

**Manchester Independent
Economic Review**

LITERATURE REVIEW

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Background and aims

The purpose of this literature review is to assist local stakeholders, the MIER Reviewers, and members of the MIER study teams in developing a thorough understanding of what research and documentary evidence already exists within the Manchester City Region (MCR) and North West (NW) region, and to draw upon additional national and international research where relevant.

This report takes each of the MIER Research team's initial literature review work as its starting point, (undertaken at the beginning of the MIER programme) and then draws out seminal research journals and thinking which is helping to shape the content and detailed focus of each study. This report also makes light reference to the context of each MIER study. However reference should be made to the MIER website (www.manchester-review.org.uk) for further details on specific aims and methodologies applied for each of the MIER's seven projects.

In addition, MIER Secretariat has conducted its own review of available local literature, in order to ensure that each of the projects has taken account of the broadest possible intelligence at all spatial levels. This involved a far reaching search through journals and other academic literature via the internet. This has been a robust process and as such, it is believed that all relevant key literature has been taken into consideration by the research teams.

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1. Agglomeration Economies – Executive Background

The MIER's 'golden thread' and its overarching study is the Case for Agglomeration Economies, led by Enterprise London School of Economics¹. The study draws upon the findings from the full range of the Review's projects, which includes research on the following: Innovation and Networks; Trade; Skills and Talent; Investment; and Sustainable Communities.

The purpose of this report, and the MIER overall, is to provide an increased understanding of the nature and magnitude of agglomeration benefits and costs important to the Manchester City Region economy. It represents the first application of urban economic theory to a single city region in the UK. The Review will also set out a conceptual framework and empirical evidence that will help generate policy options and assessment of the likely impact of policy which influences agglomeration economies.

Regions grow where firms congregate and no theory of urban resurgence can afford to ignore agglomeration economies. We remain unsure, however, of what generates agglomeration and, conversely, of what weakens it. By definition, the densities of both employment and population are higher in cities than in other areas. Parts of central Manchester have amongst the highest employment densities in the UK. Cities are centres of finance and commerce; centres of culture, knowledge and creativity; centres of communication; centres of power and influence; and visitor and tourist centres. The concentration of people and business activity has many benefits that make locating in the city worthwhile.

There is the ability to create deep markets: that is, markets in which there is a lot of choice. This is particularly relevant to labour markets, where job search can be easier and the matching of jobs to people can be more effective. Access to deep pools of skilled labour is frequently cited by companies as one of the top two factors in deciding where to locate, along with access to markets. There is the ability to exploit economies of scale, not just in production, but also in marketing and sales. This can also extend to the ability of specialists to exploit a niche, which would be impossible in a smaller market.

There are network benefits from bringing people, activities and skills together. These may be knowledge networks, which enable universities to get together with business. The networks may be of ideas, the cultural activities that provide excitement and innovation; or they may be in finance, the ability to find someone who is interested in funding and/or buying a business idea. The concentration of activity also lowers the transport costs of moving goods to and from the market place.

Agglomeration is a dynamic process and the Manchester City Region is not a static area. Indeed, its size and variation are precisely what makes change possible. It has reinvented itself on many occasions. Its most recent reincarnation is in the recovery from the decline of manufacturing employment, with losses replaced by service sector jobs, which have gone on growing, in particular within the conurbation core. As a result, employment trends remain positive across the City Region and only a collapse in business services will prevent further growth. It is also why much of the expansion of employment is expected to happen in the central area. This is where the benefits of 'closeness' can be most easily absorbed and exploited.

The trend towards agglomeration and city centred growth across the UK and the MCR shows little sign of reversing. With more of the globe's population live in cities than ever before, it is increasingly apparent that the more it becomes possible to communicate at a distance, the more we want to get together to work out how to use new advances. Agglomeration creates potentially substantial benefits for those who get together.

¹ MIER Project 1: The Case for Agglomeration Economies.

Manchester city centre has significantly higher output per head than many other parts of the country, certainly the highest within the region. This higher productivity results in higher earnings. Profits are also high and this partly compensates firms for the higher costs of being in a large city, including not only the costs of commuting, but also those associated with the relative scarcity of land. Agglomeration therefore creates a dynamic of its own. As costs rise, activities must become more productive. This may drive out some activities that cannot keep costs down or where competition is intense. But it also results in a pressure to perform that can make firms more effective, more productive and more able to compete in wider markets.

However, estimates of the full impact of agglomeration on output are not yet widely available. These require detailed research and data sets, which are either not yet fully exploited or not currently in existence for the UK's City Regions. More therefore needs to be done in order to understand the impact of agglomeration within the Manchester City Region, in particular whether businesses and industry sectors benefit from the spill-over effects generated by proximity; whether the MCR's labour market is sufficiently dense enough to offer choice to both workers and employers; and whether agglomeration creates further opportunities to build niche businesses, exploit knowledge transfer and foster innovation. It will also be equally important to understand the potential diseconomies resulting from rapid growth in the conurbation and the growing pressures that agglomeration places upon land-use (commercial, housing etc), critical infrastructure (utilities, public services etc), transport (connectivity, commuting etc), labour supply and recruitment (accessibility, travel to work etc).

2. Agglomeration Economies

At their broadest level, agglomeration economies occur when individuals benefit from being near to other individuals. Traditionally, agglomeration has also been viewed as a market force that makes industries stay in one place, in the sense that it changes the division of labour and overall set of functions within industry (typically manufacturing), and some of these functions grow and require proximity. Agglomeration still has this effect, but in the modern economy knowledge-based agglomeration also has a dynamic aspect that may be more relevant to urban resurgence. Knowledge-based agglomeration economies are qualitatively different, (to 'traditional' / manufacturing based economies) and we know least about them, **Veltz (1996 and 2004)**, **Anas et al. (1998)**, cited in **Storper and Manville (2006)**.

The economy's demands for agglomeration and proximity today are largely stimulated by the way that knowledge is transmitted. This often requires that people work in close quarters with one another (see **Leamer and Storper (2001)**; **Storper and Venables, (2004)**; **Seabright (2004)**; each cited in **Storper and Manville (2006)**). The scale and proximity advantage lies not in information's quantity, but in the ability to share and mediate it. The mediation of this information, because much of it is new and tacit - not standardised, often requires face-to-face interaction, which is crucial for learning, building trust and reducing risk. Face-to-face contact is a 'soft' exchange: it allows information to be mutually understood, placed in context and verified; **Storper and Venables (2004)**. Thus, it demands and creates the human relationships necessary for innovation and economic growth.

Research literature has made considerable progress in quantifying the general importance of agglomeration economies. Earlier works illustrated increasing returns at the city level, from the sharing of ideas and technical knowledge, demonstrated formally by **Henderson (1974)**, building on the analysis of **Chipman (1970)**. Other early empirical studies of urban scale effects by **Sveikauskas (1975)**, **Segal (1976)**, **Moomaw (1981, 1985)**, and **Tabuchi (1986)**, illustrate the link between city size and productivity at the city and the city-industry level. The empirical results broadly indicate that doubling city size increases productivity by 3 to 8%.

Abdel-Rahman (1988), **Fujita (1988, 1989)**, and **Rivera-Batiz (1988)** also present a rigorous analysis of decentralized market equilibria with increasing returns at the city level due to intermediate input sharing. These contributions build on the formalization of monopolistic competition of **Spence (1976)** and **Dixit and Stiglitz (1977)** to show how increasing returns to city size emerge. Other notable contributions here on the role of cities and the efficient organisation of production include **Vernon (1960)** and **Chinitz (1961)**, **Jacobs (1969)**, **Piore and Sabel (1984)**, and **Saxenian (1994)**; other works cover the role of agglomeration and entrepreneurial activity, as in **Sorenson-Audia (2000)** and **Klepper (2006)**.

A number of recent studies including: **Rosenthal and Strange (2004, 2008)** and **Graham (2008)** summarise results from a number of studies looking at evidence on the nature and scale of agglomeration economies and the relationship of agglomeration (sharing, matching and leaning) with productivity levels, and these are covered in detail in the MIER studies.

For the purposes of the MIER, the focus will be on the Manchester City Region (MCR) economy and on the agglomeration economies that arise through **production**. It is important to remember, however, that there may be other broader benefits, for example in terms of consumption. For further points of reference on consumption economics, see **Glaeser, Kolko, Saiz, (2001)**; **Glaeser (2006)**; **Florida (2003)**. For the effects of historical or natural amenities acting as a focal point for economic growth, also refer to **Bruekner et al. (1999)**.

In the context of the MIER, a narrower focus on production agglomeration economies means that the productivity of individual firms rises with the overall amount of activity in other "nearby" firms, or with the number of nearby workers or consumers. That is, agglomeration economies arise because of the production benefits of physical proximity. The literature traditionally emphasises three sources of agglomeration economies, roughly following three examples given by **Marshall (1890)**: linkages between intermediate and final goods suppliers; labour market interactions; and knowledge spill-overs.

Unfortunately, despite wide usage, this taxonomy alone is not a particularly useful guide for policy because it is focussed on the channels through which we observe the effects of agglomeration rather than the underlying mechanisms that drive the effects. In terms of increasing understanding and formulating policy responses, there needs to be a focus upon why firms benefit and then to understand the channels through which this happens and whether policy can influence them. It is for this reason, that the MIER study draws heavily on the **Duranton and Puga (2004)** classification of the mechanisms, which they call sharing, matching and learning, through which agglomeration economies can occur, as follows:-

- **Sharing:** The simplest example of agglomeration through sharing relates to the existence of indivisibilities in the provision of goods or facilities. Examples include transport and educational facilities. The sharing of larger labour markets and the production of goods also facilitates returns to scale.
- **Matching:** Agglomerations give firms easier access to their suppliers, allowing them to seek out and integrate specialist inputs. Firms also save on transaction costs when other firms locate near to both their customers and suppliers. **Helsley and Strange (1990, 2001)**. They also create large pools of labour (referred to as 'thick labour markets') upon which firms can easily draw, thereby allowing for a finer division of labour. Thick labour markets also provide incentives for workers to invest in their skills.
- **Learning:** Agglomerations facilitate performance enhancing knowledge spill-overs meaning that business knowledge is acquired, exchanged and circulated more rapidly when firms and workers are spatially concentrated. In particular, there are more opportunities for positive externalities such as face-to-face contact which facilitates knowledge exchange; e.g. **Jaffe et al. (1993)**, **Carlino et al. (2004)**, both cited in **Berliant et al. (2006)**.

For policy purposes it is also important to know about the geographical scope of agglomeration economies and related governance issues. The geographical scope of agglomeration economies that arise from market access or access to intermediate goods will most likely depend on the transportability of the goods (or services) involved. Whilst the theoretical literature and empirical evidence on these issues remain very under-developed, references are made in the MIER studies to recent work by **Graham (2006, 2008)**; and **Rice et al (2006)**. For a review of cities and their governance arrangements, refer to the extensive literature review in **Marshall and Finch (2006)**. For work on functional urban geographies and governance, refer to: **Cheshire and Magrini (2005)**, **Boddy and Parkinson–eds. (2004)**, and most recently from Government: **DCLG (2008)**.

The final issue, which has received slightly more attention within agglomeration literature, concerns the question of whether agglomeration economies are dynamic or static in nature. This is, whether the main benefit of agglomeration manifests itself in the form of faster growth and thus higher income in the future (dynamic externalities), or whether the main benefit realised is in terms of increased productivity and income today (static externalities).

The literature identified here is mainly concerned with the sectoral scope of these externalities (i.e. whether they are of the localisation or urbanisation kind), referring to **Nakamura (1985)**, and also **Henderson (1974, 1986, 2003)**. *Localisation* economies are increasing returns related to the size and diversity of city-industries, while *urbanisation* economies refer to increasing returns to overall city size. Henderson concludes that scale effects are mostly at the industry level, but **Nakamura (1985)** finds evidence for both urbanization and localisation economies.

Glaeser, Kallal, Sheinkman and Schleifer (1992); and **Henderson, Kuncoro and Turner (1995)** test the relationship between local employment growth (urbanisation and scale) and initial economic characteristics (diversity or specialisation). **Glaeser et al.** also consider theories that explain economic growth as a result of technological externalities, covering works by: **Marshall, Arrow and Romer; Porter (1996); and Jacobs (1969)**. The authors examined a cross section of city-industries and found that, "*as measured by employment, industries grow slower in cities in which they are heavily over-represented*". They concluded that "*this result supports Jacob's view that city diversity promotes growth as knowledge spills-over into different industries.*"

According to the Marshall-Arrow-Romer (MAR) theory – revisited in **Combes (2000b)**- concentration of an industry in a city helps knowledge spill-over between firms and therefore the growth of that industry and of that city. Another earlier growth theory, by **Porter (1996)**, is similar to MAR, in that Porter argues that knowledge spill-overs in specialized geographically concentrated industries stimulate growth. Porter insists that local competition, rather than local monopoly as argued by MAR theory, fosters rapid adoption of innovation.

Similarly **Jacobs (1969)** suggested the most important knowledge transfer comes from outside the core industry. In her theory, variety and diversity of geographically proximate industries, rather than geographical specialization, promote innovation and growth, because “*in diversified cities there is more interchange of ideas*”. Jacob’s theory predicts that “*industries located in areas that are highly industrially diversified should grow faster.*” In contrast, MAR and Porter’s theories predict that industries that will “specialize geographically,” in order to absorb the knowledge spilling over between firms, will be the ones which grow faster over the long term.

These issues still remain an area of contention, with **Rosenthal and Strange (2004, 2008)** and **Combes and Overman (2004)** providing further detailed review and discussion. **Glaeser et al (1992)** reviews different approaches which have been used to capture the impact of agglomeration economics including a focus on ‘optimal cluster size’ such as **Combes, Duranton and Overman (2005)**; **Duranton (2008)**; and **Leunig and Overman (2008)**; and location patterns of industry, **Duranton and Overman (2006)**. Here analysis has been made of cluster size and its relationship with rising productivity, but set against the rising costs through increased competition on output markets, increased competition for workers etc.

Looking at demand side policy choices, there is a vast policy literature on clusters that uses the existence of agglomeration economies to justify a whole range of strategic policy interventions, e.g. **Delgado et al (2007)**. Whilst ‘cluster policies’ have held significance with policy makers over the last 10 to 20 years, the literature highlights the shortfalls in this approach as the sole basis for intervention, drawing upon critique from: **Martin and Sunley (2003)** about cluster definition; **Duranton (2008)** regarding the lack of empirical analysis and application of economic theory and the prioritisation of policy intervention – referring to the limitations of the Porter model approach **Porter (2000)**; and the lessons and limitations of UK ‘cluster policy’, citing e.g. **van der Linde (2003)**. For a recent and wide analysis of clusters, inter-firm networks and international policy case studies, refer to **Karlsson et al (2005)**, as well as other references on network analysis provided later in this review.

Having set out the background for the MIER and an overview of Agglomeration economies, the rest of the literature review looks at the relationship between Agglomeration and: trade; innovation; labour market skills; inward investment and spill-overs; and growing sustainable communities. Therefore providing background to each to the MIER’s constituent projects.

Agglomeration, Trade and Markets

Manchester has a strong trading legacy dating back to the 18th century with the manufacturing boom. The openness of today’s global economy offers MCR an excellent opportunity to further develop it’s international trade, whilst strengthening it’s distinct offer and internal linkages, in order to attract investors and high growth businesses to the city region. The broad benefits of economic linkages have been succinctly outlined by Government in their paper on international trade and investment: **BERR (2006)**.

Any study which identifies the importance of trade and linkages must also look at the barriers and inhibitors to the development of these linkages. UK Government (**BERR 2006**) groups these factors into costs of overseas market entry, such as the cost of accessing information on overseas trade, and expected benefits of market entry which are not realised, including the potential lack of direct revenue return from investment. An insight into specific barriers will be provided through the case studies that are being conducted within the MIER trade study. The NWDA has also published a paper ‘North West Economy: A joint Response to changing economic circumstances’; **NWDA (2008)**. This study prioritises certain initiatives to ensure that the region is well equipped to deal with the economic downturn and can continue to enhance it’s international presence.

In the late 1970s and early 80s, several researchers looked at agglomeration and trade – **Krugman (1979, 1980, 1981)**, **Dixit and Norman (1980)**, and **Lancaster (1980)** – and independently formalised the idea that economies of scale and imperfect competition can give rise to trade even in the absence of comparative advantage. **Krugman (1979)** showed how trade can induce pro-competitive effects in a model with monopolistic competition and endogenous mark-ups. In related contributions, **Ethier (1979, 1982)** developed models of intra-industry trade based on growing economies of scale in intermediate rather than final goods.

Markusen (1981) formalized and highlighted the pro-competitive effects from trade due to the reduction in market power of a domestic monopolist. This latter modelling framework was then extended by **Venables (1985)** and **Horstmann and Markusen (1986)** to the case of oligopoly with free entry (while maintaining the assumption of a homogeneous traded good). These papers emphasized, among other things, how free entry could generate welfare losses for a country unilaterally liberalizing imports. It was **Krugman (1980)** who highlighted the standard welfare gains from additional product variety as well as the asymmetric welfare gains of trade induced by differences in country size and trade costs.

Krugman (1980, 1991) and **Helpman and Krugman (1985)** – reviewed extensively in **Bernard et al. (2007)** - set out new approaches for the theory of international trade, providing '*New Trade Theory*' which gives an explanation for the observed patterns of production factors and intra-industry trade. Krugman emphasises the significance of international trade in driving the specialisation and success (or failure) of regional economies. His basic argument outlined that advanced economies are losing their comparative trading advantages in routine production to less developed countries where labour is much cheaper. The main route out of this challenge is to develop absolute competitive advantages based on products and services that are geared to the specific needs of international customers. Generally these 'advantages' need to be based on trading knowledge and quality that are not readily available, or possible, in the less developed economies.

Specialisation and greater division of labour is one route by which city regions in the advanced economies may achieve absolute international competitive advantage. Innovation is clearly a key basis for the achievement of absolute trading advantage. The city regions in the advanced economies that can provide high levels of specialisation, sophistication and highly qualified labour, together with international trading capabilities (in contested global markets), are therefore likely to be both those where high levels of innovation take place and those with international competitive trading advantages.

The ability to generate absolute trading advantages in high-tech, knowledge/innovation activities is confined to a relatively small number of regions – often the focus of international knowledge flows - within areas which combine and concentrate a mixture of international trading capabilities, city regional specialisations, high quality local factor conditions (quality of place), sophisticated local and national customers (and consumers), and supporting industries and innovation oriented firm strategies. These attributes combine, within an agglomeration, to create a virtuous circle of innovation and international competitiveness for the minority of city regions in which they are found; as cited in **Simmie et al. (2001)**.

Recently, endogenous growth models have illustrated the dynamic gains of international trade. Exchange between two countries enhances the diffusion of technological and organizational knowledge from the more advanced economies to the rest of the world, and hence, stimulate productivity. There are several channels through which knowledge spill-overs potentially take place, including the following, but not exhaustive list, from **Groizard (2003)**:-

- International trade allows countries to gain access to a broader variety of intermediate and capital goods;
- International trade also establishes communication channels needed for learning new production processes, new designs, or new management techniques;
- Trade facilitates copying and adaptation of foreign technologies to domestic uses; and

- Openness to trade improves the productivity in imitating and developing new technologies from abroad. Several technological spill-overs take place throughout FDI and personal contacts.

Wide empirical evidence suggests that international traders are more productive than those firms not engaging in international trading activity and that firms and workers are, on average, more productive in larger markets. For cities this fact, first suggested by **Adam Smith (1776)** and **Alfred Marshall (1890)**, is now firmly established empirically (see **Rosenthal and Strange (2004)** for a review and **Henderson, (2003)**, and **Combes, Duranton, and Gobillon, 2008**, for recent contributions). The evidence is also mounting for spatial markets at higher levels of aggregation, such as regions and even countries; **Head and Mayer (2004)**; **Redding and Venables (2004)**; **Amiti and Cameron (2007)**.

Ades and Glaeser (1999) suggest that increasing returns operate by expanding the extent of the market (as in the big push theories of **Murphy, Shleifer and Vishny (1989)**), with trade linkages creating enhanced growth by increasing the division of labour and because trade causes advanced economies to specialise in products which creates more opportunities for learning.

Cameron et al (2003) analyse productivity growth in a panel of fourteen UK manufacturing industries since 1970. As well as the roles played by research and development, and human capital stimulating productivity growth, he also finds that international trade enhances the speed of technology transfer (i.e. reduces the distance between industry and the 'technological frontier' – leading to overall growth in productivity).

Alcalá and Ciccone (2001 and 2004) show that international trade has an economically significant and statistically robust positive effect on productivity. Domestic businesses often indirectly increase their productivity as they seek to capitalise on the ability to trade overseas. They may also directly raise productivity in order to ensure that they grow markets and survive against the future threat of rival foreign firms.

Combes et al (2008), have recently shown that firms and workers are more productive on average in larger markets and offer two explanations: agglomeration economies (larger markets promote interactions that increase productivity) and firm selection (larger markets toughen competition allowing only the most productive to survive). This builds upon work by **Melitz (2003)** and **Melitz and Ottaviano (2005)**, who present models that predicted how a wide set of industry performance measures (productivity, size, price, mark-up) respond to changes in the world trading environment. Combes et al suggest that trade induces increased competition for scarce labour resources as real wages are bid up by the relatively more productive firms who expand production to serve the export markets. Increase in real wages forces the least productive firms to exit. Therefore larger markets exhibit tougher competition resulting in lower average mark-ups and higher aggregate productivity.

Bernard et al (2007) find that the characteristics of exporting firms differ significantly, compared with those who do not. Firms which import/export are more likely to be bigger and more productive, pay higher wages, and are more skill- and capital-intensive than non-exporters and non-importers. However the direction of causality is also questioned, i.e. do firms gain benefit from international trade or is it because they are successful that they can also succeed in international markets.

Harasztsosi and Bekes (2008) also look at the spatial concentration of economic activity and international trade using panel data. They suggest that the probability of being an international trader is higher in denser regions (i.e. where businesses and employment are heavily concentrated), as the knowledge of international commerce is part of the fixed cost of trading and the concentration of similar firms seems to affect such costs, thus making traders spatially concentrate more than non-traders.

For further and wide ranging literature on agglomeration, trade theories and productivity, also refer to: **Rivera-Batiz and Romer (1991a, 1991b)**; **Grossman and Helpman (1991)**; **Barro and Sala-i-Martin (1995)**; **Aghion and Howitt (1998)**; **Frankel and Romer (1999)**; **Fujita, et al. (1999)**; **Alesina, Spolaore and Wacziarg (2000)**; and **Ciccone (2006)**.

3. Agglomeration and Thick Labour Markets

Closely linked with the theory of agglomeration economies is the concept of thick labour markets, which provides another pillar of the MIER research programme². The concept in its most basic form refers to labour markets, where there are high levels of demand for and supply of skilled labour from a multiplicity of employers. The literature reviewed here provides a brief review of the empirical research and theoretical literature examining thick labour markets; why they are of benefit, the mechanisms through which they operate and how they are measured.

Thick labour markets are most often referred to in academic literature as one mechanism through which agglomeration economies raise productivity in densely populated areas, (referring again to **Duranton and Puga's classification (2004)** by *sharing, matching and learning*). Thick labour markets allow greater specialisation in human capital. They do so by reducing the risks to workers of firm specific employment shocks, while firms benefit from the availability of a pool of specialised workers if they wish to respond to an upsurge in demand in particular markets.

There is strong empirical evidence for these kinds of labour-pooling effects, shown by **Dumais, Ellison and Glaeser (2002)**, although they seem to be less well explored in academic literature, compared with the other mechanisms of agglomeration economies. A different but closely related benefit of pooling are matching effects. **Andersson et al (2004)** show that thicker labour markets are associated with more matching between workers and firms in specialised markets, and when combined with complementarity of worker and firm quality, this raises productivity. **Bleakley, Hoyt and Lin (2007)** show how matching effects have different implications at different stages of the 'life-cycle' of people careers and 'life-choices'.

Finally, dense labour markets may bring economic benefits by facilitating the acquisition of human capital, or what **Duranton and Puga** may classify as learning effects. The most notable work on these effects is by **Glaeser (1997)** who built upon the ideas of the 19th century economist **Alfred Marshall**. **Glaeser** formalised this theory and showed that cities will have a higher mean and higher variance of skills. Cities will attract young people who are not too risk-averse and who benefit most from learning. Older, more skilled workers will stay in cities "*only if they can internalize some of the benefits that their presence creates for young people.*" Other studies, for example **Rauch (1993)**, look at the role of cities and productivity, including the increasing returns to education and the effects of human capital externalities within cities.

4. 'Escalator', 'Fountain' Effects and Labour Market 'Density'

In a paper with **Maré (2001)**, Glaeser investigated the structure of the urban wage premium. They found that workers who migrate to cities do not receive the full premium at first. However, as experience accumulates, the premium rises. These themes are also pursued by **Peri (2004)**. He showed how young educated workers were attracted to urban areas despite low wages. This is explained because they gain benefits from learning from others.

These theories by Glaeser and Peri share similarities with migration theories of English authors, Fielding and Champion. **Fielding (1991)** posits what is termed the 'escalator hypothesis', arguing that in cities there is a higher rate and faster than normal progression from education into managerial posts, and a higher degree of churning between professional and managerial jobs.

Fielding uses the example of South East England as an 'upward escalator' but also recognises that they can move downward in other regions. **Fielding's** thesis has two major antecedents. One was the identification of a 'missing link' in contemporary research, which was seen as having neglected the relationship between social and geographical mobility as cited by **Savage (1988)**. The other antecedent was the growing recognition during the 1980s of the effect of place on '*life chances*'. People possessing the same qualifications and achieving the same levels of work performance were nevertheless observed to experience quite different occupational class trajectories in different places (**Ashton et al (1987)**) leading to a 'bumping down' process whereby those in northern cities tended to lower their sights – in the face of higher levels of unemployment - and accept jobs which did not use their abilities to the full, as articulated by **Peck and Houghton (1987)**.

² Project 5: Labour Markets, Skills and Talent: <http://www.manchester-review.org.uk/projects/view/?id=722> {accessed 19.09.08}

Fielding (1991) also sets out the conditions that would need to be met before a region could be correctly categorised as an (upward) 'escalator region.' The culmination of the escalator effect is the 'spill-out' to other areas, through out migration of a significant proportion of those who had experienced the upward social mobility. People migrate partly to cash in the assets gained during their advancement. Others are drawn upon for the purpose of developing a new career (for example, the use of specialised skills or management experience to set up in business on one's own). This last stage of the escalator effect has also been coined the '*fountain effect*' or a '*counter-urbanisation cascade*' by **Champion (2005)**, - see also **Champion and Atkins (1996)** and others, for example **Plane et al, (2005)** on the USA - as the highest skilled people disperse to less densely populated areas.

Studies drawn from analysis of urban migration also explore some of the push factors from urban centres, for example **Coombes et al. (2007)**; and others look in some detail at the characteristics of housing markets, including the function that areas of better quality housing and amenities could play in supporting further economic growth, for example in Manchester – shown by **Ecotec (2006)** and in larger studies across the North of England ('The Northern Way') **Llewelyn Davies Yeang (2006)**.

Fielding and Halford (1999) as well as the more recent research of others, have felt able to conclude that areas such as the South East of England have continued to satisfy the key conditions of the escalator region. In his own words **Fielding (2007)** cites: "... *these relationships between migration and social mobility within hierarchical urban systems are quite remarkably stable over time*".

Researchers have also found that the larger an agglomeration gets the greater the agglomeration and productivity benefits become, i.e. there are increasing returns to density. The clear implication for policy-makers is that if they can increase the effective size of a city (by attracting residents and skilled labour, new investment, employers/jobs and improving transport) they can increase the agglomeration economies available and improve performance.

One major obstacle in research in this area is that labour market density is difficult to measure. The MIER project provides critique of the approaches used, including: population and employment per square mile **Andersson et al (2004)**; measures of labour market density based on observed commuting patterns **Gautier and Teulings (2000)**. There are very few British studies which have attempted to calculate labour market density for particular sectors. Examples include studies for HMG in the UK engineering sector undertaken by **PACEC (2008)**.

5. The Attraction and Retention of Talent

Much of the recent discussion in the literature on the broadly conceived idea of 'urban assets' has been dominated by Richard Florida's Creative Class thesis (**Florida, 2000, 2002**). At the heart of Florida's work is the contention that in the post-industrial knowledge economy highly-skilled workers are attracted to cities or regions with 'creative class' attributes: a rich cultural scene, high densities of professionals, and in particular those working in cultural occupations, artists and 'bohemians', as well as openness to ethnic and cosmopolitan diversity - and that such attributes strongly dictate the sustainability of future agglomeration benefits to economic growth (see bibliography for a variety of references in particular **Clifton (2007)**).

This thesis builds on a number of more traditional concerns with the role of quality of place or local environment in attracting firms and individuals and generating economic development, cited in **Wong (2001)**. But the implication is that "*quality of place must be understood in broader terms than we have traditionally been accustomed to: while the attractiveness and condition of the natural environment and built form are certainly important, so too is the presence of a rich cultural scene and a high concentration of people working in cultural occupations*"; **Clifton (2007)**. One of the main challenges to previous accounts then is that consideration must be made to the cultural and creative phenomena that are supported by the bare environmental and place assets of the urban area.

The Creative Class thesis has been the subject of considerable debate and criticism by scholars. The concept has been criticised for its conceptual fuzziness, definitional problems and the direction of causality employed by Florida. There is also controversy over the extent to which economies

have genuinely moved towards post-industrialism or the extent to which urban economies are accurately characterised as being based on the 'knowledge economy'; cited in **Brown and Lauder (2006)**. More particularly, attention has been drawn to the persuasiveness of the thesis to policy-makers and elite urban actors, dominating policy debates despite doubts about the lack of strong empirical evidence. Many academics are sceptical that the very persuasiveness of the concept and apparently simple policy messages 'crowd-out' the potentially growing inequalities and negative externalities that might stem from 'creative city' strategies; cited in **Peck (2005)**.

The Creative Class thesis is closely associated with arguments, largely arising out of policy literature, about the important role that 'quality of place' plays in influencing labour markets and local or regional competitiveness. Place making and shaping have become more prominent objectives of planning policy, part of the push for more of a comprehensive or holistic approach to public investment; cited in **Lyons (2007)**.

However there is only limited evidence currently available which aims to address how cities and 'quality of place' influence labour market characteristics in different localities, reflecting the complexity of the factors involved and the particular difficulties in isolating quality of place decisions by business investors and individuals in the workforce. This was reflected in the Barker Review's call for better evidence on the relationship between housing and economic development, with **DTZ Consulting (2006)** providing an overview for BERR of the literature linking quality of place to the ability of an area to attract and retain higher qualified and better paid workers.

6. Innovation

Innovation is an ever-present and continual process in the modern knowledge economy leading to sustained value creation and competitive advantage. It can be summarised as the commercial introduction of a new process, service, product or method which adds value. One form of innovation may be the economic realisation of an invention, primarily the application of new combinations of resources to the economic process: "*Innovation requires access to and command of many more kinds of knowledge and capability that are summed up by the phrase 'science and technology'*"; **Metcalfe lecture (2007)**.

Innovation is more than just invention; it can also involve the use of a better production process, a new service, or the changing of the network structure itself, as stated by **Antonelli (2008)**. It is a continual process which firms engage in to drive forward business growth, profits, and competitive advantage, and innovation can ultimately improve total factor productivity. "*[Innovation] is generally understood as the successful introduction of a new thing or method . . . Innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services*"; **Luecke and Katz (2003)**. It has long been recognised that the survival and growth of firms depends, in part, upon their ability to generate and use new knowledge (**Penrose 1959**). Thus the requirement to innovate is a market pressure on firms. Their survival in a competitive setting relies on their ability to continually increase productivity. Thus the market-based system pushes the innovation process forward and the two work alongside each other in a continual process of experimentation, growth in competitiveness and selection; **Metcalfe (2007 lecture)**.

The most relevant indicators of innovative outcomes should reflect the efficiency and effectiveness in producing, diffusing and exploiting economically useful knowledge, cited by **Lundvall (1992)**. One measure of the success of an innovation is the proportion of the total possible market the innovation has penetrated; **Mansfield (1961)**. As per the MIER study on innovation, it is possible to model the spread of an innovation through the market and (through seeing how far the innovation has penetrated) gain one metric that measures innovation. However to gain a fuller understanding of the innovation occurring within firms, and within a region, it is important to also know how often firms are introducing new processes, services or products, and critically how they are communicating these changes to other firms and to consumers; again the MIER studies on both trade and innovation look at this.

An understanding of the structures in place within the firm that either encourage or discourage innovation will therefore be required – these may be organisational structures that encourage employees to bring new ideas to managers, that allow new ideas 'air time' with decision makers within the organisation, or that prevent new ideas gaining traction within a firm.

Carter and Williams (1956) undertook such an assessment of firms in order to gain an understanding of the characteristics of technically progressive firms. They noted that innovation is not an optional extra to be tacked on to the operation of the firm but an integral function to be managed jointly with other dimensions of a firm's activities (**Carter and Williams, 1956, and Manchester Joint Research Council, 1954**). Essentially this is about measuring the extent to which innovation-related activities are embedded in an organisation's operational practices, involving an understanding of:-

- how much R&D the firm undertakes;
- how up-to-date it keeps itself with new ideas and innovations;
- how much time and finance it invests in the introduction of new processes and services; and
- the number and type of innovation-related connections maintained by organisations across business sectors, involving measures of how well connected firms are with each other.

7. Networks

Urban networks facilitate the flow of ideas, skills, knowledge and deals. They underpin the supply of innovation, and the demand for it. Cities support their own strong networks, and enable firms to access wider networks and flows in the regional, national and international economy. **Alfred Marshall (1890)** was the first to articulate the key role networks play in innovation, emphasising the need for a variety of firms, each having areas of complementarity between them and each able to enter into the collaborative process. Technological knowledge is a process where organisations, located together within an industrial district, contribute complimentary knowledge towards the discovery of a new and improved production process.

Marshall also understood that innovation was a continual process, which involved the combination and re-combination of knowledge. This sees innovation as essentially a collective process, usually occurring across networks of firms, universities, R&D labs, government agencies and a range of other economic actors. It is a process that benefits from involving diverse organisations since this promotes the sharing of complimentary pieces of diverse knowledge that are held by different actors throughout the economy. Innovation occurs when different 'units' of information are combined in such a way, and through such networks, new discoveries emerge.

Network dynamics – the structure of the network and the position of firms within this network – are recognised as key to the process of innovation, which increasingly depends on combining dissimilar bodies of knowledge generated by multiple organisations, not only firms. Network structures are now recognised to have a significant impact on innovation and economic outcomes. **Gluckler (2007)**. An understanding of the number and type of innovation-related connections maintained by organisations within and across sectors is therefore required. This raises a number of key questions related to the degree of innovation-related connectedness a firm possesses, as follows:-

- How well connected are firms with each other?
- How are these connections exploited to aid the spread of innovation?
- Are there barriers to inter-firm interactions based on the need to sustain competitive advantage through secrecy, or are firms heavily interconnected and willing to share innovations? and
- Do firms interact with consultants, universities and other third parties - to bring new ideas into the organisation?

Approaches to understanding these connections (i.e. a **network model** of the innovation process) will therefore need to capture those features that are relevant to the spread of innovation between firms. It is therefore important to gain an understanding of the number of links firms have with others, their own ability to generate innovations, and their abilities to both disseminate and absorb knowledge and innovation from the wider network of firms in which they are embedded. It is also important to think about the way firms pool resources in order to generate innovations, and whether links across industries, rather than just between industries, have a part to play.

In a literature review of innovation networks from the early 1990s, **Freeman (1991)** identifies several features which firms with a record of successful innovations share – re-iterating the key questions listed above. These include:

- Internal networks within the firm between development, production and marketing;
- Linkages with external technology networks; and
- Basic research performed internally.

These points highlight the type of network and the importance of a strong position within that network structure, is key to the success of an innovation. The types of networks that are important include the following:-

- **Local area networks:** These feature formal and informal business-to-business collaboration between firms; and also between firms and public research institutions. Business-to-business collaborations occur at both formal and informal levels. Informal networks are important in identifying business opportunities, acquiring knowledge and developing ideas. **Boshuizen (2007)** looks at the significance of informal relations and trust within local industry clusters, which help facilitate the exchange of localised tacit knowledge; **Simmie (2003)** looks at cities as national and international nodes for the transfer and sharing of knowledge;
- **University-business networks:** These occur across many cities and are mainly concerned with co-operation and the use of university innovation, technological and scientific expertise and are the subject of a vast literature including **Boddy (2000)** and various reports by **NESTA** including **Athey et al (2007)**; and
- **Public-private networks:** These foster business engagement with government programmes and universities. For example innovative cities such as Tampere (**Sotarauta, and Linnamaa (2001)**), exhibit strong networks between public sector actors, and between the public sector and the business sector.

Freeman (1991) defines a network as *“a set of selected and explicit linkages with preferential partners in a firm’s space of complimentary assets and market relationships, having as a major goal the reduction of static and dynamic uncertainty”*. **Antonelli (2008)** tells us that *“innovation is a path dependent, collective process”*. It is collective because it requires a variety of organisations to take part; and path dependent because the past history of innovations and knowledge affect its future course. Again, innovation is embedded in a particular context, i.e. historical as well as institutional.

The process of innovation also benefits from study from a networks perspective because knowledge, in reality, is not a public good which once discovered can be used by anyone, it is subject to complex processes of collection, sharing and modification. **Jaffe et al. (1993)** note that *“the diffusion of knowledge is a process embedded in location”*. The closer we are to the source of knowledge, the quicker we learn it. Agents are endowed with only bounded rationality, and face costs to gathering and processing information. Thus we need to study the social space within which agents and firms act, to properly understand that the information to which they have access is a function of the size and structure of the network within which they act.

Foster (2005) tells us that the analysis of economics using complex systems has shown that the network is the most appropriate structure to model the economy. At the firm level, this is because firms are not production functions, but networks or governance structures; bundles of network connections. On the macro scale, innovation is best studied using an economic geography approach because innovation is itself a group process – an emergent property from a sufficiently complex structure.

Freeman (1991) confirms that time and again the importance to innovation of external collaboration has been shown. The strength of links between firms, users, in-house and external R&D, universities, government labs, consultants and research associates all impact on the amount of innovation an economy is capable of. These groups combine to form an “innovation ecology”

(Metcalfe 2007 lecture). Within this ecology, innovation opportunities are often created or shared by the structure of the network. The possession of creative knowledge (the building blocks of innovation) depends upon a firm's ability to access the channels through which knowledge is disseminated **(Antonelli 2008)**. A location in which many agents are working on related issues creates a critical mass of knowledge workers so that they become an epistemic community, in which a common language emerges, problem definitions become standardised, and problem solving heuristics emerge and are developed. Agglomerations having these features foster innovation.

Cowan's (2004) paper provides a detailed review of the importance given to local networks in fostering innovation. A firm located within a network cannot possibly hope to form connections with the whole of the rest of the network. Firms are located within a local ecology (where proximity can be physical, technological or social). While innovation related connections can span geographic boundaries, there is growing evidence that local linkages are preferred at both the firm and individual level, especially where knowledge is tacit or complex; cited in **Hassink (2005)** - or where iterative product development processes are involved requiring repeated face-to-face communications; as illustrated in **Powel et al (2005)**. **Ramlogan, Metcalfe et al. (2007)** also show a distinct clustering in nodes of the network of innovators in certain medical disciplines.

However, a high degree of local 'networking' or 'cliquishness' alone is not sufficient for innovation. The innovative process requires a considerable degree of novelty to be brought to on the problem. A clique will quickly exhaust novelty within it. Thus external links to other 'global' cliques or network groups are important, as stated by **Gluckler (2007)**. Firms and cliques must sustain innovative potential with selective access to knowledge external to the cluster. Variation brought about through external linkages inevitably becomes crucial to avoiding technological lock-in and subsequent economic decline.

8. Innovation and Cities

Innovation matters because it helps cities improve their economic performance. It creates new markets and helps drive up the productivity and competitiveness of firms, which in turn helps support income and employment growth, **Romer (1989)**. There is a vast range of theoretical literature and research exploring innovation in cities, and the different ways in which urban places support innovative activity, including the following:

- **Traditional Urban Theory and Economic Geography:** Traditional economic geography emphasising location theories of firms and population, such as the Weber Model; **Weber (1929)**;
- **New Economic Geography:** Focussing on the role of local institutions and networks, such as **Amin and Thrift (1994)**; and
- **Innovation systems approaches:** These often take a closer look at clusters and knowledge spillovers; **Etzkowitz and Leydesdorff (2000)**; and **Cooke (2001)**.

In the globally-connected knowledge-driven economy the relevance of agglomeration forces that rely on proximity - continue to increase, paradoxically, despite declining real costs of information, communication and transportation. The growth of cities results from a complex chain that starts with scale, density and geography, which then combine with industrial structure (characterised by its extent of specialisation, competition, diversity, relationships and networks), to yield innovation and productivity growth that encourages employment expansion, and further urban growth through inward migration; **Henri L.F. de Groot et. al. (2008)**.

Large urban agglomerations offer three overlapping benefits for people and firms – proximity, density and variety. Essentially, cities make it easier to do business through meeting people, sharing information, making deals, and selling things; **Glaeser (2000)**. For firms, the scale and choice of economic activity creates thick labour markets, enables access to a range of suppliers, and helps diffuse knowledge; **Jacobs (1961)**. Indeed, **Glaeser (2003a, 2003b)** suggest that cities survive only by adapting their economies to new technologies. Glaeser's "*Reinvention City View*"

and “*The Rise of the Skilled City*” works demonstrates that human capital predicts city growth because human capital enables people to adapt well to change.

Cities provide a deep and diverse pool of talent – their large, highly skilled workforces allow firms to adapt quickly to new challenges and opportunities. Proximity to suppliers and users means that firms can more easily find and use specialist inputs that improve their performance. Critically, the concentration of people allows for frequent face-to-face contact. Knowledge based activities, such as business services, depend on building trust, maintaining relationships and exchanging complex information. These interactions are still best done in person; **Sassen (2006)**. Cities allow ‘face time’, critical in the knowledge economy. See: **Storper and Venables (2003)**, **Iammarino and McCann (2005)**, cited in **Athey et. al. (2007)**.

‘Urban hubs’ and ‘local links’ are useful classifications of existing schools of thought about the urban innovation process. They are both overlapping, and should be seen as complementary concepts that aim to capture different sets of factors and actors that make innovation happen in cities. Each stresses different aspects of an urban economy: ‘urban hubs’ approaches emphasise urban assets, market size and business networks; ‘local links’ perspectives focus on institutions, knowledge networks and public-private collaboration.

The concept of ‘urban hubs’ is based on the notion of ‘urbanisation economies’, which postulates that it is the scale and choice of urban economies that helps firms innovate. Having a large and diverse population means that businesses in cities and urban areas can select the optimal mix of suppliers and workers. This ‘pick and mix economy’ of major cities like London helps explain the concentration of innovative firms in and around the capital; **Simmie (2004) in Parkinson, M. and Boddy, M. (eds)**. Businesses in cities also often enjoy a wider and easier access to the international flows of money, ideas, people and goods; **Liu, X. and Buck, T. (2007)**, **Saxenian (2007)**; cited in **Athey et. al. (2007)**.

While some cities have the advantage of being hubs for many things, others have the advantage of possessing strong ‘local links’. This is a feature of cities highlighted in the ‘localisation economies’ literature, e.g. **Piore and Sabel (1984)**, **Storper (1997)**, which suggest that specialised connections and networks in cities help firms innovate faster. Essentially, proximity allows firms to establish business and knowledge networks within a given sector, or between businesses and public institutions. Cities allow a complex and deep division of markets and labour, and thus the formation of specialist firms and pools of skilled labour. Proximity encourages knowledge spillovers and helps organisations collaborate – for example, on new ideas, shared standards, skill requirements, or buying raw materials.

Firms and their entrepreneurs are the most important actors in urban innovation, as they are at the interface between the supply of innovation and the demand for new ideas. Businesses develop new ideas, adopt others’ thinking and market innovative goods and services. Since firms help to invent, adopt and disseminate, they are at the centre of urban innovation networks – applying and adapting ideas, and generating their own. This again raises the importance of studying urban business networks and behaviour, as in **Martin and Sunley (2003)**. Similarly, businesses use urban assets and are influenced by public institutions and policy frameworks. Business strategies, supply chains and market size all shape urban innovation, with firms of different sizes playing important, complementary roles, as in **Frenz and Oughton (2004)**.

Absorptive capacity is also vital to the potential to harness innovation within an economy. It is the ability to take in and use knowledge in order to improve performance and competitive advantage (**Abreu et al. 2008**). Absorptive capacity is based on the employment of suitably qualified scientists and technologists, the undertaking of in-house R&D activities, and the organisational structures and management practices in place. It is also affected by the importance a firm puts on absorbing information from outside sources. Being surrounded by a diverse innovation network or ecology can only be of benefit to a firm if it is able to take advantage of this fact, by absorbing from the network relevant pieces of knowledge; and the spread of awareness of an innovation across a network of consumers (which may include other firms wishing to buy the innovation to use themselves) will allow the firm to benefit.

Antonelli (2008) notes that there can be a 'not-invented-here' syndrome which prevents the adoption of new technologies. Vertical integration of innovators and downstream manufacturing activities can be one solution to these non-appropriability problems. **Metcalf (2007 lecture)** notes that firms need to invest internally in their own absorptive capacity if they are to be able to participate fully in the innovation ecology. In a recent study, **Abreu et al. (2008)** argue that differences in the degree of innovation between firms in the North and South of the UK are largely down to variations in firms' absorptive capacity.

Not all the knowledge required to innovate need be available locally, particularly in high science and technology sectors, where connections with the 'international science and technology base' are also vitally important. The nature of the required connections is very sector specific. There is much variation in the nature and scale of innovation between sectors. Most of the literature on innovative firms has focused on science and technology sectors, such as bioscience, ICT and advanced manufacturing (e.g. electronics, defence and precision engineering). These sectors have a very visible innovation profile, with high levels of R&D spending and patenting. They also tend to have a greater dependency on links to nearby universities and centres of excellence.

Innovation outside science and technology is also critical for cities. Firms in the service sector, for example, spend less on visible innovation – such as R&D, or patent registration – but often innovate by coordinating supply chain management (for example, large supermarkets) or through new technology (for example, call centres and internet banking), (**Miles (2001) cited in Athey et. al. (2007)**). For these types of firms, proximity to centres of research is less important than proximity to their market and network of suppliers.

Markets drive and sustain commercially successful innovation, and reflect the demand for innovation and new ideas. For innovation to thrive, new ideas need lead markets – demanding consumers who provide an early customer base. There are several aspects of markets that are important within the urban context but these vary between sectors: Local markets that require high levels of density and interaction can be supported by cities. For example, the dotcom/new media sector is heavily concentrated in a few districts of major cities – inner London and Manhattan in particular; cited in **Graham (2004)**. Internet businesses draw in finance and know-how from financiers and researchers, and then sell to nearby media, publishing and advertising firms; cited in **Castellani and Zanfei (2002)**. Large markets that facilitate the development of niches, specialist providers and subcultures can drive innovation. Big cities have large populations of consumers and customers in specific markets, with diverse tastes and preferences. Specialised or niche market preferences and tastes can often be provided for on a profitable basis from a city, as the market is of sufficient size to make this economically viable. **Anderson (2004)**.

Global markets in capital, product and labour tend to be more accessible via cities and large urban areas. Advanced producer service firms increasingly use major cities as hubs for global business networks. Similarly, big cities are sites of international migration – often highly-skilled people with new ideas and links to markets 'back home.' **Saxenian (1996, 2002, 2007), cited in Athey et. al. (2007)**.

9. Innovation and Urban Assets

A city's urban asset base underpins economic and innovative activity, and shapes firms' location and expansion decisions. Some surveys suggest that the main factors affecting business location are the availability of qualified staff, communications, low property and other costs, access to markets and good transport links. (**Cushman, Wakefield, Healey and Baker (2004)**). The main types of urban assets and their role in innovation are set out and described below:

- **Connectivity (physical and electronic):** Roads, hub airports and rail links increase cities' effective reach and improve firms' innovation potential; cited in **Rice and Venables (2004) and Graham (2005)**. Good transport links and services mean that firms and institutions are closer in time and distance, facilitating collaboration, market transactions and networks. Such links also increase the potential size of markets for services, products and labour.
- **Skills:** The availability of highly skilled workers is a major factor for the location and retention of innovative firms in a city. **Simmie et.al. (2002)**. The diversity of skills and ability of large urban labour markets to support specialist skills are also important for innovation.
- **Property, land, built environment:** Land and property availability impact on how firms configure production and distribution; and also shape the types of developments permissible.
- **'Quality of life' and 'Quality of Place':** Factors such as amenities and cultural diversity help underpin urban growth and innovation. They are important for the attraction and retention of firms and skilled labour. See **Florida (2001)**.
- **Urban institutions and their networks:** Characterised as public or collective organisations, including: Government, universities, business associations and the voluntary sector. These help to maintain the asset base and more importantly, may often take an active role in transforming, supporting, facilitating, and shaping innovation. These could include government departments, public agencies (e.g. economic development and regeneration agencies), local authorities, public service providers, public-private partnerships, private institutions such as Chambers of Commerce and trade associations, and third sector and community / voluntary sector networks; cited in **Bacon et.al. (2008)**.
- **'Change agents'/star scientists:** Within institutions, change agents can help build or push innovation forward. Strong city leaders can enable network links between public, private and third sector institutions. Within universities, 'star' scientists responsible for major breakthroughs can also impact a city's innovation trajectory, and help attract businesses and further talent; cited in **Mahroum (2000)**.

10. Inward Investment and 'Spillovers'

Theoretical perspectives on multinational enterprise generally suggest that foreign firms are potential agents of technological diffusion, having a series of ownership advantages over domestic firms (**Dunning 1993**). The multinational firms' original 'stock' of advantages may spillover or be appropriated by indigenous competing or supplier firms (**Caves 1996; Markusen and Venables 1999**). This type of appropriation is consistent with endogenous growth theory where non-internalised technological change and development from one industry can become an externality which is captured by other industries and individuals (**Fingleton 2001**).

In addition to the obvious employment effects of being able to attract large scale internationally mobile investments, much of the policy analysis around inward investment focuses on the spillover, or indirect technological benefits of FDI. Most traditional theories of FDI activity, are based on **Dunning's (1979)** work, particularly on the concept of ownership advantages.

Such firm specific advantages are often characterised as technology based, relating to economies of scale, capital intensity and R&D. **Blomstrom and Kokko (1996)** provide several reasons why such technology is expected to transfer from multinational enterprises (MNEs) to domestic firms. This can occur directly, through the licensing of a particular technology, through supplier networks or subcontracting arrangements, or indirectly as knowledge becomes public, and spillovers are assimilated by the domestic sector. **Pain (1997)** estimated that around 30% of the productivity growth in UK manufacturing between 1985 and 1995 could be associated to the impact of inward investment.

The 'ripple through' effects of changes in production and working practices triggered by the presence of new inward investors have been particularly important. The above suggests that there could be productivity gains at the industry level connected with foreign investment in that industry. Secondly, there is the possibility that this technology 'spills over' in a less formal manner to domestic firms. The literature on technology externalities is now well developed, see for example **Griliches (1992)** for an extensive survey of this literature.

11. Investment and Technology Transfer

One of the main reasons why a country or region seeks to attract inward foreign direct investment (FDI) is that MNEs can act as agents for the transfer of technology across national boundaries – with new technology "assimilated" by the domestic sector. Academic studies, together with a number of government sponsored reports, have sought to evaluate the extent of this phenomenon in aggregate (see for example, **PACEC, 1995, Barrell and Pain, 1997** and the summary of this literature provided in **Görg and Strobl, 2002**).

The purpose of the MIER Investment study is, however, to examine the effects associated with one mechanism through which this is expected to occur – buyer-supplier linkages between inward investors and domestic firms. **Dunning (1993)** highlights the expected significance of such linkages, showing that foreign-owned firms can impact on supplier industries through terms of procurement, through the physical quantities they purchase, but also through the impact that they have on suppliers technical capability, managerial initiative and organisational competence. (See also **UNCTAD, 2001** which provides an international review of policies designed to strengthen linkages between foreign and host country firms).

12. Productivity Spillovers

The issue of how far inward investment generates productivity spillovers has recently become of significant interest. Research has examined the connections between foreign investment and general technical change and progress, and in promoting domestic productivity growth in the UK (see for example **Barrell and Pain, 1999, 1997; Hubert and Pain, 1999; Driffield, 2001a; De Mello, 1999**). The majority of papers suggest that empirical estimates of spillovers from inward investment are rather lower than might have been expected (see for example, **Haskel et al. (2007); Girma et al. (1999, 2001), and Harris and Robinson (2002a, 2002b)**). Indeed, **Aitken and Harrison (1999)** show that FDI exerts both positive and negative effects on domestic producers.

Research has also focused on the wider dynamics of the spillover process into defined parts of the UK domestic sector. **Driffield and Munday (2000)** examined the relationship between the comparative advantage of UK industries, and new inward investment into these industries. This research explored the link between inward investment and export performance in the UK economy and its regions, and provided evidence of dynamic benefits of foreign direct investment. **Driffield (2001a)**, however, illustrates that inward investment per se is not sufficient to generate such spillovers, but that the scale and scope of spillovers is dependent on the actions of the inward investors, and the ability of the domestic sector to assimilate the imported technology.

Following the arguments by **Blomström and Kokko (1996), Driffield (2001) and Porter (1996)** for example, the scale and scope of spillovers from inward investment are determined by the ability of the domestic sector to assimilate the imported technology, and the extent to which agglomeration contributes to this. As such, domestic firms in the less technologically advanced regions of the UK may be less able to assimilate the new technology that may accompany FDI.

The regions with assisted area status are also by definition those with high levels of unemployment, and a low skill base, so expansion through technological advance may be hindered in such regions. As such, while previous studies suggest that spillovers may occur as a result of FDI, such externalities may be confined to those areas with a higher skill base, and with higher levels of productivity, viz. the areas of the UK not covered by Assisted Area status.

In a similar vein, there is significant evidence that in the UK, development agencies are not only actively competing to attract international capital; cited in **Lovering (1999)**, **Young et al (1994)**, and **Gripaios et al (1997)**, but in more recent years have been concerned to contain any spillovers from FDI within their region. **Wren (2002)** outlines examples of these policies, designed to increase the scale and scope of local spillovers from FDI .

However, while the extent to which such policies are likely to succeed has been questioned, **Armstrong (2001)**, **Wren (2002)**, it is nevertheless clear that such agencies have sought where possible to maximise local linkages from inward investment. **Porter (1996)** argues that policies designed to increase local sourcing will lead to a loss in overall agglomeration economies and will be to the detriment of other regions and possibly to the economy as a whole.

The empirical and theoretical literature has begun to examine the possibility that an important motivating factor for FDI might be the desire not to exploit technology in a foreign country, but to gain access to technology; thus technology sourcing may be the motivation for FDI. For example, **Fosfuri and Motta (1999)** present a formal model of the FDI decision which embodies the possibility of technology sourcing. This is because there are positive spillover effects arising from close locational proximity to a technological leader in the foreign country which, because of the externalities associated with technology, decreases the production costs of the investing firm both in its foreign subsidiary operations and in its home production base.

Further, the literature on the internationalisation of R&D suggests that there is a growing willingness to locate such facilities close to leading centres of research and innovation specifically with a view to absorbing learning spillovers from geographical proximity to such sites (**Pearce, 1999; Niosi, 1999**).

13. Technology Sourcing

Recently, however, there has been increasing theoretical and empirical emphasis on technology sourcing rather than technology exploitation as a motivation for FDI. This suggests that an important motivating factor in the internationalisation of production and R&D is not the desire to exploit existing technology within the firm, but to access the technology of leading edge firms within a host economy. Support for this perspective has come from economic evidence on the determinants of FDI (**Kogut and Chang, 1991; Neven and Siotis, 1996**), and from theoretical work on the existence of multinationals without advantages (**Fosfuri and Motta 1999; Siotis 1999**).

A range of studies have suggested that buyer-supplier partnerships involving foreign firms are a mechanism for productivity spillovers, technology diffusion (**Morris et al. 1993; Gorg and Ruane 1998**), and more fundamental value chain restructuring (**O'Huallachain and Wasserman 1999**).

In a wider review, **Crone and Roper (2001)** examined the specific literature on knowledge transfers from multinationals, and concluded that the supply chain is the main route through which knowledge is transferred from multinational plants to indigenous firms, and that such transfers lead to important improvements in supplier performance (this linking with the issues identified in the MIER's innovation and networking project) and there is then an underlying assumption that higher levels of transaction linkages between foreign and domestic firms are beneficial to the domestic sector, with an implicit recognition that the intensity of input-output linkages encourage knowledge and technology spillovers to indigenous sectors.

14. Labour Market Effects of Investment

There are a number of studies that identify substantial differences in factor demand between foreign and domestic firms. The inference here is that foreign multinationals demonstrate higher levels of labour productivity, and in turn greater demand for high quality labour. Entry by such firms therefore is expected to impact on domestic labour markets via two mechanisms.

Firstly, inward investment generates a straightforward labour demand effect, stemming from an exogenous increase in output. This is likely to be particularly important at the region and industry level rather than in the aggregate. While previous evidence suggests that this is likely to favour skilled, rather than unskilled workers, this will of course depend on the nature of the activities undertaken by the inward investors. Secondly, linked to this is the likely impact on domestic firms of the inflow of new technology that is assumed to accompany FDI. There is growing evidence for this in the UK, see **Driffield (1996)**.

Wage spillovers from FDI are found to be not as large, or as prevalent as productivity spillovers, based on previous work. Wage spillovers are largely confined to skilled, rather than unskilled workers, implying that the benefits of FDI are unevenly distributed. **Barrell and Pain (1997)**, showed that the technology accompanying FDI is unskilled-labour augmenting, reducing the demand for unskilled labour, and therefore relative wages of unskilled workers. This follows the arguments of **Machin and Van Reenen (1998)**, who demonstrate that new technology is complementary to skilled labour, and its introduction results in increased demand for skilled workers.

Equally, it is anticipated that there may be causes of friction in terms of wage spillovers, particularly between the foreign and domestic sector. Labour market segmentation is an important phenomenon, particularly when considering mobility between domestic and foreign firms, see for example **Driffield and Taylor (2000)**. As such, there is no guarantee that workers in domestic firms will be able to obtain jobs in foreign firms, with different skill requirements.

There is some disagreement about whether technology or trade is the most important factor in causing increasing demand for skilled workers (**Machin and Van Reenen, 1998; Wood, 1994; and Desjonquieres et al., 1999**), and this is as much a theoretical issue as an empirical one (**Haskel, 2000; Slaughter, 1999**). However, what is clear is that in the case of the UK there has been a parallel trend of increasing wage inequality and inward investment (**Bailey and Driffield, 2002**).

15. Sustainable Communities and Polarisation

The UK is one of the most highly urbanised countries in the world. Nearly 80 per cent of its population lives on just 9 per cent of its land; cited in **Barker (2006)**. The 2001 census showed that 63 per cent of employment in England is concentrated in 56 cities that have a population above 125,000; **Parkinson et al (2006)**. These 56 cities accounted for 61 per cent in the net increase in jobs (or 834,300 net new jobs) in England between 1998 and 2004. And GVA in 25 of the 56 grew faster than the national average between 1995 and 2002, including six of the eight cities that call themselves the Core Cities (Birmingham, Bristol, Leeds, Liverpool, Manchester, Newcastle, Nottingham and Sheffield); cited in **Athey et al (2007)**.

However cities are also areas where the major economic and social challenges and problems are located. This is why cities are important – they are where we can join economic opportunity with need. The importance of cities has recently been reinforced by recent reviews such as Lyons (local government), **Barker** (planning), **Eddington** (transport) and **Leitch** (skills) – which have all explicitly recognised the importance of cities as drivers of growth, but also locations of need (intervention and support). UK cities face two major economic challenges – creating and sustaining economic performance and connecting economic development and growth with communities that do not benefit from these opportunities.

The persistence of large disparities between the most disadvantaged neighbourhoods and other areas has prompted governments to intervene to reduce disparities. The centrality of neighbourhood within UK government policy is in part manifested through the growth of area-based policy initiatives which aim to tackle inequalities at an area level in the belief that some of these inequalities may be self-reinforcing; **McCulloch, (2001)**.

The Government's neighbourhood renewal objectives – as set out in the National Strategy for Neighbourhood Renewal (NSNR) - are ultimately people-based (i.e. no-one being disadvantaged as a consequence of where they live). However, it is primarily assessed on its area-based objectives (i.e. narrowing the gap between disadvantaged areas and the rest). Therefore both 'place' and 'people' impacts need to be considered.

Clearly, the two perspectives could potentially differ significantly. For example, the 'gap' is primarily measured by people-based indicators – such as unemployment levels - but residents of disadvantaged areas who gain employment may use their additional income as a means of moving to a better environment elsewhere.

According to **Glennester et al (1999)**: *“one of the most firmly established views of neighbourhood decline is that certain areas of cities (usually inner areas) are bound to be more or less permanently in the bottom layer as they provide ‘zones of transition’, housing new migrants, who then move out as they move up”*. On the other hand, gentrification - the process of in-migration of wealthier residents and out-migration of existing more deprived residents - can change the socio-economic mix of areas and turn around the fortunes of deprived areas.

There has been a long standing debate about whether place matters; whether neighbourhood conditions have an additional independent impact on people's life chances. The notion that the concentration of poverty exerts additional individual disadvantage worsening the life prospects of deprived people is often referred to as the *neighbourhood (or area) effect* thesis. There are numerous mechanisms through which neighbourhoods can have an adverse impact on individuals. These can relate to the physical or institutional characteristics of the area, for example, through the quality of local resources and services ('institutional' model) or physical isolation and barriers to opportunities, but more importantly, to the interaction with other people living in the area. **Buck (2001), and Lupton (2003)**.

According to **Lupton (2003)** and **Friedrichs et al (2003)** much of the academic literature on neighbourhood effects can be classified into two broad categories based on the methodological approach adopted. The first adopts a case study approach using predominantly qualitative methods and the second largely quantitative methods and multivariate techniques applied to national, in many cases longitudinal, datasets.

Qualitative studies often offer strong evidence of the negative impact of area effects particularly in terms of stigma, social networks and social conflict, crime and anti-social behaviour (**Fitzpatrick, 2004**). For example, **Atkinson and Kintrea (2001)** used household survey data to compare four areas in Edinburgh and Glasgow, two very deprived and two less deprived but more socially mixed. They examined area effects in relation to a number of outcomes including isolation, obstacles to location choices, social networks, stigma and reputation, employment and health and found evidence that the concentration of deprivation in neighbourhoods intensifies disadvantage for individuals living in those neighbourhoods for most of the outcomes, but most notably through the perceived reputation of the area.

Quantitative studies offer more mixed evidence. Much of the controversy in empirical literature on whether neighbourhood effects exist and the extent of their impact lies in the differences in theoretical and methodological approaches adopted. Recent studies in the UK have investigated the relationship between neighbourhood and individual life chances (or outcomes) using longitudinal datasets such as the British Household Panel Survey (BHPS). **McCulloch (2001)** examined the association between ward level deprivation and a number of outcomes for individuals relating to financial expectations and income, health, neighbourhood dissatisfaction and social support. Here area effects on individual outcomes reduced and became insignificant after controlling for individual and household characteristics except for four outcomes: male employment, current financial situation, health status and neighbourhood dissatisfaction.

Buck (2001) examined neighbourhood effects using outcomes related to various dimensions of social exclusion such as non-monetary poverty, persistence of poverty and labour market exclusion. The analysis aimed to capture the direct association between an area characteristic, normally deprivation measure, and an outcome measure. The study used controls for individual characteristics which may also influence that outcome, and found associations between area deprivation and social exclusion indicators remained significant after controlling for individual and household characteristics.

Differences in approaches yielding different results typically lie in the definition of neighbourhoods; the choice of the theoretical model that explains how the area effect operates; the choice variables (and datasets) investigated and the statistical procedure used. As argued by **Lupton (2003)**, the main issue with quantitative neighbourhood research lies in the difficulty in capturing the complexity and interrelationships between different aspects of neighbourhood, including the following:

- **data constraints** which mean that area indicators used in studies fail to reflect this broader characterisation of neighbourhoods i.e. people and the relationships between residents;
- **simultaneity**, where people are influenced by their context, and at the same time influence that context, **Buck (2001)**;
- **selection bias**, which arises from the assumption that individuals choose their neighbourhoods, where individual conditions relating to individual outcomes are also associated with this choice; and
- **relationship to other places and neighbouring areas** which impacts upon quantitative estimation of area effects, including the wider district or region within which these areas sit. See **Bolster et al (2004)** for examples.

These methodological difficulties have prompted much scepticism over the size of the impact of area effects. Lupton argued that difficulties in capturing the complex nature of neighbourhoods in statistical models make findings unconvincing. Overall, researchers seem to agree that the neighbourhood environment makes a non-trivial, independent difference for a variety of outcomes although the size of the impact varies according to the outcome investigated, the age of the person being affected and how neighbourhood is measured, cited in **Friedrichs et al (2003)**.

Similarly, inferences about the significance of area effects to area-based policies have been challenged. Although the main argument about the importance of area effects research is that it provides evidence about whether or not to pursue area-based policies, **Lupton (2003)**, there seems to be consensus that the existence of area effects is only one of several justifications for area-based policy.

Both **Buck (2001)** and **Lupton (2003)** argue that the rationale for policy intervention at an area level should not be based solely on the identification of area effects because area-based initiatives can be implemented for other reasons such as equity and welfare, efficiency, social cohesion and community capacity building. One of the main arguments for the implementation of area-based initiatives is that they can be universal within an area and hence non-stigmatising to the individuals who will benefit; cited in **Smith et al (2001)**.

Area based initiatives (ABIs) can also be used to pilot new approaches to service delivery, and to focus activity in order to maximise impact, **Lupton (2003)**. For these reasons, area-based policies should not be seen as an alternative, but as complementary to individual-level policies and could support the major national reforms in tackling poverty and social exclusion. For a fuller discussion see **Dorling et al (2001)**.

This broad issue has been widely discussed in recent years, principally in relation to debates on 'area effects' (see **Smith, et al., 2001; Dorling, 2001; O'Reilly and Stevenson, 2003**) and can be summarised by asking "*are some areas less likely to have positive outcomes because of their location next to other deprived areas?*". The evidence base is still rather incomplete, despite several attempts to answer this question (e.g. **McCulloch, 2001a, 2001b; Burrows and Bradshaw, 2001; Atkinson and Kintrea, 2001**).

More recent government guidance has acknowledged the importance of specifying the correct spatial units of analysis for such studies, but stops short of recommending an approach; **ODPM (2004)**. Despite the lack of certainty about the degree to which such issues are important, there is an emerging consensus that 'the context in which the neighbourhood sits is also a very important influence on neighbourhood outcomes', **Atkinson and Kintrea (2001)**.

16. Migration and Polarisation

The flow of households from and to different neighbourhoods can differ in terms of the social composition of the mobile households. Where there are significant differences between in-movers and out-movers, change in neighbourhoods may give a false impression of the fortunes of individuals living in the areas at the outset, for examples see **Cheshire et al (2003)**, where residents who benefited from employment and skills programmes moved out only to be replaced by more disadvantaged residents.

Recent New Deal for Communities (NDC) evaluation findings (**Beatty et al (2007)**) also indicate that some of the benefits of the programme "leak out" as those who move out of NDC areas are more likely to be employed and have higher educational attainment than those who move in. The flow of households from and to different neighbourhoods can also differ in terms of the sheer volume of residential churn and this may have significant implications. Areas with high levels of churn may be de-stabilised; areas with low levels of churn may reflect the fact that households are trapped in areas in which they would prefer not to live. High churn in deprived areas can exacerbate the spiral of decline that characterises them by threatening existing social networks, putting pressure on local services and creating additional problems such as high crime.

The **National Neighbourhood Renewal Strategy (2001)** recognises that high churn can be particularly problematic. For all these reasons the 'success' of interventions in any given neighbourhood needs to be assessed against the fortunes of the households who live or lived in them, as well as against conditions in the area as a whole as reflected in standard area-based indicators.

The literature on the determinants of migration indicates that migration probabilities are determined by:

- **Conditions at the origin and destinations:** That is, 'push' and 'pull' factors (respectively) such as housing markets (availability, house-building rates, mix-of social and private housing), labour markets (mismatch of jobs, unemployment and wage differentials), environmental quality of life; and
- **Differential population composition:** The determinants of migration flows as explored in some detail by **Champion et al, (1998)**.

Higher migration rates in deprived areas are thought to be a symptom of the multiple problems these areas face. High crime and unemployment, poor housing, poor health and poor education increase levels of out-migration and this in turn gives rise to additional problems of crime and vandalism. It is widely accepted that high churn in deprived areas also has implications for social stability, and can contribute to social exclusion by eroding existing social networks. High churn rates within cities can put pressure on local public services. In addition to the potential direct costs such as registration and administration costs (e.g. electoral and council tax registration) there are a number of indirect costs (e.g. special housing support and disruption to class learning in schools) for local public services, and the more deprived and dependent in-movers are, the higher the associated costs; cited in **Travers et al (2007)**.

The local environment in terms of the quality of landscape, type of housing and buildings, social opportunities, anti-social behaviour and local services can affect migration probabilities. Recent evidence shows that people living in deprived neighbourhoods have higher levels of dissatisfaction with their neighbourhood and housing and are more likely to move for these reasons; cited in **Kearns and Parkes (2003)**.

The probability of people moving also depends critically on a number of compositional factors such as age, stage in the life-cycle and socio-economic status. Many studies have found that migration probabilities are higher for young adults and lower for children and old people; **Champion (1998)**; **Kearns and Parkes (2003)**; **Bailey and Livingston, (2006)**. There is however surprisingly little evidence on the relationship between 'area population turnover' and deprivation. An exception is the recent study on population turnover and area deprivation by **Bailey and Livingston (2007)** who found that population composition, particularly the concentration of young people and very young children, was the strongest determinant of area turnover. Once they accounted for compositional factors, area deprivation was found to have only a modest impact on turnover.

Deprived areas are often associated with 'network poverty' that results from geographic and social isolation preventing residents from taking advantage of opportunities outside these areas **Fitzpatrick (2004)**. Residential turnover can play an important role in affecting the nature of social networks, such as informal networks which can pass on information about job opportunities; **HMG Social Exclusion Unit (2004)**. Hence, individuals living in well-connected deprived areas may have better access to external opportunities than those living in isolated areas.

Bailey and Livingston (2006) also examined connection rates between deprived and non-deprived areas and found that the stronger determinants of connection were individual deprivation and city-regional deprivation. Their results showed that more deprived individual areas and more deprived city-regions had lower connection rates with non-deprived areas.

The most recent relevant studies of the impact of mobility on deprived areas are Bailey and Livingston's national study and the evaluation of the New Deal for Communities (NDC) - **Beatty et al (2007)**. Despite most out-movers moving within five kilometres of their local NDC area, following the move there was a marked increase in their perceived quality of life, their satisfaction with the area as a place to live, feelings of safety and satisfaction with accommodation. More relevantly, the survey provides evidence that it is less disadvantaged residents who generally move out of NDC areas and are typically replaced by the more disadvantaged.

The research methodology for the MIER includes the development of a model to examine area change. The modelling focuses on local area worklessness data and uses this information - combined with other datasets - to model the likelihood of area 'transition' between 2001 and 2006. It therefore reviews the relative importance of social, economic and policy factors to the likelihood of change in the polarisation of areas.

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