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Policy Transfer Through Research Networks – the Example of Urban Road Pricing

Catharina Sikow-Magny and Marcel Rommerts*

The European Commission has advocated the reform of transport pricing for over a decade now. The theoretical concept of marginal cost pricing was first advocated in the green paper Towards Fair and Efficient Pricing in Transport (1996) and taken further in the white papers Fair Payment for Infrastructure Use (1998) and European Transport Policy 2010: Time to Decide (2001). According to the proposed approach transport users should be charged for all the additional costs they impose to society by their use of the transport system. Transport taxes and prices should thus vary according to infrastructure damage caused by vehicles, the degree of congestion, accident risk and environmental nuisances.

In the EU, the principles of such a charging policy are already implemented in the rail sector and a revision process is on-going for the road haulage sector: the so-called Euro-vignette directive[1] establishes the possibility to charge heavy road goods vehicles for the infrastructure (construction and maintenance) costs caused by their usage of the trans-European network. To manage congestion and environmental effects, charges may be differentiated to reflect the level of congestion and the sensitiveness of the environment (e.g. mountain passes).

Research activities under the Community Framework Programmes for research, technological development and demonstration activities (FP) have provided the analytical support to both the shaping of the pricing policy and its implementation. While the earlier FP projects have addressed more theoretical issues, such as operationalisation of the marginal cost principle, determination of optimal charging instruments and analysis of small-scale demonstrations, the focus has gradually shifted from theory to practical implementation of efficient pricing. More recently, demonstration projects in European cities have been carried out to test the acceptability of different pricing schemes and how to apply them.

The projects and expert networks supported by the Framework Programmes act as platforms for policy transfer. However, a clear analysis and understanding of this process is lacking so far. In this paper, we will first recall the principles of efficient pricing in transport and its socio-economic impacts. We will then briefly discuss problems of implementation and analyse the role of research networks for policy learning and knowledge transfer. The focus of the paper is on urban road pricing.

Principles of optimal pricing

External costs of transport

Good transport connections are essential for trade and economic development. Smooth, safe and secure transport systems reinforce sustainable economic growth and competitiveness and ensure smooth movement of passengers, goods and services. However, transport, and road transport in particular, causes several negative impacts to society as an unwanted and unintended side-effect of productive uses of the transport system. These so-called external costs include particularly the following:

- time wasted in congested traffic conditions,
- lives lost and injuries from accidents particularly on roads,
- health problems and premature deaths caused by air and noise pollution,
- lost biodiversity following the expansion of land use for new capacity to meet demand increases,

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[1] The amendment of Directive 1999/62 is currently being discussed by the co-legislators.

– increasing contribution to climate change caused by "green house" gas emissions.

Several of the FP research projects have assessed the external costs of transport and developed methods for their monetary valuation. Following the state-of-the art methodology developed in the ExternE[2] series of projects, the UNITE[3] project has estimated the external costs of transport infrastructure use for all transport modes in different traffic and geographical contexts in Europe. The results indicate that the environmental cost of a lorry driving on the motorway from Basle to Karlsruhe is around 10 € cents/km whereas the cost doubles when driving in a city such as Berlin in day time and rises to almost 40 € cents/km at night because of higher noise annoyance. Regarding, for instance, the marginal emission cost of a ferry in the open sea, it is estimated to be 18 €/km or 1,622 € in total for a trip from Helsinki to Tallinn. For aviation, noise and air pollution costs amount to around 400 € for a Boeing 737–400 flight from Berlin, Tegel to London, Heathrow.

Towards a policy based on marginal cost pricing

The need to change the current pricing system stems from several factors:

– improved efficiency of the transport system,
– sustainable development and mobility,
– equity and cohesion issues.

In Europe the transport sector, in particularly road transport, is characterised by high fuel prices, mainly due to the various fuel taxes levied in most Member States of the European Union. On average these taxes represent around two thirds of the final consumer prices. The external costs do not, however, depend principally on the amount of fuel consumed but rather on the place and time of driving as well as the characteristics of the vehicle used. In addition heavy goods vehicles damage road surface and structures as a function of their axle load, and axle loading is not directly related to fuel consumption. Given its 'blunt' nature the fuel tax is an inefficient and therefore expensive means to achieve transport policy goals.

The policy of efficient charging aims to balance the level of the external costs and the cost of their mitigation. The European Commission's policy on transport pricing, as outlined in the various policy papers mentioned above, aims at a revenue neutral shift from taxation to charging transport at the point of use and according to the costs incurred.

The long term objective of efficient pricing in transport is to implement charging schemes that ensure that users of the transport infrastructure and services pay for the real costs they impose on society, such as costs related to infrastructure wear and tear, congestion, accidents and environmental damage. Marginal cost pricing, whereby charges reflect costs for actual use, is the preferred principle for such a scheme. The achievement of the long-term objective calls for an incremental approach, where a number of successive steps are taken. An application of the strategy has also to allow for differing speeds of implementation.

Socio-economic impacts of efficient pricing in transport

Economic theory has shown that marginal cost pricing leads to efficient allocation of society's resources. According to results from the EU Framework Programmes[4] and national research, implementing marginal cost pricing would be beneficial to the society. The overall welfare gain to the citizens ranges between 0.5–1.3 percent of the total regional income. Optimal pricing induces reductions in total transport volumes in the urban areas between 7–14 percent and in the inter-urban areas between 2–3 percent on average. In the peak, speeds increase by 32–70 percent in the urban and by 5–12 percent in the interurban areas. External costs of transport reduce by 13–35 percent in the urban and by 3–5 percent inter-urban areas.

The TRENEN[5] project analysed the impacts of efficient pricing in a number of European cities. For instance, in Amsterdam, with the current taxation and pricing regime, private cars account for 68 percent of all motorised trips[6] in the peak hours while the share of public transport is 32 percent. Because of severe congestion, the average speed on the roads is 13 km/h, which is only slightly higher than average speed by bike. Congestion pricing would enable rebalancing of the modes, private car's share would drop to 53 percent of trips and that of public transport would increase to 47 . The average speed on the roads would

[2] External Costs of Energy Use. For more information see http://www.jrc.es/pages/f-search.html.
[3] Unification of Accounts and Marginal Costs for Transport Efficiency, project to end early 2003, more details and intermediate results can be found at: www.its.leeds.ac.uk/research/index.html.

[4] See TRENEN, PETS, MC-ICAM, UNITE, IASON http://europa.eu.int/comm/transport/extra/web/index.cfm.
[5] Models for Transport Energy Environment, project completed, see final report at ports/strategic/trenen.pdf.
[6] Cycling is well developed in Amsterdam, however, non-motorised modes were not part of the modelling.

increase to 20 km/h. The benefits of efficient pricing more than outweigh its costs.

These modelling results have been recently confirmed by the London congestion pricing scheme.

However, cases of the practical implementation of marginal cost pricing has been rare in practice – except for the recent London congestion charging scheme and for some examples of heavy goods vehicle tolling systems in central Europe. The existing charging regimes typically rely on taxes that only remotely, if at all, reflect the underlying marginal costs, and revenue raising objectives.

Overcoming obstacles to implementation

A major requirement for a successful further development and implementation of efficient pricing is to pay greater attention to acceptance issues. At the EU level it is an issue of convincing citizens but also policy makers in the Member States to endorse or at least accept new charging schemes.

The EU, national governments and local authorities can use very different means when it comes to setting charges to transport and collecting general taxes but also when deciding upon regulations. Implementation of efficient pricing might imply changes in the respective roles and existing money flows. Also the ownership, degree of independence and charging principles for network infrastructure and terminals (ports, airports, etc.) differ considerably. Consequently, the necessary co-ordination and co-operation for different institutions at different decision-making levels might be difficult to achieve.

An interesting finding from the AFFORD[7] project is that politicians perceive the citizens to be more pro-car than they are in reality. The majority of citizens in the 6 cities[8] covered by the project could accept a well-structured package including pricing and other measures in cities where transport problems are perceived to be severe. The role of the media in influencing the discussion and public opinion on road pricing has not been sufficiently considered to date. For a pricing strategy to be accepted by citizens and by businesses it should comprise of the following elements:

- the objectives of the strategy have to meet main public concerns as to transport problems;
- the proposed strategies have to be perceived as effective solutions to the problems;
- revenues must be hypothecated and alternatives provided;
- fairness and distribution of costs has to be addressed meaningfully;
- people must have confidence in the effectiveness of the measures, use of revenues and anonymity of the system and
- there must be an "intelligent" marketing strategy.

Policy learning and transfer through EU-supported research projects and networks

Research projects and networks supported by the Framework Programmes may act as platforms for policy learning and policy transfer and may contribute to the emergence of a "pre-governance system" in the (urban) transport sector. However, there is no clear understanding of how these issues are related and of how they interact. One of the reasons is that the development over time of the project networks themselves, and the actors involved in them, has not been analysed. Academics with a background in science and technology assessment and political science have however discussed these issues in more general terms.

The process of European integration on S&T policy has been accompanied by the formation and organisation of interest groups at the European level. These groups represent the public and private sector and include scientific and economic interests (Grande and Peschke 1999). The practical collaboration takes place within, separate, "sub-networks". Luukkonen (1998) argues that EU research funding may act as a catalyst in the creation of new network configurations and considers the creation of networks a major impact of the EU framework programmes: she also suggests that there is an accumulation and continuity in many research networks.

Projects and networks can work where bureaucracies and/or markets do not yet do so. A policy network is a cluster or complex of organisations that are connected to one another by resource dependencies (Rhodes 1986). The Marsh and Rhodes (Rhodes 1997) approach to policy networks defines two types of policy networks: policy communities and issue networks. The actors involved in EU research projects on pric-

[7] Acceptability of Fiscal and Financial Measures and Organisational Requirements for Demand Management, project completed, see final report at http://europa.eu.int/comm/transport/extra/final_reports/urban/afford.pdf.
[8] Athens, Dresden, Edinburgh, Helsinki, Madrid and Oslo.

ing seem more a policy community, which is reflected by their shared values, the high quality of interaction and the continuity of the interaction over time.

The relationship between policy networks and policy transfer at the international level can be integrated through the notion of a policy transfer network (Evans and Davies 1999). Policy transfer is defined by Dolowitz (2003) as the process by which the policies and/or practices of one political system are fed into and utilised in the policy-making arena of another political system. Wolman and Pace (2002) suggest that policy transfer, since it is a form of policy learning that is done by governments, is a form of "organisational learning". A clear scheme for measuring the occurrence of policy transfer is lacking, as mentioned by Dolowitz and Marsh (1996) and by Evans and Davies (1999). In the view of Evans and Davies a policy transfer network is an action-oriented phenomenon set up with the specific intention of engineering policy change.

There is a possible linkage between networks, EU research funding and Aspinwall's concept of "pre-governance" in which the Commission informally gathers the participants of a possible future governance system (Aspinwall 1999). Aspinwall suggests that by engaging "industry and consumer groups" in research and discussions the Commission is actively establishing a constituency in the newer, undefined areas of transport policy, which are not yet regulated at the European level. This is the case for urban pricing. The networks help to define the nature of the problem to which the Commission later can offer potential solutions.

Formal network activities under the Framework Programmes

To ensure wide dissemination of results but also to allow for a debate among practitioners, a concerted action on pricing, CAPRI[9] was set up in 1998 under FP number 4. It aimed at co-ordinating research activities on pricing, disseminating and discussing the results of FP4 projects with the Member States, and identifying points of consensus and disagreement.

In FP5, CAPRI was followed by a thematic network project IMPRINT-Europe[10]. The overall aim of the network was to facilitate a two way process through a series of seminars, which enabled research results to be fed into pricing policy implementation, and to inform researchers about relevant policy questions. In this way it was intended to improve the quality of both policy making and research and to promote consensus by improving understanding of alternative points of view. Networking activities have continued also under FP6 where the focus is more on practical implementation and modal applications.

In parallel, support has been provided to a number of cities that intend to implement pricing in the near future, working together in the EuroPrice[11] network. The network brought together local government authorities and politicians in various countries to share information about the different strategies, technologies, information campaigns, and investment strategies employed in their efforts to introduce urban road pricing schemes. Three technical papers have been produced dealing with the full range of most relevant political questions about road user charging.

During FP5 the CUPID[12] thematic network developed and implemented a sound pan-European evaluation framework for urban pricing demonstrations. It worked closely together with the PROGRESS project described later. CUPID also had the role to facilitate the exchange useful information, to organise workshops and prepare papers on key issues and to run dissemination activities.

Research projects on urban pricing

In addition to the formally established networks described above, networking activities have also taken place through research projects on urban pricing. The community of researchers and cities involved in the different projects has remained rather stable over time. The research on urban pricing that was sponsored by the FPs during the second half of the 1990s specifically looked at real life impacts and acceptability. The projects have led to the conclusions described below.

Urban pricing measures do have an impact in real life

While the projects described before look at transport pricing on the aggregate, systemic level, several research projects have also looked at the implemen-

[9] http://www.its.leeds.ac.uk/ projects/capri/.
[10] http://www.imprint-eu.org/.

[11] The EuroPrice cities are: Amsterdam, Belfast, Bristol (coordinator), Edinburgh, Genoa, Leeds and Rome. For more information see http://www.europrice-network.org/.
[12] http://www.transport-pricing.net.

tation of specific pricing measures in practice. These projects use partial demonstrations or existing real life cases, sometimes in combination with modelling, to gain more detailed insights on user reactions and political barriers.

For example, CONCERT-P[13] assessed the efficiency and acceptability of integrated pricing and restraint measures, time-dependant and vehicle-based tolling and pollution-based pricing. The study results confirm the hypothesis that pricing measures are able to improve the usage of road space and can persuade motorists to switch to using public transport. In Trondheim, increased tolling reduced car use by 6.2 percent while increasing park and ride by 1.4 percent and public transport use by 4.2 percent. The Bristol case indicated that a daily toll combined with free public transport would reduce traffic flows up to 25 percent. Pricing measures also provide a new source of income. The tolling system in Trondheim has raised 125 million € in its first 12 years, all reinvested in transport and environmental measures.

The EUROTOLL[14] project validated the potential of pricing measures to combat congestion in 14 cases. The findings indicate that car users, in particular leisure travellers, shift travel times to off-peak or change routes if price differentials provide an incentive to so. Modal shift or a reduction in the overall number of trips was however found to be negligible. In Leicester, reactions to road pricing on an arterial road combined with P&R and a shuttle to the city centre were twofold: a number trips were shifted to the shuttle, while some of the car users preferred to avoid the charge by using secondary by-pass streets.

These projects demonstrated that pricing measures can change people's behaviour and travel patterns. The changes in behaviour don't need to be dramatic to have a noticeable effect on traffic conditions. Car users appear to change the timing, route or destination of their trip more easily than their travel mode.

Urban pricing schemes can be made acceptable

Acceptability by the public and at the political level is seen by many as the main obstacle for implementing marginal cost pricing in practice. The reasons behind opposition to efficient pricing are manifold: the distributional impacts are considerable, the benefits are not obvious to transport users, and behavioural changes might be induced affecting people's daily habits and even their economic or location choices. Several research projects have looked at acceptability and defined actions to increase acceptability.

The PRIMA[15] project has identified the criteria that foster acceptance or result in non-acceptance, of urban road pricing schemes by analysing successful cases as well as failures. The project showed that citizens consider road pricing as a means of last resort, i.e. traffic problems must be severe and no other way of solving them can be identified. In addition, road pricing should be a part of a policy package with clear, simple and transparent content and objectives. Other critical factors for acceptance are the level of the charges in the beginning, the distribution of the effects over different groups and the availability of travel alternatives. Adequate communication and transparency in the money streams are crucial.

The results of the PROGRESS[16] project show convincing financial, traffic and environmental impacts but at the same time demonstrate that the introduction of urban pricing is difficult. The PROGRESS demonstrations were partly of high profile and had obtained strong political support. The planned city-wide schemes in Bristol and Edinburgh did not take place. The area-wide electronic access control and parking pricing in Rome, an example of a hybrid pricing scheme, was successfully implemented. The tests of pricing concepts based upon satellite vehicle location systems with volunteers in Copenhagen and Gothenburg showed that the urban applications of this technology needs further development.

In the future research on urban pricing it will be important to begin to look beyond the current policies and marginal cost pricing in isolation and to assess the role transport pricing has in the overall transport policy development. The Commission's CIVITAS[17] Initiative is a major step in this direction and combines the objectives of the FP's transport and energy research programmes. The aim of CIVITAS is to assess the impacts on congestion, energy consumption, noise and air pollution of the introduction of ambitious integrated sustainable urban transport policy packages, involving pricing and other measures, technologies and infrastructures.

[13] http://btsa.es/concert/.
[14] http://www.cordis.lu/transport/src/eurotollrep.htm#7.
[15] ftp://ftp.cordis.lu/pub/transport/docs/summaries/road_prima_report.pdf.
[16] http://www.progress-project.org.
[17] http://www.civitas-initiative.org.

Conclusion

The European Commission has advocated the reform of transport pricing for over a decade. Research activities under the Community Framework Programmes for research, technological development and demonstration activities have provided the necessary analytical support to the development of the pricing policy as well as its implementation. They have helped to develop the principles of optimal pricing, supported formal network activities of experts and practitioners and supported projects testing the practical implementation of urban pricing at city level.

Research projects and networks supported by the Framework Programmes may also have acted as platforms for policy learning and policy transfer and contributed to the emergence of a "pre-governance system" in the urban transport sector. In this paper, we have attempted to explore relationships and interactions of these cases. However, more work is still needed to better understand these interlinkages. One of the reasons is that the development over time of the project networks themselves, and the actors involved in them, has not been analysed. This offers a clear opportunity for further analysis by academics with a background in science and technology assessment and political science.

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