PROJECT

MC-ICAM

Implementation of Marginal Cost Pricing in Transport - Integrated Conceptual and Applied Model Analysis

**Funding:** European (5th RTD Framework Programme)

**Duration:** Apr 2001 - Jun 2003

**Status:** Complete with results

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**Background & policy context:**

The need for pricing reform in transportation has been a major topic in policy discussions for over a decade, starting from the early 90’s in most countries. The view that marginal cost pricing should have a significant role in practical pricing systems has been gaining support, albeit slowly. An obvious trend in discussions on marginal cost pricing and pricing in transport more generally during the last few years has been the shift of focus from the derivation of optimal pricing rules to practical implementation problems. In particular, it has been recognised that marginal cost pricing cannot be universally implemented simultaneously across modes, regions, and any other relevant dimension ('big bang'), for many reasons.

This observation immediately raises a number of questions, such as: Which modes or parts of the network should be addressed first? How far should we move towards full marginal cost pricing on each? What accompanying measures should we undertake? To what extent can the initial steps capture the benefits of full marginal social cost pricing? Are these first steps so good that later refinements or additional steps are relatively unimportant? Or are these steps so poor that they are hardly worth pursuing?

Very little work has previously been undertaken on these issues.

**Objectives:**

**General objectives are:**

1. to develop the phased approach to implementing marginal cost pricing; and
2. to develop the practices for the use of revenues in relation to marginal cost pricing.

**Specific objectives are:**

1. to define optimal (full, first-best) end states in the short, medium and long term compared to the current situations – for all important passenger and freight modes covering both urban and interurban issues, and taking account of relevant technological, institutional and national contexts;
2. to determine on the conceptual level the necessary or optimal (second-best) implementation steps – in terms of recommendations for actual pricing measures (policy packages) and for modal and geographical priorities, while taking account of the relevant technological and institutional constraints and policy contexts;
3. to present a general framework for assessment of marginal cost based pricing policies and the associated revenue use issues – allowing for the existing real-world models and the principles of cost-benefit analysis;
4. to carry out in-depth modal level (urban, interurban road, rail, air, water) analyses of the current pricing and other regulatory issues, and of the barriers to the marginal cost pricing in different modes;
5. to suggest the transition path and the necessary or second-best optimal implementation steps in different real-world policy-making contexts;
6. to conduct a thorough empirical assessment of the welfare effects – both efficiency gains and distributional impacts – related to the different steps identified towards the full optimum, as compared with the current non-optimal situations (with no marginal cost pricing); and
7. to give clear information to policy-makers on the welfare gains related to the optimal steps of the
phased approach and to make policy suggestions for policy-making both at the strategic and more
detailed levels: recommended strategy or taking the necessary steps towards efficient (and fair)
pricing based on marginal costs.

Methodology:

The project is organised along 9 workpackages.

WP1 aims to provide an overview of the project (policy questions, research themes, case studies), to
present necessary background reviews (policy developments, practical experience, literature), and to
elaborate on the MC-ICAM approach to marginal cost-based pricing in transport.

WP2's main objective is to identify the relevant theoretical backgrounds to the concept of marginal cost
pricing in the context of second-best distortions. The work package will primarily build on conceptual
model analysis. WP2 will define first-best end states in the short, medium and long term compared to
the current situations. This exercise will be carried out for all important passenger and freight modes,
covering both urban and interurban issues, and taking account of relevant technological, institutional
and national contexts. WP2 will then determine on a conceptual level the second-best implementation
steps, formulating recommendations for actual pricing measures (policy packages) and for modal and
geographical priorities, while taking account of the relevant technological and institutional constraints
and policy contexts.

WP3 prepares the modelling exercises by defining what models are to be used and how they are to be
used. First WP3 reviews the policy issues identified by WP1 and WP2, and asks how previous modelling
exercises answered these questions, identifying what problems remain unsolved. Second WP3 will
provide an in-depth analysis of selected real-world simulation models, focusing on their properties in
relation to cost-benefit assessment, to be used in later workpackages. As a result, a taxonomy of model
types will be presented, reflecting their applicability for assessing alternative pricing schemes.

WP4 and WP5 will carry out in-depth modal level (urban, interurban road, rail, air, water) analyses of
the current pricing and other regulatory issues, and of the barriers to marginal cost pricing in different
modes.

WP6 will suggest the transition path and the (necessary or second-best) optimal implementation steps
in different real-world policy-making contexts.

WP7 and WP8 will conduct a thorough empirical assessment of the welfare effects – both efficiency
gains and distributional impacts – from implementation of marginal

Related Projects:

CUPID;
DESIRE;
IMPRINT-EUROPE;
PROGRESS;
REVENUE;
UNITE

Parent Programmes:
FP5-GROWTH KA2 - Sustainable Mobility and Intermodality

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Partners:

• Institute for Transport Studies, University of Leeds (UK);
• Free University of Amsterdam (NL);
• The Center for Economic Studies (Belgium);
• TNO Inro (NL);
• TOI (Norway);
• ADPC Sprl (Belgium);
• Tel Aviv University (Israel);
• RC/AUEB/TRANSLOG (Greece);
• Technical University of Dresden (Germany);
• VTI The Swedish National Road and Transport Research Institute (Sweden);
• ISIS Istituto di Studi per l'Integrazione dei Sistemi (Italy);
• University of Antwerpen (Belgium);
1. Theoretical and methodological developments A key feature and contribution of MC-ICAM has been to make a conceptual distinction between barriers and constraints. The barriers represent factors or societal phenomena that cause the constraints. By constraints we refer to second-best constraints, which have attained growing attention in the recent economic literature. The barriers and their implied constraints appear in essentially different dimensions. Barriers are categorised according to distinct factors that may affect the implementation of marginal cost-based pricing. Constraints categorisation identifies different aspects of the pricing system itself: those aspects that the policymaker is not able or free to determine or choose in a fully optimal way. A key feature is that a given barrier may give rise (contribute) to more than just one constraint, or conversely that different barriers may lead to similar constraints. For instance, one can easily think of examples of technological and practical barriers implying constraints on the coverage/scope, composition and degree of differentiation of the pricing measures. Much uncertainty remains about the exact nature of the barriers and constraints and the link between them. MC-ICAM has defined implementation paths as a sequence of constrained second-best optima. If we have a reason to suppose that the barriers will or can be eased over time, the implications of this for the constraints may then be considered and a new second-best optimum found. Thus we see the optimal implementation path as a sequence of second-best optima, each better than the last, that becomes feasible as the constraints are eased.

2. Key barriers and constraints For this purpose we have drawn on three sources:
   - literature,
   - case studies of attempts at implementation,
   - and interviews with individuals responsible for policy design and implementation.

The main barrier for urban and interurban road transport pricing is acceptability. Studies generally conclude that the benefits and costs of marginal-cost-based pricing of roads fall unevenly on the public. Policy implications

1. Urban.

In urban transport, where problems are acute and benefits of implementation clear, it is likely to be possible to move straight to higher prices and more complicated schemes than when this is not the case. Thus we would expect to see the biggest most congested cities moving straight to fairly high charges and quickly to reasonably sophisticated schemes. Smaller cities with less acute problems may never progress beyond simple low cordon tolls.

2. Interurban roads.

Many countries are reluctant to impose motorway tolls themselves because of possible diversion to other roads, and thus need a more sophisticated system of charging heavy goods vehicles. If they do move to a GPS based system, the technology is then in place both for added sophistication of hgv charging (by time and place) and the extension of charging to all vehicles. Where the geography of the country involves large cities at relatively large distances (Spain, France) a continued reliance on motorway tolls may be more adequate.
3. Rail, air, water.

In the rail, air and water sectors, the stronger competition and the more acute capacity problems the more sophisticated a system is likely to be both justified and acceptable. 4. Implementation of EU policy
The Directive covering rail infrastructure charges (2001/14) was needed largely for reasons of competitive policy with in the rail sector, but it represents an appropriate step on the implementation path in that it provides for marginal social cost-based pricing, with mark-ups where necessary for financial reasons (but they must not lose types of traffic, so there is an element of Ramsey pricing). Charging for scarcity is permitted, charging for environmental externalities is not required until this is implemented for competing modes. The revision of the Eurovignette propose

Documents:
- MC-ICAM Final Report (Final report)

STRIA Roadmaps: Other specified
Transport mode: Multimodal transport
Transport sectors: Passenger transport
Transport policies: Societal/Economic issues
Geo-spatial type: Other