ROADS & RAILS TO RICHES?

"WHAT IMPACT DOES TRANSPORT INFRASTRUCTURE HAVE ON NATIONAL, REGIONAL AND LOCAL ECONOMIES? AND WHAT ARE THE LESSONS FOR DETERMINING INVESTMENT TO SUPPORT MACROECONOMIC GROWTH?"

PAPER FOR THE TRANSPORT PLANNING SOCIETY'S BURSARY AWARD

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1 INTRODUCTION

"Congestion on our roads cost our economy £20 billion a year. In one year alone, there were fourteen million minutes of delay to rail journeys in our country, costing £1 billion in terms of time lost to passengers. Other countries understand the importance of modern infrastructure to economic growth." ***– Prime Minister David Cameron to CBI, 25th October 2010***

1.1 WHY DOES TRANSPORT AND THE ECONOMY MATTER?

In 2010, the UK emerged from the deepest recession since the war. Public sector borrowing reached a record 11% of GDP. Economic recovery and control of the deficit dominated the political landscape in the run-up to the general election. The coalition government that resulted from that election set out plans to reduce the deficit in June's Emergency Budget, including the announcement of a Comprehensive Spending Review.

In a time of public sector austerity, transport spending, particularly investment, is often seen as an easy cut to make, as there are few obvious "front-line" services to make headlines. However, with a fragile economic recovery underway, many transport practitioners have argued that transport provides a solution to the economic situation, and this view has been supported by some business leaders and politicians.

That transport infrastructure has an economic benefit is often stated as a self-evident fact. But in reality the situation is more complex. In a time of limited public funds, it is important to be sure that such claims are backed-up by evidence and that spending is targeted to maximise achievement against the goals of the day.

1.2 SCOPE OF THIS PAPER

This paper will focus on the impact on the economy of capital spend on transport, in particular investment which boosts the capacity of the country's transport network. There are a range of projects which could contribute to this: building new roads or railways, widening existing roads, increase in railway capacity (either through track upgrades or the purchase of rolling stock), light-rail schemes in urban areas to name but a few. The author recognises that both transport spend and transport planning in the UK cover a wider range than this, and indeed some of the arguments made will be applicable to other types of spend. However arguments will be framed in the context of improvements to the infrastructure of UK plc. It should also be noted that the author does not have any particular type of scheme in mind, but merely considers an arbitrary scheme which leads to an increase in transport capacity. Debates as to the extent different schemes might improve transport capacity are left to the reader.

Conventional transport appraisal is driven by quantification of social welfare benefits, that is, it seeks to answer the question: Are the benefits society gets from this scheme worth the costs, or: Is society willing to pay the costs to get these benefits? Much of the "benefits" included in the standard appraisal methodology are social welfare rather than economic. While recognising that the social welfare benefits are important, this paper considers only the impacts on the economy, i.e. the impacts on GDP.

2 LINKS BETWEEN TRANSPORT AND THE ECONOMY

2.1 INTRODUCTION

We begin by considering the conceptual links between transport networks and the economy. That there is some link is manifest: in the extreme case of no transport infrastructure, we would all have to be subsistence farmers, reliant only on the resources immediately around us; conversely it is important to realise that transport itself does not contribute any economic output (ignoring a few particular examples such as Rail tours).

History provides examples of where investment in transport infrastructure has driven economic growth: canals supported the industrial revolution in the 18th century, the railways in the 19th century contributed to a boom in productivity in the UK. Similarly shipping and international trade routes have supported economic growth associated with globalisation. This is not just a historical lesson either, examples of transport spurring economic growth can be found in many developing countries, notably China.[1]

While these examples show that there is a link between transport systems and the economy, they are not necessarily relevant to today's decision-makers. Both the UK transport network and UK economy are mature: railways and the motor-car mean that even the furthest apart regions of the country are less than a day's travel away. It is perfectly possible and straightforward for a small cider producer in South Devon to serve a market in Glasgow. It is done at a cost, but this cost is not a significant barrier if there is an economic market to be served.

2.2 POSSIBLE MACRO ECONOMIC RELATIONSHIP

Most considerations of the impacts of transport on the economy look at microeconomic impacts on firms and markets. However from a national, macroeconomic perspective, the key questions to consider are:

- Does investment in transport infrastructure **cause** any change in GDP?
- **When** are impacts felt? One-off or impact on rate of growth
- Does such transport investment have a direct impact or is it a **catalyst**?

The microeconomic answers to these questions of how investment in transport has economic impacts are reasonably well understood. A number of papers, including the Eddington report[2], have set out the micro-mechanisms through which increased or improved transport capacity can have economic benefits. These include mechanisms which affect the way firms operate (some time-saving efficiencies, agglomeration economies) as well as mechanisms to improve the operation of the market (increased competition and market choice, more efficient labour markets, etc) and mechanisms that lead to new economic activity (either attracting mobile activity from elsewhere, or enabling innovation).

At a macro-economic level these micro-drivers map across to three ways transport infrastructure can increase the value of goods and services produced in an economy.

- increasing productive efficiency (a lower cost per good produced or service performed);
- increasing allocative efficiency (a better allocation of resources to produce goods and services valued more by society); and
- causing innovation (new economic activity or ways of working that increase the theoretical maximum production).

[1] The Eddington Transport Study (2006)

[2] See *The Eddington Transport Study, Main Report, Volume 1,* HM Treasury and Department for Transport, Dec 2006

Individual businesses benefit from improved productive efficiency, leading to lower prices and increased demand so greater economic output overall. Elements of this are measured under current appraisal, but this measurement depends on assumptions such as the level of competition.

Increased allocative efficiency can occur by improved operation of markets. In the case of investment in transport infrastructure, this is most obvious for labour markets – although in this case the benefits are realised as production efficiencies for firms. Generally however, a more efficient market can lead to resources being used to create a higher-valued combination of goods. The impact such changes will have on the economy as a whole is dependent on the market inefficiencies present originally.

Increased allocative efficiency could be argued to be a direct effect of transport investment, and could result in a one-off impact on the economy. Some increases in productive efficiency have a direct impact on GDP/GVA (e.g. lower fuel consumption reducing imports of oil); however for the most part they serve to remove a constraint on the economy.

Enabling new economic activity is perhaps the most useful mechanism. Innovation or invention and the increased productivity this can generate are the fundamental source of increasing wealth in an economy. The other two mechanisms are fundamentally about improving the market operation to obtain a more efficient outcome (either allocative or productive), but innovation increases the theoretical maximum that can be produced[3]. However, while the cost savings associated with transport investment can be measured and forecast to occur, the innovation it facilitates is harder to measure, and cannot be forecast directly. Transport infrastructure improvements can facilitate the rate at which it occurs (e.g. through agglomeration) Given that this is the macro-economic way in which the rate of economic growth is affected, it is a very important mechanism.

It is worth noting that infrastructure can be both facilitator and constraint at the same time, to different sectors of the economy. The Channel Tunnel may have facilitated economic activity in the service industries between Britain and mainland Europe – such activity was possible before through flying or shipping, but there was no particular view that capacity or cost was deterring such activity. At the same time in some sectors, the Channel Tunnel has relieved a constraint by increasing the UK's capacity to import goods. This occurs because transport affects the economic activity of different sectors, which have different needs and can operate in different environments.

When politicians and scheme promoters talk of the economic benefits that major new transport infrastructure will bring, they typically talk of it as facilitator which will enable new economic activity. However, when evidence is provided it is typically that a constraint on the economy will be removed in the context of cheaper travel costs (e.g. congestion costs the UK economy £20 billion per annum[4], but Crossrail will boost London's economy[5]).

Summary: Investment in transport infrastructure has only limited direct economic impact at a macro level, but acts as a catalyst, either facilitating economic growth, or removing the constraint that an over-stretched network can put on the economy.

2.3 TRANSPORT INFRASTRUCTURE'S ROLE IN LOCAL & REGIONAL ECONOMIES

Evidence of transport being associated with areas of economic activity locally can be found everywhere: local shops and amenities develop at cross roads and around tube and rail stations; town centres have bus networks and major roads spreading out of them; retail and business parks have sprung up next to motorway junctions in recent years. The amount of office space in the area around the rail station in city of Lyon, France has increased by 43% since the opening of their high-speed rail station; rent for office space near high-speed rail stations in France and throughout northern Europe is consistently higher than comparable office space further

[3] In economic terms, this is moving the "production productivity frontier".
[4] This is figure is often quoted by politicians (including the Prime Minister at the and the press, although the source is not apparent. It appears to be an update of earlier figure calculated by the CBI in 1989.
[5] E.g. Boris Johnson speech on 20th October following the Spending Review announcement

from stations[6]. Equally, investment in pedestrianisation has in many instances given rise to an increase in footfall and activity in local shops.

However, there is a question of causality in all this: do transport networks get built around economic centres or do economic centres develop around transport hubs? There is clearly an element of the former: bus networks in town centres; the DLR and Jubilee line to Canary Wharf. However, there are also examples of economic centres developing at e.g. cross roads, and situations where the development has followed the transport. In these cases it can be argued that transport had led to the development happening in that area in particular, although the development may have otherwise happened elsewhere.

In other instances, particularly recently, transport is actively used to facilitate economic development, for example the Westfield Shopping Centre in West London, where stations were built on existing lines for the express purpose of serving the shopping centre. However, causality remains an issue, does the economic impact of Westfield depend on the transport provision, or is the transport provision a result of the large amount of retail happening in the one location? The answer is almost certainly a mix of the two: without Westfield the stations would not have been built, and transport connections in the area remained poorer, but the business case for Westfield may not have been as strong if it had to rely on the existing transport links, both for the customer base and to access the necessary labour market.

Looking beyond a very localised level, evidence for transport causing an increase in economic activity at a town, city or region level is less obvious, but there is certainly still evidence. For example, several towns and counties along the Frankfurt-Cologne high speed rail route in Germany showed a marked increase in GVA in the following the line's opening[7]. Closer to home, in the South East the most prosperous and richest towns tend to be those with good rail links to London. While the Victorian building of railways may have linked the larger towns for reason of their size, development now is driven by the railways, and particularly links to London, which attract higher-earning London commuters who then have more income to spend locally.

It is telling that areas of France are willing to spend large amounts of money on high speed rail being delivered to them: in the early 1990s local authorities in France contributed very little or nothing to the construction of TGV lines as this was seen as the responsibility of the national government. Since then the funding has increased dramatically. In 2007 local authorities in the Lorraine region contributed 23% of the costs of a new line while in 2009, local authorities in Brittany contributed 39% of the cost of a new line between Le Mans and Rennes.[8]

We can see how these benefits can occur: it makes sense that somebody setting up a shop would locate it so as to attract the best market locally, and also where they will limit their own costs, i.e. easy to get to for delivering goods. Similarly a business looking to set up a head office with good links into London, but could not justify the cost of central London is likely to choose Woking with a regular fast rail service into London over Camberley which has a much slower and less frequent journey.

Indeed these are the arguments put forward by the erstwhile regional development agencies, and town councils when promoting a scheme. However, not everywhere with good transport is economically productive; compare for instance Edinburgh and Glasgow: Glasgow has more motorway links, better public transport, and as good if not better rail links as Edinburgh, but Edinburgh has the stronger economy[9]. This suggests that at least some of the benefits from transport investment come from the infrastructure facilitating economic growth, rather than leading to it directly.

Summary: There is ample evidence for investment in transport infrastructure contributing to economic activity and growth at either a local or regional level. While the question of causality makes it impossible to determine how much economic growth is attributable to the transport investment, it is clear that there is a link of some sort.

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[6] MVA/SYSTRA for Greengauge 21 (2009) Workstream 2: Strategic Choices

[7] Ahlfeldt, Gabriel M. and Feddersen, Arne (2010) From periphery to core: economic adjustments to high speed rail. London School of Economics & University of Hamburg.

[8] MVA/SYSTRA for Greengauge 21 (2009) Workstream 2: Strategic Choices

[9] Whitelegg/Ecologica (1994) Roads, Jobs and the Economy: A report for Greenpeace

2.4 DISPLACEMENT VS CREATION & THE NATIONAL ECONOMY

From a national policy perspective, the problem with these arguments is that for the most part they rely on attracting existing economic activity, rather than creating it. Different types of economic activity are mobile over different levels in the sense that they can choose where to operate from different sized areas: local shops are "mobile" over an area of maybe 1km sq, while a town supermarket over a few square miles; the business head office alluded to earlier is "mobile" over the South East.

There may be a benefit to society in attracting economic activity to new areas on grounds of regeneration and equality gains. However nationally does this cause an increase in GDP i.e. is any new economic activity created?

While economic activity attracted from another area by better transport links is not a benefit, the relocation is evidence of some net benefit: the firm would not relocate if it did not gain some benefit from relocating. The advantage gained by the relocating firm would also be gained by firms currently in situ, which do not need to relocate. Thus overall there is a benefit from greater efficiency; however this only increases national GDP if the extra efficiency is converted into extra production. The transport investment raises the productive potential, but this only leads to economic growth if there is not spare capacity in the economy (or economic sector).

As well as business relocation, people may relocate or choose a different area to spend money in as a result of new transport infrastructure. One area will gain from the increased demand, while another loses out. Nationally there is only a gain if the overall demand increases; this is possible as the new area may offer something valued more by the individual. The alternative reason for relocation is that the same good or service can now be obtained for a lower price, the implication of which is that demand shifts to the more efficient operation and hence there are supply-side benefits. However any overall change resulting from demand relocation will be much smaller than the impacts on the regions individually.

What if we consider nationally important infrastructure (e.g. HS2)? It is beneficial to the regions involved, but what about nationally? Much of the answer depends on how much benefit it gives to existing firms across the country, but there is also a question of whether this type of infrastructure is going to support the benefits less easy to measure, such as supporting innovation. From a national self-interest view, HS2's ability to attract businesses in the international market is also vital. It is notable that the political story surrounding Crossrail and the continued support for a route through the financial sector is justified primarily on the basis that it will attract mobile activity. If we were asking the question in a European context, it would no longer be legitimate to claim that it will help compete with other centres, such as Frankfurt.

Summary: While investment in transport infrastructure can empirically be seen to have economic benefits on a regional level, much of this may be displaced from other areas rather than generated anew. The displacement itself is evidence of the existence of underlying economic benefits to the country as a whole, but not the scale of these.

3 PUTTING IT INTO PRACTICE

The previous section discussed the theory and evidence surrounding the impact on the economy of investment in transport infrastructure. In this section we consider what this means for decision-makers, and transport planners who aid them.

3.1 BACKGROUND

Increasingly, at both local and national levels of government, emphasis is placed on the economic impact of investment:

- during the recent Comprehensive Spending Review, allocations of capital expenditure were reviewed from a zero-baseline across government. The guidance for determining investment emphasised the importance of focussing on expenditure that would have most economic benefit for the UK;
- Boris Johnson has repeatedly stressed the importance of Crossrail and the tube upgrade for London's economy;

- the Regional Growth Fund will "support for projects with significant potential for economic growth and create additional sustainable private sector employment"[10;]
- a number of recent submissions from local government to the Transport Select Committee have listed the supporting local economies as a top priority for them.

This is at odds with the standard method of transport appraisal used in this UK, which is driven by social cost benefit analysis based on willingness-to-pay theory. This incorporates some measure of economic benefits (business time-savings), but the majority are social welfare benefits.

Network Rail's recent paper[11] "Prioritising investment to support our economy" makes this point well: current transport appraisal asks "How should the tax proceeds of economic growth be used to buy the things people like?". However the questions asked recently, particularly by the CSR have instead been "how can investment be targeted to support economic growth, and hence the tax proceeds that come with it?". To properly answer this question requires a method which measures the economic impacts more fully.

3.2 HOW SHOULD WE ESTIMATE ECONOMIC IMPACTS?

To answer the question asked in the CSR, how to target investment to support economic growth, we need to be able to say how much economic growth an investment will contribute. Conventional wisdom and theoretical economics say that transport can contribute to investment, but not how much. The benefit to the economy will vary depending on how the investment impacts on a number of elements including journey times, the structure of the economy affected and the economic geography.

More recently transport appraisal has begun to be extended in an attempt to measure more of the impacts on the economy. This is achieved by bolting on measurements of the micro-mechanism benefits to existing business. The key thing here is that it is to existing firms only; the additional economic value to firms relocating is not included nor is any economic value from new start-ups or relocation included. As the appraisal is designed to measure net benefits to the UK, it does not seem unreasonable to exclude relocation benefits (although perhaps firms relocating to the UK from elsewhere should count), but the additional benefit they gain from relocating should be. However, this amount is only small, and the reason for exclusion may be practical in nature. Aside from arguments over the methods of measurements, there is nothing overtly wrong about using them to measure some economic benefits.

However, the transport planning industry as a whole does not seem persuaded by these methods, perhaps because so-called "Wider Impacts" are seen only as a way to "find" additional benefits, which schemes before have managed without. Transport Planners are not the people who need to be convinced though. Transport appraisal is designed to allow evidence-based decisions between schemes, or on the details of schemes. The economic argument is for competition with investment in other sectors: housing, communications, energy, technology.

In the past year, alternative methods of measuring economic impact have been developed and begun to be used[12]: KPMG for Greengauge21 and Northern Way (among others) and SERC's wage equation model. Broadly these are based on calculating a relationship between some measure of economic output in an area, and a set of explanatory variables. The impact of transport investment on these explanatory variables can be calculated and hence the impact on the economic output. For example KPMG make use of a measure of "connectivity" based on the number of businesses and workers within a certain travel time of an area. There are two differences between these methods and those used in the WebTAG appraisal methods:

- they are holistic, in seeking to quantify the total effect on economic output rather than differentiating between different mechanisms;
- they measure the potential economic impact on an area, rather than impact on existing firms only. It is acknowledged that they include abstraction from other areas;

[10] HM Government (2010) Regional Growth Fund, Information for applicants
[11] Network Rail (2010) Prioritising investment to support our economy
[12] ITS Leeds for Northern Way (2010) Review of Methodologies to Assess Transport's Impacts on the size of the Economy

The holistic approach has the advantage of being a simpler model – there is no need to calculate different micro-effects, and no worry about how they interact or whether there is some element of double counting. However, this means that they have lower confidence levels, although some would contend that traditional appraisal is not as precise as the industry might like to think. Measurement of the total potential economic impact will be seen as a good thing by some particularly those whose interest lies in local or regional development; as it allows full understanding of the impact of a scheme, including the effects of development spurred on by transport and redistribution of economic activity. However, national policy-makers will be primarily interested in the overall impact on the country's economy. Similarly some will argue that measuring the potential impact including associated secondary developments is double counting.

Some efforts can be made to overcome the abstraction issue. In their work for Greengauge21[13], KPMG estimated the proportion of economic activity that is mobile within and between regions. However, this only considers the abstraction element on job creation (i.e. production). There is also an abstraction measurement to be considered for consumption, when transport can give consumers a wider choice and draw consumption away from other areas. Even so utilising methods such as this together with estimates of the economic impact of transport infrastructure could be a useful tool, particularly for regional decision makers who have a different strategic objective. It could also allow national policy-makers to see how transport infrastructure will not only support the economy of the whole, but how other strategic and political considerations, like closing the North-South divide and rebalancing the economy, might be met.

The holistic methods are new and largely under-development, but are already a potentially useful tool to policy-makers. While the methods behind them need to be tested more extensively and robustly developed to give the right answer, they are at least attempting to answer the right question.

Summary: There are two broad methods being used to measure the economic impacts of transport: "conventional" methods built up from estimates of the value time-savings using detailed demand models, and newer holistic approaches which attempt to derive relationships between economic activity and measures of "connectivity".

3.3 HOW TO DECIDE WHAT TO GO AHEAD WITH?

Transport currently uses similar appraisal methods across the board, whether the scheme in question is strategic national transport infrastructure or a very local scheme, of benefit only to those in the local area. The ultimate aim of transport appraisal, indeed much of the transport planning industry, is to aid decision-making. It should be remembered that WebTAG and NATA do not make decisions themselves, but tools in the decision-makers toolkit.

With this in mind, should we be using the same tools to answer both questions of a strategic nature and those more technical in content? Strategic decisions are made both nationally and regionally, and determine both where to invest and the type of thing to invest in. Building Crossrail is a strategic decision, for both the UK as a whole and London. For the UK strategic choices might be whether to build High Speed rail to Manchester, bolster the capacity of the M1 to Leeds, or boost road capacity into Cornwall for the summer visitors. Technical decisions (for want of a better phrase) are about the best way to achieve some specific objective, the routing of a tram line, to build an extra station on Crossrail or a bypass. There is not a clear dividing line between these types of questions; rather a continuous scale and some questions will be strategic at a local or regional level, but not nationally. But for a given decision-maker, some questions are of a more strategic nature than others.

The tools available to support decision-making all have drawbacks, and there is no reason why one tool should be right in all cases. WebTAG appraisal is well developed and evidence-based but is designed to answer a specific question, which may not reflect the strategic questions. Is there more benefit from improving the M1 corridor, or across the Pennines, or bolstering access to Manchester? All have merits, but how should we decide where interventions are most needed? The answer will depend upon the government of the day's priorities and how interventions in each will impact on these priorities.

[13] KPMG for Greengauge 21 (2010) High Speed Rail: Consequences for employment and economic growth: Technical Report

This paper suggests that, with the current national policy emphasis on deficit reduction and economic recovery and a clear strategy of using (the limited) capital expenditure to support the Economy, measurements of GVA impact are most appropriate to help answer the strategic question. Depending on government's priorities, direct methods might be a possible answer, as they provide information on how economic geography would and could potentially change. Developed properly they could identify in broad terms where and broadly how the government should intervene. Once defined in broad terms, the details of the scheme could be determined by more traditional appraisal approaches to ensure that overall value for money is achieved.

A two-tier method like this would ensure that central or regional government targets funds on the most promising investments from an economic perspective if that is the primary consideration, while "re-balancing" and other such objectives could also be considered.. While this might seem to be a departure from the rigorous evidence-based method of evaluation recently praised by Philip Hammond, in reality these strategy questions have often been determined well away from transport assessments; in the offices of politicians, in the press and by civil servants in the Treasury, often influenced more by interest groups and pet projects rather than evidence-based analysis.

In their report[14], Network Rail identified Housing and Regeneration as areas which could be integrated with transport for appraisal of economic returns. Strategic transport-planning and land-use planning (whether housing, regenerative or anything else) could be integrated with a view to maximising the economic value to the country, region or city. In a time of government austerity, working across departmental boundaries gives the potential to implement complimentary measures which may deliver more for less. This touches on the most important aspects of the holistic approaches, that they could be adapted to show which interventions might best serve defined policy objectives, rather than the notional value-for-money metric alone.

Summary: WebTAG and NATA are essential tools to the transport planner, but may not be the right tools for helping politicians and decision-makers with questions of strategy. Recently developed holistic methods of measuring the impact on GVA might be developed to tools more appropriate for these questions, particularly if they can incorporate questions from related disciplines.

4 CONCLUSIONS

4.1 CONCLUSIONS

This paper has considered the question of what impact investment in transport infrastructure can have on national, regional and local economies. The evidence and theory suggest that such investment can support economic growth and the ways it does are understood on an individual and firm level. However at an aggregate level it is less clear how the micro-mechanisms might add up to generate macro-economic benefits. Much larger gains can be had by regional and local economies through displacement and attracting activity at the expense of other areas.

As the UK's fiscal consolidation continues it is vital that investment to support the economy is targeted in the right way. This will require a united approach, and the ability to compare investment in different sectors, transport infrastructure, housing, communications or energy. The establishment of UK Infrastructure is a good start. The planning industries will need to support UKI with clear advice and tools to measure the impacts of different investments on a consistent basis.

Over the past few years traditional transport appraisal has developed to consider so-called Wider Benefits (in effect the gap between the measured benefits and the actual benefits). This still has a way to go to fully measure all benefits, and only measure benefits to existing firms and workers. Alternative methodologies are being developed which look to directly measure the GVA (or GDP) impact of transport investment. These methods may be suitable to support strategic decision making on a national or regional level. Being broad-brush gives makes it easier to make investment decisions across sectors, so the economic impact of transport can be compared more directly and easily to investment in say, smart energy grids. However, there are technical drawbacks that should be recognised with these methods. The inclusion of economic growth

[14] Network Rail (2010) Prioritising investment to support our economy

achieved through displacement means that they may be more suitable for regional and local decision-makers than nationally, but with the government's growing localism agenda, this could be a good thing.

The answer to the strategic question of where (or if) we should invest in transport infrastructure will depend on who is asking the question, even if the primary aim for all parties is the economy. Asking these questions locally rather than nationally will give more support to schemes that benefit an area at the expense of another, as the impact on other areas is not a primary concern of local decision makers. Investment that helps local economies the most may not be the investment that delivers most growth nationally. This raises an interesting question about the government's localism agenda, and whether an unintended consequence might be to reduce the impact of such investment in (transport) infrastructure on the national economy: a Prisoner's Dilemma situation may occur where all authorities invest to stop activity going elsewhere, but very little net benefit is actually delivered.

4.2 WIDER CONSIDERATIONS

What if we'd considered other transport initiatives? The answer would probably be quite similar, but with added layers of complexity. Eddington highlighted that a number of studies have shown that the efficiency of using transport networks is as important as the underlying investment. Smarter travel measures that cause a mode shift or decrease in trips are effectively a capacity increase. Similarly some "revenue" expenditure can have capital effects, such as running a bus service. Ideally all such initiatives should be considered together, although to be on the scale where there is a noticeable economic impact, we will typically be considering infrastructure measures.

This paper has argued that decisions regarding transport infrastructure should be based on the macro-economic impact of that investment. However, while this may be an appropriate approach currently, there are a large number of other non-economic issues and indirect economic issues that must always be considered. To continue to grow the economy based on transport and travel will, at some point, run into problems associated with too much travel, carbon emissions etc. This does not make the arguments any less valid, but highlights that political strategy needs to balance social, environmental and economic objectives, in the short- and long-term. Ultimately this is a decision to be made by the government of the day. The author hopes that we can trust our elected politicians (and those who vote for them) to set the right balance.

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