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Agenda

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Do small savings in travel time matter?

In October, we looked at the importance of connectivity in appraising transport schemes. Another element that is relevant in such appraisals is how time savings are treated. It has been suggested that aggregating lots of small time savings to road users resulting from road improvement schemes makes little sense when they might not be noticed by the beneficiaries, or get swallowed up by travel time unreliability. Oxera Associate, Chris Riley, argues that, when it comes to time savings, size does not really matter

The UK government's Comprehensive Spending Review has highlighted the importance of assessing the value for money of different types of public spending.[1] Decisions about which categories of spending should be cut, and by how much, are necessarily influenced heavily by politics, but economic appraisal also has a vital role to play. How do we ensure that the best value is obtained for the general public from necessarily limited resources? Economists attempt to answer this question by estimating the impact on welfare of alternative options for spending, and taxation. The bible that sets out the approach to be used for appraising government projects in the UK is the Treasury's Green Book.[2] Individual departments tailor the appraisal guidance for their own specific areas in light of this overarching guidance from the Treasury.

The appraisal of transport schemes is a technically sophisticated process, and has been developed in a way that purports to generate explicit measures of value for money that permit conclusions to be drawn about the absolute and comparative merit of individual schemes. The UK Department for Transport (DfT) guidance is web-based; the New Approach to Transport Appraisal (NATA) is set out in great detail in WebTAG.[3] The impacts taken into account in appraisal are grouped under headings that describe key goals and challenges for transport policy, and aim to cover the three pillars of sustainability—environmental, economic and social—using the best available data and analysis. Wherever possible a quantitative approach is used, usually based on detailed modelling, with impacts ideally translated into monetary terms to permit direct comparison of costs and benefits. Most of the economic and safety impacts are handled in this way, and monetary valuation has now been extended to the measurement of a number of environmental impacts including CO_2 emissions, air quality and noise. Where monetary valuation is not possible, physical measures or scores are mostly used, and as a minimum a qualitative description is required.

Despite the seeming sophistication of transport appraisal methodology, however, which is greater than that employed in most other government departments, it remains a contentious subject. Aiming for a highly explicit and transparent approach to measurement, whatever its merits in the context of objective decision-making, inevitably exposes the methodology to detailed criticism and complaint. A consultative exercise to 'refresh' the NATA in 2007–09 led to relatively few changes, and opponents of the approach have continued to assert that it has major defects. Among the main issues of contention are the following.

- Appraisal and modelling are too often confined to analysis of narrowly defined transport impacts, such as journey time savings, and give insufficient attention to land-use impacts and other dynamic and longer-term effects that deliver wider economic and social benefits.[4]

- Impacts in the more distant future, up to the full 60-year horizon required by WebTAG, are so uncertain that they should be discounted at a much higher rate than the standard 3.5% social discount rate used in government appraisal.[5]

- Environmental and safety costs should not in general be monetised, because they are too important to have a price tag put on them. Some critics argue that some things—'a person's life, for example, [or] ... the habitat of an endangered species ... have an infinite value'.[6]

The views expressed in this article are those of the author.

- Cost–benefit analysis, with its focus on the concept of social welfare, is a technique built on foundations of sand.[7] No attempt should be made to weight different factors or calculate an overall score. Much better would be to use, at least until we can do better, 'a simple filtering process to discover which programmes really do meet agreed objectives'.[8] Alternatively, we could focus just on measurable impacts on economic growth.

Some of these criticisms have a firmer grounding than others, although the merits of these arguments will not be discussed in detail here.

Another persistent complaint relates to the measurement of travel time savings and the important role they play in most transport appraisals. For many appraisals of transport infrastructure projects, savings in time travel account for a high proportion of total benefits, and projects which deliver no time savings, such as many of those often referred to as 'smarter choices', are put at a disadvantage.[9] First, it is argued, quite rightly, that the economic benefits of improved transport go well beyond time savings, enabling changes in land use, productivity and employment which the direct effects on journey times do not measure. The approach to measuring 'wider economic benefits' recently introduced into WebTAG is a move in the right direction, but arguably doesn't go far enough. As noted above, high quality dynamic modelling of all the impacts of a transport scheme is needed to capture these effects, but this generally does not happen.

A related criticism is that average daily travel times hardly change over time, which suggests that people prefer to make use of journey time improvements by taking longer journeys, because more distant places and people become more accessible, rather than by spending less time travelling.[10] However, this is an issue about model elasticities that determine the response to time savings, and does not contradict the notion used in appraisal that these time savings are a key driver of transport benefits. Transport yields benefits because of the connectivity it provides, which can be broken down into the destinations available and the generalised cost of reaching them.[11]

The second strand of criticism of the present treatment of time savings is whether it is right to attach the same value of time to very small savings as to larger savings. A number of commentators argue that adding together very small time savings for a very large number of transport users, which can imply large aggregate time savings, gives a misleading impression of the scale of the benefits obtained. They argue that substantial savings obtained by fewer people, for example users of a significantly improved train service, are worth more than very small savings to a large number of people—for example, by improvements to a small section of a busy and congested road. Not surprisingly, this argument finds particular favour with environmental lobbyists, who argue that the present appraisal system unduly favours road schemes and discriminates against public transport.

Proponents of this view cite research evidence which suggests low or negligible unit values of time for very small time savings. Analysis by the Leeds Institute of Transport Studies (ITS) of stated-preference data from a 1999 study by AHCG,[12] for example, suggests that while unit values of time savings above about ten minutes are similar to values for higher savings, unit values of savings below this level are significantly smaller, and for savings below five minutes they are negligible.[13] This conclusion has not been overturned by subsequent research.

Taking this evidence at face value in appraisal, however, is subject to two serious difficulties.[14]

- It implies a relationship between time saved and the marginal valuation of a minute saved. If the average value of, say, ten minutes or more saved is 5p per minute, but the value of the first five minutes is zero, the marginal value of the intervening five minutes must be 10p per minute, higher than for any other time interval. This is most implausible.

- It also implies that appraisal of a series of small schemes saving less than five minutes each would deliver little or no value, while a larger scheme delivering the same aggregate time saving but all together would deliver substantial benefits. Given that, on any objective measure, the gains to transport users would ultimately be the same in both cases, this does not obviously make sense.

In its advice to the DfT in 2003 on the value of time savings,[15] ITS Leeds put forward a model in which a 'perception mechanism' effectively reduced the weight given to savings below 11 minutes, with values close to zero for savings of less than five minutes. This fitted the data well and avoided another problem with freely estimated models: negative values of time for very low savings. It argued that there were various reasons why small savings might attract low values in stated-preference studies, including failures of perception or slack time buffers and scheduling constraints, while the true values were in line with those for higher savings. Accordingly, it recommended that the DfT should not discount the value of small savings in appraisal, and this is the approach currently adopted.

The ITS approach is a neat one which has clear theoretical advantages, but it invites the following question: if transport users perceive small savings

to be without value, however misguided that might be in some sense, why should this be ignored when prioritising transport investments and taking infrastructure investment decisions? More generally, why are 'perceived' benefits less important than some theoretical notion of 'actual' benefit? After all, our democracy is based very much on individual perceptions, irrespective of the reality, and it is accepted that this is the least bad option for our society.

This issue has parallels in the economic literature on 'happiness'.[16] It is well known that survey data indicates no upward trend over time in quantitative measures of happiness in society, despite measured growth in incomes, living standards, healthy life expectancy, education and public services. These factors can be argued to contribute unambiguously to better living conditions, as cross-section data implies, and most people would argue that this should make people 'better off', but changes over time appear to be discounted by the general public. Similar issues arise in measuring poverty: should it be measured in absolute terms, in relation to the levels of income and expenditure available to individuals, or in relation to the level of these relative to some average level? There is a good deal of evidence showing that what matters to people is heavily influenced by their expectations: if 'improvements' are expected but fail to materialise, people feel worse off than if no improvement had been expected. It may therefore be outcomes compared with expectations that have a particularly important role in determining people's perceptions of their welfare.

These considerations, however, do not lead the general public to stop clamouring for better health and education services, or for higher economic growth. They, and the politicians who represent them, may accept the need for public spending cuts in extreme circumstances, but prefer to focus on cutting waste rather than NHS services. Few people argue for lower economic growth or reductions in income. Considerable weight is therefore given in practice to improvements over time in these variables, which seems to be discounted in measures of 'happiness', when determining policy priorities.

Small travel time savings may be discounted by the general public when asked explicitly in a survey for a stated-preference study, but that should not be taken to mean that they have no value. Taken together with the theoretical objections noted earlier, this means that the approach set out by the DfT after the NATA 'refresh' exercise is correct: it is important to include small savings in the welfare measures used in transport appraisal, but it is also sensible to include measures of the distribution of savings to give an indication of how many people benefit and by how much.

That is not to say that no improvements are needed in how the value of travel time is treated in appraisal. There are still problems with the present approach, including:

- the use of constant values of time when the evidence points clearly to a positive relationship with journey length or distance;
- the use of wage rates to measure the value of savings in business travel time; and
- the assumption that time saved by business travellers using public transport has no value.

These problems need to be addressed so that the treatment of travel time savings can be improved in line with the available empirical evidence—and, as discussed above, better modelling of wider economic and other benefits is needed. Discounting small savings is not the right approach, and it is certainly not appropriate as a means of redressing any perceived bias against public transport in the appraisal system. If there is such a bias, which is unclear, the true reasons should be identified and addressed. The DfT has already taken, or is taking, steps of this kind, by:

- changing the treatment of indirect taxes, treating duty increases as a benefit rather than a reduction in costs;
- extending valuation as far as possible into environmental impacts, so that cleaner forms of transport are not put at a disadvantage.

As the Eddington Transport Study demonstrated, these changes make a real difference to the implications of transport appraisal for the prioritisation of transport schemes.[17] However, it must also be recognised that economic appraisal based on welfare economics is not, and should not be, the only input into decision-making. Practicality and deliverability are clearly also important criteria, and if elected governments wish to put additional emphasis on other criteria—for example, the achievement of particular targets (however sensible or otherwise) or the avoidance of particular types of impact (such as raising carbon emissions)—they should pull together the types of analysis needed to inform this approach. Some have argued, for example, for a specific assessment of the impacts of transport schemes on economic growth,[18] but these should complement an economic assessment of the overall effects on social welfare using the best available techniques, not replace it.

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[1] HM Treasury (2010), 'Spending Review 2010', Cm 7942, October.
[2] HM Treasury (2003), 'Appraisal and Evaluation in Central Government'.
[3] http://www.dft.gov.uk/webtag/.
[4] For example, Wenban-Smith, A. and van Vuren, T. (2009), 'Using Transport Models in Spatial Planning: Issues from a Review of the London Land-Use/Transport Interaction (LUTI) Model', Association for European Transport and Contributors; and Network Rail (2010), 'Prioritising Investment to Support our Economy: A New Approach to Appraisal Methodology'.
[5] For example, Wenban-Smith, A. (2010), 'Tinkering Can't Solve the Serious Weaknesses of NATA', *Local Transport Today*, **549**, July 9th, and Buchan, K. (2009), 'Investing in Transport: Making the Change', Green Alliance, November.
[6] Green Alliance and Campaign for Better Transport (2008), 'Getting Transport Right: Proposals for Better Decision-making', February.
[7] See, for example, Melia, S. (2010), 'All this Debate About NATA Misses the Point—Appraisal is Built on Pseudo-science', *Local Transport Today*, **552**, August 20th–September 2nd.
[8] See Buchan, K. (2010), 'A Simple Pass/Fail Test Would Help the DfT Identify Spending Review Priorities', *Local Transport Today*, **550**, July 23rd.
[9] Cairns S., Sloman, L., Newson, C., Anable, J., Kirkbride, A. and Goodwin, P. (2004), 'Smarter Choices – Changing the Way We Travel', Final Report of the Research Project: The Influence of Soft Factor Interventions on Travel Demand, Department for Transport, July.
[10] See, for example, Metz, D. (2008), 'The Myth of Travel Time Saving', *Transport Reviews*, **28**:3, pp. 321–36, May.
[11] See Oxera (2010), 'To Timbuktu, and Back Again: Why Transport Connectivity is Important', *Agenda*, October.
[12] AHCG (1999), 'The Value of Travel Time on UK Roads', The Hague Consulting Group, Accent Marketing and Research and DETR, The Hague, Netherlands.
[13] Mackie, P.J., Fowkes, A.S., Wardman, M., Whelan, G., Nellthorp, J. and Bates, J. (2003), 'Values of Travel Time Savings in the UK', ITS Leeds, January.
[14] Some more sophisticated arguments against assuming low values for small savings are set out in Fowkes, A.S. (1999), 'Issues in Evaluation: A Justification for Awarding All Time Savings and Losses, both Small and Large, Equal Unit Value in Scheme Evaluation', pp. 341–59, in AHCG (1999), op. cit.
[15] Mackie et al. (2003), op. cit.
[16] See, for example, Layard (2005), *Happiness: Lessons from a New Science*, Penguin Books.
[17] DfT and HM Treasury (2006), 'The Eddington Transport Study. The Case for Action: Sir Rod Eddington's Advice to Government', December.
[18] Network Rail (2010), 'Prioritising Investment to Support our Economy: A New Approach to Appraisal Methodology'.