

# **What Policy-Makers Require from Transport Pricing Research**

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## **Outline**

The purpose of this paper is to provide an overview of policy-makers' research needs in the transport pricing field and a brief assessment of the extent to which recent and ongoing research projects have or will meet these needs.

After a note on the sources of policy-makers' views that form the basis for this paper there is a summary of the general pricing research themes that emerge. These themes are then considered from the perspectives of different types of policy-maker – those with modal interests (road, rail, aviation and maritime) and at different levels of organisation (European, national and local). Following a discussion of the degree to which policy-makers' needs have or are being met and identification of remaining gaps, the paper concludes by identifying two key priority areas of future research.

## **Introduction - Sources of Policy-Makers' Perspectives**

This paper is based upon four years' of experience, playing a leading role in several major European research projects (Pricing European Transport Systems, PETS; Concerted Action on transport Pricing Research Integration, CAPRI; and, UNification of marginal costs and transport accounts for Transport Efficiency; UNITE) and one key UK national research project (Surface transport costs and charges).

For European-level perspectives, interviews of 12 Commission policy officers were conducted in Feb-April 2001. These included officers with multi-modal pricing policy responsibilities as well as those dealing with pricing reform in the road (urban and inter-urban), rail, aviation and maritime sectors. No discussions on inland waterways took place.

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At the national level, the perspectives of senior civil servants are drawn from views expressed during IMPRINT's predecessor, the CAPRI concerted action. Supplementary evidence comes from the Advisory Board of the UNITE project (4 Member States) and meetings of the Committee of Government Experts on Infrastructure Charging.

Views of local or regional policy-makers are gleaned from various sources, including meetings of the EUROPRICE group of cities and the responses of 105 local authorities to the UK Government's consultation prior to the publication of the 1998 Transport White Paper.

### **Range of Issues that Policy-Makers would like more Research on**

#### *Introduction*

There is a vast array of issues of importance to policy-makers in the development of transport pricing policy. Some of the main groups of issues are:

- **Basic information on costs and charges.** The cost and charge elements that are relevant for pricing, current estimation methodologies and estimates;
- **Likely impacts of pricing reform.** The likely impacts of changes in prices on travel demand and the economy more generally are of interest;
- **Comparative performance of alternative policy measures.** Information on the comparative advantages of existing and new transport pricing instruments in relation to other transport policies and other forms of intervention; and,
- **Evidence that supports strategy development.** This includes alternative approaches to phased implementation, design and marketing approaches that maximise acceptability and real life examples of schemes that operate successfully.

These groups of issues are discussed in turn.

#### *Basic information on costs and charges*

The starting point of any policy-maker's analysis of the need for pricing reform and the imbalance between current costs and charges. To begin this analysis it is necessary to define which individual cost and revenue components are relevant or not

relevant for inclusion. This may sound like a trial exercise, but the inclusion or omission of a single element can undermine the whole analysis. Similarly, vague or ambiguous definition of a component can seriously distort matters.

Having established definitions, policy-makers require information on the current state-of-the-art methodologies that can be used for estimating each revenue and cost component. Inevitably the data and resource availability constraints that different policy-makers face will mean that in many circumstances implementing a state-of-the-art approach is impossible. Therefore, as well as the ideal solution, it is also helpful if alternative methodologies are specified.

Comparing estimates of marginal costs and revenues helps to establish whether or not there is a *prima facie* case for pricing reform. Ideally, such information is central to any movement towards MC-based pricing. What is surprising, however, is that even amongst the strongest advocates of marginal cost pricing an equal priority is placed on the need for total cost and total revenue estimates. This is particularly the case for financial (as opposed to social) cost information. In most part this is testament to the primacy of budgeting information in decision-makers' daily lives – deficits have to be financed and required levels of financial contribution to general budgets be met through the generation of surpluses.

In addition to making use of methods that are reasonably consistent with the state-of-the-art, estimates must be relevant to the context in which they are to be applied and sufficiently comprehensive to allow a policy shift to be made with confidence. In many cases these desires will mean that fresh research commissioned for the context in question is necessary. Having said this, the relevant levels of, for example, environmental costs in urban and inter-urban areas or for different vehicle types, can be extremely valuable in gauging the plausibility of results in newly commissioned research.

#### *Likely impacts of pricing reform*

Although basic information on costs and charges helps establish the current imbalance and need for reform, any changes will inevitably lead to a wide range of impacts. Of initial interest is the range of travel demand impacts: How much demand will be

suppressed or generated? To what extent will modal transfer occur? What proportion of adjustments will take place within a mode, such as changes in time of travel?

Another impact of interest is who will be affected by changes in travel demand. Are the users facing the largest price changes in socially disadvantaged or privileged groups?

Further concerns relate to the distribution of economic activity in the short-term and after longer-term changes in land use have occurred.

#### *Comparative performance of alternative policy measures*

In identifying whether a specific type of pricing reform should be prioritised above other policy measures it is beneficial to have an indication of how other types of pricing reform and non-policy transport policy perform in different circumstances. Should, as an example, existing pricing instrument such as fuel taxation be fully exploited prior to embarking on a more differentiated electronic pricing regime? Will regulation be more effective than pricing in some areas, such as traffic noise?

#### *Evidence supporting strategy development*

Due to the extremely sensitive nature of pricing innovations, perhaps the most valuable research evidence relates to strategy development. Issues here include the implementation strategy, the way in which an ultimate goal may be achieved in a distinct number of separate stages. It is preferable to introduce a complex pricing system with fine differentiation, or should implementation commence with a low, simple charge and then move to peak/off peak differentiation before proceeding?

Another strategy issue refers to design and marketing of pricing and innovations in a way that maximises public acceptability. Although the limitations imposed by technology are becoming less and less significant over time, it is increasingly recognised that achieving public acceptability is the greatest challenge to be met in implementing pricing reform.

Finally, under the heading of strategy development the enormous value of real life experience from either permanent or temporary pilot schemes in acting as a catalyst

for reform is identified by decision-makers as a major source of inspiration. Both positive and adverse experience are equally welcome in support of the creation of a strategy.

### **How do Research Needs differ across Different Types of Policy-Maker?**

#### *Differing perspectives*

In this section the above research needs are discussed in the context of the priorities of different types of policy-maker. The focus here is on how these priorities differ according to whether a policy-maker deals with a given mode (road, rail, etc.) or is at a particular level of decision-making – European, national or local.

To avoid repetition, where detailed issues arise in relation to policy-making at the urban or inter-urban, passenger or freight levels, these are dealt with under the modal or European/national/local headings.

#### *Modal policy-makers' perspectives*

##### *Road*

The main potential pricing policy areas for policy-makers in the road sector are inter-urban road tolling, heavy goods vehicle charging and urban road pricing. Research needs in the latter area are discussed later in this paper. In relation to the other two areas there is a strong desire for comprehensive information on social costs of transport –both marginal and total. The definitions of the elements of social cost and charge are relatively straightforward in comparison with non-road sectors and well understood. When total financial costs are brought into play in designing charge structures and levels there is also a need for robust cost allocation approaches.

The other main research issue is the comparative performance of different charging system. Should a flat rate per vehicle km be established for HGVs or would a more differentiated, location-specific charging system be more effective in modifying behaviour? Is charging the fuel price a strong enough measure, could road tolls be more effective or are area-based solutions to inter-urban traffic problems likely to offer value for money?

### *Rail*

In relation to social costs of rail infrastructure use the process of defining components and confirming appropriate estimation approaches has begun in the wake of the Commission's charging directive. The directive does not envisage accident costs as a component of track charges and nor are environmental costs a priority as it is stated that these can be considered optional until other modes have introduced environmental charges. The focus of interest is thus on infrastructure costs and the opportunity costs of providing train paths when capacity is exceeded (scarcity costs).

A limited number of policy-makers in the rail sector realise that it is the relationship between what the final passenger or freight customer pays that is central to ensuring efficiency. Charging the appropriate track access fee to the train operator is a means to this end but does not ensure that the final user pays a tariff that maximises incentives. Thus, some policy-makers identify the need for information on costs and benefits relating to train operations as well as infrastructure costs.

### *Aviation*

Curiously, prior to the disruption to the aviation industry in Autumn 2001, policy-makers in the aviation sector expressed a strong desire for information about the total costs of infrastructure as a complement to marginal cost information. Some felt that there was a danger of financial deficits arising from marginal cost pricing, even though the outlook at that time was for very strong growth and continued problems of a lack of airport and air corridor capacity. This emphasis on the complementary roles of total costs and marginal costs information is now more pronounced.

In the marginal cost field there are particular concerns over the estimation of scarcity costs and the costs of high altitude emissions.

### *Maritime*

The maritime industry is characterised by considerable excess capacity among the majority of ports, leading to concerns that are similar to those in the aviation industry about the balance between the value of total cost and marginal cost information.

Furthermore, in many parts of Europe ports are part-funded and part-owned by municipalities and it is commonplace for no corporate accounts to exist. For this reason the starting point of the maritime sector is far less advanced than the rail or aviation sectors. The Commission has thus established that the production of consistent and transparent accounts for ports is a key short-term priority.

One of the main needs in the maritime sector, identified by the scepticism of policy-makers and academic authors, is for a demonstration of how marginal cost-based pricing could operate in circumstances of widespread over-capacity.

#### *European level perspective*

Within the European Commission there is a strong desire for a major expansion of margin cost evidence for all modes at a comprehensive, i.e. national, and detailed level. This is felt to be particularly valuable in understanding for which modes and in what contexts prices should rise and fall, and confirming the Commission's priority areas for reform, e.g. consistent charging of HGVs across Europe.

A shared concern of most Commission officers is that pricing at marginal cost could in some circumstances lead to financial deficits. Thus, there is a strong level of interest in total financial cost information, and in developing strategies that can take into consideration budgeting constraints. Perhaps the most surprising finding, at first sight, is that at the European level interest in the absolute values of marginal cost estimates is limited. On second sight, however, the reason for this is apparent. Charging directives, such as the rail directive or Eurovignette directive on HGV charging, by their very nature require Member States to provide robust evidence on social costs as the basis for charge levels and structures. It is not the responsibility of the Commission to provide or identify cost information.

A far higher level of interest thus arises in relation to methodological issues, such as the appropriate techniques for use in cost estimation, and even basic issues such as the definition of terms (e.g. terms such as "maintenance cost" and "construction cost" are often left open in directives).

Great importance is placed on the relative values of costs, e.g. across different road vehicle types. This is for a number of reasons, including the need to corroborate evidence provided by Member States. Another reason is that differentiated prices, the relative levels of which are set on the basis of relative cost estimates are in some circumstances seen as a positive and pragmatic step towards introducing charges based more firmly on the absolute levels of marginal cost estimates.

#### *National level policy-makers*

National policy-makers naturally have a need for social cost and charge information at a national level. Case study evidence may be interesting but unless it is sufficiently broad to allow generalisations to be drawn it is too anecdotal to be of value in national policy-making.

Another central research interest is for information on total financial costs of different modes, again at the national level. This is essential information for dealing with budgetary issues and understanding how new pricing policies can be designed in a way that is affordable. Needs for marginal and total cost information are equally strong.

Although national policy-makers are concerned about travel demand, economic activity and land use implications of pricing reform, perhaps a primary area of interest is in understanding which groups of user would be most affected by pricing policy changes.

A fundamental issue at the national level is the comparative performance of alternative pricing means. Is there a strong need for new instruments, such as electronic road pricing, or can the instruments controlled at a national level be used to greater short and medium term effect? A related issue of interest is the relative effectiveness of (further) differentiation of fixed annual charges, such as annual vehicle license fees, to reflect relative environmental performance.

Countries do not appear to share the Commission's concern about implementing pricing reform across modes. The road sector is generally picked out as the main area

for reform. In contrast, rail is generally seen as an environmentally friendly mode so that the issue of an environmental component in rail charges is usually put to one side.

#### *Local level decision-makers*

The level of interest in pricing reform is often relatively low at the local level – but for different reasons in the public transport and road sectors. Political opinion is extremely sensitive regarding public transport, so that even modest, revenue-neutral reforms such as increasing peak prices and reducing off-peak prices are seldom countenanced. Increased differentiation, with higher peak prices, is seen as counterproductive at a time when there are strong political demands for a modal shift to public transport.

Although political sensitivity is also high for road pricing the main barrier to progress and cause of a lack of interest is the legal one. In most cases national legislation simply does not allow any such intervention at the local level. Even where legislation that permits road user charging exists, e.g. in France, this legislation may mean that such charges are only allowed to pay for the construction of new infrastructure and not for demand management purposes.

Thus, local policy-makers often have sympathy with marginal cost-based approaches to pricing, but the major challenge is to introduce *any* new form of charging. For this reason, information on the social costs of transport is not usually of direct relevance to pricing reform for local policy-makers.

A major concern relates to travel demand impacts because of a desire to provide adequate capacity on alternative modes and understand how the overall transport system can cope with major changes. An even greater concern is about possible land use impacts should charges be introduced in congested urban areas. Loss of economic activity to outlying areas or competing regions is a real fear. Even those areas at the forefront of pricing reform at the local level, cities with vibrant economies and strong growth prospects, identify this as a key issue.

Comparative performance of alternative transport strategies at the local level is of interest, particularly in affirming that pricing innovation can achieve policy goals effectively.

Lastly, strategy issues. The immense sensitivity of local political and public opinion to pricing reform means that those who are proceeding along the path towards developing new instruments are particularly in need of research evidence that supports strategy development.

### **Which of these Research Needs have or will be met?**

#### *Information on costs and charges*

A broad consensus has been established by the High Level Group on Infrastructure Charging and the CAPRI project (Nash et al., 2001) on the definition of components of social costs can be considered relevant for a marginal cost pricing regime.

Marginal cost case studies from the ExternE, QUITs, PETS and TRENEN projects have been helpful in defining such elements, and also in demonstrating how methodologies for the different categories of cost may be used in practice.

The testing of marginal cost methodologies has been extensive for the road and rail sectors in past research projects – evidence relating to aviation, maritime and inland waterways has been more rare. This is an area that the UNITE project, with around 30 case studies for different modal and cost category combinations, seeks to contribute to. Another ongoing research project, being conducted for DG TREN by the Transport Research Laboratory seeks to contribute additional case study evidence. Taken together these two projects will provide valuable methodological experience that others can benefit from.

One remaining gap will be the development of approaches for the estimation of marginal costs of scarcity, particularly relevant for rail and aviation.

Also on the methodological front, the UNITE project provides approaches for the estimation of total costs and in particular infrastructure costs.

Although a large volume of marginal cost case study evidence has or will be produced, in general this has been insufficient to be able to draw conclusions at the national level. One example of an attempt to aggregate-up case study evidence comes from the 2001 UIC study on revenues from efficient pricing – but with only 3 case studies in some countries this endeavour was extremely ambitious and it is difficult to see how national-level conclusions can be drawn with confidence.

Exceptions to the absence of national-level, comprehensive marginal cost and revenue studies include research projects from Finland and Sweden, the Netherlands and Great Britain. The British study (Sansom et al., 2001) drew upon a national traffic database with 280 disaggregations by area and road type (e.g. rural motorways), vehicle type and time period (weekday peak, other time period). This level of detail in calculations and outputs enables robust conclusions to be drawn about the need for an increase in aggregate prices (e.g. fuel taxation) and more differentiated pricing instruments (by vehicle class, time period, location, etc.).

Other countries such as Spain are now exploring the scope for making similar contributions to the body of European evidence.

For total cost and revenue estimates, the degree to which a comprehensive evidence base will exist in the near future is a little different. The UNITE project will provide such evidence for 18 European countries (EU 15, Estonia, Hungary and Switzerland) and for up to five modes per country (road, rail, air, maritime and inland waterways).

#### *Likely impacts of pricing reform*

The main body of European research evidence on travel demand impacts relates to urban and inter-urban road sectors. There is a mix of types of research. This mix includes modelling studies (PETS, TRENEN) which have largely focussed on modal choice impacts and consequent implications for congestion, environmental performance, etc.

Experiments of road user charges have been conducted for various urban areas, including Bristol (CONCERT-P) and Leicester (EUROTOLL). The main source of inter-urban evidence has been the EUROTOLL road tolling initiatives, which have

introduced differentiation by time of day, day of week or route to existing tolls. This urban and inter-urban evidence has affirmed that changes within a mode (e.g. using a car at a different time) tend to dominate modal transfer. Changes in travel behaviour may have been small. The complementary modelling research projects (PETS, TRENEN) have, however, demonstrated that, only limited behavioural impacts are needed to achieve major economic and environmental benefits.

Less research evidence has been provided at the European level about the distributional impacts of pricing reform – which groups of individuals are likely to win or lose from price restructuring. An important point emphasised by the results of TRENEN, however, is that the way in which revenues raised are used is crucial in making this determination of the ultimate beneficiaries.

On economic activity and land use impacts very little research has been conducted although this is a primary concern of those seeking to implement road user charging in urban areas. This is a major gap and acts as a barrier to progress in this area.

#### *Comparative performance of alternative measures*

There is a strong body of evidence on which type of pricing instrument, new or existing, can maximise the benefits from road user charging. The TRENEN project has shown that simple instruments (e.g. parking charges or a simple cordon toll) may in some circumstances secure the major part of the benefits of more sophisticated systems such as full electronic road pricing, but at a fraction of the cost.

Similarly, the OPTIMA and FATIMA projects have demonstrated that road user charging only performs more effectively than car park charges on non-pricing transport measures in 50% of the case study cities.

Due to the very different circumstances of different cities and the specificity of different modelling tools, it is impossible to draw general policy conclusions from such findings. The powerful overall conclusion, nevertheless, is that simple pricing reforms can achieve extensive benefits in many circumstances.

Research evidence on the comparative performance of a wider set of policy measures, including regulatory interventions, is to be provided by 5<sup>th</sup> Framework research projects. Such evidence may be particularly beneficial in identifying the comparative advantages and disadvantages of different types of pricing in relation to other policy measures. In identifying where pricing can best play a role this research will strengthen the case for pricing intervention in priority areas.

### *Strategy development*

Research on issues such as implementation or staging strategies is a relatively recent development, e.g. in the AFFORD project, but one that is essential in supporting policy development. Witness the history of road pricing in Singapore. Although Singapore is considered a highly authoritarian society and has a very small CBD in international terms, it took almost a quarter of a century (1975 to 1998) to introduce a highly differentiated road charging system. The evolution of this system, from a simple morning-peak only charge to an electronic charge varying by half hour time period, has been extremely gradual.

Although the study of existing initiatives may not be considered by some as a pure research activity, it appears that there is significant scope to learn from the experiences of places like Singapore and the interstate road “value pricing” initiatives in the United States as well as innovations such as the Swiss HGV charging system.

The public and political acceptability research carried out in projects such as PATS provides a valuable contribution to overcoming barriers to innovation and the design and marketing of systems that maximise acceptability. It may also be valuable in focussing research efforts away from abstract, theoretical solutions that would be political non-starters. Impractical solutions may include those that transfer surpluses from urban to inter-urban transport systems or suggest that urban road pricing revenues from a small number of cities be transferred to the general government budget. Further research of this nature will help to build upon institutional realities.

## **Closing Observations on Future Research Priorities**

### *Two key areas of research*

Based upon this review of policy-makers research needs and the current and short-term base of existing research evidence, I would like to conclude by proposing two priority areas for research initiatives.

### *Towards a comprehensive set of marginal cost evidence*

It is my view that progress towards a more differentiated, marginal cost-based system of transport pricing has been held back by the pricing debate being conducted in a vacuum without information. Since pricing systems need to cover complete countries, the evidence on marginal costs and charges also needs to be available at a nation-wide level. It is only then that the full implications for pricing reform can be drawn and practical consideration made of whether to introduce new measures and what the areas of most urgent attention are.

### *Focus on imperfect and simple solutions*

Schemes that recognise the imperfections of the world maximise their chances of actually being implemented. Budget constraints dominate all areas of activity, information is imperfect and asymmetric, the state can be an inefficient organiser, regulation or provider. Research that recognises that simple approaches, such as a low charge for entering a congested city centre in the morning peak, can act as a much more effective catalyst for change than immensely complex proposals would offer good value for money. Similarly, it is preferable to design schemes that take into account financial constraints from the outset, as opposed to considering such central issues as an afterthought.

## References

Nash C, Sansom T, Matthews M (2001). Concerted Action on Transport Pricing Research Integration (CAPRI). Final Report for publication. Co-ordinated by the Institute for Transport Studies, University of Leeds, January 2001.

Note that the CAPRI final report for publication and annexes, which may be obtained electronically from the IMPRINT Secretariat at the University of Leeds (jwhitham@its.leeds.ac.uk), contains details of the following projects:

EUROTOLL, CONCERT-P, EXternE, FATIMA, QUITTS, OPTIMA, PETS, TRANSPRICE and TRENEN

Sansom T, Nash CA, Mackie PJ, Shires J, Watkiss P. (2001). Surface Transport Costs and Charges: Great Britain 1998. Final report for the UK Government. ISBN 0 85316 223 9. University of Leeds, July 2001.