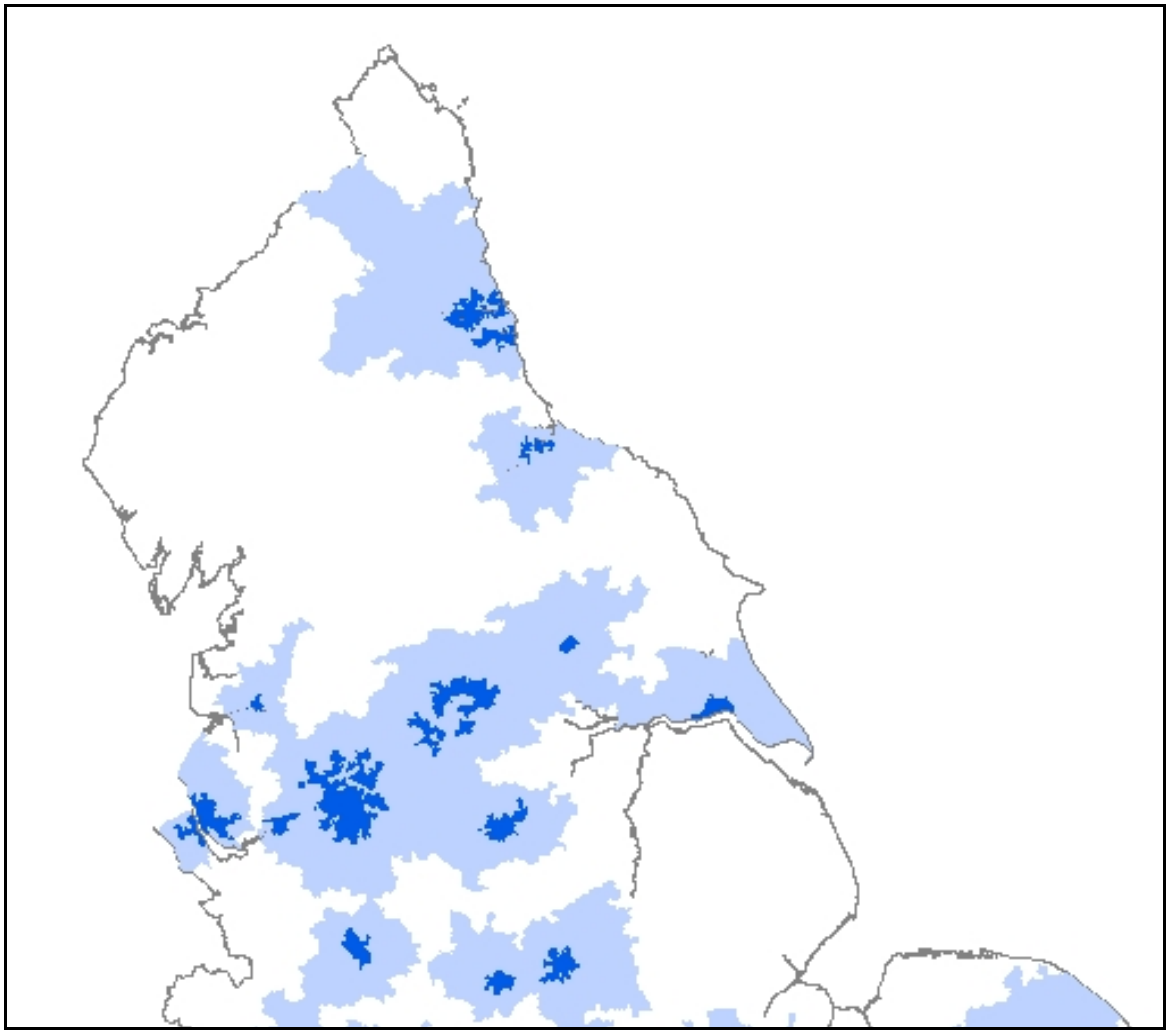
TEG TRANSPORT ECONOMISTS' GROUP

The Transport Economist

The Journal of the Transport Economists' Group



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The Transport Economist

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Seminar on Cities, Transport and the Economy

One Great George Street, Friday, 6th March 2009

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TEG Committee 2008-2009		
The Transport Economists' Group		

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http://www.transecongroup.org/meetings.htm

Introduction

Peter Mackie

Peter Mackie introduced himself as a member of the Standing Advisory Committee on Trunk Road Assessment (SACTRA) when it produced "Transport and the economy" in 1999, and subsequently of the group producing the "Eddington Report" in 2006.

In his view, the subject of the seminar had been in cyclical demand for the last generation. The DfT-funded University of Leeds' "M62 study" nearly 40 years ago raised massive questions about the impact on GDP in each region connected by it, and concluded that the answer was "1.1%". This shows how hard it is to establish the increment, if any, due to increased connectivity, and it would be equally hard to measure the reverse effect now if the M62 were suddenly to close. By 1973, Leitch had felt that the focus should be on the direct, not indirect, benefits of schemes, but by the mid-1990s that view had again been seen as unsatisfactory, and interest in the subject had grown.

He presented a series of questions which he felt it would be useful to consider and to address in the final open forum:

- Has the relevant theory and evidence base been clarified or improved?
- What is DfT's approach in relation to major/minor schemes; urban/interurban; policies/projects?
- Does the appraisal community have quality control over practical applications?
- What difference, if any, does the economic crisis make to these arguments?

Report by Dick Dunmore

Transport, cities and the economy: what can we learn from history?

Dr Tim Leunig

Reader in Economic History, London School of Economics

Illustrating from history, Tim based his presentation on six propositions about transport in cities:

- Journeys were and still are short
- The number of motorised journeys increases over time as income increases
- Price matters more than comfort
- Speed matters
- Inducing modal shift through policy is hard to achieve
- City size matters

PROPOSITION 1: JOURNEYS ARE SHORT

In the nineteenth century the mean rail journey was 9.7 miles (the median was shorter) and trams were heavily used in urban areas. Today, the number of tube journeys are greater than rail journeys in the London region and the busiest rail journeys (e.g. central London to Croydon) are all short. Mean car journeys within urban areas, at 7 miles, are also short.

The policy implication of these journey lengths is that government should concentrate on investing in short, not long-distance, journeys, since that would improve journeys for a larger proportion of the population.

PROPOSITION 2: JOURNEYS INCREASE AS INCOME INCREASES

As incomes rise, people travel more rather than travelling longer distances. Rail (Figure 1) and tram (Figure 2) journeys increased from the mid-1800s to 1910 and a chart of recent road traffic growth had increased in line with the growth in GDP.

Figure 1: Growth of rail journeys, 1840s to 1910

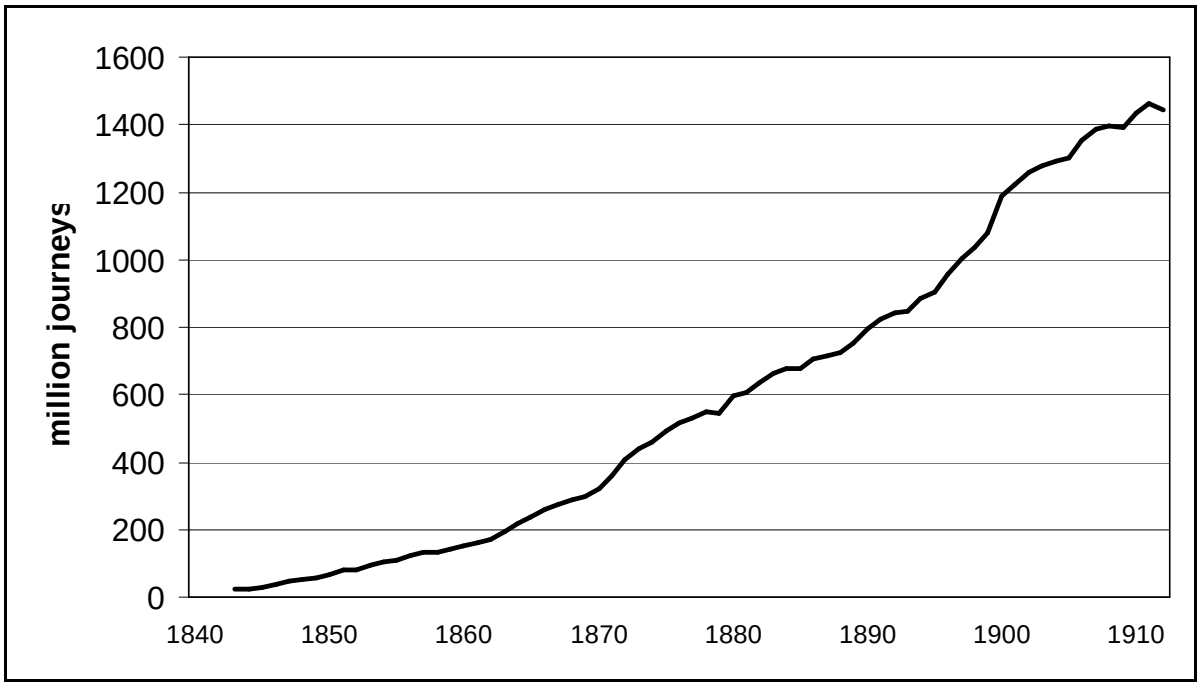
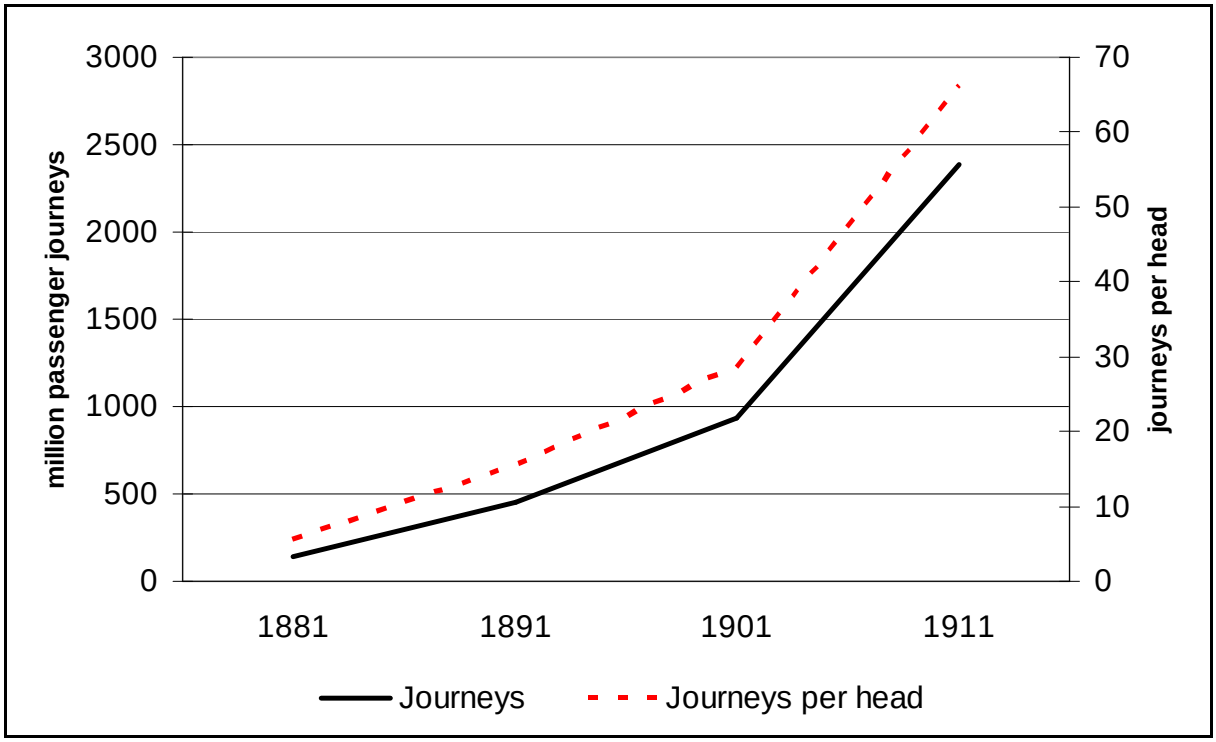


Figure 2: Growth of tram journeys, 1881 to 1911

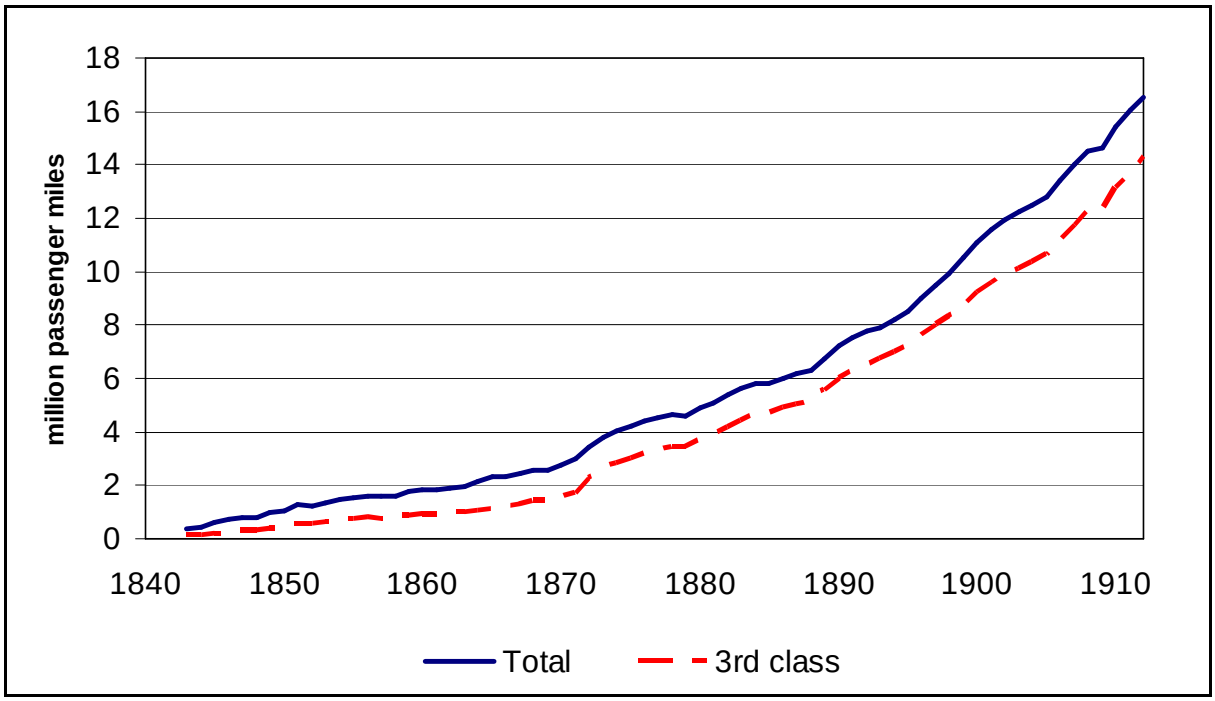


Most road traffic occurs in urban areas simply because the majority of the population lives in towns and cities. The policy implication is that unless incomes fall or the price of transport rises, there will be increased congestion unless capacity is increased.

PROPOSITION 3: PRICE MATTERS MORE THAN COMFORT

Of all factors determining travel, price matters the most. In the nineteenth century third class travel was the key to increasing travel demand, as shown by passenger miles.

Figure 3: Growth of rail passenger miles per annum, 1840s to 1910



Trams were a defining feature of the growth of cheap city transport in the latter part of the nineteenth century. Today, of course, there is the growth of low cost, no frills airlines. The policy implication is that, with public transport rarely offering a “Ryanair” type of option, third class rail, with lower fares and standing room only, might be a cheaper and more acceptable option than extending train and platform lengths. Would reduced seating on tube trains also be acceptable?

PROPOSITION 4: SPEED MATTERS

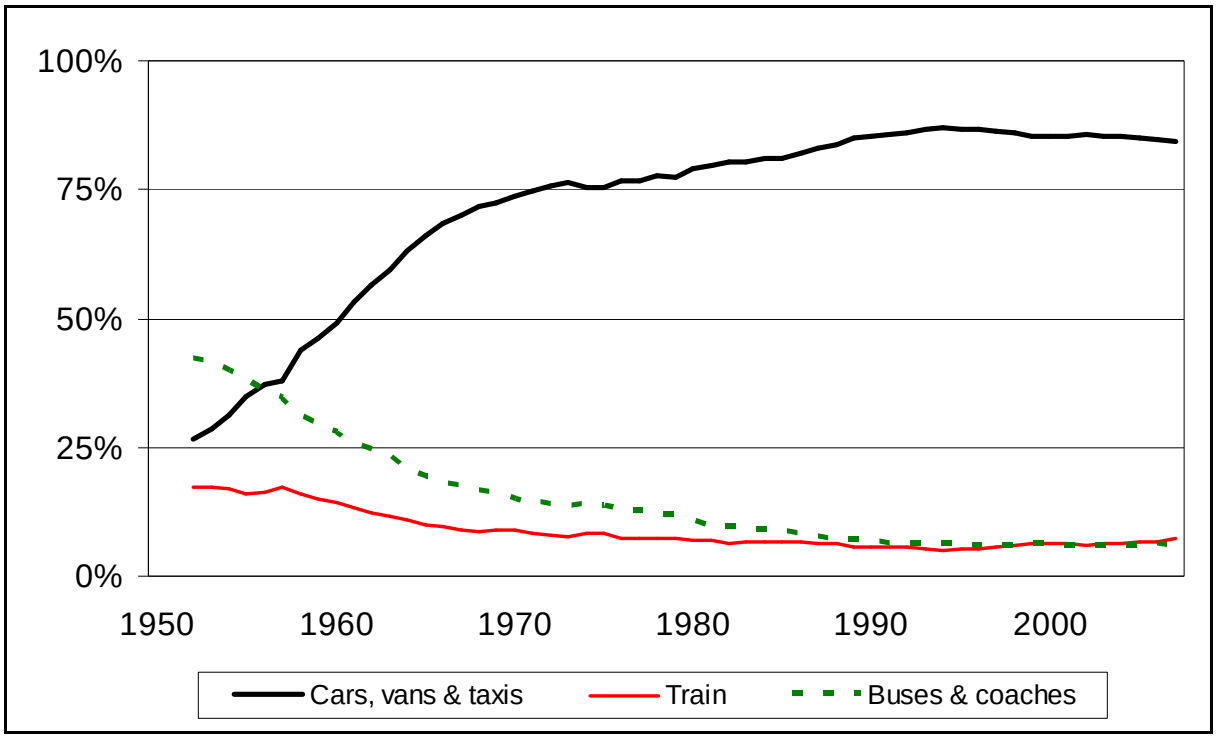
Commuting in cities has generally been between 60 and 80 minutes for over the last 100 years. Speed has increased the distance people have been able to travel and, therefore, increased the catchment areas of cities, but journey time has remained the same. Recent research by the speaker has shown that rail services in London have become slower since the 1970s. If this continues, will catchment areas get smaller?

Arguably, slightly increasing journey times has resulted in greater reliability: over the next 50 years we will see what the reaction will be. The policy implication is that faster journey times, by road and rail, will increase agglomeration economies.

PROPOSITION 5: MODAL SHIFT THROUGH POLICY IS HARD TO ACHIEVE

Modal shift that is induced by technological change is very strong and is led by the market. For example, the railways replaced stagecoaches and led to the decline of canals for transporting goods; aircraft largely replaced ships for passenger transport; and cars and the lorry have replaced almost everything.

Figure 4: Passenger miles by mode, 1952 to 2007



The implications for policy are that you cannot go against the trends, and for Great Britain as a whole public transport is a niche item. Public transport is very expensive to both passengers and taxpayers in terms of labour and infrastructure. It is also very slow door-to-door, but is most useful when parking is difficult, as in London.

PROPOSITION 6: CITY SIZE MATTERS

Size of the city is very important. In most places – in small towns and suburbs – cars work well, since mass transit makes little sense. The Docklands Light Railway is the same size as the Sheffield Supertram but has six times the passenger miles. This is because there is very little parking in Docklands; in Sheffield cars can park and are therefore used.

QUESTIONS AND COMMENTS

David Metz (University College London) noted that the National Travel Survey (NTS) indicates that, on average, journey lengths are increasing by 1 kilometre per annum, and the main group seeing this increase is older people.

Robert Cochrane commented on the technological transformation of cities. Tim Leunig's view was that people like travelling in vehicles on rails but that buses are much more useful. This requires better priority, like trams. **Peter Mackie** questioned whether it is speed or reliability that is important. Tim agreed that reliability is important.

Martin Brazil commented that Cambridge worked very well on bicycles.

Mary Acland-Hood opined that it is very difficult to take away services once they are provided. It is the view that if there are rails, a train will come but a road does not guarantee a bus.

Report by Laurie Baker

Productivity effects of transport investment

Dr Daniel Graham

Centre for Transport Studies, Imperial College

Transport investment can raise productivity by facilitating agglomerations of employment. These increase the scale and efficiency of spatial economic interactions by raising productivity. These "agglomeration benefits" are additional to those measured under conventional cost benefit analysis (CBA). They arise from the sharing of knowledge and technology, and a larger and more specialist labour force. The increased agglomeration should therefore lead to an increase in productivity.

The ease of transport and the generalised costs of travel affect the extent of agglomeration. Transport costs in part determine economic concentration, and transport constraints can inhibit agglomeration economies. New investment can change the concentration of activity and will affect the pool of labour accessible to firms.

AGGLOMERATION BENEFITS OF TRANSPORT INVESTMENT

Writers such as Venables have argued that agglomeration is an externality or market imperfection and as such is not captured in standard appraisal work.

To quantify "agglomeration benefits" it is necessary to know two things:

- The extent to which factors such as improved transport facilitate greater agglomeration
- The amount by which productivity will rise in response to this increase

Dan then outlined his four-step approach to estimating productivity effects of agglomeration:

1. Gather data on production characteristics of firms or spatial units from across the economy (inputs and outputs)
2. Construct a measure of agglomeration such as access to economic mass from some location *i*, given by:

$$A_i = \sum_j \left(\frac{E_j}{d_{ij}^{\alpha}} \right)$$

Where E*j* is employment at location *j*, and d_{ij} is the distance between locations *i* and *j*

3. Specify a production function with agglomeration included as a shifter of productivity, such as y = g(A) f(K,L,M), where y is output, K is capital, L is labour and M is materials

4. Estimate elasticities of total factor productivity (TFP) with respect to agglomeration

Dan then discussed empirical evidence on the effects of agglomeration particularly from three recent studies:

- UK (with Ralf Martin & Steve Gibbons, LSE)
- UK (with Kurt Van Dender, International Transport Forum / OECD)
- New Zealand (with Dave Mare)

The studies were based on extensive firm level panel data. The production function estimation with agglomeration was measured in a way consistent with the methodology discussed above, although several different models and estimation methods were used. In the third study, there was a positive association between productivity and agglomeration in both countries, as shown below. Overall they were higher in New Zealand, and highest in the service sector.

Table 1: Agglomeration benefits by sector for the UK and New Zealand

Industry	**UK**	**New Zealand**
Manufacturing	0.06	0.06
Retail	0.04	0.05
Real estate	0.11	-
Information Technology	0.07	-
Financial services	0.15	0.11
Business services	0.12	0.18
Whole economy	0.10	0.15

There are, however, uncertainties associated with the typical estimation approach. In addition, this is a “black box” approach which says nothing useful about the sources of agglomeration. It would be desirable to have an explanation for the positive association between access to economic mass and productivity.

Care is needed regarding potential “confounders”: the key issue is heterogeneity in the functions of industries. Productivity may, for example, be correlated with agglomeration but not caused by it. Do firms in different locations do different things? Care is needed that like is compared with like.

Endogeneity is also an issue: agglomeration and productivity may be simultaneously determined. For example, productive locations could attract more capital. There are several different ways of addressing endogeneity, typically based around:

- IV (instrumental variable);
- dynamic panel GMM (generalised method of moments); and
- FE (fixed effects) approaches.

Dan said that he had used a control function approach. This involved deriving a function to proxy for unobserved productivity and including the proxy function as an additional model component to obtain consistent parameter estimates. The autoregressive AR(1) specification draws on variation over time rather than across firms. This had the advantages of not imposing further externalities, leaving more identifying variance, avoiding the difficulty of finding relevant and exogenous instruments, and providing additional information.

Table 2: Results from control function estimates in the UK

Industry	**UK**
Manufacturing	0.02
Construction	0.03
Consumer services	0.02
Business services	0.08
Whole economy	0.04

There are smaller effects when corrected for firm level heterogeneity and endogeneity. These are still positive and very significant in absolute terms, and are again highest for the services sector.

SUMMARY OF RESULTS

The data show evidence of agglomeration economies, and the effects are largest for business service sectors.

Agglomeration economies appear to exist after correction for potential endogeneity bias and confounding.

The productivity-agglomeration relationship is bidirectional, but endogeneity does not appear to induce substantial bias.

Correcting for unobserved heterogeneity reduces the magnitude of the agglomeration elasticities.

Dan then suggested some areas for future research. The key issue concerns the relative roles of different sources of agglomeration. Evidence on the role of sources would provide a real test of the theory and improve understanding of the mechanisms that actually drive agglomeration economies. For transport, this is important, and he noted three factors that increased different elements of transport activity:

- Labour market economies drive commuting trips
- Knowledge spillovers drive business travel
- Input-output association drives freight movement

Knowledge of sources will improve the accuracy of calculations of agglomeration benefits.

CONCLUSIONS

There is a strong theoretical case for investigating the productivity effects of transport investments that may arise via agglomeration economies. The data show that there is a positive association between productivity and access to economic mass. The best evidence for the UK suggests an aggregate elasticity of around 0.04.

Evidence on the role of sources would greatly improve empirical understanding of the mechanisms that actually drive these external benefits.

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QUESTIONS AND COMMENTS

Kieran Arter (Colin Buchanan) asked if any work had been done on low levels to high levels of correlation. Dan replied that there are diminishing returns in places like London – the results are not linear and depend on the size of conurbation. **Tim Leunig** noted that the results were larger for New Zealand, where urban areas were smaller. This may be because London is reaching the size of diminishing marginal returns.

David Metz (University College London) asked if the benefits to land owners had been included. Dan replied that higher rents result in a higher factor price, in the same way that higher productivity equals higher wages, and landowners will benefit.

An attendee asked if the studies gave results for individual industries. There were 28 sectors in the original work, and Dan did not believe that there were many benefits to going into further detail.

John Dodgson asked if there was a certain critical size required to achieve benefits. Dan said that benefits appear to start for quite small areas.

Michael Spackman (NERA) said that increases in productivity might not equate to a similar increase in welfare, as there might be some negatives such as more crime. Has any work been done on welfare costs? Dan said that this had not been included in his work.

Gerard Whelan (MVA Consultancy) enquired as to the robustness of findings: how much variation is there among different types of analysis? Dan agreed that there is a lot of variation, indeed changes in methodology could make aggregate benefits disappear, depending on how the model is specified. Agglomeration benefits do not vary much over time: adding in time effects can make them disappear altogether.

Robert Cochrane asked about the time and cost. Using generalised time can cause benefits to be double-counted, hence the use of distance in Dan's research. There was evidence of benefits for journeys of up to 60-80 minutes, but little for longer journeys such as London to Manchester.

Ian Sheppard (WSP) asked whether, if benefits vary so much, we can measure but never predict. Dan reiterated that they may not be linear, but are stable over time.

Report by Peter Gordon

Myth and reality in the search for the wider benefits of transport: reflections on SACTRA ten years on

Professor Roger Vickerman

Centre for European, Regional and Transport Economics
University of Kent, Canterbury

INTRODUCTION AND MOTIVATION

Roger Vickerman began by indicating that transport as a determinant of land use and economic development (the wider economic benefits) is the subject of much controversy. “What determines what” is the root of the controversy, since transport economists worry about detail but do not talk to urban and regional economists. Getting them together is very important to understanding the mechanism of urban areas.

Formal appraisal techniques tend either to exclude the possibility of wider economic impacts, because of the fear of double-counting, or simply to include an arbitrary add-on. Recent work has improved our understanding of the way in which accessibility affects the performance of firms, the public sector and labour markets. However, the empirical evidence remains problematic because there are endogeneity and causality questions, conflicts between macro- and micro-based estimates, and interrelationship and spillovers between different areas.

This has two policy implications for transport infrastructure:

- Underinvestment could lead to lower growth and congestion
- Overinvestment could lead to problems for public budgets and negative externalities associated with over-expansion

Roger’s presentation covered seven main issues:

- The SACTRA Legacy
- Transport and the local economy
- Transport policy objectives
- The agglomeration issue

- Looking for evidence (through macro, market and micro studies)
- Implications for appraisal
- Implications for policy

1. THE SACTRA LEGACY

The SACTRA report “Transport and the economy” marked a watershed in the treatment of Wider Economic Benefits (WEBs). It provided detailed analysis of CBA variants but needed to ensure consistent results. It codified how imperfect competition in transport-using markets could produce both positive and negative WEBs and identified developments in modelling and appraisal to allow for WEBs.

There are two key issues for appraisal:

- The two-way road effect – does investment suck benefits in or out?
- The unlocking argument

Computable General Equilibrium (CGE) models have a role particularly in the development of transport’s role in regeneration and the impact on land use and labour markets, which had been overlooked before. Regional and spatial specificity in transport is also an important aspect since it cannot be assumed that the results from one location apply elsewhere – as implied from the “New Economic Geography”.

2. TRANSPORT AND THE LOCAL ECONOMY

Transport has a multiple nature since it is a derived demand, a substitutable input and an engine of growth. Transport infrastructure affects accessibility between and within urban areas, and moving around urban areas is probably more important than between them because of the “two-way” road effect and internal efficiency.

3. TRANSPORT POLICY OBJECTIVES

Transport is over-burdened by being over-relied upon to solve all of a region’s problems and because it is subordinate to wider policy interests.

Where policy involves significant capital expenditure it may also be inefficient, leading to overinvestment. However, if the wider benefits of

transport are significant and if appraisal techniques ignore them, there will be underinvestment. This is compounded by a real shortage of skills.

Transport has more complex impacts on output and growth. Improved transport leads productivity growth and reduces costs to industries, which become more competitive. This can also lead to changes in the location of activities and employment growth, but it should not be assumed that transport will solve all the problems.

4. THE AGGLOMERATION ISSUE

The “New Economic Geography” provides the necessary linkages where transport costs are a determinant of the price of an urban location and hence of the real wage, going beyond the simple value of time savings as a transport benefit.

The theoretical basis of agglomeration in increasing returns, transport costs and market size, linkages in the local economy and the role of real wages in cumulative causation lead to the question: “Is agglomeration universal and inevitable?”

Agglomeration benefits in labour markets can be seen in changing participation rates, increased working hours and moves to more productive jobs. The increased size of commuting areas has impacts on productivity and wage differentials.

5. LOOKING FOR EVIDENCE

Roger outlined the evidence for wider economic benefits. Theoretical explanations and numerical simulations demonstrate relevance, but useful application, importantly, requires empirical evidence based on real data.

He felt that such evidence is not straightforward, depending on the geographical scale of the empirical study, the unit of analysis and the ability to control for other factors which determine urban development. Three levels and types of study were looked at: macro aggregates, individual markets and the behavioural responses of individual agents.

6. IMPLICATIONS FOR APPRAISALS

There will be a need to move towards a more theoretically correct CBA, that recognises externalities and imperfect competition, and to make

models proportionate to the scale of projects, linking estimates and network effects.

Wider benefits will have to include user benefits (journey time savings), and the effects on agglomeration, competition and labour market.

Evidence will be required at a more detailed level than is typical in CGE studies.

7. IMPLICATIONS FOR POLICY

Simple rules are dangerous: both investment in transport and lack of investment can damage your health.

Appraisal rules need to be comprehensive but transparent. Decisions have to be robust and clearly understood by all stakeholders.

Levels of decision-making will need to be considered with the effects of spill-over between different levels and the problems of policy refraction in a multi-level system of government. Policy makers must also be mindful of jurisdictional competition and the problems of over- or under-investment.

CONCLUDING REMARKS

We have come full circle on wider benefits, from “transport is critical”, to “beware double counting”, to “wider benefits are the key”, but there is a need to beware of all simple rules in transport appraisal.

Much remains on the research agenda with

- Imperfect competition and the productivity gains from transport
- Micro-behavioural evidence
- Link versus network effects
- Spill-overs and jurisdictional competition
- More ex-post studies: does transport investment really make the difference claimed?

QUESTIONS AND COMMENTS

Robert Cochrane asked if anybody is thinking through what models are required and how to test them. Roger replied that there is theoretical modelling about the shape of models but a more practical purpose is to take a holistic view of the (investment) programme and what does matter to the rest of the network. CGE modelling can be valuable to see where the benefits occur relative to the location of the investment. This makes it a bigger issue to resolve.

Peter Mackie suggested that the link between incremental investments as opposed to the “grand plan” lead to questions of “Where do we need to be in 2050?” and “Multi-pole versus single city?”.

Report by Laurie Baker

Transport analysis and review

Vicky Cadman

Economic Adviser, Department for Transport

Department for Transport (DfT) investment appraisals aim to take into account all costs and benefits, using New Approach to Appraisal (NATA) to assess the costs and benefits of the proposal as fully as possible.

In 1999, SACTRA identified conditions where wider impacts of transport could exist and would be additional to time and money savings. They would therefore need to be estimated separately, and incorporated within the investment appraisal framework. To make a full assessment of the costs and benefits, whether an investment is worthwhile, it is therefore necessary to assess these “Wider Impacts” (WIs).

The 2006 Eddington Study, with its focus on “the economy”, estimated the impacts for a number of schemes and reviewed a lot of evidence. It set in train further work to build the evidence base and application tools, and to assess WIs routinely.

There has been much interest and motivation to move forward the evidence and tools for assessing WIs: The Department for Business, Enterprise & Regulatory Reform (BERR) and the Treasury have been interested as they are keen to understand how transport contributes to productivity. Regional Development Agencies (RDAs) are keen to understand how transport will support their regional strategies.

DfT has aimed to establish the theoretical basis for WIs, to ensure that it understands how to estimate “additional” impacts and avoid overlap with user impacts already appraised. Understanding the theory helps to avoid this.

DfT has worked to populate the theory with evidence to provide a practical method that provides estimates. In 2005 it published a discussion paper, with a broad approach to estimation, and has since been working to refine this and produce NATA guidance.

Appraisal guidance will cover three WIs:

1. **Productivity impacts from agglomeration**: falling transport costs may increase the level of agglomeration as they effectively bring firms and workers closer together, and in some cases there may

be some actual relocation of firms and workers. More agglomerated areas generally have higher productivity, and the productivity impacts are estimated from the change in the level of agglomeration.

2. **Productivity impacts from labour market effects**: labour supply and the move to more or less productive jobs. Where transport interventions affect the costs of "accessing" jobs there may be changes in the level of labour participation and location of jobs as a result of the transport scheme. Both may affect productivity by bringing unemployed resource into or out of use, or by moving employment into more or less productive locations.

3. **Welfare gains from increased output in imperfectly competitive markets**: output in imperfect markets is often lower than it would be in a perfectly competitive market. If transport costs fall this may allow for increased output and welfare gain because the willingness to pay for the additional output exceeds the cost of production.

Vicky produce the diagram overleaf, which shows the NATA benefits and WIs together.

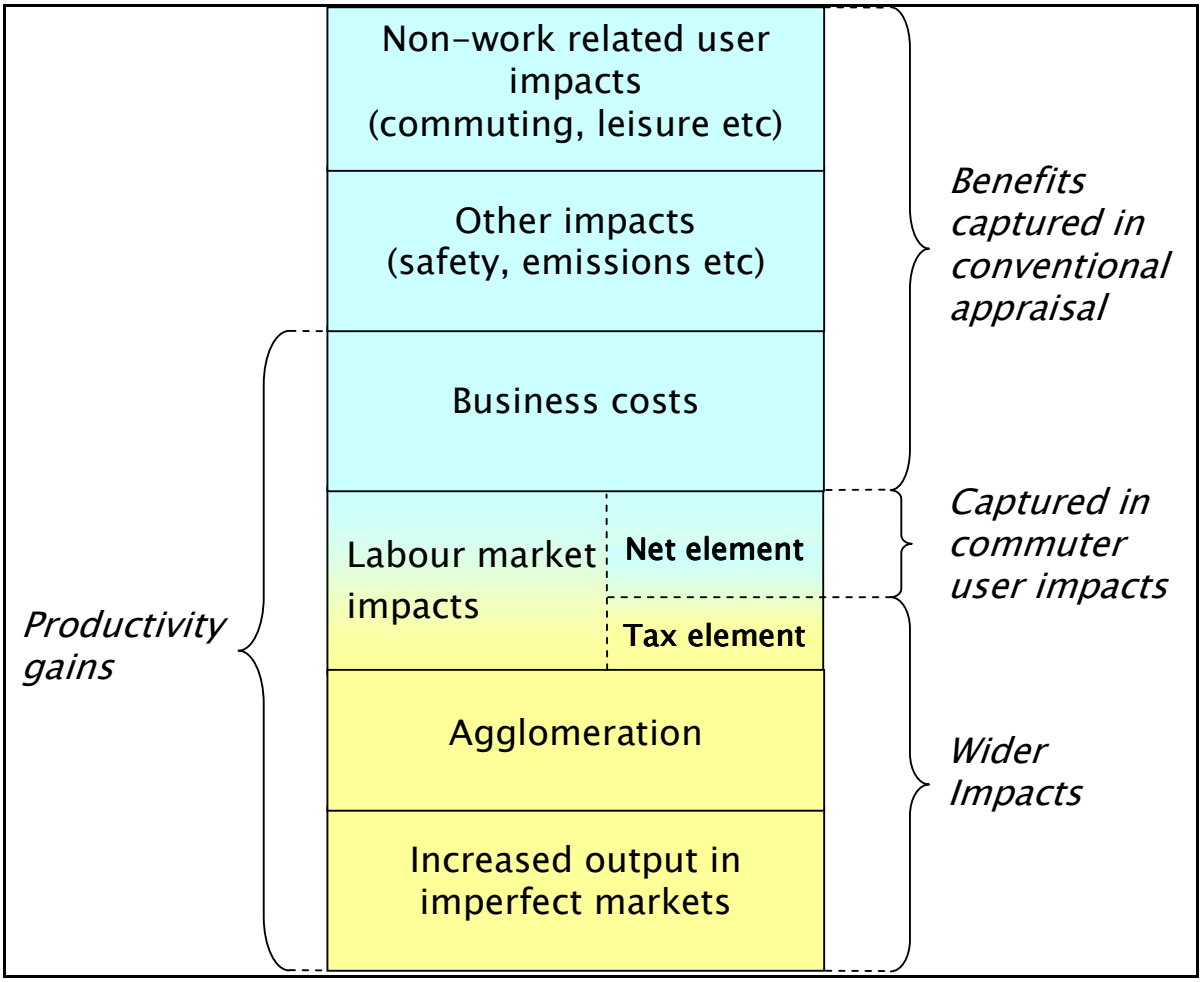
The upper areas represent conventional user impacts and the lower areas represent WIs that arise from market distortions. The diagram aims to show overlap between impacts.

The labour market impacts straddle the conventional/WI area because some labour market impacts are captured in user benefits and others are wider impacts. As a example, consider increased labour supply: if extra people decide to join the labour force there will be an increase in total GDP equivalent to how much they produce. The new workers benefit by the amount of the wage they take home. This benefit is already measured in NATA in commuter user benefits, which reflect the new workers' willingness to pay (WTP) to travel, and that will reflect the net wage they get back from travelling. This part of the labour supply impacts is not therefore a WI.

However, there is a WI, because the new workers are paid less than their full contribution to GDP from joining the labour market. They benefit by being paid a wage net of tax, but their full productivity is more, equivalent to the gross wage for their work. The wider impact is therefore the difference between the gross wage (the full amount of output they produce) and the net wage they are paid from working. The issue here is

isolating the social gain, which in this case is the difference between the gross wage and the net wage – the tax wedge – this is a WI.

Figure 1: Wider Impacts (WIs) in appraisal



WIs are also considered to result from changes in trade flows and foreign direct investment (FDI). These are not included here, or in forthcoming appraisal guidance, but DfT is working to develop the evidence base.

Vicky noted that there had been much discussion of the evidence and research on WIs, especially agglomeration. In transport appraisal, DfT aims to make use of the best available evidence to assess WIs. It is important to do this obtain a full picture of the costs and benefits and to get the right investment package. Vicky therefore presented a brief summary of the evidence for each of the WIs in the current appraisal guidance:

- Agglomeration: Dan Graham's evidence on the agglomeration-productivity relationship was applied here. Recent estimates of

"distance decay" of agglomeration are also used to reflect the declining importance of agglomeration interactions over longer and longer distances.

- Labour market: two impacts were discussed with two key pieces of evidence:
    - Labour supply: return to work labour supply elasticities are the key piece of evidence here and are applied to changes in wages (net of transport costs), assuming that transport costs feed into return to work. The elasticity is sourced from the Department for Work and Pensions.
    - The move to more productive jobs: if employment is relocated this may affected productivity, since jobs are more or less productive in different area. DfT has an index (produced by ITS Leeds) to estimate net productivity impacts for changes in employment location. This index controls for individual, employer, firm and industry effects on productivity differentials to obtain a pure regional effect on productivity differentials.
- Increased output: the impact arises from the reduction in transport costs allowing for increased output, with the welfare gain from difference between willingness to pay and the cost of production. The additional benefit is an uprate (V) on standard business user benefits, determined by the price cost margin of firms and elasticity of demand. The evidence used is from a number of sources, including a number of the SACTRA authors.

As an example of how the evidence is used, Vicky gave an overview of the modelling of agglomeration, which tends to be the largest of the WIs.

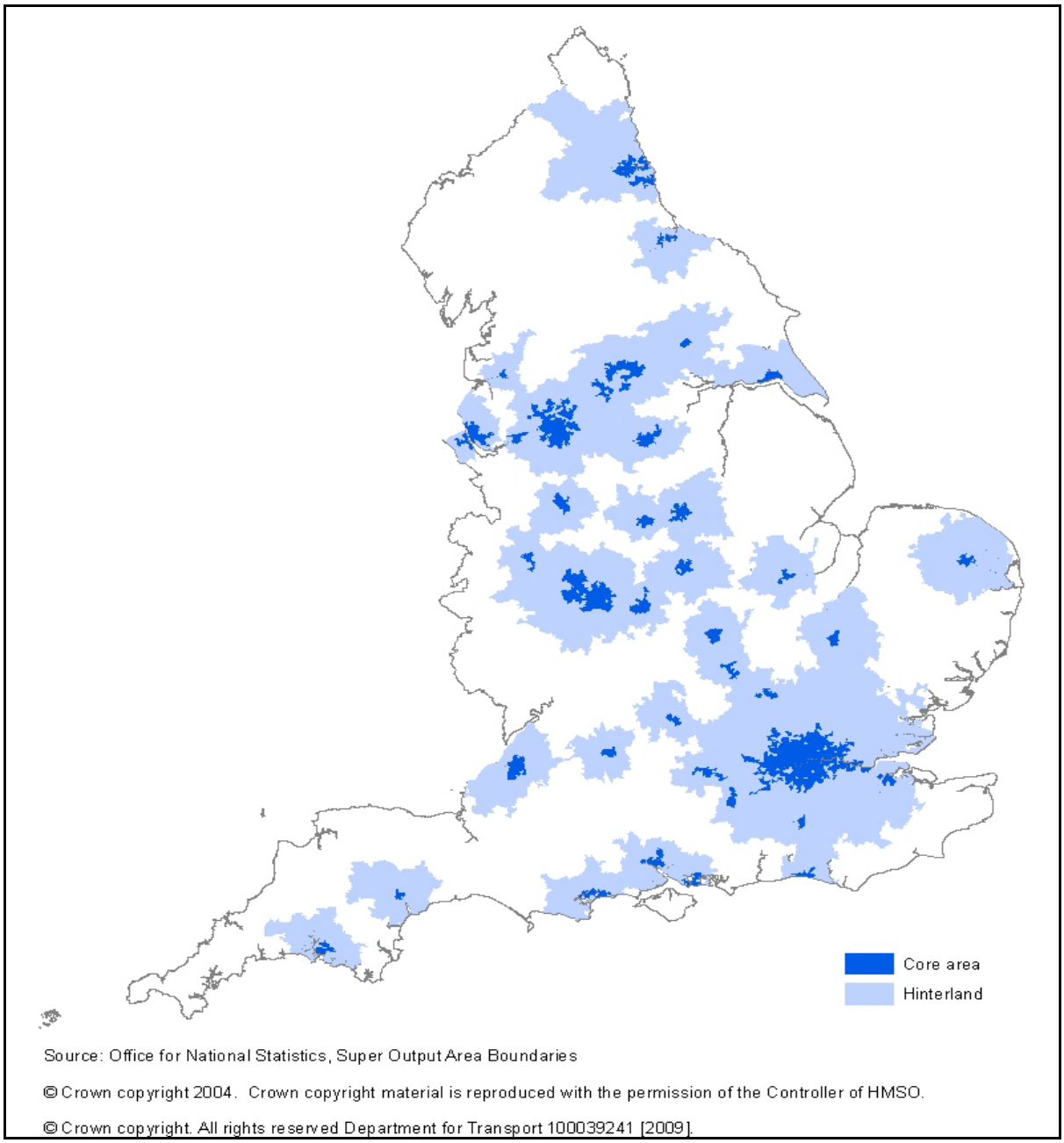
The assessment would estimate the impact of the scheme on generalised costs and trip numbers. Taking this information for the base case (no intervention) and the alternative case (where the intervention is in place) enables the estimation of the base and alternative level of agglomeration. If there are also modelled changes in land use that affect employment, then these changes are also fed into the estimate of effective density. From this, productivity impacts from changes in effective density can be estimated.

Vicky noted that there is a strong geographical aspect to agglomeration. There is good evidence that suggests that cities – big ones in particular – are very productive, and theory backs this up. Transport schemes can

increase the level of effective urbanisation, which would affect elasticities of demand as in the case above. Given the geographical aspect to agglomeration, DfT aims to provide advice on where agglomeration impacts are likely to be most significant and worth appraising.

Vicky then showed a map of Functional Urban Regions, now known as FURs, which helps manage the appraisal burden for scheme promoters.

Figure 2: Functional Urban Regions (FURs)



The term FUR taken from work by the Group for European Metropolitan Areas Comparative Analysis (GEMACA) to identify areas or regions according to economic activity rather than administrative boundaries.

Each FUR is constructed by defining a core and then identifying a corresponding commuting field (or hinterland) for that core. Wards are examined in a contiguous fashion building outwards from each core, with wards being added to a core's commuting field until a ward does not meet the two commuting thresholds set. The core plus its commuting field then constitutes a FUR.

DfT originally intended to make WI assessment mandatory for all schemes, but to be practical about the appraisal burden instead makes use of geographical information to provide a first guide on where impacts may be most significant. If a scheme falls within a highlighted (light or dark) FUR, a WIs appraisal should be undertaken.

Agglomeration impacts should be appraised for schemes within a FUR, although this does not mean that all scheme in a FUR will have significant WIs. The further from the centre of the core, the smaller the agglomeration impact is likely to be. The geographic scope of agglomeration is reflected in the analysis through the incorporation of the "distance decay" factor, which makes each employed person less important to another employed person's productivity over longer and longer distances. Because of the distance decay, schemes could cover long distances across a number of FURs and still have small WIs because they do not necessarily increase accessibility within a FUR area.

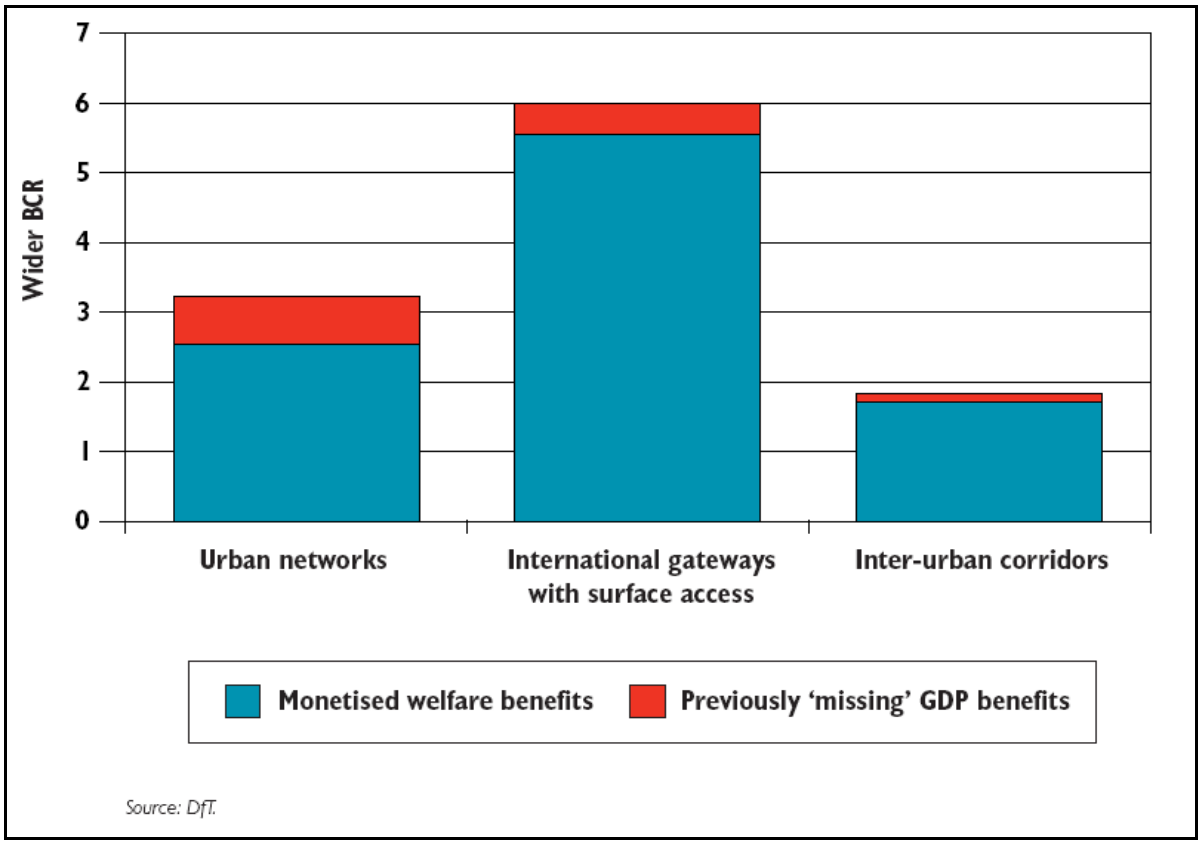
The maps cannot therefore be used to identify if interurban schemes should assess agglomeration, which needs to be discussed on a case-by-case basis. The concept of the FUR is clearly focused on the idea of "urbanisation", not "localisation", economies. There may be schemes outside the highlighted areas where the scheme appraisers expect there to be impacts such as on clustering of industrial activity. In these cases assessment of agglomeration is also relevant.

The wider impacts as assessed to date give a range of benefits from 0-30% of user impacts. The impact is generally higher were:

- Productivity or density elasticity is high, reflecting the sectoral mix in the area
- Density is higher: there is more employment, and it is more productive
- Gross value added per worker is higher across the area

The chart below the wider impacts (upper bar), relative to the conventional impacts (lower bar) for a sample of schemes assessed for the Eddington study. The missing impacts are not huge, but are most significant for the urban schemes, where they are likely to affect benefit-cost ratios (BCRs) and the overall performance of schemes. For urban schemes in this sample, they increase average BCR from around 2.5 to over 3.

Figure 3: average economic returns from government expenditure with GDP impacts added in: wider BCRs



Transport schemes will deliver higher productivity gains from agglomeration in cities than in more rural locations. To deliver productivity gains, especially from agglomeration, then cities should probably be the area of focus.

Progress is being made with appraisal guidance, and consultative web Transport Advice Guidance (WebTAG) appraisal guidance will be issued in April 2009. This will be somewhat prescriptive, to achieve consistency where appropriate, and will offer advice on the types of schemes where impacts matter.

This will be supported by software and an economic data set. Maps in the TAG will help guide the need for assessment and ensure that assessment is consistent.

After comments have been taken on board, an “In Draft” Guidance will be released later in 2009, with the Guidance to be formal by April 2010.

RESEARCH AND FUTURE WORK

DfT recognises that appraisal of productivity impacts is not always straightforward and that the evidence base could be strengthened further. More research is needed on the economics and on modelling development, particularly on:

- Modelling tools to capture land use impacts, by looking at models available across different areas, and considering the challenge of capturing land use impacts over time.
- Integration of rail and multimodal models, to ensure that agglomeration measures capture costs from origin to destination, and do so consistently where necessary.

Understanding and estimating the sources of agglomeration is also seen as important, to ensure that the appropriate weight is placed on benefits to different users, to reflect the importance of different user impacts in facilitating gains from agglomeration.

DfT is also carrying out evaluation work, testing a method produced by Overman and Gibbons at LSE to assess productivity impacts of transport for particular transport schemes. This would assess if the impacts have materialised for the schemes which have been built.

QUESTIONS AND COMMENTS

Mary Acland-Hood welcomed the redefinition of WIs, but asked where the negatives are? Cases have arisen with wider productivity impacts estimated as positives, but there was no reason why the method would not also come up with negatives, such as employment moving away from the centre. Vicky said that DfT also noted that the NATA framework would assess wider impacts of schemes such as on the environment, social and distributional impacts. These would be assessed whether positive or negative.

Adrian Holloway (Bedfordshire County Council) said that he couldn't spot Bedford on the map! Vicky replied that the map is indicative, but gives an idea of where agglomeration might be most significant, to help the appraisal burden. There may still be schemes not in the FURs where agglomeration impacts are significant. Agglomeration assessments for schemes off the map would still be considered by DfT.

Steve Lowe (MVA Consultancy) noted that the distance decay factor was larger than the currently assumed value of 1, and asked if this would mean fewer schemes in rural areas. Vicky said that the WIs would put urban areas on a more even footing with rural areas. Currently investment costs are higher in urban areas, reflecting the higher productivity in them. Future appraisals would include benefits that in turn recognise higher productivity in urban areas. It was also noted that the DfT appraisal still includes an assessment of regeneration and distributional impacts, which would allow decision-makers to consider all of these factors before deciding if a scheme should go ahead.

Robert Cochrane asked whether account had been taken of the revenue benefits from additional taxation, and if the labour supply impact was concerned with those who were unemployed. Vicky confirmed that the impact quantified the tax wedge from those previously opting out of the labour market and now choosing to work.

Davis Starkie wanted to know more about the imperfect market effect, as output in an imperfect market will tend to be less. Reduced transport costs allow for an increase in output in imperfect markets, and this output is valued by more that the costs of producing it. There is therefore a welfare gain, equivalent to a wedge on a competition diagram between the demand curve and the production costs, for the additional output.

Report by Peter Gordon

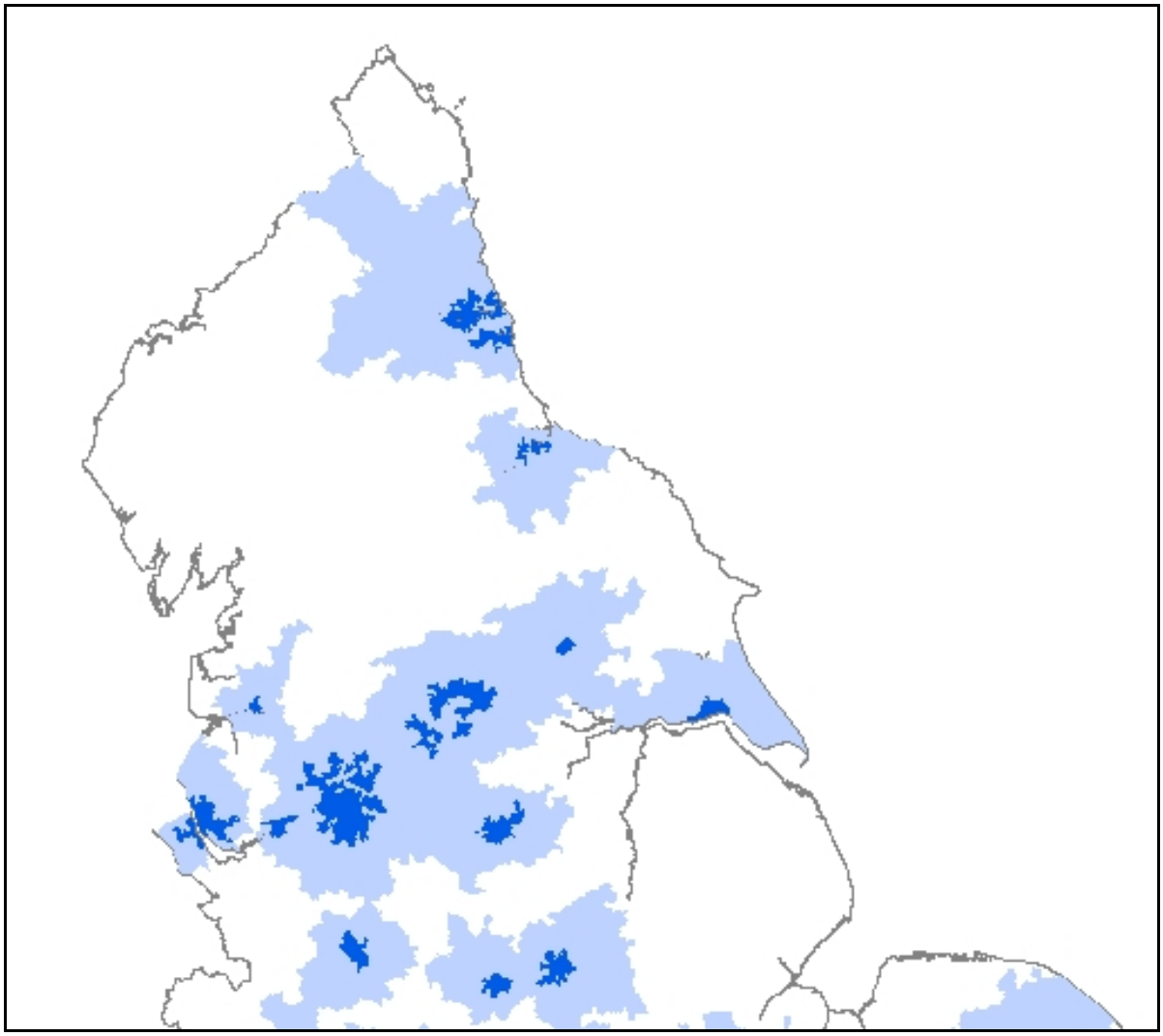
Open Forum

Peter Mackie first asked the speakers if they had any comments.

Tim Leunig noted again that car commuter journey time is not rising.

Dan Graham noted that Silicon Valley is not dispersed but asked if the growth reported by Tim was urban, interurban or freight.

Vicky Cadman pointed out that “Wider Economic Benefits” were now described as “Wider Impacts” (WIs) in recognition of the fact that they could be negative. A further issue is scheme boundaries, and even whether Great Britain is the right area when effects such as trade and FDI needs to be considered. Sometimes, however, there was evidence of where boundaries lay: the “FURs” map, an edited version of which is shown below, arguably suggested that “The Northern Way” should include Sheffield, York and Hull but not Cleveland or Tyne and Wear.



Vicky reiterated that new WebTAG guidance would be out to consultation in around a month, with the aim that draft guidance would be published by during 2009 and formal guidance in 2010.

Peter Mackie then reintroduced his four questions:

- Has the relevant theory and evidence base been clarified or improved?
- What is DfT's approach in relation to major/minor schemes; urban/interurban; policies/projects?
- Does the appraisal community have quality control over practical applications?
- What difference, if any, does the economic crisis make to these arguments?

He then invited general discussion on them.

HAS THE RELEVANT THEORY AND EVIDENCE BASED BEEN CLARIFIED AND IMPROVED?

John Dodgson (NERA) shared Tim Leunig's interest in the nineteenth century and noted that the social savings of road, canal and rail networks had all been studied. He wondered whether any more specific lessons from history could now be evaluated. For example, had any major transport schemes such as the Metropolitan Line, the wider London Underground, or the Merseyrail "loop and link" under the Mersey, brought agglomeration benefits? **Tim Leunig** said that no such studies had been done, for a number of reasons. For example, it was impossible to obtain even a definitive map of Great Britain's tram network, unlike rail. It was also impossible to obtain local year-on-year wage data, which was only available nationally, severely limiting the scope for econometric analysis at the regional level. Work with Stephen Glaister had hit the same problem in trying to evaluate the post-war development of the motorway network.

David Starkie understood that there are welfare gains from increased outputs in imperfect markets, but suspected that nearly all transport markets are imperfect, potentially leading to a "transport bias" in investment. Would not a more rational source of gains be working to reduce the market imperfections? **Vicky Cadman** agreed that this was a potential problem, if other government departments did not do similar

analysis. BERR was involved in the imperfect market work, but to a lesser extent than DfT, although Treasury is aware that DfT looks more widely than other departments. **Peter Mackie** agreed that the playing field is not currently level. **Roger Vickerman** pointed out that a solution of the imperfect competition problem would mean that WIs would be measured directly, and the same investments would still proceed.

Richard Davies (ATOC) wondered why WIs were different from the general valuation of value of time. **Dan Graham** noted that agglomeration is an increasing return to scale, and thought that travel time savings assume perfect markets, but suggested that Vicky Cadman might know better. **Vicky Cadman** thought that if gross wage data were available they might reflect some of the externalities. **Richard Davies** suggested that we could just use a higher value of time. **Tim Leunig** said that this would not work, as WIs were not a fixed proportion of time savings. In the nineteenth century, for example, value of time benefits were very high, as new modes were much faster than walking, but agglomeration benefits were still small. **Peter Mackie** agreed that there would still be different effects in urban and rural areas.

Gerard Whelan (MVA Consultancy) wondered whether there was an optimal city size. **Dan Graham** asked under what constraints, and optimal for what? **Tim Leunig** said that this would depend on the industry or industries involved, although it appeared that some third world cities were now too big, given the prevailing skill level. Might there be an optimum density? **Dan Graham** suggested that Hong Kong was very efficient. **Peter Mackie** noted that this issue would become complex in a multi-polar region of varying density, and the results would not necessarily be the same as if region was homogeneous, but it should still be possible to build quantitative models.

Peter Gordon (DeltaRail) widened the discussion to how the city size itself was defined, giving Tokyo, New York and London as examples. **Roger Vickerman** drew attention to the FURs chart. **Vicky Cadman** confirmed that various tools were available for defining boundaries, including employment density and the commuting field. **Peter Gordon** wondered about overlaps between, for example, Minneapolis and St Paul or New York City and Newark: in each case, how could agglomeration benefits be identified to a specific city? **Vicky Cadman** responded that agglomeration benefits were a property of a network or system rather than of a location. **Dan Graham** noted the concern, and didn't use cities in his work because of the difficulty in defining boundaries. The safe approach was to model "access to economic mass": rather than define a boundary, ask "What can I access?" **Peter**

Mackie asked how one would select a study area for, for example, a lower Thames crossing? The results might be sensitive to the choice. **Vicky Cadman** said that this issue had been considered. One could start "UK-wide" in a perfect world, but there was the distance decay effect, enabling a view to be taken on how far economic effects spread. **Roger Vickerman** was still concerned that the beneficiaries of a lower Thames crossing might be "all over the place": most obviously the Channel Tunnel probably benefits distant places more than local ones. This suggested that the distance decay might be discontinuous.

David Starkie asked whether this meant that London could derive agglomeration benefits from links with New York? (4.2 million passengers flew between London and New York in 2007, equivalent to nearly 6,000 each way per day). **Peter Mackie** agreed that this was an interesting question – Are the issues different, or the same but on a different scale? – and invited **Emily Bulman** (NERA) to comment. NERA is doing work for Vicky Cadman, looking at the WIs from international business, such as the effects of tourism and inward and outward FDI. The work is ongoing, but there are issues specific to international business, and the evidence is that there are externalities. NERA has found little research on how transport affects trade, but there is a lot on how trade and FDI affect productivity. As with agglomeration, a key issue is whether endogeneity has been dealt with correctly. So far, however, there is little evidence that agglomeration benefits exist in the London-New York pair.

WHAT IS DFT'S APPROACH IN RELATION TO MAJOR/MINOR SCHEMES; URBAN/INTERURBAN; POLICIES/PROJECTS?

One attendee was concerned that agglomeration would itself generate more traffic and wondered how this would be dealt with if it happened. **Vicky Cadman** distinguished the needs to estimate agglomeration over time and how it would affect travel subsequently. Travel costs and demand could be picked up in a model and, if the employment effect of WIs is estimated, Land Use Transport Interaction (LUTI) models will estimate the transport effects. Thus there was a linkage back to demand, and it would be possible to feed this back to productivity and iterate, but this begged the question of how many times. Peter Mackie sought the view of **David Simmonds**, who added to Vicky Cadman's point that there is an issue of labour supply effects, and hence a potential interaction between land uses and their impacts. The focus is on the **supply** of labour, but the guidance and the underlying work are silent on where people will find jobs, and the elasticity of demand for labour is

unclear. Adding these effects to models raises practical problems. He has tried this in one area but it is difficult to model a change in **demand** for labour, particularly if this means a model in which neither attractors nor generators are constrained. He reported making progress on modelling methods to predict increased demand for space leading, for example, to the redevelopment of derelict railway arches.

Robert Cochrane felt we are trying to find ways to connect into these valuable tools without needing to understand the details of the theory. For example, in the long term it seems that congestion pricing is inevitable, although we are already taxing motoring at levels which some argue are very high. Are we double-counting, or over-taxing? He didn't want a specific answer, but wondered what Vicky Cadman's advice would be to those evaluating urban congestion charging schemes. **Vicky Cadman** said that the key thing was to look at all impacts, as expected by NATA, and to check how the scheme works against all objectives, although options should have been designed with the objectives in mind. This approach would, hopefully, eliminate double-counting from the scheme set. **Tom Worsley** added that there was guidance in WebTAG, which also suggested modelling high and low values of time to get the pricing-off effect right. There was, however, a difficulty in modelling a large number – let alone a continuum – of values of time in current models.

DOES THE APPRAISAL COMMUNITY HAVE QUALITY CONTROL OVER PRACTICAL APPLICATIONS?

David Metz (University College London) had no doubt that agglomeration benefits exist, but asked how sure we were of their magnitude. Current methods are "opaque". Detroit had gone as a centre for motor manufacturing and Fleet Street, which survived from 1700 to the 1980s, is now gone: why? Was this printing technology change and, if so, why are editorial offices now scattered from Kensington to Canary Wharf? He thought that the objectives had been to break restrictive practice and to release land values. How could this be fitted into a conceptual model assuming agglomeration benefits, which did not seem very important in this case, particularly if the restrictive practices were seen as a form of agglomeration disbenefits? Similarly, was the agglomeration of financial services a good idea, or had it merely led to a massive disbenefit through "groupthink"? Warren Buffet, in Omaha, might be the exception that proved the rule. David felt that the bigger picture was the rise and decline of cities: was the latter due to out-competition or agglomeration disbenefits, and where was the evidence

that transport was more than a second-order consideration? **Tim Leunig** noted that the Fleet Street journalists had at least remained in London, and that academics in London are heard more, which may not be fair but is a fact. On the possible agglomeration disbenefits in financial services, Northern Rock, RBS and HBOS were all based outside London. **Roger Vickerman** wondered whether the real issue was "Cities reinvent themselves: how do we facilitate this?" and that transport was one element of the solution. He thought that there was good evidence that transport had constrained reinvention in areas such as Docklands. **Dan Graham** noted that people pay to locate in central London or Silicon Valley. Agglomeration raises prices and adds congestion, so there must be some outweighing factor. He has done classic hypothesis testing: does David Metz think that the results are evidence-based? **David Metz** was not suggesting that the work was biased, but he expressed caution, given a history of optimism.

Dominic Walley (KPMG) wondered how well RDAs and others looking at transport at the regional level were weighing the research on WEBs against other approaches. **Vicky Cadman** confirmed that analysts in different parts of government do talk, and that she had had discussions with the Treasury Green Book team. There were good contacts not only across Whitehall but also with the regions, RDAs and the consultants who work for them.

Gregory Marchant asked if all agglomeration is the same. Hull and Brighton & Hove are similar-sized one-sided conurbations bounded by water, but the latter might also be influenced by the presence of London. **Peter Mackie** suggested that their relative isolation would be picked up by the modelling. **Vicky Cadman** said that differences in the cities' economic sectors, employment levels and distances from other activities would all be picked up in the appraisal, but she agreed that agglomeration would probably have different effects in each.

Michael Spackman wanted to consider the wider issues of the seminar title. Is DfT optimally focused, or has it been distracted by WIs? Stephen Glaister, for example, might say that Road User Charging was the key issue. **Vicky Cadman** agreed that recent conferences and seminars had focused on WEBs, but DfT still does a lot of conventional work, such as the whole NATA refresh. However, DfT also has to work within the government policy environment, which does affect where analysts are allocated. **Tim Leunig** felt that Stephen Glaister would still say that there is a need for more roads and that the case rests partly on WIs. The problem is the political bosses' lack of evidence-based policy: they have rejected schemes for which Eddington found benefit-cost ratios of 10.

John Swanson (Steer Davies Gleave) wondered at what size scheme it became worth investigating WIs? Vicky Cadman said that the scheme size was less of an issue than the agglomeration impact, but there was an issue of practicality. The consultation will suggest a threshold of £20 million for schemes in the FURs map.

Martin Brazil agreed with all the points which had been made, but felt that a lot of the rail network should have been scrapped. He felt that it was bizarre that motorways such as the M1 had fewest lanes on the urban approaches where demand was highest. He foresaw long term decline and was sceptical of some of the claims for some schemes now being examined.

WHAT DIFFERENCE, IF ANY, DOES THE ECONOMIC CRISIS MAKE TO THESE ARGUMENTS?

Stephen Howard asked why we have less rail electrification, high speed line and light rail than other countries and in particular have few rolling programmes. Would we get economies of scale if we approved programmes, rather than schemes, within a long term strategy? **Roger Vickerman** agreed that there was some benefit in having an idea of where we are going, but noted that even France is “pushed off course” by, for example, regional politics. Plans should not, and possibly could not, be followed slavishly. **Stephen Howard** added that TGV has moved on, and that the latest is very different from the first. **Tim Leunig** felt that there is a need for proper ex-post evaluation, but this is done in neither Great Britain nor France, and it was not clear that France had done better. We sometimes do it well: BR had had a rolling plan for trains of the Class 455 family, and the Networker family operated everywhere from Oxford to Kent. There were also differences between Great Britain and France, such as the distance between cities. Finally, rail electrification was expected to save 3 minutes between York and London and 2 minutes between Bristol and London: there were unlikely to be material agglomeration benefits!

Peter Mackie thanked all the speakers and drew the proceedings to a close.

Report by Dick Dunmore

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TEG TRANSPORT ECONOMISTS' GROUP

The Transport Economists' Group, formed in 1973, provides a forum for people involved in transport economics to meet regularly and discuss matters of mutual interest. Membership is open to economists working in transport and others whose work is connected with transport economics.

The aim of the Group is to improve the quality of transport management, planning and decision making by promoting lectures, discussions and publications related to the economics of transport and of the environment within which the industry functions.

Meetings are held every month from September to June (except December) at Arup's Central London HQ at 13 Fitzroy Street. The meetings consist of short papers presented by speakers, drawn from both within the Group's membership and elsewhere, followed by discussion.

The Group's Journal, "The Transport Economist", is published three times a year reporting on meetings and other activities of the Group. It reviews recent publications of interest and contains papers or short articles from members. The Editor welcomes contributions for inclusion in the journal, and can be contacted at peter.gordon@deltarail.com.

The current membership of over 150 covers a wide range of transport modes and types of organisation. Members are drawn from transport operators, consultants, universities, local and central government and manufacturing industry. All members are provided with a full membership list, updated annually, which serves as a useful source of contacts within the profession. Applications from people in all sectors are welcome.

Applications for membership should be made on a form obtainable from the Membership Secretary at gregorymarchant.teg@btinternet.com.

Alternatively, an application form can be downloaded from the Group's website: www.transecongroup.org.

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Seminar on Cities, Transport and the Economy

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