

Investing in City Regions: the case for long-term investment in transport

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Executive summary

Unlocking UK jobs, housing and growth is our shared goal. In achieving this cities, and their transport infrastructure, matter. They are the drivers of economic growth and performance today and increasingly in the evolving world economy – a fact undisputed by much research and recent reports on the subject.

Over recent decades, a modern knowledge economy has flourished in our cities, at the heart of dynamic city regions. They have shown how larger centres can generate greater density and higher wages if supported by good transport systems, both for the labour market and business-to-business access.

This report seeks to add to the current debate on what should be the proper powers and responsibilities of cities in the UK through a renewed focus on transport infrastructure investment and the empowerment of city regions to achieve their full potential.

We know from cities around the world that devolution and more integrated approaches to investment will secure better infrastructure, unlock growth and create new, locally-determined funding opportunities.

Crucially, this report highlights a mismatch between central government's ambition to boost jobs growth and economic prosperity in cities and the system used to prioritise transport investment and funding. It is a system that developed during an era in which only modest budgets were available for managing what was felt to be the inevitable decline of cities. With this central assumption

laid to rest, these approaches are ill-suited to the more expansionary climate of today, in which cities are once again the drivers of the country's future growth and success.

Without the proposed improvements outlined in this report, the UK will continue to miss out on the potential of its cities, as investment decisions, often heralded as economic decisions, are made without reference to their impact on the competitiveness and economic performance of its cities.

Visionary schemes such as Crossrail, HS2, and the One North proposals rest precisely on their ability to be game-changers for city regions and the whole country; and they require complementary plans to be put in place to allow this to happen.

What we need is a reformed system that looks both at returns on investment and that allows these corresponding policies to be put in place. Major investment decisions must be shaped by a more holistic view of cities' needs. This must start with the growth imperative and be supported by strong risk analysis, rather than a narrow transport appraisal system that assumes the development of the economy is broadly independent of the transport system.

The report lays out the backdrop to the need for city regions to have funding guarantees that cut across political cycles, fiscal devolution that allows cities to keep a greater proportion of the tax revenue generated by investment, and additional powers over transport services.

This report finds that:

Centralised decision-making means transport decisions are evaluated independently of their impact on the economy or interaction with other policies, something which astonishes non-economists and even some politicians.

Britain's cities are among the least devolved in the world, with very little control over services, funding, or borrowing, constraining their ability to give a clear focus across policies at the local level to promote sources of competitive advantage in the interests of local and national productivity.

The report recommends a fresh approach to these decisions to give a strategic focus on how investment is to be paid back; whether by fares, taxes on increased activity, or developer contributions.

The proposition is actually fairly simple. Better transport, land use planning and devolution go hand in hand. Both for London and other cities, an integration of land use planning and development with the transport investment is central to economic growth and to future welfare¹.

Transport builds cities that drive growth

Section 1 considers how transport builds density in cities and how that density relates to economic growth.

The UK's centralised system means city funding comes down a complex set of pipes, with no connections or integration at the city level. A more devolved system could not only take a more coherent view of the investment needs of cities, but also prioritise on the basis of a wider set of criteria than is currently possible. That ability to set priorities – and the ability to fulfil them – will be pivotal in ensuring cities get the right mix of investments. In transport, that centralisation is seen in the decision-making of the Department for Transport (DfT), which uses assessment criteria which focus on a conception of welfare based on user benefits rather than economic potential and growth. The problem is that this is incapable of identifying likely future needs where the economic system is dynamic and is likely to result in damaging under-investment.

This section sets out how maximising economic potential of cities will require the densification of city centres. In turn, this will require the creation of larger, more effective commuter catchment areas for all cities outside London, together with projects such as Crossrail 2 that would result in comparable productivity gains. In addition, creating dense and successful cities is not just about the labour market but also about creating better opportunities for successful businesses with good access to markets and to new opportunities.

¹ Welfare has a particular meaning in economic theory which is narrower than the meaning in normal language.



Cities held back

Section 2 considers in more detail the constraints placed on cities, both by the lack of the right type of infrastructure and the challenge posed to the current static system of assessment for transport infrastructure investment, by focusing on its role in economic growth over time.

The UK's current appraisal and funding system is based on the assumption that transport investments are made to generate welfare improvements for passengers, rather than to change the economy's output potential. Where change is only incremental it may well be reasonable to consider the economy as being independent of transport in this way. However, where there is the potential for structural economic change, accompanied by major spatial change locally and regionally, this is unlikely to provide a sufficiently full view of likely future transport requirements.

The changes experienced at Canary Wharf show that past trends are not a useful guide to the future in all circumstances. This is a very important realisation when our appraisal system insists on using models in which the past informs assumptions about the future. This suggests that our current static framework for evaluation, particularly of large-scale and long-term projects is inappropriate. It will not capture the feedbacks that change the nature of places, even when so-called 'wider benefits' are taken into account. What should be asked is what constraints exist, how serious they are and what might relieve them. The

further question is to gauge the extent of new opportunities, how they can be accessed and what investment would make it possible to achieve them.

What is to be done?

Section 3 sets out the alternative, which is to start from the proposition that growth can be created by transport investment that is locally determined in the context of integrated city region growth plans, and then consider what might happen in the absence of such investments. This means focusing on output, gross value added (GVA), productivity and financial payback.

Paybacks

The report recommends a focus on revenue and the wider economic returns that are generated by major transport investment programmes. It steps away from a focus on welfare benefits, which are not paid for, in favour of those which have direct value. It then follows to think about what revenue will not cover and why there might be a case for such investment. This is where GVA, productivity impacts and returns to the national economy over time come in.

This allows us to consider the capital financing of transport projects in a new way. A project which offers proven, realistic potential to add to jobs and productivity will raise the total sum of taxes generated and present new sources of finance over time. And in due course, there will be continued streams of activity-generating benefits.



By viewing spending priorities in this way, we can break with the constraints of short-term decision-making and spending approaches to create a virtuous investment and performance that rewards a spirit of entrepreneurialism in our cities. Through this model, of course, welfare benefits will still be represented, as has been shown by the Greater Manchester Transport Fund investment programme, whose components were determined by their GVA potential and refined by the ability to secure social and carbon benefits at a programme level.

Why cities?

Crucially, linking benefits to paybacks, particularly those generated by new economic activity, is much more easily done at a sub-regional or city region level than nationally. Once the assumption that the economy is independent of the transport system is abandoned, the immediate question is what the objective is of a policy so that the relevant benefits can be examined.

Cities and city regions should be able to have a more focused view of their prospects and how best to respond to opportunities. Indeed they will be essential to actually taking advantage of new opportunities. Transport is a necessary but not sufficient condition for success. Cities and their regions will play a key role in ensuring the other conditions are in place and, therefore, for maximising the value for money of the overall investment.

Thinking about risk

Risk analysis is a vital component and should play a much broader role in our analysis. It must achieve two things. First, it must identify the key risks, then it must assess them. A big element of this is to assess where the future could be different from the past and how much needs to change for the future to pay back an investment. A sense of the scale of change, and whether such change has any historical precedent, is enormously valuable in assessing both feasibility and risk.

The risk that we fail to put in place sufficient infrastructure and thus constrain growth needs to be set against the risk that we over-invest. All the evidence suggests that we have historically under-invested, while economic opportunities are currently burgeoning. The need is to free up the ability to invest on the basis of a potential payback in revenue and in output terms.

Delivering at scale and for the long-term

Finally, the model requires a new paradigm for planning and funding transport across all agencies – national and local – breaking free from five-year funding cycles to truly respond to the long-term.

The scale of opportunity offered and pace of change by our cities, acting in a global marketplace, demands this; as does the national transport framework that will be shaped by programmes such as Crossrail and HS2 that will be delivered through the next 10-15 years.



1 Introduction

There is now an established consensus that cities matter to economic prosperity. There are a growing number of commissions, centres and reports witnessing this. The City Growth Commission, the Core Cities organisation and the Centre for Cities, for example, all provide research reports on a regular basis showing how growth can and has been enabled and supported in cities.

‘The performance of cities is crucial to the performance of the UK economy. They account for nine per cent of land use, but 54 per cent of population, 59 per cent of jobs and 61 per cent of output. But, as well as being important in terms of scale, they are also important in terms of efficiency.

Cities in the UK produce 15 per cent more output for every worker than non-city areas, while they produce 32 per cent fewer carbon dioxide emissions than non-city areas.’

Cities Outlook 2014, Centre for Cities

The city advantage rests fundamentally on communications. Cities allow people to get together, exchange ideas, use resources more effectively and be creative; it is this which creates the place that the city is. Transport systems make it possible to achieve this, but also to make the wider connections to other experts, to markets, and to wider ideas; and even digital economies still need physical connections, as Silicon Valley shows. So the question on which we need to focus is how best to enable the range of communications needs cities have in order to thrive, and what the right mix of investments is – particularly in physical transport.

Getting the right mix of investments requires the ability to set priorities and the ability to fulfil them. UK cities have little leverage at present in this, because of the centralised nature of decision-making in this country.

This, too, has been extensively investigated in recent years; by the City Finance Commission and the London Finance Commission as well as by the Government. The most recent publication is by the City Growth Commission. Once again, it has highlighted how the UK is the most centralised of developed economies, and how even recent City Deals and Growth Deals have made only very limited impacts on this. They propose that city regions – metros – should have the ability to access greater independence in finance and investment, subject to some selection criteria to show that the city has the requisite skills and tax base.



'To compete on the global stage, the City Growth Commission argues that UK metros need sufficient decision-making powers and flexibilities to become financially self-sustainable.'

Powers to Grow, City Finance and Governance, City Growth Commission, September 2014

A consequence of the UK's centralised system is that funding for cities comes down a complex set of pipes, with no connections or integration at the city level. A more devolved system could not only take a more coherent view of the investment needs of a city, but also prioritise on a wider set of criteria than is currently possible. In particular, such criteria can be focused on economic potential and growth as much as on welfare (or user benefits), which is the basis for current spending decision-making in government departments such as the DfT.

Maximising economic potential will require both inter-city and intra-city investments and parallel engagement from all cities, from London as well as outside it. Most importantly,

the decision process needs to be reconsidered to focus on how payback is to be generated and by whom so that financing and funding decisions can be aligned.

Maximising economic potential will require the building of dense city centres which can accommodate productive workers in knowledge-intensive firms and sectors. Such firms exist across a whole range of activities, from bio-medical research to 3D printing as well as accounting and law. Creating dense city centres requires both commuter networks and external networks to access major markets, as well as the planning policies to support development.

Devolution will be required to ensure that these elements can be effectively brought together, as well as to prioritise the investments which support growth in a manner that can be responsive to local economic conditions. This is in contrast to the current system which focuses on generic welfare benefits and considers economic benefits as a secondary matter.

A process which focuses more centrally on the economy, through economic entities/ geographies and corridors, will prioritise both revenues and output potential as well as take a risk reward perspective to investment, rather than assume that the future will be like the past.



2 Cities, transport and economic potential

A snapshot measure of economic potential compares the current level of output with that possible if productivity or employment were to be higher. Thus, IPPR North calculated that closing some of the gap in productivity with the South would raise UK output by £40bn². This is clearly a significant prize but such calculations do not explain how the gap is to be closed. To do this will involve describing the mechanisms by which it can be achieved sustainably. Transport investment needs to fit into a growth programme and be linked to supporting investments.

For cities, jobs and productivity are related to density, as **Figure 1** shows. The figure compares wage levels and density across the largest local authority districts and illustrates this curve. The densest and most highly paid

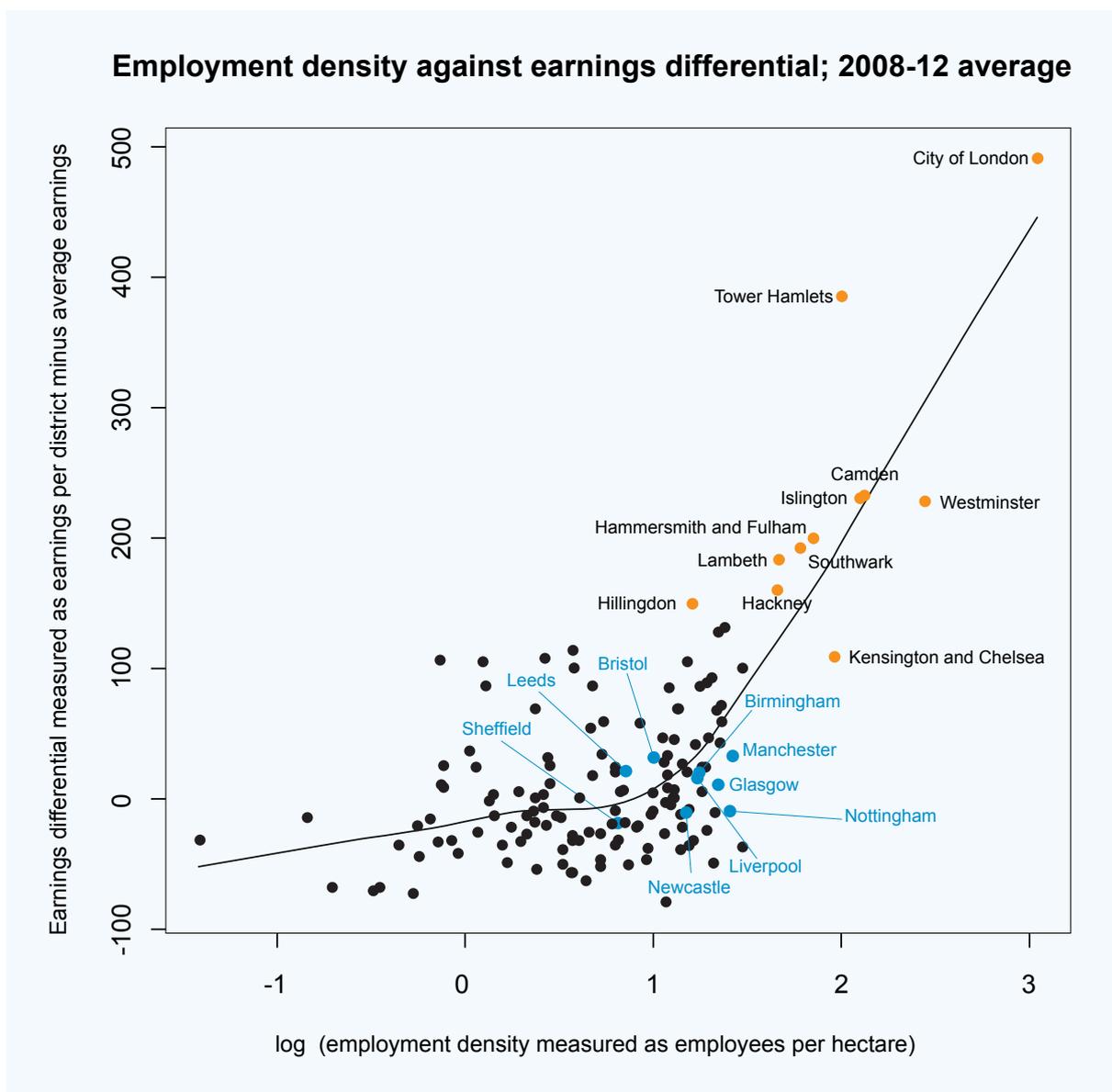
districts are all in London, where there is also a high concentration of private sector knowledge-intensive jobs – 51 per cent in 2011. The other major cities are all in a middle range of densities, and have not yet all achieved relative wages significantly above the average.

Crucial to the role of a city is the existence of its city centre. This is where the intensity of communication that generates a successful location takes place. Increasing the scale of such centres enables individual and business specialisation which in turn generates diversity in a city's offer. This point has been strongly argued by Ricardo Hausmann³, Harvard Professor of Economics and a former Planning Minister in Venezuela, among others.

² Northern Prosperity is National Prosperity, NEFC Interim Report, April 2012

³ Hausmann, R. The Specialization Myth. Social Europe Journal, 2013

Figure 1: Employment density and earnings



Source, Nomis, Volterra calculations

Diversity is related to cities' ability to attract sufficient density of knowledge-intensive jobs.

Figure 2 draws on work undertaken by the Centre for Cities which looks at the proportion of such roles in the top city centres.

The cities with higher proportions of knowledge-intensive business services based jobs (KIBS) also have higher relative earnings for a given density. Newcastle and

Nottingham do less well than Birmingham or Manchester. Achieving greater densities needs to go alongside achieving the range of knowledge-intensive roles which are apparent across London, where both wages and densities are highest alongside high proportions of knowledge-intensive roles.

Figure 2: Private sector KIBS jobs in city centres, 2011

| | City | City centre private KIBS jobs | Private KIBS jobs per hectare | Private KIBS jobs as a share of all city centre private sector jobs (%) | City centre private KIBS jobs as a share of all KIBS jobs in the city (%) |
|----|---------------|-------------------------------|-------------------------------|---|---|
| 1 | London | 629,816 | 194 | 51 | 51 |
| 2 | Manchester | 51,710 | 99 | 53 | 34 |
| 3 | Glasgow | 48,378 | 93 | 44 | 53 |
| 4 | Birmingham | 47,377 | 91 | 52 | 33 |
| 5 | Bristol | 40,430 | 78 | 57 | 50 |
| 6 | Leeds | 37,788 | 73 | 52 | 51 |
| 7 | Liverpool | 20,843 | 40 | 38 | 54 |
| 8 | Newcastle | 18,863 | 36 | 38 | 38 |
| 9 | Nottingham | 16,969 | 33 | 35 | 37 |
| 10 | Milton Keynes | 15,441 | 76 | 58 | 45 |
| 11 | Sheffield | 15,377 | 30 | 46 | 42 |
| 12 | Cardiff | 13,395 | 66 | 38 | 40 |

Source: Centre for Cities, ONS 2013, Business Structure Database

The central city area need not be large. In most metropolitan areas, it is a relatively small proportion of the total. **Figure 3** looks at the percentage of England's largest city regions and London⁴ which is covered by the densest areas.

⁴ The Appendix lists these areas and shows their scale.

Figure 3; The density and area of the counties of contiguous Central Business District (CBD) for different proportions of city employment, 2012⁵

| City region | Percentage of area used for different proportions of employment (%) | | | Density, employment per hectare for different proportions of employment | | |
|--------------------|---|------|------|---|--------|--------|
| | 10% | 20% | 30% | 10% | 20% | 30% |
| Greater London | 0.32 | 0.66 | 1.26 | 1167.4 | 919.23 | 687.23 |
| Greater Manchester | 0.22 | 1.84 | 5.23 | 402.59 | 97.94 | 51.77 |
| South Yorkshire | 0.36 | 1.18 | 2.21 | 91.50 | 60.48 | 40.48 |
| West Yorkshire | 0.37 | 1.24 | 5.39 | 126.94 | 74.90 | 25.90 |
| Merseyside | 0.38 | 1.30 | 4.42 | 217.26 | 130.02 | 55.01 |
| Tyne and Wear | 0.38 | 1.84 | 4.85 | 237.33 | 99.44 | 56.51 |
| West Midlands | 0.63 | 3.61 | 8.18 | 201.14 | 69.85 | 46.00 |

Figure 3 shows that, for example, 20 per cent of Greater Manchester’s employment is in less than two per cent of its contiguous area, at a density of about 100 jobs per hectare. London is much denser. Twenty per cent of the city’s employment is captured in less than one per cent of its area, with nearly 1,000 people per hectare for 20 per cent of the city’s employment, captured in less than one per cent of its area. These figures apply to a contiguous area in the city, working from the densest ward. If non-contiguous areas are taken, it does not make much difference to the London, Manchester, Leeds or Newcastle city regions. In the Sheffield and Birmingham city regions, however, there are additional centres of density and the CBD could be seen as split.

The analysis shows that higher wages go with higher densities and more knowledge-intensive jobs. Transport therefore needs to respond to two challenges; to enable higher densities to be achieved in centres, and to attract the higher wages and higher productivity of knowledge-intensive jobs. To improve densities and reap the benefits of agglomeration, greater access to centres is needed, and careful consideration given to the development of split centres, whether between cities or within them. To attract such roles, it will be access to markets (both skills and trade) and external communications which are going to be important, as these are regarded as the key sources of competitive advantage in a knowledge economy.

⁵ Volterra LLP, Nomis, Business Register of Employment Survey, work place based employment 2012



Of course, a high-value city centre does not operate in isolation from either subsidiary centres, its hinterland or other centres. Linkages between cities such as Leeds, Manchester and Sheffield can potentially create effective densities across centres. In turn, they need freight linkages and networks too.

Agglomeration is a process that was first observed in Manchester. As the scale of the labour market increased so too could its efficiency with better matching between jobs and people and more choice for both employees and employers. The importance of this has risen over recent decades with the proportion of two-earner households and the flexibility that this requires. Between businesses, marketing new ideas is easier in a larger market and so too is generating them in the first place. Facilitating the emergence of new specialisations adds to the diversity and attractiveness of the business centre and creates positive feedback.

A recent example might be the emergence of King's Cross as a new business area. Reinvestment in the railway stations, coupled with the High Speed line to the Channel Tunnel, encouraged additional public and private investors, from new offices to St Martin's School of Art, Kings Place concert hall, the British Library and the Francis

Crick Institute. An area once known for drug addiction and prostitution has been completely transformed. It is surprisingly difficult to collate the evidence for such feedbacks over time. One example is a recent research paper from Ahlfeldt et al⁶ which looked at the relationship and the causality between trips in Berlin and economic performance for the period 1880 to 1914, when Berlin's transport network was being developed. The authors conclude that there was a mutually reinforcing relationship between use of the network, its extension and economic performance.

Facilitating the trip to work is obviously an essential element in creating dense city centres, and public transport systems in cities have largely grown up to facilitate the first public bus services, trams and trains, to city road systems.

Most cities have seen increasing numbers of commuters. It is most marked in Leeds and London, though with rather different patterns and of course the numbers coming into London are at a much higher scale, as **Figure 4** shows. A number of cities; Manchester, Sheffield, Leeds and London, have seen faster growth from outside their geographies than from inside them. By contrast, Birmingham and Newcastle have seen reductions in numbers coming in from outside the city region area.

⁶ Ahlfeldt, Moeller and Wendland, Chicken or Egg, the PVAR Econometrics of Transportation, SERC Discussion Paper 158, March 2014

Figure 4: Commuters into city boroughs from anywhere in England, Wales and Scotland, elsewhere in the city region they are within and those commuters from outside the city region⁷

| City | Commuters into the city from anywhere | | |
|----------------------------|--|---------|------------|
| | 2001 | 2011 | Growth (%) |
| Newcastle | 88,846 | 90,140 | 1.46 |
| Manchester | 172,332 | 179,810 | 4.34 |
| Liverpool | 88,967 | 91,322 | 2.65 |
| Sheffield | 60,650 | 63,776 | 5.15 |
| Leeds | 107,613 | 121,323 | 12.74 |
| Birmingham | 162,512 | 166,272 | 2.31 |
| City of London/Westminster | 774,704 | 867,630 | 12.00 |
| City | City region commuters into the city | | |
| | 2001 | 2011 | Growth (%) |
| Newcastle | 56,160 | 57,518 | 2.42 |
| Manchester | 129,387 | 132,254 | 2.22 |
| Liverpool | 66,100 | 67,010 | 1.38 |
| Sheffield | 33,919 | 34,904 | 2.90 |
| Leeds | 64,218 | 73,789 | 14.90 |
| Birmingham | 91,722 | 97,954 | 6.79 |
| City of London/Westminster | 563,357 | 626,438 | 11.20 |
| City | Outside of the city region commuters into the city | | |
| | 2001 | 2011 | Growth (%) |
| Newcastle | 32,686 | 32,622 | -0.20 |
| Manchester | 42,945 | 47,556 | 10.74 |
| Liverpool | 22,867 | 24,312 | 6.32 |
| Sheffield | 26,731 | 28,872 | 8.01 |
| Leeds | 43,395 | 47,534 | 9.54 |
| Birmingham | 70,790 | 68,318 | -3.49 |
| City of London/Westminster | 211,347 | 241,192 | 14.12 |

⁷ Nomis, Census 2011 and Census 2001, Origin – Destination data



These variations are the result of a number of interacting forces which can be hard to disentangle and are not just about the scale of job opportunities or the available transport infrastructure. For example, workers in Greater Manchester can commute by rail from Cheshire which is outside the county, while there seem to be fewer commuters to Liverpool from outside the Merseyrail system than would be expected.

The primary conclusion must be that creating a larger and more effective commuting potential for all the cities outside London should be a priority. Given the difference in scale, this suggests that more effective integration of these cities needs to be a priority. This is indeed a key conclusion of the One North⁸ report prepared by the cities of Leeds, Liverpool, Manchester, Newcastle and Sheffield.

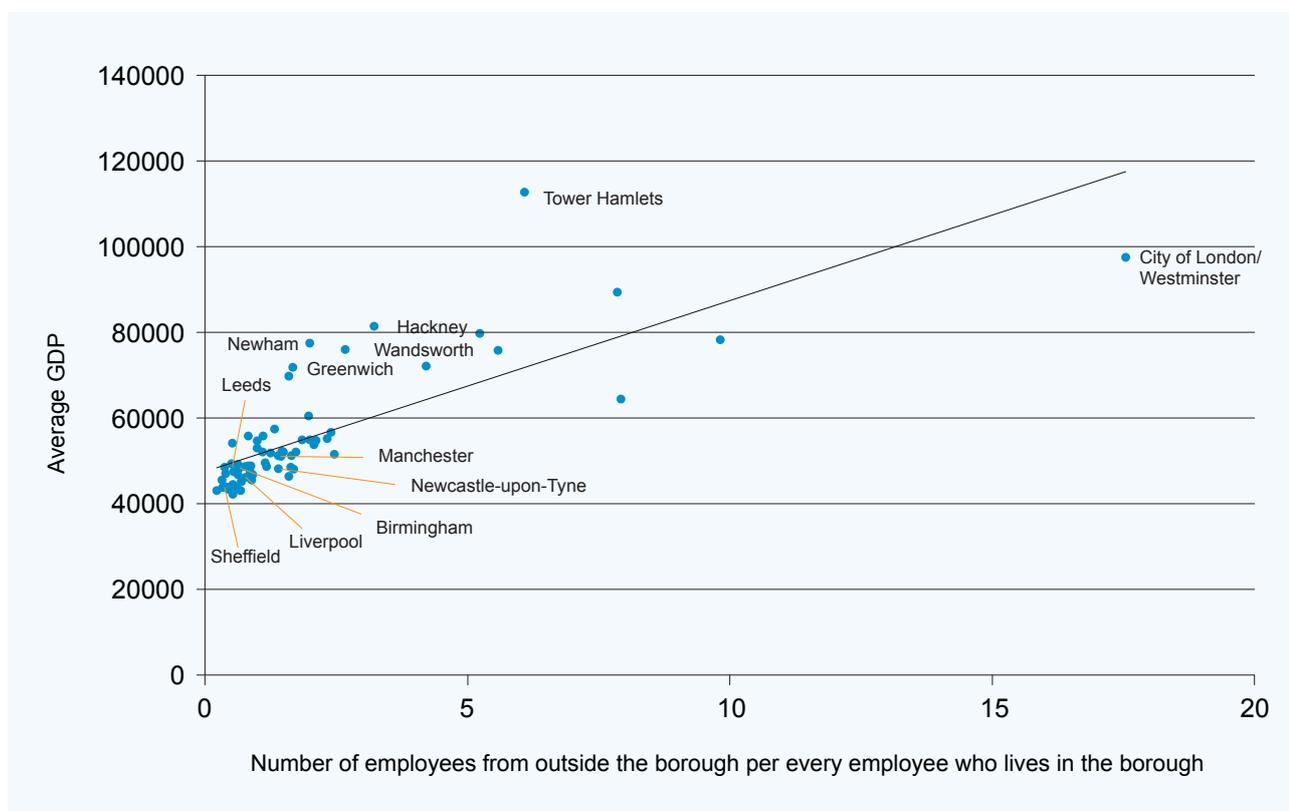
They conclude:

'Our proposition builds on this common perspective and aims to create a North of England that is a powerful and integrated series of economic geographies. This will be a highly interconnected region of thriving cities and towns, providing a valuable counterweight and complement to London and helping to re-balance and deliver growth for the national economy in the decades ahead.'

This conclusion is supported by looking at the metropolitan boroughs, where a wider range of commuters coming from outside the borough in question is associated with on average higher output per person, see **Figure 5**. The outliers here are the City of London/Westminster with the highest draw from outside, and Tower Hamlets, with very high output per head on average since it includes Docklands, but lower commuting as much of the borough is lower density and with lower commuting. However, removing such outliers still gives a positive relationship.

⁸ One North: a proposition for an interconnected North, July 2014

Figure 5: Average GDP as a function of the ratio to employees from the borough to those employed from outside the borough, 2011



Source: ONS and Census 2011



However, links between cities in the North are not as effective as those into London. The Centre for Cities has produced a useful analysis. The fastest link is between London Euston and Milton Keynes, with a time of 30 minutes for 50 miles. The distances between Sheffield, Manchester and Leeds are all below this, with 39 miles between Sheffield and Leeds or Sheffield and Manchester, and 43 miles between Manchester and Leeds. Yet the quickest trip is between Sheffield and Leeds at 40 minutes and Manchester to either Sheffield or Leeds is nearly an hour. There are 10 trains between these three pairs in the peak hour 8-9am. By contrast there are 11 just between Milton Keynes and London.

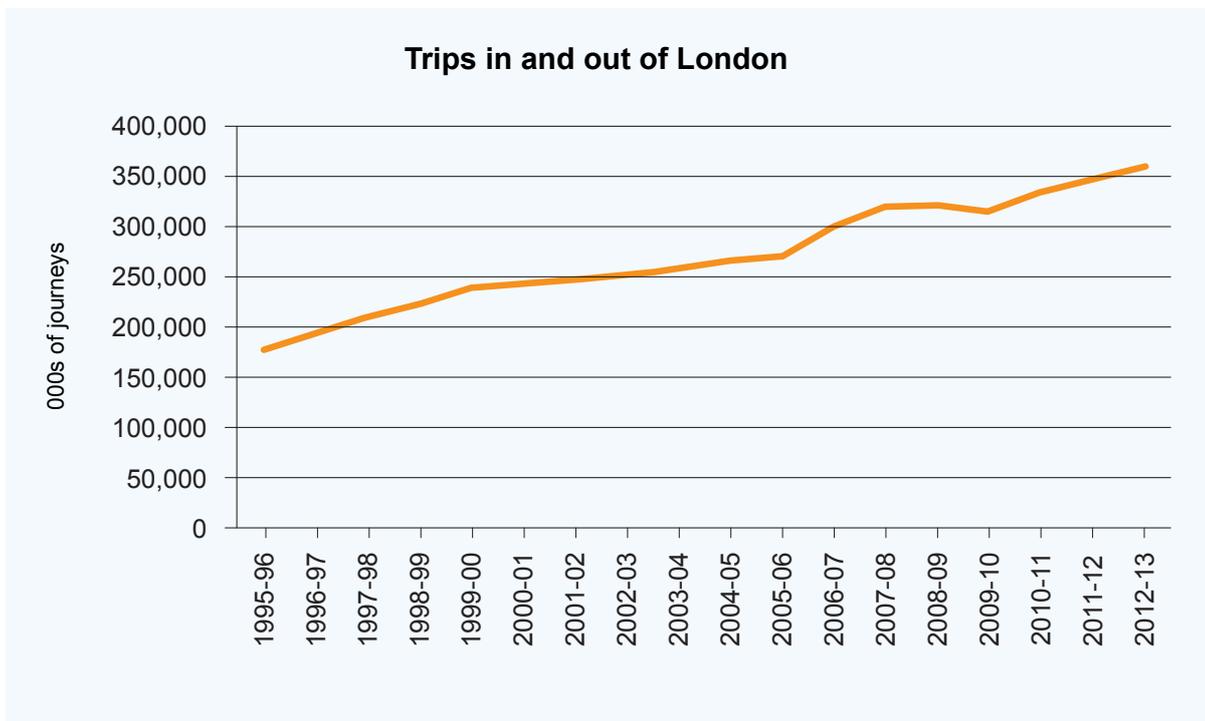
Improving links between cities which are so close opens up a wider range of job opportunities to people who can then be attracted to live, or possibly not move away from, their preferred family locations.

The preceding analysis has focused particularly on northern cities and the gap

in commuting generally with output and productivity. London's network is the most crowded and it does not appear that there is any tailing off in the density/wages relationship shown in **Figure 1**. Investments such as Crossrail 2 are just as likely, if not more so, to have a good payoff in terms of productivity as those outside London.

In addition, creating dense and successful cities is not just about the labour market but also about creating opportunities for successful businesses with good access to markets and to new opportunities. This means longer distance links are also important. For example, in the last decade, the number of trips into and out of London from other regions has grown by 42 per cent (see **Figure 6**). The strongest growth was from the North West and the West Midlands, at over 80 per cent. The total number of trips was hardly dented by the recent recession and has since regained its upward trend. This shows that inter-city trips are as important as commuting trips.

Figure 6: Trips between London and all other regions in England⁹



The investment in HS2, as well as continuing electrification projects, will make it possible to continue such growth using rail capacity rather than roads.

Making use of new capacity implies that the economic potential that it unlocks exists and can be accessed. This does mean a rather different approach both to city and to transport planning than has developed in the past.

⁹ Regions are defined as Government Office Regions – North, Yorkshire and Humberside, East Midlands, East Anglia, South East, South West, West Midlands, North West



3 Planning and investing in transport

A different approach requires an understanding of the mechanisms by which transport can be associated with economic performance. This was explored in a paper for HS2, by Rosewell and Venables¹⁰. It is not enough to observe that trip growth has been associated with economic performance, since correlation is notoriously not causation. Moreover, there is an increasing view that the performance of some cities has already been constrained by a lack of infrastructure of the right type. A focus on growth creation and the role of transport investment challenges our existing system of evaluation and how we think about finance and funding.

Existing system

The UK has developed a centralised system of comparing costs and benefits. Of course, a rigorous approach to making such comparisons ought to be welcomed. But it is also necessary to understand the assumptions that lie behind any such methodology. The UK system is fundamentally aligned to thinking of transport benefits as measured by time savings, which have one value across the country to ensure equitable treatment. One person's time is as good as another's.

This underlying assumption means that transport investments are made to generate welfare improvements for passengers, not to generate economic output. A welfare improvement in this sense is a benefit which

is not measured by jobs, or incomes. Should transport demand be such that the system becomes just as crowded and slow as before then it can be argued that the time savings have been parlayed into other kind of savings, but the value is just the same. There is an economic model which underlies such a view and which implies that all profitable investments have already been undertaken, so that trip making is independent of the output of the economy. Any correlation that we observe between trips and output is measuring how people are using their time, not how they are creating value.

It is very important to understand this view of the world as it is embedded in the models that we use to compare and rank transport projects. The assumptions on which it rests are however strong ones¹¹. If there are constraints on the ability of any part of the economy to invest in profitable projects, whether financial, institutional or of information, then the conclusion that welfare benefits will equal economic benefits no longer holds. This means that a more careful approach will have to be taken in which the possible causation links between transport and the economy will need to be clarified.

A statistical approach to this question would be to create a reductive analysis which allocates change in the economy to each of its possible causes, treating each as independent. It is

¹⁰ Rosewell and Venables, High Speed Rail, Transport Investment, and Economic Impact, HS2 2013

¹¹ The assumptions required were set out in the SACTRA report on road project evaluation in 1999. At the time, economists had yet to accept how unrealistic it is to assume that an equilibrium outcome will always arrive in due course

on this basis that we have undertaken the analysis of agglomeration effects. This is the identification of a separate density element in generating growth, in which a response rate can be measured of how output has responded to changes in density of activity, estimated while holding constant other factors.

In principle, this appears like a sound approach. In practice, it may mask both spatial and temporal effects. A thought experiment can illustrate this. An economy with no transport system cannot get goods to market, or workers to work, or children to school. It would be an economy of family-based production and probably poverty, no matter how good the underlying skills base or the raw materials available. Some kind of transport system is necessary for any kind of economy at all, but it is not sufficient either. Skills, raw materials, institutions and finance are all also needed to create any real economy. It is the right kinds of combinations of these factors which create success and the attempt at reduction is misplaced. It is a combination of factors which creates the sense of place which gives meaning to a location and attracts investors. This means that identifying the right combinations might be more important than identifying the role of an individual factor.

Combinations of factors are what create a place and which leverage variety of investment. The Manchester Metrolink, when first opened, beat expectations of ridership and leveraged private investment into the city. Reinvestment in St Peter's Square in Manchester, as well as in the airport, has

also been leveraged as a result of better connectivity that has been secured through the current Metrolink expansion programme. However, it is important to note that this expansion programme has been facilitated by a locally-led, risk-based funding programme with a significant proportion of finance secured through borrowings against future farebox returns and local Council Tax receipts.

This approach has allowed Greater Manchester to deliver regeneration-led investment projects, such as the Manchester Airport Metrolink extension, which perform less favourably under national welfare-based analysis approaches, than the productivity-led analysis and prioritisation used by the Greater Manchester authorities. Argent, which led the redevelopment of the land between King's Cross and St. Pancras in London, is now leading the development of the Airport City North development in Manchester, which forms a major component of the Enterprise Zone that has been identified around the only UK airport outside Heathrow with two runways.

Integration

Such integration requires both a spatial and temporal element. Over the past decade, London has developed such an approach with the ability to consider both planning and transport strategies in parallel as a result of the creation of the Greater London Authority. Thus economic projections can be made over timescales which also enable views on transport investments to be made. Over short timescales and across a wide geography,



it may well be reasonable to consider the economy as being independent of transport, which will not be able to change much in a few years. Over the longer timescales, however, this ceases to be true. The existence of infrastructure itself affects the spatial distribution of activity, and changes will occur which will mean that the future is not a continuation of past trends. This is very important when the past provides the data on which models of the future are built.

One of the best modern examples of this is the redevelopment of Canary Wharf and Docklands. This was originally planned in the 1980s to be low-density, light industrial development, supported by a light rail system with low capacity. In the event, private investors saw an opportunity to build larger footprint buildings which could be used by new financial institutions. This would generate density of occupation which the Docklands Light Railway could not support. Its upgrade and a new Underground line – the Jubilee line extension – would be essential to make this possible. Such an investment was not about welfare benefits and did not pass the tests based on such benefits. It was therefore a judgement call, based on a view of potential direct and indirect contributions, which allowed the project to go ahead.

Devolution

The choices made in Docklands reflected a view of a local area, how it could be developed and how to overcome constraints on that

potential. In that respect, its trajectory was more similar to the norm in Europe. Studies of European cities uniformly show very different trajectories to those in the UK. The example most often used here is probably Lille in Northern France. This is partly because its situation after the collapse of its textile industry in the 1980s was so dire, and its subsequent renaissance has therefore been the more remarkable.

The lessons of Lille almost entirely rest on the combination of transport investment, creating attractive places, and leveraging inward investors. The strength and confidence of the city, plus its ability to create funding streams alongside the TGV station changed its fortunes.

Similar integrated plans can be found in cities such as Montpellier in Southern France, Gothenberg in Sweden, and Rotterdam in the Netherlands. Each city worked effectively with neighbours and integrated local transport schemes with wider transport initiatives¹².

French cities have a 'versement' tax base which allows them to take control of their own initiatives and to reap the benefits of competition as a process between themselves and other cities, even those in France.

The contrast with the UK is dramatic. Here, competition is considered wasteful. A good illustration of the consequences is the way in which the benefits of the Northern Hub investment are presented. The central case uses the national projections provided by

¹² See for example, Cadell, Falk and King, *Regeneration in European Cities: Making Connections*, Joseph Rowntree Foundation, 2008

the DfT. These are based in turn on national projections for the economy, provided by third parties. The variant case uses a locally-based, policy-derived set of projections. It looks at the benefits if these projections are achieved.

This example perfectly encapsulates both the theoretical clarity of the UK approach and its severe weaknesses. After all, using benefits which reflect a desired result is surely inferior to using a forecast prepared by a third party. Except that not only are forecasts often wrong, but they are also essentially based on time series extrapolations. In the Crossrail example, we were able to show quite easily that a reasonable extrapolation caused gridlock on the Tube. But that merely shows that the Crossrail investment should not have been left so late as to risk this outcome; one which is experienced now with station closures and severe overcrowding. What should be asked is what constraints exist, how serious they are and what might relieve them. The further question is to gauge the extent of new opportunities, how they can be accessed and what investment would make it possible to achieve them.

These are precisely how cities such as Lille – struggling to reinvent itself – or Montpellier – ambitious to grow – thought about the problems and challenges that faced them. The question became what can reasonably be achieved, and what is required to achieve it alongside where the payback might be generated. These cities will not be setting their priorities in national context which limits their

ambition or assumes that the economy just happens anyway. Relying on ‘do nothing’ might result in nothing happening.

Feedbacks

Successful feedback between transport availability and the extent and nature of economic opportunity is the basis of the subsequent expansion of areas such as Docklands and its ability to exploit available opportunities. The crucial feature here is that in the process the future of the area became quite different from the past. Indeed, a challenge for transport modelling in London has been how to adjust from a ‘blue collar’ area in which trips were traditionally short, to a ‘white collar’ one in which trips are made over much greater distances. Rapid access to other businesses matters a lot in the new world, but hardly at all in the old. Such differences between the historic data, present situations, and the future are particular reasons why model results need to be carefully interpreted.

The existence of these feedbacks also brings into focus the concept of ‘necessary but not sufficient’, which can apply to both policies and to investment. Investing in transport where there is no ability or possibly willingness to access new opportunities will not be successful. On the other hand, no amount of such ability or willingness will be of much use without a transport system to give access to markets. Perhaps it is easiest to see this with the benefit of greatest historical perspective. Take, for example, Josiah Wedgwood. He was experimental and innovative and came from a



line of Staffordshire potters. He used his ability to create factory production on a new scale in Stoke-on-Trent. He also invested heavily in canals, without which exporting his product was expensive, hard and risky. No doubt he would have invested in railways, but he died a bit early in 1795.

Another useful thought experiment is to consider how to disentangle the causation between the invention of the passenger railway, its use as a commuter network, the expansion of Victorian London and the development of office work. Mr Pooter, satirised by the Grossmiths in *Diary of A Nobody* published in 1888, achieves his new house in Holloway courtesy of the railway and goes daily to his office in the City. The clerical bureaucracies made possible by this expansion of the labour market also supported the global enterprises running through London and the British Empire. Each element requires the other and is supported by it. It may not always be obvious how new opportunities will be taken up. It has been observed that the success of Canary Wharf led the City of London to revise its own planning policies and helped to unlock redevelopment in the City itself.

This discussion suggests that our current static framework for evaluation, particularly of large-scale and long-term projects is inappropriate. It will not capture the feedbacks that change the nature of places, even when so-called 'wider benefits' are taken into account.

Wider benefits

The wider benefits now potentially included in evaluation are of three kinds. These are:

- Pure agglomeration
- Move to more productive jobs
- Imperfect competition

The last of these is a 10 per cent addition based on some earlier work¹³ that suggests this could be the difference between the perfectly competitive outcome assumed to be captured by time savings and what might happen in the real world. The move to more productive jobs is based on an assumption of full employment but where jobs in a newly accessible location would be more productive than jobs elsewhere would be. Pure agglomeration is the effect on others' productivity of the increased density of employment created by the new jobs. Elasticities have been estimated for each of these, and are now described in guidance.

It is not necessary here to go into a detailed critique of these measures, though it is certainly possible to show how they are restricted. Rather, for the purpose of thinking about how cities evolve and use transport systems, it is necessary to consider whether they are likely to capture total impact. The wider benefits methodology sets out a fixed set of responses of density of employment to increased accessibility. It is based on the assumption that these will not change, and that the transport analysis captures the true

¹³ SACTRA, *Transport and the Economy*, 1999

economic value of almost all the improvement, as static time savings are transformed over time into economic activity. Hence it rests on a set of assumptions and estimates which are based on average responses, rather than a particular set of circumstances and transformational change.

This approach is currently confusing some of the thinking about HS2. If the starting point of analysis is always time savings, then the main focus will be speed rather than capacity or integration of the economy. The most recent business case for HS2¹⁴ recognises the limits of these assumptions and also provides a range of risk scenarios for assumptions. It recognises the importance of the capacity of the network as well as speed, but benefits still rest largely on time savings. A perspective which had started from economic growth and where individual cities had a larger voice could have considered station location in particular through a different lens.

An alternative approach

The analytical challenge should be addressed from a different direction. Our current system, as described above, starts from the assumption that in the long-term no constraints on competition exist, and then makes some adjustments. The alternative is to start from the proposition that growth can be created by access and other features and then consider what might happen in the absence of such investments.

This means focusing on output, GVA, productivity and financial payback. Financial payback is a good place to start. In the case of both Crossrail and the Northern line extension to Battersea, for example, direct revenue from fares as well as the capture of land value uplift, is predicted to be sufficient to more than cover the repayment of prudential borrowing for capital investment, operating costs and maintenance costs. In both cases this analysis is based on fairly restrictive assumptions about use and transfers from other routes and modes. This is an important starting point as it focuses immediately on the role of any public sector subsidy. A project which can pay back debt from users is clearly different from one that does not. The net revenue is included in appraisal as a cost reduction, but little separate attention is paid to this element in the decision process.

In particular, more attention should be given to the assumptions about ridership and assumptions about passenger generation. For example, the Crossrail analysis suggested about half the peak hour use would transfer from other, more crowded routes. Experience suggests that this may be a relatively short-term phenomenon and that the system will return to its current crowding levels. In this case, passenger revenue would be able to cover a considerable proportion of the capital cost. Such analysis should be much more readily available and presented, even if as a sensitivity test.

¹⁴ HS2, The Economic Case for HS2, October 2013



In the Northern Hub output reports, the revenue impacts are considerable but are not routinely shown against the costs. A focus on revenue and what passengers want to pay for, steps away from a focus on welfare benefits which are not paid for and into those which have direct value.

It is then possible to think about what revenue will not cover and why there might be a case for such investment. This is where output (commonly defined as GVA) comes in, productivity impacts and additional taxes. Some proportion of capital cost of a transport project needs finance and payment of interest and capital over a future period. A project which has a realistic chance of adding to jobs and productivity will raise the total sum of taxes generated too. These can be used to repay the loans. In due course, once the debt is paid, there will be continued streams of activity-generating benefits. It is easier to be confident where transport is a clear constraint on existing success, compared to where failure is being addressed. But the process is the same.

With this approach welfare benefits can still be considered, for example in terms of equity and distributional benefits and it becomes clear how much public money is just being 'given' for such purposes. It has recently been suggested that Northern cities are treated unfairly, attracting less public subsidy than London. Without getting into the detail of

which numbers are most appropriate to use¹⁵, the approach suggested here focuses more directly on how activity can be generated, and avoids the need simply to ask for money.

It is also possible to consider time frames more clearly. We have at least moved away from annual controls, with five-year control periods for such organisations as Transport for London (TfL) or Network Rail, although TfL still faces uncertainty as its funding is often indicative and continues to be subject to revision in government spending reviews. This is a relatively new phenomenon. Network Rail has just entered Control Period 5, running from 2014 to 2019. Large projects may need more than five years to be implemented. Crossrail has been established as a separate company, owned now by TfL, to deliver the railway. It has existed already for more than a decade and its major funding envelope started in 2010 and will not be complete until 2018. HS2 is another separate company currently with an open-ended timeline and wholly owned by the DfT. The ability to take a long view of transport needs can be linked to the ability to take a long view on funding mechanisms. Borrowing money is usually much easier than paying it back and the payback mechanism is a good way to focus attention on where the benefits will come from to drive such payback.

Linking benefits to paybacks, particularly those generated by new economic activity, is much more easily done at a sub-regional

¹⁵ See for example Henry Overman, <http://spatial-economics.blogspot.co.uk/2014/03/how-unbalanced-is-infrastructure.html>

or city region level than nationally. A smaller area can consider the interactions between different transport modes – from bus and cycle to tram and metro – in a way which will never be done nationally. However, national priorities and choices will continue to have a role, which means that it will also be important to think about what is meant by cost benefit analysis.

It is sometimes suggested that looking at ‘wider’ benefits moves us away from cost benefit analysis. For example this is a thread in the report on transport evaluation in the Sintropher project¹⁶. However, this is not really true. Cost benefit analysis is about trying to set benefits against costs. It is always necessary to consider which the appropriate benefits are. Which benefits should be counted depends entirely on the priorities and approaches of the investor. If the investor is a public sector agent whose concern is welfare benefits and time savings, then these are the relevant benefits. If, on the other hand, the public sector agent’s priority is economic growth and employment, then this will be the relevant benefit to measure.

Once the assumption that the economy is independent of the transport system is abandoned then the immediate question is what the objective is of a policy so that the relevant benefits can be examined. This was clearly pointed out by the National Audit Office¹⁷ when it evaluated the work so far on HS2. The report effectively concluded

that value for money could not be assessed because the objectives of the scheme were not clearly stated.

Early on, a group¹⁸ argued that the national investment should be separated from the regional, so that a national investment would focus on the main inter-city track, while cities would need to evaluate and choose how city centre stations were located and managed. Had such an approach been followed, a more collaborative process would have been required and perhaps the definition of HS2 station locations and scale could have been managed better.

Cities and city regions should be able to have a more focused view of their prospects and how best to respond to opportunities. Indeed they will be essential to actually taking advantage of new opportunities. If transport is necessary but not sufficient, then cities and their regions will be a key part of getting value for money for the investment. Note that such a conclusion assumes that without such engagement, individual entrepreneurs or ‘the market’ will not be sufficient on their own. This is a key conclusion from the decades of making the assumption that they will, which has led to what is now generally agreed to be under-investment in infrastructure and in other supports. The next section examines how such integration can work, focusing on our near neighbours across the Channel.

¹⁶ The Sintropher project was led by Sir Peter Hall, who sadly died in August 2014 and will be much missed

¹⁷ NAO, High Speed 2: A Review of Early Programme Preparation, May 2013

¹⁸ Foster, Griffiths, Rosewell, Ross and Smith, High Speed Rail, How to get started, February 2010



Additionality

One of the consequences of an approach which implies that everything possible has already been invested is that it becomes necessary to prove additionality for any public investment. In fact, it is very important to recognise that it is impossible to prove, at least in a real scientific sense. Consider HS2. This is an investment over 20 years at a minimum, even if we accelerate the implementation. What will happen in the 'do nothing' case? Enormous changes in the world economy can occur. The EU might collapse. We can be sure it will be hard to access new opportunities for northern cities and that they will remain small scale. But what is the economic consequence? How severe? Forecasts based on extrapolation cannot answer these questions.

Yet unless you are sure about the do nothing, it is impossible to be sure about the impact of the do something. Even less can you be sure if the do something needs other investments alongside it, in local transport or in skills, to be truly effective. Additionality is an empty concept where long-term change is in prospect. It might have some validity at a small scale or over a short time. But in the case of significant change or over a long time scale it is impossible to use.

A more relevant approach is risk analysis. Risk analysis must do two things. First it must identify the key risks, then it must assess them. A big element of this is to assess where the future could be different from the past and

how much needs to change for the future to pay back an investment. A sense of the scale of change, and whether such change has any historical precedent, is enormously valuable in assessing both feasibility and risk.

For example, we can go back to Crossrail. The additional peak capacity created by the scheme is around 80,000 additional people delivered into the central area. The analysis instead assumed that only around 35,000 additional people would arrive, based on both transport, cost and crowding off models. Could the additional output pay for the railway? On what assumptions? Again, some restrictive assumptions about full employment, the size of a productivity differential and the time frame for increasing employment were used, and the output and taxes were still sufficient. So the risks are largely on the upside. To the extent that the rest of the system fills up, payback will be larger. To the extent new investors are attracted, payback will be larger.

An approach of this nature would look at investments such as HS2, One North, or Crossrail 2 from a rather different perspective. It would be possible to conclude that such investments are necessary, because of the risk of constraints that could otherwise emerge, even if we cannot be certain.

There is a highly visible and powerful risk that London and the South East will become still more unbalanced with respect to the rest of the country. I have argued here that agglomeration forces are powerful and it is therefore likely that scale will attract scale. It is not feasible to

create an alternative agglomeration in one city, so the most likely strategy to succeed is both to connect existing agglomerations together more effectively and to connect them better to the outside world and to the international gateway of London.

It must be recognised, from the analysis of cities with more than one centre, that multi-level agglomerations are harder to grow. However, they do exist both in Germany (the Ruhr) and the Netherlands (Randstad) and close links enable specialisation to become the diversity which drives success and resilience.

This is where it is necessary to begin to think in risk terms rather than formal and unprovable models based on the past. A thought experiment is useful. Let us assume that better connections between the cities of the North supports an additional 5,000 jobs in each of the major cities. This is significant but for example, 13,000 private sector roles have been created in Manchester over just the last two years. Let us also assume that this also raises the employment rate so that 20 per cent of the jobs go to people not previously working. This would narrow the gap on participation rates but not close it. Using estimates of average output, this generates roughly £15bn of additional value over a 60 year period. This calculation illustrates how a relatively small impact on the number of jobs available can build up over time to a large total creating output and economic performance which helps pay for it.

Such calculations can and should be challenged. For example, what productivity growth rate should we think about and how can history inform this? Are such job assumptions too weak, or conversely can they only happen if other investments are made too, whether in transport or other areas? However, all of these questions can be laid out on a limited number of pieces of paper so that everyone can understand them.

Most non-economists, including some politicians, are astonished to learn that transport is not considered to be an investment in the economy. They would consider it obvious that a city development plan should go alongside the plan for a new railway and new stations. Yet it required a task force, chaired by Lord Deighton¹⁹, to make this recommendation as a key element in maximising the benefit of new transport investment, alongside recommendations to review guidance on how we evaluate such major game-changing investments.

A previous review, of transport evaluation chaired by Lord Eddington, argued that smaller projects may be more effective. With our current system that is both an inevitable result of an evaluation system which starts from the proposition that the economy and transport can be separated. It also results from greater ability to analyse smaller projects, because more variables can be held constant.

¹⁹ DfT, High Speed 2 Get Ready, a report to the government by the HS2 Growth Taskforce, 2014



Schemes such as Crossrail, HS2 and the One North proposals rest precisely on the ability to change everything and require plans to be put in place to allow this to happen.

The proposition is actually fairly simple. Better transport and land use planning and devolution go hand-in-hand. Both for London and other cities, an integration of land use planning and development with the transport investment which can pay for them is central to economic growth and future welfare.

However, the cities and city region authorities will also need a wider structure that is reoriented to reflect this. Taking HS2 as an example here, its success requires a robust alignment of local and national agencies to realise its potential. This will need a significant shift not only in the prioritisation and investment approaches adopted by agencies, such as Network Rail, but also in their planning and funding horizons, so as to ensure that the current arrangements – typically constrained to five-year cycles at present – can be reformed to reflect the 20-year development processes involved in HS2. Only in this way can the UK ensure that its processes do not undermine its potential.

The risk that we fail to put in place sufficient infrastructure and thus constrain growth needs to be set against the risk that we over-invest. All the evidence suggests that we have historically under-invested, while economic opportunities are currently burgeoning. The need is to free up the ability to invest on the basis of a potential payback in revenue and in output terms.

This is not a zero sum game. If economic growth is somehow pre-determined, then both government policy and market pressures will limit debt to GDP ratios. However, this paper argues that devolution and more integrated approaches to investment will make better infrastructure, unlock growth and create the opportunity to pay back debt. In this case there is a distinction between the purposes of borrowing. As growth emerges, then debt amounts can leave ratios unchanged.

The challenge for cities and transport authorities is to ensure that the case for borrowing includes the mechanisms by which it can be paid back.

Appendix

There are six metropolitan areas in England, where transport planning arrangements are undertaken at a city region level:

- Greater Manchester
- Merseyside
- Tyne and Wear
- South Yorkshire
- West Yorkshire
- West Midlands

Since 1968, Passenger Transport Executives (PTEs) have been in place in these city regions outside London. A new model of Combined Authorities, initially established in Greater Manchester in 2011, has now been introduced in all but the West Midlands. As a result of this change in governance, expanded models of local transport management are under development in a number of city regions that expand the role and remit of the PTEs.

In London, TfL also acts as PTE but has different governance because of the Greater London Authority.

Growth and scale of the city regions

Figure 1: Metropolitan county workplace-based employment growth 2007-2012²⁰

| City Region | Level 2012, 1,000s | Growth (%) |
|---------------------------------|-----------------------|------------|
| Greater London (London) | 4,062 | 6.29 |
| Tyne and Wear (Newcastle) | 205 | 0.33 |
| Greater Manchester (Manchester) | 1,151 | -1.58 |
| Merseyside (Liverpool) | 525 | -2.41 |
| West Midlands (Birmingham) | 1,138 | -3.48 |
| West Yorkshire (Leeds) | 945 | -3.63 |
| South Yorkshire (Sheffield) | 508 | -5.45 |

²⁰ Nomis, Business Register Employment Survey, workplace based employment



The scale of the metropolitan counties is also very varied with London very much the largest and only the West Midlands and Greater Manchester with more than a million employees.

It is clear that while London has shrugged off the recession, other cities have yet to regain previous peaks. However, Birmingham, Liverpool, Manchester and Leeds are all in the top 10 of private sector job creation over

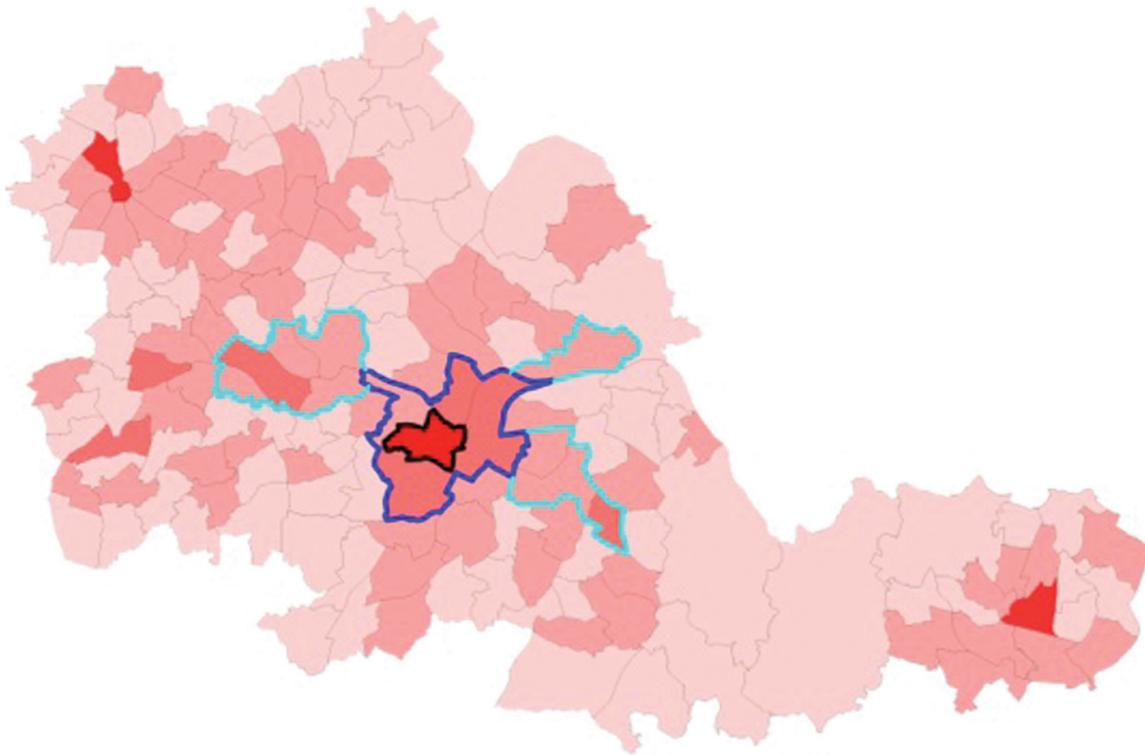
2010-2012, although all behind London. However, public sector job losses moderate these gains. Although these areas are now in net terms gaining jobs, there is still a way to go.

The gain in private sector employment is also reflected in productivity growth in these centres, with only Birmingham faced with a relative loss of manufacturing capacity, showing a decline.

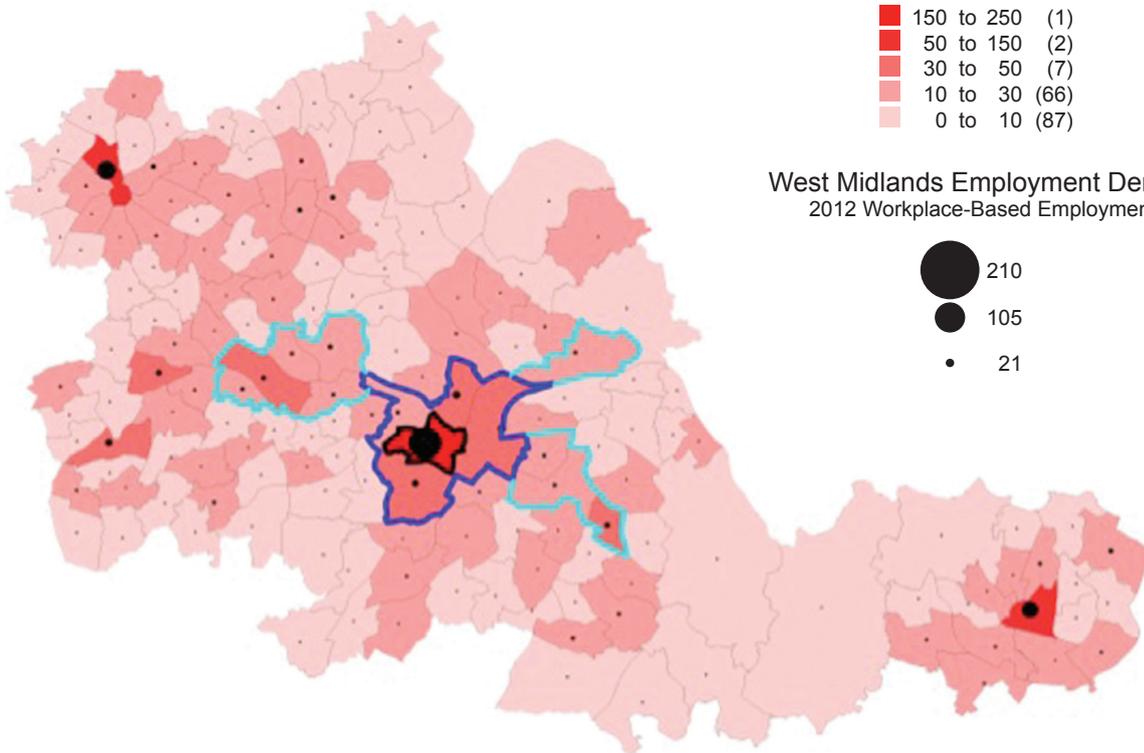
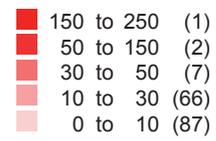
Figure 2: Metropolitan county GDP growth per worker 2006-2011²¹

| City region | GDP growth (%) |
|---------------------------------|----------------|
| Greater London (London) | 4.23 |
| West Yorkshire (Leeds) | 4.03 |
| South Yorkshire (Sheffield) | 3.44 |
| Merseyside (Liverpool) | 3.20 |
| Greater Manchester (Manchester) | 2.99 |
| Tyne and Wear (Newcastle) | 0.67 |
| West Midlands (Birmingham) | -1.19 |

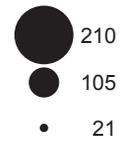
²¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/275844/tag-workbook-wider-impacts-dataset.xls



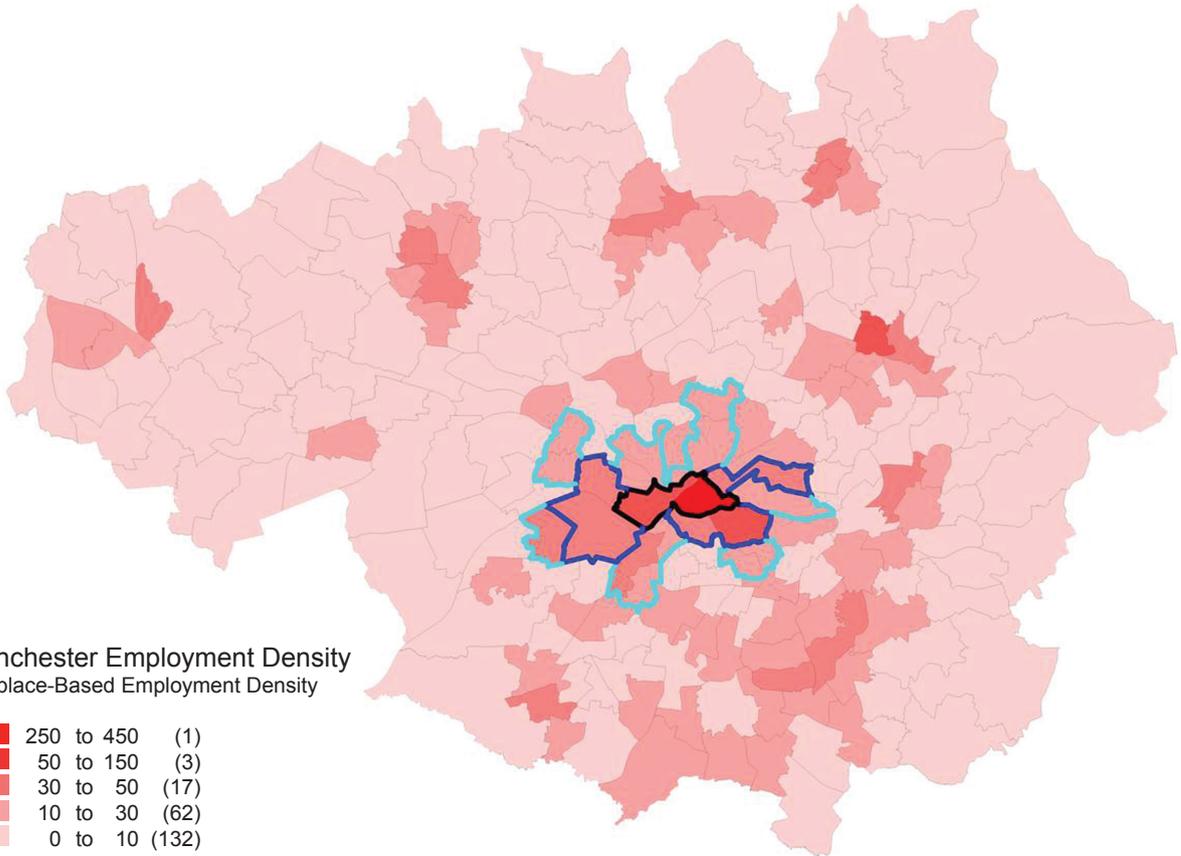
West Midlands Employment Density
2012 Workplace-Based Employment



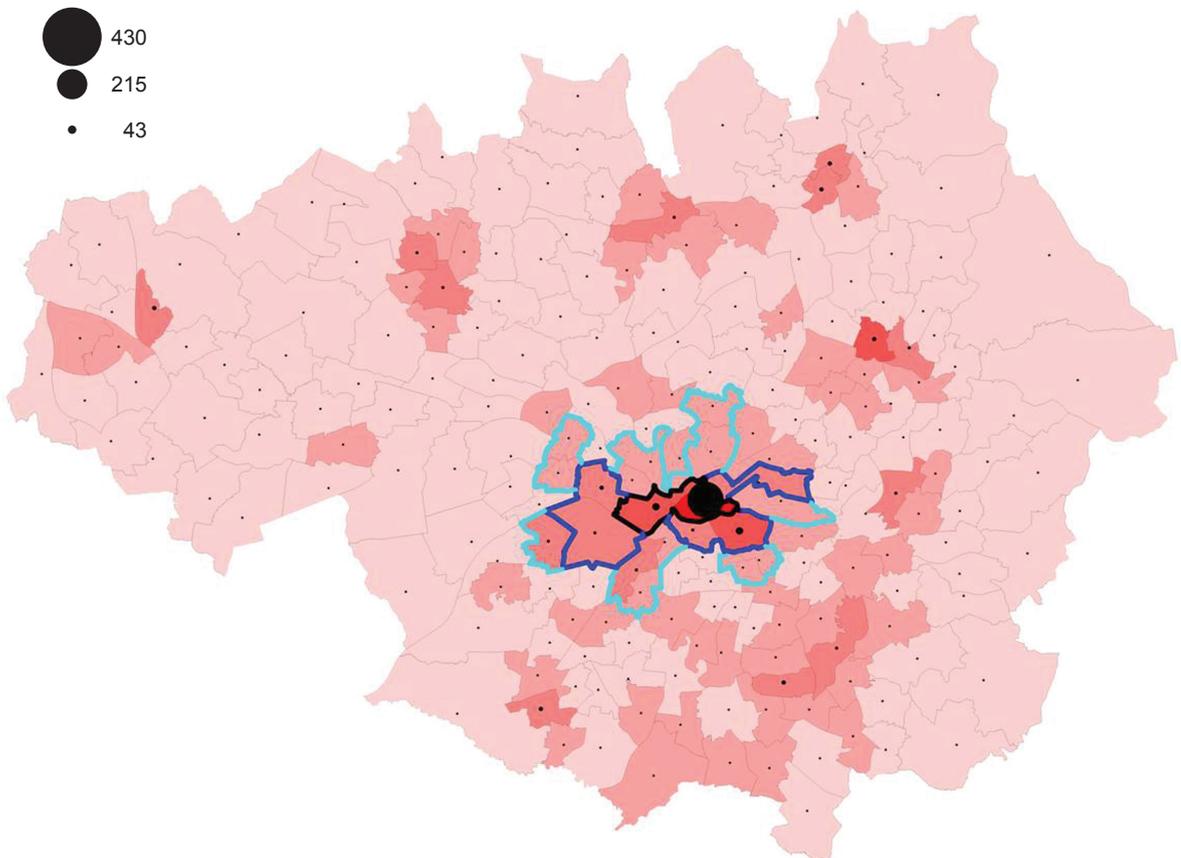
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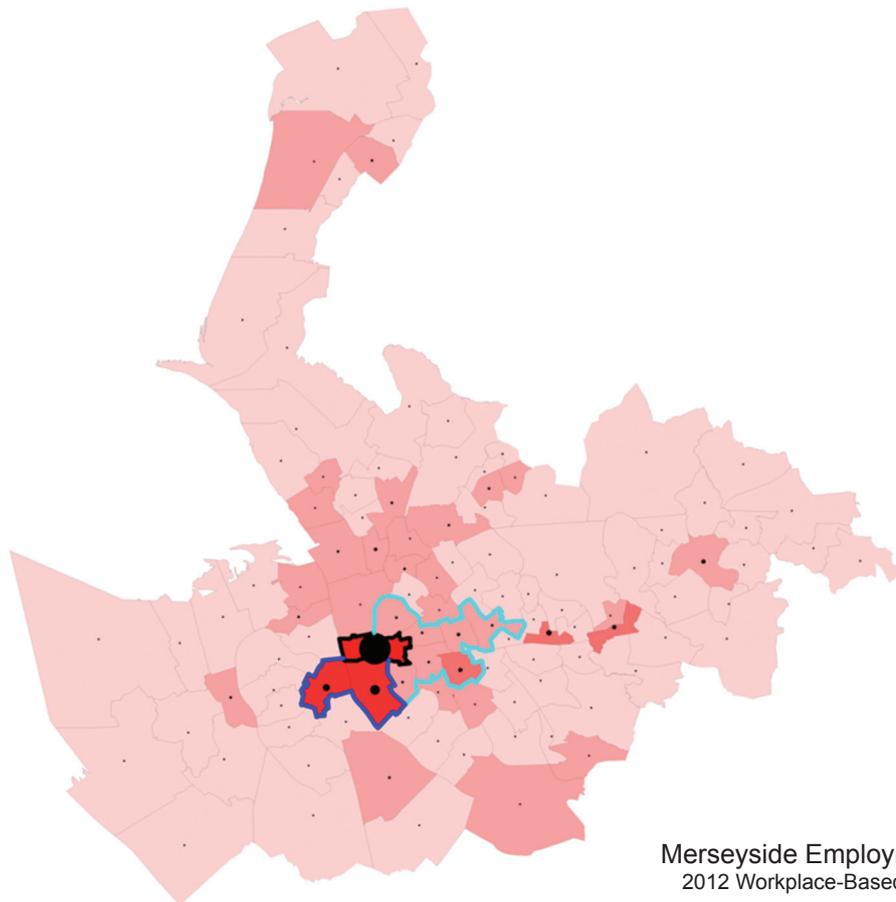


Greater Manchester

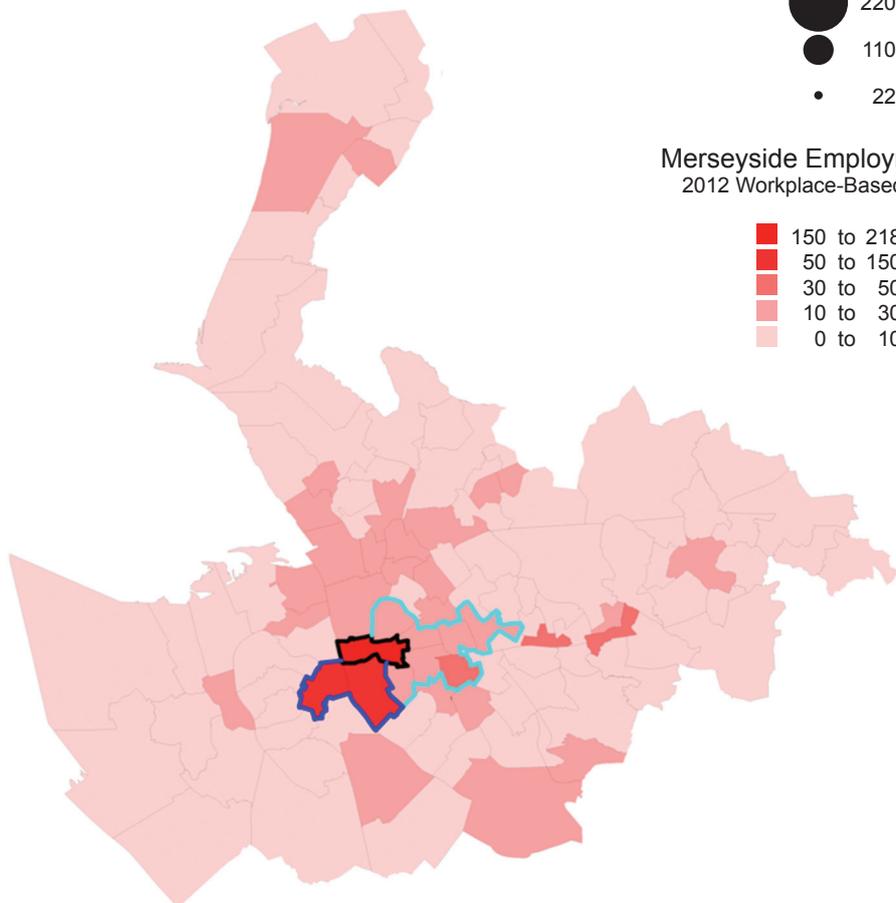
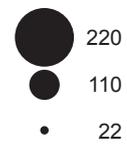


Greater Manchester Employment Density
2012 Workplace Employment Density

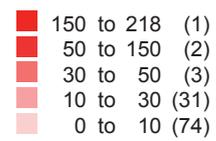




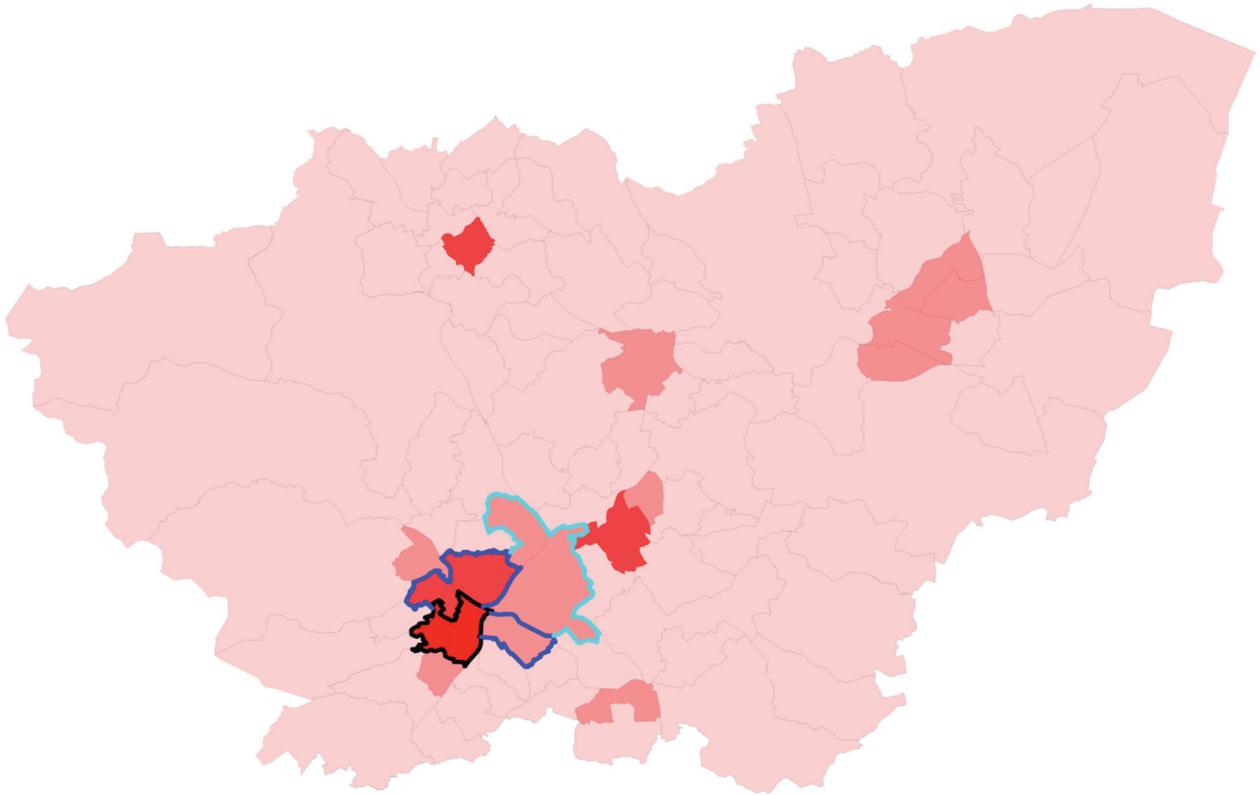
Merseyside Employment Density
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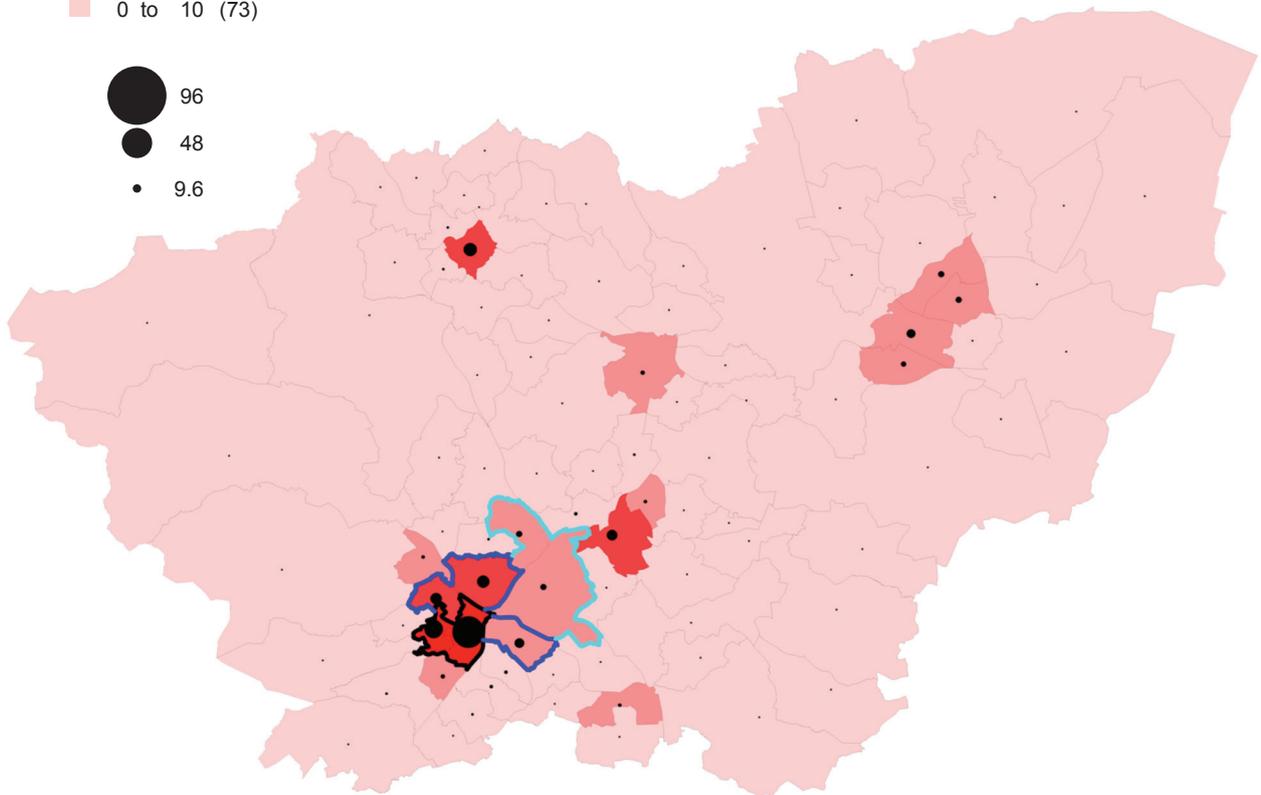
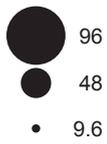
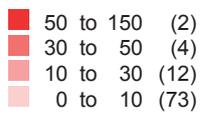
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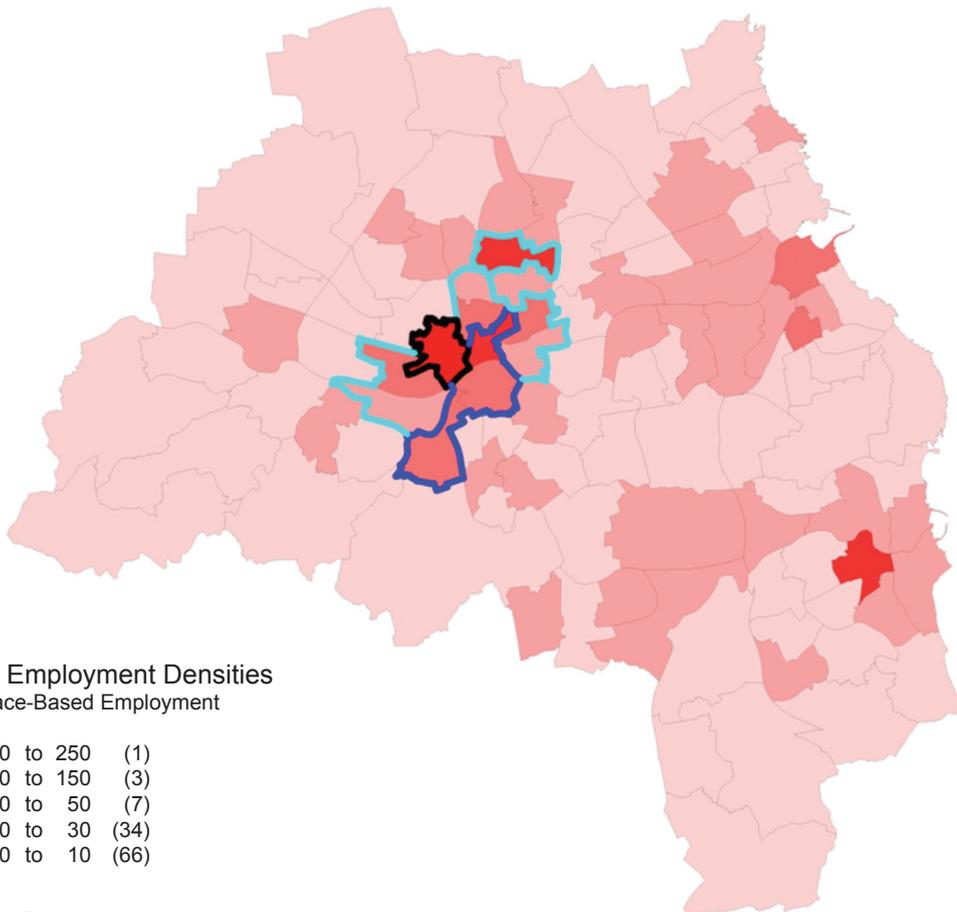


South Yorkshire

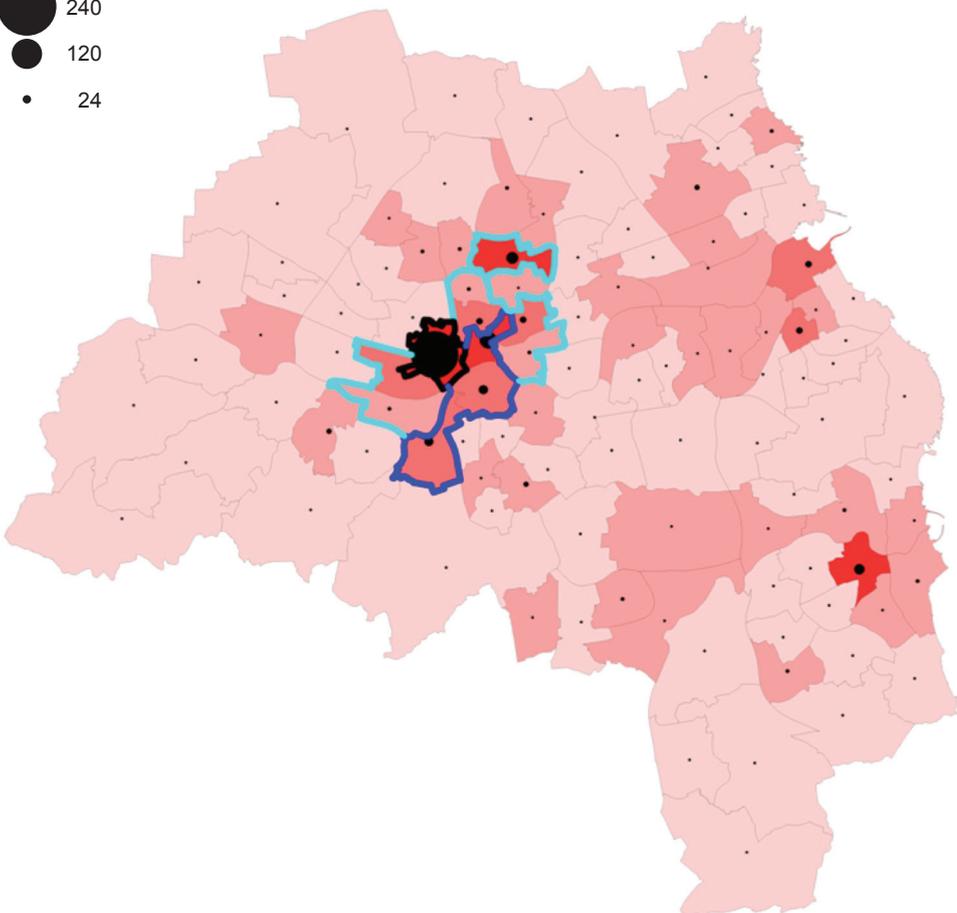
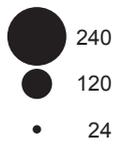
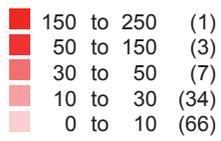


South Yorkshire Employment Density
2012 Workplace-Based Employment

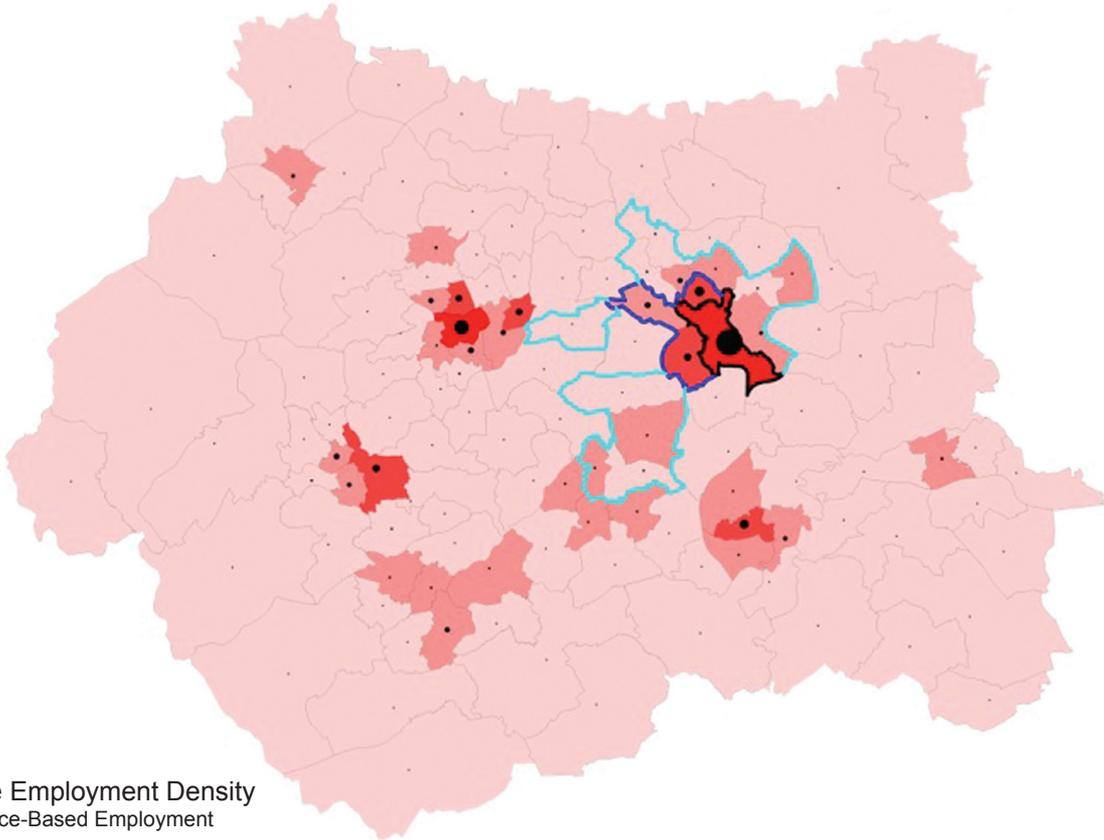




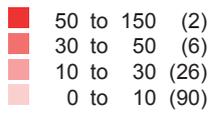
Tyne and Wear Employment Densities
2012 Workplace-Based Employment



West Yorkshire



West Yorkshire Employment Density
2012 Workplace-Based Employment



West Yorkshire Employment Density
2012 Workplace-Based Employment

