

Final Report for Publication



PRICING MEASURES ACCEPTANCE

Ways and Means to Increase the Acceptance of Urban Road Pricing

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PARTNERSHIP

The PRIMA project has been carried out by the following partners.

INREGIA, Sweden	Co-ordinating partner
BARCELONA REGIONAL, Spain	Full partner
BEATT, Netherlands	Full partner
CERTU, France	Full partner
CETE MEDIT, France	Associated partner
ECOPLAN, Switzerland	Full partner
KTH (The Royal Institute of Technology), Sweden	Full partner
SYNERGO, Switzerland	Full partner

EXECUTIVE SUMMARY

The aim of the PRIMA project is to analyse the reasons behind the acceptance or non-acceptance of road pricing schemes and to produce policy recommendations and guidance for implementation of urban road pricing in Europe.

One salient characteristic of the project is the combined approaches of economic and political sciences and case studies. In PRIMA we have confronted theories of road pricing and decision-making with observations of eight European case cities with their varying history, urban geography and traffic policy and their different positions on road pricing. The surveys with 500 citizens and interviews with 30 politicians, experts and stakeholders carried out in each of the eight case cities are a key part of the project.

The case cities have the following road pricing experience (the figure within brackets shows the population in the functional area in millions).

Oslo: A cordon toll was opened in 1990 in order to finance road investments. Differentiation by time is under consideration (0.9).

Barcelona: Interurban toll roads have been realised since the 1970's in Catalonia. As the urban area sprawls, the tolled roads are highly criticised (4.3).

Marseille: A tunnel, which passes through the city, is tolled and operated by a private concessionaire since 1993 (1.1).

Lyon: The northern part of the ring road is tolled since opening in 1997. The toll was strongly rejected by the inhabitants (1.2).

Stockholm: An urban road toll system was designed and decided (Dennis Agreement), but was rejected in 1997 (1.7).

Rotterdam: A national scheme for urban cordon tolls is planned. The city of Rotterdam also designed a "charged lane scheme" on highways. It has preliminarily been agreed to implement a combination of measures. (1.1).

Bern: Experts have recommended a combined road pricing and car park charging system. The political evaluation is underway (0.3).

Zürich: Road pricing has not been considered so far. Land-side access charges to Zürich airport are under study (0.8).

The transport policies in the case cities have more or less the same objectives and concerns: increased accessibility, reduced environmental nuisances and increased public transport shares. The background is also rather similar among the cities and is charac-

terised by an increased perception of congestion and pollution and a general lack of financing resources.

In an overall assessment of the survey responses concerning private transport only Oslo and Rotterdam are characterised as having small problems. As regards public transport, the problems seem to be most serious in Barcelona, Lyon and Marseille.

The institutional and territorial organisation of the transport system and the decision-making processes are very city-specific. From national to local levels, numerous transport authorities intervene in decisions in a complex way. The local and regional authorities cannot introduce urban road pricing without support from their national governments. Road pricing is not legally possible in Switzerland and the Netherlands. It is legal in the other countries as long as the pricing scheme is related to financing of new roads.

The acceptance of the road pricing schemes in the case cities can currently be characterised as follows:

?? one scheme on the way from fascination to complaints: Barcelona

?? one success story and one failure: Oslo and Stockholm

?? one smooth and one difficult birth: Marseille and Lyon

?? one scheme of hopes: Rotterdam

?? two cases without road pricing: Bern and Zürich

According to the surveys self-responsibility is seen as a main way to cope with the current traffic problems. Except for the two Scandinavian cities, the polluter pays principle is broadly accepted as a general guideline for policy making. Promotion of public transport and construction of road bypasses are seen as other important policy measures. Urban road pricing is not perceived as an efficient instrument to influence the behaviour of road users. Quite generally speaking public opinion is against it.

On the other side there is considerable support for road pricing as a way to finance investment in transport. Hereby the use of revenues for investing in public transport and other environment-friendly modes gets slightly more support than the construction of bypasses. Respondents from Rotterdam and the Scandinavian cities are more enthusiastic about using the revenues to improve the road network.

In this connection, it is important to be aware of the fact that opinions about road pricing may differ before and after implementation. The experiences from Oslo and the other two Norwegian cities that also have implemented cordon tolls, show that public acceptance increases after implementation. The experiences from Lyon and Marseille indicate that acceptance is quite sensitive to the toll level. In Barcelona, initial acceptance turned into growing protests when toll free motorways were constructed in other parts of Spain and urban growth successively engulfed the tolled parts of the interurban motorways.

The 240 interviews carried out in the eight case cities clearly underline the huge difference between the simple textbook exercise of finding the optimal road pricing scheme and the political and practical problems involved when it comes to introducing road pricing in an urban area. There are not one but many stumbling blocks on the way from the first discussions phase of road pricing to the implementation. The time from initial discussions to implementation is long and hence it is difficult to foresee all kinds of problems that may arise. Any scheme must be designed with respect to the specific institutional context, traffic conditions and policy objectives in the city where it is going to be implemented. The same holds for the decision process needed for introducing and implementing the scheme.

However, the PRIMA interviews and surveys as well as the practical experiences from the case cities provide some general conclusions with regard to getting acceptance for urban road pricing.

1. Acceptance relates to perceived benefits by users, non-users and potential investors and toll operators. The traffic problems of the city must be evident and it must be demonstrated that road pricing is the best way to complement other measures and thus to handle the problems for users as well as non-users. Road pricing should rather be perceived as a "facilitating" instrument and not as a kind of punishment. Furthermore potential concessionaires should feel convinced that it might be a good business.
2. Acceptance relates to availability of alternative modes of transport. The surveys of the PRIMA project show that improvement of public transport should be part of a policy package introducing road pricing. Such improvements can also compensate groups whose welfare will decrease by the road-pricing scheme. However important it is to have a coherent transport policy, the package idea should not be over stressed. The larger the package of policy measures, the larger is the risk that the political strings are not long enough to keep it together.
3. Acceptance relates to the level of charges. Experiences from the case cities indicate that fairly low starting levels are needed and that the charges can be increased successively to meet financial requirements.
4. Acceptance relates to equity effects. Notice should be taken of effects related to income as well as to the location of housing, workplaces and service centres. Compensating measures should be considered for groups whose welfare will decrease by the pricing scheme.
5. Acceptance relates to the design of the decision making process needed for the introduction, discussion and implementation of a road pricing scheme. According to the interviews a stepwise procedure characterised by adaptive learning seems to be best from the acceptability point of view. A financing toll system is more easily accepted than an ambitious pricing scheme differentiated by time and area and thus allowing for influencing travel behaviour. Furthermore, a pure financing scheme can be developed successively as more experience and knowledge is gained about the resulting effects.

6. Acceptance relates to the negotiating abilities among the politicians involved at different levels of government and among the experts and planners representing the various affected governmental bodies. A bottom-up strategy where the initiative to introduce road pricing comes from the urban area, is essential but not enough. A supplementing top-down strategy is needed as well. The national legislation must be changed in many countries and financial support from the national government will make it easier for the urban citizens, especially car users to accept increased personal expenses.

7. Acceptance relates to the communication efforts initiated in the very beginning of the decision making process. The starting point for introducing road pricing must be a political and public discussion on the traffic problems and the general objectives of the urban transport policy. Representatives from the public should also be invited to discussion and assessment meetings and be given rich opportunities to suggest modifying alternatives.

8. Acceptance of urban road pricing depends on earlier road pricing experiences. Hence, EU-support for activities aiming at dissemination of information experiences between cities is very important. It is also important to continuously assess the coherence of urban development and urban road pricing with existing interurban road pricing systems since public acceptance can be negatively affected if there are inconsistencies in the interface where these systems meet.

9. Acceptance relates to experiences with the general privatisation trend and with the increased use of IT-equipment and electronic payment in other areas. The interviews of the PRIMA project also demonstrate that private initiatives to construct toll roads may increase the political acceptance and that the increased use of IT-equipment might explain why the integrity issue no longer seems to be an obstacle to urban road pricing.

10. Acceptance from a majority of the citizens can not be expected from the outset. It will increase by an open communication process. Experiences from several cities show that acceptance tends to increase after the implementation. However, the Barcelona case indicates that getting acceptance is a continuous process from developing the pricing scheme till implementation and while in operation.

OBJECTIVES OF THE PROJECT

The basic aim of the PRIMA project is to analyse the reasons behind the acceptance/non acceptance of urban road pricing schemes and to find measures to increase its acceptability. The specific objectives of the project are:

- ?? to assess the acceptance of road pricing in urban areas;
- ?? to evaluate optimal designs of urban road pricing schemes and decision making processes, thereby taking account not only of what is technically feasible but also of the acceptability of different schemes;
- ?? to identify barriers towards implementation of urban road pricing systems and to develop a guideline showing how to remove these barriers.

Another important objective of the PRIMA project has been to continuously disseminate and discuss the results with planners and experts from the case cities and to interact with specific target groups consisting of politicians, policymakers and stakeholders with the help of formal assessment workshops and a conference.

MEANS USED TO ACHIEVE THE OBJECTIVES

The PRIMA project is of the comparative case study type including Oslo, Barcelona, Lyon, Marseille, Stockholm, Rotterdam, Bern and Zürich.

These eight cities, that differ according to progress in terms of implementing road pricing are studied as regards e.g. current transport system and transport policies, institutional set up, attitudes of the citizens regarding road pricing schemes and characteristics of the decision making process. In each case city, interviews have been made with 30 politicians, experts and stakeholders and surveys have been carried out with a sample of 500 citizens. Use is also made of already available data and information. An extensive state of art review of issues related to acceptability has been made and media reactions to road pricing schemes or related transport policy measures have been studied in each case city.

The empirical analyses are both of the quantitative and qualitative kind and address how the acceptability of road pricing schemes is related to household characteristics and to explanatory factors such as personal consequences, use of revenues, awareness of environmental problems and public dissemination of information.

The decision making process is classified according to attributes like participation of politicians from different levels of government, knowledge generated and disseminated in the preparatory phase, participation of citizen groups, influence of various stakeholders, etc. The analysis is used to identify decision making designs that in the light of the interviews and earlier experiences have a potential to increase the possibilities to implement road pricing.

The empirical analysis is based upon public choice theory as well as on earlier empirical findings. Public acceptability is looked upon from an economic utility framework. The theoretical foundation strengthens the possibilities to generalise findings and conclusions to other cities.

Close interaction with public authorities in the included cities has been maintained throughout the project. The results obtained at various stages of the project have been informally discussed with city representatives. The main results concerning optimal design of road pricing schemes, urban/interurban operability of such schemes and the analysis of decision processes and barriers have been discussed in one-day assessment workshops organised in Scandinavia, France, Switzerland and Spain. A preliminary version of the conclusions in this report was discussed at the final conference of the PRIMA project in Stockholm in June, 2000. The conference was attended by about 70 politicians, policy makers, experts and planners from cities and other public sector levels in Europe.

1. INTRODUCTION

1.1 Background

The aim of the PRIMA project is to analyse the reasons behind the acceptance or non-acceptance of road pricing schemes and to produce policy recommendations and guidance for implementing urban road pricing in Europe.

Throughout this report the terms road pricing and road tolls are used to denote both conventional road tolls and congestion pricing.

Conventional road tolls are used to charge motorists for using a facility such as a tunnel, a bridge or an expressway but can also be applied to charge them for entering, leaving, or driving in the central parts of a city. The main motive for conventional road tolls is to raise money for the services provided by the new facility or for related transport investments. Congestion pricing is used to charge motorists at times and places when the road system is congested. The main concern is to influence their travel behaviour. Faced by higher charges in congested periods or places motorists are encouraged to use alternative modes of transport, change time of the day or to adjust their travel behaviour in other ways.

The idea of relating charging directly to the use of roads is not new. In the United Kingdom and the United States, for example many turnpikes were built as private or public toll roads from the late 17th to the middle of the 19th century. Also the recent interest in road pricing is based on financial motives but increasingly other objectives are discussed, such as to manage congestion, pollution and other nuisances. The transport demand management motive is especially pronounced by proponents of urban road pricing.

Individual road users base their travel decisions upon a comparison of the benefits they will receive from the use and the costs to themselves. The costs normally do not include the congestion cost their travelling impose on other road users or negative environmental effects on the whole population. Since these cost components are not included, some trips will add more costs than benefits to the society and as a result the road system will be overly or inefficiently used.

The disregard of what is called negative external effects and the resulting inefficiency constitutes the basic theoretical rationale for road pricing. By introducing a sophisticated charging mechanism directly related to the use of a road it is in principle possible to force all potential travellers to also consider the external costs.

One salient characteristic of the PRIMA project is the combined approaches of economic and political sciences and case studies. In PRIMA we have confronted theories of road pricing and decision-making with observations of eight European case cities with their varying history, urban geography and traffic policy and their different positions on road pricing. In each one of the case cities 500 households have answered a set of questions concerning travel habits and attitudes about road pricing schemes and other transport policy measures. We have also interviewed 30 involved politicians, experts and stakeholders in each city. The interviews covered questions about current policies as well as prerequisites for developing or introducing road pricing.

1.2 Good experiences and few followers

Though road pricing undoubtedly is a theoretically elegant way of closing the gap between private and social costs for car driving, there are few practical experiences. It is quite common to use tolls on interurban motorways to raise funds for infrastructure investments but there are few examples of pricing mechanisms aiming at a more efficient use of the road space. Likewise, many cities are using tolls on certain road links, mostly bridges and tunnels, for financial reasons. Driven by the same motive the three largest cities of Norway established toll rings around their inner areas some ten years ago. So far, Singapore is the only city that has implemented an urban road pricing scheme directly aiming at influencing travel patterns.

The experiences of the cities that have implemented some kind of road pricing demonstrate that it is possible to reduce traffic congestion and traffic related nuisances substantially. In spite of the theoretical arguments and these experiences there is a strong public and political resistance to use urban road pricing as a tool for transport demand management. The most obvious reason is of course that almost every road user will be worse off if the revenues are not used to compensate them in some way. There are also other reasons for this resistance. Firstly, the theoretical arguments in favour of urban road pricing may be weaker or at least less straightforward than many transport economists seem to believe. The simplifying assumptions the road pricing argument is based upon certainly do not capture the rich variety and the manifold interactions and dynamic processes characterising a city. Modern urban economics, which has much broader perspective than transport economics, teaches us somewhat more about the interdependencies between urban development, urban land use and urban transport. The spatial distribution of activities in an urban area as well as the urban travel and transport pattern slowly evolves as a result of concentrating and decentralising forces such as agglomeration economies of scale and demand for land, respectively. The introduction of road pricing will not only affect the transport flows but also the relative attractiveness of different parts of the urban area, the land prices and the spatial wage profile. Over a longer time period the location of housing, workplaces and other urban activities will also be affected.

Adding equity concerns and heterogeneity to this complexity, it should not be surprising that many city politicians and city planners feel less convinced about the merits of road pricing and about the possibilities to foresee the consequences of a pricing scheme than some transport economists do.

The surveys as well as the interviews of the PRIMA project underline the importance of going beyond the economic textbook exercise in order to get a deeper understanding of the possibilities to introduce urban road pricing. Either the pricing argument is based on transport economics or on urban economics, real life and political decision making is of course far more complicated than the theories assume. Politicians are more familiar with regulation and physical measures than with pricing instrument. Even if some politicians are positive to the idea of urban road pricing they will have to seek support from others. A political majority at the urban level will not be enough. Usually, national, regional and local politicians will have to negotiate and agree in order to implement a pricing scheme. The experts involved are often from different governmental agencies and sometimes have different opinions about the effects of alternative pricing schemes. Without earlier practical experience, uncertainties are inherent which of course leaves extra room for different stakeholders and pressure groups.

1.3 Machiavelli and urban road pricing

What about the positive experiences of cities that have introduced some kind of road pricing scheme? Should not the positive results achieved in for example Singapore, in Oslo or in Marseille have softened the scepticism among politicians and planners? The system of governance and the institutional set up in Singapore may be too specific to bring about such a change but it should be less easy to dismiss the Norwegian cordon schemes. Some politicians may of course have changed their mind due to the Norwegian experiences but still hesitate because of public resistance to urban road pricing. Few urban citizens outside Norway are familiar with the experiences of the ring tolls in Oslo, Trondheim and Bergen. When they face traffic problems they are used to demand new investments in roads and public transport. Most of them probably think that they already pay too much in taxes and car related charges and are certainly not used to ask for new pricing schemes.

Even if people were willing to pay more in order to get a better transport system, the negative public attitude to urban road pricing should not be surprising since it represents an entirely new way of handling urban traffic problems. As underlined by the following statement by Machiavelli, the support for new concepts and ideas is mostly quite weak in the beginning.

"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things.

For the innovator has for enemies all who have done well under the old conditions, and lukewarm defenders in those who may do well under the new”.¹

The introduction of new consumer products provides a more recent example of this phenomenon. The demand for new products and services usually increases very slowly in the beginning even if backed up by massive marketing efforts. The demand successively gains momentum when more and more consumers become familiarised with the product. After a period of rapid market penetration the rate of increase slows down again as the fraction of users grows closer and closer to the maximum.

The interviews made with politicians and experts from the PRIMA case cities indicate that this kind of S-shaped time profile of acceptance for consumer products also may hold for public acceptance of urban road pricing. It is not easy for city politicians to introduce new pricing schemes without having the possibility to refer to successful practical results from cities familiar to the citizens. If the time profile of acceptance is S-shaped, urban transport policy seems to be stuck with a dilemma of the Catch 22 type. It is difficult to gain acceptance without being able to point at positive practical experiences and it is difficult to get the experience without having enough public support. At the same time the S-shape offers reasons for optimism. For each city added to the "road pricing club" it will become a little easier for others to follow and eventually it will become quite natural to implement pricing schemes.

The weak political support for urban road pricing is also related to the legal situation. Tolls on new urban roads or on bridges and tunnels are legally allowed in several countries but new laws are needed in almost all European cities in order to allow implementation of more stringent pricing schemes. The necessary legal work is complicated because many levels of government and governmental bodies are involved in urban transport policy. In most urban areas several local governments and at least one regional government share the political responsibility with the national government and in most cases numerous national, regional and local agencies are involved in the policy making.

1.4 The case cities

The PRIMA project case studies include the following cities and road pricing experiences (the figure within brackets shows the population in the functional area in millions).

Oslo (0.9): A time-limited investment program (the Oslo package) for new road tunnels, mainly plus a few facilitation buslanes etc, was inaugurated in 1990 and financed by a road toll cordon. The toll revenues are supplemented by additional national public means, including both ordinary allowances and specific funding of the package. An in-

¹ Machiavelli, 1513, taken from: Roth, G. 1996 Roads in a Market Economy, Avebury Technical, Great Britain.

tially very critical public opinion has gradually become more accepting to the tolls in pace with the resulting amelioration of the road net and the urban environment . Currently, a prolongation of the tolling period with differentiation by time is under consideration for a new package, mainly containing investments in public transport.

Barcelona (4.3): Since the 1970's interurban toll roads have been realised in Catalonia, operated by private concessionaires. Because of urban growth and sprawl some parts of the tolled roads have become surrounded by the urban settlement and, consequently, interurban through-traffic has found alternative untolled deviations inside the urban districts, which has caused disturbances and much criticism. Means to cope with such interface problems are under consideration.

Marseille (1.1): The first urban toll road in France, a toll tunnel through the city was opened in 1993. Public and media opinions were, and still are, mainly positive, due to a successful information and communication strategy with public participation in the planning. A private concessionaire operates the tunnel, which is an important link in the road net and has relieved the surface net of a substantial through-traffic.

Lyon (1.2): The northern part of the ring road is being tolled since it was opened in 1997. The inauguration was accompanied by riots and protests against the then ruling administration for an allegedly incorrect behaviour in selecting the contracted operator and taking other decisions on the matter. The intended changes of the transport pattern were not accomplished, as the tolled passage, at first, became a failure. The charges had to be lowered, circulation restrictions on alternative routes abolished and information to citizens and the media improved. Successively, the passage has become more used, and the opinion somewhat more positive.

Stockholm (1.7): A time-limited investment program (the Dennis package) was launched in 1933 after the model of Oslo. In contrast to the Oslo package, this one was comprehensive and contained both road and rail investments and other means in order to ameliorate city environment, accessibility and economic development, Just like in Oslo, the financing mechanism included a road toll cordon, ordinary allowances and additional specific public funding. A strong political alliance of the national government and the largest parties in the city and county stood behind the agreement, whose different ingredients were much criticised in media, by the excluded political parties, local opinions, the environment movement and other opponents. The work started and many parts were fulfilled and others are being implemented, but the package fell into parts and in 1997 the national government decided to break the agreement.

Rotterdam (1.1): The city of Rotterdam is developing a pay lane system (the Select System), mainly for heavy traffic to the port and other economically important areas. Meantime, the national government has made up plans for urban cordon tolls in the four main cities of the Rijnstad conurbation (the Rekening rijden), which complicate the city's system. Currently, an agreement on a combination of the packages plus some other important investments of the regional transport system is under way.

Bern (0.3): In Switzerland road pricing is not allowed, except for national measures to limit the environmental strain caused by heavy international through-traffic. Still, experts in Bern have envisaged a combined local and regional road pricing and car park charging system, which is under political evaluation. So far, nothing has been decided, and a possible decision in the city must be preceded by a timely process of local referenda and a national juridical procedure.

Zürich (0.8): This main centre of Switzerland's business and finance is one of the leading public transport oriented cities in Europe with well developed local and regional track and rail systems. The public opinion in the city is negative to measures for increased road capacity, while the cantonal opinion is more positive towards better accessibility by car to the region centre. No road pricing scheme is currently under discussion, except for a project on landside access charges to the Zürich airport.

The transport policies in the case cities have more or less the same objectives and concerns: increased accessibility, reduced environmental nuisances and increased public transport shares. The background is also rather similar among the cities and is characterised by an increased perception of congestion and pollution and a general lack of financing resources.

Another similarity is the media opinion, which with the exception of Marseille, on the whole have been rather negative towards road pricing and, in some cases, also towards parts of the investment programs and other measures. A learning from the PRIMA project is the importance of creating good communication links to the media.

As shown in table 1.1 the survey responses indicate that all case cities except Oslo and Rotterdam have some serious or intermediate problems as regards private transportation.

	Serious problem	Intermediate problem	Small problem
Time loss in congestion	Barcelona, Lyon, Marseilles	Stockholm, Zürich	Bern, Oslo, Rotterdam
Lack of parking space	Barcelona, Lyon, Marseilles, Zürich	Stockholm	Bern, Oslo, Rotterdam
Level of parking fee	Barcelona, Lyon, Marseilles	Bern, Rotterdam, Stockholm, Zürich	Oslo

Table 1.1 Problems in private transport according to the survey

Table 1.2 presents the corresponding results for the public transport system. The assessment of public transport is at least moderately positive in Bern, Oslo, Rotterdam, Stockholm and Zürich. By combining the information of table 1.1 and table 1.2 it may

be observed that Barcelona, Lyon and Marseille all have serious problems across the entire transport system.

	Serious problem	Intermediate problem	Small problem
Time loss	Barcelona, Lyon, Marseilles	Oslo, Stockholm	Rotterdam, Bern, Zürich
Comfort and molestation	Barcelona, Lyon, Marseilles	Oslo, Rotterdam, Stockholm	Bern, Zürich
Level of fares	Barcelona, Lyon, Marseilles	Bern, Oslo	Rotterdam, Stockholm, Zürich

Table 2.2 Problems in public transport according to the survey

The institutional and territorial organisation of the transport system and the decision-making processes are very city-specific and they differ according to progress in terms of implementing road pricing. Road pricing is not legally possible in Switzerland and the Netherlands. It is legal in the other countries as long as the pricing scheme is related to financing of new roads. However, local and regional authorities can nowhere introduce urban road pricing without support from their national governments.

Considering the road pricing experiences of the case cities it seems fair to characterise them as follows:

?? one scheme on the way from fascination to complaints: Barcelona

?? one success story and one failure: Oslo and Stockholm

?? one smooth and one difficult birth: Marseille and Lyon

?? one scheme of hopes: Rotterdam

?? two cases without road pricing: Bern and Zürich

In the PRIMA project acceptance has been related both to the type of the road pricing system, to the urban-interurban interface of pricing schemes and to the decision process needed for implementation. The main findings and preliminary conclusions have been informally discussed with city planners and experts and formal assessment workshops have been carried out in four countries.

The following report is based upon all material produced within the project and especially upon three earlier published project reports (Deliverable D1 "Comparison of transport system in case cities and state of the art regarding acceptability and barriers",

D2 "Survey, Interviews and Media Analysis. Structure, Questionnaires and Results" and D3 "Assessment of Urban Road Pricing Schemes and Political Process"). It has also benefited from discussions at PRIMA's final conference in Stockholm. The report is structured as follows.

The second chapter gives a historical perspective and reiterates some arguments against urban road pricing, and the third chapter provides an overview of the generic difficulties facing urban transport planners and underlines the importance of experiments and adaptive learning. The fourth chapter discusses the implications of structural economic changes for the acceptance of road pricing and the fifth chapter gives an account an analysis of the opinions on road pricing among citizens in the PRIMA case cities. In the sixth chapter we stress the necessity to design road pricing schemes with a proper balance between efficiency, practicability and acceptance. The seventh chapter deals with the relationship between acceptability and issues of distribution equity. Chapter eight addresses the institutional framework and the need to establish participatory rather than closed decision processes. Chapter nine provides a description of the lessons to be learned from the case cities, and in the concluding chapter we give some recommendations on measures to be taken in order to increase the acceptance of urban road pricing.

2. Looking backwards?

2.1 Rootlets of urban road pricing

Road pricing is a phenomenon that has gathered quite a number of sceptics, even some outspoken enemies — but, alas, very few genuine supporters outside the profession of academic economists.

Drivers already pay too much for owning and using their vehicles, so road pricing is just a new tax that is unfair, unnecessary and inefficient. Road users are the true victims of congestion and have to pay for it by longer and longer commuting times. Why should they pay twice for being stuck in queues? Road pricing violates integrity, causes border problems. The technique for collecting is uncertain. These are some of the most frequently heard arguments against, in PRIMA case cities as in other European environments. Sometimes proponents of urban road pricing systems even are accused of a wish to reintroduce long time ago outdated measures such as town tolls.

In a way, the last accusation is correct. Medieval and later rulers were eager to promote trade and economic development of their cities and to protect them from outside competition. Granting privileges to town tradesmen and craftsmen and imposing tolls on goods passing through the gates were seen as powerful means to this end.

Today the objectives of road tolls and other forms of urban road pricing are more complex but in principle stemming from the same roots, the desire to make cities and city life better with prospering trade and industry, good dwelling and living conditions, health and sound environment.

The political logic for introducing road pricing to that end might look intricate but after some reflection it is clear enough. By tolls you can raise capital for building new infrastructure and for maintaining it, thus creating better circulation. Sometimes the new infrastructure will make the city more beautiful and create a better environment. The use of toll revenues in Oslo provides a good example. One of the strategic parts of the Oslo package was a new road tunnel under the plaza in front of the Oslo City Hall and the old Akershus Castle. It was the first element constructed of the whole package and replaced the noisy and dangerous traffic flows in the surface right in the centre of Oslo, thus manifestly beautifying the waterfront of the city. Furthermore, all kinds of road pricing will have some influence upon the habits of drivers and will, at least to some extent, also serve as instruments for managing the volume and distribution of traffic, thus affecting accessibility, environment and quality of urban life. As pointed out in many interviews of the PRIMA project even simple road pricing schemes will make urban citizens more familiar with the road pricing principle. In that respect a simple system may pave the way for pricing schemes with explicit demand management objectives.

The reasoning today and in medieval days may look similar but there are also fundamental differences. Old urban road pricing schemes aimed at goods and passengers, while the new ones focus on circulation and vehicles. Direct benefits and disadvantages of traffic are in sight and only indirectly are the effects on the city’s competitiveness considered.

Experiences from Lyon and Marseille also demonstrate this linking of the manifest objectives to collect money for investments with the underlying will to increase the city’s beauty and improve the conditions of city dwellers and economic life. And, as has been shown in the interviews carried out and also in public polls, this attained amelioration of the city is important for getting popular acceptance of the additional costs for driving. Of course, positive effects of this kind will far from always result from a pricing scheme. In Barcelona, the unintentional interfering of through traffic with the urban environment is a strong reason for non-acceptance.

The most important findings in the surveys were, however, that the popular opinion is less critical to the objectives than to the chosen instruments. The city rulers could learn from that, that citizens should be involved in the implementation process, not only in the formulation of objectives.

2.2 Ups and downs of interurban road tolls

Interurban road tolls should be distinguished from urban road pricing (or more correctly, intraurban, as there always are interface effects). In both cases you are forced to pay for utilising the roadway for transport, but the objectives of interurban road pricing usually are less complicated. It has been introduced either for financial reasons or for achieving political goals such as reduced road transports and support of railways or shipping. In other cases, e.g. in Paris, road tolls are differentiated by time on a large motorway to the city as a measure for alleviating Sunday afternoon queues on the way home. The reasons for urban road pricing often are of the same kind, but mostly there are other objectives, as well.

From the history of interurban roads and tolls we can learn much that can be useful even for today’s planners and politicians. Carefully planned and built roads were a concern of the antique and medieval states for transporting the king’s goods and messengers and, foremost, his armed forces. The main roads physically tied the different parts of the kingdom or empire together and were important for creating the concept of coherency — or cohesion in the modern language of the European Union.

As interregional and local trade and mobility grew, fine-meshed road nets became necessary and couldn’t any longer be the exclusive affair of the state. Public rights to travel on private land were granted and in Britain the obligation of parishes to maintain the roads through statute labour and later on monetary duties was established. This system

was not very practical, as the charged parishioners not necessarily were those who caused the most wear and tear of the roads. The responsibilities of the parishes had to be replaced by a more effective system capable of financing maintenance and even widening of roads.

The inventiveness of the British society in the early days of industrialism gave birth to time-limited turnpike trusts with a right to collect tolls from travellers and with funds for road costs and compensation of landowners for damages. Such trusts were instituted by Parliament in growing numbers beginning in the late 17th century. The Acts regulated in detail the authority of the trusts, the charging principles, the rate of interest of creditors etc. The first turnpike trusts were parts of the county administrations, but early in the 18th century private trusts came into being and successively they became more powerful and widespread, all over the country and later on in the US, too. The diffusion of the system in Britain had the shape of a usual S-curve with its steepest part from 1750 to 1770. This has been demonstrated by Pawson and Levinson.² (Fig. 2.1)

Turnpikes met some resistance from those who couldn't afford paying the tolls or who had commercial or political motives against. The state reacted with heavy fines and even public whipping for destroying tollgates. On the whole, the resistance was modest.

Road tolls became more widespread up to the middle of the 19th century, but the pace of diffusion slowed down with the arrival of steam engines. And finally they became outdated by the joint attack from railways (and canals), which represented a new and more effective technology for transport, and new effective institutions such as the taxation power of the national state. In the course of a decade or two road tolls disappeared almost everywhere.

² Eric Pawson: *Transport and Economy: The Turnpike Roads of Eighteenth Century Britain*. Academic Press, London, 1977

David M. Levinson: *Road pricing in practice*. In *Road Pricing, Traffic Congestion and the Environment*, Cheltenham, UK, 1997

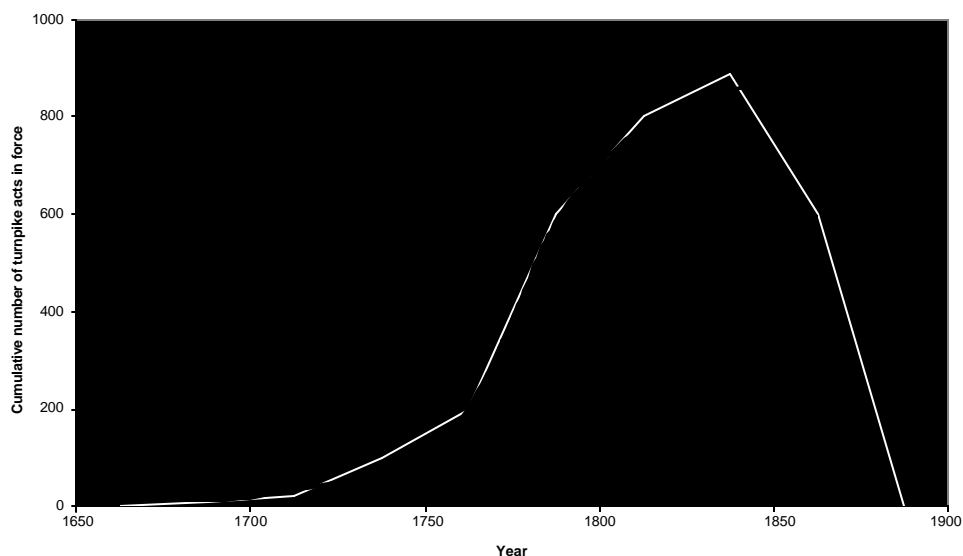


Figure 2.1 An S-curve representing the development of turnpikes in Britain

The next step in the history of interurban road pricing came with the advent of the automobile, which in turn outdated railways and canals. Taxes gradually became insufficient for financing the vast systems of highways and other roads fostered by the 20th century's mass motorization. Interurban road pricing met with a new spring in many countries, which still lasts. Hitherto, the public sector usually has been the initiator and manager, but private or semi-private companies have re-entered the scene and may, eventually, become the main actors, as public finances grow tighter.

In France and Spain, especially in Catalonia, where interurban toll roads were introduced decades ago, two principles were stated: (i) only new facilities should be tolled, and (ii) there must be a parallel free-of-charge road. More or less, these two principles have remained the tacit basis for interurban road pricing in many countries.

2.3 Urban road pricing — another story

City tolls disappeared in the 19th century, too. But the reason was of another kind: the spreading of liberal doctrines with free trade and abolishing city privileges and guild systems. Tollgates became antiquated.

What, then, about road pricing in our cities today? Their traffic volumes have risen in a hitherto unforeseen scale and created so many problems that something has to be done. It is not difficult to foresee that urban road pricing will be one of the possible instruments taken into consideration for curing the disease.

A first and a bit puzzling observation is that, except for financial tolls, even today you can hardly find a city with a functioning road pricing scheme where traffic management and environmental improvement are pronounced objectives. But urban road pricing for such ends is on the agenda in many countries over the world.

Theoretical arguments in favour of road pricing have developed very much and new electronic techniques have given an impetus to designing new schemes. Why, then, has so little happened in reality, and why is it that difficult to get acceptance?

One reason might be that not only the arguments in favour and the new supporting techniques have developed, but also our understanding of the reasons for the widespread reluctance and even opposition towards urban road pricing. The world has become more complicated, and one-dimensional thinking doesn't supply us with answers.

This is something new, and we will discuss it in this report.

3. Surgery on a Living Body

3.1 A living body rather than a machine

Public orators often compare large cities to forceful machines, engines for the national economy and development.

However pertinent this rhetoric might have been in the early industrial era, the machine metaphor looks somewhat outdated on the verge to the knowledge society and the biological revolution.

Now, metaphors from life sciences are more adequate. A city is more like a living body than a machine. It is complex and dynamic, a net of veins and nerves and a fabric of a very large number of interacting and counteracting parts and processes, only partly known and understood. The surveys and interviews carried out within the PRIMA project as well as the assessment workshops provide ample evidence about the importance to consider these complexities. If they are not better understood and handled it will be difficult to increase the acceptance of urban road pricing.

3.2 Successes and failures of city surgery

Malfunctions and circulatory disturbances are well-known phenomena to medical practitioners but also to citizens, to decision-makers and traffic planners in cities.

The city network is complex, and urban traffic management is complex. Interdependencies and external effects (side effects) are rules rather than exceptions. Interventions to cure bad functioning, to control and adjust flows, widen arteries or open up bypasses usually make more changes than was intended. Often the side effects can be at least roughly estimated, but not always; sometimes they are positive, in other cases new problems arise.

Urban road pricing is no exception. It faces a much more complex system of traffic flows, comparable to veins and nerves, than interurban road pricing. For inter-urban roads, the objections have been small or moderate as regards changing transport flows. One reason for this is that interurban transport often takes place on well-identified links for which methods of analysis and public perceptions are fairly transparent and accurate. Hence, benefits and costs can be calculated and conveyed to the society at large.

The same approaches frequently fail when applied to traffic flows inside an urban region. Characteristics of the built environment in an urban region make the pertinent transportation system more complex in several dimensions. Generally speaking, an urban region has a rich network of alternative paths which connect the same origin-destination pair of

nodes or zones. With such a network it becomes vital to distinguish between user equilibria and solutions which are optimal from a system's point of view. Moreover, network richness takes the form of several, partly competing, partly complementary, modes of transportation generating interdependencies between many layers of the transportation networks. There is also a clear competition for space between transportation and other economic activities, between transportation infrastructure and other forms of the built environment. In addition, congestion on various links of the urban transportation system is strongly time dependent. The result of these complexities and interdependencies is that the planning, design and assessment methods are far less reliable compared to the inter urban case. Hence, the consequences of a road pricing policy become uncertain and ambiguous both to the analysts and the public. This observation helps to explain why road pricing schemes for urban regions often are rejected by the public opinion.

Introducing a toll cordon or a toll road in an urban area might look as a simple operation, but evidently the totality of effects is not easy to grasp, a fact that makes experienced politicians doubt whether the gains are worth the price. Reflecting upon a road pricing scheme, politicians will also have to consider their objectives for other kinds of public services within their jurisdiction. Trade-offs between different services and investments must be considered as well as over-all financial constraints. Sometimes this broad perspective will block or at least delay seemingly simple decisions. Since the broader perspective also opens up for log rolling it will in other cases make the political decision-making process easier.

The double role of the politician, to be an exponent of the people's interests and wishes, and to lead the opinion, often becomes apparent in the case of road pricing, where the opinion is divided with vociferous spokesmen on both sides. Any active politician risks misjudging the dynamics of the popular opinion and take the wrong stand.

The PRIMA case cities are good illustrations. Even Oslo, the most successful one, saw a long and cumbersome process until the final decision was taken and implemented and the reactions of drivers and all other affected people showed to differ positively from what had been found in advance studies and opinion polls. The location decision for the toll ring included both aspects related to traffic flows, land use, financial consequences and equity considerations. Politically difficult as that may be, the choice of technical equipment for the tolling system turned out to be much more problematic. According to the PRIMA interviews this part of the decision process was in fact extremely dramatic. It included a power struggle between the national and the local government that included the usual assessments of technical prestanda and costs but that above all was fuelled by arguments related to industrial policy, trade policy and even foreign policy. In the end the national government decided that a Norwegian system should be used instead of a cheaper one from abroad.

The two French cities demonstrate the importance of transparency and a good communication process between the 'doctor' and the 'patient'. These were major factors for the success in Marseille and the riots in Lyon in spite of relatively similar physical conditions and chances.

The complexity and the difficulties to foresee what will happen when a road pricing scheme is implemented are arguments for learning more. In a city a multiplicity of people are affected, which makes reasons for open, collective and decentralised decision processes rather than playing authoritarian power games. Modern planning laws support broad participation from all concerned, whether they feel favoured or the opposite from the proposed action. Many times it is most productive to start a dialogue with the opponents and try to reach consensus on the nature of the problem and the effects of different measures. We will come back to that later in this report.

What is important is to create mutual respect and understanding of the motives of the other parties, and to be clear about the fact that, whatever common theories may state, there is no such thing as an average man. He is a sheer construction, but planners and experts have for long made up their plans and investigations presupposing that all that is good for the average man logically should gain acceptance from the majority, at least after an information, explanation and marketing campaign.

This erroneous thinking stems from underrating differences between people. Some win and some lose, but the gains and losses vary, sometimes very much. Still, every one has got one vote in a democratic process, irrespective of that. The total outcome for the collective of citizens could be positive, even if a majority of them lose. Simple arithmetic can be fallacious.

Another erroneous thinking has to do with the rationalistic models often used in urban transport planning. Cities are no machines, nor are their citizens. Some of the models could, none the less, convey an impression of engineers and economists believing that citizens act like machines or Pavlov dogs. By pulling the right lever you could bring about the wanted reaction. Nothing could be more wrong. Human beings — political decision-makers and ordinary inhabitants, as well — are packages of rational, and even irrational, behaviour, and their standpoints in one matter may be coloured from their interests and opinions in other matters. Predicting the outcome is more complicated than can be shown in a simple modelling. Fine-tuning, the catchword of macroeconomists in the 1950's and 1960's no longer has good reputation; since then we have learnt the importance of creating stable sets of rules for decentralised decision-making.

Stockholm, the only failure hitherto among the PRIMA case cities that have decided to introduce road pricing, could serve as an illustration of the risks for outsmarting oneself by rationalistic calculating. The so-called Dennis package had a very clever composition: good for environment, for accessibility and for economic growth, support by the three largest political parties who got consent for their own darling projects by approving the two other parties' favourites. And, finally, an elaborate implementation plan with a number of formal checkpoints and assessment studies. Still, the decision process collapsed after the next general election and an accompanying change of priorities on issues of higher political dignity than road pricing and traffic planning in Stockholm.

3.3 New knowledge will open up new possibilities and make new treatments feasible

In spite of the complexity that is common to an urban transport system and a living body there are striking differences between the attitudes of medical men and decision-makers and experts in city planning and management. Doctors for their treatments are more ready to take advantage of the perpetual inflow of new knowledge and techniques, while their colleagues in the field of transport planning are more inclined to take a wait-and-see attitude. Some of these differences could be ascribed to the less advanced state of art of transport sciences than that of medicine. The knowledge of effects and side effects of certain measures is more fragile. But the most important difference is the fact that a city is also the object of politics and conflicting interests. No one bears the complete responsibility; everyone must be ready for compromises.

The two Swiss PRIMA case cities are good examples of such a political hesitation to introduce road pricing schemes due to the traditional Swiss respect for people's different interests and the risks for negative reactions against top-down decisions. This deep democratic instinct could, however, lead to troubles in solving traffic problems even if they are obvious to a large number of citizens and decision-makers.

To conclude, the city itself is not more complex than the living body but its decision system is decentralised, and the knowledge is more limited both of what disease the patient is suffering from and what the outcomes of different kinds of treatment will be. Still, there are good reasons to learn from the willingness of doctors to make experiments and always be prepared to interrupt a less effective treatment and try another one. And to be open to findings and new experience of other colleagues.

Our cities are now entering the global knowledge society. In the next chapter of this report we will discuss what to learn from that.

4. On the Road to the New Economy

4.1 The new economy

The turnpikes introduced in some countries between the 17th and 19th century were outdated by the technological changes associated with the industrial revolution. On the verge to what is often called "the new economy" it does not seem too far-fetched to believe that the new economy will bring about a new attitude to road pricing.

Several labels have been and are used to characterise the structural economic and social changes of the last two decades. "The information society", "the knowledge society", "the post-materialistic society", "the network society" are examples of such labels. Though there is no common and unambiguous definition of "the new economy" it seems fair to say that it covers most of the features highlighted by these labels. Additionally, it includes the deregulation and privatisation trends characterising many countries and the increased importance governments attach to establishing firm and growth enhancing rules of conduct for different economic sectors and actors. Lower costs of communication and information handling in combination with decentralisation and changes of the institutional set up governing interaction imply lower costs of transport and transaction and a more efficient use of resources. According to many debaters this constitutes the basic new feature of the economy.

4.2 New technology makes it possible to use infrastructure more efficiently

What then, has the new economy to do with the acceptance of urban road pricing? The most evident link is perhaps caused by the seemingly endless cost reductions for communication and information handling. On the supply side, the rapid introduction of new and better electronic devices will result in new and more efficient ways of charging road users. By means of better and better technological equipment the space needed for toll-plazas will become smaller and smaller, and it will become simpler and simpler to relate charging to the level of congestion and to various environmental characteristics of the vehicle. Eventually electronic road pricing based on GPS and other technical devices may even make it practically possible to abolish toll-plazas and to charge individual vehicles momentarily according to the external effects they give rise to.

It is perhaps not likely that lower costs for implementing and operating more efficient road pricing systems will increase public acceptability significantly even though it would be beneficial to the users and imply an overall gain to the society. However, there are reasons to believe that the increased use of computers and telecommunication in other areas will indirectly work in that direction. More and more people are daily using so-

phisticated electronic devices such as computers, mobile phones, smart cards etc. Vehicles are becoming increasingly computerised and road informatics will to be a growing business.

Few people seem especially concerned about the possibilities for others to trace which internet sites they have visited, which phone calls they have made or what kind of consumer products or services they have paid for with credit cards. This observation is in line with the information from the case cities. The privacy issues linked to road pricing do not seem to have played or to play an important negative role. Only a small minority of the 240 interviewees in the PRIMA cities considers protection of individual privacy as a major political issue.

This does not mean that privacy is unimportant to people. In one of PRIMA's case cities a leading transport politician named electronic road pricing "satellite police". There is no doubt that many people feel that the government (or the market for that matter) already knows too much about their doings. Some interviewees also think that the argument of dangers with regard to data protection would become useful in the political fight against road pricing. It is, however likely that the most emotionally oriented kind of arguments will lose in power. The more familiar urban citizens become of using various electronic devices and connecting with different networks, the more likely it is that their attitudes to electronic road pricing will become more positive. Furthermore, it seems likely that new techniques will also open up new possibilities for the protection of privacy.

4.3 Roads should not be excluded from market solutions

Deregulation and privatisation are other features of the new economy that are likely to affect the public and political attitude to urban road pricing. During the last decades a growing scepticism about the efficacy of government intervention and service production has successively initiated a multidimensional reshaping of the public sector. It entails both changing roles of the private and the public sectors, a reconsideration of the proper division of responsibility between different levels of government and a search for more efficient ways of organising the production process in different bodies of government. Deregulation, privatisation, contracting out of public services and introduction of quasi-markets in public services are included in the wide spectrum of measures that have been initiated.

By and large the experiences of this reshaping seem to be good and it has also stimulated new policy ideas for the transportation sector. The resurgence of road pricing, public-private partnership for construction and operation of new links in the transportation network and new ways of financing are some examples.

The transportation sector is in several respects becoming more market oriented as is the telecommunication market. This policy reorientation will undoubtedly make urban citizens more used to pay directly for the service they ask for. Everyone pays for being

able to use his phone and phone rates vary by the hour, by the length of the call and according to the distance to the one called up.

When more people get used to changes for services earlier paid for solely by taxes road pricing will probably also become a more natural or at least less frightening idea. The same "familiarisation" process is likely to influence politicians. It is not unreasonable to think that politicians who are used to contract out public services or to operate quasi-markets in other policy areas will also become more positive to road pricing.

Contracting out seems to be especially important. According to the interviews carried out in the PRIMA project many conservative politicians are strongly against road pricing. However some of them were positive to toll financing by private concessionaires. In Stockholm, a proposal by a private consortium to construct and operate the Eastern link of a planned inner ring road by means of tolls was a main driving force that some time later initiated the Dennis package.

Acesa, the main private toll operator in Spain is also involved in urban parking, in the construction of logistic centres for goods handling and in introducing the next generation of mobile phones in Spain. Private companies of this kind focussed on mobility and communication will probably make road pricing a more tempting alternative for politicians.

There are of course several reasons that have contributed to the evolving view in favour of decentralisation and privatisation. The difficulties for national as well as regional and local governments to balance their budgets are one important factor. The budget problems have forced politicians to try to devise new ways of producing and financing different services. From this point of view it is not surprising that the road pricing schemes implemented in some of the PRIMA project case cities are all financially motivated.

4.4 Top-down and bottom-up perspectives are equally important

Increased national and global competition among metropolitan areas and regions is an important feature of the new economy. When availability of natural resources was the most important locational factor there was little that regions and municipalities could do to increase their attractiveness. An increasing knowledge, information and service orientation of the economy has successively altered this situation. It is now possible for a region to influence its competitive strength in various ways. Measures that increase the supply of well-educated labour and of research and development resources or investments that enhance the local, national and international accessibility will support the competitiveness of a region. The increasing importance that many regions attach to strategic planning and to city marketing is an obvious manifestation of the growing territorial competition.

Stronger local and regional ambitions to foster economic growth are related to road pricing in at least two ways. Urban road pricing has a potential to solve or alleviate the

traffic problems in a better and less costly way than possible by means of traditional policy instruments. Since popular concerns about the urban environment seem to be increasing in pace with mobility and the importance of accessibility, a city that implements road pricing will probably also become more attractive to live in, to work in, to do business in and to visit. Hence it will gain an advantage from the competitive point of view.

When the competition issue was brought up during our interviews in Barcelona some people expressed fears in that their road pricing system had weakened the competitive position of Barcelona as compared to Madrid. However, the fear did not seem to be related to road pricing as such but rather to the fact that Barcelona started with an inter-urban road pricing system that successively has become urban as the settlement pattern of the city has grown and become more decentralised. No fears of this kind were expressed in the other cities.

National and local political ambitions to foster economic growth are also related to the decision-making process needed to introduce, implement and operate road pricing schemes. The national government can not impose urban road pricing schemes without approval from the regional and local politicians concerned.

National decisions of that kind may have been possible when centralised decision making was more common and looked upon as more natural in both the public sector and among private firms. Other kinds of decision mechanisms are needed in an environment characterised by increasing decentralisation and by growing demands for influence from local and regional politicians.

Likewise the PRIMA interviews show that a bottom-up approach, where the initiative to introduce road pricing is expected to come from the urban areas is not enough. As a supplement a top-down approach is needed as well. In most countries the legal background making it possible for urban areas to introduce road pricing autonomously does not exist. The often held opinion that the cities first have to deliver a concrete proposal for road pricing before changing legal backgrounds at national level is not convincing. The incentive for cities to go this way is very low if they don't know when (if ever) national legislation is adapted.

Enabling laws are not always enough. The Norwegian experience demonstrates the importance of national incentives that stimulate urban areas to adopt road pricing. In Oslo, as well as in Trondheim and Bergen, the national government supplemented the revenues from the toll rings with an additional fund to improve the transport system. The extra funds are equal to the toll revenues. According to our interviews, it is doubtful if the urban politicians would have dared to implement the toll rings without this financial support from the national level.

The necessity of extra national funds is also indicated by the preliminary outcome of the negotiations between the city of Rotterdam and the national government. By supporting Rotterdam's pay lane concept as well as other improvements of the public transport

system, new roads etc the national government has gained acceptance from local and regional politicians for a toll ring.

The experiences from many of the case cities show that the negotiations between the national and the local level should be an integrated part of the decision process needed to introduce, implement and operate urban road pricing schemes. As illustrated by figure 4.1, flexibility and dynamic adaptation to new circumstances are needed during this process. In the new economy "linear thinking" is certainly not enough to successfully introduce new concepts of the road pricing calibre.

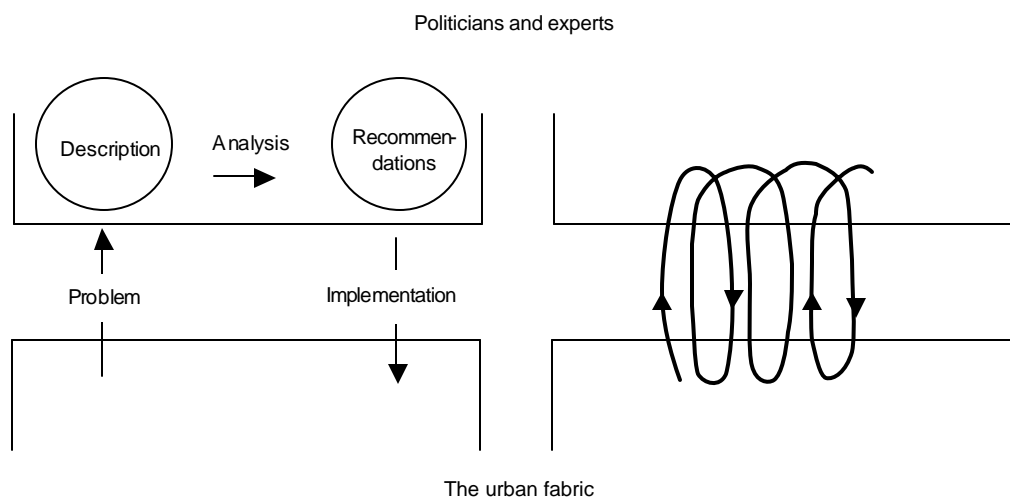


Figure 4.1 The linear (left) and the dynamic (right) approach

The left part of figure 4.1 gives a schematic presentation of the linear decision making style. It consists of seemingly simple steps including problem identification, analysis, recommendations and implementation. The right part of the figure illustrates another kind of logic. Since it often is difficult to provide a clear problem description from the outset and since new and unexpected circumstances will always arise, the decision process is characterised as a stepwise and dynamic iteration between problem identification and prescriptions.

The rise and fall of Stockholm's Dennis package demonstrates the danger of using the linear type of decision process. Once the package was fully described and agreed upon the politicians involved were not prepared to make any adaptations neither in view of new circumstances, such as a deep recession, nor because of critical arguments from various stakeholders.

The growing protests against the interurban toll system in Barcelona can also be associated to the decision process. Evidently, the functioning of the system should have been assessed continuously and the readiness to make adaptations should have been larger.

Since it is always difficult to foresee urban growth and settlement decentralisation as well as the development of several other factors related to the functioning of an implemented road pricing scheme, it seems wise to explicitly consider uncertainties when designing the decision making process.

5. The Opinion of 4 000 Europeans

5.1 Theory and Practice

Urban road pricing is a field where a well-developed economic theory meets with often divergent public and political opinions. Strictly speaking and using economic terminology, road pricing is a policy correction that improves welfare for the whole society. Still, there are many sceptics among decision-makers and ordinary citizens.

Both for the layman and the economist it is clear that the introduction of a toll on a road brings a new element into the implicit calculus of costs and benefits made by everyone for every decision whether to use that road or not. Benefits such as less congestion and less environmental nuisances have to be weighed against the additional expenses. That the new toll creates both winners and losers among the directly affected drivers is fairly evident to all, but it is not that evident that larger groups than instinctively thought of must be taken into consideration. Including those drivers who continue to use the tolled road but who find the benefits to be worth less than what they pay. Indirect effects, good and bad, fall upon drivers, cyclists, pedestrians, shopkeepers, dwellers along alternative roads, public transport users etc. There are winners and losers in every group, except the toll collector who gets the revenues.

Against this background it is not surprising that public acceptance of road pricing may be low. To highlight the public opinion about road pricing surveys were carried out in all PRIMA case cities.

5.2 Public acceptance in the PRIMA cities

Answers from 500 citizens were gathered from surveys that were conducted in each of the eight case cities in the autumn 1999. The answers were collected either by telephone or by post. The questions concerned the travelling pattern, perception of traffic problems, transport policies and attitudes to road pricing.

A common questionnaire was produced, and great care was taken to formulate questions to make cross-city comparisons possible. Still, however, one should be aware of the uncertainties related to the answers. As for every sampling study, there are uncertainties related to the sample size and to the response rate. The sampling method (random samples and the quota method) certifies representativity, but the response rate is quite low, in some cases below 50 percent. Despite the efforts to formulate easily understandable questions one cannot exclude errors due to misunderstanding. Neither can strategic answers i.e. deliberate misrepresentations of the true valuations, be ruled out

The figure below shows the public perception of traffic congestion problems in the case cities.

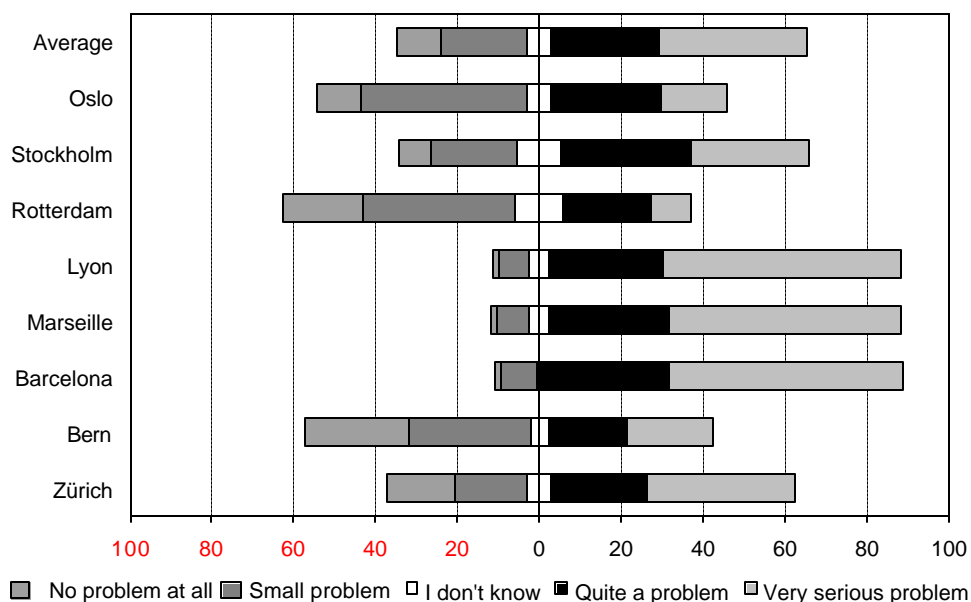


Figure 5.1 Seriousness of time loss in congestion

All PRIMA case cities have some congestion problems. About 60 percent of the citizens think that congestion is at least quite a problem. Some 30 percent think that the problems are negligible and the rest do not know what to think. In Lyon, Marseille and Barcelona a majority perceives congestion to be serious. The traffic congestion is considered somewhat less severe by the inhabitants in Stockholm and Zürich. However, still a majority recognises congestion as a very serious problem or quite a problem. Bern, Oslo and Rotterdam are much better off. In all these cities a majority of the citizens think that there are no congestion problems or that the problems are small.

Of course, there are also differences between different groups of people. As expected the perception of congestion is somewhat more serious among those who always have a car available. And also among those who mostly travel during peak hours. But, on the other hand, there is no significant difference between those who commute by car and those who travel by public transport to work or school. On the overall level, there is no difference in perception between men and women. But, city specific data show that women in Marseille perceive traffic congestion as more problematic than men do. In the Scandinavian cities it is the other way around.

Asking people about which measures to use for coping with the problems of congestion and traffic related environmental nuisances one would perhaps expect the answers to be closely related to their perceptions of the problems. However, as indicated by figure 5.2 there is no such evident link between the congestion problems and preferred measures for handling them.

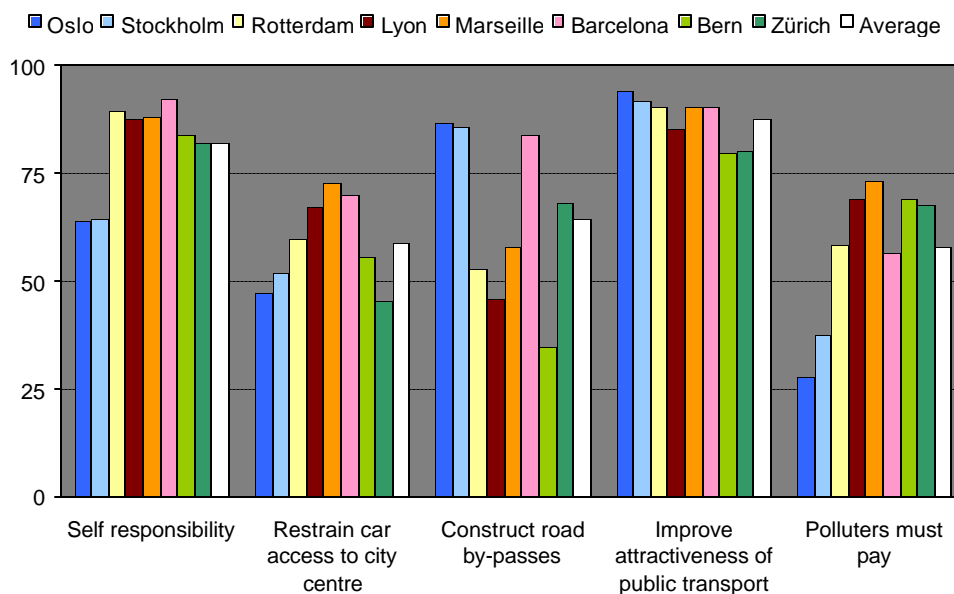


Figure 5.2 How to cope with congestion and environmental nuisances (in percentages of “I fully agree” and “I rather agree” answers)

The answers to the question concerning policy measures show that improving the attractiveness of public transport is a top priority in all cities. At least 80 percent in all case cities give their support to this measure. The promotion of public transport is given the first ranking in all cities except Zürich and Bern, which have already achieved very good service levels.

The second ranking is given to self-responsibility. There are, however, large differences among the cities. Oslo and Stockholm seem to be less convinced than the other cities about the effectiveness of this laissez-faire approach. The high ranking of self-responsibility may also be looked upon as preference for free-riding. The principle does not oblige anyone to change her behaviour and may simply express a wish that other travellers will assume the responsibility.

Number three in ranking is construction of road bypasses. This approach is given high support in the Scandinavian cities and in Barcelona. The support for building bypasses is relatively low in the French cities and in Bern and Rotterdam. Since the congestion problems are perceived as smaller than in most other cities the high rating of road bypasses in Oslo and Stockholm seems somewhat surprising. The reason is perhaps that bypasses have since long been on the political agenda in both cities.

The polluter pays principle finds most approval in the French and Swiss cities whereas the Scandinavian cities give this principle rather low support. Restraining of car access to city centres finds most approval in the French cities and in Barcelona.

What about the attitudes to road pricing? Without doubt, road pricing finds much less approval than the measures above. One reason is that road pricing includes a direct

payment by car drivers. Another reason may be strategic answers. The figure below shows the opinions about road pricing.

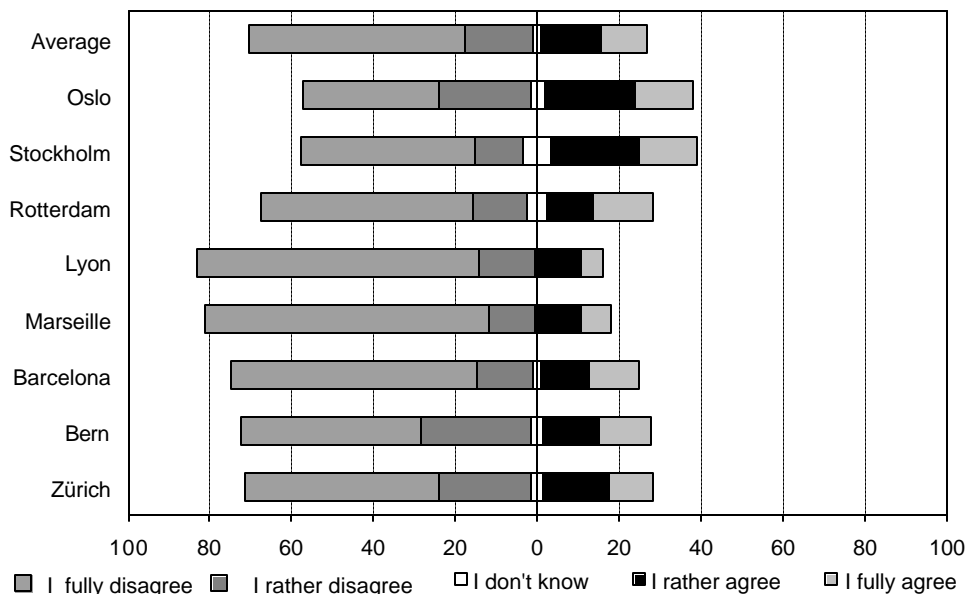


Figure 5.3 Introduce road pricing to reduce traffic congestion and nuisances in the city

The figure shows that there is a considerable public resistance to road pricing. About every second respondent says that she or he fully disagrees with urban road pricing. On average less than 30 percent support the introduction of road pricing.

The variation among the case cities is considerable. In the Scandinavian cities, somewhat more than 35 percent are in favour of urban road pricing. The opinion in the Swiss cities is close to the average of all cities, and Barcelona is just below the average. The French cities give the least support to urban road pricing. The fraction of citizens agreeing is less than 20 percent.

Besides road pricing, the respondents were asked to rate other charges for reducing congestion and environmental nuisances. These questions included higher charges on public parking, employer provided parking, a vehicle tax proportional to fuel consumption and extra taxes on petrol. The most “popular” policy measure was a vehicle tax proportional to fuel consumption. Higher parking charges were rated at about the same level as road pricing. Interestingly enough, road pricing was considered better than higher petrol taxes in all case cities except Bern and Zürich.

A closer look at the respondents that are positive to road pricing reveals that they are:

- ?? Younger than the average, except in Barcelona.
- ?? Women are more often in favour of road pricing than men. This difference between the sexes is most pronounced in Barcelona, Bern, Lyon and Oslo.
- ?? In general the support for road pricing can be expected to be higher the closer the individual lives to the city centre. However, place of living does not seem to affect the attitude to road pricing in the case cities. But the pattern varies among cities. The expected pattern is found in Lyon, Rotterdam, Stockholm and weakly for Zürich. In Barcelona the support for road pricing is significantly higher among those who live in the suburban belt. However, considering only those who fully agree to road pricing the expected pattern is present.
- ?? As expected car availability affects attitudes significantly. The highest support for road pricing is found among those who do not have a driving license. The mode choice is also important. Those who drive by car to work or school give less support than others to road pricing. Those who commute by metro and train are, as expected, the most supportive. This pattern is present in all PRIMA cities.
- ?? Position (self-employed, manager, employee) has no effect on attitudes. Trainees have a more positive attitude, but, on the other hand, they are relatively few in the survey.
- ?? Somewhat unexpectedly, the survey shows that those who perceive congestion to be a serious problem give less support to road pricing than people who think that it is a minor problem. This pattern may reflect a doubt among people about the efficiency of road pricing. Nevertheless, the attitudes differ somewhat between the PRIMA cities. In Lyon, Rotterdam and Zürich most support comes from those who find congestion to be a major problem. For Bern there is no difference in attitudes to road pricing with respect to perception of congestion problems.
- ?? Respondents who support the polluter pays principle are more positive to road pricing than others. But there is no significant difference in attitudes towards road pricing between defenders and opponents of more self-responsibility.
- ?? On average the support for road pricing increases with the level of education. Except in Barcelona and Marseille which show lowest support from people with high education. In Lyon the attitudes to road pricing do not differ according to the level of education.

These results show that the most obvious losers, the car drivers, give least support to road pricing. In addition, for some of the cities there is evidence that those who will gain from less traffic and pollution, the inhabitants of the city centres, are more in favour than others.

An important issue when discussing road pricing, in particular for planners and politicians concerns the design of a road pricing scheme. When the respondents were asked

to give their opinion about different designs, on average 30 percent agreed with each of the three schemes presented. However, quite large differences between the cities are present, see figure 5.4. The French and Swiss cities prefer road pricing on all access roads. Stockholm, Barcelona and Rotterdam are most in favour of highway pricing. In Oslo the strongest support is given to charges on new roads. These differences indicate that the choice of road pricing scheme is likely to influence acceptability.

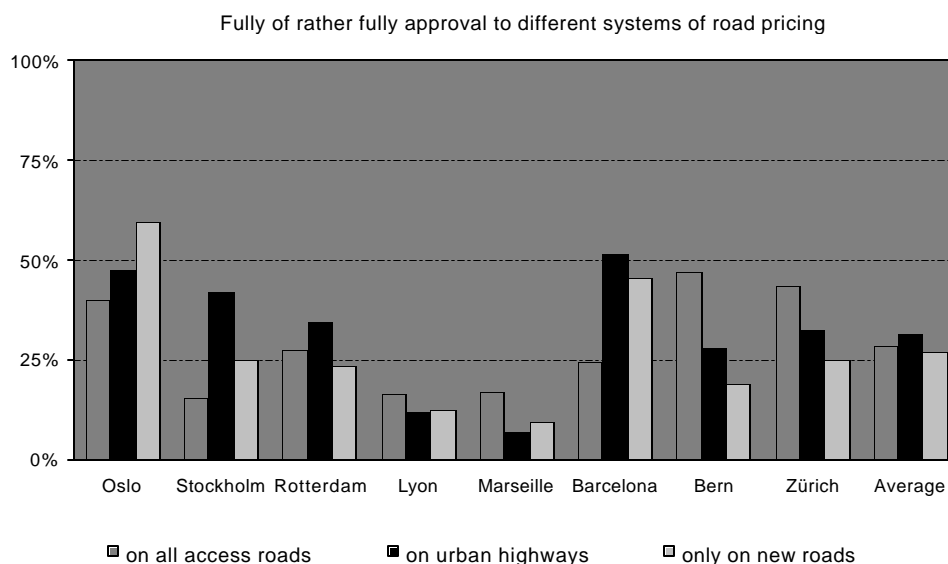


Figure 5.4 Perception of possible road pricing schemes in PRIMA-cities

During the interviews with politicians, experts and stakeholders, the different possible road pricing schemes were discussed in more detail. It is possible to draw the following conclusions from the interviews:

Oslo: Most interviewees pointed out the merits of the cordon tolls. Even representatives of motorists' and truck-owners' organisations say that their members have accepted the tolls, as they are reasonably cheap and as the investment program has proven to facilitate accessibility for commercial traffic. Many of the interviewed experts and some of the most visionary politicians think that the logical future is a transition to a demand management system with tolls differentiated by time and environmental category of the vehicle.

Stockholm: One of the most frequent comments concerning the question about possible future road pricing schemes was that the public opinion needs more time to adopt to new ideas of this kind. Some interviewees favour a step-by-step introduction with new road links financed by tolls, others would prefer to combine road pricing with lower income taxes.

Rotterdam: In Rotterdam a majority of the interviewees is in favour of road pricing on all access roads as well as road pricing on newly built roads for financing purposes.

Lyon and Marseille: The interviewees mirror the survey result in being sceptical towards any form of road pricing, but overall some kind of zone-based pricing with electronic and manual vignettes as a fee collection technique was rated relatively high.

Barcelona: Interviewees strongly criticise the existing road pricing system. Cordon pricing is rejected because it separates losers from winners. There is the feeling that the concessionaire profits from almost monopolistic conditions, although the advantages of road pricing (financing a better road infrastructure) is recognised.

Bern: Motorway pricing as well as road pricing on new roads only, were clearly rejected by interviewees. Highway pricing is rejected because one would like motorists to use this type of road. On the other side a majority found the idea of an area-based pricing promising as well as road pricing on all access roads to the city.

Zürich: In the Zürich region, a road pricing scheme applied to all access roads of the city gets most support, both in the survey and in the interviews. Still, the discussion of where to locate the cordon did, in the interviews, not lead to a unanimous result. On the other hand, road pricing on new roads is not favoured, by principle. Yet the right wing politicians saw more possibilities than those from the left wing.

6. Navigating between Scylla and Charybdis

6.1 Overview of major road pricing schemes

When a city is considering road pricing, many different aspects of the scheme and the design of the system need to be discussed and evaluated. A road pricing scheme, can be characterised by several elements, e.g. the infrastructure to be charged, the collection technique, the basis of the charge and the use of revenues. All of these affect acceptance. However, as the spatial form is the most important element of differentiation in the urban context, the PRIMA project has derived five major spatial forms of urban road pricing schemes. The five schemes or adaptations based on them, were used in the PRIMA surveys and interviews. The main features of each of them are described in short below. The schemes go from spatially simple to more complex urban road pricing schemes.



Charges on **single roads** or **single lanes** are generally collected at passage (entry or exit). This form of urban road pricing is common for financing new roads. There are several examples of where the practice of urban road pricing is realised on single roads. The collection techniques in use are manual and electronic. Financing is the common objective. Usually the charge is linked to the production cost of the new road section. However, there are important departures from the principle. In Marseille, for instance, the charge was initially lowered to increase public acceptance.



Charges on the **motorway network** is the most common form of road pricing. In the urban context this form is often limited to the network outside the city or to the major roads leading to the city. The general objective is financing of new infrastructure. Motorway charging is possible also within the city and such design makes it closely linked to the previous form of urban road pricing, the single road alternative. The implications of tariffs etc therefore follow the single road scheme.



Area licensing is used to influence traffic volumes in particular areas of the city. The aim is to achieve a regular traffic flow without congestion within the priced area. The purpose may be congestion pricing, ecological pricing or efficiency pricing. The charges have to be differentiated according to the objective. Possible charging techniques are vignettes or

electronic charging. Multi-zone licensing, or differentiation within the licensed area requires, electronic collection technology.



Cordon pricing is comparable to area licensing with the important difference that the area now is the whole town or the inner parts of the town and not only one or a few zones. Additionally, payment is collected on entry and/or exit only, whereas in area licensing schemes it is possible that also trips starting and ending within the area are priced. The objective of cordon pricing may be financing, efficiency, congestion relief or environmental pricing. The cordon tolls have better features than single roads from a financing point of view, as the volumes of detour traffic are relatively small. The level of charges needs to follow the objective.



Complex area pricing denotes a distance based area pricing scheme. Ideally the level of charges is set in accordance to marginal cost pricing. Besides efficiency the objective may be congestion pricing or ecological pricing. The aim is to find differentiated charges, which can vary per kilometre driven due to marginal cost, congestion or pollution caused by vehicle. Such high degree of differentiation can only be realised with electronic charging devices installed in cars. However, a drawback may arise if there are too many prices. In order to affect behaviour in the desired way it is important that the driver can approximate the price of the trip in advance.

Road pricing experiences from cities around the world show what has been accepted in practice. The first scheme, single road pricing, is in operation in two of the PRIMA case cities, Marseille and Lyon. Both cities have implemented road pricing to finance new sections of their urban road network. Charging only one lane is under discussion in Rotterdam.

Motorway pricing is present in the urban area of Barcelona. When the scheme was introduced in the 1970's it was very well accepted. Over time the urban area of Barcelona has grown. As a result the priced motorway sections now run through the metropolitan area. Since the design does not serve the local traffic, acceptance has decreased considerably.

Area licensing is present only in Singapore. The scheme has congestion management as its purpose. In order to steer the traffic volumes, Singapore charges higher fees during rush hour. Before implementation, Singapore considered conventional road tolls, but chose area licensing due to the lack of space for building toll plazas. The more complex, multi-zone licensing has so far not been implemented.

Cordon pricing is in operation in the three largest Norwegian cities, Oslo, Bergen and Trondheim. The objective is strictly financial and charges are not differentiated according to peak hours. In Oslo the same toll is charged at all hours. Bergen and Trondheim charge a flat rate during daytime on weekdays. The main part of the revenues is invested in the road network. As border effects arise with cordon pricing it may be more difficult to find acceptance than for single road pricing. In Norway, prices were set at a relatively low level, which has avoided serious border problems from arising. Keeping low charges was made possible by state grants matching the toll revenues. Another important lesson to be learnt from the Norwegian experiences is that acceptance has increased over time. In Oslo the opponents who feared increasing congestion were proven wrong, as the cordon tolls did not give rise to additional queues. As a matter of fact, acceptance has increased since introduction. The share being positive to the toll system has steadily increased in Oslo, from some 30 percent of the population before the introduction to 46 percent in 1998.

The planned Dutch “Rekening rijden” system also corresponds to a cordon pricing, as each vehicle entering the area of one of the four main cities of the Randstad area during peak times would be charged.

The last scheme, complex area pricing, has so far not been implemented in any urban area. One important reason is the lack of transparency of the charging principle. Another is that the necessary electronic equipment has not been put into practice yet.

Practical experience shows that financing is the most common objective. Only Singapore operates a road pricing scheme for traffic management purposes. The straightforward connection between the prices being paid and infrastructure use is certainly one important explanation why the financing objective is more common.

6.2 Trade-off between efficiency, acceptability and practicability

Theoretical assessments usually evaluate road pricing schemes from an efficiency perspective only. In order to open up the perspective, the PRIMA project has carried out an assessment where efficiency, practicability and public acceptance were considered. These three criteria are interrelated in that all of them are important for getting acceptance in an urban region.

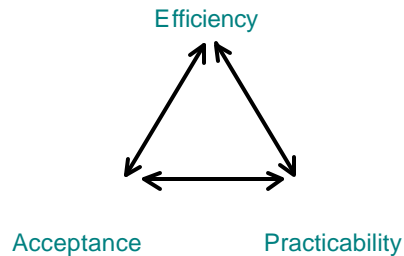


Figure 6.1 The assessment triangle

The assessment of the main urban road pricing schemes according to these criteria shows that no road pricing scheme can be chosen as the most favourable. The conclusion is that there is a trade-off between the different dimensions:

?? *Single road pricing* and *motorway pricing* are the simplest road pricing schemes, thus implying that public acceptance should be relatively high. From the practicability point of view they get high scores since there exist practical experiences. However, these schemes can neither be rejected nor promoted from an efficiency point of view. The crucial point is the availability of alternative routes. If the priced road sections are arterial roads, single road pricing and motorway pricing may be efficient and effective. But if as a consequence car drivers are switching to other, possibly longer routes causing additional congestion, air pollution and noise, the pricing of single road or motorway sections cannot be recommended. Single road and motorway pricing may be effective if the objective is to raise money. Nevertheless, successful implementation including that of Marseille, shows that it may be difficult to attain full cost recovery with the accepted price levels. If traffic detour is not a major problem, the advantage of these schemes is that they are suitable as the initial step in a step-by-step implementation strategy.

?? *Area licensing* does not have the drawback of switching to alternative routes, as every trip in the priced area is charged. Therefore area licensing can be a very interesting alternative for initiating road pricing compared to the more common single road pricing scheme. Depending on the choice of the area the negative border effects (e.g. only the CBD where not many people live) normally are lower than with a cordon pricing around the town. From the point of view of efficiency a multi-zone-pricing is much better than a simple single-area pricing scheme. But the practicability of multi-zone pricing does not yet exist. The reason is that the scheme requires standardisation and commonness of electronic charging equipment before becoming practical.

?? *Cordon pricing* has advantages and drawbacks. It may be difficult to agree on the location of the cordon. A central pre-condition is that there must be some kind of “natural” position for the cordon as for example a ring road. The Norwegian cities

show, that such a position of the cordon can be found and that cordon pricing is a practicable and extendable road pricing scheme.

?? *Complex area pricing* will be valued as most appropriate from the perspective of efficiency, i.e. marginal cost pricing. But, from the viewpoint of practicability as well as acceptance this scheme gets more an image of wishful thinking than of being ready to be implemented. This does not mean that a complex area pricing scheme should be forgotten. But it is not a road pricing scheme to start with, as the major pre-conditions are not fulfilled for such a step. To be practicable the electronic collecting techniques would need to be put in most of the cars. In addition, it is an advantage if the same on-board-unit could be used for road pricing in different cities. In any case, using a step-by-step approach the long term goal may still be to introduce some kind of complex area pricing.

If referring to the urban road pricing schemes in operation, the implication is that simple schemes are more easily accepted than the more complex ones. In most cases acceptance for road pricing has increased over time. Therefore, a stepwise implementation beginning with a simple scheme is recommended. Additionally, the analysis shows that a staged approach is necessary because the equipment for the differentiated road pricing schemes is not yet common for road users. In the future, possibilities of electronic fee collection will be much larger and implementation cost will decrease when more and more cars become equipped with the necessary electronic devices.

Below the key problems of practicability of urban road pricing are listed:

Physical conditions: The choice of a fee collection system for urban road pricing depends to some degree on whether physical toll stations can be built or not. In urban areas, toll plazas may have negative local impacts on air pollution and noise levels (more congestion, more stop and goes) as well as on the quality of the landscape. Due to scarcity of space in urban areas, construction of toll plazas may even be out of question. In cities that lack space for toll plazas, vignettes for entering the tolled area is a possible solution. The case of Oslo shows that where it is possible to find space for toll plazas, the system can handle at least 250 000 paying vehicles per day. One factor of success is that the toll-plazas are designed without barriers in order to avoid queues. Their size range from two-lane to six-lane stations. At all 19 toll stations it is possible to pay either manually or electronically without stopping.

On the other hand, the complex pricing schemes need no physical toll stations. Instead, they require electronic devices (on-board-units) to be installed into the cars. The boundary of the area is recognised by the on-board-unit and GPS based beacons.

Treatment of users not having electronic means of payment: A particular problem is the treatment of vehicles not equipped with electronic means of payment (on-board-unit, tag) or whose electronic means of payment is not operational (no viable contract, damaged on-board-unit, empty smart card). Possible solutions are:

?? Manual paying lanes allowing to pay with cash or credit cards

?? Booking solution: Users have the opportunity to “check in” at petrol stations, at special information places or by phone.

?? Renounce to fee collection for occasional users without an on-board-unit: This procedure is conceivable in the case of congestion pricing, where the regular user (commuter) is the target of the charge.

Control opportunities and reliability of enforcement: The control opportunities are reliable at ordinary pay lanes since the road can only be used after having paid the charge. Vignettes require traffic controls. At electronically operated lanes some kind of automatic registration will be needed. In Oslo, the licence plates of all cars passing the electronic collection lanes are photographed. The records of those who lack a valid tag are kept for fining. Others are discarded. Photographs may not be stored. In addition, privacy is controlled by a government authority.

On-board-units need different solutions. It is necessary for the operator to have a complete and understandable set of data to prove to the driver that he has used the toll road. The user could simply switch off the on-board-unit. In order to prevent this a declaration duty has to be stipulated: The user has to guarantee that the on-board-unit is operational and the user is also responsible that damages of the on-board-unit are repaired.

Installation of the on-board-unit: The installation of on-board equipment in vehicles has to be regulated: First, the equipment has to be connected properly (also to prevent improper use). Second, the vehicle category has to be declared correctly, which can only be ensured by an authorised garage. The installed equipment must stand a test where all functions are checked. Such a test can only be done by a garage having a certificate from the road pricing operator.

Today, most road pricing schemes operate with parallel manual and electronic charging technologies. Practicability is ensured for single roads, as well as areas or cordons with gates or toll stations. Technically the complex road pricing schemes could be introduced. But to become practicable, on-board-units need to be installed into a majority of vehicles.

In the future it can be expected that the European initiatives to harmonise collecting techniques and to set the necessary standards will improve the practicability of electronic fee collection based on equipment installed in cars.

Overall, the timing is crucial for the implementation of road pricing. Since road pricing can be a measure of traffic management and a source for financing, the timing concerns finding solutions to different transport problems. The problems to be considered are:

- ?? Capacity: Road pricing can smoothen congestion problems by introducing price differentiation (congestion pricing) and/or by raising money to finance additional transport capacity (private or public transport).
- ?? Environment: Road pricing can help to reduce road traffic volumes on sensible road sections by steering road traffic to better alternative routes or to public transport. Road pricing can also help to finance environmental protection measures, including by-passing or tunnelling environmentally sensitive areas.
- ?? Financing: Road pricing is a supplementary source to the existing mechanisms of financing road infrastructure. In addition, road pricing has the potential to increase cost recovery degrees of the whole transport system. The revenues may also be used to finance public transport projects.
- ?? Adapt tariff systems of transport: The use of public transport is paid both by out-of-pocket expenses by the travellers and by taxes. The use of road infrastructure is mainly taxed indirectly. With road pricing the two systems would approach and become more efficient.
- ?? Equalisation of burdens: Often, central cities have to finance their road network without or with only a small support from the municipalities around. The share of burden, especially for road maintenance, is not equally distributed on the users of the roads. With an urban road pricing scheme these burdens could be better levelled out.

6.3 Acceptable road pricing can successively be made more efficient

A city considering road pricing may find itself in an intricate situation. The efficient road pricing solutions may not be practicable and they often get less political and public acceptance than simpler road pricing schemes. Furthermore, road pricing that is foreseen to solve congestion and environmental nuisances would require higher prices than what is accepted by the public.

The lesson from the assessment, as well as from the PRIMA project interviews is that a road pricing scheme must achieve other characteristics than just efficiency. A city cannot rely on only one principle, neither coming too close to Scylla nor too close to Charybdis. However, being serious about implementation leaves only two choices for the navigator. Either implementing what is accepted or not implementing road pricing at all. Oslo implemented financial tolls. The purpose was to reduce serious congestion by financing road investments. If Oslo had been hesitant and not implemented road pricing, congestion would most certainly be much higher today. Owing to the broad acceptance of the chosen scheme, Oslo can move one step ahead towards efficiency. Currently, Oslo is planning to extend the system to time differentiation.

The PRIMA cases show that public acceptance increases with successful implementation, thus showing, it is possible to raise acceptance by implementing a carefully selected road pricing scheme. The scheme can successively be developed to a more efficient

measure. Based on what has been implemented in practice, the most suitable schemes to begin with are single road pricing, area pricing and possibly cordon pricing.

An overview of elements to increase acceptance of road pricing is listed below. The presentation follows “Jones’ six principles”³. In addition, some further propositions that have been found important for the PRIMA case cities are added.

Objectives of the scheme should meet the main public concerns

The objective of a road pricing scheme is most likely to be successful if it addresses the traffic related problems of the relevant region. Oslo is an illustrative example of this principle. In the mid-1980’s the city was stuck in a difficult situation with frequent congestion. The problems were apparent to all. The cordon tolls were set up to finance investments to alleviate the serious congestion problems.

Demonstrate that there are no effective alternative solutions

There is strong emotional resistance against road pricing as people are used to regard public roads as a ‘free’ good. This calls for the need to show that road pricing is the best solution. The policies road pricing need to be compared with include parking policies and the supply of better public transport. Several interviewees point out that road pricing is a step that can be taken only after the implementation of strong parking policies.

The scheme should be kept as simple as possible

The simplicity of a road pricing scheme can be characterised by its spatial form, the pricing principle and possibly by the objective. The simplest spatial forms are the single lane and single road schemes. Simplicity of prices implies that the driver can approximate the price of a trip in advance. The practice in the PRIMA cities also shows that a low level of prices is important.

In addition, objectives can be simple or more complex. Many interviewees point out the importance of an easily understandable road pricing scheme. Financing is perhaps the simplest objective as there is a straightforward connection between the prices being paid and the use of the infrastructure. Congestion pricing is a more complex objective. One reason for this is that congestion pricing is based on marginal costs. Since the principle of marginal cost pricing may be difficult to understand and since the level of the marginal costs depends on the sum of the trip makers the transparency is low.

Revenues should be hypothecated and alternatives provided

The most important reason to earmark revenues is the resistance against what is perceived as another tax. In the PRIMA cities, more than three out of four respondents

³ Jones, P.M., 1995, Road Pricing: The Public Viewpoint, In Johansson, B. And L.-G. Mattsson, (eds.) Road Pricing: Theory, Empirical Assessment and Policy, Kluwer Academic Publishers, London.

think that car drivers are already too highly charged. However, if getting something in exchange car drivers may be willing to pay. The revenues can also provide funding for offering better public transport.

The surveys and the interviews of the PRIMA project reveal the following opinions concerning the use of revenues.

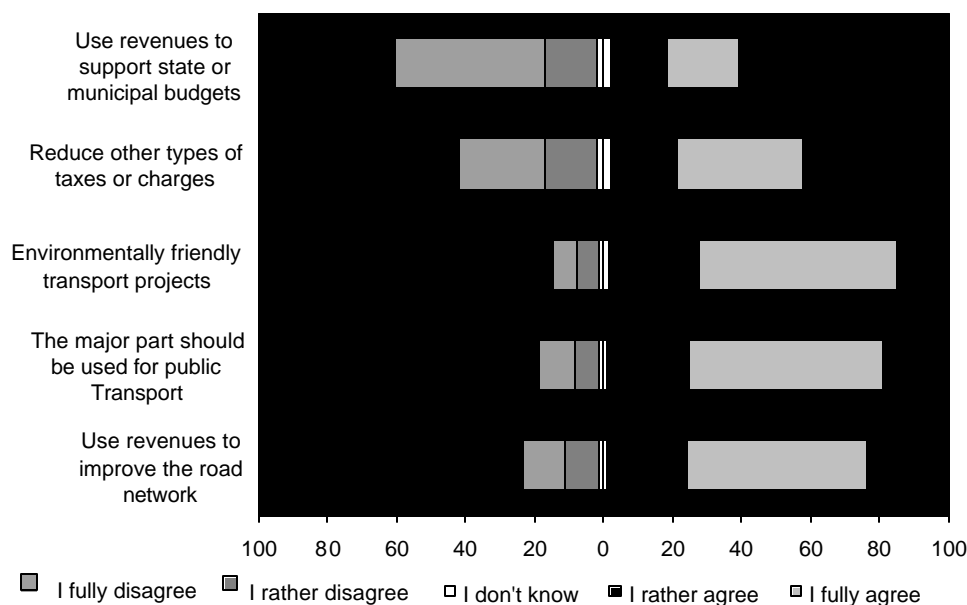


Figure 6.2 Perception of possible forms of revenue use in PRIMA-cities, percentages

The survey answers show that people are strongly in favour of earmarking road pricing revenues. The use of revenues for environmentally friendly transport projects, for public transport and for extensions of the road network are accepted to a much higher degree than to use them for general budget purposes or to reduce taxes. In Oslo, Rotterdam and Stockholm earmarking revenues for investments in the road network gets the first place, in other PRIMA cities the use for environmental-friendly transport projects, ranks number one. Likewise, earmarking for public transport gets large support. Only in southern cities does the use of revenues for reducing other taxes or to support public budget obtain a majority.

In general, the results of the interviews show a similar picture. Interviewees are very much aware of the fact that with a clever revenue use it should be possible to create win-win situations.

Issues of equity need to be addressed

Since road pricing involves a payment, there is a general concern that the measure hits low income travellers. It is important to identify how this group is affected and compensating measures need to be considered. The interviewees in Rotterdam and the French cities suggested discounts on public transport and exceptions for special groups. Another possibility would be to offer the citizens a limited number of trips free of charge.

Technological issues should be carefully considered

Aside from the concern that technology might not work, there are worries about privacy issues arising from monitoring vehicles. However, according to the PRIMA interviews very few consider automatic toll collection a problem. Thus, suggesting that the privacy issue is not an equally important obstacle, as it has been earlier. But even if it is so, interviewees in the two Swiss cities think that the argument of privacy dangers would become an issue in the political fight against road pricing.

Importance of the first implementation

The case of Oslo highlights the fact that the first implementation is important. The first project financed by tolls was the tunnel beneath the City Hall. The tunnel replaced the heavy traffic flows in the surface right in the centre of Oslo. In Marseille the price level was initially lowered to increase public acceptance.

On the other hand, initial mistakes do not have to imply that road pricing has to be forgotten. Lyon, which faced difficulties with its road pricing introduction, has launched an assessment study of various road pricing scenarios.

Charging only new facilities can be a relatively easy way to introduce road pricing

Using road pricing only for new infrastructure improves acceptance, as there is a net benefit from the new investment. This suggestion was rather frequent in the interviews.

Communication and marketing strategy is essential

Representatives from Oslo stress the importance of “selling” road pricing to different groups. An elaborated marketing strategy was conducted in Marseille, which was the first French city to set up an urban toll in 1993. The private concessionaire who operates the "tunnel du Prado Carénage" sees itself as a time-gain seller. They initiated a very active communication campaign, including broadcasting advertisement on local radio stations and sponsoring events.

Apart from marketing, many cities point out the importance to provide information to the public (Lyon). There must be room for openness (Stockholm) and transparency in decision making, also with regard to the price level (Bern). Information to road users about price levels, differentiation and time of pricing is of paramount importance. A lot of attention should also be paid on good information and road signs when pricing starts.

A danger of marketing and information dissemination is also present. This can be illustrated by the experiences in Stockholm. An information office was established to provide neutral information to the citizens about the effects of the Dennis agreement. The media and the opposers of the Dennis agreement threw suspicion on the information

office. The opponents accused the information office for being biased. This negative reaction may have been due to the fact that the information office was established relatively late. Some of the construction work had already begun.

All these observations suggest that the preparation phase of a road pricing scheme is very important.

Acceptance needs to be monitored

Not only are preparations important. The need for follow-ups may be of equal importance. This is highlighted by the case of Barcelona.

The lack of harmonisation of the interurban toll system to metropolitan growth and changed travelling patterns has caused increasing non-acceptance among the inhabitants. When the interurban tolls were set up in the 1970's they were very well accepted, but due to growth and urban sprawl the toll roads are now situated in the metropolitan area. The process has gone far enough to create serious problems as the road net, including both the tolled and the free roads, cause local disturbances rather than providing service to local urban traffic. This example shows that the acceptance of urban road pricing may turn negative if the effects are not followed up after the implementation.

7. The Danger of the Average

7.1 Social equity matters

One dimension, often lacking in transport planning is assessing the effects on different income groups. The surveys show that the inhabitants of the PRIMA cities are concerned with the adverse effects of road pricing on the less wealthy, thus emphasising the need to address social equity for increasing acceptability.

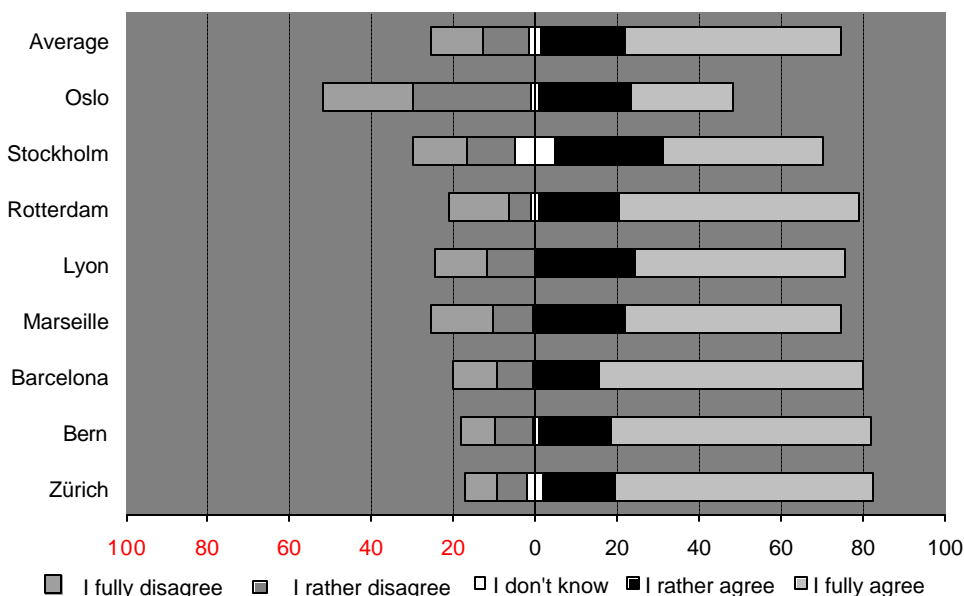


Figure 7.1 Urban road pricing disfavours the less wealthy

As many as 75 percent of the respondents agree fully or rather fully that urban road pricing disfavours the less wealthy. The views do not differ according to place of living within the city or whether the person has a car available or not. However, the opinions differ somewhat between Oslo and the other PRIMA cities. In Oslo the share of those who agree that the less wealthy are disfavoured is 50 percent which is well below the corresponding shares of the other cities. The lower share in Oslo may be related to the relatively favourable toll level and toll schemes for frequent travellers.

The winners and losers of a road pricing scheme can be theoretically identified according to their reaction to road pricing. Among those who continue to drive we find both winners and losers. The winners are those whose value of the time saved is higher than

the toll payment. The losers are those who continue to drive and have a value of the time saved which is less than the toll. The driver who changes her travelling pattern to another time, destination or mode is made worse off, since the use of the road for free was a priori her most preferred alternative.

Those who use public transport and continue to do so will face a more crowded environment. This reduction in quality implies that they become worse off provided that faster public transport (made possible by less congestion) does not outweigh the crowding effect. Winners are found among those who profit from reduced traffic and pollution. However, the main gainer of road pricing is the toll collector. If the revenues are large enough and redistributed to the losers a road pricing policy can become welfare enhancing. Table 7.1 suggests a strategy to compensate the losers and thereby increasing acceptance.

Groups		Strategy to increase acceptance
Winners	<p>Those who profit from reduced traffic and pollution</p> <p>The recipients of the toll revenues</p> <p>Those who continue to drive on the tolled road and whose value of time saved exceeds the toll</p>	
Losers	<p>Those who continue to drive on the tolled road and whose value of time saved is less than the toll</p> <p>Those who shift to a less convenient alternative</p> <p>Those who continue using public transport</p> <p>Those who decide not to travel</p>	<p>Enhance the services provided (safety, comfort etc.)</p> <p>Provide with good transport alternative</p> <p>Increase the quality of public transport</p> <p>Improve quality of life (noise protection, urban space etc)</p>

Table 7.1 *Winners and losers when an existing facility becomes tolled*

The above overview does not give evidence of whether those less wealthy will become more or less affected than other groups. However, one observation is important. The valuation of time tends to be correlated with the level of income. Since those who have the lowest incomes may also have the lowest value of time, it is probable that the less wealthy are among those who will change to another time, destination or mode. But we can also expect to find them among those who already use public transport. These pas-

sengers risk facing a more crowded environment in the new situation. Compensation, in terms of finding good alternatives and increasing capacity of public transport should in this case be the primary way to take care of the effects of social equity.

When road pricing is used to finance new roads another kind of reasoning is needed. Firstly, one has to find out if the social cost of the pricing scheme is higher or lower than if alternative ways are used to finance the road. Secondly, the equity impact of the road pricing scheme must be compared with the corresponding impact of alternative ways to finance the road. The crucial point from an equity point of view is whether the road pricing scheme has a larger or smaller negative impact on the distribution of real income than the corresponding impact caused by e.g. higher income or petrol taxes.

Rough calculations of the first kind for the urban toll rings in Norway show that the social cost of toll financing is lower than the social cost that would have resulted if the investments had been financed through the existing tax system.⁴ These results are of course country specific and related to Norwegian circumstances. Still, the calculations indicate that cordon tolls might be an efficient financing tool for urban areas in high income – high tax countries like Norway. Furthermore, they underline the importance of looking closer at equity impacts of traditional ways to finance urban transport investments.

7.2 Reducing to the average can create more losers than winners

Assuming a congestion toll is implemented on an existing road there will be two negative and two positive direct effects. The road users have to pay a toll or a fee, which is a negative consequence for that group. The trip-makers who change their behaviour will experience increased inconveniences, since they are shifting to less preferred alternatives. The positive effects are that certain travellers will encounter less congestion. Furthermore, the revenues can be used in such ways that they bring benefits to the travellers or a larger group of the society.

If the two positive effects outweigh the two negative effects and the losers are compensated, a road pricing policy improves the overall welfare. However, the standard procedures for decision support, may result in policy recommendations that reduce the overall welfare for the road users. The reason for the risk to arrive at erroneous policy recommendations is that different road users have different valuations of time, while transport experts usually work with an estimated average valuation.

The problem of using the average is that heterogeneity between people is lost. Individuals are much more than averages. Household structure, place of living, income, vehicle ownership and time values etc. vary to a great degree across the population.

⁴ Larsen, O. I., 1995, The toll cordons in Norway: an overview *Journal of transport geography* 3(3), 187-197.

Due to the heterogeneity it is very difficult to design a congestion pricing scheme that fulfils the two following requirements.⁵

?? More than half of those affected should be better off with than without the pricing system.

?? Aggregate welfare should increase for those involved.

Designing and implementing a congestion pricing scheme, which is optimal for the average individual and returning the revenues to the losers is not enough to fulfil the two requirements. A majority of the users or even all of them may still be worse off. This holds even if the average value of time is correctly estimated. The reason relates to the use of an average time value. If an average is used one can only be sure that the requirements are fulfilled if all individuals have the same value of time.

As the above reasoning shows, the erroneous result is non-intentional. The difficulty to design a correct policy lies in the heterogeneity of a city and the heterogeneity of its population. However, the information needed to produce sufficient decision support may not be possible to gather. The lesson for the experts is to become aware of the shortcomings of the standard tools and to open up for new knowledge when searching for improved methods.

Another observation when it comes to road pricing is that politicians are less fond of road pricing than the experts are who provide them with background analysis. This view gets support from the PRIMA interviews, as well. One reason is most probably that politicians are more sensitive to the effects on different groups of people, implying they do not agree with policies designed for an average individual. Public choice theory gives some theoretical ground for this.

According to the median voter theorem the policy which is most preferred by the median will win. Politicians are assumed to compete for public support in promoting policies that are expected to generate sufficient support among voters. If congestion pricing is carefully designed it will generate time savings for those who are using the road network. The benefits of the time savings, depend on the individual's time value. However, the time values are not evenly distributed across road users, and even less so across the entire population. Approximately, the skewness of time values can be expected to be similar to that of individual incomes. The consequence is that the benefits of time savings from a congestion pricing scheme are much smaller for the median voter than the average value of saved time. The figure below illustrates this.

⁵ Based on: Eliasson, J., 1998, Mathematical models for Analyzing Land-Use and Transport Policies - Problems and Possibilities, Royal Institute of Technology, TRITA -IP FR 98-39, Stockholm.

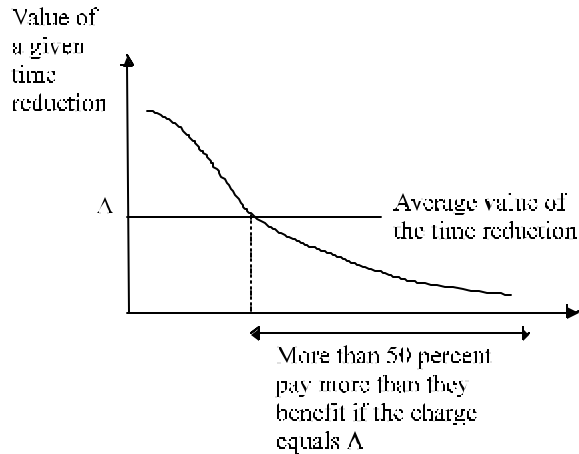


Figure 7.2 Distribution of time value versus the average value of time

The figure shows the distribution of the time values in a population ordered according to the level of the time value. Those with the highest time values are to the left and those with low values to the right in the figure. The average gain in time value in the population is A . But since less than 50 percent has a time valuation exceeding A , the losers will be in majority. Thus, the median voter theorem offers one explanation to why politicians would not support road pricing based on averages.

7.3 Spatial equity matters too

Another aspect of equity issues often raised against road pricing concerns spatial equity. The issue of spatial equity has several dimensions:

- ?? The consequences of creating barriers within an urban region. Questions often raised consider how different neighbourhoods are affected and the fear that road pricing may separate the rich from the poor.
- ?? The effects on downtown shops. Retailer organisations are often strong opponents to urban road pricing. In many urban areas the competition between the downtown retailers and the out-of-town shopping centres is keen. The downtown retailers fear that the higher costs for driving created by road pricing will affect them negatively.
- ?? Equity considerations between regions can be triggered by the design of national road toll schemes.

Spatial equity becomes a key issue when considering both where to place a toll cordon and where to locate the zones for an area licensing scheme. Both schemes create artificial borders within the urban area. If central areas of a city, like the central business district (CBD) is chosen, the effects can be expected to be relatively small since few

people live there. In addition these parts of the city generally have a good supply of public transport. However, including only these areas may not be enough from the perspective of traffic management purposes. Finding an acceptable cordon location further out or creating a larger licensing area is of course more difficult. Interviewees express their concern about creating electronic walls around the cities. Still, the cases of Oslo and the two other Norwegian tolling cities as well as the preliminary agreement for Rotterdam show possible ways to handle the issue of territorial inequality.

In Oslo different locations about where to place the cordon were discussed. At the outset many politicians in Oslo demanded that the pay stations should be placed at the border between Oslo and the surrounding region of Akershus. The effect would have been that almost only drivers from Akershus would have had to pay for their trips. As a result of the negotiations that followed between Oslo and Akershus it was agreed that the stations had to be located closer to the central parts of Oslo. In addition, Oslo and Akershus decided that the toll revenues would be spent for investments both inside and outside the cordon tolls. The exact locations of the toll stations were in a later phase inspected by right wing and left wing politicians. Their tour around the planned sites resulted in some spatial adjustments of sites that cut through residential areas. In addition, as charges have been kept at a low level the resulting border effect has not become a major issue.

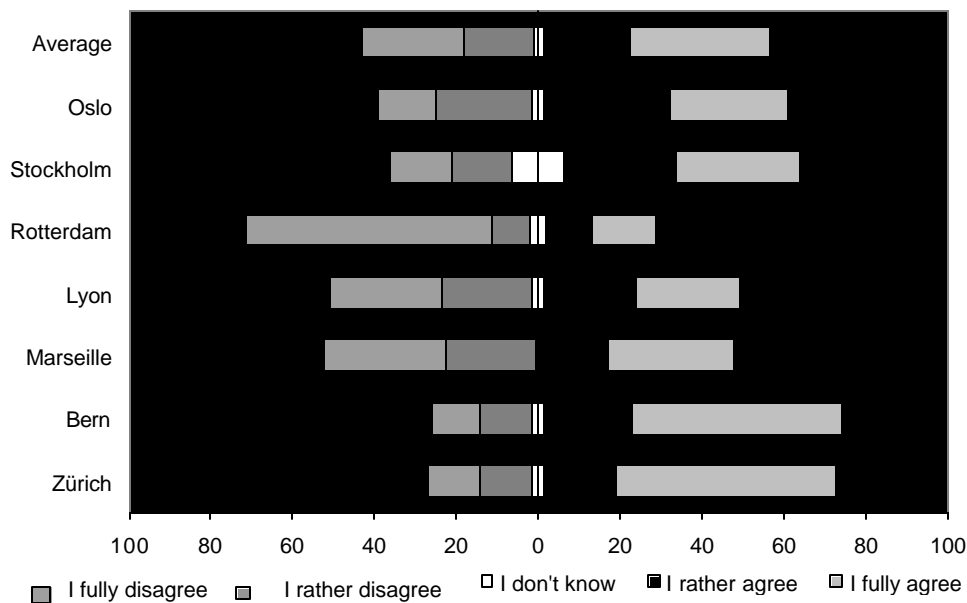
The analysis of different cordon toll alternatives for Rotterdam has led to the cautious conclusion that the tolling should be located relatively far from the city. The most preferred alternative follows the regional borders of the two major centres in the South wing of the Randstad area. This alternative can produce the necessary traffic calming, and it has a low impact on the negative borderline effects.

However, not only cordons give rise to territorial equity concerns within the urban area. The case of Barcelona shows that reinforcing barriers may also arise from a road pricing scheme which does not serve the needs of local traffic in an urban area.

Investments in public transport and road infrastructure have not kept pace with the urban growth in Barcelona. The public transport system is designed to respond to a city-centre mobility pattern, which does not exactly fit into the current mobility needs of the local population. As a consequence, an important section of the tolling system is now situated within the urban context contributing to negative impacts on spatial equity issues.

To make matters worse for urban commuters, the lack of entrance roads to the toll section has limited its use for short distance trips. In this sense, local residents feel doubly penalised; on the one hand for the lack of investment in the public transport system and, on the other hand, for the inefficiencies of the road system. In addition, the uses of revenues are geared towards the needs of the interurban driver, while disregarding those of the urban commuter.

As already stated fears that increasing costs for car trips will reduce the number of customers at downtown shops are quite common. Figure 7.3 shows the public opinion about possible negative effects for centrally located retailers in the PRIMA cities.



Note: Barcelona missing

Figure 7.3 Road pricing disfavours downtown shops

Overall, a little more than half of the respondents express their concern for this question. In particular, the Swiss citizens think that road pricing disfavours downtown shops. The interviewees in Lyon and Marseille think that road pricing should be directed against car commuting, not against shopping trips. The experience from Oslo gives some insights to post-toll experiences. The retail traders in Oslo, especially those in the city centre were strong opponents against the tolls. But there is still no evidence indicating less shopping in the city centre. However, retailers located very close to the cordon have complained that they suffer.⁶ Most probably the good accessibility to the city centre with public transport and the low levels of tolls explain the lack of a negative impact. Instead there is some evidence of an impact at locations close to the cordon.

Another issue of spatial equity is related to competition between regions. In Spain the economic growth that took place during the 1960's increased the need for high quality road infrastructure. Insufficient state allowances paved way for private and foreign investments. During the 1970's excessive construction of toll motorways took place in Catalonia. Many other regions had to wait until the mid-1980's when motorway con-

⁶ Larsen, O.I., 1995, The toll cordons in Norway: an overview Journal of transport geography 3(3), 187-197.

struction became financed over the state budget. Today, the free motorway alternatives are relatively few in Catalonia. The uneven allocation of state funds has raised the question of territorial inequality among Spanish regions and contributed to the current non-acceptance of road pricing in Barcelona.

Another example of territorial competition is present in Norway. As a result of the strong rural bias in the parliament (based upon the constitution), the capital region does not get a fair share of the national funds for road investments. Hence, Oslo would have had to wait for a very long period to finance the planned new roads by means of national funds. In view of the pressing and evident need for investments in Oslo and the long history of tolls in other parts of Norway it is not surprising that the parliament found it fair to allow cordon tolls in Oslo.

8. Participation, Negotiation and Adaptive Learning

8.1 Growing demands for participation

As has been pointed out in earlier chapters our cities are on the verge of the so-called New Economy or the global knowledge society. Today more people and companies than ever before earn their incomes from immaterial transactions such as information handling, of which a growing proportion becomes global, easily crossing borders between countries and continents and barriers between people.

This both requires and creates many more active and well-informed people. Of course, they will not limit their demands for communication and individual influence to their job life and working-hours. They get used to that kind of living and their demands on society for participation in the decision processes grow.

For decades studies on the value systems of different age groups have been performed. One striking observation in most studies is the shift among young and well-educated people, particularly amongst city dwellers, from materialist to post-materialist values, including serious concerns about environmental matters and the threats to global survival caused by the present way of living in the industrialised world. They are, not quite without reason, somewhat sceptical towards the presumed wisdom of the ruling generation.

Their motto could be expressed in a few words: “Pull down pyramids and hierarchies”.

8.2 Growing needs for participation

For city rulers the growing popular demand for participation is a great challenge. In most advanced countries there already exist statutory processes for participation in local spatial planning, but there seldom are similar potentialities as regards things like traffic regulation and road pricing. Since these matters have a large influence on the daily life of the inhabitants, it will be more and more difficult to defend and keep such democratic imperfections. The right to vote down the ruling majority in next election simply isn't enough any more.

In the PRIMA project we have undertaken surveys with more than 4 000 citizens and interviews with some 240 politicians, experts and stakeholders in the case cities. This unique material gives directly useful information on the spread of knowledge and opinions of many details of the case cities' traffic situation and transport policy. Indirectly, it serves as a confirmation of the popular wish to have a more direct influence on such policy matters than what is practised in most cities today.

There are often striking similarities between the expressed opinions in the case cities, and we have reason to suspect that they are more widespread than that. One example is the awareness that the volume of urban traffic problems justifies a search for more efficient measures, and the opinion that self-responsibility and, mostly, the polluter pays principle are ways to cope with the problems. Promoting public transport and constructing road bypasses are measures that meet with a high degree of acceptance, but not road pricing as far as there are other objectives than raising capital for such investments.

For wise decision-makers this new information could be very useful as a basis not only for their decisions in practical matters but also an argument for finding new ways for public participation in local transport policy.

One good reason for a wider participation process is the complexity of urban traffic management policy. You can never be quite sure of the sum of outcomes of different measures in an urban network with heterogeneous groups of affected citizens and commercial actors with, probably, conflicting wills and views. It lies in the own interest of city rulers to be backed by a large majority for deciding upon such interventions in citizens' habits and economy.

Local democracy, a good invention of the 20th century or in some cases like Switzerland even earlier, must be further developed to fully serve citizens of the 1st century of the New Economy.

8.3 From classical rationality to adaptive learning processes

Combining the growing demands and needs for participation with the complex character of urban transport planning and management points towards the necessity of rethinking the present decision systems in our cities.

To those more principal arguments adds the potential conflict between increasing demands for an individualised mobility pattern, the growing concern about environment and quality of life in our society and the lack of financial resources in public budgets. Cities are very much at the intersection of such trends and will need new kinds of comprehensive mobility management policies and decision systems. Road pricing and other extensive measures with far-reaching consequences must be discussed in these new terms.

Such reasoning might look odd for those who have fooled themselves by a narrow reading of textbooks about the institutions and procedures of representative democracy. But for those who have witnessed the shortcomings of decision-making in urban traffic policy it is clear enough that something has to be done. From this point of view Swiss local and direct democracy with referenda on far-reaching or expensive tax-financed municipal and regional decisions before they can be implemented sets good examples, but there is reason to believe that such a system sometimes hampers useful reforms. The good mixture of participation and paternalism is still to be found. Recipes are, however,

not very simple, as every city is unique, historically, geographically and culturally, and every measure has a set of effects and side effects that is unique, too.

Due to the complexity of urban road pricing, the classical rationality approach (such as cost-benefit calculation in a delegated political decision system) cannot provide enough decision support. The complexity calls for a widening of the rational approach in that it becomes combined with an adaptive-learning process.

The adaptive learning process differs from the rational one in that consensus finding is managed through a learning process. In such a process, political decision-makers and interest groups can learn in a mutual way. This would reduce the gap between planners and politicians, as well as reduce the risk of getting stuck into counter-productive policy games.

Urban road pricing is just one example of a field for political decisions where there are many affected people and economic activities with conflicting interests, vociferous opinions and strong feelings, and where the outcomes for different groups are hard to calculate for those affected as well as for the responsible decision-makers.

This complexity is typical of decisions on matters with environmental effects, such as the location of plants for waste disposal, reprocessing of burnt out nuclear fuel etc. In some such cases new kinds of feasible decision processes have been developed after a long period of antagonism and resistance from strong opinion groups. What they have learnt the hard way, might be translated to urban traffic in general and road pricing in particular. The following is an attempt to make such a translation.

The process structured into stages

Schematically one can separate three stages of a process aiming at the introduction of a road pricing scheme. The first stage is political and strategic, the second consists of iterative assessments, and the third is oriented towards implementation and monitoring activities.

?? *Stage I* This stage starts with the identification and characterisation of a traffic/transport problem. On this basis a project idea can be formulated by an assigned project management group (project organisation). At the same time the political system has (i) to provide legitimacy to the decision process, (ii) to establish compatibility of views expressed on the local, regional and national levels. At this stage a preliminary feasibility study can be carried out and the major results could be disseminated to the public and discussed in various forms. A final step in the first stage is to identify interest groups and design the decision process accordingly.

?? *Stage II*: In the second phase a project organisation is formed to (i) make comprehensive assessment studies that generate alternative solutions, (ii) assess the different alternatives, identify potential winners and losers. At this stage it is meaningful to establish an information channel, by which the project organisation can communicate

alternatives with the community (voters, stakeholders and other actors). In this context opposing groups may be invited to select an attached committee that can interact with the project organisation. Ideally, this interaction should result in a consensus about the nature of the transport problems and the set of effective (alternative) solutions. Subsequently we suggest that the assessment process should be organised according to principles of systems analysis. Finally, the end result of the second stage is the formulation of a plan for sequential decision-making.

?? *Stage III:* The third stage may be thought of as the “implementation phase”. This requires that the project organisation (project team) reorients itself to carry out the implementation and organise a systematic monitoring of consequences over time. In this stage project-management issues may dominate the process. An important task of the monitoring is to follow the ex post acceptance and to suggest further developments of the introduced system.

The closer contents of the stages

Associated with the decision process, there are major objective factors that influence acceptance of a road pricing scheme. The first factor is the motivation of the project. Consensus must be established about (i) the nature of the transport problems and the objectives related to the project, (ii) the consequences of not solving the problems, and (iii) the consequences of alternative ways of solving the transport problems. Dissemination of the project idea will fail if the motivation is not transparent. The second factor may be labelled the distribution and equity aspect of the solution. How are different groups of actors (inhabitants, firms, visitors) affected by the solution, what do they gain and what do they lose? Without a clear assessment of this type, there are no good options to negotiate a feasible transport management policy. In view of this, a feasible decision process can have the following substantial content:

- ?? At an early stage the responsible political decision-makers should, together with the initiating project organisation, invite the public to an information meeting that may be followed by a sequence of meetings. An overall ambition is to gradually establish a consensus about the nature of the transport problem.
- ?? At such meetings the organisation should (i) present a comprehensive problem description and (ii) inform about alternative solutions that are considered and will be compared.
- ?? In a following stage the project organisation should identify political parties, organisations and groups which are uncertain or critical to the (alternative) solutions that the project suggests, and who are organising an opposition to the project or who may do so.
- ?? Given the above identification, a small committee of representatives of opposing groups, organisations and parties should be invited to discussion and assessment meetings. This committee should be offered to select experts who may participate in the following assessment studies and attempts to modify suggested solutions.

?? Outside experts should be given rich opportunities to pose questions, make critical remarks and suggest modifying alternatives. This may form a platform for “negotiations” between experts that might lead to a “consensus assessment” of alternatives. If such a solution (or partial solution) is reached, the outcome should be documented in written form – as a joint statement from involved experts.

?? The outcome in the preceding interactive process should be publicly disseminated.

?? At this stage the management and implementation process may take new forms, with a stronger focus on “operational plan making”.

The process seen from the participants

Given this proposal about a feasible decision process, what can we say about the form for participation of the public and specific interest groups? First, with regard to the public in general, the interaction is primarily a matter of dissemination of transparent information. What about specific interest groups with strong views? According to experiences from the outlined kind of applied feasible decision processes, the ideal solution is that the different interest groups (opposers and others) select a small committee of experts and other representatives (attached committee). In the assessment work in stage II the interaction will then take place between the project organisation and the attached committee. In this ideal case the costs of interaction will be reasonable. Moreover, the committee interface will increase the probability of negotiating consensus-conclusions about vital assessment results.

Then, how can different interest groups initiate and organise their own attached committee? A clear message is that the project organisation should help and guide the initiation and organisation of the attached committee.

Although the decision process in the Oslo region did not exactly follow the described scheme, interviews with decision-makers in Oslo indicate the importance of *the process* for making decision. The proposed feasible decision process is a learning process. The project organisation and the pertinent decision-makers can through the interface better learn about obstacles, barriers and compensation preferences among opponents. The attached committee and the pertinent interest groups can better learn about the nature of transport problems, about possible alternatives and about their consequences. This will reduce misconceptions.

Some general observations

As has already been mentioned there are good examples of new kinds of decision processes to get from location decisions concerning facilities with large environmental effects. The wise decision-maker on urban transport policy could learn much from that. On the other hand, every field has its own characteristics and every city its own institutions and traditions, so parallels should be made with some caution and prescriptions avoided until having considered differences as well as similarities.

One important part of a decision process on transport policy is the interplay between actors on the political side: on the same level and between the tiers. The successful outcome of negotiations often depends on the parties' ability to make packages including different issues; the decision process in the US Congress is a very good example of this. Sometimes local politicians, overly reluctantly, submit to decisions taken by the national parliaments etc., but tacitly accept it as they know that such a superior decision might smoothen the way for them to take an unpopular stand 'at home' that will be good in the long run. The classical recipe: “two steps forward, one backwards, two forward again” as well as the formula: “the rejected proposition has fallen forwards” are other good examples of tactics as a necessary element in the art of decision-making.

Another factor to consider is the dynamics of popular opinions, the importance of distinguishing between the citizens' ex ante and ex post views. Many politicians are well aware of that and of the necessity to adjust their politics to such changes in order to get a sufficient support for every step they take. The PRIMA interviews in Lyon gave a very clear insight into the politicians' awareness of this and their conscious step-by-step philosophy. The strong initial public opposition against the tolls on the new bridge and tunnel on the northern part of the ring road in Lyon, called for action by the local authority. After closing the tolled part of the ring for two months they re-opened the passage allowing vehicles to use the bridge for free and reducing tolls for using the tunnel. Today, the tolled tunnel is accepted by the population.

8.4 Shortcomings of present decision systems

The process discussed above may look unconventional and complicated — and very time-consuming. We know, however, from harsh experience in some of the PRIMA case cities that conventional decision-making is no guarantee whatsoever for a swift and efficient process. So, we think that some arrangements of the indicated kind will be necessary for the making up of a feasible process for the new society.

The failure of the financing scheme of the Dennis package in Stockholm is but one example; the growing public unease with the unintended redistribution of through-traffic in Barcelona is another. Almost every PRIMA case city shows some examples of discouraging effects from the practised decision-making system.

The traditional way of making decisions in a representative democracy is, beyond doubt, democratic. Citizens elect their representatives in the national, regional and local

parliaments. These, in turn, elect boards, appoint executive officers etc. Decision-making is legally regulated. So, in the end every correctly taken decision is legalised by the people, even without asking them (except for Switzerland and some other countries where local referenda are institutional).

Why, then, do so many decisions on transport policy matters fail? Why is it difficult to obtain public acceptance for them? Or why are so many decisions never implemented?

Could an explanation be that the traditional decision-making system is convenient for and rather attractive to local politicians as well as traffic engineers, stakeholders, lobbyists and media? A limited number of decision-makers and other influential people are familiar with the problems and their practicable solutions and with the other parties and their ways of reacting to propositions. The game has well-known participants and decision rules.

In this system there are few ways of achieving acceptance for radically new political measures such as road pricing. Another complication is the fact that in those regions where mobility management policies are most urgently needed there is no such thing as a fully independent local traffic decision. Firstly, those affected by the measure nowadays raise their voices loudly, irrespective of formal rules. And secondly, every step taken by one of the municipalities, in particular the central one, to manage its situation influences the other municipalities in a positive or negative way. And national or regional decisions on transport policy matters could have intentional or unintentional effects upon the local traffic situation, as well.

There are good and bad examples of this interrelation between the tiers, too, to get from the PRIMA case cities. On of the good examples is Oslo, where the city for practical reasons found it impossible to adopt its road-tolling scheme alone without the consent of the regional body of Akershus and a tripartite agreement with the state, too. On the other hand, Rotterdam had developed its own transport policy but was not able to implement it without taking into consideration what the national government had thought out about road pricing in the four large Randstad cities. This mixture of bottom-up and top-down processes could, from the point of view of a dedicated protagonist of local democracy, be characterised as paternalistic, but on the other hand it was a prerequisite for success.

Paternalistic and shortsighted reactions make their appearances on every stage. It is fair to state that many of the objections from local politicians to road pricing schemes are founded in a suspicion that the municipality may not be allowed to keep the collected money for its own needs. This suspicion is, no doubt, reinforced by the widespread system that state authorities should examine and check such local decisions before they can be implemented. The legal fundament for decentralised decisions on local mobility management schemes is weak in most countries.

8.5 Feasible decision processes must be created

To summarise:

- ?? Feasible decision processes in local mobility planning must be created, possibly on the model of participation in spatial planning;
- ?? It is important to distinguish ex ante and ex post acceptance;
- ?? Procedures for participation of opponents in the process are essential; the end should be trying to attain consensus on the nature of the problems to be solved and the effects and side effects of different solutions, including that of not solving the problem;
- ?? Communication rather than information and marketing must be established; the role of media has to be considered carefully.

9. Pay Respect to the Individual

9.1 Similarities at large – decisive differences in details

In the reports from the PRIMA project and in the preceding chapters of this report you can find a number of observations about political and public acceptance of road pricing in the eight case cities:

- ?? Barcelona, Lyon, Marseille and Oslo that have introduced some kind of road pricing,
- ?? Rotterdam that is on the doorstep to do so,
- ?? Bern and Zürich where they, so far, have come to the conclusion that road pricing is not applicable to their traffic problems, and
- ?? Stockholm that decided to introduce it and then withdrew the decision.

At first, this wide variation might surprise as they all belong to the same West-European political tradition and have, broadly spoken, reached the same economic level and way of living and moving patterns.

The prime learning from this is, of course, that there is quite a number of underlying differences that make the sifting out of experiences to translate from one city to another a delicate matter. Such divergences have got to do with the individual history of the city in question, its urban geography and economic activities, its local political tradition and institutions etc., and not the least, the actual political situation.

9.2 Lessons to learn from all case cities

Every single city has to choose its own future and decide on which experiences from others are relevant. No doubt, there are lessons to learn from what has been done and what is under way concerning road pricing in the PRIMA case cities.

There are some common bases for public and political acceptance of road pricing, relating to public opinion on the traffic situation and to the scope of actions for local decision-makers.

It is necessary that there is a public and political consensus on that the traffic situation calls for such measures and that road pricing and the revenues derived from it can benefit influential groups such as road users and non-users as well. Another condition is that there are or can be created fully acceptable alternative modes of transport. This gives

arguments for making up of packages containing amelioration for road circulation and public transport and for basal city qualities: economic development, social equity, good environment, and beauty.

An inescapable prerequisite is that the local political tier has got the legal right and the real power to decide on this matter, both the introduction and design of road pricing and the use of the collected money. It is important, too, that the distrust between the political parties, between and inside the political tiers and between the citizens and the rulers is not too deep to allow reliable and sustainable agreements on these matters. In most European countries there are legal deficiencies to overcome concerning the local politicians' scope of actions, and very often the national or federal level has to be involved financially, too. The most important lesson from the PRIMA case cities in this respect is, however, that the decision system almost everywhere should be reformed to allow for a much broader and deeper participatory process.

9.3 Lessons to learn from the different case cities

Oslo's success is promising to all. The traditional rural bias in parliament and government politics on allocating funds for infrastructure investments forced the politicians in Oslo to find ways for raising local money and for co-operation with the national and regional levels.

One learning is that it can be wise to take one step at a time. The Oslo package was a financial mechanism for infrastructure investments through combined regular state funds, special state grants and toll revenues. Almost every crown from drivers should be used for investments in the direct interest of road users and the tolling should be closed on December 31st, 2007, when the investment plan was supposed to have been implemented.

Now, in Oslo package II the rail net is in focus with investments financed through a combination of higher and extended road tolls, raised fares on public transport and state funding. Time is also ripe for a transition from plain financial measures to 'real road pricing' with legal possibilities opened up for time and area differentiation. The pragmatic attitude of those who are responsible for transport policy in Oslo and the region is both remarkable and an explanation to its success. A touchstone now will be the level of charges. Today tolls are rather cheap and only charged when driving into Oslo; their effects on the volume and distribution of the traffic are limited. Will raised and extended charges meet with the same distinction between stated and revealed preferences as the present ones?

In **Stockholm**, the so-called Dennis package created much initial hope as it was comprehensive and contained a number of investments and other measures aiming at ameliorating accessibility, environment quality and economic development. It supported road traffic and public transport on rails and roads, and it was made up in accordance with

regional and local long-term planning. The leading politicians of the three largest political parties in the city and the region signed the agreement, and there was an element of ‘terror balance’ in it, as every party got his favourite project but had to accept the other parties’ darlings too.

The fatal mistake was that the coming elections could, and in fact did, bring up a political situation in both the city of Stockholm, the region, many neighbouring municipalities and the national parliament, where new alliances were formed on central political issues with parties opposing to the Dennis package. In that light the agreement became of inferior interest. The calculation on the probable and persistent arithmetic majority for the concluding parties was correct but not adequate. The lesson from Stockholm is that even a carefully prepared and well thought-out agreement backed by an overwhelming local and regional majority can fail. There always are political issues of a higher dignity, and local interests seldom can match national ones.

A lesson that can be learned from a comparison between **Lyon** and **Marseille** is the importance of an open and transparent communication process. In both cases a private concessionaire was engaged for an essential part of the road network, but the way the authorities handled the business differed very much.

In Lyon no tendering was made, the cost became double the calculated price, and the city undertook to pay for the rise and to introduce restrictions on the use of alternative routes so as to favour the pay-road. There were much criticism and suspicion of fraud and underhand dealings between the city rulers and the concessionaire, and even boycotts and riots, and the mayor had to sound the retreat in many respects. In Marseille, on the contrary, the whole process was characterised of openness and correctness. The mayor engaged strongly in the project, and the concessionaire was selected through tendering. The users of the charged tunnel, not the taxpayers, were to finance all the costs of investment and operation. Both the city and the concessionaire pointed at this fact in their marketing and communication with the citizens of Marseille.

The lesson from **Barcelona** has to do with a matter that, no doubt, will be of much larger relevance in the future European road transport network than today, namely the interface between urban and interurban road pricing schemes.

Growing cities and regions and decentralisation of housing and workplaces lead to a change of the mobility patterns, where the relative advantage of the car to public transport increases for transports almost everywhere outside the city core. In Catalonia privately financed toll motorways were introduced in the 1970’s, which strengthened the competitive force of the region in comparison to the rest of Spain. The extension of the Barcelona region gave rise to an unforeseen through traffic in untolled alternative routes that were built for local and regional traffic, which in turn created congestion and environmental problems there. The lesson is that you always have to adjust for changes in the mobility patterns caused by developing land use structure.

The two Swiss case cities, **Bern** and **Zürich**, offer interesting examples of how clearly visible differences of opinions between citizens in central areas and those in suburbs may be in a system of referenda and, thus, can have real impact on local transport policy. Urban citizens are less inclined to accept growing car use than suburbanites and often vote against new roads and parking facilities.

Bern and Zurich are together with Barcelona the European cities where public transport plays the largest role, and both cities wish to keep and strengthen this modal quality. However, here as in many other regions the cities grow and their dwelling patterns disperse, so the competitiveness of public transport will decrease and the road traffic strain increase. Mostly, urban dwellers look positively to measures for ameliorating public transport and are against measures in support of car traffic, but the cantonal opinions may differ somewhat in that respect.

In Bern an integral traffic management system has been adopted for avoiding, shifting and guiding traffic; among its means is a road pricing system, which has not yet been implemented and which still has not been concretised. In Zurich, so far, there has been no decision whatever on road pricing. The lesson from the two Swiss case cities is that they will in reality as long as possible and as long as there are other alternatives avoid road pricing tools, probably because of its unpopularity among the citizens, which is clearly demonstrated in the constitutional referendum system.

The case of **Rotterdam** is an illustration of the need for integrating local, regional and national (federal) transport policies. This is very important in a densely populated country like the Netherlands with heavy transport quantities, where these tiers are strongly interdependent, but it will in future be gradually more evident in most other European countries.

From a participatory point of view such integration will raise some problems, as local policy always is more within reach of the popular opinion and influence than regional and national policies. In the case of Rotterdam there have been elements of tensions between the tiers, but the preliminary package agreement recently agreed upon probably reflects the need to adopt national policies to local demands and priorities.

9.4 Future options of the case cities

Writing prescription for others is always a delicate matter. Still, we have after our thorough studies of the eight PRIMA case cities reached some conclusions on the possible routes for them to follow concerning road pricing policy.

The following tables summarise the proposals on how to introduce road pricing derived for each PRIMA city. Table 9.1 deals with the objectives underlying the proposals of road pricing.

Barcelona	Primary: financing of road infrastructure, secondary: reduce congestion
Bern	Prevent / reduce congestion, financing environmental friendly transport projects
Lyon	Financing transport infrastructure, support measures for more multimodality
Marseille	Financing transport infrastructure, traffic regulation (reduce congestion)
Oslo	Financing transport infrastructure, secondary reduce congestion and improve environment
Rotterdam	Traffic management, revenue use partly for environmental friendly transport modes
Stockholm	Financing transport infrastructure, secondary: congestion relief, improve environment
Zurich	Financing transport infrastructure, secondary: congestion relief, improve environment

Table 9.1 Objectives of the road pricing schemes for the PRIMA cities

?? Taking account of the survey and interview results it is not surprising that a major objective for most cities is in financing transport infrastructure. Depending on the city, the focus is more on financing new road infrastructure and road maintenance (Barcelona), on financing road and public transport infrastructure (Lyon, Marseille, Oslo, Stockholm, Zurich) or on specifically environmental friendly transport projects (Bern, Rotterdam). Nevertheless, it is difficult to generate a positive attitude and an increase of acceptance on a financing scheme alone. Financing should not be the only objective. The coherency of the whole transport policy is the key. Road pricing is then one of the tools in a complete transport policy package where all aspects of the transport system are included, such as public transport alternatives, revenue use, etc.

?? Second most mentioned objective is traffic management mainly in the sense of *congestion relief* (Bern, Marseille, Rotterdam). Some cities also follow this objective, but only as a second priority (Barcelona, Stockholm, Zurich, Oslo).

?? The improvement of environmental quality is in most cases not a priority objective of road pricing, but is at least directly or indirectly mentioned by some cities as Bern, Lyon (by supporting measures for more multimodality), Rotterdam, Zurich, Stockholm and Oslo.

?? None of the cities explicitly mentions social marginal cost pricing as an objective.

The next table summarises the proposed road pricing schemes. Corresponding to the different situation with respect to the political and public discussion on road pricing as well as the historic background the proposed schemes are varying a lot from city to city.

Barcelona	Pricing of single (mainly new) road sections
Bern	Area licensing / zone-pricing, as an exemption: single road pricing, in the long run: complex area pricing
Lyon	Area licensing / Cordon pricing. Urban motorway pricing: designing a HOV (High Speed Own Lane), similar to the single lane or a HOT (High Occupancy Toll Lane) single lane where high occupancy vehicles are exempted from tolls.
Marseille	Cordon pricing, single-lane pricing on motorways
Oslo	Transition of the existing cordon pricing to time and area differentiation
Rotterdam	Single-lane pricing (based on the existing “freight lanes), Cordon pricing (“semi-closed wide cordon variant”), in the long run: complex area pricing
Stockholm	Pricing of single road sections, cordon pricing
Zurich	Pricing of single (mainly new) road sections, single-lane pricing, zone-pricing (traffic cells)

Table 9.2 Road pricing schemes proposed for the PRIMA cities

?? The pricing of single road sections is a first choice in Barcelona, Stockholm and Zürich. As an exemption it is also conceivable for Bern. Single lane pricing on motorways is an interesting alternative or complement to the pricing of whole road sections for Marseille, Rotterdam and Zürich.

?? Cordon pricing is recommended in Lyon, Marseille, Oslo, Rotterdam and Stockholm, whereas for Bern and Zurich a central area respectively multi-zone pricing seem to be better alternatives.

?? Only Bern and Rotterdam explicitly mention a complex mileage dependent area pricing as a long run objective.

Finally, table 9.3 sums up the proposed major steps towards the introduction of road pricing in the PRIMA cities.

Barcelona	<p>Step 1: Resolve problems of the current toll motorway (change existing approach towards traffic management, including the reduction and elimination of some of the toll sections inside the metropolitan region, initiate broad debate on transport policies)</p> <p>Step 2: Implement non road-pricing measures to solve congestion</p> <p>Step 3: Discuss road pricing schemes and select pilot projects</p> <p>Step 4: Implement road pricing pilot</p>
Bern	<p>Step 1: Preliminary phase – political foundation, discuss objectives, evaluate scheme</p> <p>Step 2: Realise road pricing trial during several years</p> <p>Step 3: Initiate legal possibilities for regular (differentiated) road pricing schemes</p> <p>Step 4: Development of a more complex road pricing scheme</p>
Lyon	<p>Step 1: Go on studying road pricing scenarios together with Grenoble and Saint-Etienne</p> <p>Step 2: Prepare debate to discuss scenarios (change transport policy and citizens attitude)</p> <p>Step 2: Change the law on national level</p> <p>Step 3: Organise a debate at the urban area level</p> <p>Step 4: Test phase: implement a vignette based road pricing scheme according to the conclusions of the debate</p> <p>Step 5: Final phase: validation (and extension) or cancellation of the scheme</p>
Marseille	<p>Step 1: Strengthen actual pro-public transport policy</p> <p>Step 2: HOV debate and implementation</p> <p>Step 3: HOT debate and implementation</p>
Oslo	<p>Step 1: Go on planning Oslo package 2 with a large share of public transport investments</p> <p>Step 2: Go on processing legal amendments allowing differentiated road pricing according to time, area and vehicle type</p> <p>Step 3: Introduce time-differentiated charges (peak hours) as the next step</p> <p>Step 4: Introduce bottom-up and adaptive learning aspects in the decision process</p> <p>Step 5: Analyse the effects of a mix of objectives: financing, congestion and environment</p>
Rotterdam	<p>Step 1: Continue the discussion on road pricing, questioning existing positions</p> <p>Step 2: Establishment of road pricing trials including national debate on mobility and implementation of flanking policies</p> <p>Step 3: Using the results of the trials and the national debate road pricing proposals should be integrated into ongoing policy and planning processes</p>
Stockholm	<p>Step 1: Define a road pricing package which is acceptable for most of the political parties, e.g. pricing of new road tunnels, use of revenue partly for environmental projects</p> <p>Step 2: Launch a communication campaign and a wide public debate</p> <p>Step 3: Introduce road pricing when the new roads open for traffic, at earliest.</p> <p>Step 4: If step 3 is successful extend the road pricing to a whole cordon</p> <p>Step 5: Introduce time differentiation of the road pricing charges</p>
Zürich	<p>Step 1: Find an ideal starting point for road pricing: proposal from a political pressure group or / and from a potential private concessionaire and combine it with an intensive communication and participation campaign</p> <p>Step 2: Make a first road pricing trial (without new legal background) on the basis of a new toll tunnel through the lake of Zurich or a multi-zone pricing</p>

Table 9.3 *Implementation paths for road pricing in the PRIMA cities*

Table 9.3 recommends political and public discussion as a starting point for urban road pricing. Both the objectives of urban transport policy in general and that of a road pricing scheme require consideration. These discussions need to be complemented by a strong participation process and communication campaign, especially when the time comes to implement the proposed form of road pricing.

In several cities the discussion about road pricing has just begun. We have to notice the many sceptical votes in the surveys and interviews about road pricing. At the same time it is fair to say (and confirmed by the results of the surveys and interviews) that there is a gap in the public knowledge about transport policies, especially possible forms of pricing measures and their impacts on mobility behaviour. New, attractive and promising strategies have to be developed to fill this gap.

10. Conclusions

Three kinds of conclusions can be drawn from the PRIMA project.

From a theoretical point of view the findings demonstrate the necessity to develop the analytical tools commonly used to assess the impact of urban road pricing schemes. To model average travellers is not enough if one wants to learn more about acceptability and about the consequences of alternative road pricing schemes. Heterogeneity as well as, interdependencies between land-use and the transport system are important factors to consider in future modelling work.

The second kind of conclusions relate to the case cities. The transport policies in the case cities have more or less the same objectives and concerns: increased accessibility, reduced environmental nuisances and increased public transport shares. The background is also rather similar among the cities and is characterised by an increased perception of congestion and pollution and a general lack of financing resources.

The institutional and territorial organisation of the transport system and the decision-making processes are very city-specific. From national to local levels, numerous transport authorities intervene in decisions in a complex way. The local and regional authorities cannot introduce urban road pricing without support from their national governments. Road pricing is not legally possible in Switzerland and the Netherlands. It is legal in the other countries as long as the pricing scheme is related to financing of new roads.

Traffic congestion and nuisances are in most case cities of a size that justifies the search for more effective measures, including road pricing. However, any road pricing scheme must be designed with respect to the specific institutional context, traffic conditions and policy objectives in the city where it is going to be implemented. The same holds for the decision process needed for introducing and implementing the scheme.

Another type of conclusions for the case cities concerns the future development of road pricing. All recommendations suggest a step-by-step approach using earlier experiences and the current situation as the basic stepping stone. The different steps suggested are city specific but a common action concerns the need for public discussions, debate and communication.

The third type of conclusions are generalisations of our findings regarding factors that tend to increase or decrease urban road pricing acceptance. By considering the following ten items it should be possible to increase the acceptance.

1. Acceptance relates to perceived benefits by users, non-users and potential investors and toll operators. The traffic problems of the city must be evident and it must be demonstrated that road pricing is the best way to complement other measures and thus to

handle the problems for users as well as non-users. Road pricing should rather be perceived as a "facilitating" instrument and not as a kind of punishment. Furthermore potential concessionaires should feel convinced that it might be a good business.

2. Acceptance relates to availability of alternative modes of transport. The surveys of the PRIMA project show that improvement of public transport should be part of a policy package introducing road pricing. Such improvements can also compensate groups whose welfare will decrease by the road-pricing scheme. However important it is to have a coherent transport policy, the package idea should not be over stressed. The larger the package of policy measures, the larger is the risk that the political strings are not long enough to keep it together.

3. Acceptance relates to the level of charges. Experiences from the case cities indicate that fairly low starting levels are needed and that the charges can be increased successively to meet financial requirements.

4. Acceptance relates to equity effects. Notice should be taken of effects related to income as well as to the location of housing, workplaces and service centres. Compensating measures should be considered for groups whose welfare will decrease by the pricing scheme.

5. Acceptance relates to the design of the decision making process needed for the introduction, discussion and implementation of a road pricing scheme. According to the interviews a stepwise procedure characterised by adaptive learning seems to be best from the acceptability point of view. A financing toll system is more easily accepted than an ambitious pricing scheme differentiated by time and area and thus allowing for influencing travel behaviour. Furthermore, a pure financing scheme can be developed successively as more experience and knowledge is gained about the resulting effects.

6. Acceptance relates to the negotiating abilities among the politicians involved at different levels of government and among the experts and planners representing the various affected governmental bodies. A bottom-up strategy where the initiative to introduce road pricing comes from the urban area, is essential but not enough. A supplementing top-down strategy is needed as well. The national legislation must be changed in many countries and financial support from the national government will make it easier for the urban citizens, especially car users to accept increased personal expenses.

7. Acceptance relates to the communication efforts initiated in the very beginning of the decision making process. The starting point for introducing road pricing must be a political and public discussion on the traffic problems and the general objectives of the urban transport policy. Representatives from the public should also be invited to discussion and assessment meetings and be given rich opportunities to suggest modifying alternatives.

8. Acceptance of urban road pricing depends on earlier road pricing experiences. Hence, EU-support for activities aiming at dissemination of information experiences between cities is very important. It is also important to continuously assess the coher-

ence of urban development and urban road pricing with existing interurban road pricing systems since public acceptance can be negatively affected if there are inconsistencies in the interface where these systems meet.

9. Acceptance relates to experiences with the general privatisation trend and with the increased use of IT-equipment and electronic payment in other areas. The interviews of the PRIMA project also demonstrate that private initiatives to construct toll roads may increase the political acceptance and that the increased use of IT-equipment might explain why the integrity issue no longer seems to be an obstacle to urban road pricing.

10. Acceptance from a majority of the citizens can not be expected from the outset. It will increase by an open communication process. Experiences from several cities show that acceptance tend to increase after the implementation. However, the Barcelona case indicates that getting acceptance is a continuous process from developing the pricing scheme till implementation and while in operation.

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ANNEX 1 Main elements of transport policy in Case Cities

City	Transport policy main goals	Main measures/means	Integrated transport policy
Barcelona	In general, current transport policies are directed towards increasing the role of public transport: increase the share of public transport in metropolitan mobility; elaborate an integrated public transport system; and reduce environmental impacts of the transport system.	<ul style="list-style-type: none"> ?? Extend the rail infrastructure to the entire metropolitan region following the corridors of high-density urban areas ?? Reinforce the role of public transport on road in the region ?? Increase and improve the level of inter-connection in the public transport system 	Weak
Bern	Since 1983, the city of Bern shifted from a demand oriented transport policy to a new transport planning principle: no more capacity increase but reduction of the harmful effects of traffic. The “traffic concept” document in 1995 sets this principle into measures.	<ul style="list-style-type: none"> ?? Parking policy oriented towards mode changes ?? Develop parks and ride ?? Define a road network which is structured hierarchically and assign a traffic regime in order to reduce motorised road traffic ?? Introduce an integral traffic management system in order to influence road traffic ?? Get the traffic more steady in order to reduce air pollution and energy use 	Strong
Lyon	In 1998, a document of multimodal transport policy was voted. Lyon shifted from a private vehicle oriented policy to a public transport oriented policy.	<ul style="list-style-type: none"> ?? Development of public transport (except metro) ?? Efforts on bicycle lanes and pedestrians comfort ?? Parking regulation ?? No investment on road axes towards the city centre 	Recent, rather weak:
Marseille	In Marseille metropolitan area, there are several transport authorities, and there is no recently voted document. Heavy infrastructure investments ceased in the late 1980’s, light investments are now more the rule.	Documents specifying transport measures to be implemented in Marseille are under evaluation	Very weak

City	Transport policy main goals	Main measures/means	Integrated transport policy
Oslo	The transport policy aims at providing a transportation system to the inhabitants, which are environmentally sound, provides good accessibility and is safe. The strategy is to promote a development, which reduces the needs for transportation and increases the public transportation share.	<ul style="list-style-type: none"> ?? Give priority to developments close to public transport nodes ?? Improve the public transport system ?? Improve non-radial connections ?? Give priority to development of bicycle lanes ?? Strengthen the co-ordination and organisation of the public transport companies 	Strong
Rotterdam	The Regional government has formulated the two following basic policy goals. The safeguarding and improvement of the accessibility of economic and societal activities in the region for both humans and freight. The improvement of the liveability in the region by decreasing the negative side effects of traffic and transport on the living environment, and restricting accidents caused by traffic and transportation.	<ul style="list-style-type: none"> ?? Select system rather than increasing capacities ?? ABC location policy: activities and households are located according to their need of accessibility ?? Coherent interconnected public transport network ?? Restrictive parking policy 	Strong
Stockholm	The transport policy aims at improving accessibility in the transportation system, (in particular for industry transports, public transports and cyclists), improving the environment and diminishing the number of car accidents, mainly through investments in public transportation.	<ul style="list-style-type: none"> ?? Construction of roads in strategic locations ?? Give priority to developments close to public transport nodes ?? Improve the public transport system ?? Improve the bicycle network ?? Remove dangerous traffic locations 	Strong
Zurich	The main goals of transport policy are to improve mobility while curbing the use of the private car, enhance the image of the city, improve the quality of urban life and reduce air pollution and noise, while still catering for the needs of industry and commerce. The means of achieving these goals are mainly through public transport improvement.	<ul style="list-style-type: none"> ?? Improve public transport with new lines and by providing preference over car traffic on roads ?? Parking constraints and high parking charges ?? Encourage location along public transport axes ?? Channel traffic on the main road network 	Strong

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