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The evolving economic performance of UK cities: city growth patterns 1981-2011

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The evolving economic performance of UK cities: city growth patterns 1981-2011

Professor Ron Martin

Department of Geography, University of Cambridge, UK

Ben Gardiner

Cambridge Econometrics, and Department of Geography,
University of Cambridge, UK

Professor Peter Tyler

Department of Land Economy, University of Cambridge, UK

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Dedication: We dedicate this paper to the memory of the geographer Sir Peter Hall who sadly passed away while we were working on the final draft. He was one of the world's leading urban scholars and urban planners, and leaves a colossal corpus of incisive and highly influential work. He will be sorely missed.

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I. Introduction: motivation, aims and background

“As is commonly the case with the geography of a complex economic unit, the present makes no sense until it is related to the evolutionary process which has produced it.” (Peter Hall, *The Industries of London*, 1962)

I.1 Cities and the national economy

Cities have long played a key role in national economic life and public and political discourse. But this primacy of the urban has now attained a critical, threshold. It is reckoned that for the first time in human history, more than half of the world's population now lives in cities. Geographers and economists alike point to the increasing concentration of economic activity and wealth creation in cities, especially large and capital cities, many of which are also the key nodes that articulate and shape the global economy. Such global centres include not just advanced-nation primary cities such as New York, London, Tokyo, and Sydney, but also the vast and still growing cities of the newly-emerging economies, such as Beijing, Shanghai, Mumbai, and Rio de Janeiro. But it is not just capital cities that are powering national economies: many so-called second-tier cities, often provincial and regional capitals, are also growing rapidly (Parkinson et al, 2012). It is in cities that the most creative and talented people tend to concentrate (Florida, 2001; 2008), drawn by the presence of other such people, by the business and job opportunities found there, by the promise of higher wages and fortunes, by the scope for spending those incomes, and by the vast array of cultural and leisure amenities that cities contain. Cities have come to dominate how we think about economies. Indeed, some now talk of the ‘triumph of the city’ as a global phenomenon. (Glaeser, 2012), and others view cities as leading the emergence of a new ‘cultural-cognitive capitalism’ (Scott, 200, 2001).

Writing some thirty years ago, in her classic study on *Cities and the Wealth of Nations*, the North American urbanist Jane Jacobs (1984) argued that nations are not the key economic units, rather cities are. Cities, she contended, are themselves akin to macro-economies, local systems of production and consumption that although operating under a national monetary and regulatory framework, are the main arenas where, to use Alfred Marshall's (1920) phrase, the ‘everyday business of economic life’ is conducted. Cities, she argued, are a nation's main trading nodes, exchanging goods, services, capital, people and knowledge, with other cities, both domestic and overseas. National economies she claimed, can only be understood in terms of the growth (or decline) of their constituent cities. A similar view was later espoused by Paul Krugman, the Nobel Prize economist:

“The economy as a whole is simply too big, too remote from ordinary experience, to grasp. Is there any piece of the economy that can truly help us understand the whole? I suggest a somewhat unusual answer, but one that is growing in popularity amongst economists: that a particularly good way to understand the American economy is by studying American cities.” (Krugman, 1996a, p.206)

According to Krugman (1996b), and other ‘new economic geography’ theorists, cities are quintessential examples of *economic self-organisation*, that is complex economic and social systems that arise and evolve largely out of the individual daily micro-behaviours of myriads of economic agents, which behaviours while displaying systematic patterns

and rhythms, are largely independent of any externally imposed direction or control. Furthermore, the decisions and interactions of these co-located economic agents produce *emergent effects* - in particular, various forms of positive externality and spillover – that appear and operate at the level of city as a whole, but which are not simply reducible to those underlying micro behaviours, and which enhance the competitive advantages of the activities that cities contain. The argument is that the spatial agglomeration of economic activities in cities, and the emergent externalities produced thereby, raises the productivity of those activities, of cities, and hence of the national economy as a whole.

However, cities are not necessarily unconstrained loci of economic growth. The spatial concentration of economic activity in cities may also lead to various diseconomies, such as pollution, congestion costs, and the bidding up of land costs, house prices, and wages, all of which may impose limits not just to the growth of cities but also to their productivity and competitive advantages. Moreover, as some recent highly visible examples testify, cities can go into relative and even absolute decline. Many cities have experienced the economic decline and environmental run-down of particular neighbourhoods, both inner-city and suburban, leaving serious social problems in their wake; this was a major theme in Jane Jacob's other earlier classic work on the *Death and Life of Great American Cities* (Jacobs, 1961). But in some cases, whole cities have experienced a reversal in economic fortune. The most celebrated contemporary example is probably Detroit, once the centre of the US motor industry, if not the global car industry (Binelli, 2013). In 1913 Henry Ford began mass producing motor cars at his innovative Model T plant, transforming the city into the Silicon Valley of its day. By 1920 it was the fourth largest city in the United States, and by 1950 General Motors had become the world's largest employer. But from the 1960s onwards, with the combination of social upheavals, the search by the city's industry for cheaper labour and better tax breaks, industrial unrest, and urban planning problems, Detroit began to lose its industrial and economic dynamism. This process accelerated into the 1970s, 1980s and 1990s, so that by 2010 the population of Detroit had fallen from its peak of over 1.8 million to just over 713,000; between 2000 and 2010 its population shrank by a fifth. And in 2013, Detroit filed the largest municipal bankruptcy in US history. While Detroit is an extreme case of city decline, other examples, albeit less catastrophic, are not difficult to find. In the UK, Liverpool and Glasgow, both major port-cities that played a key role in Britain's 19thC economic supremacy and Imperial trade, lost that function and their competitive edge during the course of the 20thC and have struggled to regain their former economic prominence. There is in fact growing concern about what has become known as the 'shrinking city' phenomenon, as certain cities across the US, Europe and elsewhere appear to be declining in population and in economic growth (see for example, Wiechmann and Pallagst, 2012). How to manage this process, or perhaps stem or even reverse it, is now a problem attracting growing academic and policy attention.

But other cities show how a loss of economic and social momentum need not be permanent. There are examples of cities that have in effect 'reinvented' themselves, and found a new economic role and renewed economic dynamism. Glaeser's (2005a) study of the city of Boston in the US exemplifies this form of economic evolution. Boston has been able to survive and prosper despite repeated periods of crisis and decline. Boston has reinvented itself three times: in the early-19th century as the provider of seafaring human capital for a far flung maritime trading and fishing empire, in the late-19th century as a factory town built on immigrant labor and Brahmin capital, and finally in the late-20th century as a centre of the information economy. In all three instances, human capital – admittedly of radically different forms – provided the secret to Boston's 'rebirth'. Munich provides another case of rejuvenation following major shocks. Evans and Karecha (2014)

show how despite devastation in the Second World War, Munich recovered rapidly to become one of the fastest growing and most prosperous German cities, and though its economy seriously stalled and its population declined during the 1980s and 1990s, since then it has once again revived and out-performed the Germany economy as a whole.

The performance of a national economy will therefore largely reflect the performance of its individual cities, and how the economies of those cities develop and evolve will largely shape the future growth path of the national economy as a whole. Thus, to adapt Krugman's statement above, a particularly good way to understand the UK economy is by studying the UK's cities.

1.2 Aims and objectives: what the paper is, and is not

Accordingly, and in line with the brief for a 'backward-looking' paper on the patterns of economic growth across Britain's cities, the objective of this Working Paper is to chart and analyse the evolving comparative economic performance of the UK's main cities over recent decades, and to determine how growth paths have differed across cities. More specifically, the paper seeks to throw light on the following main (interrelated) issues:

- To what extent has economic growth differed from city to city across the UK over the past three decades or so? Key issues include whether London and the larger ('core') cities have grown faster than other, smaller cities, or vice versa; whether city growth trajectories been convergent or divergent over time; and how far city growth differences are persistent (that is, how path dependent they are).
- Does city size matter for economic growth? It is often argued that larger cities confer greater economies of agglomeration and increasing returns effects, and that, holding other things constant, these effects make for faster growth: in other words, that city size, agglomeration and growth form a process of circular and cumulative causation. Is it the case that the largest cities in Britain have been the growth leaders?
- How far has economic structure influenced city growth? It is widely claimed that specialisation is *the* motor of city growth. Is this true for UK cities? To what extent does economic structure and specialization explain differences in growth rates across British cities? Have city economic structures narrowed over recent decades?
- Since productivity is a key aspect of growth, and is often viewed as an indicator of 'competitiveness', how have British cities differed in their productivity performance over recent decades? Are British cities converging or diverging in terms of productivity?
- What are the implications of recent city growth trends for current debates over spatially 'rebalancing' the economy? Are recent trends in the economic growth paths of UK cities likely to continue?

To provide some answers to these questions, this paper constructs and analyses a time series data set for some 63 British cities for the period since 1981. The details of the data and the definition of the cities studied are given in Appendix A. The construction of these data has been a major part of the basic research undertaken for this Working Paper, with the express purpose of revealing and providing insight into the different growth performances and trajectories of the 63 cities. It is important in this context to emphasise that the aim of the paper is not to undertake a comprehensive quantitative analysis of the

determinants of the growth patterns so revealed: this is far beyond the remit of and resources available for this paper. Nor is it intended to be a synthesis, summary or evaluation of the existing voluminous literature in the field of urban economics. And yet further, it is not a case study of particular selected cities. Instead, its aim is to examine and compare growth trajectories across the UK urban system, as that system has been defined by the Foresight project. Before presenting this analysis, however, and in line with the original Foresight specification for this Working Paper, we give a brief (and thus necessarily superficial) history of the UK urban economy to provide some background context.

1.3 Britain's urban economy: a very brief and selective history

The origins of the UK's towns and cities reside in the distant past, as a system of market centres, trading posts, military settlements, and ports. It is not our purpose here to delve into those deep historical roots, but simply to note that the basic network of the UK's system of towns and cities can be traced back to Roman times, if not before, and that a distinct urban network and urban hierarchy was certainly well established by the beginning of the Middle Ages. Though subject to the vagaries of agricultural crises, plagues and civil war, this network remained largely unaltered right through to the 16th and 17th centuries.

Since then, and necessarily simplifying, three broad historical phases of urban economic growth and development might be distinguished (Table 1.1). The real growth and transformation of the UK's 'urban system' took place with the onset of the Industrial Revolution in the mid-18thC. By 1800, the invention of steam power radically improved Britain's core industries, especially the production of textiles, metalwork and other manufactured goods, and the mining of coal and other raw materials. By 1820 the potential of the steam engine as a viable source of power for ships, machinery and railway locomotives had been realised. These developments formed the basis for Britain's unprecedented economic growth over the rest of the 19thC, and its rise to world economic supremacy as a trading nation. They also fuelled a dramatic growth of the population living in towns and cities. This was the period when towns and cities assumed the key role as the drivers of national economic growth, when the previously dominant rural-agricultural economy gave way to a rapidly expanding urban-industrial economy. Different towns and cities came to have different types of industry, some because of 'first mover' advantages often associated with happenstance or serendipitous events or circumstances, some because of what economists call 'first nature' advantages, that is favourable geographical factors such as accessible harbours or proximity to specific natural resources (such as coal and iron ore), and still others because of so-called 'second nature' advantages, that is various externalities that develop through the process of localized economic specialisation itself and which reinforce a particular developmental path.

Thus during the course of the 19thC a distinct geography of urban industrial activity developed which reflected the inherent or acquired different comparative advantages of different towns and cities. Different regional and subregional groups of towns and cities become dependent on and propelled by particular types of industry. The most prominent such grouping was that of the Lancashire towns and cities. Lancashire had pioneered the factory production of textiles, helped by the combination of local coal to provide power, soft water, a damp climate, and the nearby ports of Liverpool and Manchester. By the mid-19thC the towns and cities of the region - especially Manchester, Liverpool, Bolton, Oldham, Blackburn, Preston and Burnley - accounted for two-thirds of world trade in

cotton goods, the source of more than a quarter of the nation's overseas earnings. Liverpool played a key role in this trade; indeed, in the early-19th century it claimed to be the second trading city of the Empire, after London. Meanwhile in West Yorkshire, a vibrant woollen industry was expanding, concentrated in centres such as Leeds, Wakefield, Halifax and Huddersfield.

Other industries also developed a distinct pattern of localised urban concentration. During the 19thC British shipbuilding came to dominate world production. At their peak just before the First World War, shipyards in Glasgow, Newcastle, Sunderland, Liverpool, London, Southampton, Portsmouth and Belfast built eight out of ten new ships in the world. Between 1870 and 1914, Glasgow alone produced almost one fifth of the world's ships.

Table 1.1: Two centuries of evolution of the urban economy: a stylised summary

	1800 Industrialisation	1900 Industrial Reorientation	1970 Post-Industrialisation	2000
Major economic development trends	<p>Industrial revolution, based on export driven Empire-orientated trade and commerce. Key staple sectors: coal, textiles, shipbuilding</p> <p>Leading technologies: steam, powered by coal; Electricity towards end of period. Development of railways</p> <p>Mounting international competition towards end of century</p> <p>Laissez faire state and free trade policy</p>	<p>Inter-war recessions and industries. Emergence and development of mass production manufacturing. New economic sectors based on consumer goods, motor vehicles, chemicals. Growth of public services</p> <p>Leading technologies: electricity, combustion engine, later electronics</p> <p>Long post-1945 boom assisted by regulated international financial system and Keynesian welfare state managed economy at home</p>	<p>De-industrialisation of economy sets in.</p> <p>Rapid growth of professional and business services. Accelerating globalization and financialisation of the economy. Succession of deep recessions</p> <p>Rapid technological change; micro-electronics, computers, internet, broadband</p> <p>Unraveling of post-war Keynesian welfare state model. Growth of neoliberal state stance</p>	
City economies	<p>Emergence of economically specialized towns and cities.</p> <p>Groups of towns and cities linked in regional production networks, orientated towards exports of goods (eg textiles), supply of raw materials (coal, iron) and means of transportation (ships, railways)</p>	<p>Interwar structural problems affect mainly northern towns and cities; London, and towns and cities in South East and Midlands attract bulk of new consumer goods industries</p> <p>Growth of cities as private and public service centres.</p>	<p>Deindustrialization of cities especially London and major conurbations, and subsequently spreading to smaller towns, especially in northern and midlands regions</p> <p>Shift to service based urban economies Increasing importance of cultural industries.</p> <p>Major expansion of London's role as national and global financial centre</p>	
City growth	<p>Rapid growth of population in towns and cities, including movement from rural hinterlands into urban areas</p> <p>Overcrowding in many industrialising towns and cities</p> <p>Emergence of a definite urban hierarchy, dominated by London.</p>	<p>Increasing interest in decentralizing population out of London.</p> <p>Net movement of population from northern towns and cities to southern England.</p> <p>In latter part of the period, population decline in most large conurbations, especially London.</p>	<p>Depopulation of major cities slows and some show renewed population growth, especially London.</p> <p>Policies to regenerate inner-city areas.</p> <p>Some smaller cities exhibit most rapid growth in population</p>	

In fact, most of the growth industries of the period depended directly or indirectly on cast iron, that staple of the Victorian era. From the machinery used in factories and mining, to the construction of bridges, to the building of ships and the railways, the new urbanised economy was forged in the iron works found in numerous towns and cities in the North West, West Midlands and Yorkshire-Humberside. The railways played a particularly

formative role. In 1825 the Stockton and Darlington Railway opened, followed by the Liverpool and Manchester Railway five years later. The age of the railway had begun, reducing transport times, lowering transport costs, consuming raw materials and stimulating investment in towns and cities. The railways transformed the connectivity between cities, dramatically increasing the movement of people and freight between them. They stimulated industry across the urban system, including the construction of extensive locomotive engineering works in centres such as York and Derby. Construction teams and British capital built railways throughout the Empire, and beyond, not only fuelling the British mechanical engineering industry, but helping to open huge and long lasting markets to British manufacturers more generally.

While the industrialisation of Britain's landscape during the 19thC stimulated the rapid growth of northern and Midlands towns and cities, its effects were also felt in southern parts of the country, and especially in London. By the start of the 19thC London was the world's largest port. Trade - much of it with the expanding Empire - grew throughout the century, stimulating factories, power stations and shipyards along the banks of the Thames. Other parts of the capital had accumulated a vast array of industries, including clothing and textiles, leather goods, food and drink, furniture making, light engineering, and shipbuilding. The city had already become the nation's financial capital, and one of the world's most important financial centres.¹ Up until the middle of the 19thC, the British banking system had been a regional and county-based system, but through merger, acquisition and amalgamation, and successive waves of local bank closures, by the end of the century most of the surviving major banks had become headquartered in London, where the primary institutions of the Bank of England, Lloyds Insurance and the main Stock Exchange had been established more than two centuries earlier.² Just as Britain was a leading industrial nation, so London was its largest centre of industry, finance commerce and services.

Britain thus entered the 20thC with an urban economy founded on more than a century of sustained industrialization and international economic leadership. Over the next four decades, however, a combination of forces and events wrought major changes to this system. Even before the end of the 19thC several of the Victorian staple industries, and the towns and cities that housed them, had begun to experience the first winds of international competition, notably from the United States, Germany and Japan. The deep economic recessions of 1922-24 and 1929-32 merely compounded the structural pressures on these industries, resulting in massive increases in unemployment, poverty and social unrest in many northern towns and cities. Meanwhile, a 'new economy', based around new mass consumer goods and new methods of production was emerging. The importation of mass assembly production methods transformed the British car industry between the Wars, leading to the construction of large scale plants and associated components supplier networks in Manchester (Ford), Cowley near Oxford (Morris), in the West Midlands towns of Longbridge (Austin) and Coventry (Rootes and Standard), and in Dagenham in Essex (Ford). The electrical, clothing and furniture industries also expanded, particularly in and around London.

¹ In the 18thC London ranked alongside Amsterdam and Paris as a leading international financial centre. In the 19th, Amsterdam had been overtaken by Berlin and New York, but London retained its prominent position, while in the 20thC the international financial system became organized through and controlled largely by London, New York and Tokyo.

² The Bank of England was established in 1688, Lloyds Insurance in 1694, and the London Stock Exchange in 1698. In fact these institutions had their predecessors in the Royal Exchange that was established in London in 1591.

Indeed, between 1919 and 1939, London alone attracted half of all new manufacturing establishments in these and related sectors, with other concentrations in the nearby towns of Slough, Welwyn and Watford (Hall, 1962; Scott, 2007). Meanwhile, London's dominant position in Britain's urban hierarchy, its high concentration of wealthy individuals, its roles as Britain's national and Imperial capital and main port for international trade, its highly developed service sector, and its strong nodality with respect to inland transport and distribution networks, all gave it markedly strong market access advantages. While towns and cities in southern Britain did not escape the economic uncertainties and disruptions of the inter-wars years, they fared far better than those in northern regions: a major historical and geographical shift in urban economic dynamism, from northern to southern cities, had begun - what Scott (2007) has termed the 'triumph of the South'.

This southwards geographical shift, and especially the concentration of economic activity and population in London, had already given rise to concern over what some saw as a growing spatial imbalance in the geographical organization of the national economy. The famous Barlow Commission Report (1940) was quite emphatic and not a little controversial in its views about this imbalance:

"The contribution in one area of such a large proportion of the national population as is contained in Greater London, and the attraction to the Metropolis of the best industrial, financial, commercial and general ability, represents a serious drain on the rest of the country." (para 171)

This report had a major influence on the new regional policy model introduced by the Labour Government in 1945, one of the aims of which was to divert economic activity and population away from London and other towns and cities in the south and Midlands of Britain towards towns and cities in the designated 'depressed' or Assisted areas in the North West, North East, South Wales and Central Scotland. The main mechanism used to divert investment from southern cities to those in the northern Assisted areas was the controversial Industrial Development Certificate, which effectively restricted new manufacturing investment and factory expansions in the south. From the mid-1970s onwards, however, as deindustrialization set in, and the volume of new potentially 'footloose' manufacturing investment declined nationally, so the impact of the policy slackened substantially.

There were also a number of other policies from the late 1940s onwards that began to affect the economic development of cities in both the north and south of the United Kingdom. Urban spatial policy, like regional policy, followed closely the thinking behind the Barlow Report with an emphasis on constraining city expansion through Green Belts and accommodating new growth in New Towns and overspill developments in the hinterlands around selected cities. For much of the period up until the late 1970s there was an extensive policy focus on improving the quality of housing in the cities, particularly the inner areas. This was coupled with much new urban transport infrastructure that sought to accommodate the virtually insatiable demand of motorists for urban road space. It was not until the *White Paper on Policy for the Inner Cities* (Department of the Environment, 1977), which highlighted the economic decline of Britain's inner cities, that an era of urban policy began, this time concerned with bringing economic growth back into the cities.

Little is known as to how much urban and regional policy tended to reduce the growth of London, Birmingham and other cities in the South of England and how much it benefited cities in the North over the period up until the late 1970s when both policies were dramatically reduced in their intensity. Estimates of the numbers of jobs diverted by

regional policy away from southern cities to northern regions vary, but most suggest that between 1960 and 1981, as many as 500,000 jobs may have been involved (Moore, Rhodes and Tyler, 1987). In fact, major cities across the UK were losing manufacturing firms. As Gudgin, Moore and Rhodes (1982) observed for 1948-1975 period, “whereas over 1000 firms moved into the six main conurbations (Glasgow, Newcastle, Liverpool, Manchester, Birmingham and London), over 300,000 moved out”. They estimated this to be equivalent to about a quarter to a third of the total manufacturing job losses from the conurbations over this period.

In any case, by the late-1960s, the economic problems that had remained largely hidden in many of the UK’s cities began to (re)surface with the onset of an historic process of deindustrialization (Martin and Rowthorn, 1986). Nationally, from its historical peak of 11.5 million in 1966, industrial employment began a process of relentless decline that has continued to the present day (2.9 million). Deindustrialization has both ‘positive’ and negative dimensions. On the ‘positive’ side, it reflects a developmental tendency observed in most advanced economies whereby technological advances enable manufacturing firms to increase production with fewer workers; that is, it is a consequence of rising productivity. Deindustrialization does not necessarily pose a problem if output continues to grow fast enough to support a country’s balance of trade, and if services expand fast enough to ensure full employment. In the UK, however, this was arguably not the case. From the late-1960s onwards, Britain experienced a rate of deindustrialization faster than almost every other advanced economy, and many observers attribute this as much to inherent weaknesses in manufacturing as to ‘positive’ (productivity) aspects of deindustrialization (Rowthorn, 1986).

Table 1.2: Deindustrialisation and the cities: manufacturing employment change, 1960-1978

	As percent of 1960 Employment
London	-42.5
Conurbations	-26.5
Free-Standing Cities	-13.8
Large Towns	-2.2
Small Towns	15.7
Rural Areas	38.0
Great Britain	-11.5

Notes:

- Conurbations: Manchester, Merseyside, Clydeside, West Yorkshire, Tyneside, West Midlands
 - Free-standing cities: Other cities with populations of more than 250,000
 - Large towns: Towns or cities with populations of 100,000 to 250,000
 - Small towns: Districts with at least one town with population of 35,000 to 100,000
 - Rural areas: Districts in which all settlements have a population of less than 35,000
- Source: Fothergill, Gudgin, Kitson and Monk (1986)

The key point is that by the end of the 1970s, deindustrialization had become a distinctive feature of the UK’s major conurbations and cities (Table 1.2): London lost over 40 percent of its manufacturing jobs between 1960-1978, and between them, the other six major conurbations – all of which had been leading centres of industrial growth in the

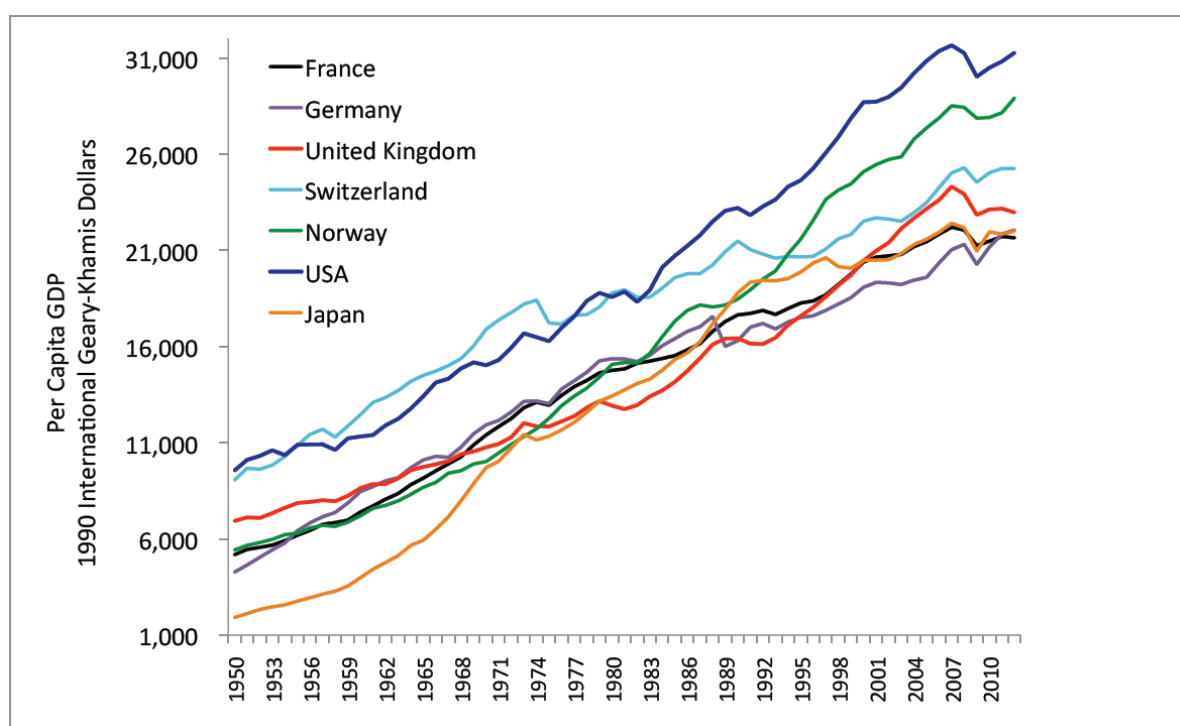
19th century - lost over 25 percent of their employment in manufacturing. What little growth in manufacturing employment that occurred over this period was to be found in small towns and 'greenfield' rural areas, leading some observers to talk of an 'urban-rural shift'. Some authors attributed this shift to a decline in the attractiveness of cities for industrial activity, and in particular to the high costs and space constraints in densely developed urban locations (Fothergill and Gudgin, 1982; Tyler, Moore, Rhodes, 1988), others to urban-rural differences in the enterprising behaviour of firms (Keeble and Tyler, 1995). No doubt these and related factors played some role. But the fact of the matter is that by the end of the 1970s a major historical re-orientation of Western capitalism had begun, driven by changes in consumer demand, the rise of new international (and lower cost) competitors, technological advances, and emergent processes of globalization and financialisation. Since the late-1970s, and in common with other Western nations, the UK has been undergoing a fundamental transition to a 'post-industrial', information-based, service economy (Turner, 1995; Kellner and Young, 2001; Wadhvani, 2002; Martin, 2006a). The UK's cities, like those in other advanced economies, have lost their traditional role as powerhouses of manufacturing activity, and their prosperity now and into the future will depend on finding a new role in this latest phase in the evolution of capitalism. It is against this background and these trends that we now turn to a detailed investigation of what has been happening to the economic growth performances of UK cities over the past three decades or so.

2. Recent city growth evolutions

2.1 The national growth context

The period covered by our analysis, 1981-2011 is a period in which the growth dynamic of the national economy appears to have changed. Although the three decades from just after the Second World War up to the early-1970s – often labeled a ‘post-war golden age’ - were years of steady and sustained economic growth with only mild recessions, the UK’s growth rate actually lagged behind that of other advanced economies (Figure 2.1), with the result that the country slipped down the international league table of per capita GDP. But after 1980, and certainly up to 2007, the UK’s average growth rate relative to that of several of its competitors improved somewhat (the growth rate of those competitors slowed below that of the UK), so that its position actually improved (Figure 2.1). At the same time, however, this comparative improvement in growth has been characterized by a marked increase in its cyclicality, with one phase of growth following the deep recession of 1980-82 and another phase following the deep recession of 1990-92. Whether or not this second phase, which lasted from 1992 to 2007, was indeed the longest ‘NICE’ (‘non-inflationary continuous expansion’) period on record, as some claimed, the idea that it signaled the ‘end of boom and bust’, as was also claimed, unfortunately tempted fate too far: the deep contraction that hit the economy in 2008, triggered by the banking crisis, brought the ‘longest boom’ on record’ to an abrupt halt. Recovery from this last recession has been a protracted process.³

Figure 2.1: The growth of per capita GDP in the UK, 1950-2012, in international context



Source of data: The Conference Board Total Economy Database, Groningen Growth and Development Centre (www.conference-board.org/data/economydatabase/)

³ The fall in output in the recession of 2008-2010 was the worst since that in the Great Depression of 1929-32. In fact, the recovery from the 2008-2010 contraction has been the slowest on historical record, far slower than the recovery from the Great Depression. It has taken six years for output to return to its pre-recession peak in 2008.

Among the issues raised in the debates surrounding the causes, consequences and solution to the economic crisis of the past five years, is the argument that economic growth in the UK, especially over the 1993-2008 period, had become too spatially and sectorally unbalanced. The concern is that economic growth has become too dependent on London and the South East of England, that northern regions and cities have been lagging behind, and that this imbalance in the economic landscape has become a source of instability.⁴ So how have the UK's cities performed economically over the past 30 years or so?

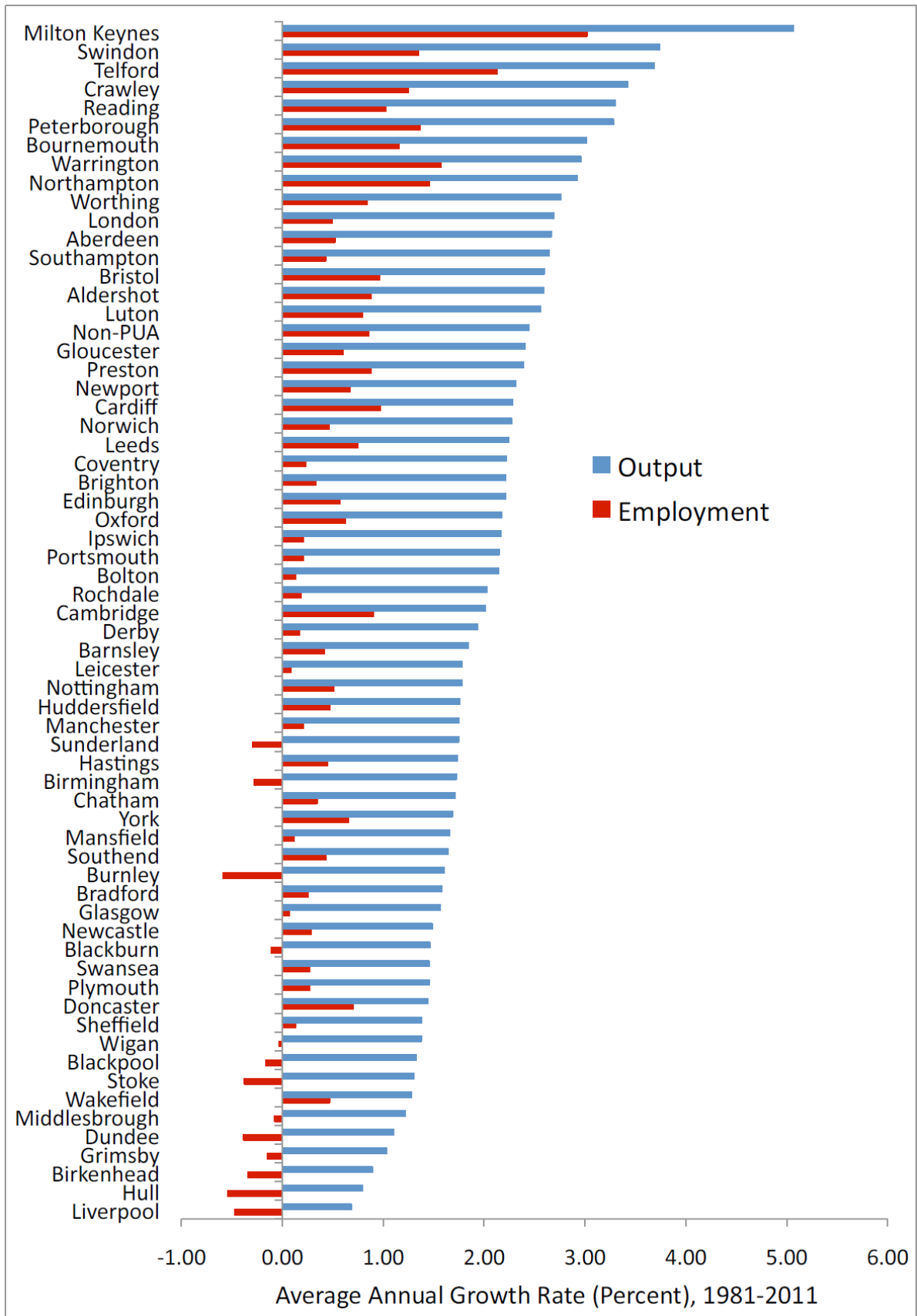
2.2 Economic growth across the urban system

Our analysis is based on a time series data set we have constructed for UK cities as defined by the 'primary urban areas' (PUAs), as identified by the Centre for Cities, and which have been adopted by the Foresight 'Future of Cities' programme as the basis for much of its analysis. These PUAs, it should be noted, are not necessarily functional economic areas, like, for example, travel-to-work areas (see for example, Cheshire and Magrini, 2009), but rather refer to the 'built-up' areas (based on contiguous local authority districts) of the cities concerned. As a result, some PUAs will underbound cities defined, say, on a functional travel-to-work basis. However, travel-to-work areas have their own problems and limitations (see Appendix for discussion), not least the fact that constructing time series data of the sort we use here would involve very considerable effort, and indeed would itself almost certainly necessitate approximation, again using local authority districts. Nevertheless, the limitations associated with PUAs need to be born in mind in what follows. The details of the data constructed for the system of PUAs are described in the Appendix. The series refer principally to annual estimates of workplace employment and output (real Gross Value Added), and hence by derivation a measure of productivity, that is output perworker employed, for some 46 major sectors of economic activity, for 63 PUAs, for the period 1981 to 2011.⁵ These series afford a means by which to examine the growth trajectories and economic performance of these PUAs over what, as described above, has been, and still is, an era of dramatic change in the national economy.

⁴ "Our economy has become more and more unbalanced, with our fortunes hitched to a few industries in one corner of the country, while we let other sectors like manufacturing slide..." (David Cameron, Prime Minister, 2010); "For years, our prosperity has been pinned on financial wizardry in London's Square Mile, with other sectors and other regions left behind. That imbalance left us hugely exposed when the banking crisis hit.... We need to spread growth across the whole country and across all sectors" (Nick Clegg, Deputy Prime Minister, 2010).

⁵ The Centre for Cities defines 64 PUAs in the United Kingdom. Unfortunately, it was not possible to construct comparable and reliable time series data for the Belfast PUA, and so this city has been excluded from our analysis (which throughout the paper is therefore for 63 PUAs). This is regrettable but necessary for statistical consistency. Thus where we refer to the 'national average', it is usually the Great Britain average which is being used.

**Figure 2.2 Economic Growth (Output and Employment) Across UK Cities
(63 PUAs), 1981-2011
(Average Annual Percentage Change)**



Source of Data: See Appendix

Note: Output is Gross Value Added at constant 2009 Prices

Figure 2.2 ranks our 63 cities according to their average annual growth rates of output (real gross value added) over the entire 1981-2011 period, and also shows their corresponding average annual growth rates of total employment. The striking feature is just how far British cities have varied in economic performance over the past thirty years or so. At one end of the spectrum are the fastest growing cities of Milton Keynes, Swindon, Telford, Crawley, Reading, Peterborough, Bournemouth, Warrington and Northampton, all with an average annual growth rate of output of 2.9 percent or more. Significantly, most of these are centres that were designated as new, expanded or overspill towns, mainly in the late-1960s or 1970s, and which have benefited from explicit growth and development strategies, implemented by dedicated institutional bodies (both central and local). These cities exemplify what can be achieved by purposive intervention involving the spatially integrated provision of housing, infrastructure and sites and premises for industry and other activities. At the other end of the distribution are Liverpool, Hull, Birkenhead, Grimsby, Dundee, Middlesbrough, Wakefield, Stoke, Blackpool, Wigan, Sheffield and Doncaster all of which grew at or around only half that rate (1.45 percent per annum). These are all old industrial or service centres that in the beginning of our study period had ageing infrastructures and housing stocks. Those cities that have grown fastest in terms of output have tended to be those that have also seen the fastest growth in jobs over the three decade period, and conversely those that have registered the slowest rates of economic growth have seen the smallest increases in their employment base (Figure 2.3). Successful cities, in other words, are those that not only have a higher rate of wealth creation, but also of job creation. Cities that lag in wealth creation (output growth) tend also to create fewer jobs.

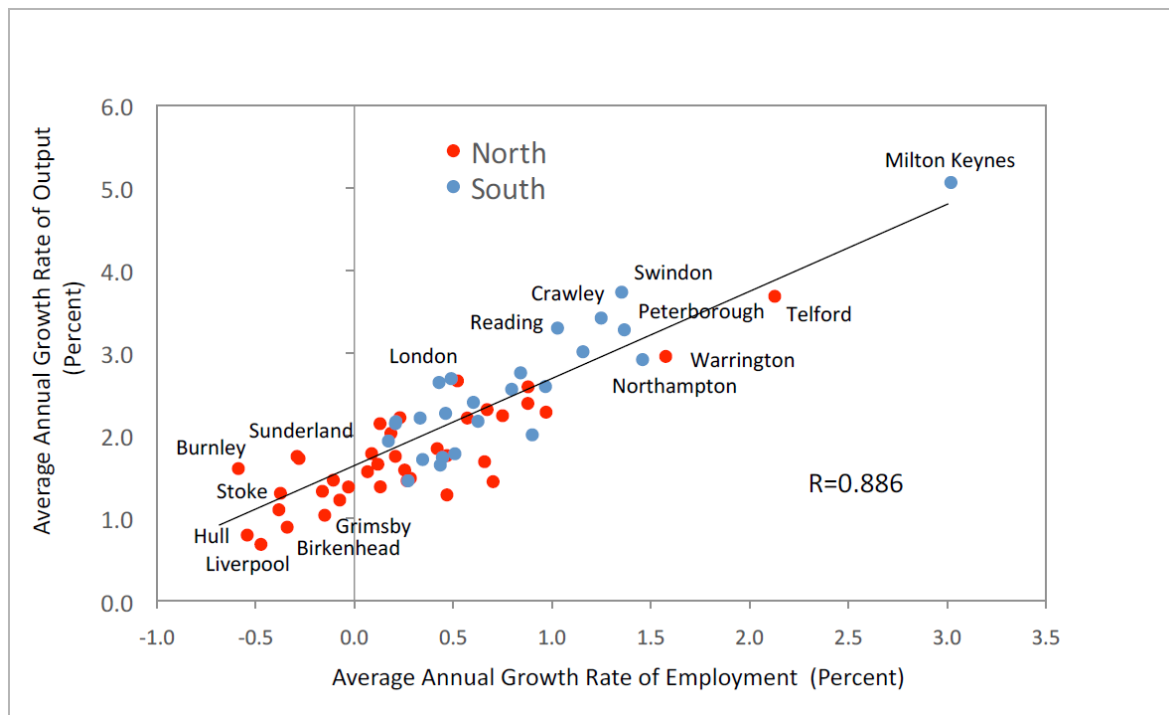
2.3 Convergence or divergence in city growth paths?

These differences across cities in overall growth rates suggest that individual cities have been following quite different growth paths over the past 30 or so years. One way of showing these paths is by means of cumulative differential growth evolutions, a method used to striking effect by Blanchard and Katz (1992) in their seminal paper on regional economic growth in post-war USA (see also Gardiner, Martin, Sunley and Tyler, 2013). This procedure plots the cumulative sum, year by year, of the difference between the percentage growth rate of a given city i in a given year t , g_i^t , and the corresponding growth rate of the national economy (here Great Britain as a whole), g_N^t , so that for any year $t+k$ the cumulative growth differential up to that point is expressed as

$$Cumdiffg_i^{t+k} = \sum_{j=1}^k (g_i^{t+j} - g_N^{t+j})$$

The advantage of this simple measure is that it shows how a city's differential growth path (of output, or employment) has evolved and changed over time: for example, it can reveal not only persistent trends in the relative growth of paths of cities, but also any changes in direction or 'turnarounds' in a city's relative growth trajectory.

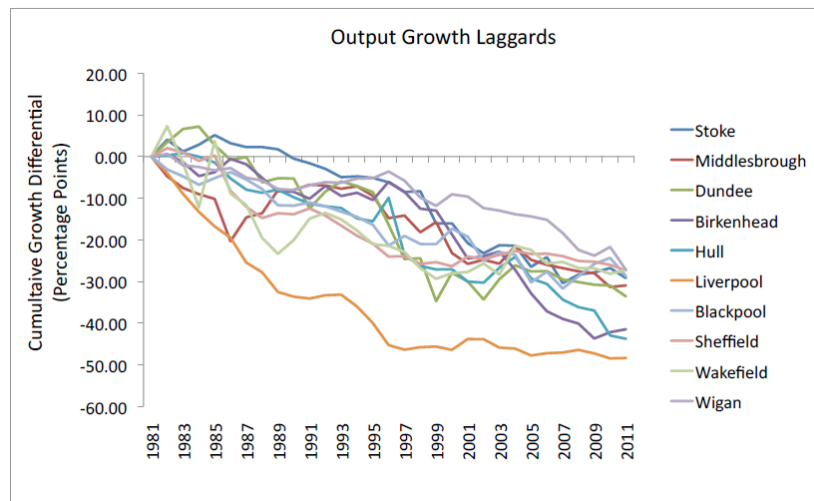
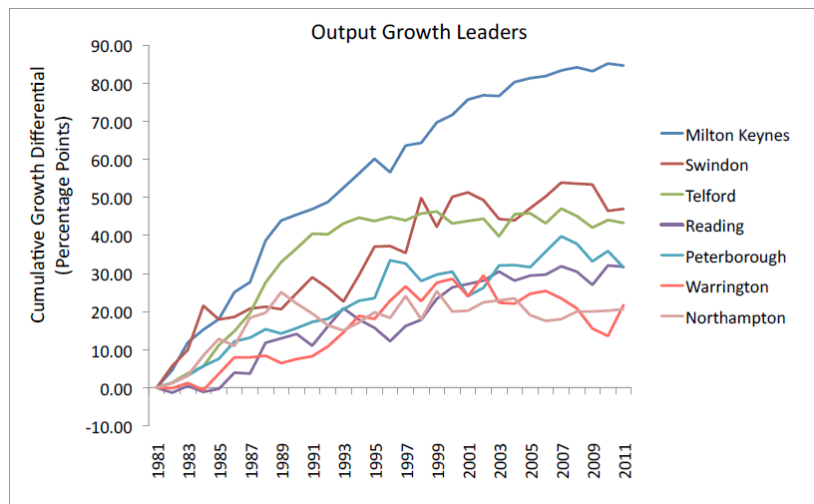
**Figure 2.3: Relationship between output growth and employment growth across British cities, classified into north and south:
(Average Annual Growth Rates for 1981-2011)**



Source of Data: See Appendix

Figure 2.4 plots the evolving cumulative growth differentials of real GVA for the fastest growing cities ('growth leaders'), and the slowest growing cities ('growth laggards'). The former are those cities in which real GVA grew by 20 percentage points or more *above* the GB average over the whole 1981-2011 period, and the latter those in which real GVA grew by 25 percentage points or more *below* the GB average. Figure 2.5 shows the corresponding plots for employment growth: for those cities with a cumulative differential growth in jobs of 15 percentage points or more above the Great Britain rate, and those cities in which employment grew by 25 or more percentage points less than the nation as a whole.

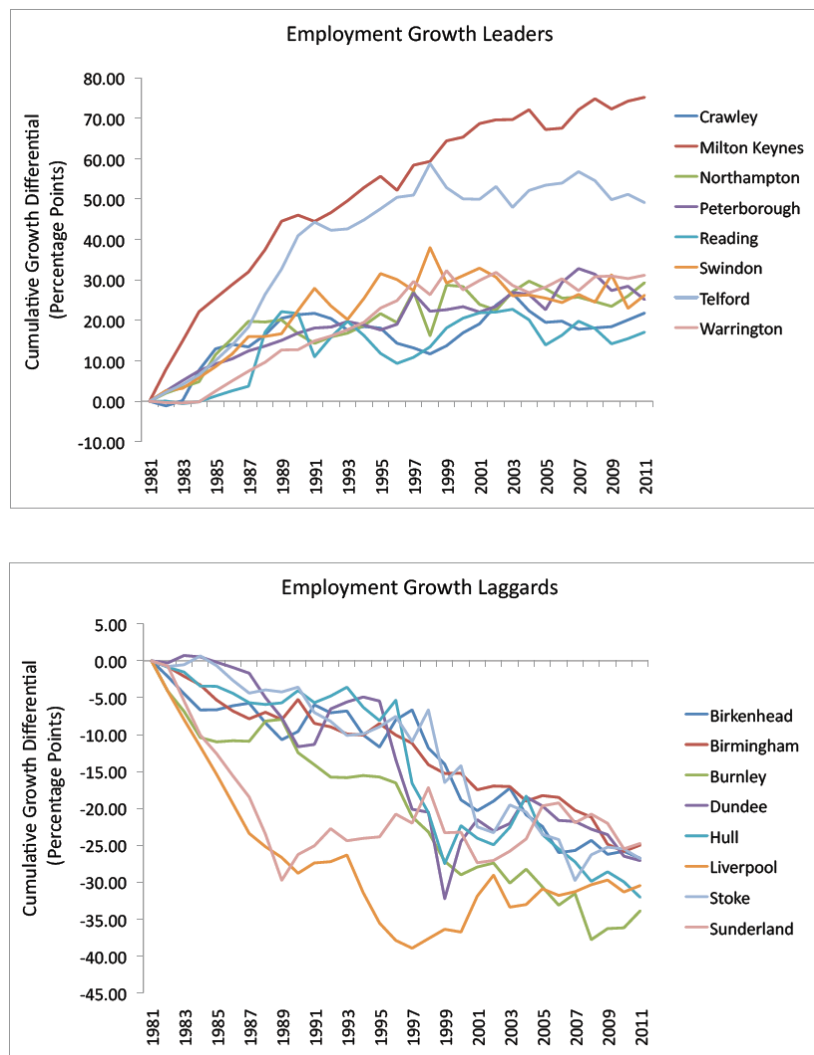
Figure 2.4: Cumulative differential output growth paths: fastest and slowest growing cities (GVA in 2009 prices), 1981-2011



Source of Data: See Appendix

Two key features stand out from Figures 2.4 and 2.5. The first is that, as expected from Figure 2.3, there is a close correspondence between the growth-leading and growth-lagging cities as measured by output, and those as measured by employment. Second, while there has been much debate surrounding the existence and extent of a 'North-South Divide' in the country's economic landscape (see Martin, 2004, for an overview), the cumulative differential growth performances of the nation's cities certainly do seem to map out a broad geographical division of this sort. Third, what is also evident is that much of the divergence between the fastest and slowest growth groups of cities occurred during the 1980s and 1990s. Since then, the growth rates among the 'growth leaders' (both in output and employment) have attenuated, so that their cumulative growth advantages has tended to stabilise. The majority of the slowest growing cities ('growth laggards'), however, have experienced a consistent pattern of slower growth over the entire period. The exceptions are Liverpool and Sunderland. Liverpool had the lowest rate of output and employment growth of any of our study cities during the 1980s and first half of the 1990s, but since then its growth has been more or less the same as the national average, so that its cumulative growth disadvantages in output and employment have at least stopped increasing. The same happened to Sunderland's relative employment growth path from the beginning of the 1990s onwards.

Figure 2.5: Cumulative differential employment growth paths: fastest and slowest growing cities (GVA in 2009 prices), 1981-2011



Source of Data: See Appendix

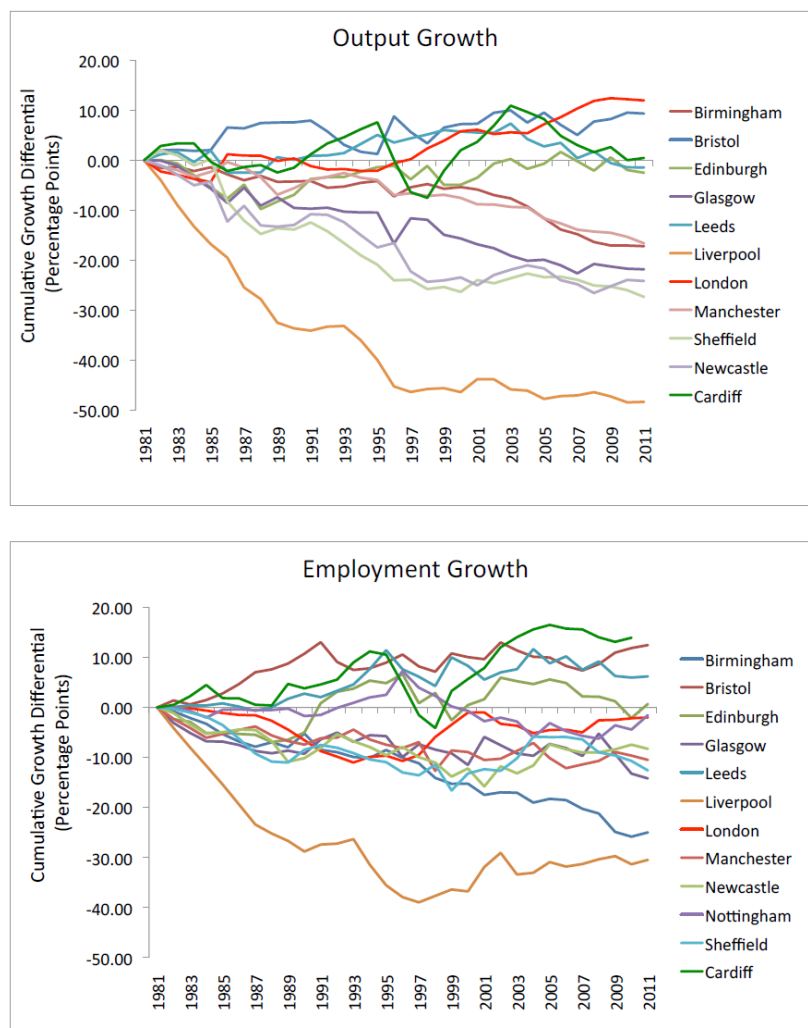
It is also instructive to examine certain other cities. London and the eight so-called English 'core cities' are of particular interest. These cities, together with Scotland's core cities of Edinburgh and Glasgow, and Cardiff in Wales, currently account for about 40 percent of British gross value added. As such their economic performance obviously has a major bearing on that of the national economy as a whole. London's role has attracted special attention in this respect. During the 'long boom' of 1992-2007, London was singled out by observers and Governments alike as the 'dynamo' of the UK economy, and a source of vital foreign earnings, tax contributions to the public finances, and of demand for goods and services from across the rest of the country.⁶ In their study of regional growth paths in the UK since 1971, Gardiner, Martin, Sunley and Tyler (2013), and Martin (2013), show how up until the early-1990s, London's economic growth (in terms of both output and employment) actually lagged behind that of the nation as a whole. A turnaround in London's differential growth performance then occurred, fuelled by the dramatic expansion of financial and knowledge intensive business services, and its growth rate overtook that of the national economy. This turnaround is clearly evident

⁶ Indeed, such was the apparently unstoppable success of London's financial services based economy that Gordon Brown, as Chancellor of the Exchequer, repeatedly celebrated the city's growth, claiming it to be a shining example of what a highly skilled, high value added, talent driven workforce could do (Brown, Mansion House Speech, 20 June, 2007).

in Figure 2.6. By 2011, and even allowing for the financial crisis of 2007-2008 and the recession of 2008-2010, London's output growth rate had pulled well ahead of all of the core cities, with the exception of Bristol, and its employment growth had also improved noticeably. As for the rest of the core cities, only Edinburgh, Leeds and Cardiff have kept pace with the national growth rates of output and employment. The remaining cities have consistently underperformed, and have fallen progressively behind the rest of the national economy. Cumulative underperformance has been especially marked in Birmingham, Glasgow and Sheffield, and acutely so in Liverpool. Even Manchester, often regarded as the UK's 'second city', has in fact lagged national growth over the past 30 years, taken as a whole.

The significance of using cumulative differential growth paths to chart city output and employment evolutions is that these indicate the sheer scale of the growth gaps that have opened up between British cities over recent decades. Thus to take the extreme cases in Figure 2.4, between 1981 and 2011 a growth gap of some 130 percentage points had accumulated between Milton Keynes at the top of the growth league table, and Liverpool at the bottom. Put another way, if Liverpool's economy had consistently grown at the same rate as that of Milton Keynes over the 30-year period, by 2011 its real GVA would have been more than double what it actually was. Figures 2.4 and 2.5 indicate that the 'catch-up' task facing many of Britain's lagging cities is a daunting one.

Figure 2.6: Cumulative differential growth paths of London, the English core cities, Edinburgh, Glasgow and Cardiff, 1981-2011



Source of Data: See Appendix

3. What determines city growth?

3.1 Dominant theoretical perspectives

What explains these marked and sustained variations in economic growth across UK cities over the past three decades or so? What does theory have to say on the economic growth of cities? Over the past thirty years a truly vast corpus of literature has emerged on city economies, under the aegis of the New Neoclassical Urban Economics, the New Economic Geography, Regional Science, and related disciplines. The New Neoclassical Urban Economics, for example, has constructed sophisticated models, and marshalled a growing body of econometric analysis, on the internal spatial structures of cities, on land prices within cities, on city sizes, on the forces driving the spatial concentration of people and firms in cities, on identifying externalities and agglomeration economies in cities, and on the patterns of industry location and wage differentials across urban systems. A not dissimilar set of issues has also attracted attention within the New Economic Geography. It is not possible to summarise or assess this enormous literature here, but certain key themes are certainly relevant, namely: agglomeration economies and increasing returns effects; the role of economic structure, and especially specialisation versus diversity; human capital, including creative labour; and institutions and the form of economic governance. Although often discussed and analysed separately in the literature (a notable exception is Ahrend et al, 2014), in reality these various factors or determinants interact in complex ways: thus a city's particular mix of industries will shape the nature of its agglomeration externalities, the skill profile of its workforce, its enterprise culture, and even the sort of institutions (for example trade associations) that develop there. It is this complexity that makes it difficult to formulate any single, comprehensive model of city growth.

3.2 Agglomeration and increasing returns

What holds a city together? And why are the locations of cities so persistent, even though both individuals and firms continually turn over? The answer normally found in the literature is that cities form, grow and survive because of agglomeration economies, in which spatial concentration itself creates the favourable economic (and social) environment that supports further or continued concentration and growth (Glaeser, 2008). There is of course an element of circularity, of assuming one's conclusions, in attributing cities to the existence of agglomeration economies: 'agglomerations exist because of agglomeration economies and the latter exist because cities are agglomerations'. The basic contention, however, is that the spatial agglomeration of people and firms in cities gives rise to various positive externalities that are a source of increasing returns and hence competitive advantage to the activities located there. Economists have long discussed the possibility of increasing returns to scale within firms and industries, but the idea that the spatial agglomeration of activity may be a source of external increasing returns also has a well established pedigree, going back to Alfred Marshall (1920) if not earlier. And in recent years, interest in the external economies and increasing returns effects that allegedly accrue from the spatial concentration and localisation of activity has expanded apace (see, for example, Fujita, Krugman and Venables, 1999; Fujita and Thisse, 2002; Baldwin et al., 2003; Rosenthal and Strange, 2003, 2004; Duranton and Puga, 2004; Graham, 2007; Greenstone, Hornbeck and Moretti, 2010; Coombes, Duranton and Gobillon, 2011; Coombes, Duranton, Gobillon, Puga and Roux, 2012).

So what are these increasing returns effects generated by the spatial agglomeration of economic activity in cities? Essentially they relate to various attributes that arise at the level of city as a whole from the myriad actions and interactions of spatially proximate individual economic agents (firms, workers and consumers), which attributes, while external to those agents, then influence in positive ways those very actions and interactions. In the parlance of complex systems theory, such external economies or increasing returns effects are 'emergent' macro-level phenomena emanating from the behaviours and interactions of micro-level components, on which those emergent phenomena then exert 'downward causation'. Alfred Marshall (1920) in his work on British industrial districts in the 19thC identified three such external economies of localization: the building up of a pool of specialized and skilled labour, on which local firms could draw; the emergence of specialized suppliers and intermediaries, serving those firms; and the creation of a local pool of knowledge and know-how, what he called an 'industrial atmosphere', or 'something in the air', that shapes the production activities and the business practices and confidences of local firms. Since then, Marshall's triad of externalities has been elaborated by numerous authors, and now includes innovation spillovers, local supply-chains and networks, dedicated institutions, social capital, and local business and enterprise cultures. Geographers talk about the local 'buzz' generated by the social and economic interactions in cities (see Storper, 2013). New Economic Geography models emphasise the 'home market effects' associated with the concentration of large numbers of consumers in cities.

In much of this body of literature the argument (or assumption) is that these externalities and the increasing returns effects they generate help to stimulate a process of cumulative and circular growth which increases productivity, which in turn increases competitiveness and hence exports, and thence more output growth. Further, a high rate of growth makes a city attractive to both labour and capital inflows from elsewhere (both domestically and overseas). Thus buoyant employment prospects and high wages (permitted by high productivity growth) will draw in workers from other parts of the national economy, and potentially from other countries. Such inflows are argued to involve selection and sorting effects, such that the more skilled, enterprising and creative workers in particular are attracted to cities. Likewise, a high rate of growth will attract capital funds, again from domestic and international sources, in search of high returns. In effect, such inflows act to raise the 'growth ceiling' of the city in question, when otherwise it might encounter supply-side constraints to its growth.

Two implications or predictions can be drawn from the literature concerning the impact of agglomeration, first that agglomeration economies lead to a higher level of productivity, and second, that because of the increasing returns effects to which agglomeration gives rise, city growth is likely to be a self-reinforcing process. The evidence on these issues is not, however, unequivocal. Much of the empirical work on agglomeration and city performance is cross sectional, for example linking agglomeration and productivity and wage levels across a sample of cities at a given period, and is heavily inflected with equilibrium assumptions and modeling. By comparison, there is much less on how agglomeration and growth interact and change over time, that is on long-run dynamics. The issue is akin to the distinction between static and dynamic increasing returns. Agglomeration economies will be dependent on the sort of activities carried out in a city, and as different activities wax and wane, so the externalities associated with agglomeration may likewise change. In an interesting paper, Potter and Watts (2011) find that agglomeration economies in cities may shift from being positive to negative as the industries involved themselves undergo evolutionary life cycles. Thus a city that experiences sustained deindustrialization is likely to find that the positive externalities that had developed around its manufacturing base likewise decline. It may well be that

cities have to 'rebuild' agglomeration economies from time to time, as their economic structures change. We know little about the long-run dynamic evolution of agglomeration economies.

Similarly, agglomeration may over time lead to the build up of negative externalities or diseconomies. A high density of activity and population in a city generates various diseconomies, such as congestion, environmental degradation (for example air pollution), high wage and land costs, and high house prices (Coombes, Duranton and Gobillon, 2012). In New Economic Geography models, the tradeoff between the positive and negative externalities of agglomeration influences the shape of the relationship between agglomeration and growth, so that growth increases at low to medium spatial concentration of activity, but decreases at high levels of concentration. These models also point to the possible negative 'market crowding' effects of agglomeration. In short, increasing agglomeration does not necessarily map into ever-higher growth: 'bigger is not necessarily best'.

3.3 Economic structure and city growth: specialisation or diversity?

There has long been an ongoing debate about whether specialisation is a good thing when it comes to a city's long-run performance and ability to withstand shocks, that is, its resilience.⁷ Generally speaking, the debate revolves around two types of externality: Marshallian (Marshall, 1920) and Jacobsian (Jacobs, 1969). Marshallian externalities are those that arise from local industrial specialization, and as mentioned above, three such externalities are typically emphasized. The Marshallian 'specialization externalities' thesis asserts that cities with production structures orientated towards a particular industry will be more innovative because localized specialisation allows and promotes knowledge and techniques to spill over between similar, related, firms (see Altunbas, Jones and Thornton, 2012).⁸ Jacobs externalities are said to characterise cities with more diversified economies, and have to do with the scope and opportunities for interaction and knowledge spillover between complementary industries and sectors of activity. The argument is that exchange of complementary knowledge across diverse firms and economic agents within an urban agglomeration facilitates search and experimentation in innovation. Therefore, a diversified local production structure leads to increasing returns and gives rise to urbanization or 'diversification' externalities.

At the same time, both types of city economy have potential disadvantages (Table 3.1) (see also van der Panne, 2004; Farhauer and Kröll, 2012). Thus a specialised city is likely to be more vulnerable to idiosyncratic industry-specific shocks, and possibly also to the onset of negative path dependent 'lock-in' (see below) whereby a high degree of technological or production 'interrelatedness' amongst firms (caused, for example by imitation of techniques, or a complex horizontal inter-firm division of labour) may

⁷ For a detailed of the notion of resilience in relation to regional and city economies, see Martin and Sunley (2014)

⁸ Marshallian externalities are now generally referred to as Marshall-Arrow-Romer (MAR) externalities, on account of the subsequent elaborations of Marshall's original argument by Arrow (1962) and Romer (1986). Glaeser et al (1992) formalized the MAR model in relation to cities. Spillovers of knowledge between local firms in a given industry can arise for various reasons, for example as a result of direct forward and backward supply chain linkages among firms involved in a horizontal division of labour in the industry in question, from inter-firm movements of workers who carry knowledge with them, or from joint firm collaborative activities in the development of new processes or products, to name but some.

eventually hinder innovation, and slow down adaptation in the face of external competition.

Table 3.1 Specialised versus diversified cities

Specialised Cities (Marshallian Externalities)	Diversified Cities (Jacobs Externalities)
Advantages	
Specialised pool of labour Development of specialised knowledge base and inter-firm knowledge spillovers	Access to wide pool of labour skills and talent Cross-fertilisation of ideas across different sectors can lead to knowledge spillovers and product innovations
Presence of up and downstream firms	Diversity (variety) offers market scope for new ventures and suppliers
Tend to be smaller, hence less crowding costs	Better able to withstand shocks (diversity or 'modularity' acts as buffer)
Sector-specific institutions	Tend to be larger, and hence offer a significant 'home market'
Disadvantages	
More risk from adverse shocks, especially in mono-sector cities	Tend to be larger, leading to higher production costs (wages and land)
Prone to path dependent lock-in (eg because of technological relatedness of firms, imitative innovation, or dense input-output relationships)	

The net result of these different advantage and disadvantages is hard to gauge. Most arguments point in favour of stronger productivity growth in specialized cities where Marshallian externalities dominate, although the variance of this growth is likely to be higher as specialized cities are both more prone to, and less able to absorb, shocks. However, much is dependent on the time span being analysed, as it is possible that over any given period the shocks might not be random, but biased in favour of certain sectors due to emerging trends such as globalization, technology, financial services liberalization, and so on. Thus it becomes difficult to say much from the theory alone. Further, the empirical evidence in support of specialisation or diversity is mixed, and again is influenced by the level of sectoral disaggregation permitted by available data, and the particular measure of specialization or diversity (variety) employed. The evidence remains inconclusive as to whether Marshallian specialization or Jacobian diversification externalities are the more conducive to innovation and growth. Several studies report evidence of both types of externalities. Nevertheless, some observers are quite emphatic about the advantages of specialisation: according to Storper (2013) for example, specialization is *the* motor of city growth.

Others, however, argue that the distinction between Marshallian specialisation and Jacobs diversification is in fact too stark. Farhauer and Kröll (2012), for example, argue in favour of a third type, 'diversified specialisation' - where a city or region specialises in a few (related) sectors but is otherwise diversified - rather than the extremes of mono-specialisation and full diversification. The argument is that these types of city would, to some extent, benefit from both types of externality and thus could exhibit higher rates of growth. Yet others have suggested the idea of 'related variety' (see, for example,

Frenken et al, 2007) as being key to regional or city growth, where by related variety is meant a group (or groups) of economic activities that share or have overlapping or related features such as inputs, markets, specialised knowledges, skill sets, or technologies. Such types of 'relatedness' are deemed to confer advantages in the spillover of knowledge and the generation and diffusion of innovations. Measuring related variety is not, however, straightforward or unproblematic. And, like specialisation, related variety may actually be a source of instability, since the greater the degree of 'relatedness', the lower the degree of modularity in the local economy, so that a shock (say a collapse of demand) in one sector in a related group may quickly ripple through the other sectors in that group, thereby exacerbating the original disruption.⁹ These various debates and issues not only raise problems as to how to measure specialisation and diversity, but also for predicting the likely relationship between sectoral structure and economic performance.

3.4 Human capital and city growth

Where there is more consensus is over the importance of human capital for city growth. Human capital was initially introduced to augment the neoclassical (Solow, 1956) growth model, but in the 'new growth theory', jumpstarted by Romer (1989), has produced two distinct approaches on how to incorporate human capital into models of economic growth. The first regards the accumulation of human capital (essentially skill acquisition and learning) as the engine of growth, while the second emphasises the role of the human capital stock (intellectual and knowledge capital) in the process of innovation and adoption of new technologies. Although empirical measurement issues abound in studies that seek to determine the actual contribution that human capital makes to economic growth (and of course there is reverse causation since a higher rate of economic growth may lead individuals to demand more education and training because higher growth has a favourable effect on wages), on balance the evidence seems to indicate that educational expansion, skill acquisition and training all contribute to output growth (Schütt, 2003).

In terms of city economies, here too the evidence points to a positive influence of human capital on growth. The ability of a city to attract and retain highly educated and qualified labour would appear crucial to its economic prosperity and success. Following Glaeser (1994) and Simon and Nardinelli (1996, 2002) there have been numerous studies documenting the powerful connection between skills and city growth. Initial skills are correlated with subsequent population growth, wage growth and house price growth (Glaeser and Saiz, 2004). This connection occurs in the USA, UK and elsewhere, and seems to have become stronger over the post-war period. Furthermore, cities that have highly skilled residents seem to be better able to adapt to changing economic circumstances and opportunities, and to attract, nurture and develop new industries and reinvent themselves (Glaeser, 2005a). Other scholars point to the ability to attract so-called 'creatives' (those with artistic, technical and scientific talents) as key to a city's economic success (Florida, 2002, 2008). Again, there is a strong degree of two-way causation: the presence of well-educated, skilled, talented and enterprising people tend to increase a city's growth rate and its productivity, and a growing city will tend to attract more of those very same types of labour. Why cities differ in their stocks and

⁹ The notion of modularity refers to the degree to which the components parts (or sub-systems) of a complex system are able to function independently of one another, such that if one or more of those parts fails or is disrupted, the system as a whole can continue to operate. The more interrelated and interdependent are the component parts, the less the modularity of the system concerned.

accumulation of skilled, highly educated and enterprising people, and how such variations feed back to influence growth rates across cities, are thus key research – and policy – issues.

3.5 Institutions and governance

A recent focus in the literature on urban economic success - on why some cities prosper more than others – is on the role that institutional arrangements and governance structures play in promoting and facilitating growth. The argument is that the nature, ‘thickness’ and orientation of both formal and informal institutions (the latter often includes references to social capital) can exert a significant influence on a city’s economy, positively or negatively. The attitudes of local public and private bodies towards growth and development, the local presence of pro-business groups and associations, the degree of local autonomy over raising tax revenues and over expenditure, and the presence of strong local leadership with vision, all these can contribute to the perception and reality of a city as a place to locate and expand businesses, and to attract and retain workers. There is increasing interest in the different ‘governance models’ that are found in different cities – especially as between countries – and whether ‘best practice’ forms can be identified and possibly transferred from one context to another. In their analysis of city productivity in five OECD countries, Ahrend et al (2014) found that cities with fragmented governance (administrative) structures tend to have lower levels of productivity. Metropolitan areas with twice the number of municipalities were found to be associated with 6 percent lower productivity, an effect that is mitigated by almost half when a governance body at the metropolitan level exists.

Interestingly, however, this effect was weakest (in fact not statistically significant) in the case of the UK. Nevertheless, there is much current discussion and debate in the UK over two key governance issues: the case for strong city mayors, with powers akin to those enjoyed by the mayor of London; and the highly centralized nature of the public funding that supports social, economic and infrastructural services in the UK’s cities. These two issues figure prominently in the study by Lord Heseltine into how to promote more growth in localities and cities outside London. Having more powerful and visionary mayors in British cities whilst possible necessary to promote growth, would not of itself be sufficient: what would also be needed is a more devolved system of local government finance, to allow such mayors to undertake actions backed up by the necessary funds. The fact of the matter is that the evidence on how governance models influence city growth is far from unequivocal or comprehensive enough to come to firm conclusions. Indeed, some studies suggest that the ‘growth dividend’ associated with more decentralised and devolved systems of governance may have been overstated (Pike et al, 2012).

3.6 Path dependence and city growth evolutions

While Urban Economics and New Economic Geography models undoubtedly help illuminate differences in productivity, wages, prices and the like between cities, they are much less useful for understanding long-run trends and shifts in a city’s growth path, that is how city economies evolve. Equilibrium notions and models are not well suited for this task. While Urban Economics and New Economic geography models might claim to allow for ‘history’ by showing how different ‘initial conditions’ lead to different equilibrium outcomes, the models are still equilibrium based. But as complex, highly open, dynamic entities, city economies need never be in equilibrium, and instead are constantly evolving, sometimes slowly, at other times more rapidly. Identifying the forces that make

for continuity and those that make for change, and how the two interact, may therefore throw useful light on city growth paths over time. To that end, ideas and concepts from evolutionary economics and the theory of complex adaptive systems may be useful. The fact there is as yet no agreed formal 'evolutionary model' of city economic growth and development of a sort to rival the technical sophistication of Urban Economics and New Economic Geography models does not mean evolutionary ideas have no explanatory purchase.

One such idea that has spawned a sizeable literature in economic history, and several other social sciences, is that of *path dependence*. In path dependence economics, as pioneered by David (1985; 1993, 2005) and Arthur (1999), at any point in time, the state of an economy depends on the historical adjustment path taken to it. That is to say, an economy is an irreversible historical process in which future outcomes depend to some degree on past events and outcomes: an economy inherits the legacy of its own past. Thus current structures and arrangements, themselves influenced by previous structures and arrangements, condition future possibilities. Path dependence is certainly not a theory of economic growth, but the notion does focus attention on those structures, forces and mechanisms that tend to impart a self-reinforcing momentum to a given pattern of (spatial) economic development (Martin and Sunley, 2006; Martin, 2010; Martin, 2013).

So construed, the notion of path dependence is of relevance for understanding the different growth paths of different cities. Indeed, path dependence is quintessentially a place dependent process, in the sense that a city's previous developmental path, which to a large degree will be unique to that city, will condition to some extent the possibilities for its future development. Development growth paths get 'locked-in'. Several potential sources of such 'lock-in' can be identified (Table 3.2), and the nature and relative mix of these will vary from city to city, reflecting each city's specific form of past economic development. Furthermore, 'lock-in' can be positive or negative. In the former case, a virtuous growth regime becomes cumulatively self-reinforcing: Milton Keynes may well fit this scenario. Over time, however, a positive growth regime may lose its momentum, or it may be disrupted by a major external shock (such as a city's loss of its principal export markets), and a process of decline may set in, which then becomes self-reinforcing, so that a form of negative lock-in or path dependence becomes established: Liverpool's economic evolution may be illustrative of this change in the nature and direction of path dependence.

Table 3.2 Sources of path dependence in city growth and development

Source	Features
Natural resource based	City's development path shaped by dependence on a particular raw material (eg coal, oil, forestry products, etc), and the technical possibilities this provides for related and derived industries.
Sunk costs of local assets and infrastructures	Durability ('quasi-irreversibility') of a city's capital equipment, especially in heavy industries and its physical infrastructures, such as urban built form, transport system and the like, which remain in use, and shape economic development possibilities, because fixed costs are already 'sunk' while variable costs are lower than total costs of replacement.
External economies of industrial specialisation	City's economy based on cluster(s) of specialised activity characterised by dynamic externalities and untraded inter-dependencies – common pool of specialist skilled labour, dedicated suppliers and intermediaries, local knowledge spillovers, and local co-ordination effects, such as networks of co-operation, business practice conventions, etc., all of which create a high degree of local economic 'inter-relatedness'.
Technological or innovation system	Development of a distinctive specialised technological regime or innovation system through processes of local collective learning, mimetic and isomorphic behaviour, dedicated technology and research organisations, inter-firm division of labour and other forms of technical inter-relatedness.
Economies of agglomeration	Generalised self-reinforcing development based on various agglomeration externalities, such diverse labour pool, large market, thick networks of input-output relations, local supply chains, services and information. Wide scope for various specialist functions and activities.
City-specific institutions, social forms and cultural traditions	Development of locally specific economic and regulatory institutions, social capital, social infrastructures and traditions, all which embed economic activity into a specific trajectory.
External linkages and inter-dependencies	Development path of a city may be shaped by those in other cities and regions, though intra-industry and inter-industry linkages and dependencies; reliance on financial institutions elsewhere; and influence exerted by economic and regulatory policies pursued in other locations and at national level (or even beyond).

Note: Adapted from Martin and Sunley (2006)

What the idea of path dependence also highlights is the importance of *new path creation*, of the capacity of a city's economy to adapt over time by shifting or branching from old, mature and perhaps stagnating sectors into new more productive and more dynamic ones. Path dependence, in other words is not simply or solely about 'lock-in'; it is also about how new pathways of growth and development emerge, and in our context, why this process varies from city to city. The capacity for new path creation may itself depend on a city's previous economic development path, since its existing range of industries, occupations, skills and technologies will be expected to exert some influence on the possibilities for developing new industries and technologies.

Some city economies, by nature of the features associated with their particular economic activities, may provide 'enabling' environments for the emergence of new sectors that are able to build upon or branch out of those former activities. In other cases, the very nature of a city's inherited economic structures may be much more 'constraining' of such economic adaptation or reorientation. For example, compare London and Birmingham. Historically, both were major national centres of manufacturing, and both experienced sustained deindustrialisation from the early-1970s onwards. But London, unlike Birmingham, also had a long-established core of financial and business services. With the growth in importance of these activities from the late-1980s (aided by the wholesale de-regulation of banking and financial markets from 1986 onwards), not just nationally, but globally, London was well placed to embark on a new growth path largely denied to Birmingham (and other UK cities). Moreover, the very nature of Birmingham's manufacturing base – dominated by car production and related engineering activities, and the knowledge systems these involve – has arguably proved less enabling as a platform for economic re-orientation.

It is certainly not being suggested here that path dependence fully explains the divergent differential growth paths revealed in Figures 2.4.2.5 and 2.6; far from it. But that path dependent processes influence city development trajectories, there can be little doubt. By the same token there can be little question that the future economic success of many of the UK's cities, and especially those whose economic growth has persistently lagged that of the national economy taken as a whole, will depend, in part at least, on their capacity to reorientate their economies around new development pathways.

It is not our aim or purpose here to seek to assess the empirical significance in the UK context of these various factors that have been argued to influence the economic performance of cities. That would require an extensive study in its own right, and in the case of some of the claimed determinants, the required data are simply not available for the system of cities and time span discussed in this Working Paper. It is possible, however, to undertake some limited exploration of some of the ideas discussed above.

4. Does city size matter for growth?

4.1 The size distribution of British cities

The issue of city size and its relationship to growth has long held a fascination for urban analysts. The most well-known feature concerning city size is the so-called Zipf's Law, or rank-size rule. This rule states that the population of a city is inversely proportional to its rank. If the rule held exactly, then the second largest city in a country would have half the population of the biggest city; the third largest city would have one third the population, and so on. Put another way, if we plot the ranks of a country's cities (on the x-axis of a graph) against their populations (on the y-axis), using logarithmic scales, then the line relating rank to population is downward sloping, with a slope of -1.

Now, according to Overman and Rice (2008) while medium sized cities in England are, roughly speaking, about the size that Zipf's law would predict given the size of London, the largest city, the major second-tier cities (which include the so-called 'core' cities) all lie below the Zipf line and hence are smaller than would be predicted. They go on to state that:

"It is important to note that this feature is *not a consequence of London being 'too large'*. If we had predicted the population of England's largest city by drawing the Zipf line through the medium size cities and projecting to the y-axis then we would obtain a figure not much different from that of the actual population of London. Of course, such a simplistic exercise comes with a number of important caveat (not least the fact that Zipf's law need not necessarily hold for English cities and that the exact definition of urban areas will affect the relative size of urban areas). But, the Zipf plot is at least indicative of the fact that, for England, *second tier cities may be too small.*" (op cit, p. 3, emphasis added).

Such an argument would suggest that there is scope for increasing the size of the provincial 'core cities', so as to gain the advantages of agglomeration.

However, this conclusion may not be entirely correct. As Krugman (1996a), argues, while the Zipf relationship holds fairly closely for the cities of the United States, and has done so over a long period of time, indicating a pattern of equal proportionate growth across the urban system, this is not necessarily the case elsewhere:

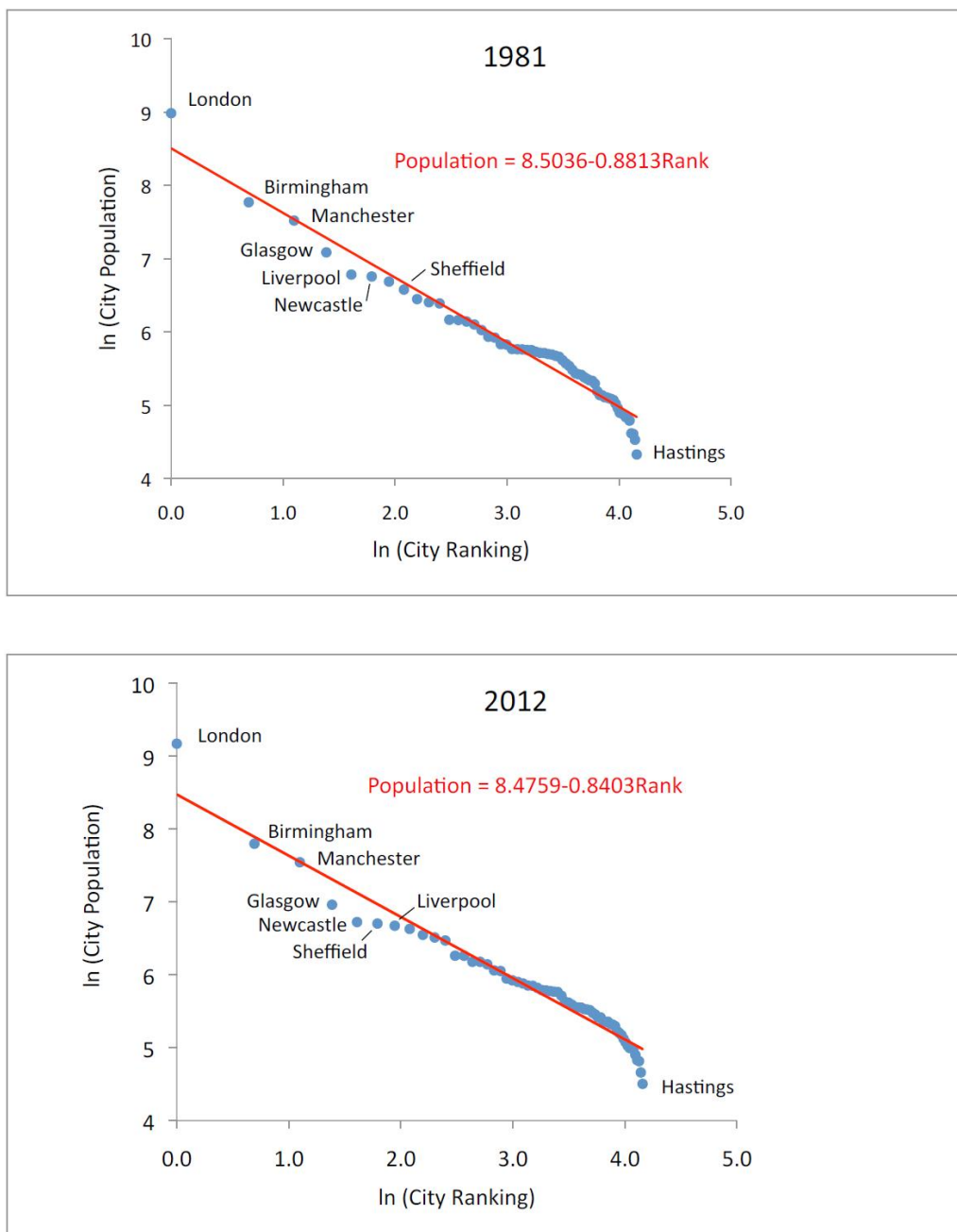
"Zipf's law is not quite as neat in other countries as it is in the United States, but it still seems to hold in most places, if you make one modification: many countries, for example, France and the United Kingdom, have a single 'primate city' that is much larger than a line drawn through the distribution of other cities would lead you to expect. These primate cities are typically political capitals: it is easy to imagine that they are essentially *different creatures from the rest of the urban system.*" (Krugman, op cit, p. 41, emphasis added).

A similar point is made by Gabaix (1999), who argues that:

"In most countries Zipf plots usually present an outlier, the capital, which has a bigger size than Zipf's law would warrant. There is nothing surprising there because the *capital is indeed a peculiar object, driven by unique political forces.*" (op cit, p.756, emphasis added).

If we actually fit a regression line relating rank and size (as in Gabaix, op cit), then we get a result that can be interpreted as confirming the statements of Krugman and Gabaix. Thus in Figure 4.1, which shows the relationship between city size and rank for 1981 and 2012, not only is the slope about -0.8 rather than -1.0, London lies well above the fitted line in both cases; indeed, its 'outlier' position increased slightly over the period.¹⁰ London, in other words, demonstrates well the 'special or unique' character, referred to by Krugman and Gabaix, of being *larger* than would be predicted from the overall size-rank relationship that exists in Britain's urban system as a whole. The second and third largest cities, Birmingham and Manchester, lie on the fitted line, and thus could be regarded as not being 'too small', although Glasgow and Newcastle do appear to be slightly 'undersized' than would be expected given the fitted rank-size relationship.

Figure 4.1 Relationship between city size and rank, 1981 and 2012



¹⁰ The population data are ONS estimates, and were kindly supplied by Professor Tony Champion: see his Future of Cities Working Paper 3

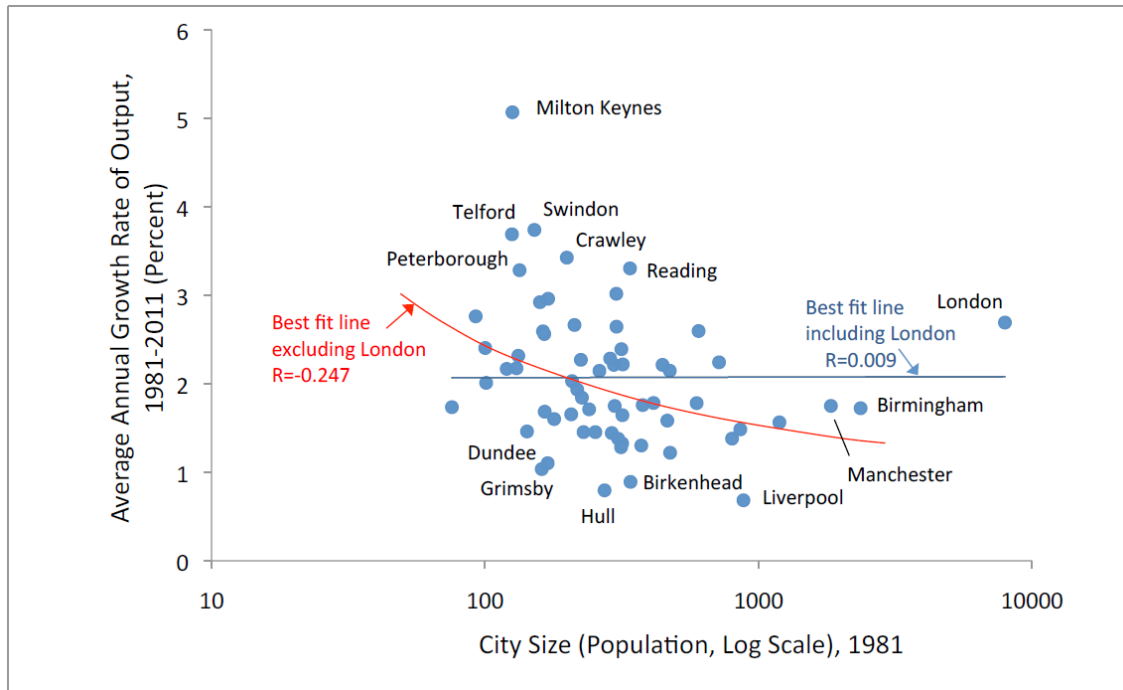
Appealing to Zipf's law (and the 'rank size rule'), then, is not unproblematic. It assumes the urban system to which it is being applied is precisely that, an integrated and meaningful *national* system. But as Krugman, Gabaix, and our findings suggest, the presence of a large primate capital city, and even more so a capital that is also a 'global' city to a significant degree 'disconnects' such a city from its respective national urban system. London is as much a part of a 'global primate city system' as it is of the UK's urban system. In that sense it might be argued that London is 'undersized' compared other prominent global cities, although that would serve merely to reinforce its 'disconnection' from the rest of the UK urban system. By the same token, arguments that use a Zipf-type relationship with London included to suggest that other UK cities are 'undersized' is open to debate.

4.2 Evidence on city size and city growth

The evidence on whether greater spatial agglomeration of economic activity in cities promotes faster growth, both of the cities themselves, and by implication of the national economy to which those cities belong, is mixed. Whilst some NEG-type studies claim to find a positive relationship between national growth and the degree of spatial agglomeration, though in some cases only up to a certain level of economic development (Dall'erba and Hewings 2003; Martin 2005; Lees 2006; Crozet and Koenig, 2008), others find no such relationship (Bosker 2007; Brülhart and Sbergami, 2009; Martin, 2008; Gardiner et al., 2011). Findings seem to depend on how agglomeration is measured, on the underlying economic model used to estimate the impact of agglomeration economies, and on the time period being studied. What one can say is that the empirical evidence is equivocal.

Our focus here is on the relationship between city size and growth: is it the case that the UK's largest cities – and hence, according to theory, those in which increasing returns effects of agglomeration should be greatest – have shown the fastest growth? Even a causal inspection of Figure 2.2 in Section 2.2 would cast doubt on any such simple association: the country's largest cities (such as London, Birmingham, Manchester, Sheffield, Liverpool, Glasgow, Edinburgh) are scattered throughout the distribution of cities by average growth rates, and similarly so are small and medium sized cities. And, as Figure 2.6 revealed, the growth rates of output and employment in the majority of the core cities have consistently been below the corresponding growth rates for the national economy. Not surprisingly, therefore, if we plot average city output growth rates over 1981-2011 against city sizes (by population) in 1981, we find there is no statistically significant relationship (Figure 4.2). If, however, we exclude London, a stronger relationship then emerges, but it is negative: it has been the initially small-to-medium cities, especially in southern Britain, that have tended to register the fastest rates of economic growth, as was revealed in Section 2 (Figure 2.3). The size-growth relationship is obviously complex. And we are certainly not suggesting agglomeration economies are unimportant. Clearly they are. But they may not increase without limit as city size increases. Much more research is needed into this issue.

Figure 4.2 City size and economic growth



5. Does economic structure matter?

5.1 Measuring city specialisation

There are numerous indicators which can be used to capture economic structure and compare it across areas - see Palan (2010) for a useful summary. There are two main types of indicator: those that focus on mono-specialisation and those that look at a more generalized picture of specialisation versus diversity.

Mono-specialisation measures focus on how much a city is dominated by a particular sector. The specialisation index suggested in Duranton and Puga (1999) is one such measure:

$$ZI_j = \text{Max}_i(s_{ij})$$

where s_{ij} is the share of the relevant indicator (e.g. employment or output) in industry i in city j , and the index takes the value of the largest such share (*Max*). A disadvantage of this measure is that it is not independent of the sectoral disaggregation used to create it, such that large 'widespread' sectors, which are present in every city, such as retail or public administration, will tend to dominate the findings. Duranton and Puga thus suggest adjusting by national sectoral shares (s_i) as follows to create a Relative Specialisation Index (RZI):

$$RZI_j = \text{Max}_i(s_{ij} / s_i)$$

While this is an improvement on the previous measure, the relative specialisation index still suffers a major difficulty when analyzing trends over medium or long time periods, since the sector that has the largest relative share may change over time.

More general measures, such as the Krugman Specialisation Index (KSI), compare a city's economic structure against a reference average, typically the country as a whole (Krugman, 1993). The KSI is expressed as:

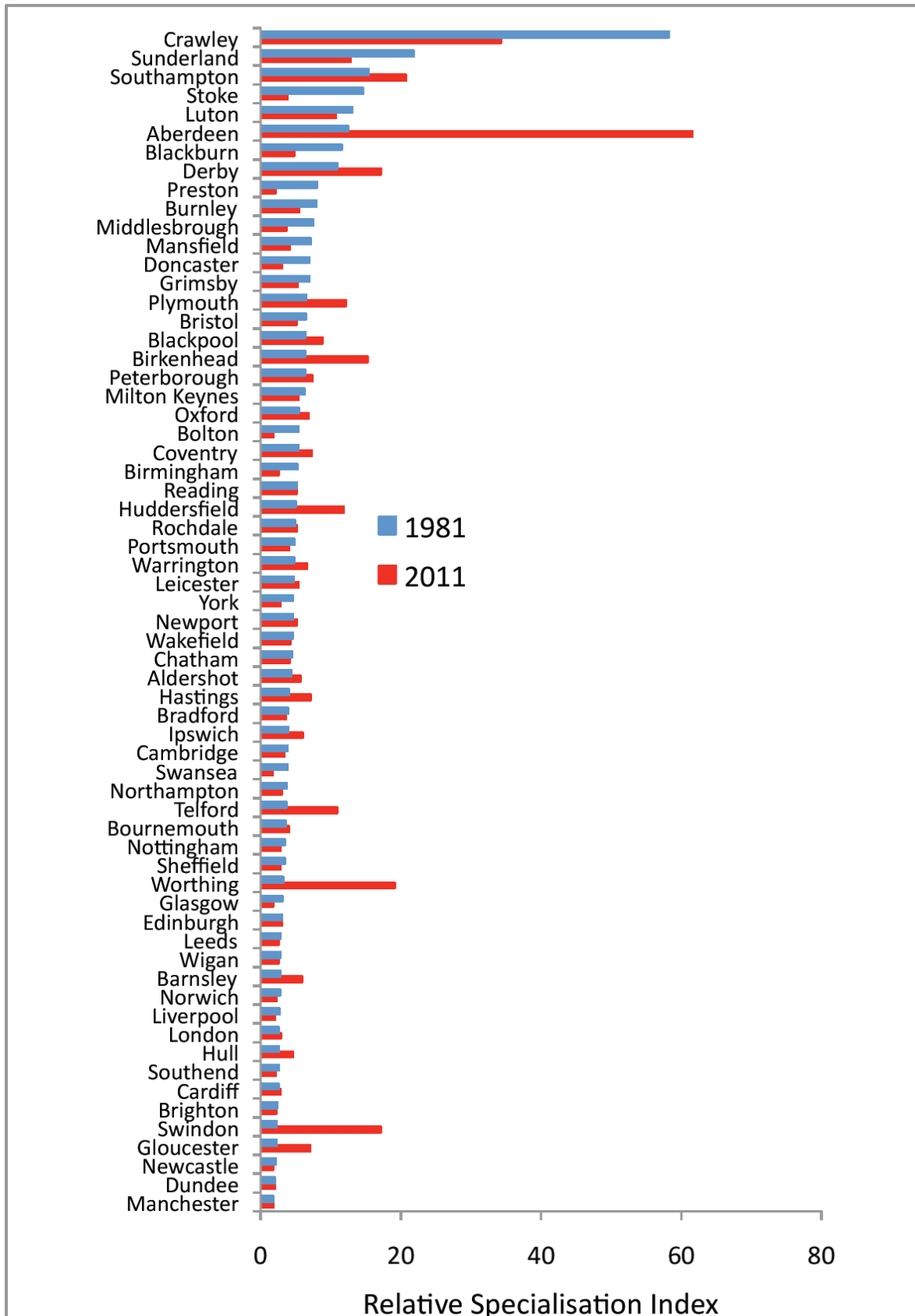
$$KSI_j = \sum_{i=1}^n \text{ABS}(s_{ij} - s_i^*)$$

where, as before, s_{ij} is the share of employment in sector i in city j , and s_i^* is the average share across all cities excluding the city itself (j) (ie the city for which the KSI is calculated), and the sum is over the absolute differences between the industry shares of a given city's employment and the corresponding industry shares of national employment. The KSI is also closely related to the Relative Diversity Index (RDI). The KSI can take values between 0 and 2. A value of 0 implies that a city's economic structure is similar to the reference structure (e.g. the country average), while higher values indicate increased specialisation or deviation away from this norm.

Following on from their description of 'diversified specialisation', Farhauer and Kröll (2012) also suggest an indicator to capture this, which is the employment share of the three largest sectors in a city. However, such an indicator would have the same problem as the ZI specialisation index, in that it would simply record sectors such as retail, construction and public administration in the majority of cases. Also, there may be no

obvious connection between the sectors. And why choose just the three most important sectors? A possible modification, not explored in this paper, would be to link sectors using input-output coefficients so that those sectors most related to the dominant one would be included in the calculation (a version of 'related variety').

Figure 5.1: Relative Specialisation Index across British Cities, 1981 and 2011



In order to demonstrate what these types of specialisation look like across British cities, a representative indicator was calculated for our 63 PUAs over 1981 – 2011, using employment as the indicator of choice over the 46 sectors.

(1) Relative Specialisation Index (RZI)

As previously stated, there is no point in calculating the ZI index (as most cities are dominated by the retail sector, which tells us nothing), but the RZI is of some interest. Figure 5.1 shows how the RZI index has changed between 1981 and 2011, the beginning and end-points of our sample. What is clear from the chart is how most cities have a relatively low level of specialisation relative to the national average. Two exceptions stand out – Crawley, which is home to Gatwick airport and thus has an extreme specialisation in air transport, and Aberdeen which, over the period of analysis, has rapidly expanded its oil-related activities. Although not shown in the chart, some further investigation was undertaken to check for how many cities the same sector represented the maximum relative share in 2011 as in 1981 – the answer is 18 (out of a total of 63), which indicates how sector specialisations wax and wane over time, and somewhat undermines the use of this indicator in a general analytical setting which aims to analyse long-run economic performance.

(2) Krugman Specialisation Index (KSI)

Figure 5.2 shows how comparative economic structures across British individual cities have changed over time by comparing Krugman Specialisation Indices for 1981 and 2011. The shift over 30 years is quite significant, with only three cities (Reading, London, and Edinburgh) having become more specialized over this period. Some cities, especially such as Burnley, Coventry, Sunderland, Derby, Bolton, Birmingham, Middlesbrough and Rochdale, all significant industrial centres in the 1970s, have experienced particularly large year-declines in relative specialisation, reflecting the shift away from manufacturing (deindustrialisation) towards services (tertiarisation) that has taken place since the beginning of the 1980s. To illustrate these shifts, Figure 5.3 plots the by-year average value of the KSI, with standard deviations. The downward trend (towards increasingly similar city economic structures, ie less specialisation) is clear, although this seems to have flattened out somewhat, possibly only temporarily, with the onset of the economic recession in 2008.¹¹

¹¹ Of course, our findings are conditioned by the level of sectoral disaggregation permitted by our data (namely 46 sectors). A much finer disaggregation may well reveal instances of higher specialisation. However, a cross-check using a 220 sectoral data set for local authority districts, not cities, for 2000 revealed Krugman specialisation indices not much different in value from those for our cities in that year. A trend towards convergence of employment structures across British cities has also been found by O'Donoghue (2000).

Figure 5.2 Krugman Specialisation Index for British Cities

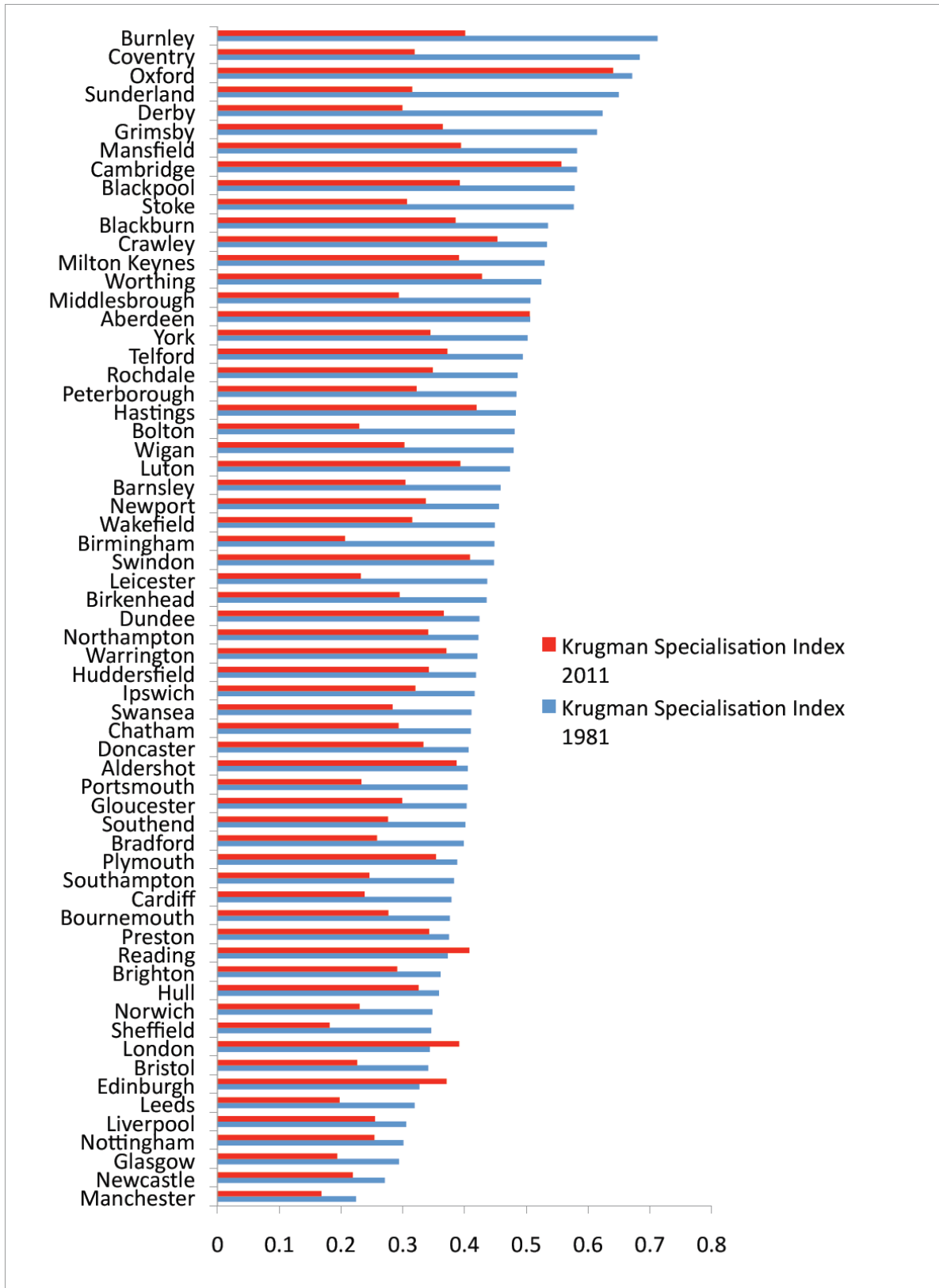
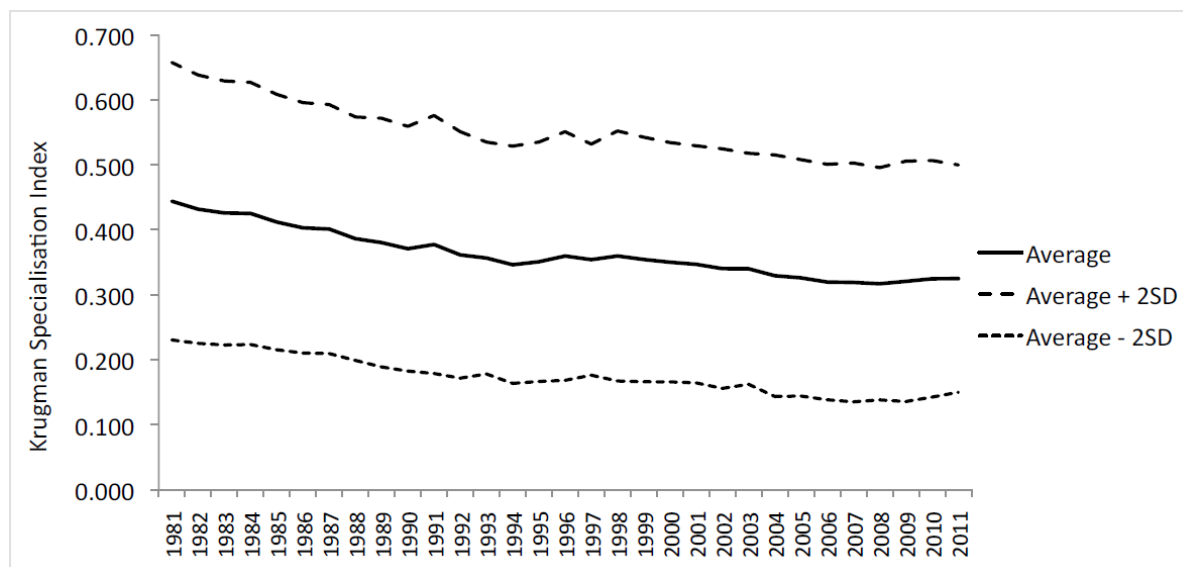


Figure 5.3 Krugman Specialisation Index for 63 Cities, 1981-2011



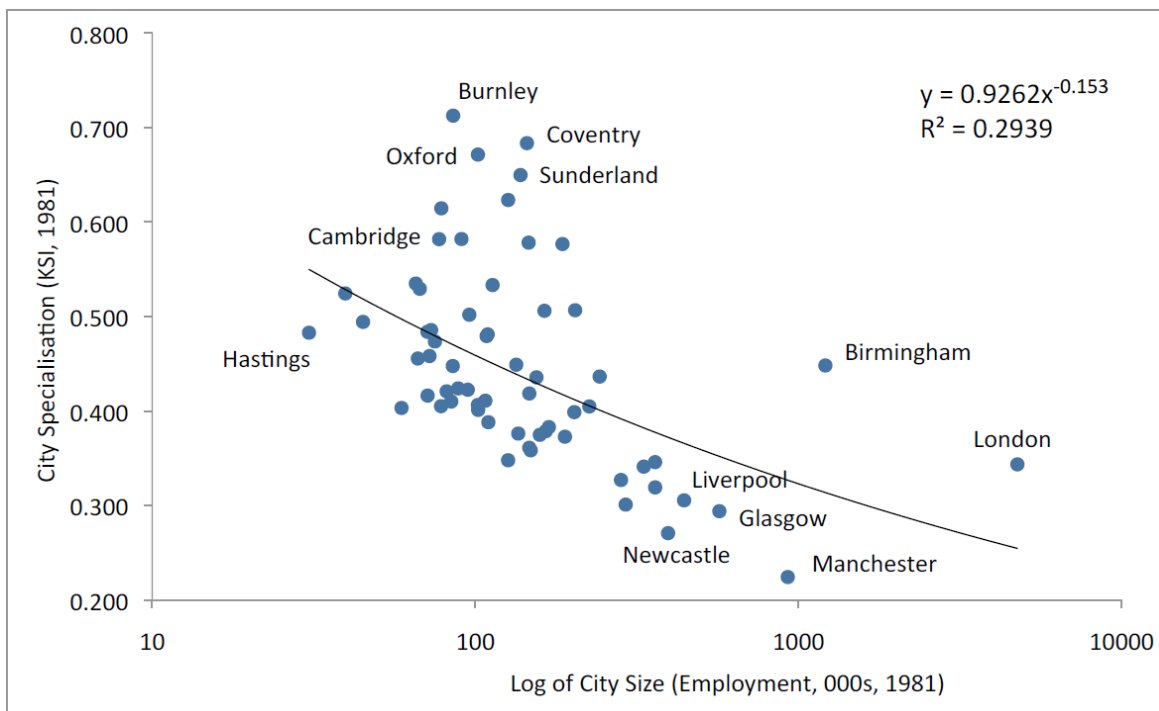
5.2 Specialisation and city size

The association between the degree of economic specialisation in a local area and its size (usually measured in terms of total employment or population) has been explored previously by, among others, Dewhurst and McCann (2007). Dewhurst and McCann took 4-digit sector data at local authority district level from the 1995 Census of Employment to look at how area specialisation and size were related. They looked at a variety of different measures of specialisation, but the results were consistent – namely that there is an inverse (negative) association between the specialisation index and the log of area size. There are at least two reasons why this might be the case. First, larger cities (eg. the national capital and regional or provincial centres) tend to have a greater number of functions, and enjoy larger ‘home markets’; thus they tend to be less specialized (more diversified). Second, larger cities typically have a wider skill base, and this can support several different industries, which would lower the degree of specialisation.

To test this finding on our own dataset, we plotted the KSI against city size (log of employment).¹² Figure 5.4 shows the results for 1981. Clearly a similar negative association exists among British cities. London and Birmingham (the two largest cities) are also above the fitted line, implying that their level of specialisation is higher than one might expect from a city of their size. The result for London echoes what was found in Dewhurst and McCann, who included dummy terms for the City of London in their own (more detailed) regression analysis. Birmingham’s higher-than-expected result is mostly driven by metal products and motor vehicles, while London’s is due to financial services, media, and some manufacturing sectors still present at that time (1981).

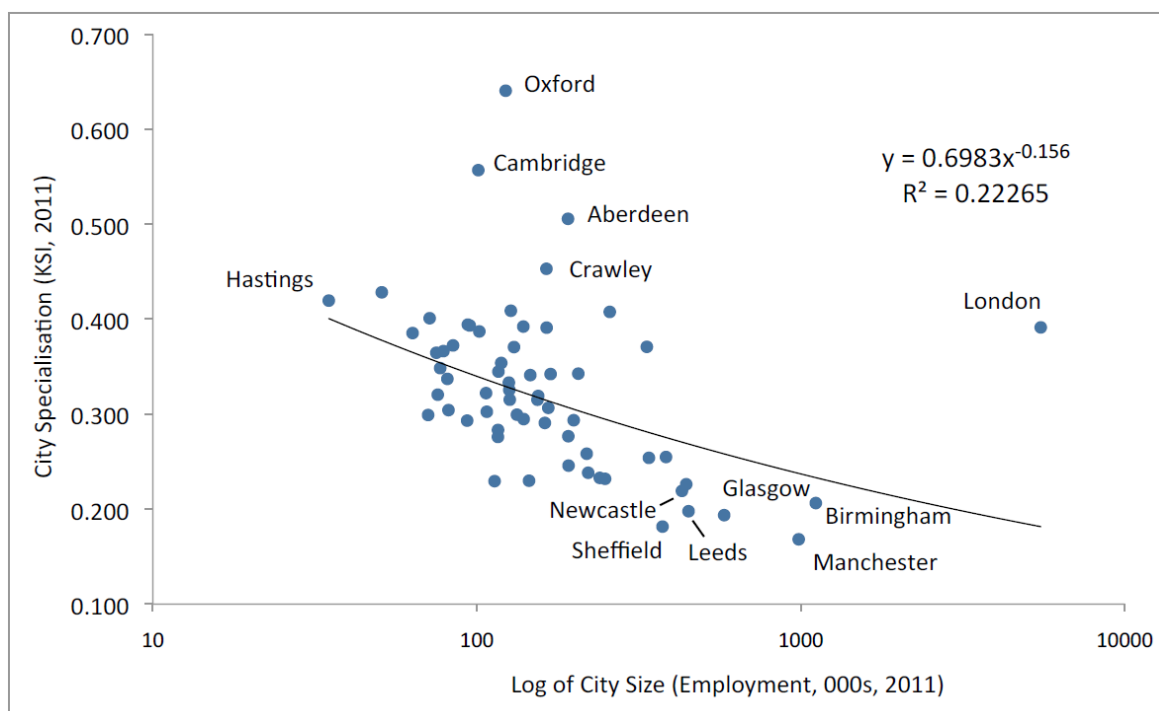
¹² A similar exercise was undertaken to investigate the degree of association between relative specialisation (RZI) and city size. No evidence of any association was found.

Figure 5.4 City size and specialisation (1981)



As we have time series data and not only just a one-off cross section, we also looked at whether this association was stable across time. Broadly speaking this is the case, although the gradual reduction in city specialisation noted above tends to make the fitted line flatter, as shown in Figure 5.5. But it is interesting to note that the general decline in specialisation has certainly proceeded at different speeds in different cities, with the result that certain cities – specifically Oxford, Cambridge, Aberdeen and Crawley - now stand out as being more specialised relative to the rest than before. Meanwhile, by 2011 Birmingham was no longer more specialised given its size than it was in 1981. And London actually increased its specialisation over the period, primarily due the rapid growth of its in financial and business services sectors.

Figure 5.5 City size and specialisation (2011)



5.3 Specialisation and performance

As was mentioned previously, the debate about specialization and diversity in cities is somewhat inconclusive on how this relates to performance, albeit with an acknowledgement that more specialised cities are likely to suffer from greater volatility. As we noted, in his recent book on the economies of cities, Storper (2013) is quite emphatic about the central role that specialisation play in city growth, although he provides little detailed evidence to support this assertion, nor any discussion of the problems of defining and measuring specialisation and diversity summarized above.

To investigate how performance and specialisation are associated for the British cities, the KSI for 1981 (ie as it was at the beginning of our study period) was matched against the growth of employment, output and labour productivity over the subsequent three decades. The results for employment and output (not shown) indicate no evidence of an association, but interestingly the result for labour productivity does show limited evidence of an association (Figure 5.6). Clearly other factors are involved in explaining city performance, and one should also bear in mind that specialisation is a dynamic concept that will change over the period of analysis, thus interacting with growth.

Figure 5.6 City specialisation and productivity growth



A related issue, not pursued in depth here, is that of city performance in recessions versus that in recoveries (and more generally the 'resilience' of city economies when subject to external shocks) and how this relates to specialisation. In economic geography it has been frequently argued that regions or cities with specialized economies are likely to be much more prone to business fluctuations and related perturbations. Recently, this issue has been taken up in the new interest in regional and local 'resilience', that is the resistance of regions and cities to, and their recoverability from, shocks.¹³ According to

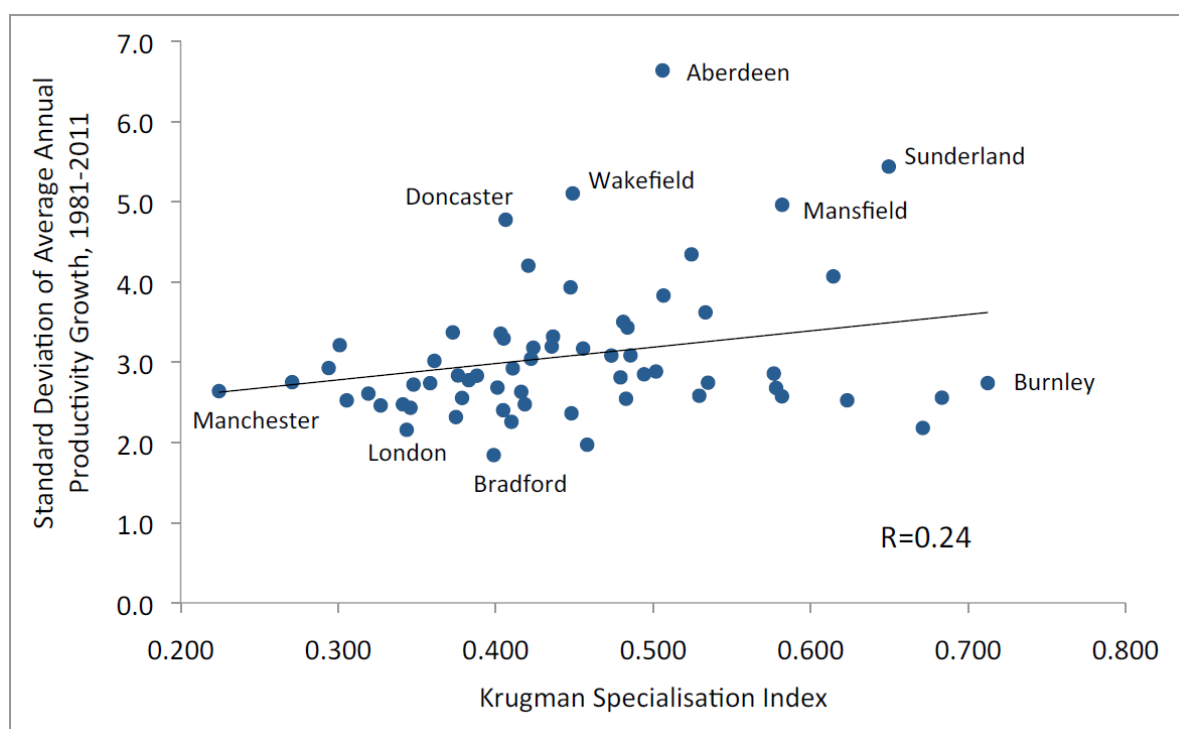
¹³ The topic of regional resilience has received much academic interest during the past few years. See *Cambridge Journal of Regions, Economy and Society* (2010); Martin (2012) and Martin and Sunley (2014) for detailed discussions.

Davies and Tonts (2010), for example, the more diverse a region's or city's economy the more resilient it will be:

“The general contention is that those places with diverse economies are more resilient in socio-economic terms than those with a narrow economic base.”
(p. 232).

Since different types of industry have different elasticities of demand, different export orientations, different labour and capital intensities, and different exposures to external competition, so, the argument goes, a diverse economic structure should not only reduce the vulnerability of a region or city to shocks (a sort of 'portfolio' effect), but also enable a more rapid recovery if a shock occurs (an innovation and market opportunity effect). The implication is that a region or city with a narrow economic base, that is one specialised in a limited range of activities, will not only be more susceptible to sector-specific shocks, but will have fewer opportunities to re-orientate its economy, and hence fewer alternative routes to recovery. In a related vein, Mrinska and Smetkowski (2013), have argued that “Capital cities in most European countries have done relatively well out of the [recent] crisis, mainly due to the nature of their diversified economies and prevalence of services in their structure” (p. 31). We are unable to pursue the issue of city resilience here, but we can at least look at volatility of performance over time to see whether more specialised cities have a greater variability of growth.

Figure 5.7 City specialisation and variability of productivity growth



This association is shown in Figure 5.7, which works in much the same way as Figure 5.6 except it is the standard deviation (volatility around the mean) of city productivity growth rather than the overall period average growth rate on the vertical axis. The relationship is not strong, but there is some evidence that the more economically specialised (less diversified) cities tend to experience more volatility in productivity growth. Although only productivity growth is shown, the degree of association is similar (if not slightly stronger) for both output and employment. As before, the findings are far from conclusive (clearly there is more to volatility of performance than economic specialisation), but the finding is at least consistent with expectations.

5.4 Using dynamic shift-share to identify the evolving influence of economic structure on city growth

The links between performance and structure can be further explored by using shift-share analysis. The shift-share technique has long been used to study regional and city growth patterns and to decompose those patterns into various effects (the literature is extensive, but useful surveys and reviews include Selting and Loveridge, 1992; Loveridge and Selting, 1998; Artige and van Neuss, 2014). The technique is typically applied to either regional employment or output, although there are also trade-related applications (e.g. Chern et al, 2002).

Most shift-share analysis is static, in that it only considers growth between the beginning and end years of a study period, or sometimes over a limited number of sub-periods. Conventional shift-share decomposes a region's or city's growth (of employment or output) over such a given period into three parts: a 'national share' component, an 'industrial mix' or economic structure component, and a 'regional or (city) shift' or 'competitiveness' component (see Box 5.1). The 'national growth' component is that rate of growth that would have occurred over the period in question if a region's or city's economy had grown at the same rate as the national economy as a whole. The 'industrial composition' effect or shift is the contribution to the region's or city's growth that can be attributed to the difference in industrial structure as between the region or city and the national economy; it reflects how far the region's or city's share of nationally faster and slower growing industries and activities differs from the nation as a whole, that is how far a region or city specializes in more and less dynamic industries.

The 'regional (city) shift' component is often deemed the most interesting since it is normally assumed to indicate the extent to which locally-unique factors have caused growth or decline in a region's or city's industries. More specifically, it captures the extent to which a city's industries have grown faster or slower than their national counterparts, and this difference is assumed to point to some local competitive or comparative advantage (or disadvantage), such as agglomeration effects, the availability of particularly skilled labour, the presence of other sophisticated inputs, such as superior suppliers, or particular occupational advantages (for example associated with the concentration in a city of an industry's higher-order functions). This shift component is often referred to as the regional or city 'competitiveness' component, though it does not identify the causes of that competitive advantage (or disadvantage).

The traditional use of the shift-share technique essentially assumes that a region's or city's industrial mix (the sectoral distribution of employment or output) in the initial year remains fixed throughout the entire study period, so that growth between that initial year and the end year is then decomposed holding the starting economic structure constant. This opens the method to two main criticisms which have been well-rehearsed in the literature. The first is that an in-built bias is introduced because a region's or city's industrial structure is likely to change over time, and using the initial sectoral shares of employment or output and holding these constant over the entire study period will not take account of this. Such a bias most likely occurs in regions and cities undergoing rapid structural change, and/or where the time period being studied is a long one, since this would allow significant structural change to occur. The second problem is that if the difference between a region's or city's growth rate and the national growth rate itself varies during the study period, the initial fixed weights (which equate to the region's size relative to the national total), will introduce a bias into the national effect.

For these reasons we employed a dynamic version of the shift-share method, which allows both growth rates and industry structures to vary over time (see Barff and Knight, 1988; Selting and Loveridge, 1990; Chern et al, 2002). This removes the potential for the above types of bias to occur, and also provides additional information on any changes that take place in the relative growth trajectories of cities, which would be concealed by the static version of the method. More specifically, city total growth differentials (from the national average) and their various components were estimated on a year-to-year basis, and these growth rates were cumulated through time (see Box 5.1). This approach thus provides a direct extension of the procedure used in Section 2.3

to chart the cumulative evolution of city growth differentials through time, by decomposing those cumulative differential paths into structural and city-‘competitiveness’ effects. Further, this method helps to reveal any structural breaks or changes in the contribution of the growth components, rather than simply identifying the direction of the overall net shift of cities between the two beginning and end points of the study period. Given that there have been profound shifts in the structure of the UK economy over the past three to four decades and these shifts have played out differently across the country, a dynamic version of shift–share seems a useful enhancement to the comparative-static version.

Box 5.1 A dynamic shift share procedure for decomposing city growth evolutions

The classic shift-share approach is to decompose a temporal change in a city's employment or output growth over a specified time period into three additive components:

- (i) 'National share' (NS) the change that occurs if all of a city's sectors grow at national rate
- (ii) 'Industry mix' (IM) the change that occurs if all cities' sectors grow at national sector rate (minus, or conditional on, the national share effect)
- (iii) 'Residual shift' (RS) the difference between the actual change and the sum of national and industry shifts, i.e. a residual designed to capture city-specific factors such as positive (or negative) externalities (e.g. arising from agglomeration effects, local labour force characteristics, local policy environment, etc)

More formally, if we consider a variable X , defined over industry i , city j and time t , a temporal change between time t and $t+n$ can be written as:

$$X_{ij}^{t+n} - X_{ij}^t = \Delta X_{ij}^{t+n} = NS_{ij}^{t+n} + IM_{ij}^{t+n} + RS_{ij}^{t+n}$$

Each of these three components can be expressed as follows:

$$NS_{ij}^{t+n} = X_{ij}^t * g_n \quad IM_{ij}^{t+n} = X_{ij}^t * (g_{in} - g_n) \quad RS_{ij}^{t+n} = X_{ij}^t * (g_{ij} - g_{in})$$

Where:

g = the growth of the variable X over the pre-defined time period (between t and $t+n$);
 g_n = the national (percentage) growth of variable X during this period,
 g_{in} = the national (percentage) growth by industry i of variable X during this period; and
 g_{ij} = the city (percentage) growth by industry i of variable X during this period.

It is then a simple matter to see that adding all the terms together gets us back to the ΔX_{ij}^{t+n} variable.

By summing over all industries in a city, we arrive at the overall national, industrial mix and residual shift components for any given city,

$$NS_j^{t+n} = \sum_i X_{ij}^t * g_n + IM_j^{t+n} = \sum_i X_{ij}^t * (g_{in} - g_n) + RS_j^{t+n} = \sum_i X_{ij}^t * (g_{ij} - g_{in})$$

In our analysis we undertook the above decomposition on a year-to-year basis (t , and $t+1$, for $t=1981$ to 2011), and computed a running summation of these year-to-year changes. That is, for any year $t+k$, we have:

$$NS_j^{t+k} = \sum_{i=1}^k NS_j^{t+i} \quad IM_j^{t+k} = \sum_{i=1}^k IM_j^{t+i} \quad RS_j^{t+k} = \sum_{i=1}^k RS_j^{t+i}$$

Figure 5.8 shows the results of applying the dynamic shift-share technique to the city-level output data, while Figure 5.9 shows the equivalent results for employment.¹⁴ What is clear, in a general sense, is how it is largely the local or 'competitiveness' component that determines a city's differential performance. That is not to say the industry-mix component is not important in certain cases, but when viewed across all the cities, the pattern becomes clearer.

The three most dominant cities in terms of output growth (Milton Keynes, Swindon and Telford) are all dominated by local effects, which is equivalent to saying that their sectoral structure contributed little to their strong performance – in fact for Swindon and Telford it was actually a negative contribution. For each city, the local and industry components can be investigated by sector. For Milton Keynes, the local effect is dominated by services, in particularly financial and insurance and IT services, which together comprise about a third of the local component. For Swindon the picture is somewhat different, with over a third of the local effect provided by the motor vehicles sector, while selected services (warehousing and postal services, and financial services) explained another 40 percent of the differential. Telford meanwhile, is less dominated by 'stand-out' sectors with a broad range of activities (machinery and transport equipment manufacture among the largest) providing a contribution. Aberdeen provides a notable output outlier, by virtue of its strong oil sector. Nationally speaking, the mining and quarrying sector has performed badly, which explains both the strong negative industry effect and the equally large and offsetting positive local effect (due to the localised nature of Aberdeen's success).

¹⁴ The category 'non-PUA' shown in both figures represents the GB total minus all 63 PUAs. This is so that we can investigate national differential growth. Productivity was considered but findings are mixed for this indicator as it represents the ratio of output and employment and thus combines different patterns that are best kept separate at this stage.

Figure 5.8: Dynamic shift-share analysis of city cumulative differential output growth (1981-2011)

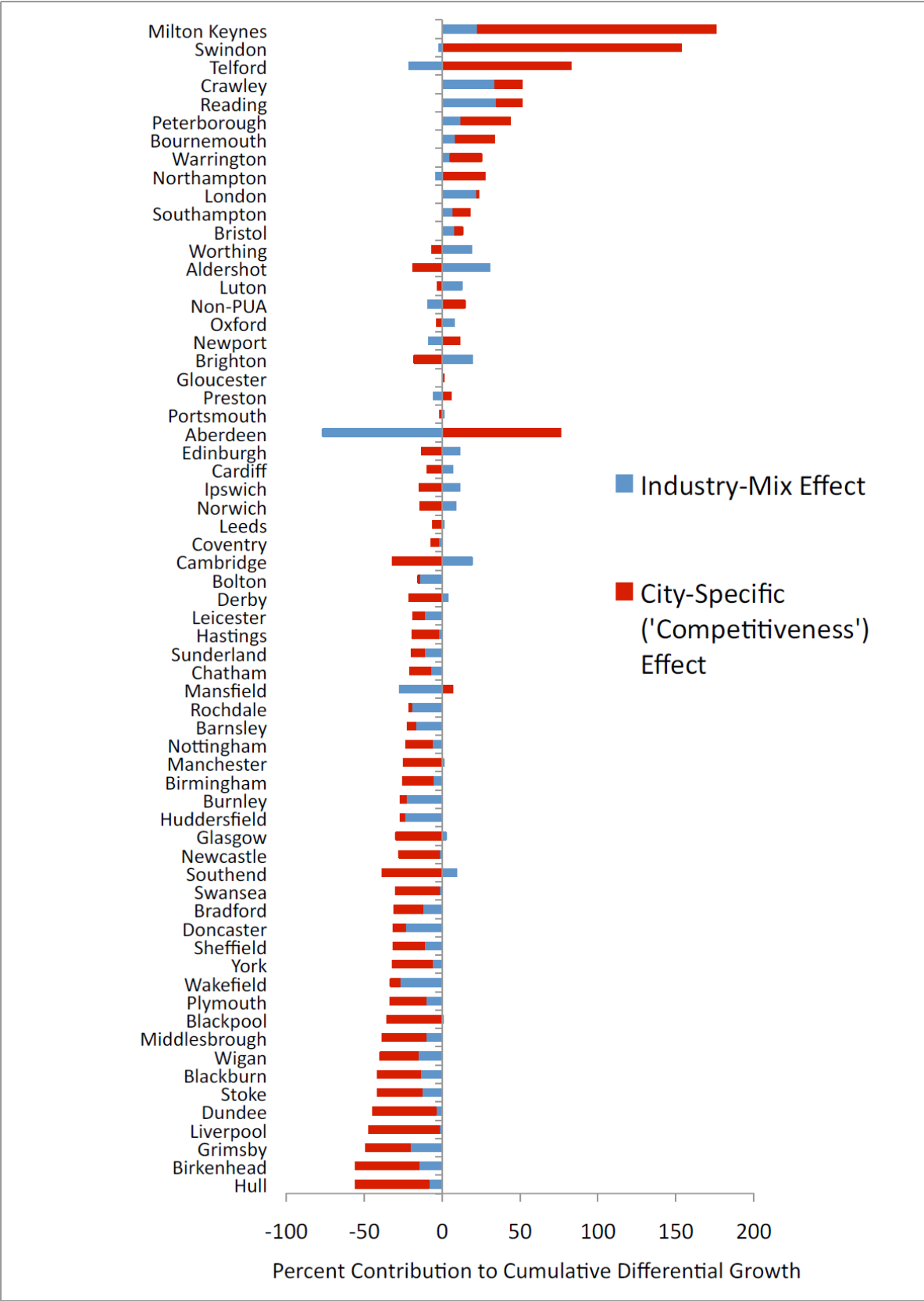
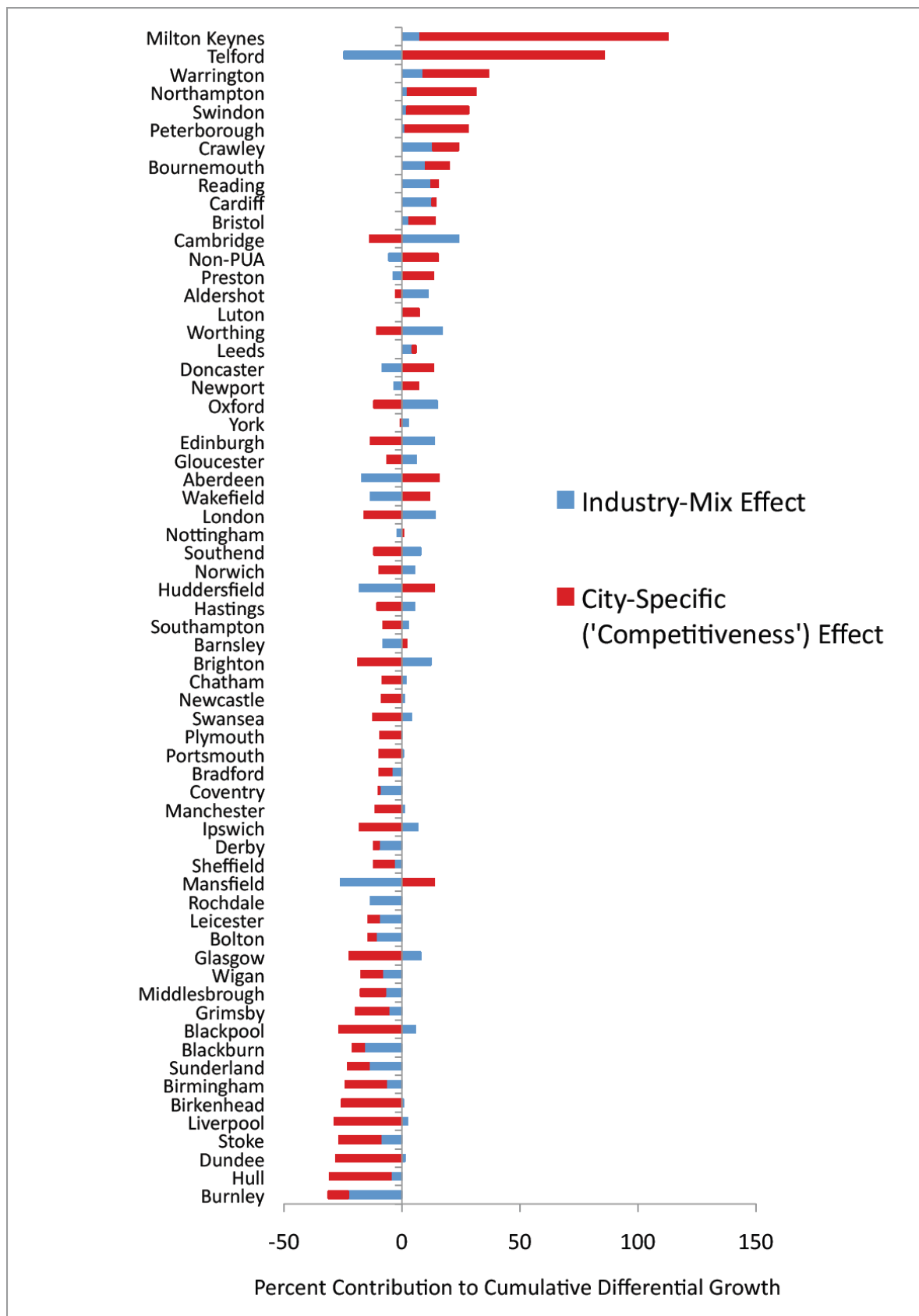


Figure 5.9 Dynamic shift-share analysis of city cumulative differential employment growth (1981-2011)



At the bottom end of the ranking all the cities have industry and local effects which reinforce the negative performance differential. For Hull, the overall industry-mix effect represents some positive (e.g. financial services, retail and health services) and negative

(e.g. food and drink, education, and public administration) contributions, while for the local component the effects are more spread out across a range of manufacturing and service activities.

Liverpool is also worth of mention as it is a large city that is near the bottom of the output (and employment) rankings where the performance is in both cases dominated by the local effects. For output, three sectors (education, financial services, and food, drink and tobacco manufacture) make up 40 percent of the negative differential. For employment, again in the leading cities (Milton Keynes, Telford, Warrington and Swindon) differential growth is dominated by city-specific effects. Many of the cities follow the same patterns for output as for employment, but there are some notable exceptions. Cambridge, for example, is only mid-ranking on the output measure but does better with employment although the industry and local effects work against each other. The industry effects are dominated by health and education which account for over 60% of the differential, while the negative local effects are dominated by public administration, and construction.

It is clear from the preceding analysis that each city has a unique story to tell in terms of its own pattern of specialisation and strength, and how this relates to its performance when compared against national trends. Nonetheless, for most cities, locally-specific effects appear to have played the dominant role in accounting for their differential growth. As mentioned above, such locally-specific effects are often interpreted in terms of factors that confer particular competitive advantages (or disadvantages) across the sectors making up the local economy. This idea of city 'competitiveness' is therefore worthy of some closer examination.

6. City competitiveness and productivity

6.1 What is city ‘competitiveness’?

The notion of ‘competitiveness’ only really entered general economic parlance in the 1980s, mainly through the writings of business school scholars (most notably Michael Porter – see, for example, Porter, 1994, 1995, 2000, 2001). Since then, it has become a prominent discourse amongst policymakers the world over. Economists and experts everywhere have elevated ‘competitiveness’ to the status of a ‘natural law’ of modern capitalism, and assessing a country’s competitiveness and devising policies to enhance it have rapidly become officially institutionalized tasks.

While initially a national-level concern, this focus on national competitiveness has also stimulated considerable interest in regions and cities. One expression of this is an emphasis on the regional and urban ‘foundations’ of national competitiveness. Another is that many regional and city authorities have themselves become increasingly concerned about the relative ‘competitive standing’ of their local economy compared to that of other regions and cities, and with strategies to move their area up the ‘competitiveness league table’. Regional and city ‘benchmarking’, constructing rankings of regions and cities by this or that competitiveness index, has become common practice, the recent Economist Intelligence Unit report *Hot Spots 2025: the Future Competitiveness of Cities* being a prime example. Its 2025 City Competitiveness Index benchmarks the competitiveness of 120 cities across the world using 32 different indicators for each city. The eight, distinct, thematic categories covered are economic strength (30 percent), physical capital (10 percent), financial maturity (10 percent), institutional character (15 percent), human capital (15 percent), global appeal (10 percent), social and cultural character (5 percent), and environmental factors (5 percent). This illustrates the wide range of factors that many consider to be of some importance, though the precise range of determinants, their empirical indicators, and their relative significance, are all open to debate.

Indeed, the notion of regional or city competitiveness is far from straightforward (see Kitson, Martin and Tyler, 2006; Martin, 2006b). In his early writings on the subject, Krugman (1996a, 1996b) took the view that ‘competitiveness’ is an attribute of firms, but not of cities, regions or even nations. In contrast, Porter (2001) has argued that the notion can indeed be meaningfully applied to places, to local business clusters, cities and whole regions, as well as nations. In a departure from his earlier view, however, Krugman also now argues that the notion may after all have particular relevance at the regional and city scales (Krugman, 2006), in as much that local ‘externalities’ (such as specialist suppliers or a pool of highly skilled labour) and local ‘fundamentals’ (such as high-quality educational institutions, a favourable local finance market, a supportive economic governance system, and where permissible, a favourable business tax regime) can raise the productivity of local firms, thereby enabling the latter to provide sufficiently attractive wages and employment prospects to draw in labour and capital into an area, and thence to stimulate local growth and yet higher productivity.

However, there is no one overarching theoretical perspective that is capable of capturing the full complexity of the notion of city competitiveness, and different perspectives have different interpretations and emphasise different determinants (or ‘drivers’). A city’s competitiveness cannot be conceptualized simply as a spatially ‘scaled down’ version of national competitiveness, nor as the spatially aggregated or ‘scaled up’ version of firm competitiveness. Whatever the concept actually means it surely must reflect something

about how a city's specific economic, social, physical and institutional assets come together to influence the willingness of business to invest there and for people to want to work and live there, and the effectiveness and efficiency with which the city's activities operate. As such, a city's competitiveness embraces a wide range of characteristics:

“Competitiveness is a holistic concept. While economic size and growth matter, several other factors determine a city's competitiveness, including its business and regulatory environment, its institutions, the quality of human capital, cultural aspects and the quality of environmental governance. These factors not only help a city sustain high economic growth, but also secure its future competitiveness.”
(Economist Intelligence Unit, 2013, p. 5).

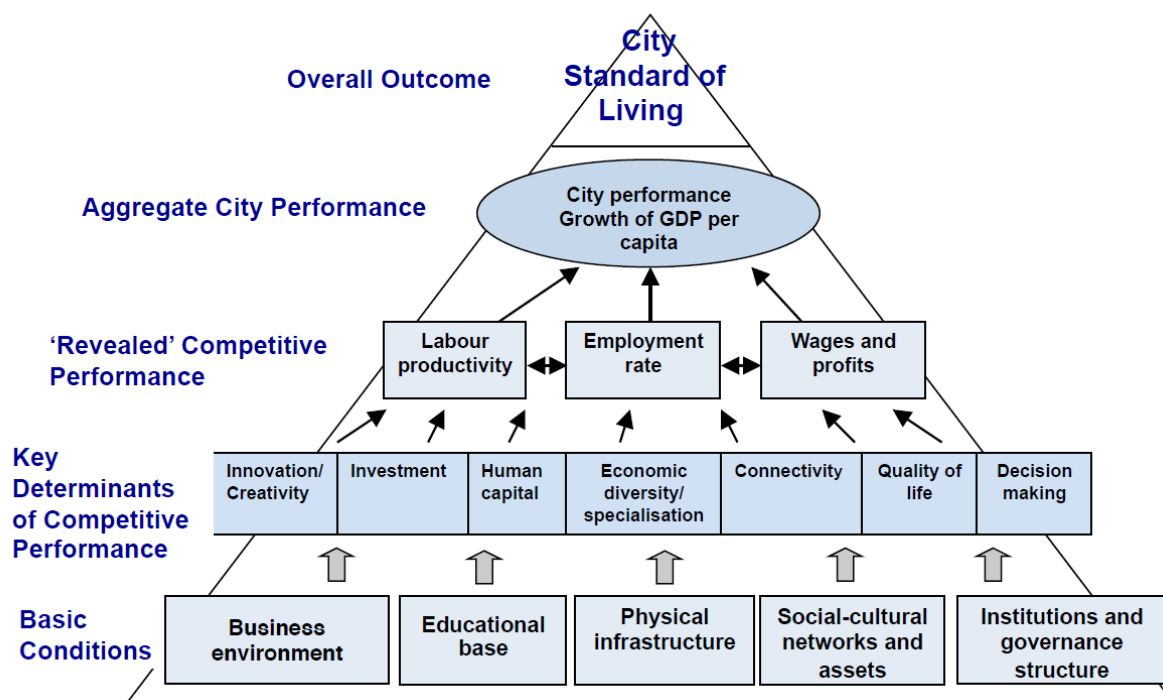
But, at the same time, competitiveness it is not a static feature or state of affairs. Rather, competitiveness has to do with:

“the ability of cities to *continually upgrade* their business environment, skill base, and physical, social and cultural infrastructures, so as to attract and retain high-growth, innovative and profitable firms, and an educated, creative and entrepreneurial workforce, to thereby enable it achieve a high rate of productivity, high employment rate, high wages, high GDP per capita, and low levels of income inequality and social exclusion.”(Martin and Simmie, 2008 p.336).

In other words, a city's competitiveness or competitive advantage is a *dynamic process*. In the long run, successful cities are those whose economies are able to adapt, restructure, and reorientate themselves as market opportunities emerge and disappear. How well a city's firms and workers adapt to the ever-shifting threats and opportunities that arise in the global economy determines whether they remain competitive in their respective industries and services. But adaptation is not simply about how a city's existing firms, industries and workers adjust or upgrade in response to or in anticipation of changing opportunities and conditions. It is also about how well a city's economy is able to develop *new* industries, sectors, skills and technologies over time, that is how well it is able to reconfigure its economic structure to take advantage of new markets and knowledges. Cities have to 'reinvent' themselves from time to time (Glaeser, 2005a). Thus, as Metcalfe, Foster and Ramlogan (2006) have argued in a more general context, what matters is *adaptive* economic growth.

One way of bringing together the many different factors that have been argued to be important in determining the dynamic competitiveness of cities is in terms of a 'pyramid' schematic, of the sort depicted in Figure 6.1. Whilst this is hardly a causal framework, it does at least emphasise the fact that a city's competitiveness rests upon a complex sets of basic factors, conditions and determinants. To fully analyse and explain differences in competitiveness across the UK's cities, and how those differences are changing over time, would thus be a major research task, both beyond the scope of this paper and requiring not only time series data on a wide range of characteristics, data that are not readily available, but also the specification of a plausible structural-causal model of the city economy. Limitations of space and resources do not permit us, therefore, to explore the relative importance of the factors set out in Figure 6.1.

Figure 6.1 Possible factors influencing a city's economic competitiveness



Source: Adapted from Kitson, Martin and Tyler et al (2004)

All we can do here is to examine one aspect of what we might call ‘revealed’ dynamic competitiveness, namely productivity. Most economists would agree that productivity is important since it shapes how a firm, industry, or a city trades. As Krugman (1996a) has put it, productivity may not be everything, but it is highly beneficial, since it helps a country – or a city – to produce and therefore consume more. In the long run it determines how fast incomes can rise, and hence is a key determinant – though by no means the only determinant - of the standard of living.¹⁵ Ideally, we would like to measure total factor productivity, but because of data issues, our analysis is restricted to labour productivity, as measured by GVA per person employed. While output per hour worked would be a better indicator of labour productivity, output per worker will reflect at least some of the factors and determinants identified in Figure 6.1.

6.2 How do British cities differ in productivity?

How then does productivity vary across British cities, and what have been the trends in urban productivity over the past three decades? Figure 6.2 shows that there are considerable differences in labour productivity across cities, with productivity in London (the highest) some 50-60 percent greater than in cities such as Burnley and Swansea. Further, there is a fair degree of correlation between city relative productivity levels in 1981 and those in 2011 ($R=0.55$), indicating a certain persistence in city disparities over time. What is also evident is that the correlation between city size and productivity is rather weak ($R=0.29$). The urban economics literature suggests that, because of agglomeration externalities, productivity should increase with city size (see, for example,

¹⁵ Of course, the standard of living has to do with more than productivity, or more broadly GDP per capita. It also has to do with aspects of everyday life that cannot be easily measured but which influence a person's or population's quality of life and well-being. Nevertheless, GDP per capita, that is the production of wealth, is key, since this determines the resources available, via taxation, for the various public services (such as a good health system and a good educational system) that contribute to the quality of life and to wellbeing.

Ahrend et al, 2014). While the largest city, London, certainly stands out with by far the highest productivity, most of the other large cities - Birmingham, Manchester, Sheffield, Newcastle and Glasgow – have below average productivity levels, lower than many smaller sized cities.

According to neo-classical growth theory, productivity levels should converge across regions and cities over time, as low productivity areas ‘catch up’ with higher productivity areas. There have been numerous empirical tests of this thesis, for several countries, using the ‘growth regression’ approach developed by Barro and Sala-i-Martin (1995), in which regional productivity growth (or growth in GDP per capita) over a particular study period is regressed against productivity (GDP per capita) levels at the start of the period. The relationship should be a negative one (areas with the lowest initial productivity levels should have the highest rates of productivity growth), and the coefficient of growth rates on initial levels provides an estimate of the rate of ‘convergence’ of productivity levels per annum. Applying this model to our cities gives the result shown in Figure 6.3. Although the relationship is negative, as predicted by theory, it is weak, and the ‘convergence coefficient’ suggests an extremely slow process of productivity convergence across the city system (just over 1 percent per annum). In combination, Figures 5.2 and 5.3 would seem to suggest that productivity differences across British cities have been firmly entrenched and persistent, at least over the past thirty or so years.

Figure 6.2 Productivity (GVA per person employed) across British cities, 1981 and 2011

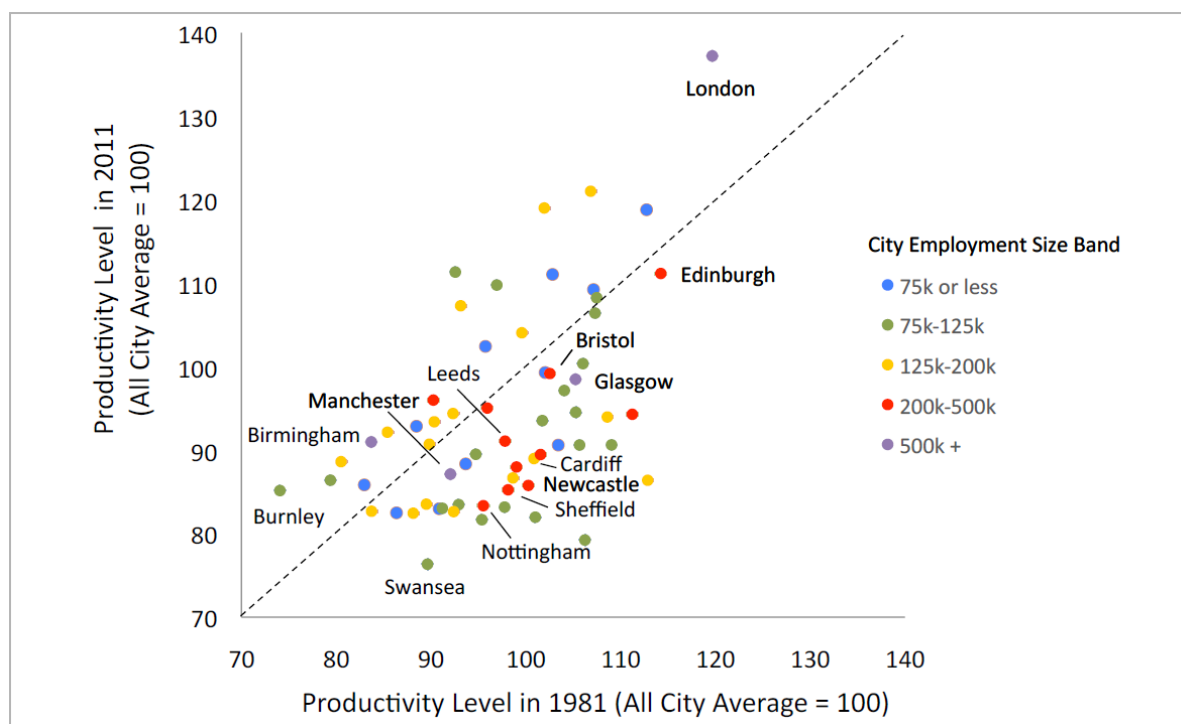
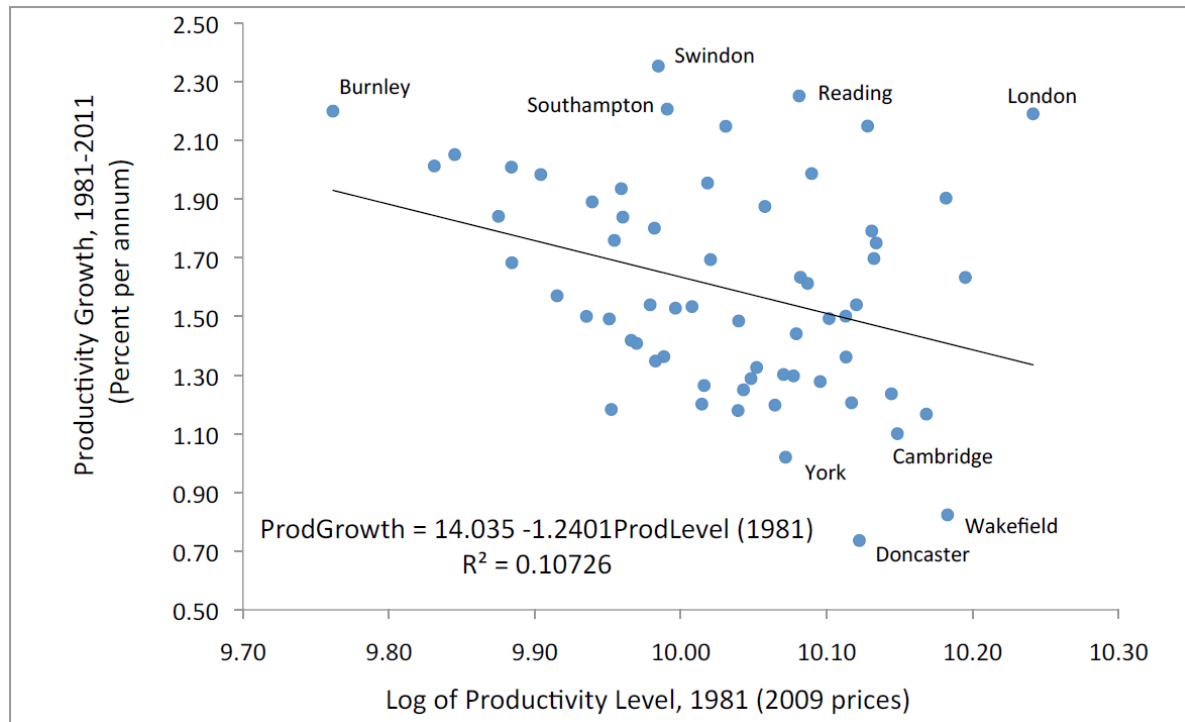


Figure 6.3 Very slow productivity convergence across British cities

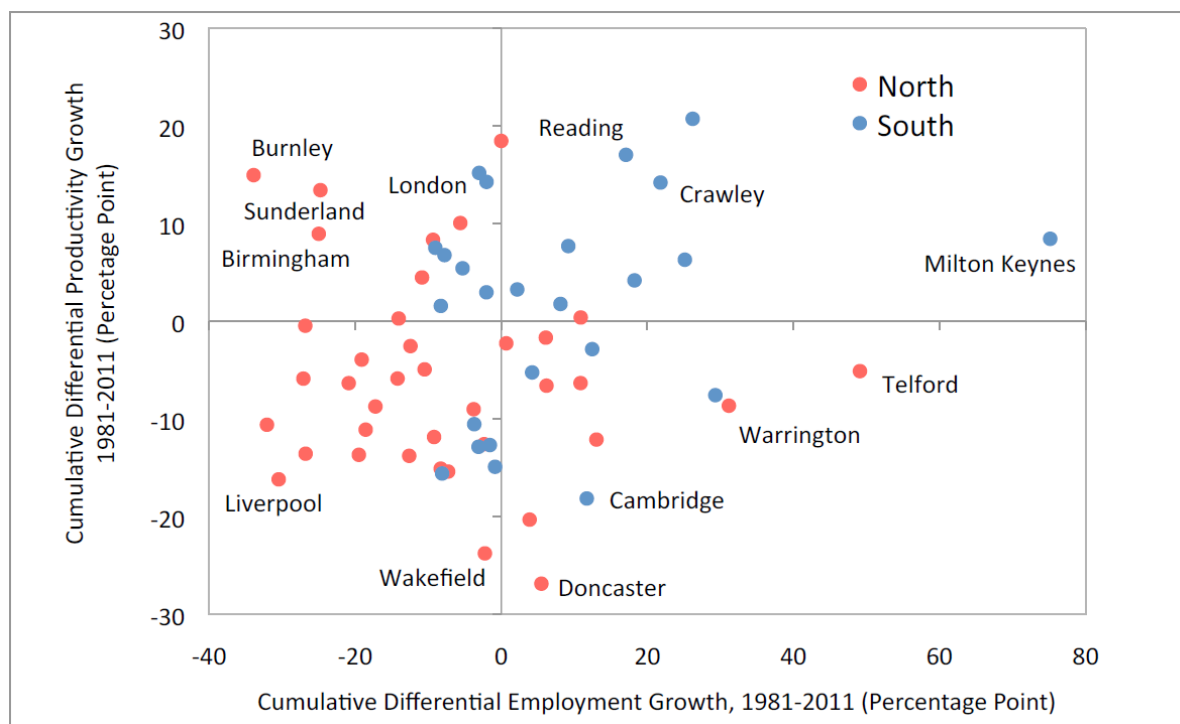


The wide range of city average annual productivity growth rates shown in Figure 6.3, from highs of around 2.20-2.30 percent (London, Swindon, Reading, Southampton, Burnley) to lows of 1.0 percent or less (Doncaster, Wakefield, York, Cambridge), hide some interesting dynamics. Changes in output per worker are of course determined by the relative changes in output and employment. At the aggregate level, a city's productivity per worker can rise because a city's output is increasing faster than its employment; indeed, productivity will rise even if output growth is minimal but employment declines (the same total output is being produced by a smaller total workforce). As we saw in Section 2.2, some cities have in fact experienced steady absolute declines in employment over the 1981-2011 period (see Figure 2.2). A successful city would be one that generates above average growth in both productivity and employment. It is of interest, therefore, to see how cities have fared in this respect.

Figure 6.4 compares cumulative differential productivity growth with cumulative differential employment growth across our cities. Only a few British cities have been in the favourable position of having relatively strong productivity growth and relatively strong employment growth (the upper right-hand quadrant in Figure 6.4). There are no Northern cities in this favoured quadrant. The majority of the Northern cities are in the bottom left-hand quadrant, characterized by relative slow productivity growth *and* relatively slow employment growth. On these grounds, and in these terms, it could be argued that, with a few exceptions, most Northern cities are less competitive than their Southern counterparts.

There are a small number of northern cities, such as Sunderland and Burnley, in which relative productivity growth has been above the national average but where this has been due to relatively slower employment growth rather than to above average output growth. In other cases, such as Doncaster and Warrington, above average employment growth has been accompanied by slow output growth, so that differential productivity growth has lagged that nationally. Cambridge is also in this quadrant, virtually uniquely amongst the southern cities; this may reflect the high concentration of public employment to be found there.

Figure 6.4: Differential Productivity and Employment Growth across the Cities, 1981-2011, classified into North and South



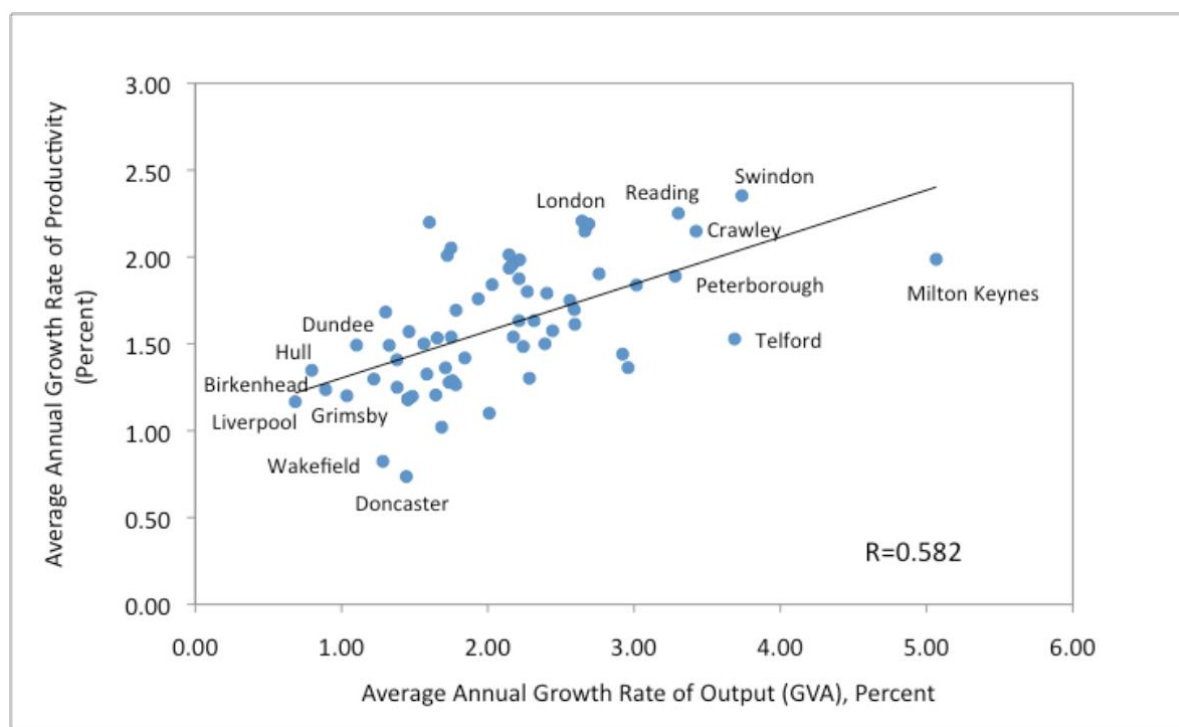
6.3 Productivity and output growth across cities

As shown in Figure 6.1, potentially, several factors shape a city's productivity growth. While we cannot investigate these here, for reasons explained above, we can examine the relationship between output growth and productivity growth across cities. There is an extensive literature on the relationship between output growth and productivity growth, much of it concerned with testing Verdoorn's, Kaldor's and Fabricant's laws, either for countries or industrial sectors within countries.¹⁶ These laws argue that higher output growth leads to higher productivity growth. The basic idea is that output growth facilitates increasing economic returns that arise from scale economies and opportunities for investment in technology, and that these in turn increase productivity (Scott, 1991). To the extent that the agglomeration economies associated with cities give rise to dynamic scale effects, a similar relationship might be expected to hold for cities, so that those cities that have experienced faster output growth should also have experienced a faster growth in labour productivity. According to Kaldor (1975, p. 893) the existence of a statistically significant regression coefficient of labour productivity growth on output growth of less than 1.0 is evidence of the existence of dynamic economies of scale. Because output growth appears on both sides of such a regression, however, Kaldor suggested a second regression, of employment growth on output growth, should also be estimated. Figure 6.5 and Table 6.1 show the results of these types of analysis for our 63 cities. While, strictly speaking these are cross-section regressions rather than times series Verdoorn-Kaldor-Fabricant type relationships, the findings are at least consistent with the idea that higher rates of city output growth foster increasing returns effects that raise productivity growth. The coefficient of productivity growth is significantly less than 1.0 (as required), and while that of employment growth on output growth is higher, it is

¹⁶ These three sets of 'laws' are interrelated and are all concerned with the relationship between productivity and output (see the detailed discussion by Scott, 1991).

still significantly less than 1.0, which is often also taken as confirming the existence of increasing returns effects.

Figure 6.5 Relationship between productivity growth and output growth across British cities: (Average Annual Growth Rates for 1981-2011)



Whilst Verdoorn type analyses are of interest, there has been some criticism of such models in the literature on the grounds that typically authors fail to consider the impact of differences in the quality of the available labour force (see Scott, 1991). In other words, is at least part of the explanation for the substantial differences in the growth of productivity the result of differences in the skill base? It seems highly likely. As we saw in Section 3.4, there is in fact growing evidence of the importance of skills and education in explaining differences in economic growth between cities. Glaeser (2005b), for example, finds a correlation of $R=0.50$ across Scottish local areas between the proportion of the local population with skills in 2001 and growth in local GVA over 1981-2001.¹⁷ This is a similar correlation to that which he finds for US cities. Unfortunately, historic time series data on skills for the British cities are not available, so that we cannot estimate trends in labour-quality adjusted productivity, over 1981-2011, nor relate productivity growth over this period to skills as they stood in 1981. But recent data constructed by the Centre for Cities for 2012, measuring the proportion of city populations that have qualifications at NVQ level 4 and above, confirm that cities vary considerably in this respect (Table 5.2). Whilst 65 percent of the working age population in Cambridge is educated to this level, the equivalent figure in Burnley is only 19 percent. The United Kingdom average was 34 percent.

¹⁷ To relate productivity growth over a given period to skills at the end of that period clearly raises issues of causality. However, as noted earlier, the relationship between productivity and skills is almost certainly a recursive or two-way one, since higher skilled workers will be attracted to cities with high rates of productivity growth, and hence output (and wage) growth, and the attraction of such workers will in turn raise productivity growth.

Table 6.1 City growth regressions

(i)	$Productivity\ growth = 1.032^* + 0.270^* Output\ growth$ (9.723) (5.648)	Adjusted R^2 =0.328
(ii)	$Employment\ growth = -1.010^* + 0.715^* Output\ growth$ (-9.627) (15.111)	Adjusted R^2 =0.783
<p>n=63 cities Estimated using average annual growth rates measured over 1981-2011 t-values in parentheses, * indicates statistically significant at 1 percent level Coefficients on output growth statistically less than 1.0 (at 1 percent level) in both equations</p>		

Table 6.2 Percent of Working Age Population with NVQ4 Qualifications and Above, 2012: Top Ten and Bottom Ten Cities

Percent			
Top Ten Cities		Bottom Ten Cities	
Cambridge	65.9	Liverpool	23.2
Oxford	62.3	Stoke	22.9
Edinburgh	56.1	Hull	22.9
London	46.5	Sunderland	21.9
Reading	42.6	Barnsley	21.4
Brighton	42.4	Wakefield	20.2
York	41.3	Grimsby	20.2
Glasgow	41.1	Southend	20.2
Aberdeen	41.0	Mansfield	19.9
Bristol	38.6	Burnley	19.4

7. Prospects and challenges

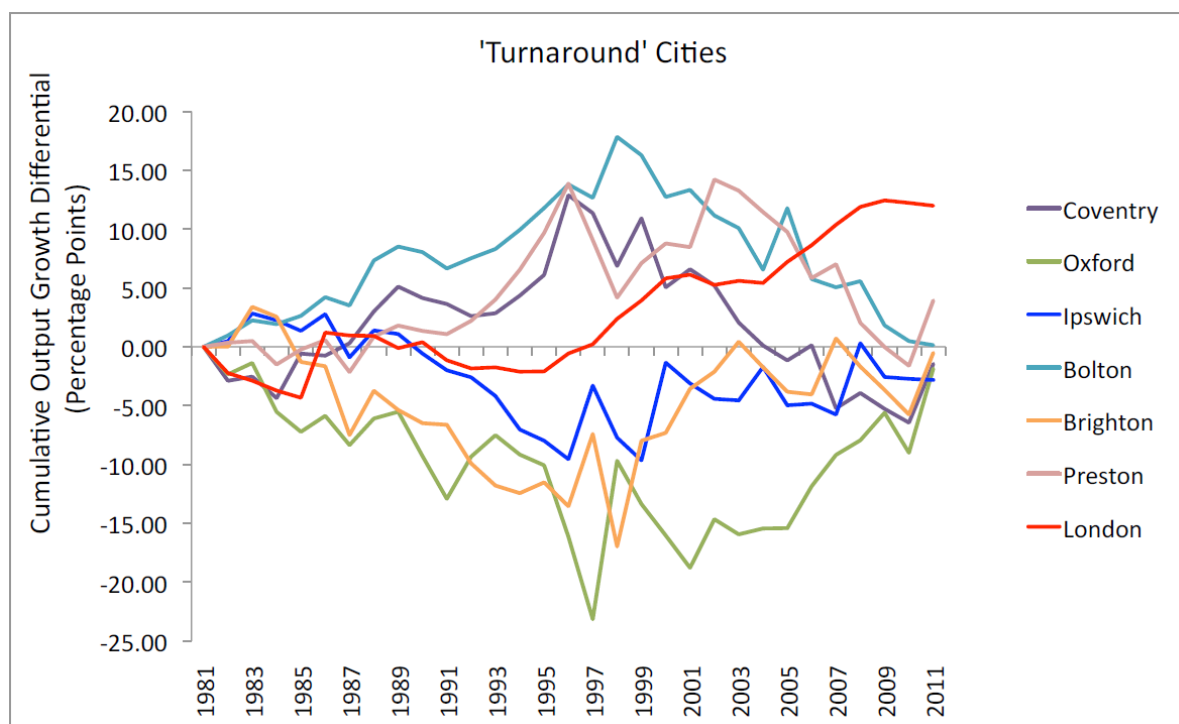
7.1 Future city growth paths

It is beyond the immediate brief of this particular Working Paper to engage in predicting or projecting the future economic growth trajectories of British cities over the coming decades (and in any case, as Niels Bohr once quipped, “prediction is very difficult, especially about the future”). Predicting such futures would be a brave undertaking, even if we had a well-confirmed structural-causal model of city growth to utilize for the exercise. And even if such a model were available, as we projected further and further ahead, so the confidence we could attach to such projections would rapidly diminish. Just as city economies have been undergoing rapid and transformative change over the past three decades, so they can be expected to experience equally significant change over the next three or four decades. Under these circumstances any forecast or projection would have to carry a serious public policy health warning! Having said that, one can of course ask the question ‘what if past trends continued unchanged into the future? – a sort of ‘business as usual’ scenario. Such an exercise would at least provide a ‘base-line’ counterfactual with which to stimulate discussion of possible policy challenges and options.

Our findings in Section 2 revealed, overall, a cumulative divergence in growth rates across the British cities, and marked and persistent differences in productivity, in both cases with a distinct North-South pattern. There is also, we suggested, a definite degree of path dependence to city growth and developmental trajectories: city growth paths do not, on the whole, change dramatically over night. And future population projections over the next few decades suggest that much of the increase that is forecast is likely to be focused in southern cities, especially London (see Working Paper 3). How these population increases will be absorbed by southern cities is not a trivial question. But, on the basis of past trends, overall one might expect that for the next few years at least, many northern cities will either continue to fall further behind those in the south in relative wealth creation, productivity and job generation, or at best ‘tread water’ in terms of their relative performance.

Yet, at the same time, there is nothing pre-ordained about such an outcome, and past trends may not necessarily continue into the future. In fact, over the past three decades some cities have experienced positive shifts of direction, or positive ‘turnarounds’, in their differential growth paths, Oxford, Brighton, Ipswich, and London being notable examples (Figure 7.1). On the other hand, others have undergone shifts in the opposite direction, from favourable relative paths to unfavourable ones, such as Bolton, Coventry, and Preston. Similar such changes and shifts are likely to occur in the future. Much will depend on how different British cities are able to attract and develop the growth sectors of the future.

Figure 7.1 'Turnaround cities': positive and negative shifts in growth path



7.2 Sources of growth in the post-industrial city

At the beginning of the paper (Section 1.3) it was suggested that since the beginning of the 1970s, UK cities have experienced an ongoing historic shift in economic orientation, driven on the one hand by a process of sustained deindustrialization and on the other by a progressive rise in service and tertiary activity. This shift is apparent in both output growth and job growth (Figures 7.2 and 7.3). Nine of the ten fastest growing sectors in output terms over the 1981-2011 period were service activities, with information and technology (IT) services clearly standing out as the growth leader, followed by head office and management functions, air transport, business support services, media, and finance and insurance. The only non-service activity in the top ten sectors was pharmaceuticals. At the other end of the spectrum, all of those sectors that experienced a decline in output over the same period were manufacturing activities. Likewise, all but one of the top ten job creating sectors were service activities, the exception being petroleum production, and all of the sectors that declined in employment were in manufacturing. Unfortunately our data, for 46 sectors, do not allow us to detect trends at more disaggregated level, for example the different activities that make up IT, or the role of biotechnology and life science activities. And the shift to the post-industrial economy involves the emergence of new activities (such as various kinds of digital activities) that are not captured by existing industrial classifications at all. Nevertheless, all in all, Figures 7.2 and 7.3 provide strong support for the idea that we have entered the age of the 'post-industrial' city.

Figure 7.2 Output growth rates by sector, 1981-2011

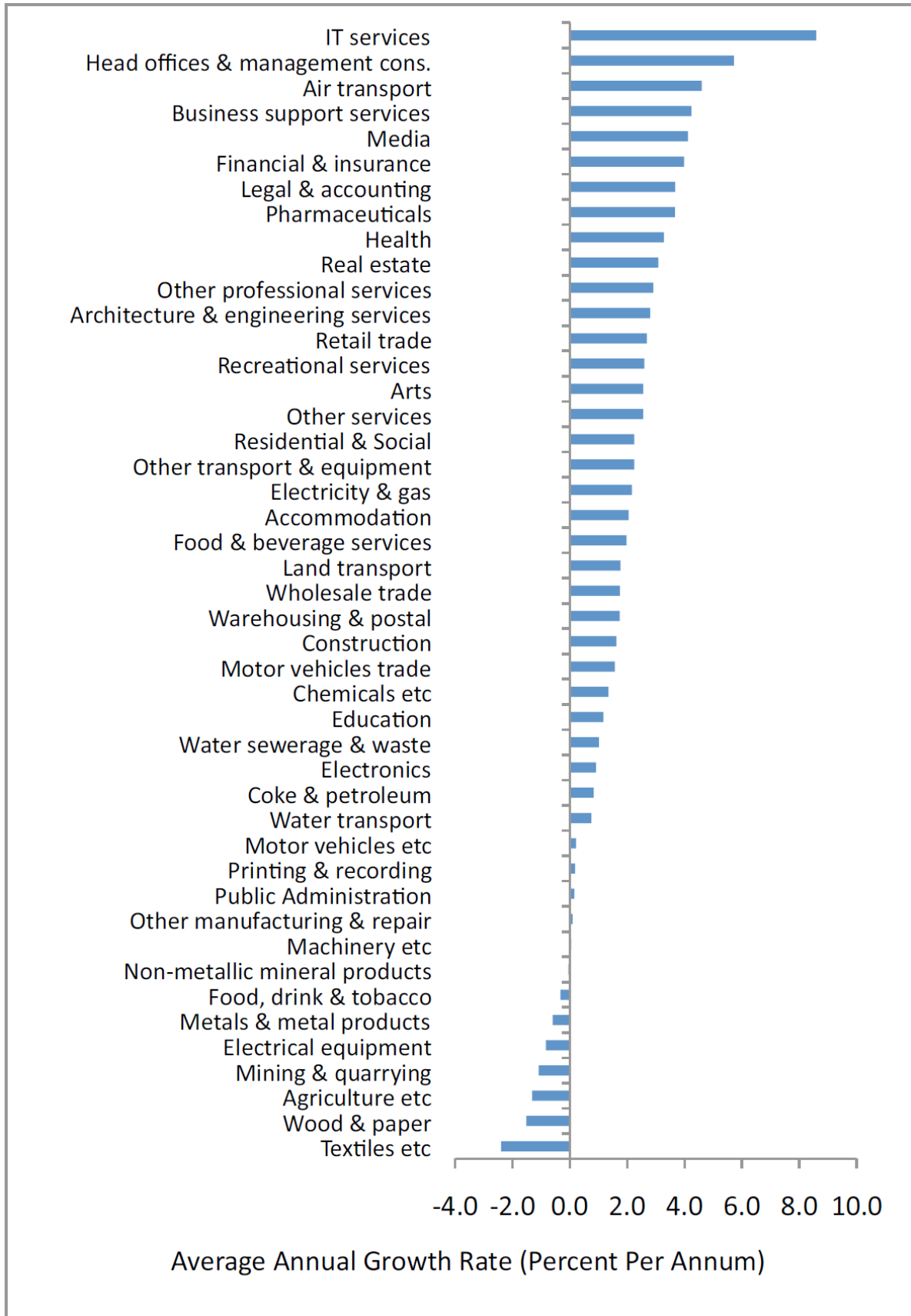
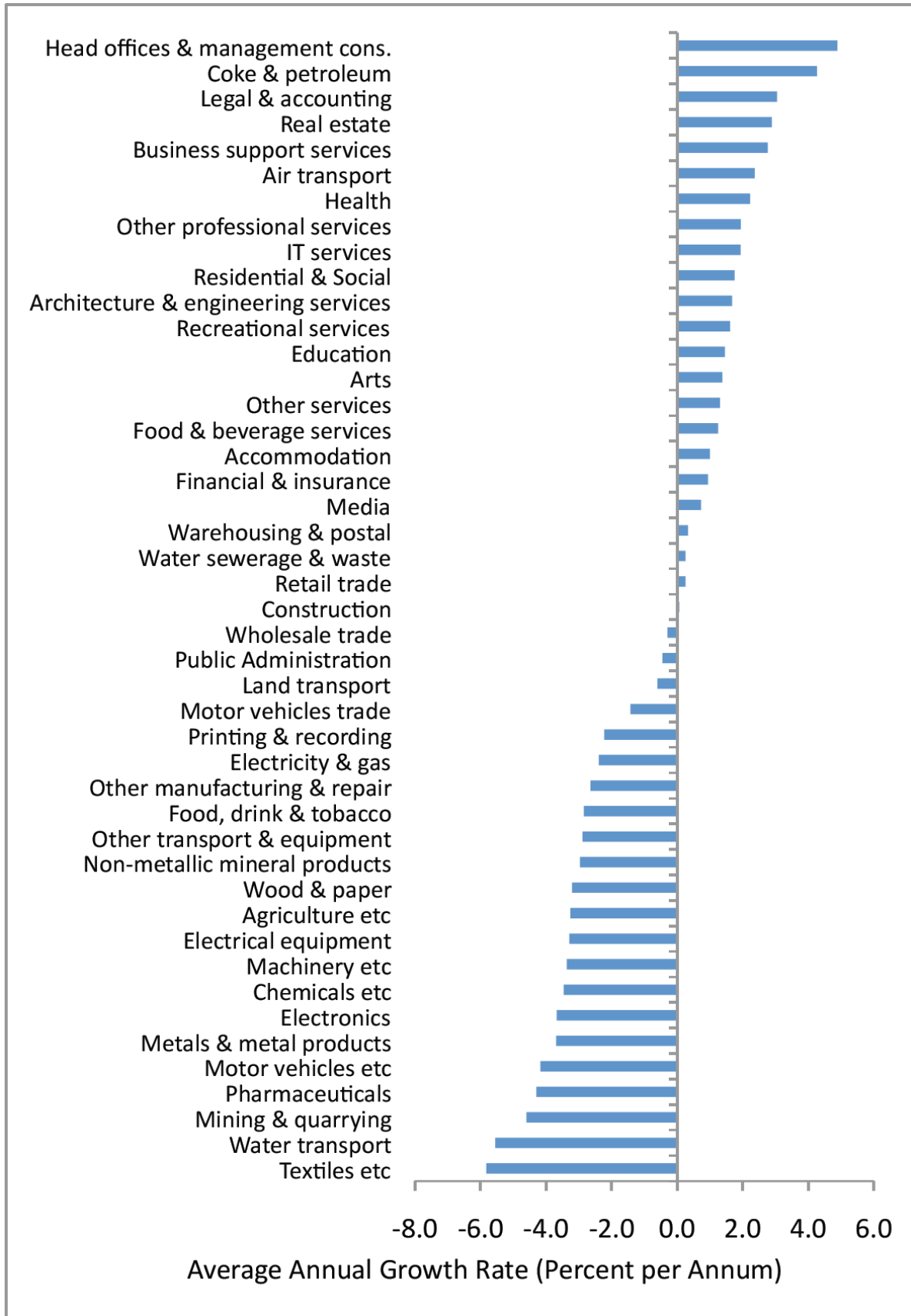


Figure 7.3 Employment growth rates by sector, 1981-2011



A basic issue, however, and one borne out by the analysis in this paper, is that not all UK cities and regions are making the transition to this new, 'post-industrial economy' with equal success (see also Martin, 2006a). Economic adaptation and re-orientation have

proceeded unevenly across British cities. Some of what were once the most industrial cities have found it difficult to ‘reinvent’ themselves as centres for service- and technology-led growth. London perhaps stands out as the city that has most effectively managed to re-orientate its economy around a post-industrial mode of growth. At the beginning of the 1970s, manufacturing still employed over a million workers in London. But by 2008 this had fallen to a mere 216,000, a contraction of some 835,000 or 80 percent. The problem was that during the 1970s and 1980s this retreat was not offset by job growth in other major sectors; hence the overall decline in total employment during these decades (Table 7.1). Although job growth in various services, especially business services began in the 1980s, it was not until after 1991 that it accelerated. Over the next seventeen years almost 930,000 net jobs in services were created, more than all of the job losses in manufacturing that had taken place since 1971 (Martin, 2013). Many of these were in business services including so-called ‘knowledge intensive business services’ (KIBS), those activities heavily reliant on professional knowledge of some sort.¹⁸ As Wood (2009) points out, as well as a source of job growth, KIBS are often assumed to be a sign of the increasing engagement of major cities like London in global networks of expertise, knowledge exchange and innovation. Certainly in the UK case, London has dominated the national expansion of KIBS, possibly accounting for half of all such jobs created since 1998 (Wood, op cit).

Table 7.1: Changes in London’s Employment by Major Sector, 1971-2008

Thousands	1971-1981	1981-1991	1991-2008	1971-2008
Manufacturing (inc. energy)	-387.5	-297.6	-150.1	-835.2
Services (total), including:	-22.1	148.0	929.7	1055.6
Banking, Finance	28.3	52.1	37.8	118.2
Other Business Services	46.8	224.4	500.9	772.1
Public Sector	27.4	-72.8	126.0	80.6
Total	-464.2	-145.3	742.8	133.3

In addition to KIBS, and often considered as a subset of the latter, over the last few years much has been made of the role of the so-called ‘creative industries’ as a new motor of growth in the post-industrial city (Florida, 2002; 2008). In its everyday usage, ‘creativity’ refers to all manner of imaginative and innovative practices. It could be argued in fact that all forms of production and service provision require some level of creativity to be exercised. However, in contemporary urban studies, and in some quarters of the policy community, creativity has taken on a narrower connotation, centering on the production of products, artefacts or displays which have cultural or artistic merit. Thus the ‘creative industries’ are typically identified with such sectors as architecture, media, fashion, film, advertising, IT software, television and radio, music, and the visual and performing arts, activities that have their origin in artistic or performative skills and which are imbued with

¹⁸ There is no universally agreed definition of KIBS, but the following typically figure in most discussions: marketing and advertising, computer services and telematics; training services; design; financial services (including banking, securities, stock-market-related activities, and insurance); office services; building services (e.g. architecture; surveying; construction engineering); management consultancy; accounting and bookkeeping; legal services; technical engineering; environmental services; Scientific/laboratory services; and R&D consultancy.

considerable aesthetic and symbolic value (Scott, 2000, 2001). According to some estimates, the creative industries are among the fastest growing sectors in the UK economy. The creative industries are reckoned to account for around 1.7 million jobs, or 5.6 of the total number of jobs in the UK (Department for Culture Media and Sport, 2014); some 790,000 of these are in IT, software and computer services. The GVA of the creative industries is reckoned to be about £71.4 billion (5.6 percent of total UK GVA). It is estimated that London contains a third of the nation's jobs in the 'creative industries' (Freeman, 2011; GLA Economics, 2010).

While the importance of these activities should certainly not be underestimated, the whole issue of what is and is not a 'creative industry' – and indeed a 'creative job' – is a contentious one. Estimates of employment and output in the 'creative industries' are known to be problematic. There are many creative jobs outside the so-called creative industries (for example many manufacturing jobs involve high levels of creativity and skill), and similarly many non-creative jobs exist within the creative industries (such as routine maintenance and office jobs). Indeed there are as many 'creative' jobs outside the 'creative' industries as there are within them (Higgs, Cunningham and Bankshi, 2008; Department for Culture Media and Sport, 2014). And creativity is hardly a new phenomenon as far as the economy is concerned: Victorian society was highly creative, industrially and culturally. What arguably matters is the 'creativity' of the UK economy as a whole, and more specifically the creative economy of its cities, than a narrow focus on a range of 'cultural' industries, important though these are. And it is the creativity and innovativeness of manufacturing and services as well as cultural activities that will determine the productivity (and hence 'competitiveness') of city economies.

There is, for example, considerable emphasis in Government policy statements on rebalancing the UK economy via the promotion of 'advanced manufacturing'. Given that the latter involves the development and application of advanced technologies and the production of innovative, complex and exciting products (the visual and aesthetic aspects of which can be of critical importance), advanced manufacturing is just as creative (and productive) as, say, architecture or fashion.¹⁹ A basic problem of the UK economy as a whole is that for the past three decades or more, successive Governments have promoted, and relied upon, a model of economic growth that has given priority to financial activity, exports and earnings, and a declining commitment to manufacturing, to 'making things'. Many routine manufacturing jobs have been off-shored, leaving the more advanced functions at home. But those advanced functions have not been seen as a critical source of wealth and job creation, and have attracted relatively little support. The UK patenting rate has fallen behind that of its international competitors, and many UK manufacturing firms complain of skill shortages in critical occupations (especially engineers). In the 19thC, the UK was one of the most innovative and creative economies in the world. The Government is right to want to recapture that spirit in the nation's manufacturing base, but the effort required for this to happen will have to be massive. Not all UK cities can build their economic futures solely on the so-called 'creative' industries; for them a growth model built at least in part around the development of 'advanced manufacturing' may well prove decisive.

¹⁹ One thinks here, for example, of Dyson, the highly innovative UK manufacturer of vacuum cleaner and ventilation products, which not only embody sector-leading, indeed globally-leading, technologies, but are also designed with aesthetic and visual appeal very much in mind.

7.3 Policy challenges

As was footnoted in Section 2.1, a key concern of the Coalition Government elected in 2010 has been to promote a spatially rebalanced economy, one in which all parts of the country – all of our cities, towns and localities – contribute to and benefit from economic growth. Our research for this paper has shown just how spatially *unbalanced* Britain's urban economic growth machine has become. British cities have varied markedly in their rates of economic growth (whether of output, employment or productivity). Moreover, there is a distinct North-South pattern to this imbalance, with most cities in the North (approximately north of a Wash-Severn line) exhibiting lower rates of growth over the 1981-2012 period than those in the South. Furthermore, thus far there have been few significant or consistent signs of these northern slower-growing cities catching up with their more buoyant southern counterparts. *This has to be one of the key challenges facing policy-makers over the coming decades.*

Yet it is a challenge that has elicited some strident opposition. The UK's spatially unbalanced economy has led some observers to argue that improving the growth prospects of northern cities is neither feasible nor even desirable, and that the growth of London should take priority:

“There is no realistic prospect that our [northern] regeneration towns can converge with London and the South East. There is, however, a very real prospect of encouraging significant numbers of people to move from those towns to London and the South East... The implications of economic geography for the south and particularly South East are clear. Britain will be unambiguously richer if we allow more people to live in London and its hinterland.”(Leunig and Swaffield, 2008, p.5).

The issue is compounded by the fact that some sections of the literature on the cities and the spatial economy, especially the New Neoclassical Urban Economics and New Economic Geography (NEG) theory, have been used to support an argument for encouraging yet more agglomeration of economic activity in south east England, and London especially. The key assertion in the NEG models, for example, is that the increasing spatial concentration of economic activity in just a few city-regions (or even in just one major city-region – such as London) will benefit national growth, whereas a geographical configuration in which economic activity is more spread out between the various cities and regions of a nation could mean a lower rate of growth in the nation as a whole (see for example, Baldwin, et al, 2003). It is but one step to then argue that that policies that seek to achieve a more even distribution of activity across the cities and regions of a country may in fact be nationally inefficient; in other words, that a ‘trade-off’ may exist between the pursuit of national growth and the reduction (or rebalancing) of spatial (inter-city or inter-regional) economic disparities (Baldwin, et al, 2003; P Martin, 2005; Lee, 2006; World Development Report, 2009).²⁰

²⁰ A UK Treasury paper advances this view quite explicitly:

“a positive relationship exists between regional disparities and national growth, forming a policy trade-off between economic efficiency and a regionally equitable spread of economic activity... Theory and empirical evidence suggests that allowing regional concentration of economic activity will increase growth. As long as economies of scale, knowledge spillovers and a local pool of skilled labour result in productivity gains that outweigh congestion costs, the economy will benefit from agglomeration, in efficiency and growth terms at least.” (Lee, 2007, p. 24).

Such arguments can be contested not just on social equity grounds: do we really just let the economies and communities of northern cities shrink and atrophy? – but also on sustainability grounds: is continued concentration of growth, economic activity, and population in London and the South East really sensible, given the impacts of such increased agglomeration on costs, the environment and the quality of life in this part of Britain? Further, the assumption seems to be that the agglomeration of activity in London and its surrounding cities and towns - the polycentric mega-region of the Greater South East - is simply the inexorable outcome of the logic of market forces, that these locations are simply where market forces are attracting people and firms to concentrate. Of course, market forces play a role: but they do not operate in a vacuum. The fact is that the London economy, like other regions and cities of the UK, is to a significant degree underwritten by the state – by some £80 billion, or over £10,000 per capita, in 2007 (Oxford Economics, 2007). On several dimensions (eg infrastructure, education) it receives more public expenditure per capita than any other city in the UK. Much of this has gone into major new infrastructural projects and programmes intended to improve the functioning of London's economy and its accessibility to its surrounding commuter hinterland. Thus while London certainly makes a very valuable net positive contribution to public finances (and thence to public spending in the other parts of the UK), to attribute this purely to the 'market performance' of London's economy would be quite misleading: public spending plays a crucial role in underpinning London's economy. And further still, no-one has yet convincingly shown that Britain *would* be "unambiguously richer" if we let northern cities fall further behind in wealth creation and incomes in favour of the concentration of more and more of the nation's economic activity in the Greater South East of England. And we simply do not know the full details of the 'balance sheet' of the benefits and costs of promoting yet more growth and expansion in London (see Deutsche Bank Market Research, 2013).

But to question or oppose the Leunig and Swaffield type view is not to argue that the growth of southern cities, and London in particular, should somehow be suppressed and diverted to northern cities. Economic growth is not some simple 'spatial zero-sum game', or 'spatial equity versus national efficiency' trade-off (Martin, 2008; Gardiner, Martin and Tyler, 2010). There is not some fixed amount of economic growth or activity that has to be distributed more equally across the national urban system, favouring some cities at the cost of others. Rather, the challenge is to foster and harness the indigenous economic potential of all cities, but especially northern cities, and to give the latter 'second wind', to use Krugman's (2005) phrase. How best to do that is, of course, a topic of considerable debate. Some observers argue that specific 'place-based' policies and interventions are ineffective, and that general, economy-wide 'people-based' measures, for example to promote skills and training, or to boost small firm growth, will have more impact. Up-skilling the workforces of northern cities, indeed of all cities, is undoubtedly crucial for future success (Krugman, 2005; Glaeser, 2005b). But while such general people-based measures may be necessary, they are unlikely, of themselves, to be sufficient to boost economic growth in northern cities. It is well known that skill differences between cities are persistent over time. It is also the case that a city's skill base reflects, to a significant degree, a city's past economic development path, its inherited mix of industries, technologies, and activities. In short, *places shape skills, and skills shape places*.²¹ Improving the growth prospects of the UK's northern cities will require both people-based *and* place-based policies.

²¹ There appears to be an assertive view in certain circles that once we 'control' for all sorts of 'people characteristics' – such as skill, personal enterprise, entrepreneurship, and the like – typically via some

Both Krugman (op cit) and Glaeser (op cit) point to a range of other growth-inducing factors that may well require locally-targeted and locally-specific policy support or intervention, including good schooling and education institutions, a local culture of entrepreneurship, modern and efficient infrastructure, good access to investment finance, freedom to spend local business taxes, and effective local political and business leadership, to name but some. A shared vision by local political and business leaders is increasingly stressed in the urban growth literature. But for local political leadership and developmental visions to have impact, the necessary finances have to be available. In the UK this would require the large-scale devolution of public spending, for example on infrastructure, housing, education, skills, and technology, from central Government to local and city authorities, of the kind recently proposed by Michael Heseltine (2013).²² Different cities have different problems hindering growth, and require different policy mixes. Devolving spending (and tax-raising authority) to cities would at least allow cities themselves to devise policies appropriate to their particular circumstances, challenges and opportunities. The new City Deals recently introduced by the Government are arguably one move in this direction, although city authorities will have to find much of the agreed funds themselves, a not altogether easy task in the present financial climate.²³ The fact of the matter is that almost all central Government policies, from spending on infrastructure, to measures to support the housing market (such as the new Help to Buy scheme), to small firm support policies, impact differently on different cities. The impact of these may even outweigh explicit city and urban policies. The reality is that ‘non-spatial’ macro-economic policies have spatial effects which need not be neutral across different cities, and indeed may have unintended negative consequences in their impact. Little is known about how central government policies, fiscal and monetary, shape city outcomes.

It is not our purpose in this paper to enter into a detailed discussion and analysis of various policy options for boosting the economic growth of the UK’s lagging cities over the coming decades. But our analysis in this paper does suggest that the future policy challenge is an immense one, and that to be successful future policy will have to be radical in nature, and quite different from that of the past. At best, previous urban policies and programmes may have stemmed the relative slippage of northern cities, but they have clearly failed to prevent city growth paths from diverging. We have argued elsewhere (Tyler et al, 2014) that if Britain’s northern cities are to repeat the success of London in turning themselves around from their industrial past then they will require

sophisticated econometric modelling procedure, then ‘place’ emerges as all but irrelevant for explaining spatial differences in productivity and growth. However, such procedures treat place or location in a naïve way, as simply a ‘container’ with no causal powers, and whose attributes are simply aggregations or averages of ‘people characteristics’. Little wonder, then, that if these latter are somehow ‘controlled’ for econometrically, places appear to become ‘irrelevant’. The complex interdependencies and interrelationships between place, people and production were stressed some 75 years ago by August Lösch (1939) in his classic *Economics of Location*, one of the foundational texts of economic geography, a point seemingly overlooked in arguments which treat people and place as independent and that claim that policies for the former are all that is required while place-based policies are redundant and ineffectual.

²² In his *No Stone Unturned*, Heseltine reckons that perhaps as much as £50billion annually of public spending currently controlled and allocated by central Government could be devolved to localities. As noted earlier, he is also a leading advocate of strong local leadership, for example in the form of city mayors.

²³ The case of Cambridge is illustrative. This city has recently been awarded a City Deal ostensibly worth £1billion, mainly to undertake substantial improvements to its transport infrastructure. But the city authority itself will have to find £500million of this. Further, of the £500million coming from central Government, only the first £100million is guaranteed, and the remainder is to be in two stages, each of £200million, conditional on targets being met, and not scheduled until 2019 and 2024.

much greater levels of investment in key infrastructure, skills, business development and innovation than is currently possible from the resources that are currently made available to them from central government.

As we were revising this Working Paper, the Chancellor of the Exchequer announced his intention to create ‘northern powerhouse cities’ to rival London, and has proposed a 15 year investment plan of over £56 billion to improve the rail and road infrastructures and connectivity between Newcastle, Sheffield, Leeds and Manchester.²⁴ This proposal chimes with recent calls for an interconnected north from these cities themselves (*One North*, 2014). Whilst undeniably a major step in the right direction, it is not clear that such a scheme would necessarily benefit other slow growing northern cities, such as Middlesbrough, Liverpool, Wakefield, Hull, Stoke. Nevertheless, there appears to be an emerging and much needed recognition by northern cities that whilst three decades of regeneration measures may have helped to transform their rundown inner urban areas, these schemes have not ignited a major phase of economic growth, and that there is now a need to develop strategies that focus specifically on that objective. Whether the Government’s proposals for ‘powering up’ Britain’s northern cities succeed in propelling a new historical phase of city economic development beyond London only the next two to three decades will tell. There is though one benefit of the Government’s announcement: it has opened up a long overdue debate about what is needed to ensure that northern cities and not just London can drive the UK’s economic future.

7.4 Some final comments

The analysis in this paper raises some key issues. For one thing, it casts some doubt on what have become two conventional wisdoms in the literature on cities and growth, claims that have found their way into policy discourse, namely that both agglomeration, or city size, and city specialisation are necessarily associated with faster growth. Our findings suggest these claims cannot simply be taken as fact, or at least are much more complex or nuanced than normally assumed. For UK cities, for the period studied here, there is no significant or consistent relationship between city size and city economic growth. Some of the large core cities are in fact among the growth laggards. Many smaller cities have much faster growth rates. And most of the fastest growing cities, of varying sizes, are in the south of the country, suggesting perhaps that (commuting) proximity to London plays a role, or that cities in the Greater South East function as interconnected nodes in a sort of ‘mega-regional production system’. This might suggest that the strategic development of similar polycentric mega-regions in, say, the Midlands, the North West, and the North East ought to be given serious examination, though it would require a sea-change in public policy thinking about the spatial structure and management of the national economy.

Our finding that industrial structure in general, and specialisation more particularly, play relatively minor roles in explaining differences in city growth rates, is equally contentious. Much has been made recently about the need for cities (and regions) to specialise if they are to be successful. Indeed, in one version of this view – the so-called ‘smart specialisation’ thesis – the argument is that, using targeted ‘smart’ R&D, innovation and technology policies and interventions, cities (or regions) should seek to specialise and build competitive advantage in those sectors of greatest strategic potential.²⁵ However,

²⁴ Statement by the Chancellor of the Exchequer, 27 June, 2014.

²⁵ The ‘smart specialisation’ policy model, has been embedded within the European Commission’s regional policy where it is known as also known as RIS3 (Research and Innovation Strategies for Smart

the whole question of specialization versus diversification, we would argue, is in need of much more rigorous definitional, conceptual and empirical analysis before it can be assigned an unambiguous policy role. One intriguing issue in the UK context is that historically many cities did indeed rise to prominence and success on the basis of a high degree of specialisation in this or that industry (as we briefly touched upon in Section 1.3); in some towns and cities in 19thC Britain, 60 or even 70 percent of the workforce was employed in a given industry. Such levels of economic specialization are now rare. As we revealed in Section 5, within the limitations of our data, the evidence suggests that the degree of specialization of city economies has declined over the past thirty years or so, and that city economic structures have become more similar to one another. To be sure, particular activities are to be found mainly in certain cities; but those same cities may have a variety of other activities, so that overall they in fact have quite diverse economic structures. What may really matter for city growth is what we might call 'clustered diversity', the presence of several sectors each of which forms a dynamic local business cluster.²⁶

Another key issue that requires more investigation is the role that competitiveness plays in city growth. Our finding in Section 5, that city-specific factors have played a more prominent role than economic structure, was interpreted in terms of 'competitiveness' or 'competitive advantage'. What precisely does this notion mean when applied to a city? A crude measure, one used in this paper, is productivity. But how this is defined is equally debatable. And what determines a city's productivity? As Figure 6.1 suggests, both the idea of city competitiveness and what makes a city more or less competitive, are highly complex questions, requiring far more analysis than has been possible here. The data required in order to explore the sort of factors set out in Figure 5.1 are considerable, and not readily available for our PUAs (or indeed for other types of local area). Further, the notion of competitiveness is hotly disputed within economics, let alone in urban and regional studies. Yet, the fact of the matter is that most city economies, like most regional economies, depend for their success in generating wealth and employment on having comparative or competitive advantages of some sort, and comparative advantage derives from a host of factors that have to do with more than sectoral structure. What matters is not so much what a city does, but how well, how efficiently and effectively, it does it. Moreover, as we suggested in Section 6, a city's competitiveness or comparative advantage is constantly in dynamic flux. What is essential to dynamic city comparative advantage is *adaptation* to continuously changing and evolving markets, technology and competition. How well a city's economy adapts to ever-shifting threats and opportunities that arise in the global economy determines whether it remains competitive.

And this relates to a final set of issues which we have not been able to pursue in this paper, yet which are fundamental to understanding the relative performance of the UK's cities and how they might evolve over coming decades, namely how our cities fit into the wider global economy, what role they play within it, and how individual UK cities compare to, and compete with, similar counterparts elsewhere. Individual cities are linked into the global economic system to varying degrees and in a variety of ways – via exports and imports, supply chains, corporate ownership structures (having overseas branches of local firms, or containing local branches or affiliates of overseas firms), foreign

Specialisation) (see http://ec.europa.eu/research/regions/index_en.cfm?pg=smart_specialisation) In one sense the phrase is an odd one: who has ever advocated 'stupid specialisation' as a policy model?

²⁶ The literature on clusters is vast. Michael Porter has been the prime exponent of the notion (see for example, Porter, 1994, 1995, 2000, 2001). Evaluative discussions can be found in Martin and Sunley (2003), Asheim, Cooke and Martin (2006), and Huggins and Izushi (2011).

investment in local public infrastructures and utilities, collaborative ventures between local and overseas firms, and so on. In one sense, individual cities may be in more or less direct competition with similar cities in other countries; others regularly compare or 'benchmark' themselves with such centres; while others may look to overseas cities for 'best practice' policy or governance models to emulate. A full understanding the different growth experiences of the UK's cities would necessitate placing them in this wider context, for one thing is certain: the global economy of five decades hence will look different from the global economy of today.

8. Annex: Definitions and data

8.1 Defining the cities

There is no agreed definition of a 'city' in terms of geographical boundaries. Different authors, and different studies, use different definitions. In the UK there is no single consistent or official definition that is used as the basis for the collection of economic data series on cities, nor as the basis for public policy interventions. This makes analysis, especially over time, far from straightforward, and contrasts with the situation in the United States, where an official system of 381 Statistical Metropolitan Areas, defined by the US Office of Management and Budget, can be used to study urban trends and developments.

Ideally, cities would be defined spatially in economically functional terms. Towns and cities can be thought of as labour markets, so that an obvious functional definition would be in terms of distinct 'travel to work' areas (TTWAs), that is as spatial units within which the bulk of the resident people also work. This is the basis of the US Statistical Metropolitan Areas referred to above: these are defined as one or more adjacent counties or county equivalents that have at least one urban core area of at least 50,000 population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties. Defining cities as TTWAs obviously requires the analysis of commuting patterns. In the UK, TTWAs are defined as those areas in which generally at least 75% of an area's resident workforce work in the area and at least 75% of the people who work in the area also live in the area. The area must also have a working population of at least 3,500.

But using these TTWAs to delimit cities is not unproblematic. There is still the issue of designating which TTWAs correspond to cities: what should be the minimum population size to qualify as a city? Given that some TTWAs in the UK are quite small, in terms of population, and hardly constitute cities, some criteria would have to be found to amalgamate neighbouring TTWAs into larger units. There is then the problem that for areas with a working population in excess of 25,000, self-containment rates as low as 66% are accepted. Further, there has been a steady trend over time in longer-distance commuting, so that the geographical boundaries of many TTWAs have expanded. The result is that while there were 334 TTWAs across the UK in 1981, in 1991 this had fallen to 314. The current TTWAs were defined in 2007 using 2001 Census information, and number 234. Yet another revision of the TTWAs, which is almost certain to entail a further redrawing of their boundaries and reduction in number, based on the 2011 Census, is due in 2014. Now while it could be argued that these changes merely reflect the reality that the labour market boundaries of cities have expanded as travel to work patterns have widened, it means that data on TTWAs are not comparable over long spans of time (the same issue arises with the Statistical Metropolitan Areas in the US). And in any case, there are only limited economic data collected for the UK TTWAs; crucially no regular output data are published on this basis. The only plausible way forward would be to select those local authority districts that corresponded most closely to the 234 TTWAs and then to construct the required data series from local authority estimates.

Given these problems, and in the absence of official city statistical units, in this Working Paper we employ the so-called Primary Urban Areas (PUAs), as defined and used by the Centre for Cities.²⁷ *These are the city definitions that have been agreed as the basic units for the Future of Cities Foresight project, and thus our work in this paper is on a comparable geographical base with other Working Papers in the project.* The PUAs are defined as major towns and cities with a population of 125,00 or more, and are identified in terms of their geographical ‘built-up’ area within contiguous local authority districts. The list of 64 such PUAs and the local authorities which are included in them is given in Table 8.1, and their locations in Figure 8.1. These PUAs cover about 10 percent of the national land area, but account for more than 60 percent of national output (GVA), and contain 70 percent of the country’s skilled workforce. These PUAs do not match travel to work areas, however, and are typically smaller in geographical coverage than the latter, so that they are not wholly congruent with cities as commuter-based economically functional units. This is a not insignificant limitation of using these PUAs, and should be borne in mind when interpreting the analyses contained in the paper. Further, time series data of the sort need for this paper are not readily available, and had to be constructed from local authority district data – a not inconsiderable task.

²⁷ See www.centreforcities.org/puas. PUA data only exists for English cities. For Welsh and Scottish cities, the corresponding local authority area is used, with the exception of tightly bounded Glasgow, which is defined as an aggregate of five local authorities. Belfast is defined as the aggregate of Belfast City, Carrickfergus, Castlereagh, Lisburn, Newtownabbey and North Down. But as mentioned earlier, unfortunately consistent output and employment data, comparable to the remaining PUAs, are not available for Belfast, which is therefore excluded from the analysis in this paper.

Table 8.1: The UK System of Cities Defined as Primary Urban Areas

City and Local Authority Districts Included	
ENGLAND	
Aldershot Rushmoor, Surrey Heath	
Barnsley Barnsley	
Birkenhead Wirral, Ellesmere Port & Neston*	Dartford, Elmbridge, Epsom and Ewell, Mole Valley, Runnymede, Spelthorne, Watford, Woking
Birmingham Dudley, Birmingham, Sandwell, Solihull, Walsall, Wolverhampton	
Blackburn Blackburn with Darwen	Luton Luton
Blackpool Blackpool, Fylde, Wyre	Manchester Bury, Manchester, Oldham, Salford, Stockport, Tameside, Trafford
Bolton Bolton	Mansfield Ashfield, Mansfield
Bournemouth Bournemouth, Poole, Christchurch	Middlesbrough Middlesbrough, Redcar and Cleveland, Stockton-on-Tees
Bradford Bradford	Milton Keynes Milton Keynes
Brighton Brighton and Hove, Adur	Newcastle Gateshead, Newcastle upon Tyne, North Tyneside, South Tyneside
Bristol City of Bristol, South Gloucestershire	Northampton Northampton
Burnley Burnley, Pendle	Norwich Broadland, Norwich
Cambridge Cambridge	Nottingham Nottingham, Erewash, Broxtowe, Gedling
Chatham Medway	Oxford Oxford
Coventry Coventry	Peterborough Peterborough
Crawley Reigate and Banstead, Crawley	Plymouth Plymouth
Derby Derby	Portsmouth Portsmouth, Fareham, Gosport, Havant
Doncaster Doncaster	Preston Chorley, Preston, South Ribble
Gloucester Gloucester	Reading Bracknell Forest, Reading, Wokingham
Grimsby North East Lincolnshire	Rochdale Rochdale
Hastings Hastings	Sheffield Rotherham, Sheffield
Huddersfield Kirklees	Southampton Southampton, Eastleigh
Hull City of Kingston upon Hull	Southend Southend-on-Sea, Castle Point, Rochford
Ipswich Ipswich	Stoke Stoke-on-Trent, Newcastle-under-Lyme
Leeds Leeds	Sunderland Sunderland
Leicester Leicester, Blaby, Oadby and Wigston	Swindon Swindon
Liverpool Knowsley, Liverpool, St. Helens	Telford Telford & Wrekin
London Gravesham, City of London, Barking and Dagenham, Barnet, Bexley, Brent, Bromley, Camden, Croydon, Ealing, Enfield, Greenwich, Hackney, Hammersmith and Fulham, Haringey, Harrow, Havering, Hillingdon, Hounslow, Islington, Kensington and Chelsea, Kingston upon Thames, Lambeth, Lewisham, Merton, Newham, Redbridge, Richmond upon Thames, Southwark, Sutton, Tower Hamlets, Waltham Forest, Wandsworth, Westminster, Epping Forest, Broxbourne, Dacorum, Three Rivers,	Wakefield Wakefield
	Warrington Warrington
	Wigan Wigan
	Worthing Worthing
	York York
	SCOTLAND
WALES	Aberdeen Aberdeen
Cardiff Cardiff	Dundee Dundee
Newport Newport	Edinburgh Edinburgh
Swansea Swansea	Glasgow East Dunbartonshire, East Renfrewshire, Glasgow City, Renfrewshire, West Dunbartonshire
NORTHERN IRELAND	
Belfast Belfast City,	
Carrickfergus	

(Source: Centre for Cities: www.centreforcities.org/assets/images/charts/12-03-19%20Primary%20Urban%20Areas.pdf)

Figure 8.1 Location of the Primary Urban Areas



(Source: Centre for Cities: www.centreforcities.org/assets/images/charts/12-03-19%20Primary%20Urban%20Areas.pdf)

The resultant series, described below, are the first of their kind. Although PUAs are not functional economic areas in the same way that TTWAs would be, given that our constructed employment and output data are *work-place based*, and not residence based, PUAs do capture a high proportion of the economic activity in the cities concerned.

8.2 Constructing the data

The following description of the data construction process has been provided by Cambridge Econometrics (CE), from whom the data were purchased. The CE data were provided pre-aggregated to the above-mentioned definitions of Primary Urban Areas. The data construction process can broadly be split into two parts, the first dealing with employment data and the second part dealing with the derivation of the constant price GVA data. Both datasets are workplace-based.

I. Employment data

Stage 1: Construction of UK sectoral data

The production of the employment data starts with the construction of UK series at an 86-sector level of disaggregation. Data are estimated for male and female, full-time and part-time and for self-employment; ie six types of employment. Raw data are taken from the ONS but at this level of disaggregation some numbers are CE's own estimates.

Stage 2: Regionalisation (NUTS1)

Following the completion of the UK sectoral data, regional (NUTS1) data are constructed. Data are constructed at a 46-sector level of disaggregation (see Table 9.2) by the six employment types discussed above, scaled and made consistent with the UK sectoral data.

The combination of different datasets is not straightforward, as the data are of different aggregations and time periods. The following points are elaborated to make the process clearer:

- CE's regional (NUTS1) data (back to 1992 for employees and 1996 for self-employed) are based on the quarterly workforce jobs data from the ONS as the main dataset which provides the 19 industry data by region, type (full-time, part-time and self-employed) and gender.
- To move from the 19 industries to 46 sectors, data from the Business Registry and Employment Survey (BRES) and Annual Business Inquiry (ABI) gives 46 industry data (based on SIC07) that can be used to generate 19 to 46 industry shares for each region and type.
- To extrapolate the dataset back to 1971, the growth rates of CE's existing historical dataset are used, which are themselves based on older ONS data from the Census of Employment and ABI. These older datasets have been converted to the latest standard industrial classification (SIC07) to maintain consistency with the more recent data. Historical boundary changes for regions and local authorities are adjusted for, as part of this process to ensure consistency.

It should also be noted that the UK and regional data are based on second quarter figures, eg our employment for 2011 is based on data published for 2011Q2 (equivalent to a mid-year estimate).

Stage 3: Localisation (Local Authority District area)

In a third and final stage, employment data are produced at the LAD level. These data are originally created for all the six types of employment and 46 sectors. Data for employees start with Business Register Employment Survey data for four types of employment, male and female, full-time and part-time.²⁸ For each of the 46 industries and for every type of employment, the data for all the LADs in a region are scaled to the

²⁸ See www.ons.gov.uk/ons/guide-method/method-quality/specific/labour-market/business-register-and-employment-survey--bres-/index.html

previously-created corresponding data for the region in question. As a result of this scaling, the data move away from the original data published by BRES for three reasons:

- I. Our regional data are June data and not September data.
- II. Our detailed regional data include a detail which has come out of our procedure rather than directly from ONS and therefore will be different than the sum of the LADs.
- III. Our UK data and regional data use data published by the ONS; quite often these data get revised backwards while to the best of our knowledge the ABI data and the BRES data are not updated after they have been published.

Data for self-employment by LAD are entirely estimated by Cambridge Econometrics using regional self-employment to employees ratios for each sector.

Table 8.2 Sectoral disaggregation of regional and local data

46- Sector Disaggregation	
1 Agriculture etc	24 Land transport
2 Mining & quarrying	25 Water transport
3 Food, drink & tobacco	26 Air transport
4 Textiles etc	27 Warehousing & postal
5 Wood & paper	28 Accommodation
6 Printing & recording	29 Food & beverage services
7 Coke & petroleum	30 Media
8 Chemicals etc	31 IT services
9 Pharmaceuticals	32 Financial & insurance
10 Non-metallic mineral products	33 Real estate
11 Metals & metal products	34 Legal & accounting
12 Electronics	35 Head offices & management cons.
13 Electrical equipment	36 Architecture & engineering services
14 Machinery etc	37 Other professional services
15 Motor vehicles etc	38 Business support services
16 Other transport & equipment	39 Public Administration and Defence
17 Other manufacturing & repair	40 Education
18 Electricity & gas	41 Health
19 Water sewerage & waste	42 Residential & Social
20 Construction	43 Arts
21 Motor vehicles trade	44 Recreational services
22 Wholesale trade	45 Other services
23 Retail trade	46 Unallocated

2. Output data

In contrast to the employment data, the construction of the Gross Value Added data is reasonably straightforward (largely because local area output data do not exist from official sources). For the GVA data, productivity estimates at the NUTS 2 level²⁹ (based on the ONS sub-regional accounts data) are applied to the relevant district-level employment. This procedure makes two key assumptions:

- I. Productivity levels in a given sector are the same in all LAD areas belonging to any given NUTS2 region.
- II. National-sectoral price deflators are used to convert the sub-regional accounts (in current prices) to a volume measure, which assumes that sectoral deflators are the same in each region and local area.

²⁹ These areas are the standard second tier 'Nomenclature of Territorial Units for Statistics' used by the members of the European Union

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