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The case for better transport investment:

Agglomeration and growth in the Leeds City Region

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Summary

- Trams, commuter rail services, better road junctions, more buses: every city has a long, and mostly unfulfilled, 'wish list' of major transport projects. But at a time when financial resources are limited, **how can our cities and regions prioritise transport needs – and make intelligent investments that boost their economic competitiveness?**

- Using case studies in the Leeds City Region, this report shows the scale of the 'hidden' economic benefits – known as agglomeration benefits – that transport schemes can deliver in Britain's major cities. Our new analysis shows that **up to 25% of the potential benefits of major transport investments in Leeds currently go un-counted by the Department for Transport.** Including these benefits in transport proposals and plans would make the case for investment in the Leeds City Region stronger than ever.

- **Adding up agglomeration benefits could also radically improve the economic case for transport investment in cities across the UK** – especially when new schemes deliver faster and better access to job-rich city centres. The evidence presented in this report suggests that targeted improvements to urban transport networks could add tens of millions of pounds to a city's economic 'bottom line' each year.

- In the wake of the Eddington Transport Study, the Comprehensive Spending Review, and the Government's renewed drive to improve regional economic performance, **it is more critical than ever to count these 'hidden' benefits – and ensure that cities get the transport investment needed to fulfil their potential.**

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Introduction

In the United Kingdom, it's long been suspected that the Government underestimates the economic impacts of transport investments – especially in big cities, which are the building blocks of the national economy. Many observers believe that decades of political disinterest, conservative appraisal methods and overly-cautious investment planning have left Britain's cities at a competitive disadvantage in the global economy. And some have gone so far as to suggest that without a radical increase in urban transport investment, Britain's future economic health could be in serious jeopardy.

Transport is a key enabler of economic growth in Britain's cities, and most city and business leaders believe that more could be done to improve urban transport networks (Eddington, 2006; Marshall and Harrison, 2007). Yet transport investment decisions are currently based on assumptions that underestimate the economic impact of urban transport schemes, and there is a lack of understanding amongst decision-makers of the 'wider economic benefits' of urban transport investment. This has often made it more difficult for transport to compete against other public spending priorities.

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The biggest source of these 'wider economic benefits' is technically known as agglomeration. This report improves our understanding of agglomeration benefits, and presents new analysis that takes the debate forward. Using case studies in one city-region, Leeds, the report presents evidence that agglomeration benefits – the wider economic benefits that go un-counted in the existing appraisal system – make a stronger case for investment in urban transport. This study concludes that including agglomeration effects in the business case for transport projects in the Leeds City Region could add up to 25 per cent to the economic benefits estimated using traditional appraisal methods.

Our findings reveal that carefully targeted investments in urban transport networks can potentially add millions of pounds to the local economy each year, especially when access to city centre concentrations of high-value jobs and services is improved. Now that the Department for Transport (DfT) is implementing the conclusions of the Eddington Transport Study, which urged a more 'economic' approach to transport policy, there is an important window of opportunity to make the case for agglomeration effects – and for urban transport investment as a whole.

The remainder of this report is divided into four sections.

- First, the report explains the concept of agglomeration and its relationship with transport investment and economic growth, drawing on a recent Centre for Cities publication (Webber and Athey, 2007).
- Second, it reveals the findings of our work in the Leeds City Region – which shows that smart investments, such as improved access to Leeds city centre, can add up to 25% more benefit to the local economy than previously thought.
- Third, it compares our Leeds research with other recent studies on agglomeration, and demonstrates the robustness of our findings.
- Finally, it explores the implications of this research for central government, regional agencies, local councils and businesses – and recommends policy changes that would enable Britain's cities to capture, rather than lose out on, the economic benefits of agglomeration.

Theory and practice: what we know about agglomeration

Agglomerations are simply geographical concentrations of workers and businesses [1]. Cities are the most commonly referred to form of agglomeration, but there are many others. These include:

- Specialised industrial clusters, such as those observed in the City of London, the biotech sector around Cambridge, and Silicon Valley in California.
- City Regions – meaning the functional economic area of a city, rather than its administrative area. Think of Greater London or Greater Manchester.

Over the past 15 years, researchers have invested a great deal of time trying to understand the economic reasons behind this clustering of workers and businesses (see Rosenthal and Strange, 2004, for a review of the literature). Cities are not cheap places to conduct our economic activities. Property prices, wages and transport costs all tend to be higher. Why do firms accept these higher costs?

"Roughly speaking, the larger an agglomeration gets the greater the agglomeration benefits become – there are 'increasing returns to density"

The reason is that when workers and businesses locate close to one another, it creates a range of benefits that drive improved economic performance and more than offset the higher costs of city locations. Economists call these benefits agglomeration economies. Cities generate three main types of agglomeration economy:

- they create large pools of labour upon which firms can draw easily (Simmie *et al* 2002);
- they give firms easier access to their suppliers, allowing them to seek out and integrate specialist inputs (Saxenian 1999, 2002); and
- they facilitate performance enhancing 'knowledge spillovers' - meaning that business knowledge is acquired, exchanged and circulated more rapidly.

Importantly, researchers have also found that, roughly speaking, the larger an agglomeration gets the greater the agglomeration benefits become – there are 'increasing returns to density' (Graham, 2005; 2006).

The clear implication for policy-makers is that if they can increase the size of a city they can increase the agglomeration economies available and improve economic performance. This improved performance takes the form of productivity increases (Rice and Venables, 2003; Overman et al, 2007).

But it is not the physical size of a city that matters. Rather, it is *effective density* that counts. Increasing effective density means increasing the number of people and firms who can access the city quickly, primarily by improving the quality of the transport network. For example, if two large but isolated cities with workforces of one million each were connected by a new motorway that brought journey times to under one hour, this would create a labour market of two million.

1. This section of the report borrows from the Centre for Cities' earlier briefing note on agglomeration economies. See Webber C and Athey G (2007) **The route to growth: transport, density and productivity,** *London: Centre for Cities*

So, the theory is that increasing the effective density of an area can intensify agglomeration economies, and thereby improve a city's economic performance. But decision-makers need to understand that the extent of agglomeration benefits achieved through a transport project will vary depending on the specific conditions surrounding a local investment plan. Three factors need to be considered:

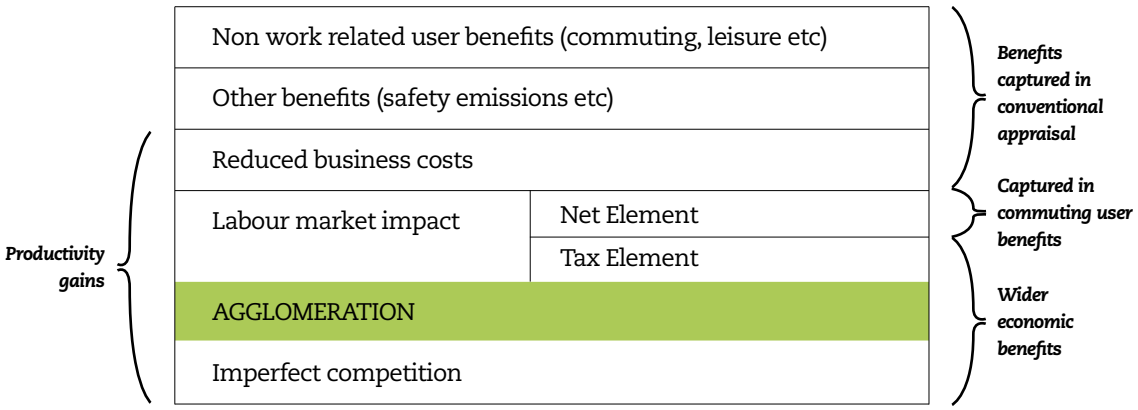
- Density – what is the impact of the scheme on the effective density of the area?
- Responsiveness to changes in effective density – different sectors of the economy respond to changes in effective density in different ways. For example, services firms tend to be more responsive than manufacturing firms. This means that the agglomeration benefits of a scheme will vary according to the industrial structure of the area in question.
- Existing productivity of an area – increasing the effective density of a city that is already highly productive is likely to lead to a greater total benefit than increasing the productivity of an area that is starting from a lower baseline.

"Increasing the effective density of an area can intensify agglomeration economies, and thereby improve a city's economic performance."

Finally, it is important to remember that conventional appraisal techniques already capture many of the benefits generated through transport investments. For example, some of the economic gains from reduced travel times are already incorporated in the Government's New Approach to Transport Appraisal (NATA) system. When we talk about the agglomeration benefits of a transport investment, we mean the productivity gains over and above those already captured through conventional appraisal methods [2].

Figure 1 breaks down the range of benefits arising through transport investments and identifies those benefits which are already captured through conventional appraisal techniques, as well as those which are not.

Figure 1: Relationship between conventional benefits and wider economic benefits



2. For a thorough discussion of the positive and negative aspects of conventional transport appraisal, see Graham (2005, 2006); Vickerman (2000, 2007); SACTRA (1999); and the Department for Transport's appraisal website www.webtag.org.uk

The Department for Transport is well aware of the potential benefits associated with agglomeration economies. However, until recently, no reliable methodology has existed for quantifying their impact. As a result, their analysis has been excluded from standard appraisals. By failing to take these effects into account we undervalue the economic benefits associated with transport investments - and risk making ill-informed investment decisions. Recently, new techniques have been developed that are able to measure the impact of agglomeration economies on the value of transport schemes with an acceptable degree of accuracy. One such technique was set out in the recent Eddington Transport Study (2006), which proposed placing greater weight on the wider benefits – economic, social, and environmental – delivered by individual transport schemes.

The development of new methodologies to measure the wider economic impacts of transport investment raises two immediate challenges for the policy- and decision-making community. The first is to test the new approach, and to set out its implications for investment both nationally and locally. The second, meanwhile, is to ensure that agglomeration benefits are fully integrated into the evaluation of transport proposals. This paper deals with the first challenge. In order to test the DfT's new methodology, the Centre for Cities teamed up with the West Yorkshire Passenger Transport Executive, Dr Daniel Graham of Imperial College London and transport consultancy firm Steer Davies Gleave to produce a detailed analysis of selected transport improvements across the Leeds City Region.

"Why Leeds? First, as a large city-region, it generates and experiences agglomeration externalities, whereas smaller cities generally lack the 'critical mass' needed to do so on a significant scale"

New research: wider economic benefits in the Leeds City Region [3]

Why Leeds? First, as a large city-region, it generates and experiences agglomeration externalities, whereas smaller cities generally lack the 'critical mass' needed to do so on a significant scale. Second, unlike other large cities, the Leeds City Region has presented a detailed statement of its long-term transport investment priorities through the Leeds City Region Transport Vision (LCR, 2006), which is part of the wider City Region Development Programme. The level of detail included in the Transport Vision enabled us to select, package together, and test the potential economic impacts of the City Region's transport proposals. In many other urban areas, this approach would have been more difficult – principally because of the lack of a single, agreed long-term transport strategy.

The detailed results of this analysis are contained in a separate technical report (Rognlien and Graham, 2007). This section of the paper discusses the scope and methodology of the analysis before going on to present a summary of the findings.

3. The Leeds City Region comprises the 10 local authority districts of Barnsley, Bradford, Calderdale, Craven, Harrogate, Kirklees, Leeds, Selby, Wakefield, and York; with the participation of North Yorkshire County Council. More information is available at http://www.leeds.gov.uk/leedscityregion

Scope and Methodology

As mentioned above, we adopted a 'package approach' in order to analyse a wide range of public transport and road improvements in the Leeds City Region. By evaluating and appraising packages of schemes, rather than individual projects, we were able to understand the impact of strategic investment programmes over time. Selecting packages of schemes also enabled us to realistically examine the impact of different transport improvements across the city-region and beyond. For example, we were able to test the relative agglomeration gains for improvements in access to Leeds city centre versus improvements in access between Leeds and Manchester, rather than simply focus on a single road or rail project.

Together with our study partners, we selected three different transport investment packages in the Leeds City Region, and analysed both the conventional and the agglomeration benefits associated with each.

"By evaluating and appraising packages of schemes, rather than individual projects, we were able to understand the impact of programmes of strategic investment programmes over time"

Table 1: Packages of Schemes Assessed in the Leeds City Region

Package 1: Improved access to Leeds City Centre
Includes the proposed Leeds Bus Rapid Transit system, Park and Ride sites, selected rail upgrades, and improvements to the Leeds ring road.

Package 2: Improved links between centres within the Leeds City Region
Centred on improved links between the City Region's employment centres – including inter-city highway improvements, elements of a tram-train system, rail electrification schemes, and some conventional bus corridor upgrades.

Package 3: Upgraded Leeds-Manchester links
Improved connectivity between the Leeds City Region and Greater Manchester, via upgrading of Calder Valley rail line linking Bradford, Halifax and Hebden Bridge to Manchester; targeted improvements to the Trans Pennine rail route; and targeted improvements to the M1 and M62.

Using conventional methods (i.e. not incorporating an assessment of agglomeration gains), the predicted benefits of these schemes were as follows [4]:

Table 2: Conventional benefits by user group (2016 values, £m 2002 prices [5])

	Package 1 (improving links into Leeds city centre)	Package 2 (improving links between centres within the Leeds City Region)	Package 3 (improving links between Leeds and Manchester)
Business	23.0	6.1	12.2
Commuting	23.6	34.7	131.4
Other	7.4	19.7	57.5
Total	**54.0**	**60.5**	**201.1**

4. The study used a simplified version of the conventional appraisal method. This was sufficient for our needs because we were interested in testing the agglomeration impacts of investment packages with a range of conventional user benefits. This meant that it was more important to obtain the relative conventional benefits of the packages, rather than exact conventional benefits. The methodology used was robust from this purpose. A full explanation of the methodology employed is available on request.

5. The figures in Table 2 and subsequent tables refer to the annual net benefit from the package of schemes in 2016, assuming that the full package was completed in 2006. In other words, the figures quoted for agglomeration benefits are based on the evolution of the economy from 2006 to 2016, assuming that the required transport investments were put in place.

These results show that, by conventional appraisal methods, the Leeds-Manchester package offers substantially more benefits than packages 1 and 2. Had package 3 been introduced in 2006, it would have generated £201.1m worth of benefits per year by 2016, as compared to £54m and £60.5m per year for packages 1 and 2 respectively.

The next step was to assess the agglomeration benefits associated with each of these schemes by employing the DfT's new draft guidance on evaluating agglomeration impacts.

As explained above, different cities (and areas within cities) have varying degrees of responsiveness to changes in effective density. Understanding these differences is essential to the accurate assessment of a transport scheme's agglomeration benefits. We need to understand the *local* responsiveness to changes in effective density rather than generalising by assuming that each city or area is equally responsive.

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The calculation of these local figures is a four-stage process involving:

- **Step 1** - assessment of existing level of effective density across the study area,
- **Step 2** - analysis of the industrial structure of the economy in question,
- **Step 3** - estimation of the responsiveness of each economic sector to changes in effective density, and
- **Step 4** - calculation of the responsiveness of different locations within the study area to changes in their effective density (based on the evidence collected in steps 1, 2 and 3).

This process enabled us to build a detailed picture of levels of responsiveness to changes in effective density throughout the Leeds City Region. We were then able to use these figures to help us accurately predict the agglomeration gains associated with each of our selected transport investment packages.

The final stage of the research was to model the impact of each of our selected transport packages on levels of effective density within the study area, and then, using the responsiveness figures calculated earlier, convert those changes in effective density into productivity gains and monetary benefits.

The model used to quantify agglomeration benefits is not without limitations. For example, we were unable to calculate Benefit-Cost Ratios (BCRs) for the packages, because detailed cost information for the schemes in question is not yet available. As such, it was necessary to estimate generalised costs for some schemes in order to model potential benefits over time. And, as noted above, the model calculates agglomeration benefits that would be expected in 2016 if the package of investment had been put in place in 2006. However, these limitations do not undermine the robustness of the findings. For a further discussion of methodology and a defence of the modelling techniques used, see Rognlien and Graham (2007).

Findings

Tables 3 and 4 present the findings of the analysis. Table 3 lists both conventional and agglomeration benefits for all three investment packages broken down by local authorities within the study area. Table 4 summarises the total conventional and agglomeration benefits for each package and highlights the percentage of the total benefit for each scheme accounted for by agglomeration gains.

Overall, what do these statistics tell us? There are four key conclusions:

- **Conventional benefits still accounted for most of the gains from these transport investments.** As Table 4 shows, in all cases the greater part of the economic benefit in the schemes lay in the value of reduced journey times rather than agglomeration gains. However, this may not be the case with every transport investment. In some cases, agglomeration gains could outstrip conventional user benefits (see section 3 below).
- **Agglomeration benefits were significant.** In all cases, incorporating agglomeration benefits into the investment appraisals increased the expected benefit substantially. For example, package 1 agglomeration gains represented a gain of 25.4% over predicted conventional benefits.
- **Agglomeration gains varied between areas.** All three packages produced different levels of agglomeration benefits across the study area. As Table 3 shows, some areas benefited greatly from schemes whereas others did not benefit at all.
- **Overall, the agglomeration benefits achieved by improving access to Leeds city centre outstripped those projected for the other packages.** This has important implications for the Leeds City Region's transport policies, which will be explored further below.

"Overall, the agglomeration benefits achieved by improving access to Leeds city centre outstripped those projected for the other packages"

"So what do all these statistics mean for transport investment in the Leeds City Region, following calls for greater prioritisation of investment resources?"

Table 3: Conventional, agglomeration and total benefits for packages 1, 2 and 3 (2016 values, £m 2002 prices)

	Package 1			Package 2			Package 3		
	User (£m)	Agg (£m)	Total (£m)	User (£m)	Agg (£m)	Total (£m)	User (£m)	Agg (£m)	Total (£m)
Leeds CR	**52.7**	**12.4**	**65.2**	**57.6**	**7.9**	**65.5**	**83.6**	**12.1**	**95.8**
Barnsley	0.0	0.0	0.0	2.4	0.2	2.6	0.9	0.2	1.1
Bradford	9.4	1.8	11.2	8.6	1.2	9.8	0.4	0.4	0.8
Calderdale	2.4	0.5	2.9	0.2	0.1	0.2	0.9	0.2	1.1
Kirklees	1.1	0.4	1.4	1.7	0.3	2.1	12.8	1.2	13.9
Leeds	31.2	8.0	39.1	34.0	4.6	38.6	53.3	8.6	61.9
Wakefield	5.2	0.9	6.0	5.8	0.5	6.4	0.5	0.3	0.8
York	1.7	0.5	2.2	2.4	0.6	3.0	11.2	1.0	12.3
Harrogate	0.0	0.1	0.1	1.1	0.3	1.4	0.0	0.1	0.1
Selby	1.9	0.4	2.2	0.9	0.1	0.9	3.5	0.2	3.7
Craven	0.0	0.0	0.0	0.5	0.1	0.5	0.1	0.1	0.2
Sheffield CR	**0.1**	**0.2**	**0.3**	**1.9**	**0.4**	**2.3**	**1.1**	**0.5**	**1.6**
Doncaster	0.1	0.1	0.2	0.9	0.1	1.0	0.0	0.1	0.1
Rotherham	0.0	0.0	0.0	0.0	0.1	0.1	0.6	0.2	0.8
Sheffield	0.0	0.1	0.1	1.0	0.2	1.1	0.3	0.2	0.5
Bolsover	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Chesterfield	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1
High Peak	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North East Derb.	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Rest of study area	**1.2**	**1.1**	**2.3**	**1.1**	**1.6**	**2.6**	**116.4**	**11.9**	**128.3**
Rest of Derbyshire	0.0	0.1	0.1	0.0	0.1	0.1	0.3	0.2	0.4
Rest of N. Yorkshire	0.0	0.0	0.0	1.0	0.2	1.2	0.0	0.0	0.0
Rest of Notts.	0.0	0.1	0.1	0.0	0.1	0.2	0.4	0.2	0.6
Humberside	0.4	0.2	0.6	0.0	0.2	0.2	0.0	0.1	0.1
Manchester	0.6	0.2	0.8	0.0	0.2	0.2	115.6	10.8	126.3
Rest of North West	0.1	0.3	0.4	0.0	0.3	0.3	0.0	0.2	0.2
Lincolnshire	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.4
West Midlands	0.0	0.2	0.2	0.0	0.3	0.3	0.0	0.2	0.2
Total	**54.0**	**13.7**	**67.7**	**60.5**	**9.8**	**70.4**	**201.1**	**24.5**	**225.6**

Table 4: Summary: agglomeration benefits in proportion to user benefits (2016 values, £m 2002 prices)

	Package 1	Package 2	Package 3
User benefits (£m)	54.0	60.5	201.1
Agglomeration (£m)	13.7	9.8	24.5
Proportion	**25.4%**	**16.2%**	**12.2%**

Analysis

So what do all these statistics mean for transport investment in the Leeds City Region, especially following the call for greater prioritisation of investment resources in the Eddington Transport Study, the Rail White Paper and the Sub-National Review of Economic Development and Regeneration?

"First, and most importantly, the agglomeration benefits arising from transport investment in the Leeds City Region are significant"

Seven principal points stand out:

First, and most importantly, the agglomeration benefits arising from transport investment in the Leeds City Region are significant. The value of transport investment to the city-regional economy has been systematically underestimated, with up to 25% of the benefits going un-counted. The scale of agglomeration gains illustrated in Table 4, confirms the importance of agglomeration and density to the performance of the city-region's economy. Agglomeration gains also suggest that decision-makers within the Leeds City Region, Yorkshire and the Humber, and relevant central government departments must take account of these additional benefits if they are to prioritise limited investment resources effectively.

Second, agglomeration benefits must be fully integrated into the Leeds City Region's transport investment proposals. The figures in Table 4 above can only help the Leeds City Region to make a case for increased transport investment – showing, as they do, the wider economic effects of systematic and prioritised investment in the City Region. This could help to raise additional finance from Regional Funding Allocations, private investors, and central government funding pots. Additionally, these figures could help the City Region to lever in private-sector contributions to specific transport projects – as the results suggest that some investments will result in substantial business gains.

Third, improved connections to Leeds city centre (Package 1) would provide proportionally greater agglomeration benefits than improved connections between urban centres in the Leeds City Region (Package 2). This may be a difficult political message, given the *Transport Vision's* emphasis on improving transport linkages between the city-region's urban centres (LCR, 2006). Decision-makers in the LCR may need to weigh up the potential benefits of the two approaches – as an economic assessment suggests that improved access to Leeds city centre from around the City Region delivers greater, but more concentrated, economic benefits.

Fourth, inter-regional transport investment (Package 3) can deliver substantial agglomeration gains – showing that inter-regional collaboration remains important. Although improved Leeds-Manchester connections showed the lowest agglomeration benefits in percentage terms, the *gross benefits* were quite high. The Leeds City Region should work closely with neighbouring areas, such as Manchester and Sheffield, as well as the Northern Way, to explore the full economic consequences of inter-regional transport connections.

Fifth, the geographic distribution of agglomeration benefits must be taken into account in the appraisal of transport investment packages. The scale of agglomeration gains varies between different locations. As our analysis shows, both intra-regional and inter-regional schemes concentrate agglomeration benefits in large, dense city centres – with fewer benefits accruing to peripheral areas. It would make sense for LCR partners to discuss the spatial impacts of investment schemes in some detail when negotiating local contributions to the financing of major transport projects.

Sixth, modelling is useful – but has its limitations. We need to remember that research on the agglomeration effects of transport investment is still evolving. As noted above, appraisal methodologies are not without their limitations. Analytical

models, such as the one used here, give us an important indication of the potential benefits of a scheme, but a number of real-world factors – such as possible changes in land use patterns, or politically-motivated decisions – simply cannot be included. Decision-makers need to be aware of these limitations when making judgements about investment proposals.

Seventh, the Leeds City Region's transport proposals now need to be fully costed and comprehensively evaluated. The next step for the Leeds City Region is to produce a comprehensive cost-benefit analysis of its proposed transport schemes. This study has shown that the potential agglomeration gains from transport investment in the Leeds City Region are highly significant, but it has not conducted the full cost-benefit analysis necessary for a formal business case. In order to make the case for large scale investment, local decision-makers now need to start working up detailed proposals.

"Our Leeds study, together with research elsewhere, has reinforced our understanding of how significant agglomeration benefits can be"

Other research: corroborating the case for agglomeration

While ours is the first study to quantify the agglomeration gains associated with a specific set of transport investments in a city-region, other reports have used agglomeration theory to analyse the potential agglomeration gains associated with transport investment.

Our Leeds study, together with research elsewhere, has reinforced our understanding of how significant agglomeration benefits can be – and how important it will be to evaluate agglomeration effects when prioritising the UK's limited transport investment resources.

Agglomeration analyses for Crossrail

A 2007 report by Colin Buchanan and Volterra Consulting, which builds on a range of internal and published studies conducted over the past decade, examined the economic impact of London's recently-approved Crossrail scheme (Colin Buchanan & Volterra, 2007). Conventional user benefits for the scheme were estimated at £13bn over 60 years, whilst agglomeration benefits were predicted to range from £31bn to £62bn depending on economic growth scenarios. These are enormous figures and, if reliable, they strongly reinforce the case for taking the Crossrail scheme forward.

Agglomeration in the North

Elsewhere, the Northern Way Transport Compact has used the DfT's draft guidance to analyse the agglomeration gains from transport improvements both within and between city-regions in the north of England (Northern Way, 2007). This analysis looked at generalised reductions in travel times, rather than specific transport schemes or packages of schemes. It showed that increasing effective density within city-regions may benefit stronger economies at the expense of weaker ones, whereas improving transport linkages between city-regions is likely to lead to a more even distribution of productivity gains.

The Northern Way's conclusions are consistent with our analysis. Package 1, improved access to Leeds City Centre, delivered the highest proportional agglomeration benefits – but the positive impacts were concentrated in Leeds.

Package 3, improved links between Leeds and Manchester, showed the largest gross agglomeration benefits, which were split between the two city-regions.

Eddington Transport Study

The Eddington Transport Study, meanwhile, modelled a range of wider economic benefits – including agglomeration benefits – associated with three different types of transport improvement. The first set of simulated investments involved improving connections to key pieces of transport infrastructure, such as airports and ports. The second set of investments involved improving linkages to a number of specialised industrial clusters around the country, such as the finance sector in London and aerospace in the North East. The final set simulated improvements in transport connections to a number of England's largest cities.

"The large predicted gain from improving access to London's finance cluster is partly due to the high responsiveness of the finance sector and London's existing high levels of density"

The results for the first set of improvements are set out in table 5. The figures show that the value of agglomeration benefits varied significantly between schemes. Improving links to Heathrow airport delivered the greatest agglomeration gain (13% of the total), whilst improving links to the port of Felixstowe delivered the smallest (just 1% of the total).

Table 5: user benefits and agglomeration benefits arising from reduction in travel times to selected airports and ports, and the M4 motorway

	Agglomeration benefits (£m)	Total user benefits (£m)	Agglomeration benefits as a % of user benefits
Airports			
Heathrow	0.3	2.1	13%
Gatwick	0.2	2.4	7%
Birmingham	0.2	3.4	6%
Stansted	0.03	0.6	5%
East Midlands	0.007	0.4	2%
Seaports			
Southampton	0.2	3.9	5%
Tees & Hartlepool	0.1	2.5	3%
Felixstowe	0.01	0.5	1%
M4	**1.2**	**27.2**	**4%**

The results for the second set of investments are set out in table 6 and show that agglomeration gains achieved through improving access to London's financial services cluster are far greater than any other cluster analysed.

The large predicted gain from improving access to London's finance cluster is partly due to the high responsiveness of the finance sector and London's existing high levels of density. But as the DfT notes, agglomeration modelling may have a bias in favour of particularly high density locations – giving a somewhat misleading impression about the overall benefits that are achievable. This is because the model does not take account of the costs of transport investments or the user demand response arising from the transport upgrade. The scheme costs of transport upgrades will be greater in high-density locations, and the user demand response to a transport upgrade would probably be more extreme - creating the potential for congestion, which could limit the overall gains from a scheme.

Table 6: user and agglomeration benefits arising from reduction in travel times to selected specialised business clusters

Clusters with evidence of agglomeration	Agglomeration benefits (£m)	Total user benefits (£m)	Agglomeration benefits as a % of user benefits
Financial & Business Services (London)	45.3	23.5	193%
Aerospace (NW)	1	6.8	14%
Aerospace (SW)	0.3	3.1	10%
Financial & Business Services (Leeds)	0.6	6.4	9%
Metal	0.8	10.6	8%
Other clusters			
R&D (S)	0.2	2.5	7%
Pharma & biotech (E)	0.1	2.3	4%
Ceramics	0.1	3.9	3%

"We now have a much-improved understanding of the scale and geographical distribution of the wider economic gains delivered through transport investment, and the policy implications are far-reaching"

The results for the third set of improvements - those which upgrade access to cities - are set out in table 7. Here we can see that London again achieves significantly greater returns to agglomeration than other large cities around England. Once more, this is due in part to a limitation in the model as well as London's economic structure and high performance (check this analysis with DfT report). Whilst not as large as the London figure, results for the core cities were also considerable, with agglomeration benefits from reduced journey times ranging between 7.5% of the total in Newcastle and 3.3% of the total in Sheffield.

Table 7: user and agglomeration benefits arising from reduction in travel times to London and England's core cities

	Agglomeration benefits (£m)	Total user benefits (£m)	Agglomeration benefits as a % of user benefits
London	56.9	183.9	31%
Newcastle	1.3	16.9	7.5%
Manchester	2.2	38.1	6.2%
Leeds	1	16.7	6.1%
Bristol	0.9	14.8	5.8%
Birmingham	2.5	50.2	5.5%
Liverpool	0.7	16.2	5.3%
Sheffield	0.5	16.3	3.3%

The studies discussed here are more theoretical than ours because they rely on generalised reductions in travel times, rather than an analysis of specific transport investment packages. However, each constitutes an important part of the emerging evidence base. Crucially, each of the studies reinforces the key findings of our own analysis – that agglomeration gains are highly significant in major cities, that benefits vary between areas, and that benefits vary between types of scheme.

Overall, our study and those that have been carried out elsewhere represent a significant body of evidence highlighting the importance of agglomeration benefits. There are limitations in the methodologies used, but we now have a much-improved understanding of the scale and geographical distribution of the wider economic gains delivered through transport investment, and the policy implications are far-reaching. Section 5 discusses these in more detail.

What are the policy implications?

As our analysis in the Leeds City Region and other research on agglomeration shows, there are substantial economic benefits to urban transport investment that currently go un-counted – and these are concentrated in large, productive city centres. If the Department for Transport and the Treasury mandate the inclusion of agglomeration – and other wider economic benefits – in the transport appraisal process, we are likely to see investment resources shift toward the UK's growing urban areas (Marshall, 2007). In the wake of the Eddington Transport Study, and the recently-announced 'refresh' of the NATA appraisal system, such a shift seems increasingly likely.

While we must be careful not to draw too many conclusions from analysis in a single urban area, the Leeds City Region case study suggests that national, regional and local decision-makers should re-consider existing transport investment 'short-lists' – and weigh up whether resources need to be reprioritised on projects that yield clear economic dividends.

"Including agglomeration benefits will support the case for transport investment – both nationally, and in Britain's major cities"

Our analysis suggests that decision-makers need to consider four related issues:

- **Including agglomeration benefits will support the case for transport investment – both nationally, and in Britain's major cities.** While transport spending has increased substantially in recent years, the UK still has a major history of under-investment to overcome (APUDG, 2007). Over time, the consideration of agglomeration effects in individual funding decisions and longer-term Spending Reviews could help to correct this, and ensure that investment is used to underpin and sustain economic growth.

- **Integrating agglomeration benefits into transport investment decisions can create winners and losers.** As our work in the Leeds City Region shows, agglomeration benefits are overwhelmingly concentrated in city cores, where high-value jobs and services are clustered. While our results suggest that agglomeration improves the economic case for both intra-city and inter-city transport investment, job-rich city cores are likely to generate most of the gains. So large cities stand to gain the most from the introduction of agglomeration into the transport appraisal system – whereas smaller towns and rural areas are likely to see less benefit. This is consistent with Sir Rod Eddington's call to "invest in success" – but could be difficult for election-minded politicians to implement. As it moves to implement the recommendations of the Eddington Transport Study, central government will need to explain what this means in terms of transport investment – especially if budgets are tightened and resources get re-prioritised on big city-regions and the Greater South East.

- **The economic benefits derived from agglomeration need to be weighed against important environmental concerns.** As the Eddington Transport Study and our results in Leeds show, investment in road projects can sometimes deliver higher levels of economic benefit than investments in public transport schemes. Some studies (e.g. Archer and Glaister, 2006), suggest that the economic benefits of road-building far outweigh the environmental costs. But large-scale road-building is politically unacceptable for all three

main political parties. Our results suggest that a mixed approach, combining judicious public transport and road projects in large urban areas, may be the best way forward. Combining transit and road schemes into packages of access improvements, for example, can yield substantial economic benefits without relying entirely on road-building. Simultaneous investment in public transport for commuters, and targeted 'pinch-points' on urban road networks, would free up road capacity for productive use while offering individuals a more sustainable range of travel-to-work choices.

- **A better evidence base – including agglomeration impacts – will help decision-makers prioritise investment more effectively.** This is especially critical for cities and city-regions, where targeted transport investment could deliver substantial economic returns. By committing resources to better analysis, cities will be in a better position to secure funding from a variety of public-sector sources. Also, a better local evidence base, including agglomeration benefit estimates for proposed transport schemes, will help cities to prioritise their own resources – and use devolved financial powers to deliver the greatest possible economic impact.

"A better evidence base – including agglomeration effects – will help decision-makers prioritise investment more effectively"

Conclusions and recommendations

The new empirical evidence presented in this report sends a clear message to Government: transport investment in cities can have substantially greater returns than previously assumed. As our case studies in the Leeds City Region suggest, we have substantially under-estimated the contribution that big-city transport projects can make to local economies.

Our research suggests that better prioritisation of resources is needed – with priority given to projects that support economic growth. But re-prioritisation alone will not allow us to capture the potential of wider economic benefits. Additional resources, focused explicitly on urban transport schemes that boost growth, will be needed in the long term.

Conversely, a failure to invest in urban transport could constrain UK cities' capacity for growth. The failure to capture agglomeration gains could leave our cities at a substantial disadvantage in the increasingly global race to secure jobs, new residents, attract inward investment, and ensure their future economic success.

What does all this mean for policy-makers? The evidence suggests that policy changes are needed at national, regional and city-regional level – so that the UK can capitalise on the 'agglomeration potential' of its major cities.

Recommendations for central government

1. **Use the opportunity of the NATA 'refresh', announced in October 2007, to make agglomeration benefits a key ingredient of the transport appraisal process.** Our evidence shows the relative importance of these benefits – and how they can be used to prioritise transport spend to achieve maximum economic impact, in line with the Government's recent response to the Eddington Transport Study.

"As this study shows, the wider economic benefits of transport improvements, and especially agglomeration effects, are set to play an increasingly important role in investment decisions"

2. **Include agglomeration analysis in future Regional Funding Allocations (RFAs).** The Sub-National Review (HM Treasury et al, 2007) noted the Government's interest in expanding Regional Funding Allocations, and increasing flexibility to tackle specific regional priorities. If this occurs, business cases will become more important tools for the prioritisation and allocation of limited investment resources – suggesting that the DfT should work with RDAs and other regional stakeholders to include agglomeration as a factor in the project appraisal process.

3. **Incentivise the development of transport appraisal capacity at city-regional level through the Local Transport Bill.** City-regions that invest in expertise and appraisal, alongside stronger transport governance structures, should be rewarded with greater financial freedoms and flexibilities.

Recommendations for regional agencies

4. **Develop capacity to analyse agglomeration and wider economic benefits within RDAs.** Given their existing role in the prioritisation of Regional Funding Allocations and Transport Innovation Fund monies, and their expected lead on Single Regional Strategies from 2010, RDAs need in-house capacity to explore agglomeration effects both within and between regions. This will be critical for RDAs and local partners as they work to prioritise funding – especially given the Government's decision to revise existing appraisal guidance.

5. **Conduct agglomeration analysis for specific inter-regional schemes.** The Northern Way RDAs should follow up their general work on agglomeration with modelling of specific schemes, especially Trans-Pennine rail improvements, that are considered priority investments. Since the benefits of these schemes will be felt across the North, the cost of conducting analysis should also be shared.

Recommendations for cities and city-regions

6. **Use agglomeration analysis to prioritise transport resources.** Integrated Transport Strategies – which are likely to replace Local Transport Plans in many major urban areas – should consider agglomeration effects when prioritising locally-controlled resources. In city-regions and sub-regions, cross-boundary collaboration will be required to deliver this analysis, and to ensure maximum economic impact and value for money.

7. **Conduct agglomeration analyses alongside scheme costing.** This could help bolster the case for funding transport projects earlier in the project development process – and will help city-regional leaders to prioritise worked-up schemes, rather than submit 'shopping lists' for funding.

8. **Share best practice on wider economic benefits with other cities.** The Leeds City Region, for example, should share the positive lessons from the development of its *Transport Vision*, and the calculation of agglomeration benefits, with the Core Cities, and other areas developing sub-regional approaches to transport.

As this study shows, the wider economic benefits created by transport improvements, and especially agglomeration effects, are set to play an increasingly important role in investment decisions. Cities, regional agencies, and Whitehall departments must account for wider economic benefits when planning their long-term investment strategies – and prioritise the 'smart investments' that deliver clear economic dividends.

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