unable to attract the same rate of investment in business services. At a regional scale it is important that some centres capture this kind of growth to prevent such services being delivered from very strong centres in neighbouring regions (notably Birmingham, Manchester and Leeds). This is only likely to be achieved if regional economic strategies recognise the need to produce differentiated policy frameworks which do not presume that all city regions can develop the same mix of functions.

Figure 1 reveals that city regions vary greatly in their sectoral mix of key knowledge based activities (see the key for the list of sectors included). Figure 1 does not take into account the absolute level of employment in each sector and, looking purely at the shares between sectors in this way, we can see that in Derby knowledge-based manufacturing sectors occupy a greater share of employment than do all Nottingham's manufacturing and private service knowledge based sectors. Derby has a knowledge economy which specialises in manufacturing (especially in transport equipment) whilst Nottingham's is more focused on services. We can compare with London and Bristol which have the strongest service sector positions, and Northampton is closest to moving in that direction (after Leeds), albeit perhaps without a strategic position that comes from a concentration of corporate headquarters.

**Figure 1 City Region knowledge economy employment structure 2003**
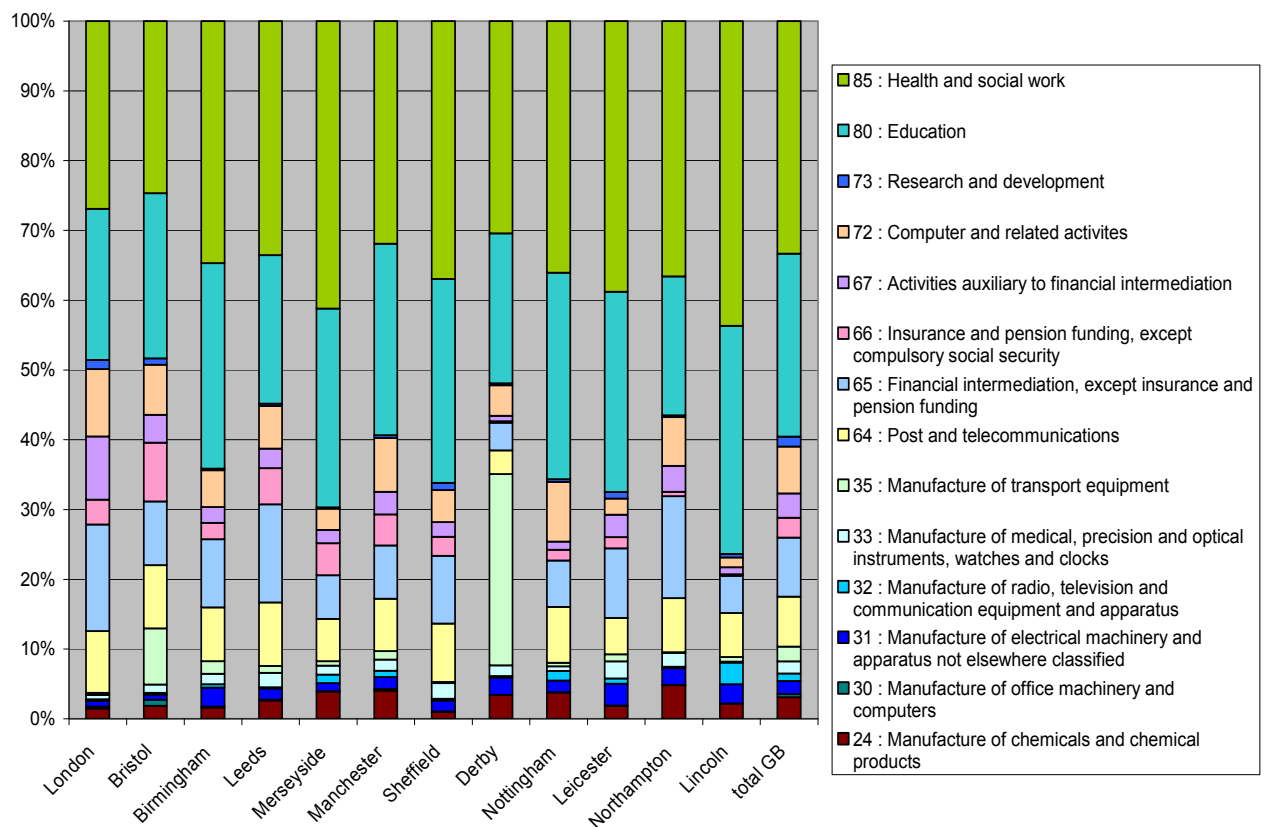
Source: Annual Business Inquiry 2003

Turning now to the knowledge infrastructures of cities, we can compare the knowledge production opportunities of cities through their university investments. From the previous figure we have already noted that all the cities have relatively

11

little private sector R&D as identified as a separate sector in the Annual Business Inquiry, although there may be more located within other industrial sectors. The cities are however locations for major universities so we can examine the scale of investment in knowledge production in the universities through expenditure on research.

One simple measure is the so-called 'QR' strand of investment made by the Higher Education Funding Council in the research infrastructure. Although only one part of the total research expenditure of universities it does tend to be strongly correlated with other research income through grants and contracts, and it illustrates where the high quality research is located as the QR funds are based on the results of the Research Assessment Exercise. Figure 2 compares the East Midlands cities' universities with some other cities and we see that the absolute level of income in the East Midlands is less than it is in some competing core cities.

Figure 2 Income from QR 2005/6 to East Midland and selected other universities
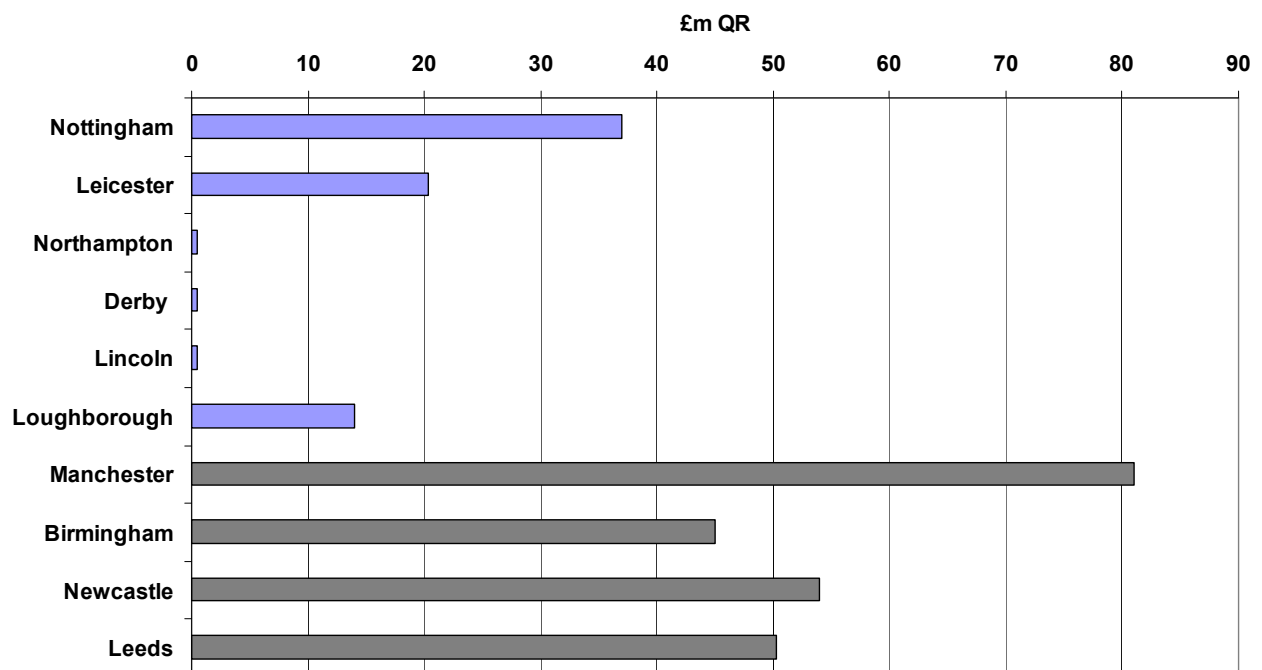
Source: HEFCE

Nottingham is the most successful city in the East Midlands but still trails behind Newcastle, Leeds and Birmingham which have a higher overall research income inflow. Derby, Northampton and Lincoln, although having their own universities, unfortunately gain almost no research funds from HEFCE and are much more limited in what they can add to the local knowledge base except through teaching. In

addition, although Nottingham, Leicester and Loughborough together could constitute a significant critical mass, at present there is little real collaboration between the three places of the kind seen in new inter-institutional research networks in Scotland.

Concluding from this we see that within the East Midlands Nottingham is clearly the strongest location for the knowledge economy, although with Northampton a special case of high attraction for business services and Derby for transport equipment manufacturing. Other city regions face a more difficult task in attracting knowledge economy investments. What remains unknown is the extent to which a more networked system, based upon particular areas of specialisation, could be cultivated. This may be one option for a regional strategy for competition with other regions, in the UK and beyond, by which to develop greater critical mass, and to attract talent and investment (cf. Martin 2005). Later in this report we consider the evidence on the extent to which parts of the East Midlands are developing towards such a networked urban system in the form of polycentric city regions.

3   Multiculturalism and Diversity

There is much research showing that migrants have made substantial contributions to the economic development of British cities and regions. Different migrant communities have created different flows and patterns and had a range of different migration motivations. They have had significant, if variable, impacts on host communities, such as encouraging economic change (Kay & Miles 1992), creating new social and political processes and contributing to the growing cultural diversity of English regions and local areas (Peach 2002). At the same time, of course, in some areas the presence of migrant groups has challenged social cohesion and has tended to be associated with the concentration of deprivation. A key issue now is whether these impacts of the migrants to Britain in the latter half of the twentieth century will be repeated with more recent migrants who, it is argued, may more often be making short-distance and short-term moves (Findlay 1998). It remains an open question how much English cities and regions will benefit from the labour, skills, enterprise and innovation which the newer migrants might provide (Dobson et al 2001).

The new migration patterns partly reflect the restructuring of Europe and partly other changes in global labour markets. The accession of several Eastern Europe countries to the EU has prompted new research which, whilst not yet definitive, suggests these migrants are beneficial to the host community (see for example the IPPR report *Paying their Way*). New research on earlier migrant minority ethnic communities has attracted growing policy attention with the recognition of 'ethnic entrepreneurialism' (Ram and Jones 1998) and the possible contribution of their international links to city region development processes through a process termed 'globalisation from below' (Henry et al 2002).

Research into migration from eastern Europe has suggested that that these flows are characterised by 'new migration types' (Garnier 2001, p.131) in which many migrants make short-term moves, perhaps in response to difficult and uncertain economic conditions in the home country, and often maintaining strong connections to their country of origin (where they may keep both a home and family, and perhaps even a job). They are often young males and may be well-educated with foreign language skills. Thus employer organisations encouraged the government to take a different stance to that adopted in other western European countries, with the inflow of east European employees viewed as a way of reducing skill shortages in British labour markets. The fact well-qualified people then took skilled or semi-skilled manual work has been described as less of a 'brain drain' than a 'brain waste'

(Garnier 2001, p.133). The larger contribution migrants *could* play in local and regional economies if they were to settle more permanently and utilise all their skills can be illustrated by the potential role of in-migrants in the medium- to long-term as future 'export promoters' who offer language skills and economic and cultural knowledge of their former countries (see the DTI document *Insight into Central Europe*, September 2000).

Relatively little is known yet about the migrants from the "A8" countries in East Central Europe whose accession to the European Union occurred last year. The flow of in-migrants has been very much larger than was predicted by the government, because the predictions did not anticipate that most western European countries would decide against allowing A8 migrants free access to their home labour markets. There were 200,000 registered A8 in-migrants to Britain in the 14 months ending June 2005 (Home Office 2005). The proportion taking work in the Midlands was roughly in keeping with the regions' share of the national population. Early evidence has suggested that Lincolnshire is one area where there has been a large-scale inflow, probably due in large part to recruitment into seasonal contract labour in agriculture. As a result, the numbers who have moved more permanently to the larger cities such as Derby may be quite modest.

Whereas the A8 migrant data records people who have secured some employment, published data on asylum applicants relates to people who are receiving support in one form or another. At the end of 2003 the East Midlands housed 4,525 supported asylum seekers (including dependents), which as just over 5.6% of the national total (Home Office 2004). In general, the impact of asylum seekers on regions is declining due to policy changes which are reducing numbers quite sharply. Their impact on the labour market was always very low, and little in-demand housing was used for their accommodation. An impact on community cohesion in some areas (Community Cohesion Unit, 2002) has been noted, but that issue is of less direct relevance to this report.

Table 2 reports the proportion of each of several key labour market groups who were from non-White ethnic groups. The first column shows that the East Midlands region

in aggregate has a slightly lower proportion of ethnic minority people among its full economically active population than does England as a whole (5.0% as against 7.1% for England). The proportions in Nottingham and Northampton lie somewhere between the East Midlands and England values, Derby's is a little higher than both, and Leicester's very much higher (22.7%). The very low proportion in Lincoln makes it similar to more rural areas rather than the other cities. Although the 'outlier' result for Leicester reflects a well known local history, it is worth noting that there are few other regions where it is the second most populous city which has by far the largest ethnic minority share of its population.

Table 2   Ethnic minority groups in labour force categories

| | *% of specified group who are from a non-White ethnic group* | | | | |
	all economic-ally active	all self-employed	all in NS-SEC 1-3 occupations	all highly qualified	age 25-59 economic-ally active
Nottingham PUA	**5.5**	**9.2**	**6.2**	**11.4**	**7.7**
rest of Nottinghamshire	1.6				
Leicester PUA	**22.7**	**26.7**	**20.1**	**27.3**	**27.2**
rest of Leicester-shire + Rutland	3.0				
Derby	**9.5**	**15.6**	**8.6**	**12.3**	**11.5**
rest of Derbyshire	1.2				
Northampton	**6.3**	**8.7**	**6.2**	**10.2**	**7.7**
rest of Northamptonshire	2.7				
Lincoln	**1.9**	**2.8**	**2.5**	**5.6**	**2.3**
rest of Lincolnshire	1.0				
East Midlands	**5.0**	**6.1**	**4.9**	**8.0**	**6.1**
England	*7.1*	*7.4*	*7.3*	*11.9*	*8.6*

Source: Population Census 2001

Table 2 allows some exploration of the idea that there may be a distinctive contribution of ethnic minority groups to a city's or region's economic development.

The values in the first column act as a benchmark for values in the other columns, indicating what would be expected if the ethnic minority groups exactly matched the White groups in the characteristics measured here. Thus it can be seen that people from ethnic minority groups in Nottingham are much more likely to be self-employed than are White people, because the non-White groups make up over 9% of all the self-employed even though they constitute only 5.5% of all the economically active. This ethnic minority over-representation among the self-employed can be seen in the other cities too, although it is less marked in Leicester where the numbers involved are so large.

By contrast, people from ethnic minority groups are slightly less likely to be in the professional and managerial occupations (nb. these are the "NS-SEC 1-3" classes). For most East Midlands cities, the differentials are not very high; this seems a more positive outcome than is implied by some claims about high levels of discrimination in the labour market. Table 2 also shows the proportion of all highly qualified people who are from ethnic minority groups, but these figures perhaps pose more questions than they answer. One response could focus on the fact that in every area these values are higher than the proportion of non-White people with NS-SEC 1-3 occupations; this perspective raises once more the question of discrimination, because it could then be argued that less well qualified White people have gained high status jobs in preference to better qualified people from ethnic minority groups. One reason why this argument response may be over-interpreting these results in that the ethnic minority population has a youthful age profile, and this is at least part of the reason why they 'lag behind' others in getting high status jobs. Table 2 does confirm, in its last column, that ethnic minority groups make up a larger part of the workforce in all areas once the oldest age groups are removed from the analysis.

What are the implications of these analyses? Taking the last point first: ethnic minority groups make up a growing share of the labour force, and so it is vital that they are enabled to make as large a contribution as possible to economic development. Failure to respond positively to this imperative would be all the more critical for the cities where non-White people make up a larger share of the total

workforce. Leicester is one city where it is self-evident that fulfilling its potential is impossible without the ethnic minority groups also flourishing economically. As already noted, studies such as Henry et al (2002) have speculated on how groups with links to other countries can help economic development directly through their links in a diaspora. In addition, it is important to be aware of the suggestions that the cultural diversity which cities can offer may indirectly stimulate economic development through the fostering of creativity and the attractiveness of 'melting pot' locales to talented migrants (Fotheringham et al 2000).

More prosaically perhaps, the greater likelihood of people from ethnic minority groups having high qualifications can be a contribution towards economic development strategies centred on learning and knowledge. In much the same way, policies which emphasise enterprise can be supported by the positive attitude among many ethnic minority groups to self-employment and entrepreneurship (although to date their high levels of self-employment may have been sustained as much by limited opportunities elsewhere as by a greater inclination in that direction). Such assets are particularly important to the cities, not only because most ethnic minority groups are more likely to live in large urban areas, but also because those in the majority White population who are orientated towards education and/or entrepreneurship are now more likely to live in rural areas.

4   The concepts of the City Region and Polycentricity

The growing interest in city regions in Britain has yet to be accompanied by a clear and policy-relevant definition of the concept. In practice, what is meant is an area lying in scale between English regional and local authority areas (both of which are large by comparison to their equivalents in most other European countries). With the present government focus on markets in general, some policy discourse gives a nod towards the idea that city regions are the scale at which labour markets, housing markets, consumer markets (e.g. for leisure and comparison shopping) and some production supply markets tend to overlie one another spatially. As indicated by Clark (2005), these are ideas which are familiar in terms of metropolitan areas, and in that context they have a long and robust intellectual history (cf. Coombes 2004).

One reason for the increasing interest in this sub-regional scale is that an increasingly mobile society continues to 'out grow' local authority areas, as has been recognised by successive local government reorganisations. Labour markets, in particular, have become markedly less localised due to longer-distance commuting becoming much less unusual. Among the key reasons for this trend are:

- sustained increase in car use, allowing access to more workplaces
- diffused job opportunities (e.g. employers de-centralising to city edges)
- greater affluence (e.g. more professional and managerial jobs), and
- more double-earner households (who can't live near both work-places).

Many of these processes have clearly affected other movement patterns too. For example, there has been a similar patterns of lengthening average journeys to shop, so that smaller towns are increasingly in the 'hinterlands' of larger centres and so no longer have very separate catchment areas. Little consistent data on journeys to shop – or other movement patterns such as travel to reach education or similar services – is in the public domain. Robson et al (2005) have analysed a small sample of specially accessed datasets on the users of major city service facilities such as theatres and found that these too now have wide sub-regional catchment areas. At the same time – and as in this report – Robson et al focus particularly on commuting patterns, partly because the labour market dimension to local geography is of major importance, but also on the assumption that commuting patterns tend to roughly 'proxy' other patterns of local linkages which would be of great interest if only there were similarly available datasets (cf. Sohn 2005).

City Regions: the traditional model

Some basic features of the city region concept have clear echoes of the familiar mapping of the world into separate territories, each with a single capital. The model dates from the Roman Empire's system of provinces, and was followed by the church which imposed the structure of bishop's dioceses and their cathedral cities. This model has proved highly suitable for territorial administration, with the most relevant example in the East Midlands being the division of England into counties centred on county towns.

This model is so familiar its key elements might almost be taken for granted, so it is important to identify the essential *principles* of this version of city regions.

1 Each part of the wider territory is part of one and only one region.

2 The territory is divided into regions that are, in general, single contiguous areas.

3 Each region has one and only one city as its central focus.

With little adaptation, this model has been applied in many British administrative systems and the welfare state — often at a more localised scale than that implied by the term city region — hence the familiarity of maps of non-overlapping regions, with no hierarchy among the regions, and each having just a single centre. As something of a footnote, there were some 'exceptions proving the rule' in the application of the model in practice. The church became fairly relaxed in accepting territories with more than one central focus – contrary to principle 3 – as the Bishopric of Bath and Wells shows. The administrative 'central case' of counties includes Lincolnshire which was divided into three parts for local administration, illustrating a hierarchical system which does not really fit the single-tier model of the historical county and its county town.

The most familiar form of city region for people today remains the one which is exemplified by counties and their county towns. Any versions of city regions which do not conform to the 3 principles above can still cause puzzlement, as was shown by the response in some areas to the introduction of postcodes: where the codes did not clearly centre on a familiar county town then questions were asked about why areas had been grouped together in that way. Thus people in North East Nottinghamshire did not welcome being part of the DN (Doncaster) postcode area because they felt it implied that Doncaster was the dominant centre for their area when there was no historical recognition of that relationship. The area has remained in Nottinghamshire for local administration, and the county continues as the focus for identity, yet for over a century it was Doncaster – and more so Sheffield – increasingly providing most 'higher order' services and jobs to people in the area. Transport networks made

south Yorkshire's large urban centres more accessible than Nottingham (or nearby Mansfield).

Continuing changes to employment location and the distribution of service provision have encouraged people to be ever more mobile, to travel to different places for different purposes. The result is that cities are less likely to fit into the simple 'one tier' model in which each centre provides the same functions for its own readily distinguishable hinterland. The next question here is how to specify precisely the difference between a polycentric city region and the traditional county model, so that the current situation in the East Midlands can be examined to assess whether the polycentric variant of the city region concept applies in any part of the region.

Polycentric Regions

Academic interest in polycentric regions (often known as polycentric urban regions) stemmed from development trends in north America in the first instance. The growth in personal mobility led to increasingly over-lapping hinterlands of cities whose areas of influence were previously distinct. In addition, emerging *edge cities* (Garreau 1991) further complicated the urban hierarchy in some regions. The latter phenomenon remains less evident in Europe — even after the customary time-lag before new trends in North America arrive over here — but academic interest in polycentric regions has grown. One stimulus has been the suggestion that polycentricity is associated with economic success: this idea may have stemmed from the observation that countries such as Germany and the Netherlands which until recently were the most economically successful were distinctly polycentric.

Perhaps the clearest attempt to identify the crucial features of a polycentric region has been provided by Parr (2004) who isolated seven attributes which, in combination, would leave no doubt that a region was polycentric according to the common strands in the academic literature to date. Parr recognises (p. 232-3) that it would be an extremely severe test to require regions to satisfy all seven conditions, but his objective was to set a 'gold standard' definition around which some variation might be expected. Several of the conditions are ones which would be expected of any form of city region, such as that the region is not so large as to lose coherence. Comparing these conditions with the three principles of traditional city regions which this report identified, there seems to be little distinctive about polycentric regions in terms of the first two because polycentric regions are no less likely to be internally contiguous, nor more likely to overlap with neighbouring regions.

Not surprisingly, the key differences centre on polycentric regions lacking the single dominant centre of the monocentric traditional model of a city region. The following four conditions are indicative of polycentric regions.

1 The region has at least two principal centres that are of comparable significance.

2 The centres are not in the same built-up area (i.e. not part of one conurbation).

3 The centres do not simply duplicate each other in the functions they provide.

4 There is substantial interaction between the centres, with a reasonably close balance between the flows in each direction: this flow pattern can include "interpenetration or overlapping of the labour markets of the various centres and the intricate pattern of commuting to which this gives rise" (p.233).

Thus the fourth condition seems to have two possible forms, with the stronger version requiring direct flows between the centres themselves, while the weaker form is satisfied by the overlapping of the centres' market areas.

In the empirical element of this study, a key question will be whether any part of the East Midlands meets these conditions and so can be deemed a polycentric region. The requirements are that the area must be small enough for centres of physically distinct settlements to have commuting patterns which overlap, and there must be two or more such centres which are of similar significance but possess somewhat different functional specialisms. If these conditions are met in any parts of the region then those areas will be identified as, at least on that evidence, polycentric regions. Elsewhere it is likely the familiar monocentric form of city region remains the norm.

Before turning to the East Midlands case, it is important to review certain key strands of the literature on polycentric regions. The first point to note is that polycentricity can be identified at highly varied scales. For example, the fact that there is not a single dominant city in Germany can be referred to in terms of a polycentric German urban system (by comparison to London's primacy within Britain). One important example of an even wider perspective is the recent work on cohesion within the expanded European Union (ESPON 2005) in which any evidence that growth was taking place outside the north west European core was hailed as emerging polycentricity at this continental scale. This example is important because the ESPON research follows up the European Spatial Development Perspective (ESDP) analyses which did much to popularise the idea that polycentricity provides a more sustainable future. In the earlier work, the focus was much more at the regional scale, with the supporting research looking at various flows between adjacent towns and cities (ESPRIN-UK team 2000). The research was inconclusive in its assessment of whether any of the parts of Britain explored displayed polycentric characteristics, but

the planning policy debate included arguments which were reflected in the model of polycentricity elaborated by Parr (op cit).

Considerable emphasis was placed in the ESDP (Nordregio 1999) on the potential for polycentric regions restraining – if not reversing – the long-term trend for average commuting distances to lengthen. This was expected as a consequence of the region's dispersed pattern of job opportunities, associated with each centres having its distinctive functional specifications. In the absence of definitive research to find all Europe's polycentric regions 'on the ground' using data on commuting in particular, some research has proceeded on the assumption that the Randstad in Holland can be studied as if it is a laboratory in which conditions approach the polycentric model. The results of these analyses have so far been inconclusive in practice. Musterd and van Zelm (2001) conclude that the movement patterns of most people in the Randstad area are indeed fairly limited, but that this supports a model of several fairly distinct local urban systems which are near to each other but are not sufficiently integrated to be seen as a single polycentric whole. Meijers (2005) finds evidence which casts doubt on the distinctive and complementary economic functions of the Randstad cities. Schwanen et al (2005) found that commuting patterns vary in this part of Holland in ways which do not consistently support the hypothesis that that growth in longer-distance commuting would be restrained; in this they were building on the analysis of van der Laan (1998), who emphasised the variability of commuting patterns within the Randstad where the polycentric model suggests that a greater symmetry of flows between cities would be expected.

The following section of this report will focus down on the East Midlands case and examine the available evidence about its urban system. Which are the principal centres and how separable are their areas influence? How influential are the large centres located just outside the East Midlands? Are there centres of similar scale which are near to each other and whose hinterlands extensively overlap in the way which characterises polycentric regions?

5 The urban system in the East Midlands

The historical imprint of the region's urban hierarchy is dominated by the five main county towns (nb. Rutland's Oakham is not a centre of great influence). In other regions, there may be a single dominant centre – such as Bristol in the South West – but the East Midlands did not have that character. The only other pre-modern feature which has shaped some regions' urban structure is the ecclesiastical hierarchy: for example, the archbishopric of York fostered that city's regional dominance for many centuries. Although much of the East Midlands was in the diocese of Lincoln there were large areas assigned to York or Lichfield and so Lincoln did not emerge as a primary regional centre. As commercial activity developed into the early modern period, London exerted a pre-eminent role in the region's wider trading links; no city within the region dominated the other main centres, with Coventry perhaps the nearest to being a 'second order' centre between London and the county town tier of centres (Laughton et al 2001).

Industrialisation radically re-shaped urban hierarchies in some regions, as was shown in the West Midlands where Birmingham emerged from genuine obscurity to become the dominant city. In the East Midlands the process took the form which was more common in many continental European countries, with the existing main cities attracting much of the new growth. Innovations in factory production began in and around Derby before textile production spread to Nottingham and Leicester along with many other areas. The outcome is that the higher levels of the urban hierarchy in the region continue to be dominated by the five main county towns (DTZ Pieda 2003). Lincoln saw relatively little growth with industrialisation and, within its historic county, it lost dominance due to the growth of Grimsby and Scunthorpe to the north of the East Midlands regional boundary.

Three principal points can be drawn from this extremely brief historical review:
- there is no single highly dominant regional centre (cf. Manchester or Bristol),
- five county towns are still significant within the region's urban hierarchy, and
- the region's current boundary is not a strong divide with deep historical roots.

To elaborate slightly on the last point, the boundary of the East Midlands is in fact notable for closely approaching centres in other regions which are larger than the nearby settlements within this region. Examples to the south are Peterborough and Coventry – and now perhaps Milton Keynes – whilst for the Peak areas of

Derbyshire Manchester and, much less dramatically, Stoke are major centres which are not far away. To the north, Sheffield and Doncaster join Scunthorpe and Grimsby as significant centres for the nearby parts of the East Midlands where the indigenous centres are smaller than those just across the regional boundary. All these centres just across the boundary of the East Midlands will be included in the empirical analyses in this section of the report.

The remainder of this section of the report examines evidence on the main urban centres within the East Midlands and considers the nature of the urban network which they comprise. This first involves identifying the hierarchy within the key centres, then looking at the evidence for growth in commuting between cities, and finally reaching a view on whether the main centres have retained distinctly separate areas of influence.

Urban Hierarchy

The most familiar hierarchical aspect of towns and cities is probably a retail ranking which places London's West End at its summit and a single corner shop at its foot. Several commercial organisations have marketed hierarchical listings of British cities and towns, but issues of methodology were always raised by the way each of these had been calculated. Work on behalf of the Office for the Deputy Prime Minister (ODPM) has hugely improved on all those independent analyses (Geofutures 2004), providing a newly definitive basis for ranking the retail size of town and city centres. Figure 1 uses this dataset to show the largest centres within the East Midlands region itself together with 21 significant cities and towns close by in adjacent regions.

The results are rather unusual in suggesting that there are distinct 'breaks' in the hierarchy of centres[1] which are readily identified. Nottingham does not lag far behind the more internationally known Core Cities of Birmingham and Manchester (in part perhaps because both those cities have large suburban and/or 'out-of-town' shopping centres not far away). Leicester proves to be closer in size to Nottingham than to the smaller centre of Derby: on this evidence the region is dominated by its two largest centres and *not* by three cities which are closely comparable in size.

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[1] Even more unusually, the four 'breaks' in the size ranking follows a regular pattern: 35,000 sq m; 70,000 sq m; 140,000 sq m; 280,000 sq m.

Figure 3 City and town retail floorspace (sq.m.) 2002
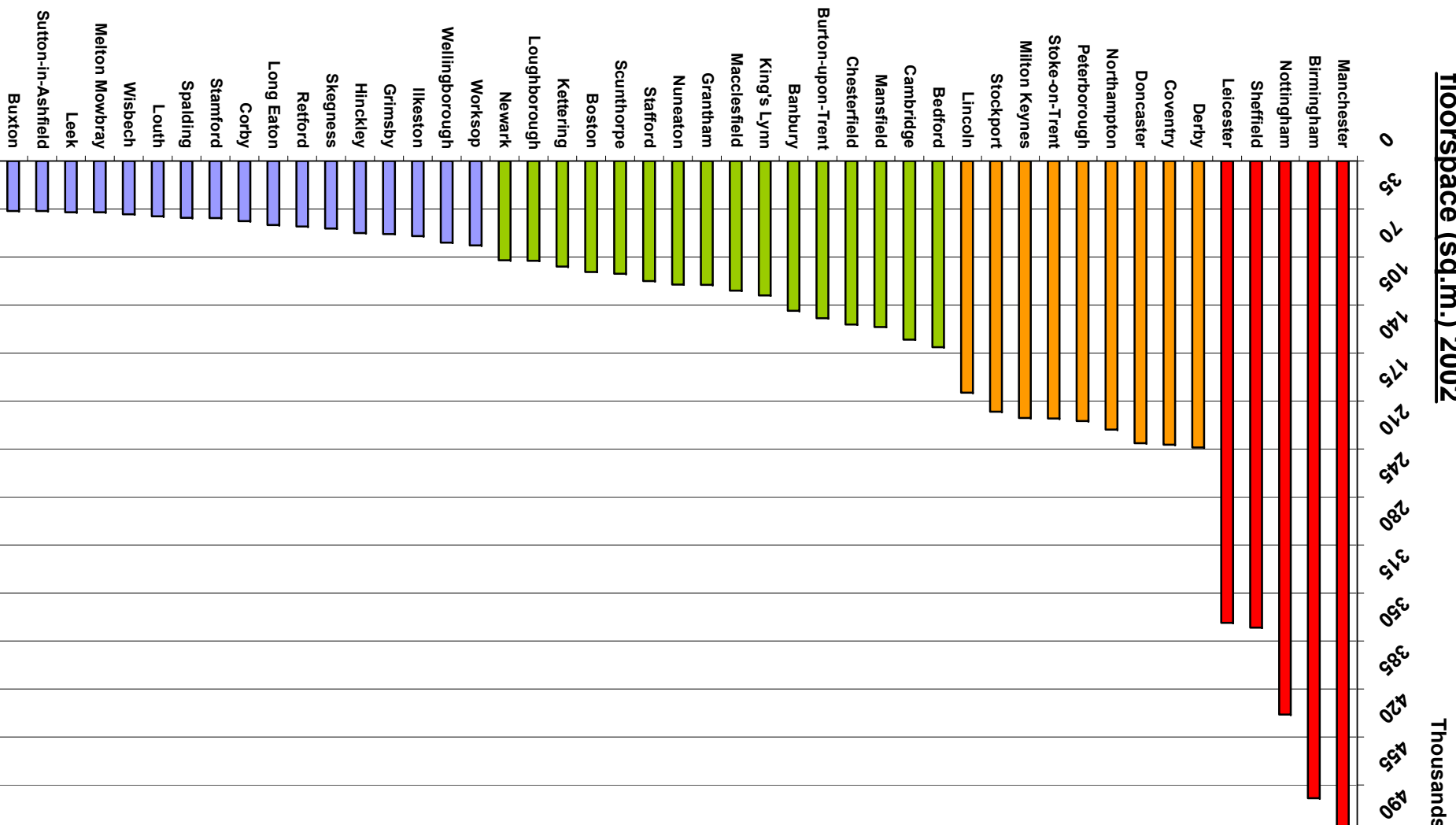
To be specific, the retail centre of Derby is more similar in size to Northampton and also Lincoln (even though the latter city has, of course, a much smaller resident population). These first two size categories have segregated the five county towns from all the region's other urban centres, just as the region's Urban Action Plan emphasises the five county towns, together with Corby as the other Priority Urban Area (Urban Partnership Group, 2005). Lower in the hierarchy it becomes slightly less clear-cut where there are 'breaks' in the ranking between centres of similar size, although Newark is appreciably larger than Worksop which is taken here to be the largest of the fourth tier of centres in the region. Buxton is the smallest of these, after which there was another 'break' in the ranking, with Daventry and Rushden the next in size (but below 30,000 sq metres). Figure 1 has been coloured so as to highlight the four size categories which emerge from the ranking analysis. Map 1 shows the spatial pattern of these 47 centres, and using the same colouring system – together with size of label – to indicate the retail centre size category of each city or town. Annex 1 provides a look-up list for the two letter codes indicating each city and town location.

One basic requirement for an urban network to be considered polycentric is that there are centres of similar status which are near to each other. It is debateable just how near the centres have to be for this condition to be met, but it is certainly the case that this distance will vary according to the status of the centres concerned. On this basis there are parts of a conurbation like the Black Country which could be deemed to be polycentric because they have numerous large centres which are close to each other. Figure 1 does show several *pairs* of centres of similar status which are not far apart, taking into account that larger centres are likely to have larger areas of influence: Nottingham and Leicester fall into this category, as do Mansfield and Chesterfield and also Kettering and Wellingborough (nb. Grantham and Newark are probably too far apart to qualify, given their limited 'reach' due to their relatively modest status). Although the definition of a polycentric region *can* include one with only two centres of similar status, the debates around this concept mainly focus on regions with more centres. This is especially true for those suggestions that polycentricity brings developmental benefits, due to each centre 'drawing strength' from its neighbours and thereby achieving agglomeration economies without the congestion costs of traditional conurbations.

Although the retail dataset is a newly definitive measure which gives an intuitively reasonable analysis of a vital aspect of urban hierarchies, it is still only reflecting one

Map 1   Retail hierarchy of city and town centres in and near the East Midlands

Retail Hierarchy (see text)

NG

NN

GM

MM

For place codes, see Annex 1

Region

County

Built up areas

Source: ODPM Town Centre Boundaries and Statistics

aspect of a multidimensional issue. Several studies over recent years have examined a range of measures of town or city status to provide a more rounded assessment. Coombes (2000) produced a mapping of all Localities in Britain through a synthesis of many factors, and then classified these Localities in terms of 16 key characteristics of cities to define 43 cities around which City Regions were identified. Across the East Midlands it was the five major county towns which emerged as the central cities of City Regions on this basis (nb. parts of the region like Buxton and Stamford fell within City Regions centred on cities in adjacent regions, as would be expected). This should not be seen as evidence that Derby is, after all, of a similar status to the larger cities of Nottingham and Leicester because Lincoln was also placed at this level and this city could not plausibly be claimed to match Nottingham in a hierarchy. What the analysis did show was that these centres provided *most* high-level functions for their identifiable hinterlands; just as the City Regions of Derby and Lincoln had smaller populations than those of the larger cities, so the smaller cities had rather fewer or more modest versions of the archetypical city facilities such as universities.

A parallel study by Hall et al (2001) carried out a similar classification of towns and cities according to several characteristics of urban status. This research did not identify the regions around each city, but instead attempted a more differentiated ranking of towns and cities. A major focus for the study was on the change in this ranking through the twentieth century, but the difficulties of producing comparable measures over such a long period inevitably make those results highly contestable. One interesting example of these findings is their suggestion that Derby was not at the same broad hierarchical level as Leicester and Nottingham in the 1960s but it had joined them – and thus moved beyond Lincoln and Northampton – by the late 1990s. Hall et al (2001) also include a range of other hierarchical views of the late 1990s, with the general purpose analysis combined in different ways with their own retail status analysis (based on the more partial information which could be compiled prior to the availability of the newly definitive data used here). Here the results directly reflect the uncertainty which has emerged in this section of the report over whether Derby can be considered to be the 'last among (near) equals' of a three city region: there is a nearly equal number of the analyses which support this view of Derby's relative status as there are ones which see Derby as *not* on a par with Nottingham and Leicester but instead of a similar status to Northampton (and even Lincoln). The balance of the material reviewed here is towards this latter, and more modest, assessment of Derby's status: a similar conclusion was drawn on rather different evidence in the Ove Arup (2003) study of the region's three largest cities.

City linkages

Cities of similar status may be in close proximity but for them to be part of a polycentric region there must be linkage between them. This linkage may either be direct, in the form of city-to-city flows connecting them, or indirect (i.e. flows which link the cities with same 'hinterland' areas). The empirical analysis here first looks at direct flows, with the focus on commuting flows between adjacent pairs of the five main county towns in the region. (It should be noted that the empirical analyses here follow Parkinson et al (2005) in including with Nottingham and Leicester those adjacent districts in which the majority of the population lives in areas which are continuously built-up with the city concerned: Oadby & Wigston and Blaby with Leicester; Gedling and Broxtowe plus Erewash with Nottingham).

Figure 4 presents the statistics from the latest Census and also the data from 10 and 20 years earlier, so that evidence on growth in linkages can be assessed. Only two pairs of cities have seen a growth of flows which has been enough to reach an appreciable scale: Nottingham's linkage with Leicester and Derby (nb. the flows between Nottingham and Derby are probably overstated here, due to the analysis including Erewash which not only includes part of Nottingham's urban area but also some areas near Derby's urban core). For both pairs of cities, it is the flow *to* Nottingham which has increased the more rapidly, although this differential is not so marked as would have been expected if Nottingham had exerted an unequivocal primacy over other cities in the way that a city like Manchester does over its neighbouring cities.

Figure 4   Commuting flows between cities 1981-1991-2001
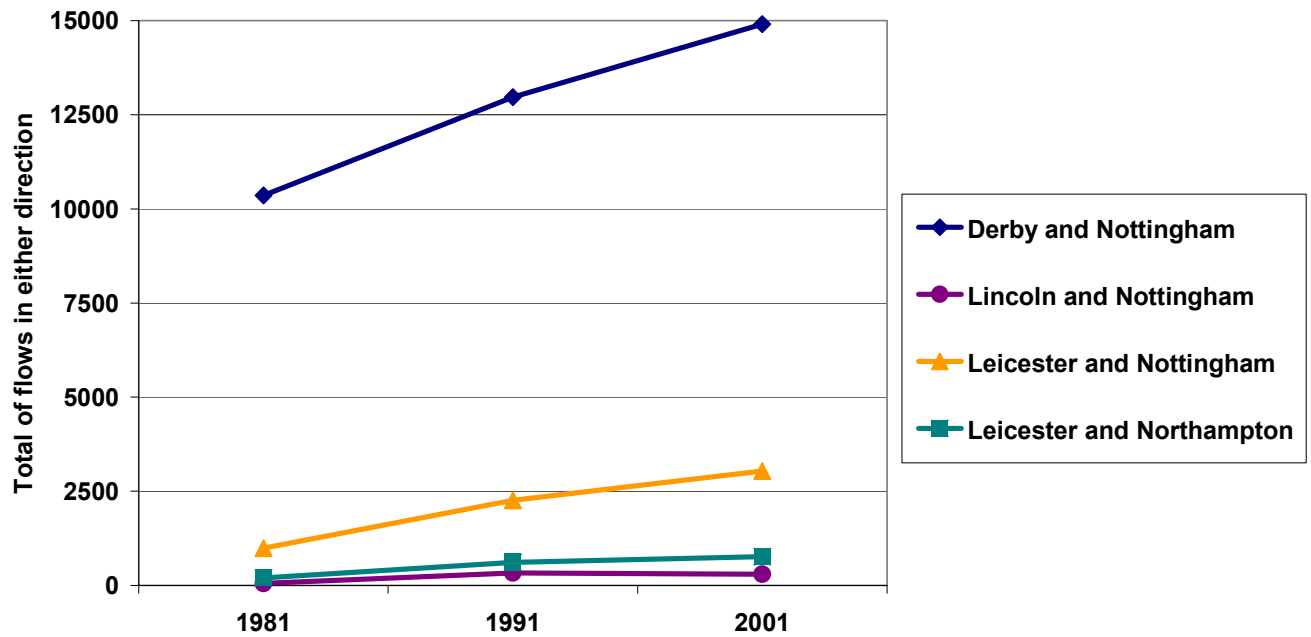
Source: Population Censuses

It is not simple to draw firm conclusions as to whether this evidence tends to support or undermine the hypothesis that the three city area makes up a polycentric region. Given that Leicester is larger than Derby by some distance, the fact that the larger city's linkage with Nottingham is at a much more modest level implies that Leicester had remained relatively free-standing into the new century. This prompts the question of how significant the flows between Derby and Nottingham have become. The most persuasive case for polycentricity is provided by the flow *to* Derby: for every 7 people who both live and work in the city, one person worked near them who lived in Nottingham's urban area (including – as noted above – Erewash). Derby residents make up a much smaller proportion of Nottingham's workforce because the sheer number of jobs in the larger city is so great the inflow from Derby makes a much smaller contribution. In short, this evidence does not strongly support a polycentric interpretation of this part of the region's urban network, but nor does it conclusively prove that the model does not apply. As was noted earlier, large city-to-city flows would provide a very high level of evidence of a polycentric structure, but the more conclusive disproof of polycentricity would be provided by find that each city retains its own separable labour market area with a high degree of self-containment which indicates very little over-lapping of the cities' area of influence.

Labour market areas

It is not appropriate here to assume that the city is the 'core' of its labour market area, with its hinterland defined as the areas from which there is substantial commuting. The key reason is that the geography of labour markets has moved beyond that traditional model, in which the only significant flows are those *into* cities: processes such as the suburbanisation of jobs mean that the modern way of defining labour market areas cannot presume that each of them has a single employment core at its centre. ONS and Coombes (1997) defined Britain's official Travel-to-Work Areas using a method which is internationally acknowledged as the state-of-the-art in defining labour market areas, not least because the method gives equal weight to all flows in any direction. There have been a number of studies which have used the TTWA regionalisation method but changed some of its key criteria so as to produce broad city region scale boundaries. For example, a study commissioned by the City Region Campaign devised a set of city regions which might provide an alternative geography for the devolution of Whitehall powers (Coombes 1996). Rather similar analyses, of 1991 Census commuting data, informed the ODPM definitions of City Regions for the Northern Way (nb. the one substantial change to the areas defined from the data was that the policy boundaries grouped north and south Humberside together when the commuting data had not).

There is now similar city region research on-going for ODPM using 2001 Census commuting data (Robson et al 2005), and some of the results are presented here. It is important to recognise how the TTWA form of definition shapes the regions produced:

➢ the method is ***non-nodal*** which means that polycentric regions can be identified,

➢ the boundaries are ***exhaustive*** so every part of the country must be included,

➢ they are ***solely commuting-based*** in general, but at the same time

➢ analyses can focus exclusively on commuting by professional/managerial workers.

Within this approach, the parameters which can be changed to define regions of differing scales are the minima of size and self-containment (nb. a 'trade-off' between these two criteria exists, but this complication is not of great importance at this rather broad scale). The size measure is the number of jobs in the area; the measure of self-containment is the proportion of commuters *not* crossing the region's boundary (strictly speaking, it is the number who both live and work within the boundary as a percentage of *the larger of* the number of jobs in the area and the

number of employed residents there). Robson et al (2005) acknowledged that the decisions made in selecting values for these criteria is always debatable, but their research – which is described below – resolved that areas would only be considered separable City Regions if they house more than 100,000 jobs each.

The level of self-containment determines the extent to which those regions with large cities tend to embrace many smaller neighbouring towns. A low level of self-containment allows these 'satellite' areas to reach the required population size while remaining separate from the major centre nearby: this is one way in which groups of similarly-sized towns can emerge as polynuclear regions without a single dominant centre. Other important but technical points to bear in mind are that the analyses are ward-based – they ignore local authority boundaries – and are not constrained by the Welsh or Scottish borders. (It should be noted that there are some minor non-contiguities in the detailed boundaries, but these can be ignored for the present purpose of identifying areas at the city region scale.)

Different self-containment values produce results which are interesting for the differing scales at which they report on the region's urban geography. For example, the 70% level found a separate region with 100,000 jobs which groups together all the four towns Corby-Kettering-Rushden-Wellingborough with adjacent east Northamptonshire rural areas but *not* Northampton itself. Map 2 shows results from setting the self-containment value at 85% (nb. this value was selected after experiments to find results which include 8 regions in northern England which are roughly equivalent to the 8 Northern Way City Regions). This analysis finds that – of the 36 regions with their principal urban centres in England – 5 include substantial areas within the East Midlands region: Map 2 sets these areas against the earlier identification of the region's retail hierarchy (Map 1). One of the more surprising features of these results is that Derby is not found to be the main centre of a separate region (even though some smaller towns like Burnley and Torquay are). More surprisingly still, Derby is not combined with Nottingham but with Sheffield and most of the Derbyshire-Nottinghamshire coalfield area. Lincoln too groups with an area across the region boundary, in this case with Scunthorpe and Grimsby and the rest of the south Humberside area. Leicester groups with all the Northamptonshire towns (plus Burton-on-Trent). One result which very clearly did *not* emerge here then was the grouping of Nottingham with Derby and/or Leicester which might have been the outcome which was most expected.

The reason why an area like Burnley remained a separable region is that it not only does include a substantial workforce, but this is a workforce with relatively few higher-earning people and that means that there are few longer-distance commuters, thus causing the area to have rather high self-containment levels. Yet it is probably to be expected that a city region provides most of its higher-level activities internally, and this means that it should include a fair number of well paid people working within its boundaries. In response, a second analysis only examines the commuting patterns of professional/managerial workers. Due to these workers' greater tendency to commute longer distances, fewer separable regions are defined using the same self-containment criterion (e.g. there were just 19 separable regions in England defined using the 85% self-containment for this higher status segment of the workforce). Map 3 shows the results when the self-containment criterion was set at 80% in order to produce roughly the same number of separable city regions from the data on professional/managerial workers' commuting flows, with their greater average length. There are 37 regions found to have their principal urban centre in England on this basis.

Map 2   Large labour market areas 2001: the East Midlands

Retail Hierarchy (see text)

NG
NN
GM
MM

☐ Region
☐ County
▨ Built up areas
▥ Large labour market areas (Robson et al 2005)

For place codes, see Annex 1

Sources: various, including authors' analysis of Population Census 2001

Map 3   Managerial and professional labour markets 2001: the East Midlands

Retail Hierarchy (see text)

NG
NN
GM
MM

For place codes, see Annex 1

Region
County
Built up areas
managerial and professional labour market areas (Robson et al 2005)

Sources: various, including authors' analysis of Population Census 2001
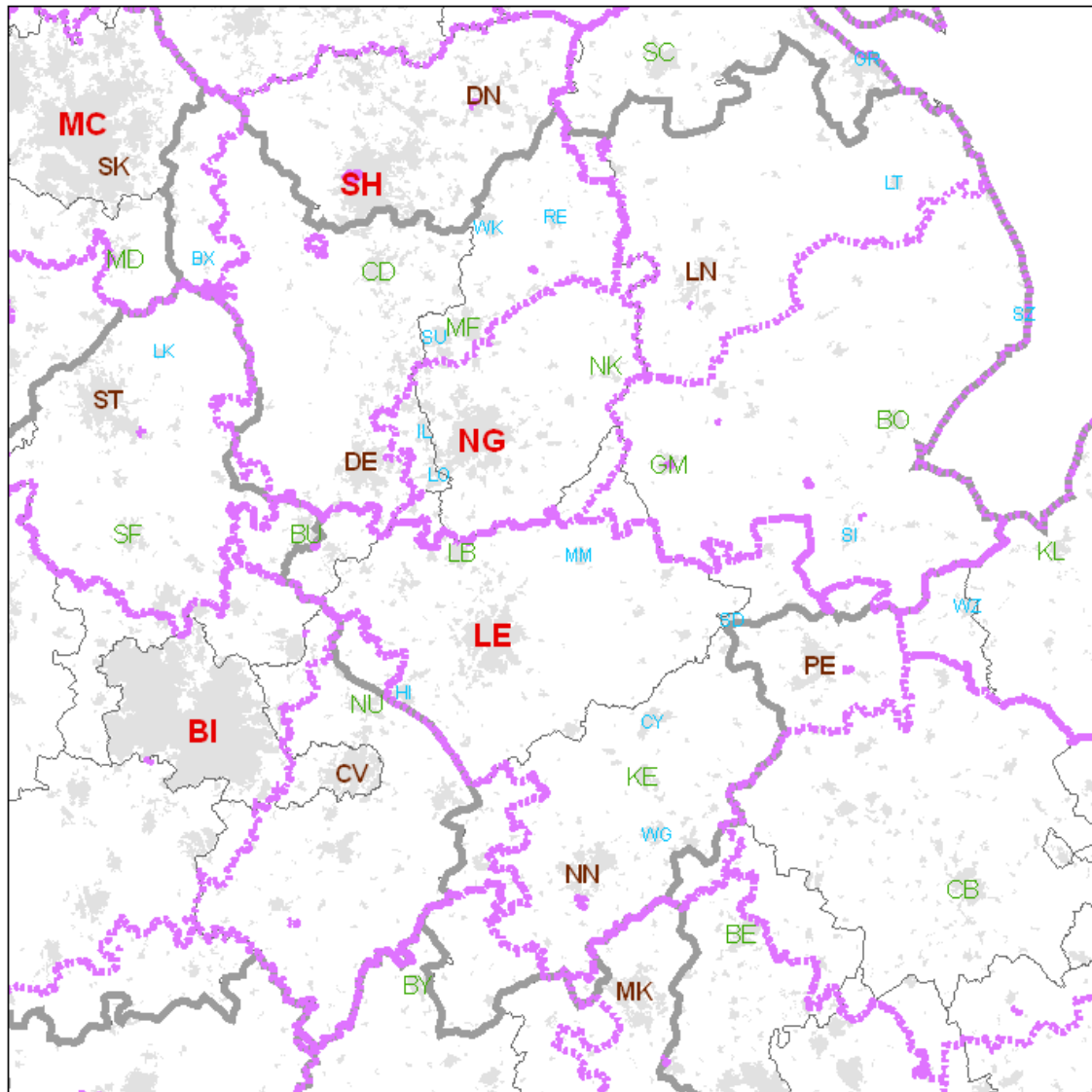
Although one conclusion from this form of research is that there is no simple answer in terms of a 'best' map, each set of boundaries gives an accurate reflection of one aspect of the modern complex pattern of commuting flows. Map 3 offers a set of boundaries which may well conform to many notions of city regions in the context of the East Midlands region. Particular points to note here are:

➢ Nottingham and Derby group together, along with the nearer parts of the coalfield

➢ Leicester dominates a region roughly matching its county (apart from Hinckley)

➢ a similarly monocentric region surrounds Lincoln (nb. Skegness links to Grimsby)

➢ Northamptonshire groups with Milton Keynes and Bedfordshire in a region which provides a distinct echo of the area ODPM have defined under the emerging Sustainable Communities policy rubric as the Milton Keynes-South Midlands growth zone.

Housing markets and migration

Clark (2005) lists housing markets among the factors which indicate city region geography. Recent guidance on the definition of housing market areas for ODPM suggested that the 'blue-print' was provided by the definition of TTWAs (ONS and Coombes 1998), but the previous section of this report has already applied the TTWA method so, in order to build up a range of evidence on East Midlands city regions, a different analysis is applied in this section of the report. The key information source here is the 2001 Census migration dataset which reports the current and previous addresses of all people who had been living somewhere else in the UK 12 months prior to Census night. The migrant flows of people between settlements are arguably just as indicative of those linkages between places which shape city regions as are commuting flows, even though they are much less often studied (Coombes 2004).

The form of analysis used here examines the flows in both directions between two places, looking at each local authority area separately (apart from the continuously built-up areas of Nottingham and Leicester where several local authorities are combined, as before). Every migration flow is expressed as a percentage of the relevant total for each area which is involved. For example, the number of migrants from Derby to Mansfield is expressed

(a) as a % of all people who were living in Derby in 2000 but had moved house by Census night 2001

(b) as a % of all people who were living in Mansfield in 2001 but had not been in the same house a year previously.

With the flow of migrants in the opposite direction then considered on the equivalent basis, there are four relevant calculations which between them show the relative magnitude of the migration flows between any two areas. The evidence can be summarised by counting the number of these percentage values which exceeds 5%: if there are none then the link is not at all strong, if only one then the link is probably only strong in one direction and, even then, is only of much importance to one of the two areas; if two or more – up to the maximum of four – then the link appears to be a substantial one in terms of its impact on the areas involved.

Map 4 shows the results of this analysis on the 2000-1 migration dataset. Unlike with commuting flows, links in and out of major cities tend not to dominate the results. In part this is because the major cities have large total populations and so a flow has to be very large before it can make up 5% of the total of all the in- or out-migrants in that population. That said, all the five county towns have two to four other areas linked to them with flows which are 'scored' at least 2 using the form of analysis described above. There are no such strong links directly between the three large cities. The coalfield area around Mansfield has stronger links with Nottingham than it does with the north Derbyshire coalfield area which, in turn, has its strongest links with Sheffield across the regional border. All the districts within Northamptonshire link together, but there are also links towards Milton Keynes and Bedford in a foreshadowing of the post-2001 announcement of the growth zone to group these areas. Peterborough proves to be the main link for South Kesteven (despite the level of interaction between Grantham and Nottingham), but South Holland has no strong links, which is perhaps the more notable because even the remote East Lindsay has a reasonable level of linkage with Boston which lies between these two areas.

Map 5 repeats the above analysis but with a focus exclusively on the migration flows of the managerial and professional groups in the population. There are rather more flows which are longer-distance in this case, so more inter-district links are 'scored' more heavily here (nb. the bulk of migration flows are in fact very short-distance and so many are between addresses in the same local authority boundary). Ignoring the links 'scored' just 1 and then looking at the pattern of the larger stronger links, the following observations can be made.
- Mansfield has several indirect links, via other coalfield areas, with Nottingham
- Derby has direct *and* indirect links with Nottingham (plus strong links with Burton etc.)

Map 4 Major migration flows 2000-1: the East Midlands
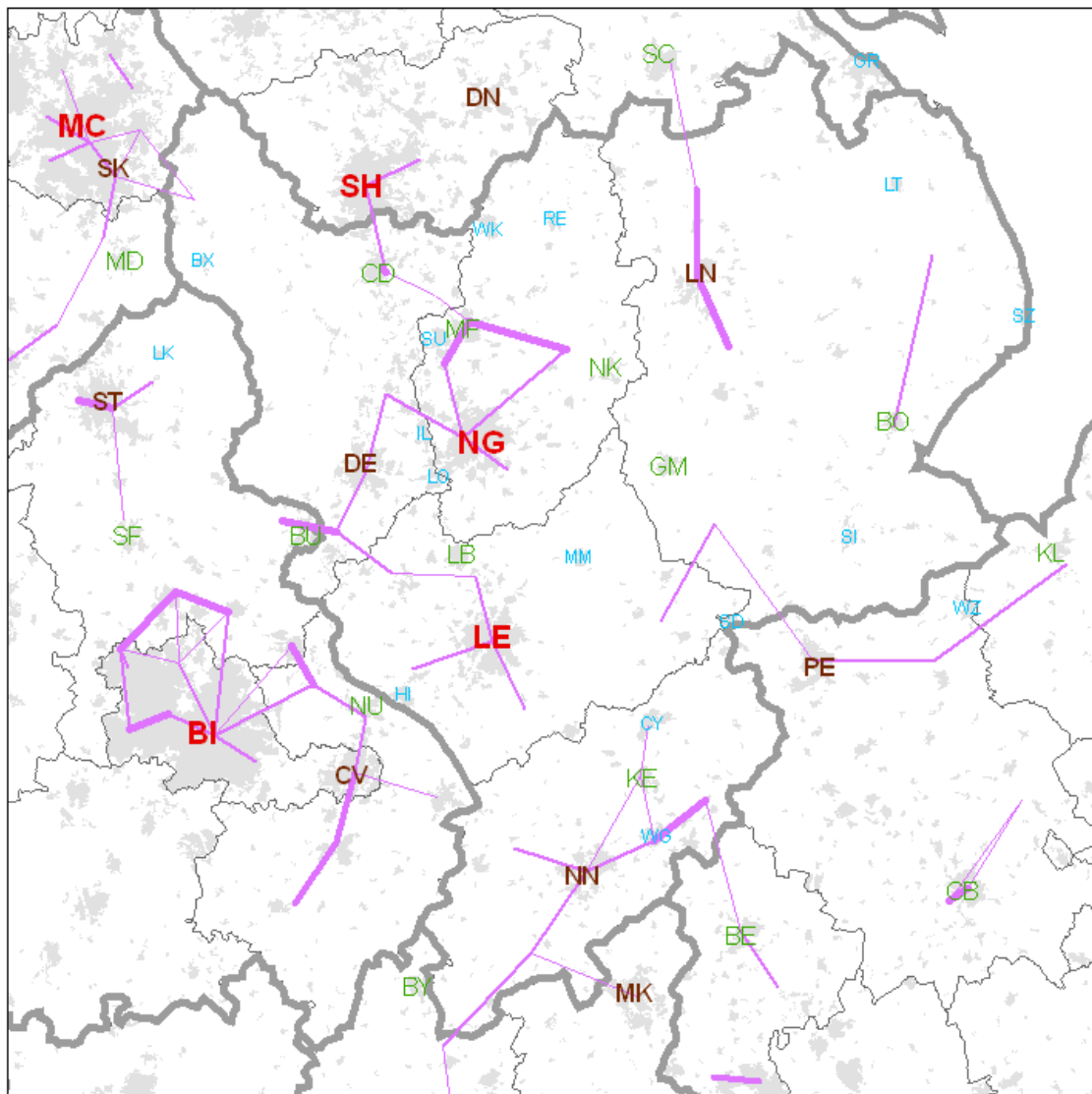
Retail Hierarchy (see text)

NG

NN

GM

MM

For place codes, see Annex 1

☐ Region

☐ County

▨ Built up areas

Migration linkage 'score' (see text)

——— 1

——— 2

——— 3

——— 4

Sources: various, including authors' analysis of Population Census 2001

Retail Hierarchy (see text)

NG
NN
GM
MM

For place codes, see Annex 1

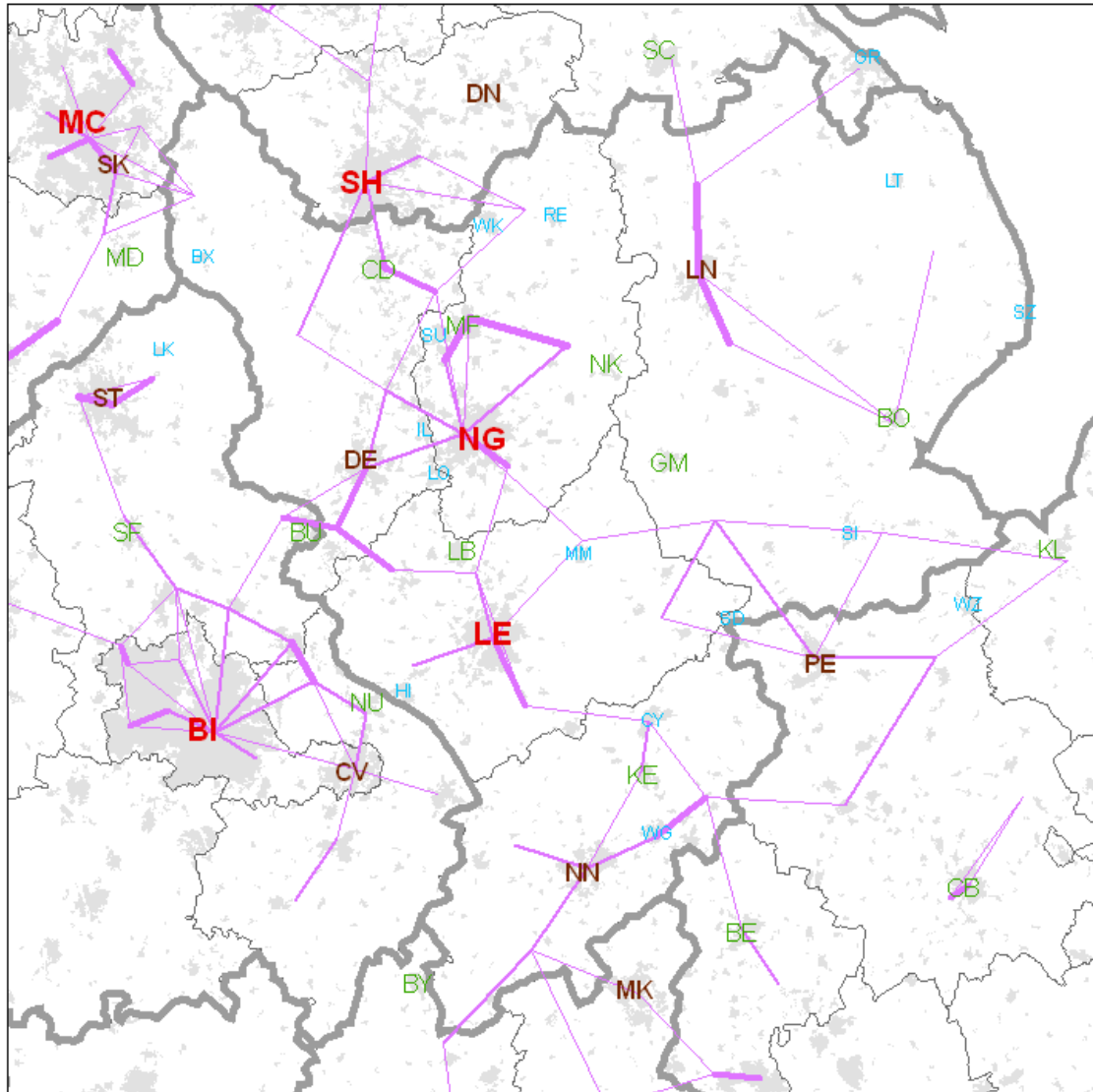Region
County
Built up areas

Migration linkage 'score' (see text)

1
2
3
4

Sources: various, including authors' analysis of Population Census 2001

- Chesterfield and the northern coalfield areas are more strongly linked with Sheffield than with other parts of the East Midlands
- Leicester and Lincoln are foci for local linkages, but not all their counties are included
- Northampton too is a local focus, but there are also links with the A6 towns and the flows across the regional boundary are quite substantial too.

6   An urban network for the East Midlands?

This last section of the report does not seek in any way to predict the future prospects for the region's urban system, nor to duplicate the recent research into the potential for the three main cities to be 'greater than the sum of their parts' (Ove Arup 2003). Before considering the evidence on the extent to which any parts of the region appear to be polycentric, it is appropriate to briefly summarise the reasons why this is a question of considerable possible policy interest. In the following paragraph, these reasons are presented in a sequence which moves from the strongly evidence-based to the more overtly speculative.

Cities are increasingly seen as the engines for regional growth, and those cities with strong infrastructure for knowledge-based economic development are the most advantaged. Cities in the knowledge economy need ever more qualified human capital to be available, but the English antipathy to urban living remains (despite the evidence of a growing niche market for prestige city centre living). One more encouraging strand of evidence is that the more successful areas tend to have more diverse populations: cities are the most attractive places for most in-migrants who then contribute to a more plural society and, in some cases at least, they also fuel enterprise levels. The most celebrated English knowledge economy is probably Cambridge (Wicksteed 2000) and this case suggests that a smaller city may be able to balance the limitations of its size – its restricted agglomeration economies – with the quality of life advantages of smaller settlements. Of course, Cambridge also had crucial advantages with its access to a very high level science base spinning out new firms which developed some cluster economies too. Reflecting on such cases, some theorists speculate that smaller cities could thrive if they had good quality knowledge economy infrastructure, and perhaps especially if they were linked to other cities in a polycentric form which could allow each city to 'borrow size' from the others, thus enabling such a city to remain relatively small and so retain the well qualified people who tend to move to away from the larger cities for quality of life reasons.

Does the East Midlands contain polycentric regions?

It is important to recognise at the outset that the research included in this report has been restricted in its ability to address this fundamental question by the limitations of the available evidence base. In particular, the concept of polycentric regions emphasises that there are functional relationships between the cities and other parts

of that region, but it is impossible to carry out the traditional 'input-output' form of regional science analysis here due to the lack of sub-regional data on spatial trading dependencies. With this mind, a study was recently commissioned by ODPM to explore economic linkages between English cities but the report was unable to go beyond theoretical discussions and summaries of past research (Coombes et al 2005).

The whole East Midlands region cannot be seen as a single polycentric region because it is not strongly integrated internally, and many outlying centres are more strongly linked with centres in other regions than with those in the East Midlands itself. More significantly, the planned Milton Keynes-South Midlands major growth policy will increase the orientation of Northamptonshire away from the rest of the East Midlands so the region is not likely to move closer towards a single integrated urban network. As a result, the question becomes whether the East Midlands includes some areas which display polycentricity in the way which that the concept has been defined here. This section of the report now draws on the evidence presented to date to summarise the main findings on this question.

Polycentricity can be sought at a range of different scales. The lowest level which the analyses here have extended down to is the larger town, with up to 30 of these found in the East Midlands retail hierarchy. At this scale, the most plausible case of polycentricity emerged in the eastern half of Northamptonshire where Kettering and Wellingborough are flanked by smaller centres. In future, this sub-county pattern may be subsumed within the wider Milton Keynes and South Midlands growth zone. That prospect is one which could be seen as essentially extrapolating past trends which saw many peripheral parts of the region become more linked with major urban areas beyond the regional border than with the any larger East Midlands urban area.

At the higher level of the region's urban hierarchy, various evidence has suggested that much of Nottinghamshire and Derbyshire coalesce into one sub-regional area (as in fact it had been for regional development policy until the mid-1970s). Leicester on most evidence remains the single centre of a substantially separate region. Nottingham looks to be the pre-eminent centre of the region on almost all the evidence, but the question of whether this dominance suggests that Derby is no longer the centre of a separable city region can now be used to illustrate the range of evidence which is relevant to such questions.

Table 3 compiles diverse strands of information, not all of which have been covered previously in this report. The structure imposed on the information needs to be explained.

The columns compare Derby against Leicester (which is expected to be less integrated than is Derby with Nottingham) and Mansfield (expected to be more integrated). Each row covers one factor which, if true, tend to indicate that the level of integration with Nottingham is substantial. The rows are grouped into three categories, which are defined by reference to the case of Leeds and Bradford where the emergence of a polycentric region is quite widely recognised:

- group 1 is of factors on which the Yorkshire cities have been linked for some time
- group 2 factors are ones by which the two cities' links have recently strengthened, and
- group 3 factors are ones on which as yet the two cities are not closely linked.

It is not useful here to repeat those strands of evidence discussed earlier in the report. Even so, before moving on to summarise the overall picture it is appropriate to explain why some of the factors *not* previously discussed have been included here. Table 3 has as its first and last two factors key aspects of identity: although such concerns may seem a long way removed from the 'hard' considerations of economic geography, there in increasing number of studies which argue that a clear shared identity can support regeneration efforts. The relative success of the Mayor of London in reinstating a pan-Borough scale of working can partly be traced to the 'unifying idea of London' which could be called upon. The other three factors in the first group all relate to transport, and in the first two factors it is largely the effect of this infrastructure on external image which is of particular interest. The recent renaming of East Midlands Airport does, of course, illustrate a keen awareness of airport names' importance for a city region's external image and recognition. The issue of rail access from other parts of the country (e.g. Edinburgh, Norwich, Southampton or Plymouth) is that people from these areas will perceive Bradford as an 'adjunct' of Leeds because they will always travel via one city to reach the other. (It is notable that in the East Midlands case the situation is slightly different, in that it is the smaller city Derby which is the 'rail head' for all the above remote cities except Norwich.) The fourth factor is a more straight-forward one because the existence of adequate public transport facilities will be a pre-requisite in most cases for the level of commuting and other interactions which characterise a city region. Table 3 includes two other factors not previously mentioned in this report. The retail centre hierarchy which has been a core element of the maps is supplemented now by

Table 3 Factors indicating linkage of Nottingham with 3 other centres

Nottingham and ...	Mansfield	Derby	Leicester
Factors linking Leeds & Bradford for some time			
shared county identity	✓	✗	✗
shared airport	✓	✓	✓
shared rail head for Scotland etc	✓	✓	✗
commuter rail link	✓	✓	✗
Factors linking Leeds & Bradford only recently			
lack of distinctive industrial cluster	✓	✗	✗
joint large labour market area	✗	✗	✗
joint man./prof. labour market area	✓	✓	✗
single dominant retail centre	✓	✓	✗
shared out-of-town centre (IKEA)	✓	✓	✗
Factors still not linking Leeds & Bradford			
substantial migration flows	✗	✗	✗
substantial man./prof. migration	✗	✓	✗
shared evening newspaper	✓	✗	✗
lack of separate history as city	✓	✗	✗
single football club for identity	✗	✗	✗

Source: authors' research

one brief reference to out-of-town shopping facilities: the example used here is IKEA which has made a policy of locating its stores at locations which will gain maximum advantage from emerging patterns of inter-urban flows for non-routine shopping trips. Finally the existence of a separate evening newspaper is taken to be evidence of a restricted level of integration.

Table 3 does, as anticipated, suggest Derby is less integrated with Nottingham than is the case with Mansfield but, at the same time, it is considerably more integrated than

the larger city of Leicester is as yet. Of course, each factor gives only a very partial –
and in some cases perhaps a rather quirky – aspect of a wider picture. This particular
selection of factors will have partly determined the balance of the evidence which
has been amassed, a balance falling more strongly towards evidence of integration
than might have been predicted. Given that this set of evidence is not strong enough
to give anything like a definitive answer to the question of whether Derby is 'just'
one part of a Nottingham-dominated city region, it is interesting to move on to
question the cities' future development. Further concentration of central functions in
Nottingham probably means that even if the Nottingham-Derby region is not seen as
polycentric now, further integration in the future seems highly likely. That said, if
the dominance of Nottingham continues to increase then the city region structure
may well be not so much polycentric but instead more a monocentric metropolitan
region.

Policy Implications

This report has been essentially exploratory, in that the aims were to clarify the
meaning of the terms city region and polycentricy and to then examine evidence on
urban centres in the East Midlands to see how far these terms describe the present
configuration. To this extent, there is relatively little scope for drawing out direct
implications for policy actions. The one potential normative aspect comes from the
suggestion that polycentric regions may be able to achieve more sustained economic
growth but, it must be stressed again, this suggestion is not yet one for which there is
a very strong evidence base.

At the widest scale, it is relatively clear that the region does not have a very deeply
integrated urban system, and the primacy of Nottingham over other centres is not as
clear as is that of Birmingham in the West Midlands for example. Northampton has
seen the strongest growth of the other large centres, and the planned major growth in
Northamptonshire and the adjacent parts of the south-eastern regions will reinforce
the recognised trend for the southern areas of the East Midlands to be linked with the
outer zones of London's commuter hinterland rather than with the three cities area.
In this way, the Milton Keynes South Midlands growth policy heightens rather than
deflects or reverses existing trends and so dramatises the fact that the East Midlands

is not strongly internally integrated, and that many of its outlying areas have more substantial links to centres in other regions than to the major East Midlands cities.

More locally, the five county towns have largely survived as the centres of the city regions which can be portrayed emerging from the evidence reviewed here. The least clear case is Derby whose links with Nottingham undermine its integrity as the separate centre of a free-standing city region (although it does remain appreciably less of a 'satellite' of Nottingham than, for example, Mansfield). It is at this point that the policy implications of the study can be considered, although there first must be clarity on which policy objectives are relevant. The first assumption is that it is not intended to 'work against the grain' by seeking to reduce the trend for increased links between Derby and Nottingham even though, for some considerable time, local pride would have called for this inter-dependence to be minimised. The second step in the argument is that this welcoming of inter-dependence would extend to links with Leicester — which as yet are rather slight — to make the 3 cities vision more of a reality. The final, and perhaps most crucial, preliminary point is to re-state that such a policy presumption in favour of increased integration is based on a relatively slim evidence base on the extent and distribution of the economic benefits which it can be expected to deliver.

It is appropriate to rehearse some policy implications within the three themes — connections — renaissance — productivity — of Smart Growth the Midlands Way (Advantage West Midlands and East Midlands Development Agency 2005). Taking the last first, the emphasis on **productivity** in the Smart Growth policy centres on the knowledge-intensive economic activity which has been the basis for the sectoral analyses in this report. The role of the universities in the region has been recognised, but the recommendation here has been that greater regional co-ordination (especially between Nottingham and Leicester Universities) should be sought to achieve greater critical mass. Such a recommendation can only be a very generalised one, until much detailed work has been done to identify complementarities which can then foster successful functional specialisation. This broad strategy also underpins the claimed economic advantages available to polycentric city regions: the constituent cities specialise so they can become complementary rather than competitive, and so draw strength from each other with a consequent acceleration of productivity generally. Lambooy (1998) pointed out how little clear evidence there is for this

process even in the polynuclear 'icon' of the Randstad in the Netherlands: there is also the risk that any benefits which *are* accrued will be far from uniformly distributed. Within the East Midlands case of the three cities, the distinctive specialisation of Derby in high value manufacturing will always be more sensitive to international competition than most of the service sectors which are likely to continue gravitating towards Nottingham if the on-going process of specialisation continues in its present form.

This report has had less to say on the **renaissance** agenda which emphasises environmental and quality of life issues. The policy implications which do flow derive from the emphasis on cities needing to attract mobile investment and highly skilled people, in competition with other cities in this country and abroad. The first point here is that the three cities — and Leicester especially — have a pool of people from ethnic minority groups who have a very high commitment to education: as such they can be seen as part of a solution to, and not the reason for, regeneration policies. At the same time, the public realm and facilities in East Midland cities may need to be further enhanced simply because most competitor cities are engaged in similar promotional policies. One definite rationale for promoting a polycentric city region structure is that there is an acute risk that further concentrated growth in Nottingham could be damaged by congestion and related problems, although dispersion of the growth implies increased travel between the constituent urban centres which is not a positive outcome from an environmental perspective. One other key point is that an understandable desire to disperse the growth in Nottingham could damage the wider interests of the region: seeking to steer high-level services to an alternative city or town in need of regeneration may simply lead to the development being lost from the East Midlands to Birmingham or some other accessible centre in another region.

Turning finally to the **connections** policy field, there is an immediate follow through from the congestion concern already expressed. As noted, polycentric development pre-supposes that connectivity between the cities and towns can reach a high level. In the three cities case, road congestion between Derby and Nottingham is already a constraint, and public transport links are not up to the highest standards in Britain let alone those in competitor European regions (such as many in western Germany). Perhaps indicatively, the airport is not well connected by public transport to any of the three city centres, when it is not only the single most emblematic instance of three cities as a cohesive region, but also in the view of Parkinson et al (2004) it is

the key gateway bringing international recognition and connectivity which underpins the competitiveness of a city region.

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Annex 1   City and town codes on maps

BE	**Bedford**
BI	**Birmingham**
BO	**Boston**
BU	**Burton-upon-Trent**
BX	**Buxton**
BY	**Banbury**
CB	**Cambridge**
CD	**Chesterfield**
CV	**Coventry**
CY	**Corby**
DE	**Derby**
DN	**Doncaster**
GM	**Grantham**
GR	**Grimsby**
HI	**Hinckley**
IL	**Ilkeston**
KE	**Kettering**
KL	**King's Lynn**
LB	**Loughborough**
LE	**Leicester**
LK	**Leek**
LN	**Lincoln**
LO	**Long Eaton**
LT	**Louth**
MC	**Manchester**
MD	**Macclesfield**
MF	**Mansfield**
MK	**Milton Keynes**
MM	**Melton Mowbray**
NG	**Nottingham**
NK	**Newark**
NN	**Northampton**
NU	**Nuneaton**
PE	**Peterborough**
RE	**Retford**
SC	**Scunthorpe**
SD	**Stamford**
SF	**Stafford**
SH	**Sheffield**
SI	**Spalding**
SK	**Stockport**
ST	**Stoke-on-Trent**
SU	**Sutton-in-Ashfield**
SZ	**Skegness**
WG	**Wellingborough**
WK	**Worksop**
WZ	**Wisbech**