

Investing in city regions: How does London interact with the UK system of cities and what are the implications of this relationship?

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Summary

A question not widely explored to date in the economics of city growth is how the cities within a country work as a network, and how the drivers of growth and policy levers differ from that perspective as compared with thinking about an individual city. In this paper we discuss the UK's cities as a network, with London the country's only 'world city', and one with continuing great growth potential.

We discuss: how many UK cities could grow to 'world city' status and the critical mass needed to trigger a faster growth dynamic; the economic linkages between UK cities and whether stronger UK supply chains would enable a configuration of activity generating faster growth for a number of cities and the UK as a whole; and the policy levers that could support a more productive urban economic network, especially in terms of transport and communications infrastructure.

We conclude that there is almost certainly untapped growth potential, although many questions remain given the large data gaps. This scoping paper discusses some of the issues raised by thinking about the UK's cities as a network, and references some evidence from previous work that seems relevant to these issues, but assembling data in order to test the relevant hypotheses is beyond our remit here.

Introduction

In this short paper we aim to summarise what is known from previous work about the linkages in the UK's urban system and set out a possible direction for future thinking about the UK's cities *as a system*.

It is worth starting by thinking about how such a system might be defined. The word could imply a set of specialisations, such as a London focused on business services and finance, while other cities specialise in manufacturing. Indeed this view is implicit in the view sometimes expressed that London's finance focus has damaged other cities, reducing them to a traditional and lower value role, while London attracts talent, captures creative industries and hollows out other places.

We wish to take a broader view of a 'system' which includes an appreciation of possible dynamics. This in turn implies a more nuanced view of specialisation and comparative advantage. The last thirty years has seen a structural shift in the global economy and in its trade patterns, and it has become more than ever obvious that comparative advantage is only an element in understanding an economic system. Specialisation and diversity go hand in hand, but also shift. Modern international trade theory has turned to considering task specialisation and become more focused on supply chain relationships.

This paper can only outline some of the forces that need to be taken into account in a model of a UK system. The building blocks of trade theory, supply chain analysis and global growth theory are also themselves in development¹. We have concentrated in this paper therefore less on a 'system' and more on 'networks'. By looking at how the network of cities is, linked in multiple ways, with spillovers between each other, and furthermore existing within a globalised economy linking cities in different countries via multinational supply chains and other relationships, we hope to shed light on the work that would need to be done to develop a true system based view.

We will aim to outline existing conclusions, describe the main issues in understanding better the interactions between London and other cities, and identify the research and data gaps to be filled in order to test key hypotheses.

Our aim is to question the frequent *assumption* that there is bound to be harmful competition between London and other UK cities, and instead ask what conditions could encourage positive spillovers between London and the other cities.² This approach draws on recent advances in the fields of economic growth and trade, which emphasise the importance of productivity spillovers and the scope for specialisation enabled by new technologies.

In this, we draw on our own experience of UK city economies: Coyle as co-ordinator of the research for the Manchester Independent Economic Review [MIER 2009] and the Allander Inquiry [Coyle, Alexander and Ashcroft 2005]; Rosewell as Chief Economist for the Greater London Authority (GLA) from 2002 to 2012 and provider of regional analysis with Business Strategies from 1988 to 2000, as well as a member of both the City Finance Commission and the London Finance Commission; both as members of the

¹ See for example, Duranton and Puga (2005) for these ideas applied to cities.

² For example, Professor Tony Travers makes a comment in this vein: "London is the dark star of the economy, inexorably sucking in resources, people and energy. Nobody quite knows how to control it." Financial Times 19/1/14 www.ft.com/cms/s/0/1412c032-80f4-11e3-95aa-00144feab7de.html#axzz2qwRjdhlF

RSA's City Growth Commission [2014]. The experience of our long association over the years with policy-making in different cities provides the context for our summary in this paper of the relevant theory and evidence which allows us to address the question of London's role in the UK's network of cities as the precursor for a more developed view of whether there is an identifiable system.

London is the UK's only world city. It is relatively small compared to some other world cities and can continue to grow. Furthermore, the UK would not be well served if it does *not* continue to grow. We do not accept the argument sometimes made (especially in a business cycle downturn when the north-south divide increases) that London's growth occurs at the expense of other UK cities. Economic growth is not a zero sum game, and this is just as true in thinking about the geographical location of activity within one national economy as in the context of international trade and growth. Having said that, even if other cities grew at the same pace as London from now on, the absolute level of value added per capita would continue to diverge between London and the rest; absolute convergence would require faster growth in the other cities/regions.

The strength of agglomeration effects in explaining urban growth does raise questions about the size distribution of a successful national system of cities – how many other cities outside London could be expected to grow significantly larger, and how much larger?

However, we hypothesise that the UK's cities, and therefore the economy as a whole could grow faster if they could benefit from positive spillovers between each other, and improved supply chain potential. The system of cities as a whole – and therefore the UK economy – is under-performing its potential given the extent of the size gap between London and other cities. The UK is an outlier in international terms in the extent to which its second tier cities are relatively small, although its capital size is in line with the size of its smaller cities.³ Furthermore, thinking about the UK city network in the context of the globalised world economy underlines the potential for growth in the economic links between cities other than London and the rest of the world. Outside finance, which is largely centred on London and its links to the other major global financial centres, there are already examples of existing, growing trade linkages, for example in education or professional services.

The evidence available to date (and there are serious data limitations in assembling evidence) suggests that there are some key policy questions, which we turn to later in this paper. They concern the potential for increased economic growth in UK cities individually, and in the UK as a whole given the relationships between the cities. The relevant policy areas are:

- investment in assets required for growth, especially in innovative high technology manufacturing and service sectors: physical assets, infrastructure of all types, and human capital;
- other growth enablers such as access to finance;
- how these assets and resources work as a *network* within the UK;

³ Overman and Rice 2008

- how to encourage the co-location of businesses in high value supply chains, and the supply chain links between UK cities;
- the division of policy responsibilities between the centre and the cities or their regions; and
- the links between high value activities and other city features such as quality of life and institutions.

Under each heading, the underlying question is whether there are unexploited spillovers or externalities, implying scope for co-ordination or other policy interventions. Economic growth is a matter of self-reinforcing activity, virtuous circles, in a *process*, and policy interventions should be thought of in this dynamic context.

We begin by briefly setting out the UK context and then go on to a discussion of the drivers of city growth. We describe how cities work together as a system linked by (internal) trade, and the connectivity (in several dimensions) on which this rests.

A section describing the relevant available evidence on the UK's cities follows. We then return to the questions this evidence base raises about institutions and policy. The paper concludes by discussing next steps for data and research. As will be clear from the discussion below, there are serious data deficiencies that mean a detailed exploration of many of the issues we raise here is well beyond the scope of this outline paper. However, there may be interesting approaches to providing evidence on some of the network connections we discuss here that could be used in future empirical work.⁴

It is worth noting that this paper does not attempt to summarise the extensive literature on aspects of the UK's economic geography, such as house prices in different cities, or the comparative skills bases of different locations. We are interested in the questions arising specifically from thinking of the UK's cities as a network subject to a dynamic process of change, itself in the context of a globalised world production network.

Context

There are two important aspects to the context in which we should think about London and other UK cities. First, London is a world city operating in an increasingly global economy. Global city surveys, dating back to the first global city ranking by the Globalization and World Cities network in 1999, consistently put London first or second – battling it out with New York.⁵ In European surveys, it ranks first.⁶ It is also expected to grow: to cite one recent forecast, consultants PwC expect London to be the fourth richest city in 2020, growing at 3% a year.⁷ Their latest report highlights emerging cities in Asia but still ranks London and New York as key places. In all these many studies, London's growth reflects world economic changes and the role of world cities in world trade.

⁴ Data limitations also explain some of the differences in coverage in the charts and tables in this paper, which sometimes refer to England & Wales, sometimes GB and (less frequently) sometimes UK. Assembling the figures on a consistent UK basis is outside the scope of our preliminary work here in setting out the issues.

⁵ GaWC Research Bulletin 5, GaWC, 28 July 1999, www.lboro.ac.uk/gawc/rb/rb5.html, accessed 5/6/14

⁶ See tables in Clark Honor Chapman Report 2012

⁷ PwC, Cities of Opportunity, 2012, www.pwc.com/us/en/cities-of-opportunity/

Secondly, London's performance correlates with that of other cities and regions in the UK. The Cities Outlook 2014 from the Centre for Cities presents a ranking among other UK cities of the proportion of private sector employment in London-headquartered businesses.⁸ For the highest – mainly in the greater South East but including York, Cardiff and Southampton – this accounts for around one in five private sector jobs. This does not answer the causation question; firms may site their headquarters in London because of its dominance. Nevertheless, the figures demonstrate the existence of significant economic links between London and other cities. The correlation between growth in London and other regions between 1998 and 2011 is lowest with the North West (Figure 1) but still significantly positive.

Similarly, firms such as Crossrail are making efforts to ensure that activity in London to construct the cross-London link, the largest construction and civil engineering project in Europe, benefits all regions. Suppliers range from steel to cranes, to sophisticated measuring equipment, supplied by firms from almost every region.⁹

Figure 1: Regional GVA at current basic prices

Region	Share of UK GVA (workplace based)		Average annual GVA growth rate (1998 to 2011)	Correlation coefficient between annual GVA growth in London and the city region (1998 to 2011)	Share of UK Employment 2012 (Excluding Northern Ireland)
	1997	2011			
London	20%	23%	5.4%	1.00	16%
South East	15%	15%	4.3%	0.61	14%
South West	8%	8%	4.3%	0.49	9%
North East	3%	3%	4.0%	0.38	4%
North West	10%	10%	4.0%	0.26	11%
Yorkshire and The Humber	7%	7%	4.0%	0.44	8%
East Midlands	6%	6%	3.9%	0.53	7%
West Midlands	8%	7%	3.5%	0.42	9%
East	9%	9%	4.2%	0.59	9%
Wales	4%	3%	4.0%	0.48	5%
Scotland	8%	8%	4.0%	0.40	9%
Northern Ireland	2%	2%	4.2%	0.64	-
UK	100%	100%	4.3%	0.74	100%

Source: ONS Regional Economic Accounts, Nomis

City regions show an interesting pattern. The least correlated with London are Liverpool, Manchester and Sheffield, although all three have amongst the fastest growth rates among the city regions. There have been particular pairs of years, such as 2000/1 and 2007/8 when these cities' performance went in different directions. Further investigation is necessary to tease out these linkages, or indeed whether they are independent

⁸ Centre for Cities, Cities Outlook, 2014, p21

⁹ www.crossrail.co.uk/suppliers/our-suppliers/

changes, although research also suggested Manchester has some distinctive features, with a mix of business areas and strong local institutions.

Figure 2: City Region GVA at current basic prices

City Region	Share of UK GVA (workplace based)		Average annual GVA growth rate (1998 to 2011)	Correlation coefficient between annual GVA growth in London and the city (1998 to 2011)	Share of UK Employment 2012 (Excluding Northern Ireland)
	1997	2011			
London ¹	27%	29%	5.1%	1.00	22.8%
Manchester	4%	4%	4.2%	0.22	4.3%
Birmingham	4%	3%	3.2%	0.55	3.7%
Glasgow	3%	3%	3.9%	0.39	2.9%
Liverpool	2%	2%	4.4%	0.09	2.1%
Leeds	2%	2%	4.4%	0.70	1.9%
Bristol	2%	2%	4.7%	0.33	1.9%
Newcastle upon Tyne	1%	1%	4.5%	0.23	1.7%
Edinburgh	2%	2%	4.8%	0.19	1.6%
Leicester	2%	1%	3.7%	0.37	1.6%
Cardiff	1%	1%	4.4%	0.60	1.6%
Nottingham	1%	1%	3.6%	0.34	1.1%
Sheffield	1%	1%	4.3%	0.12	0.9%
Belfast	1%	1%	4.5%	0.75	-

Source: ONS Regional GVA, Business Register and Employment Survey 2012, uses NUTS3 definitions

¹ London in Figure 2 is defined as a city region and is therefore different to the definition of London in Figure 1 which is a NUTS 1 region

Drivers of city growth

Scale

The starting point for thinking about the growth of a city (or region) within a national economy is its success in attracting factors of production, capital and skilled labour. The ability to exploit economies of scale is one aspect of a city's activity that will enable higher productivity. But the extra productivity generated in cities is also based on other aspects, such as market size, and knowledge spillovers. Such spillovers were recognised by Marshall in the earliest days of modern economics but have been followed up more recently by authors of the 'new economic geography' making a strong link between city growth and the productivity of its businesses.¹⁰

Agglomeration

Firms and workers are much more productive in dense and large urban economies. The very existence of cities is the result of 'agglomeration externalities', whereby there are self-reinforcing benefits of concentrating people and activity in one location. It seems clear from empirical work that these externalities are more important than alternative explanations, such as tougher competition in cities weeding out weaker firms.¹¹

Traditionally, economists identify three kinds of agglomeration benefit or spillover: more linkages to potential suppliers; a thicker labour market, with a bigger pool of potential workers, and a wider range of job opportunities for individuals; and knowledge spillovers. More recently, some authors have suggested there are also spillovers in consumption, with a greater range of attractions and shops enticing highly-skilled people to live in a city.¹² There is a debate in the literature as to the relative importance of *urbanisation* (benefits of co-location in general, with firms and workers in all sectors) and *localisation* (benefits of co-location with others in the same industrial sector, or clustering); the evidence is inconclusive although leaning towards the general rather than the specific benefits.

There are also diseconomies of agglomeration, negative externalities arising from increasing population density. These include congestion on roads and public transport; increased demand for services whose supply is inelastic, including housing and public services; potentially greater pollution, crime, and other disamenities that occur when there are more people close together. The negative externalities will prompt a response: some people will choose not to move to the city, others will trade off a longer commute for cheaper housing or greener surroundings. Over time, negative externalities will encourage further innovation, aiming at providing solutions to the emerging problems, either economic or social, a process so well illustrated by the country's Victorian urban growth, in the cities of the Industrial Revolution such as Belfast, Glasgow, Liverpool, Manchester, Birmingham, Cardiff and Bristol.¹³

These spillovers, positive and negative, can be understood as the drivers and outcomes of the dynamic process of city growth.¹⁴ Unfortunately, one major difficulty in untangling

¹⁰ Duranton 2004; Fujita, Krugman and Venables 1999; Glaeser 2008

¹¹ Combes et al 2012

¹² Florida 2002

¹³ Hunt 2004.

¹⁴ Jacobs 1970.

the city growth story is that much of the data and empirical work can only be conducted on cross-sectional data, thus comparing the characteristics and performance of a group of cities at one time. This is particularly problematic when trying to examine the process of competition and emergence of new firms, which can only happen over time.

However, all data sets show that these combined benefits are sufficiently large that they offset the costs of increasing urban density, such as congestion, higher land and house prices, and environmental costs.¹⁵ One of the dimensions of the policy questions discussed later in this paper is the scope for reducing the diseconomies of agglomeration, for example in planning, public transport or infrastructure investment decisions.

The basic economics of agglomeration point to some key characteristics of cities as being important for their economic performance.

Key characteristics

The labour market. The evidence available suggests that workers in cities enjoy a large wage premium, and one that increases with the time they spend in the labour force.¹⁶ Does the city have a skilled workforce on the supply side, and the demand for people to fill high wage jobs? Or is it in a trap of low skill jobs and low-skill workers? Is there inward migration (from the rest of the UK or overseas)? Do students stay on after their studies? For example, Bristol has the highest employment rate of any city and is attractive to its new graduates who drive new businesses. Can workers easily reach a range of jobs, encouraging them to acquire specific skills? What is the reach of the local transport system?

Finance and investment Productivity is higher on average among firms located in large cities. Is capital available for new and expanding firms? Are investment decisions taken in a central location or devolved according to local information? Is there inward investment, bringing knowledge and productivity spillovers? London in particular benefits from the large share of inward investment which it attracts.

Physical infrastructure Do the city's internal transport linkages serve commuter needs? What are the external inter-city rail, road and air links, and international air links enabling trade and encouraging investment? What is the available internet speed and bandwidth, to the city centre, and dispersed around it, and is there an adequate supply of suitable property and power? At a more basic level of infrastructure, is there an adequate water supply, food distribution chain and waste disposal?

Housing and consumer amenities In recent decades, cities with good amenities have grown faster.¹⁷ This has been badged as the 'consumer city' effect.¹⁸ Is there adequate housing, along with schools and shops, where people want to live? Is it an attractive 'consumer city'?

Social connectedness Does the process of matching to jobs, and exchange of ideas, work well? Or does the presence of poor areas mean polarisation makes the effective

¹⁵ Overman and Rice 2008

¹⁶ De La Roca and Puga 2013

¹⁷ Duranton and Puga 2004

¹⁸ Glaeser et al 2001

city economy smaller than population figures would suggest? Is there a social infrastructure to support the exchange of ideas in business and knowledge-formation?

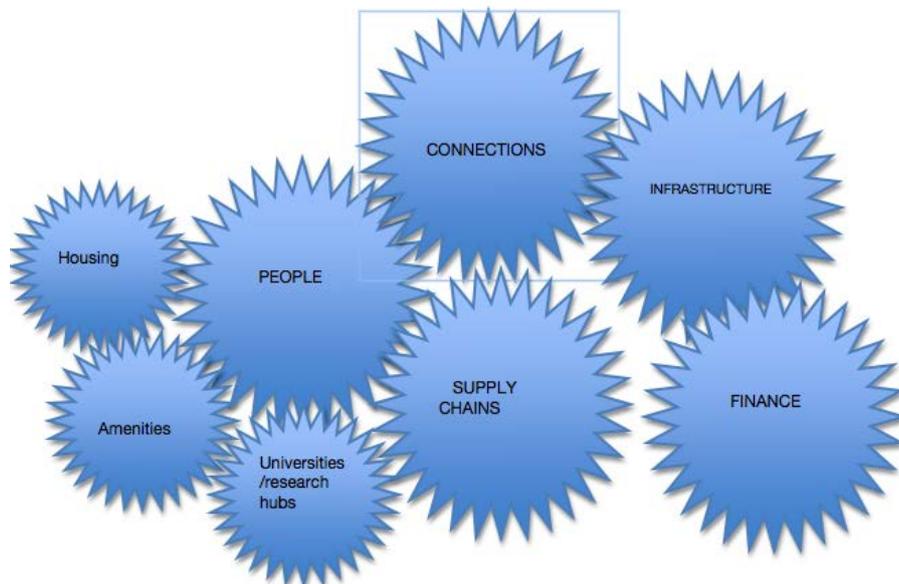
These dimensions of urban economics are well-known, although the evidence base for UK cities is nowhere near as rich as for US or even French or Spanish cities. Even definitions need to be treated with care. While US metropolitan areas have a standard definition and are capable of comparison, city definitions in Europe are generally based on administrative areas that can vary from covering a city centre only to the whole of the wider commuting region.

Interlinked nature of drivers of growth

Econometric analysis can be used to allocate growth and performance to individual causes listed above. However, this accounting exercise does not necessarily mean that these causes operate separately. On the contrary, the sustained long-term trends in urban growth (or its absence) indicate very persistent dynamics due to the mutual reinforcement of contributory factors; there are virtuous and vicious circles.

In reality the interconnections between all the factors listed here will be crucial, and focusing on one element in isolation is likely to have unintended consequences or even be counter-productive. Thinking about possible policy interventions must take account of the links. Policies in every area need to be aligned to change the growth trend. Figure 3 lays out the different elements required for successful cities, all interlocked.

Figure 3: Interlinked Concepts for Cities



Impact of new technologies

There is also some reason to believe, on the basis of both theory and evidence, that digital technologies have increased net agglomeration benefits. As means of communication are generally complements (rather than substitutes), a new communication method, or a reduction in the costs of one method, will increase all forms of communication. So the greater ease and reduced cost of digital communications have increased the number of face-to-face meetings.

In addition, in high value-added service and technology sectors, face-to-face contact is particularly important because growth of those businesses depends critically on the exchange of ideas, and tacit knowledge that can only be conveyed in person.¹⁹ The importance of “ideas in the air” is evident in the development of science and technology clusters from Silicon Valley to Nairobi, via Old Street and Cambridge.²⁰

The net benefits of agglomeration may increase with city size; economic mass is certainly positively associated with higher average productivity. Large cities create more scope for the increasing returns to scale spillovers in production described above. Large cities have a more diverse range of activities than smaller ones. So, for example, this means that a skilled individual will face a wider range of employment opportunities with the risk of not finding a suitable job diversified by the presence of different types of employer. Businesses will enjoy a ‘thicker’ supply chain for a similar reason. Jane Jacobs is the canonical source for this argument.²¹ Recent empirical evidence supports her. Ricardo Hausmann writes: “In the process of development, cities, states and countries do not specialize; they diversify. They evolve from supporting a few simple industries to sustaining an increasingly diverse set of more complex industries.”²² His work on economic complexity provides empirical support.

An alternative perspective pointing to the same conclusion comes from network theory, which analyses cities in terms of social networks, with people linked by both personal connections and types of infrastructure.

At a recent conference in San Francisco both the chief planner and technology companies stressed the importance of the coffee shop to the attractiveness of the city. This is nothing new: the City of London in the seventeenth century was built around the exchange of information in coffee houses. What is perhaps more surprising is that such exchanges remain important in the digital age when many additional forms of information gathering and processing are possible and after the invention of the telegraph, telephone and email. Nonetheless physical contact and face to face remains an important way to process new knowledge.

In the work on innovation networks for MIER, Volterra established that supply chain networks were likely to be more relevant to successful innovation than peer group copying, where an unwillingness to share was more likely.²³ Strong supply chain connections allowed problems to be identified and solved collaboratively, so firms stood a better chance of taking off in a well-connected location. This underlines that the variety of connections matters, along with the diversity that can enable a cascade of take-up.

Network cascades have become a topic of study in recent years, in mathematics, biology and epidemiology.²⁴ Mechanisms of infection and recovery, copying behaviour in fashion markets have all received attention. However much of the attention in matters relevant to economies has concentrated on how behaviour is affected in internet purchases. For example the well-known ‘download experiment’ investigated how music downloading behaviour was affected by knowledge of what others had already bought. The answer was that such impacts were significant.

¹⁹ Glaeser and Salz 2004

²⁰ A phrase first coined by Alfred Marshall to explain how Manchester’s growth in the 19th century

²¹ Jacobs 1961, 1970

²² Hausmann 2013

²³ Rosewell et al, 2009

²⁴ Barabasi, 2002, Ormerod 2012

We know much less about how propinquity affects economic behaviour and the ability to generate new products and processes. Casual empiricism would suggest it is important. The role of the coffeehouse is replicated in the spin offs that created Silicon Valley and the connections that created such success. The role of diversity and supply chains suggest that there is a critical mass at which such cascades of innovation become possible.

Swedish researchers have mapped connections for financial and business services firms and those in ICT, using a bottom up perspective and showing how the capital cities of the Scandinavian countries are strongly linked to each other, in both supply and collaborative arrangements.²⁵ Moreover, all of them were also strongly linked to London, confirming the special role that a world city plays in networks of cities.

Both physical investment in transport and communications, and social cohesiveness, will affect the network structure and therefore its ability to generate increased economic activity. Other disciplines have begun to look in detail at urban networks, using digital mapping technology and simulations, but not so far economics. For example the Centre for Applied Spatial Analysis (CASA) at UCL has specialised in mapping systems and movement in cities, especially London, from the movement of 'Boris bikes' to mobile phone calls.

The evidence on the effect on city size of the introduction of information and communication technologies is mixed. Some work suggests the technology has increased the advantages of size, increasing the benefits arising from close proximity to other people. Other work suggests that US cities have become more similar in size with the spread of internet access as this can increase the spatial scope of knowledge spillovers, and lead to a more even geographical spread in economic activity.²⁶ However, there is strong support for the idea that cities facilitate innovation, the diffusion of knowledge, and the acquisition of skills. Significant new product introductions cluster geographically to a greater extent in industries where new ideas play a more important role – and there are more of these in ICT-intensive sectors.²⁷

This line of thinking suggests that larger cities at least need to focus on their size overall rather than – as has sometimes been fashionable – selecting specific industry 'clusters' to grow. The more diverse the economic base, the more likely it is that new businesses will be formed and new activities will emerge, and that specialisation will increase too; but the exact selection must be left to individual ideas and the competitive market.

When it comes to the question of how big cities are likely to become, there is little guidance in the economics literature as to the minimum scale and complexity for a city growth 'take-off', or how this might have changed over time. This is an open empirical question. Our starting assumption would be that none of the UK's cities outside London have achieved sufficient scale; as noted in the introduction, the UK is unusual in the scale of the size gap between the capital and the next rank of cities. The chart below suggests that a handful of cities have reached sufficient density to see a step change in productivity (represented here by the earnings premium to working there).

Figure 4 has earnings on the vertical axis and employment density on the horizontal axis; the observations are for the highest earnings UK urban locations. There is a clear

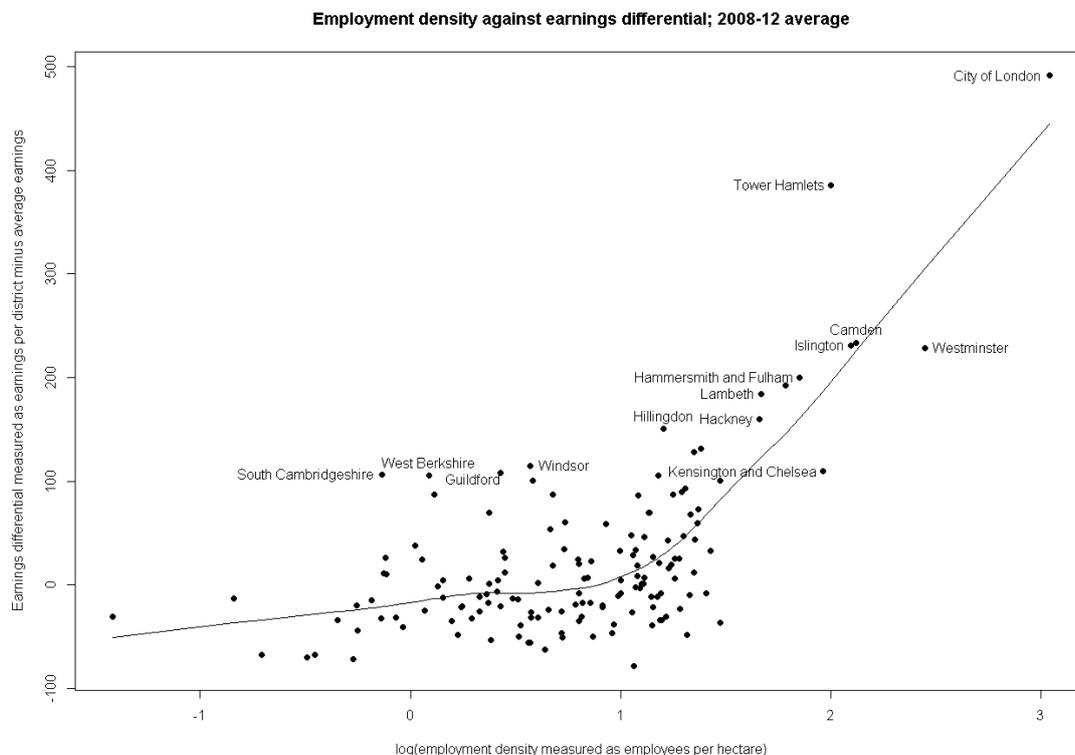
²⁵ Reported in GaWC Research Bulletin 411. www.lboro.ac.uk/gawc/rb/rb411.html

²⁶ Glaeser and Gaspar 1996; Ioannides et al 2008

²⁷ Audretsch and Feldman 2003

positive relationship once density hits a tipping point. Cities such as Leeds, Birmingham and Manchester are on the upward slope, but the highest earning and highest densities are all to be found in London.

Figure 4: Earnings differential vs log employment density for the top 150 UK districts by employment size



Source: Nomis, Volterra

Another way of expressing this is in relation to the well-known ‘Zipf’s Law’ for city size (the second largest city is half the size of the largest city, the third largest city is a third the size of the largest city, and so on). The UK’s next biggest cities after London are smaller than this would suggest, though the next rank down do broadly follow this relation.²⁸

Luis Bettencourt at the Santa Fe Institute has recently suggested that cities’ form and function can be described by a set of network principles for a complex system, covering the different aspects of a city.²⁹ However, this gives rise to the ‘planners’ paradox’ that such entities both evolve and require external input to thrive. This policy problem is also apparent in how we might deal with a system of cities, to which we now turn.

²⁸ Overman and Rice 2008

²⁹ Luis Bettencourt 2013

Criteria for growth in a system of cities

So far, we have discussed the economics of an individual city's growth potential. The pattern and rate of growth in an entire city system is a much larger issue. We start here by thinking about a network, rather than a system, and even this is less explored in the economics literature³⁰.

The 'New Economic Geography' has begun to address this by emphasising the interaction of supply chain and demand linkages.³¹ If a firm expands or locates in a given city, it can increase demand for the goods and services produced by firms elsewhere, and reduce their costs because of increased competition. But the new or growing firm will also compete for the customers of firms in other cities. So in theory there can be positive or negative links between different cities. If the agglomeration economies in one city are particularly strong, to the extent that people migrate or commute to the growing city from other cities, it will appear as if the former is benefiting at the expense of other cities. This story of winners and losers is the one often told about London versus the rest, despite the net result of high average productivity at the level of the nation, and higher real wages for the individuals working in the growing city.

In this now-standard model of the geographic location of activity between cities, the production activities of firms are given and knowledge of other locations is also given – their location is the choice variable. However, recent experience indicates that firms are using the new capabilities offered by ICTs to choose jointly location, structure of production (into what are described as 'tasks'), and resource mix (workers of different skill levels/characteristics and capital intensity). This 'task-based' approach does not displace the arguments based on agglomeration economies and the self-reinforcing dynamics that result. However, it offers a potentially richer approach to thinking about policy levers and the interactions between them.

The questions for a network of cities as opposed to a single city are:

- (a) the scope for specialisation and gains from trade within national supply chains;
- (b) the extent to which there are positive or negative spillovers between cities as well as within them, and the determinants of these spillovers; and
- (c) the size distribution of cities within the network, given the advantages of scale, and specifically how many very large cities would constitute an economically successful national system.

This latter issue has stark policy implications, if it is the case that an economy the size of the UK should support just one or two more much larger cities outside London. The policy debate tends to assume all cities are equivalent, but this is almost certainly not so in economic terms.

What constitutes the categorisation of a city for empirical purposes can create problems. The Centre for Cities, for example, includes a location such as Aldershot in its list of 64

³⁰ In economics, the ideal system is one where connectedness is established with maximal information and through price. Geography and cities become under these circumstances abstract entities with no significance.

³¹ Fujita, Krugman and Venables 1999

cities. Other studies, for example Overman and Rice, are much more restrictive, only including 20 cities or so in their comparisons, of which the smallest is Cambridge.

There are good reasons to believe the salience of these questions has increased. Just as the new technologies have created enormous potential and realised efficiency gains through the geographic splitting up and relocation of value chains across national borders, they will have done the same within national borders. This ‘task-based’ approach to understanding supply chain decisions and productivity growth has begun to be analysed in terms of international trade, but there has been no study of the implications for national economic geographies.³²

This absence is troubling because of the character of advanced manufacturing and high-value services. The products of advanced manufacturing in particular are technologically complex systems. The production processes are sophisticated and highly flexible in order to achieve production efficiency and low unit costs combined with varied or customised products. They are also constantly innovating; so-called ‘3D printing’ will enable manufacturers to produce an even wider range of products in close relationship with their downstream customers. This is sometimes called ‘manufacturing as a service’. For example in 2012, around 50% of Rolls Royce’s aerospace revenue was from selling services.

One of the effects of the ICT revolution, driving the creation of task-based supply chains, is that economic activity has become less evenly distributed geographically. Some places – the canonical example is China’s Guandong Province – have become hubs or hotspots of activity, supported by the growth of communication, transport and logistics networks. Their growth rate has far outstripped that of other places.³³ Again, this ‘winner-takes-all’, nonlinear pattern could be relevant at the level of a national economic system. The technology seems to be amplifying agglomeration economies.

The scope for increased productivity, in the task-based approach, lies in the ability to increase specialisation in each location, with a corresponding increase in trade in intermediate goods and services. The decline in costs and increase in capabilities of communication technology has made it substantially cheaper to co-ordinate complex production activities in different locations, enabling production to be divided into different ‘tasks’, each benefiting from increased specialisation. On the other hand, better information technology may reduce some of the benefits of specialisation and work against unbundling. There are some competing forces in play. However, earlier evidence already points to the importance of specialisation in urban labour markets; for example, several papers find evidence that in the professional occupations, there is greater specialisation in larger markets, with doctors, for example, undertaking a narrower range of activities.³⁴

In the case of advanced manufacturing specifically, location in order to pool skills and exchange ideas is important for innovation:

“Advanced manufacturing often displays important co-location synergies resulting in benefits to new-product development when manufacturing firms are located close to their research and development efforts and to many of their key suppliers. These

³² Baldwin 2004

³³ Although it is often cited as an example, Guandong is not of comparable scale, being larger in area than England as a whole.

³⁴ Puga 2009

synergies arise from the fact that much of the technical knowledge developed in the early phases of the research and development cycle is tacit in nature (as opposed to being codified in, say, patents). As a result, person-to-person interactions are critical to advancing and transferring such knowledge The supply chain is the key unit of analysis for understanding these interdependencies.”³⁵

These chains are not static but rather follow a typical pattern whereby an initially highly vertically integrated process ‘dis-integrates’ over time as the end-market grows in scale, and as relationships with trusted suppliers are built. The point of decoupling, or the boundary between the (initially) integrated manufacturer and suppliers tends to move back up the supply chain over time, making the number and complexity of interactions between different firms increase.

There is a growing body of work on the implications of digital technologies for international trade and investment.³⁶ For example, Asian economies have clearly captured the co-location spillovers associated with supply chains in many areas of consumer electronics. One prominent example is Apple, which has offshored all its manufacturing other than some prototyping. It is competing with Samsung, which is co-located with its supply chain. Samsung brings new smartphones to market faster than Apple and has a 31% market share compared to 13% for its US competitor.

However, little attention has been paid to the consequences of global reorganisation of production for supply chains within the UK, or indeed to the impact of the forces of agglomeration and dispersion for supply chains within the UK and in different cities. It would be unreasonable to assume in the face of such a dramatic global reorganisation of value chains that there have been no consequences for the potential competitiveness of UK cities, or for the dispersion of activity between UK cities.

Indeed, there are likely long-term disadvantages for the UK economy as a whole in this failure to think of growth potential in terms of the success of supply chains (or perhaps supply eco-systems), rather than in terms of the success of individual firms or sectors. There is missing growth potential if the spillovers or externalities are ignored in the analysis.

We are therefore interested in the hypothesis that there are untapped productivity gains to be made from a focus on supply chains, with an increase in specialisation in each link within supply chains, and with likely different specialisations in different sectors as between London and other UK cities. The experience of the evolution of global value chains suggests that technological change has created new opportunities for specialised activities within sectors to be relocated, greatly increasing growth in the new, lower productivity location and at the same time increasing productivity in the original location. The ability of locations to insert themselves into these mutually beneficial, elongated supply chains depends on the provision of a mixture of ‘hard’ and ‘soft’ infrastructure, from transportation and bandwidth to knowledge networks and trade information.

This global reorganisation has of course included UK businesses, including well-known examples such as the auto sector and financial services. These have very different geographic footprints and dependencies within the UK. Financial flows largely funnel through London and lead to some dependent activities in other cities. The auto sector links through a mixture of historic and new sites to more localised component supply

³⁵ Tassely 2014

³⁶ See Elms and Low, WTO 2014 for an overview

chains. In education, Chinese and to a lesser degree Indian students attend universities in a range of cities, including Liverpool, Newcastle, Birmingham, Glasgow and Manchester as well as London. In the creative sector, London is an important hub but certainly does not dominate other cities in the same way as financial services; depending on the sub-sector, other key urban nodes include Dundee, Glasgow, Manchester, Cardiff, Birmingham and Bristol, and all of these are connected to major creative sector hubs overseas such as New York or LA.³⁷

However, understanding the patterns and consequences of global re-organisation is complicated because of the multiple complementarities and spillovers involved, and the lack of availability of data is a serious problem. Nevertheless, the importance of connectivity of all kinds, international, national and urban, and in terms of transportation, telecommunications/broadband and ideas (or social networks), is emphasised by this approach. While the availability of 'Big Data' is much heralded, there is a conceptual gap between data collection and knowledge extraction. To turn data into knowledge requires a hypothesis to test and a methodology to test it. We do not accept the proposition that data alone will suffice, although this is contested in some quarters. In addition, the standards for testing models of complex systems do not yet exist.³⁸

Such standards will be essential both to analyse networks and to move from these to a broader understanding of a 'system' in which networks are created and maintained.

A second area to explore is the way firms determine the selection of tasks and the mix of resources, co-determined with the location of their activities. What will determine their choice between cities with different skill mixes in their workforce, and what capital-labour mix and productivity level is implied, overlaid on the communication and logistical questions? How will they deal with uncertainty and risk?

³⁷ Taylor 2011 gives an extensive overview of global city networks.

³⁸ Ormerod and Rosewell 2006

What do we already know about the economic linkages between UK cities?

The short answer to this question is not enough. As noted earlier, UK economic statistics do not make it easy to study city or city region economies. There is little information available on supply chains in geographic terms, or on trade flows within the UK. The Manchester Independent Economic Review had to rely on commissioned survey data to produce a snapshot of intra UK linkages, which of course cannot provide any time series data. The best available data on city linkages is through use of the transport system where time series are available, although still limited and with little information on trip purposes. We summarise here the types of data and research findings available.

Limitations on the availability of data at the level of the city region mean that the empirical literature on UK cities is relatively small.

One overview study in the 2009 Manchester Independent Economic Review found that compared to the South East excluding London, productivity in London was 13% higher and in Sheffield was 22% lower, indicating a wide range of economic performance.³⁹ 'Agglomeration economies', the positive spillovers from locating in a city, played an important role in explaining the results – economic mass is clearly associated with higher productivity. Skills were another important factor, and transportation played a role although a smaller one in this work.

A study for the GLA by Volterra exploring the role of accessibility in explaining residential and employment density was only able to access cross section data and showed how hard it is to isolate the impact of any one factor.⁴⁰ It is more likely that a mix of factors is essential.

One key point is that the experience of UK cities in terms of output or employment growth, or productivity, is divergent. What's more, the divergences have grown, due to the shift from manufacturing to services (where proximity is more likely to be required in some cases), and from the impact of ICTs.⁴¹

Productivity

Overman et al defined a city region on the basis of the travel to work pattern of people in higher and managerial professional occupations travelling to a core local authority district(s). Any local authority sending 15% or more of its residents to these occupations in the core employment area is included in the city region (using 2001 census data). Production data came from the establishment data in the Annual Respondents Database. The empirical work looked at London plus 13 other UK cities. The reference group selected was either the rest of the region or the rest of GB (ie excluding the city regions). The results of productivity regressions refer to differences in productivity between firms in the existing population. The results indicated:

³⁹ Overman, Gibbons and Tucci 2009

⁴⁰ GLA, 2006

⁴¹ Overman and Rice 2008

- firms in other cities are less productive than firms in London, and less productive than firms in the South East (not London);
- firms in most city regions are more productive than firms in their surrounding region (including London compared to the South East), with two exceptions (Birmingham and Sheffield);
- after London, the productivity ranking is Bristol, then Edinburgh and Glasgow, then Liverpool and Manchester, followed by Leeds-Bradford, Birmingham, Newcastle, Sheffield. (Three smaller cities – Aberdeen, Leicester and Nottingham – were omitted from the regressions.)

Agglomeration economies play a significant role in explaining the productivity advantage of firms in the city regions. The presence of skilled labour (measured by NVQ levels 3 and 4) also plays an important role in explaining productivity differences between cities and regions. The research found little independent role for transportation but did not distinguish between access to airport, roads and rail.

Labour and skills Harding et al (2009) present data derived from the 2001 Census on the number of residents of certain city regions working in higher managerial and professional occupations in the core city area. The 2011 Census is not yet available in this detail.

Figure 5: Higher skill occupations in cities

	HMP 'pool' in core city + TTWA	Actually working in core city
Manchester + Salford + Trafford	130,000	58,900
Birmingham	144,700	45,000
Bristol	88,600	25,300
Glasgow	122,045	40,850
Leeds-Bradford	156,300	61,100
London (inner London NUTS2)	1,178,600	458,650

Source: ASHE

They present data from the 2001 Census on the outflows of 25 to 44 year olds, and on the outflow of managers and professionals, from 5 cities to regional destinations (London is ranked 1 or 2 as the destination from all cities in both cases, and if 2nd, that is behind only the city's own surrounding region).

They also present data (2006-07) from HESA⁴² on the first employment destinations of graduates of universities in 6 UK cities including London. In the cases of Manchester, Glasgow and London, a majority stay in the city of their university, or its surrounding region. The destinations of Bristol, Birmingham and Leeds graduates were somewhat more dispersed. In all cases except Manchester and Glasgow, London was a significant first employment destination for graduates.

⁴² Higher Education Statistics Agency

The Cities Outlook 2014 looks at the age composition of migration flows between cities. Between 2009 and 2012 there was a net outflow of people from London of 178,000 people; but almost one in three of the young people (22-30) who relocated during those years moved to London, from all over the country; while more over 30s moved out, but largely to elsewhere in the South East. (Figures 6-7)

Figure 6: Migration into and out of London by working age, excluding full-time students, spring 2003

Age	In	Out	Net Balance
16-24	23,000	12,000	+11,000
25-29	15,000	23,000	-8,000
30 to retirement	25,000	70,000	-44,000

Figure 7: Migration to and from London by origin and destination Average 1995 to 2003

Region	From	To	Net Balance
North East	4,800	4,000	800
North West	13,200	11,800	1,500
Yorkshire and Humberside	10,300	9,100	1,200
East Midlands	10,200	11,900	-1,600
West Midlands	11,500	10,800	600
East	29,600	58,700	-29,000
South East	53,800	88,300	-34,500
South West	16,000	22,200	-6,200
Wales	5,300	5,600	-300
Scotland	7,500	7,100	400
Northern Ireland	1,500	2,000	-500

Source: Office of National Statistics. Note: All figures have been rounded to the nearest 100

London offers young people opportunities that arise from its scale and diversity. The migration data make it clear no other city at present can rival those opportunities.

Finance

The availability of finance for UK businesses, particularly for SMEs is an issue that has had continuous attention for decades, without a solution emerging. The parlous state of the banking industry has focused still more attention. There is a distinction between the kind of finance that banks provide – generally working capital via overdrafts and debt – and venture capital for growth generally provided by equity as well as debt. The latter is needed for start-up and expansion, but the former is required to manage cash flow and to finance supply chains. In our view there is too little understanding in the policy process of these inter-related requirements.

Due to the consolidation of the UK banking industry over recent decades, and to the increasing importance of scale economies in banking, loan decisions have become standardised and centralised (rather like a hub-and-spoke transport system). Local discretion has all but vanished. Local knowledge specific to individual businesses plays no part in banks' provision of working capital and other loans. However, the ICT revolution ought to imply a reversal of this decades-old move towards a centralised, head office decision structure; it should now be easier to combine lending rigour with decentralisation because the flow of information is easier and cheaper.

In the North East the JEREMIE⁴³ funds, financed by the EU, have been available for start-up funding and have been sufficiently successful that a second fund is currently being financed. However, venture capital availability is sparse outside London and the South East although the major cities all have some provision; the BVCA estimates indicate that nearly 60% of the UK total invested by its members in 2012 was in London and the South East.⁴⁴ Banking provision is still seen as too centralised in cities outside London, and some groups are giving consideration as to how a regional bank could meet this gap, using better local knowledge and different criteria to centralised credit rating systems. It remains to be seen how risk can be managed under these circumstances – a national system enables risk pooling. Sweden's Handelsbanken has a model of devolved decision making and individual responsibility, creating a hierarchy of responsibility from local to national. However, it could also create a risk averse culture. We know of no published studies which have looked at how these processes work in the UK.

Land and house prices

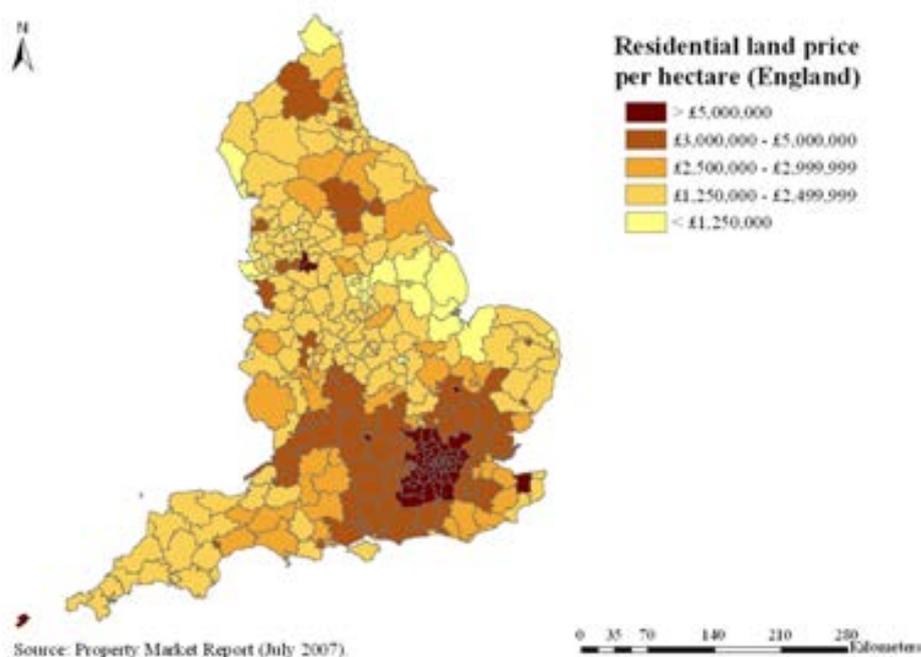
The variability of house prices and land prices is enormous, but the weight of London and the South East can clearly be seen in the map below. An unholy combination of transport systems and planning constraints had created a powerful group of NIMBYs – currently out in force to stop new railway lines – and an equally powerful group of house builders whose business model rests on slow expansion to prevent flooding a market.

We will return to the policy problem of planning later, moving here to the issue of infrastructure.

⁴³ JEREMIE stands for Joint European Resources for Micro to Medium Enterprises and is an EC fund to improve access to finance for SMEs

⁴⁴ BVCA (British Venture Capital Association) 2013

Figure 8: Land Price per hectare



Transport and infrastructure

Over the past decade it has been widely agreed that infrastructure is linked to growth of the economy. It is a mantra that is now repeated by the Chancellor of the Exchequer in each Budget Statement but it also represents an extraordinary shift⁴⁵. For in the SACTRA⁴⁶ report of 1999, it was still generally agreed that in a competitive economy, transport simply generated welfare benefits, measured only by time savings to users.

The concept that the economy might need to restructure in order to grow and this requires restructuring transport links was missing⁴⁷. For example, a report by Frontier Economics has shown that failing to establish air links with emerging economies will cost the UK in trade and output terms.⁴⁸

The vexed question of High Speed 2 has similarly been dogged by the proposition that this is just about saving time on the trip to Birmingham, as if it would have no dynamic economic consequences. A parallel would be to consider the move from dial-up internet to broadband as not all that significant because it would only save modest amounts of waiting time. The reality is that changes in frictions – such as those involved in travel between cities – can have large economic effects because behaviour changes as a result. What's more, as Dieter Helm argues, it is also important to think about individual transport investments as part of a network or system in order to evaluate spillovers and network effects.⁴⁹

⁴⁵ Autumn Statement 2013 Page 42

⁴⁶ Standing Advisory Committee on Trunk Road Appraisal

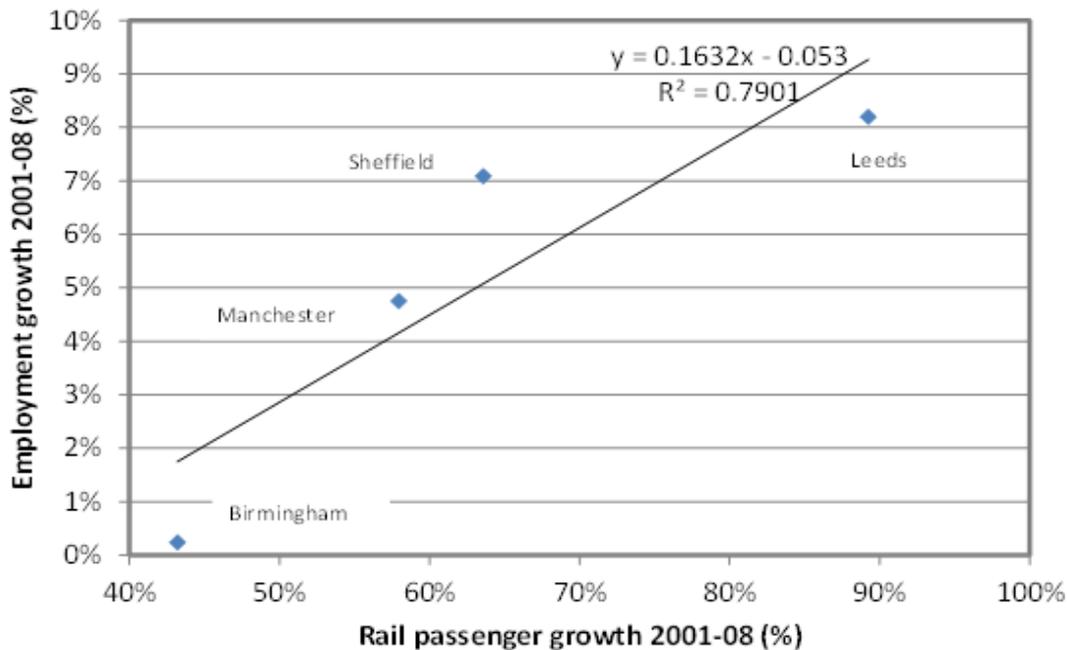
⁴⁷ The latest version of transport analysis guidance just published still starts with SACTRA 1999. Not everybody has moved on.

⁴⁸ Frontier Economics 2011 Connecting for growth

⁴⁹ Helm 2013

Cities that are growing also grow trips as the chart shows. This requires capacity, and the existing lines have run out of the ability to provide it – there is a limit on what Victorian infrastructure can deliver for us. This case has belatedly been made by HS2, and the ineffectiveness of Britain’s city network can be seen in the fact that the power of the losers in the rich suburbs of London may outweigh the needs and opportunities of Northern cities.

Figure 9: Correlation city growth and rail use



Source: Volterra analysis, ORR and NOMIS data

A further weakness of out-of-London infrastructure extends to the internet. Ofcom data on broadband availability by postcode area indicate that access and speed, and availability of superfast broadband, generally decline with distance from London, although some others among the biggest provincial cities, including Bristol, Birmingham, the Manchester-Leeds and Glasgow-Edinburgh conurbations, Tyneside enjoy similar levels to the South East (<http://maps.ofcom.org.uk/broadband/>). Scotland, Wales and the South West of England have the highest prevalence of limited broadband speeds due to the length of lines to the local exchanges.⁵⁰ Data on broadband penetration and broadband speeds available to consumers and businesses are available at the postcode level, so there is scope for further research from this user-perspective.

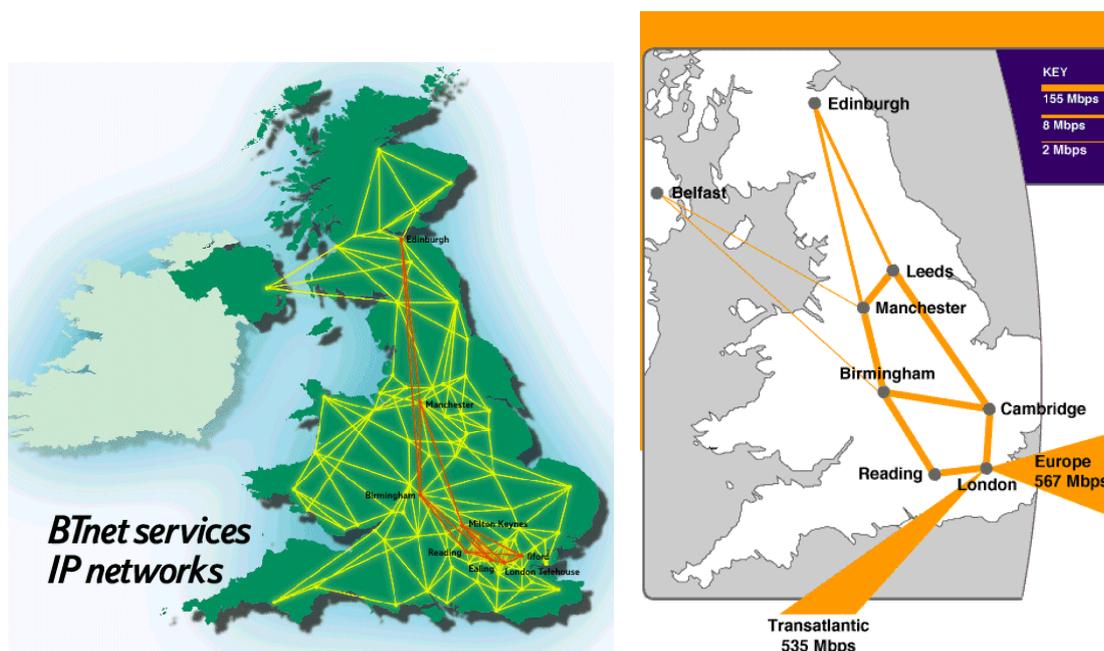
However, interestingly, there is little information readily available about the geographical distribution or quality and capacity of the underlying network. The UK's internet infrastructure is very London-centric: almost all traffic goes through London (Telehouse), with some through Manchester. There are internet exchanges in London, Manchester and Leeds.⁵¹ Most of the relevant information is held by communications providers. The maps below are the most recently available publicly showing the BT and other backbone networks. Unsurprisingly, these have the same north-south orientation from London as the location of the internet exchanges would imply.

⁵⁰ Digital Britain, Final Report. 2009

⁵¹ Internet exchange map, Telegeography, www.internetexchangemap.com

The supply of data centres is also London-centric. Where London is highly competitive and will see just in 2015 over 50,000 square meters of new data centres to become available, the rest of the country does not see a similar development. This appears to be due to a lack of competitive fibre offers in regions, which in part is due to high council taxes on lit fibres (OECD 2014). The 2009 report Digital Britain states: “The current demand for highly-connected data centres in the UK points to constraints in supply, which is of concern as these facilities can take up to two years to build from initial inception.” In the absence of sufficient local data centre capacity, servers overseas will have to be used. According to the OECD, 64% of UK websites are hosted domestically, below the OECD average of 72% and below all other G7 countries bar Canada.⁵² The main alternative locations are the United States, Germany, Ireland and The Netherlands.

Figure 10: UK Broadband Networks



The issue with internet infrastructure is whether there is sufficient competition to bring down backhaul prices, and whether the map of backbone connections between internet exchanges is more like a river system with smaller tributaries (most developing countries) or a dense mesh in which rerouting can easily occur. According to a recent OECD report, UK policy has not stimulated rollout of a robust backhaul network due to policies that raise the cost of investment in fibre, and has too few data centres.⁵³

Commuting patterns

People commute to work in London from a wide area of the country [see Cities Outlook figure 12]. This is of course highly dependent on the transport network, both rail and road. London is markedly well-served as the hub of the national transport network.

London has been well served by the capacity of its public transport network, which other UK cities have generally lacked. Many are now investing in light rail systems, from the

⁵² [International cables, gateways, backhaul and IXPs](#), February 2014

⁵³ www.oecdinsights.org/2014/02/18/beyond-the-first-mile-where-your-internet-comes-from/; OECD (2014). Long-distance operators are charged a proportion of the estimated rental value of their assets. Charges are higher for new entrants than for incumbents making incremental investments.

expansion of the Manchester Metro to Nottingham, Edinburgh, Sheffield and Birmingham. High density centres require high density people delivery systems, which car based systems cannot easily provide. While 80% of London's workforce arrives by public transport, the reverse is true in other cities and this has constrained the ability to create high productivity centres.

Most cities are well aware that a balance of local transport systems and inter-city transport are necessary for success, but have struggled to find mechanisms to support such investment.

It will be clear that the evidence base is somewhat limited, largely because of data constraints. This makes policy conclusions inevitably tentative. We conclude here with some suggestions based on the approach set out in this report.

Institutions and policy levers

Here we briefly discuss the political and social influences on the dynamics of growth in the UK city network, and the key policy questions. The recent prominence of urban issues in economics and political science is notable. Much of the research concerns the US, in part because of its rich data sets. A number of American scholars have made the case that the city is the appropriate geographic scale to consider economic growth and public policy, due to a number of converging factors including the importance of face-to-face contact in innovation in high value, technology-intensive economies; the operation of global production chains as linked urban nodes; and the social demands of increasing diverse communities coping with industrial restructuring and recession.⁵⁴

If UK firms are to remain or become leading innovators in technologically complex products and services, from advanced manufacturing to the creative industries, policy makers need to think in terms of the supply systems or supply chains required. These will differ from city to city, reflecting historical specialisms and existing sectoral strengths and skills. The kind of fine-grained knowledge about potential supply chain connections, at the level of detail and complexity needed for advanced sectors, is only available at local level. This detailed information is needed to consider the kinds of investments needed in the assets that enable technology-based competition: intellectual and human capital, physical capital, industry structure and technological and other infrastructure.

The other issue for policy is the 'market failure', or rather the need for co-ordination, arising from the importance of co-location spillovers in technologically advanced sectors. For any individual firm, the short-term logic of selecting suppliers on the basis of lowest cost regardless of location – including offshoring – is compelling; but for the UK economy as a whole there will be wider losses from ignoring the long-term innovation and competitiveness benefits of supply chain co-location. Over time, the ability to innovate will diminish, and UK firms will become less competitive in new technology lifecycles.

The example of graphene in Manchester is a timely example of the need for public and private co-ordination involving many actors. It is not clear that all the elements for successful investment and growth resulting from the innovation are yet in place notwithstanding significant public investment. As with many other emerging technologies, the scope and scale of the required R&D is beyond the research capabilities of most or all individual firms; so university partnerships are essential. In addition, though, no single

⁵⁴ Glaeser 2008; Katz & Bradley 2013; Barber 2013

actor can align the availability of an appropriately skilled labour force, the amenities required to attract skilled, mobile people, the transport and infrastructure investment and international connectivity – across a whole potential supply chain. This co-ordination role is particularly needed at the early stages of the development of a new technology when the private market opportunities are uncertain and anyway too small to enable economies of scale.

There is a particular gap in terms of ‘proof of concept’ technology research, in between the science base and commercialisation. This is research that demonstrates the possibility of a range of practical applications and provides accepted conceptualisations and industry standards. Private investors will not fund this research because of the long time to market and high risk involved. Public investment focuses on the earlier, pure science research. Some advanced manufacturing sectors can by-pass the ‘proof of concept’ stage – for example, pharmaceuticals companies can go straight to clinical trials. However, there may be a case for a strategic and co-ordinated approach to what have been called ‘infratechnologies’: “a diverse set of technical tools that are necessary to conduct all phases of research and development, to control production processes, and to execute marketplace transactions for complex technology-based goods. They include research tools like measurement and test methods, scientific and engineering data, quality control techniques, and the functional as well as physical basis for the interfaces between components of modern technology systems.”⁵⁵ There are public good elements to such tools, techniques and standards. While their geographic scope is obviously wide, the development of these ‘infratechnologies’ is aided by the co-location of different members of the research and development consortia required to bridge the distance from university research to commercial production in a supply chain.

We have argued that city success at any level is a matter of linkages and getting the right mix of underlying infrastructure, to enable supply-chain driven productivity gains. While diversity is an indicator of success it also rests on comparative advantages. Fostering these while also fostering diversity requires policy and institutions that are close to the action. The UK’s greatest weakness is that centralisation has undermined over generations the institutions of cities and London’s relative success may well rest on the fact that it has been able to overcome this by its sheer attractiveness and scale.

Greater independence and risk taking, and an end both to interference by and dependence on central institutions must be the way forward. The City Finance Commission, chaired by Stuart Lipton, showed that all cities recognised and were frustrated by their inability to act on the particular needs of their cities. Complex funding sources, incapable of flexible application, driven from Whitehall, tied their hands.

There will always be tensions and trade-offs between local and national needs and controls. They cut across all areas of activity:

- The locus of political decision-making (trade-offs between centralising for efficiency/inter-regional transfers and decentralising for responsiveness to local conditions and needs);
- Business organisation (trade-offs between economies of scale and local market access/knowledge);

⁵⁵ Tassej 2014

- Access to finance and advisory services (where this trade-off is particularly acute because of information asymmetries).

While technological change is changing these dynamics because it reduces the costs/increases the benefits of local decision-making, institutions change far more slowly.

In addition, local loyalties remain strong. The challenge of getting local authorities to co-operate to create growth, when they have been used to fighting each other for grants is difficult. Making local rivalries a positive force for innovation rather than a negative one for a share of the cake requires strong local leadership, and powers.

A strong counterweight to London's global role should not be its restriction in the vain hope that somehow global status can be smeared evenly around. It can't. Rather it requires the power and the co-operation between the Northern cities to build their own linkages. One of us has previously argued HS2 should have started in Manchester.⁵⁶ Links between the cities of Manchester, Leeds and Sheffield, with outreach to Birmingham, Newcastle and Liverpool could be the heart of such a counterweight.

⁵⁶ Working Group for Secretary of State for Transport, 2009

Next steps for research

To answer fully the question posed in our title requires both better theory and better data. More specific hypotheses about what a city system might be and how networks operate will in turn inform the data needed. We identify below some key empirical requirements and then outline some of the theoretical challenges.

Empirical challenges

Develop data sets on trade and supply-chain linkages - including some long term trends. Much of this will need to be inferred from sources (such as transport data). There may be useful indirect approaches to empirical work, for example using work-flow data as a proxy for economic activity.⁵⁷

Consider how to test for the mix of attributes that has the best chance of allowing a specific city to reach the critical mass to enable the virtuous cycle of growth.

Consider the role of new technologies, both in manufacturing and communications in changing both this critical mass and potential linkages.

Theoretical challenges

Develop further an economic analysis in which geography matters both for trade and activity concentration, but where evolution is continuous. The 'Atlas of Complexity' approach at the level of sub-national geographies is one possible starting point.

Develop theories of supply chain management incorporating information flows, for example extending the task-based approach of Baldwin (2004) or Autor (2013).

Discuss policy implications, especially for (a) city-specific competencies and attributes and (b) investment in connectivity.

⁵⁷ See eg Taylor et al 2010

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