



the route to growth: transport, density and productivity

Chris Webber and Glenn Athey

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Key points

- Agglomeration economies are the wider economic benefits arising from the geographical concentration of people and businesses.
- Increasing the extent to which people and businesses are concentrated together can magnify the impact of agglomeration economies – contributing to improved economic performance and increased productivity for the area concerned.
- Improving the productivity of a city's firms means that they can produce more output for the same (or less) input. This improves their competitive position in the economy because, among other things, they can reduce the cost of their goods or services.
- Transport projects have the capacity to increase the 'effective density' of a city or an urban area by increasing the number of people and businesses who can access that area quickly.
- Transport appraisal techniques can now incorporate estimations of agglomeration benefits. This may help to improve the case for transport investment in many cities.
- Not all transport projects will have the same agglomeration benefits. Central and local government should use the new techniques available to help prioritise spending where it will have the greatest economic impact.
- Centre for Cities is working with Leeds city-region to pilot the latest appraisal techniques and to better understand how agglomeration benefits vary between individual transport projects. The report – which is part of our City Transport work-stream – will be published later in 2007.

Introduction

Urban policy documents are often too long, and they almost always use too much jargon. But recently the task of getting to grips with them has become even more challenging. Renewed interest in cities has brought with it a flood of academic terms and concepts that often confuse more people than they enlighten.

In particular, the notion of agglomeration economies – the wider economic benefits generated when people and businesses locate close to each other – has recently made a significant impact on policy debates. Last year's Eddington Transport Study is a case in point: the report uses the term agglomeration more than 50 times (Eddington 2006).

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The new emphasis on agglomeration economies is something to be welcomed. There are few concepts more critical to understanding what drives urban economic performance. Their implications for transport policy are particularly far-reaching – hence the emphasis placed on them by the Eddington Study.

However, as is so often the case with academic terms that enter into the policy domain, there has been little attempt to translate the idea of agglomeration economies into plain English. This paper seeks to fill that gap by providing decision-makers with a short guide that links into current policy and spending debates.

The paper is split into six sections. It aims to:

- Introduce the concept of agglomeration economies
- Discuss the different types of agglomeration economies
- Review the evidence for their existence
- Examine the inherent relationship between reaping the benefits of agglomeration and improving transport systems
- Discuss some of the key policy issues surrounding agglomeration economies – with particular emphasis on transport policy
- Highlight key lessons for decision-makers.

What are agglomerations and agglomeration economies?

‘Agglomeration’ is simply the technical term used to describe a geographical concentration of people and businesses. Cities are the most commonly referred to form of agglomeration, but they are by no means the only one. Others include:

- Clusters: specialised industrial concentrations, such as the bio-tech cluster around Cambridge, or the Information and Communication Technology cluster in Silicon Valley, California.
- City-regions: economies frequently do not correspond to political boundaries. A city-region is the economic footprint of a city rather than its administrative boundary – Greater Manchester is an example.

Researchers and policymakers are interested in agglomerations because concentrations of economic activity generate a range of important benefits for the firms located within them. These advantages lead to wider benefits like more jobs, higher wages and a greater choice of goods and services for consumers. Importantly, there are also increasing returns to density – meaning that

the larger an agglomeration becomes the greater the agglomeration benefits get.

Economists call these benefits agglomeration economies or agglomeration externalities (see Box 1 for a definition of the term externality and why it is important).

Box 1: What are externalities and why are they relevant?

Externalities are the costs or benefits borne by individuals or groups as a consequence of economic activities in which they were not directly involved. They are external to the firm(s) that created them.

Two examples of positive externalities are:

- The property value uplift enjoyed by homeowners upon the successful regeneration of a derelict site near their homes.
- The increased footfall generated for local shop owners by the construction of a large office development in their area.

In the same way, the concentration of economic activities in cities creates benefits that are incurred or enjoyed by the wider economy. This means that, in economic terms, a city is greater than the sum of its parts. The concentration of people and businesses leads to greater economic output – for the same input – than would be possible if activity was geographically dispersed.

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What are the different types of agglomeration economy?

Broadly speaking, agglomerations generate three key benefits for firms:

- *They create a ready supply of skilled labour on which firms are able to draw.* For instance, in London firms can access a massive variety of highly skilled workers, and this allows them to adjust rapidly to new opportunities and challenges as they arise (Simmie *et al* 2002).
- *They give firms easier access to their suppliers, allowing them to seek out and integrate specialist inputs.* In Silicon Valley, for example, firms are able to work with an enormous array of different ICT companies and this allows them to be extremely flexible in the way they conduct their business (Saxenian 1999, 2002).
- *They lead to knowledge spillovers, which increases productivity and innovation.* The movement of workers between firms and the frequent interaction of businesses increase the rate at which knowledge is disseminated and integrated into work processes. This, in turn, can lead to the adoption of more efficient processes and the creation of new products and services.

Agglomeration economies may have only recently entered into the policy mainstream but they are not a new phenomenon. Case Study 1 below discusses how agglomeration economies improved the performance of the Manchester textiles industry during the Industrial Revolution.

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Case Study 1: Agglomeration economies in the Manchester textiles industry

Agglomeration economies were a major factor in supporting and enhancing the performance of Manchester’s textile industry during the British Industrial Revolution. Most significantly:

- Business networks built innovation capacity – between the 16th and mid-18th centuries, strong local networks were instrumental in the development of a capacity for continuous innovation. Information spillovers, the circulation of technology specialists, and the rapid diffusion of new technologies were all key features of the business environment.
- The complementary technologies and skills developed in a separate industry, clock making, were applied to the mechanisation of textile manufacturing processes.
- Finally, the development of Manchester’s textile industry was further boosted by the development of supporting educational and research institutes. (Hall 1998)

There are two key interpretations of how agglomerations come to drive productivity – localisation and urbanisation economies. The two are often presented as conflicting explanations, but in reality they overlap with each other, and it is possible that both will operate simultaneously to support improved economic performance.

Localisation economies – specialisation, knowledge spillovers and industrial districts

The great Cambridge economist Alfred Marshall was one of the first to theorise about the existence of agglomeration economies (Marshall 1920). He wanted to explain the existence of small, specialised business clusters.

His answer hinged on the idea that knowledge is industry-specific. He believed that the concentration of related business activities means that firms are able to draw on an expert labour pool and a range of specialised production inputs, which feeds further specialisation and productivity gains. Moreover, Marshall saw knowledge spillovers as more likely to occur between individuals employed in the same industry than those engaged in unrelated activities.

Case Study 2 gives an example of where the existence of localisation economies is particularly evident.

Case Study 2: Localisation economies in ‘Telecom Corridor’, Texas

Richardson, in North Texas, is home to the ‘Telecom Corridor’, the largest concentration of telecoms firms in the world, where more than 600 firms are located within two square miles. Company surveys have consistently indicated that one of the strongest reasons for firms to locate there is to be closer to other telecoms firms (Rossell and Walker 1998).

- Companies have cited agglomeration benefits such as being close to suppliers and customers, a specialised labour force, highly specialised services, products and inputs, and specialised infrastructure.
- More sophisticated agglomeration benefits are evident, including: collaboration between firms; tapping into knowledge spillovers via interaction between customers and suppliers; formal and informal business networks, trade associations, communities of practice and social networks.
- Agglomeration benefits in North Texas are part of a dynamic process. For example, as firms and people continue to be attracted to the area, new forms of collaboration begin to emerge – leading to more innovation and further productivity improvements.

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Urbanisation economies – diversity, innovation and urban scale

The idea of urbanisation economies is most closely associated with Jane Jacobs (1961). Jacobs saw the scope and diversity of the entire city as the key to innovation and urban development. In her view, the concentration of unrelated (rather than specialised) activities creates a melting pot of different ideas that feeds creativity, innovation and productivity. Once these new ideas are generated, it is the wider urban scale that is able to provide the range of skills and services – legal representatives, designers, architects, investors – needed to bring these new ideas to fruition. Case Study 3 gives an example of a situation where both urbanisation and localisation economies have come into play.

Case Study 3: Urbanisation and localisation economies in New York’s fashion industry

The New York City fashion industry consists of hundreds of highly specialised fashion and media enterprises supported by a diverse range of more generalist firms and complementary industries. This leads to higher productivity and higher rates of innovation in the sector.

- New York City is a major centre for the world fashion media industry, and the head office location for many major US department stores and purchasing departments. This benefits local enterprises by providing a global platform for their work and by maintaining New York as a focus of world fashion industry networks.
- The city has a large and sophisticated local consumer base that can support cutting-edge fashion products and design, thereby fostering innovation.
- New York’s Garment District – the historical heart of the city’s fashion industry – has been established over a long period, and this has led to a high degree of specialisation in the business base, and in the labour market.
- New types of innovation system have emerged as the fashion industry has evolved. For example, new design boutiques, catering to more sophisticated fashion tastes, have been formed as spin-out ventures from the mainstream market. These spin-out ventures are now influencing the market via knowledge spillovers and networks (Rantisi 2002).
- More broadly, there are spillovers from, for example, music, media and art sectors into the fashion sector and vice versa. New York’s ‘Fashion Week’ is a great example of this since it is actually about music, design, art, advertising, nightlife ... *and* fashion.

Agglomeration economies act as a strong incentive for firms to co-locate. But density can have costs as well as benefits – negative externalities as well as positive externalities. Most of these costs will be familiar to anyone living or working in a large city. For example, the concentration of people and businesses leads to congestion, which increases transport costs. Strong demand for housing and commercial space leads to higher property prices. And the higher cost of living means that employers must compensate their workers with higher wages. Each of these issues acts as a force for dispersion – as an incentive for firms to relocate elsewhere.

What is the evidence for the existence of agglomeration economies?

There are now numerous studies demonstrating the positive link between density and productivity, which is a key determinant of a city’s economic performance. For example, recent UK research concluded that doubling a city-region’s working age population would increase productivity by 3.5 per cent (Rice and Venables 2004). Many other studies have been carried out (see Eberts and McMillen 1999, for a review of the literature) and there is now a rough consensus that doubling the number of working age people within easy reach of a city increases its produc-

tivity by between 3 and 8 per cent (Rosenthal and Strange 2004).

These are very significant figures. If the UK is serious about addressing its productivity gap with the United States and European Union it needs to take advantage of the productivity gains offered by increased density.

There is also clear evidence that both urbanisation and localisation economies are relevant in explaining the productivity gains associated with agglomeration (see Rosenthal and Strange 2004 for a literature review).

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However, the strength of agglomeration economies varies significantly over time, and between industries. For example, a business may benefit from the diversity and range of services available in the city during the product development stage, but it can often be the case that later, standardised production takes place outside the urban core, where firms can take advantage of the lower costs of production in those areas (Duranton and Puga 2000). Equally, there are important differences in the extent to which different industries benefit from agglomeration economies. For example, industries like TV and film production, which are heavily dependent on networking, face-to-face contact and trust relationships, are likely to benefit more from agglomeration than, say, retail banking, which does not rely as much on the presence of other firms in the same industry.

Transport, density and productivity

Increasing a city's *effective density* increases its productivity. This means increasing the number of people and firms who can access the city quickly. To take an extreme example, if there were two large cities 20 miles apart, with no transport connections between them, then the increase in effective density brought about by building a motorway between the two would be enormous.

Broadly speaking, if policymakers can enable an increase in the effective density of a city, then they can increase the strength and scope of the agglomeration economies that are achievable, and thereby enhance the city's productivity.

It follows then, that there is an inherent relationship between maximising the economic benefits of density and improving the transport system. That's why the Eddington Transport Study, which focused on the links between transport and national productivity, placed such a great emphasis on agglomeration.

But we need to be clear on a couple of things. First, we need to remember that most of the productivity gains associated with transport investments – those linked to reduced travel times and lower operating costs, for example – are already accounted for in normal transport appraisal techniques. When we talk about the agglomeration benefits of transport investment we mean the productivity gains over and above those accounted for by traditional techniques.

Second, different transport investments will have different agglomeration benefits. The agglomeration effects of one scheme may be substantially more or less than those of another – indeed, in many cases, the agglomeration benefits of a scheme will be zero. The important point here is that agglomeration economies only constitute one part of a much wider appraisal process. Decision-makers need to bear this in mind when prioritising investment options.

“There is an inherent relationship between maximising the economic benefits of density and improving the transport system.”

The three key factors determining the extent of the agglomeration effect associated with a transport investment are:

- **Density** – what is the impact of the scheme on the effective density of the agglomeration? To what extent does it increase the number of firms and jobs that can access the city or business cluster quickly?
- **Responsiveness to changes in effective density** – different sectors of the economy and different locations experience agglomeration economies in different ways and to different degrees. For example, the industrial composition of some cities will mean that they are more responsive to changes in effective density than others. Decision-makers need to understand these variations if they are to allocate resources effectively.
- **Existing productivity of an area** – the absolute productivity increase achieved through a transport investment will be greater in areas where productivity is already high (DfT 2006). In other words, increasing the effective density of a city that is already highly productive is likely to generate a greater total benefit than increasing the effective density of a city that is less so. On this basis, there would seem to be a strong economic argument for channelling future transport investment into London, its hinterland and a few major cities elsewhere – although, of course, this might not be acceptable for distributional reasons.

Sophisticated methodologies for measuring the impact of transport proposals have now been developed and are constantly being refined (Venables 2004, Graham 2005, 2006). The Centre for Cities is currently working with Leeds city-region to evaluate a range of transport investment proposals using the latest appraisal methods available. The results of this analysis will be published later this year.

“There is now a stronger rationale than ever for investing in transport.”

What next?

So what does all this mean for decision-makers? The first conclusion to draw is that there is now a stronger rationale than ever for investing in transport. In the past, we have known about agglomeration economies, but we have not been able to quantify their impact. Now, with advances in economic modelling, we can estimate these effects with greater accuracy. By integrating the agglomeration benefits of transport investments into appraisal processes and business cases, we can more fully understand the magnitude of the gains from these interventions, and we can therefore allocate resources more effectively.

But there is still a great deal more work to be done. For example, we need to further develop our knowledge about how responsive different industries, and different cities, are to changes in their effective density. Equally, we need to understand more about the relative importance of different types of agglomeration externality, because this will allow us to tailor economic policies more effectively for different industries and locations. Finally – and this is an important point for local and regional decision-makers – we need to ensure that transport proposals are evaluated and prioritised properly. We should not use the capture of agglomeration economies as a justification for every transport project. They are simply one component of a much wider analysis of a proposal’s social, environmental and economic impact.

The Department for Transport (DfT) has already begun to integrate agglomeration benefits into its policy framework. For example, the Transport Innovation Fund – a pot of money that is fore-

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cast to grow from £260m per annum when it begins in 2008/09 to more than £2.5bn per annum in 2014/15 – has, as one of its key aims, the support of local, regional and inter-regional transport projects that improve national productivity (DfT 2006).

This has at least two major implications for local and regional actors. First, it means that in order for a transport proposal to demonstrate its value for money relative to other schemes, it will need to have carefully evaluated agglomeration benefits – otherwise it risks appearing less useful than alternative schemes elsewhere. If this happens, then local and regional level decision-makers may miss out on funding when they need not have done so.

Second, it puts an even greater emphasis on the need for cross-boundary partnership working since many of the transport improvements that could deliver agglomeration benefits span the city-regional or regional level rather than a single local authority.

Another important part of the policy context is, of course, the Eddington Transport Study. How great an influence will it ultimately have on government policy? Our recent discussion paper *Getting the connections right* (Marshall 2007), explored the findings in some detail. One of the key features of the Study was its emphasis on the link between agglomeration economies and transport investment. As mentioned above, these benefits are already being integrated into transport appraisals.

But this is not the whole story. Without the necessary funds to invest in transport schemes, cities will not be able to maximise the returns to agglomeration. Transport investment has fallen dramatically over the past 30 years, and the Government has only recently started to correct this. The Eddington Study received a positive response in this year's budget (HMT 2007). In the run-up to the Comprehensive Spending Review later in 2007, we should be looking for a transport spending allocation that reflects both the long-term under-investment in the UK's transport system, and our improved understanding of its critical role in underpinning economic growth.

Glossary of terms

- *Agglomeration* – a geographical concentration of economic activity such as a city or a business cluster.
- *Agglomeration economies or agglomeration externalities* – the wider economic benefits generated when people and firms congregate together. For example, the creation of a large labour pool on which firms can draw.
- *Localisation economies* – the idea that agglomeration externalities arise from the concentration of related businesses and industry-specific knowledge.
- *Urbanisation economies* – the idea that agglomeration externalities arise from the diversity of the city and the concentration of unrelated industries.
- *Effective density* – increasing a city's effective density means increasing the number of people and firms that can access the city quickly rather than simply increasing its physical size.

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