

Deliverable D2

PATS

Socio-economic principles for price acceptability

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EXECUTIVE SUMMARY

Transport pricing is currently a highly debated topic in the European Union. What is under discussion in this deliverable is the acceptability of *changes* in transport pricing. They include not only changes in the current pricing levels but also the general adoption of specific pricing strategies already experienced in some countries, such as road user charging and the introduction of completely new instruments. Such *changes* are, for instance, suggested in the Green and White Papers of the Commission and in various national documents reviewed in Deliverable D1.

Acceptability is far from being a uni-dimensional problem; on the contrary, this concept corresponds to the interaction and overlap between a number of scientific areas such as economic, social, political, legal/regulatory, technological/functional.

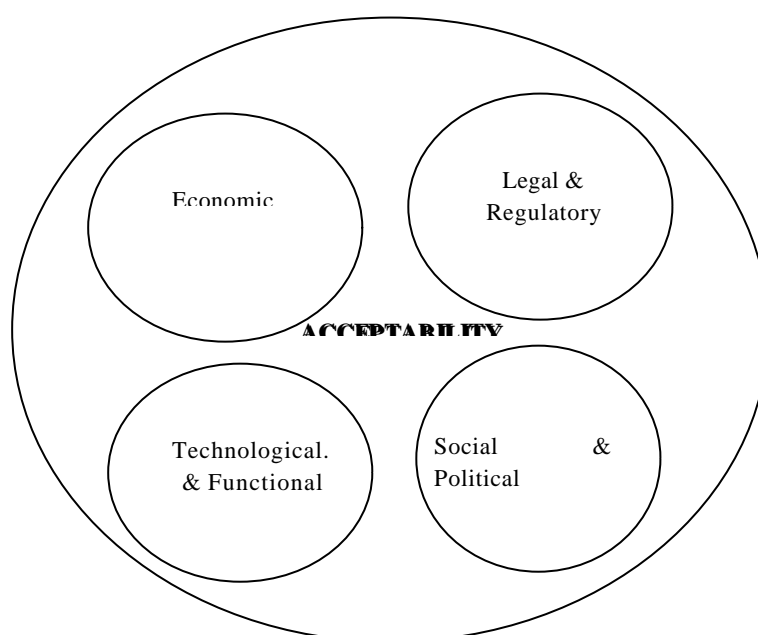


Figure 1: Interplay between acceptability aspects

Therefore, it is the purpose of this deliverable to explore the concept of acceptability in the light of the complex interplay between efficiency, fairness and feasibility of implementation. This interplay can mainly be expressed along four main issues (see figure above).

As already mentioned, all these issues are expected to directly influence acceptability. The first issue is related of course to economic efficiency since this efficiency is now required from the transport sector. A second issue regards the social & political aspects, in the sense that fairness concerns may conflict with economic efficiency. Since economic efficiency in transport pricing may require the use of sophisticated technological solutions the issue of technological & functional requirements must be addressed. The legal and regulatory framework is particularly of concern when efficient pricing schemes (e.g. rail track charges or EU-wide road user charging) are to be implemented. These are the issues which are addressed in this deliverable together with the main inter-linkages between them when they are relevant for acceptability.

The deliverable underlines that while efficiency in its economic meaning relies on a rather solid theoretical basis, fairness is often understood as a fuzzy concept since it strongly depends on individual perception. To prove it, a number of opposite reactions from the different groups of stakeholders regarding the way fairness is handled in the policy measures proposed in the two above-mentioned Commissions' Papers can be identified.

A central assumption of this research on the socio-economic principles of transport pricing acceptability is that acceptability mostly relies on the two conditions of efficiency and fairness: a policy measure that is perceived as insufficiently efficient and insufficiently fair is thus doomed to be rejected. The corollary of this assumption is that to be acceptable a transport policy must reach a minimal degree of efficiency and a minimal degree of fairness. By saying that, it is stated that there is no identity between efficiency and fairness and that the first has not automatically implicit the second. In addition, the research considers these conditions as necessary though not sufficient to guarantee the acceptability of a pricing policy since legal, regulatory and technological issues add to achieve the feasibility of implementation of pricing schemes.

This is why firstly this report starts with a detailed analysis of what efficient pricing of infrastructure and public transport services means. Then the political decision-making process and the debate about transport pricing is analysed in order to find the way of enhancing acceptability through the decision-making and to identify the main concerns of actors within the transport sector. This leads to a more detailed analysis of the dimensions of equity which are at stake in transport pricing. Then the institutional constraints are analysed regarding the organisation of transport pricing between different levels of governments. Finally, increasing efficiency and fairness in transport pricing mainly amounts to conceiving systems allowing time and space variable pricing that necessarily imply a certain degree of complexity and must at the same time be also reliable, easy to use and preserve privacy. Therefore, the issue of the requisite attributes of pricing systems from a technical/functional point of view is addressed.

Efficiency in transport pricing

The analysis of what efficient pricing of infrastructure and public transport services means, considers as a basic underlying assumption that in standard economic analysis optimal use means that the rate of capacity utilisation should be adjusted in order to reflect the costs of that utilisation, including not only the productive costs but also the ones which directly depend on user behaviour. Moreover, the report deeply elaborates on the comparison between current pricing practices and optimal prices for both the use of infrastructure and scheduled public transport, aiming at highlighting the potential for reform of pricing policies in the different modes.

The political decision-making process and the debate about transport pricing

Enhancing acceptability through the political decision-making process

The general analysis of institutional interactions between the various actors both on the supply (politicians) and the demand side (interest groups and citizens) of the political market lead to some basic conclusions regarding the way to enhance acceptability.

From the politicians viewpoint:

- it can be hypothesised that politicians prefer revenues which go to the public purse providing them with flexibility in the use of these additional resources instead of having to return them to the citizens or the taxpayers or to earmark them for a specific purpose;
- the more restrictive the budget constraint is, the more a government will be interested in relieving this restriction by getting additional resources by the means of pricing instruments.

Given that benefits are preferred to be noticeable and costs should be as invisible as possible, pricing instruments may have a chance if they are introduced in such a way that well-organised groups are benefited most and the costs are spread to less influential and latent interest groups. Earmarking of revenues in this case may be an essential feature to achieve the respective aim by politicians.

From special interest groups viewpoint, their acceptance is expected to be higher:

- when earmarking of the revenues ensures that there are not only costs but also benefits (e.g. earmarking revenues from road pricing to be used for maintaining and improving the infrastructure of motorways means that there are benefits for the operators and users of the transport system);
- when instruments are assigned on the basis of individualistic property rights, and rents are therefore attributed exclusively (consequently, it can be expected that lobbying for such instruments is, as in the case of earmarked taxes, (*ceteris paribus*) more likely to be observed than to seek general taxes, quotas or subsidies).

From the citizens viewpoint, acceptance of pricing instruments can be expected to be the higher:

- the more voters have a say – either in a representative or a direct democratic context - in the matter of revenues (i.e. implementation of taxing or pricing instruments and fixing the type and the rate of these measures);
- the more voters have a say via democratic rights in the matter of expenditures (decisions about the spending of revenues);
- and the more the principle of fiscal equivalence and institutional congruence is realised,

and additionally

- the more transparent the process of decision-making, on the one hand, and the specific pricing mechanisms themselves, on the other hand are;
- the more obvious it is that the pricing measure is not just another revenue raising tax or charge but an adequate means to supply private or public goods (i.e. either infrastructure or services in the transport sector) or to internalise external effects (e.g. incentive-based instruments for environmental protection). The more obvious is the link between the tax or charge levied and the use of revenues, the higher the acceptance can be expected.

More generally, from the point of view of citizens and voters, it is important that all relevant costs and benefits are stated explicitly and in a transparent way. Additionally, it is desirable that the pros and cons are weighted without distortion in the political decision-making process. The latter is best guaranteed if the principle of institutional symmetry is put to use. The reason for that is obvious: institutional symmetry means that both beneficiaries and those paying the costs are involved in the decision-making process and, therefore, none of them can exploit the other. The process itself ensures that all relevant arguments have a chance to

enter in the discussion. This results in efficiency to be approximated endogenously, i.e. via the process and not via the evaluation of alternative outcomes.

Arguments and concerns of actors in the transport sector

The politicians, between the constraint of budget and that of re-election, seek the system efficiency of transport as a whole, the problem of the internalisation of the external costs being obviously secondary for them. They also worry about an (equitable) balance between transport modes, territories and their inhabitants: this explains the various attitudes of governments according to the territorial level (local, regional or national) of their field of intervention.

The interest groups and particularly the operators and producers of infrastructures, as well as especially the road users, argue as expected for

- a moderation of the incentive pressure of the price which touches them particularly,
- exemptions or compensations to this pressure of the price,
- the transfer of the recovery of the fixed costs (road or public transport) on the public money, therefore taxpayers,
- the return of the revenues from taxes or pricing to their advantage.

In short, one can reasonably say that each category of actors agrees with the principles of user-pays and internalisation of the external costs but only in their theoretical aspects. When considering the practical implementation, a certain number of conditions are posed. The efficiency of the proposals of the Green and White Papers is challenged by many actors because there are doubts about the efficiency of internalisation through the price and the sufficiency of pricing *per se* to improve the situation.

This means that with regard to efficiency, stakeholders still have to be convinced that pricing is an effective means to change behaviour (even if for the economists the answer is positive in relation to the behavioural data in the medium and long term) and that the implementation of the proposals of the Green and the White Papers will not involve a too negative effect on the economy as a whole.

However a more significant issue is that the arguments of all these actors without exception, including those less directly touched (governments, consumers, etc.), refers to the question of equity. This concern plays a significant, if not paramount role in the acceptability of the suggested measures.

The dimensions of equity involved in transport pricing

Three dimensions of equity were identified namely:

- territorial equity, corresponding to the ‘principle of liberty’, in which the society must guarantee everywhere the access rights to the goods and the services;
- horizontal equity, corresponding to the ‘principle of equal opportunity’, which concerns the equal treatment between users and the user-pays principle.
- vertical equity, corresponding to the ‘principle of difference’, which explicitly takes into account the inequalities and its consequences as regards transport.

Some contradictions were raised between these various dimensions and with the objective of economic efficiency (see figure below).

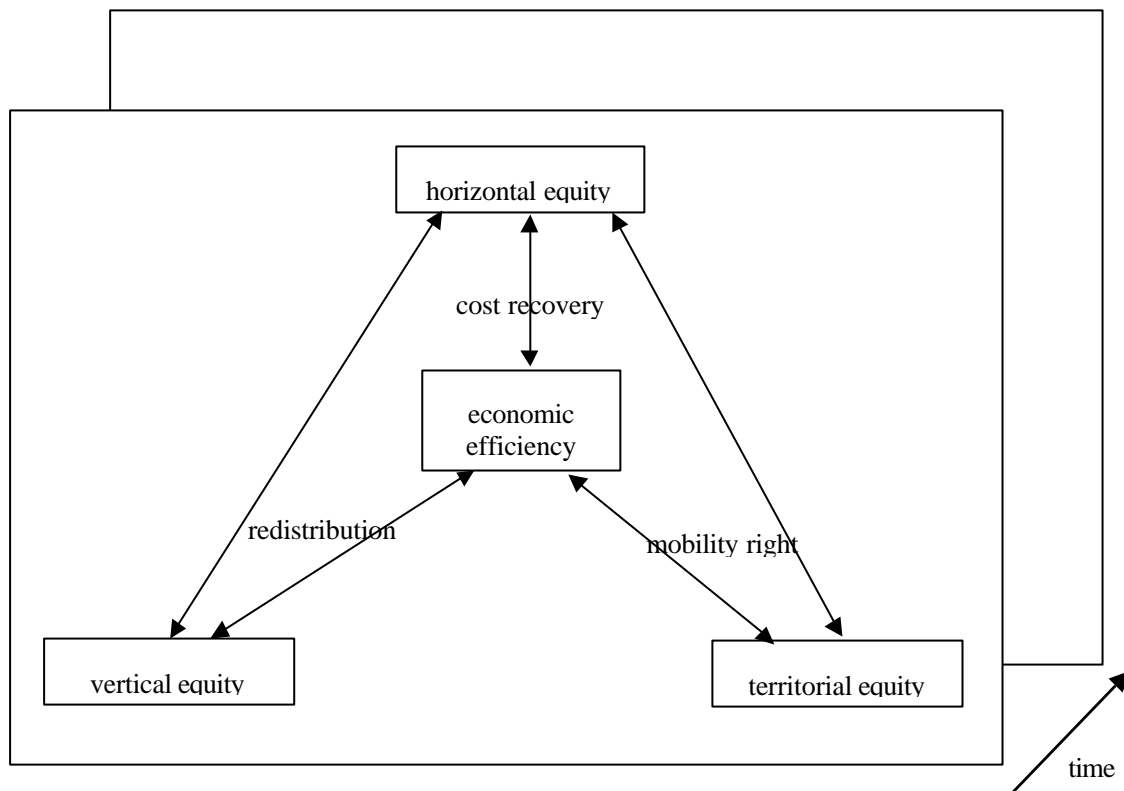


Figure 2: Relationships between equity dimensions and efficiency

The economic efficiency and the horizontal equity can each one involve price increases going against vertical equity (attention paid to most penalised). Conversely, vertical equity requires mechanisms of redistribution or compensations which challenge the economic efficiency of pricing and the user-pays principle of horizontal equity.

The economic efficiency and the horizontal equity can also each one involve price increases going against territorial equity, while challenging the right to mobility. Conversely, the preservation of this right requires investments and imposes limits on the prices, being likely to challenge the economic efficiency of pricing and the user-pays principle of horizontal equity.

Finally the economic efficiency (marginal cost pricing) and the user-pays principle of horizontal equity are generally incompatible but some compatibility can be found within the framework of ‘transport funds’: horizontal equity is not required any more mode by mode but from the point of view of a transport service, within the perimeter of the transport funds.

The implementation of changes in transport pricing implies the necessity to observe this framework in a longitudinal way along time according to the four entries of economic efficiency and equity:

- Economic efficiency implies changes in pricing, including pricing something that was previously perceived as ‘free’. Some actors may consider themselves as losers, i.e. perceive a degradation of their own situation, when compared to the period before the implementation of the new pricing measure (e.g. ‘I pay more than before without drawing from it more benefit’). Reluctance to such price increase can be in some cases overcome if higher quality or capacity is delivered. However pricing changes may conflict with the following equity dimensions.
- Territorial equity or principle of liberty, implies the free exercise of the right to mobility of people and goods. On the one hand, the maintenance of this freedom imposes obvious

limits on the increase in transport pricing and, on the other hand, this freedom remains contained within the limits of the general interest of the society.

- Horizontal equity or user-pays principle, implies a better coverage of the costs by the users. However with pricing changes implied by this equity principle some actors concerned may consider themselves as losers, comparatively to the others (e.g. ‘I pay more than the others with regard to the costs that I inflict and to the advantages that I bring to the society’).
- Vertical equity or principle of maximisation of the situation of most penalised groups or areas implies that any policy, which is likely to worsen the situation of the least advantaged groups or the least best served areas, or even which openly does not aim an improvement of these situations is very likely to be rejected. It results from this that the principles of allocation of revenues from pricing play, by their more or less distributive character, a central role in the acceptability of pricing.

These three dimensions of equity are indivisible from the perception of the fairness of a transport policy. They are also related to the criterion of economic efficiency, which cannot be ignored. This set of contradictory constraints thus forms the framework of definition and management of transport policies, which aim at being both equitable and efficient. It results from these incompatibilities that one will obtain at best only an imperfect compromise between the economic efficiency and these three dimensions of equity.

A possible strategy consists in starting from the couple horizontal equity – economic efficiency around which the controversies between public authorities, operators and users are established. These controversies can be solved through the concept of transport funds, which combines the principles of efficient pricing and costs coverage, in a perimeter defined by a given area or relation, and a set of transport modes. The two former principles would form the heart of the specification of such transport funds. The two dimensions of vertical and territorial equity would be added to this specification, but with a political and financial commitment of the public authorities to cover the additional costs, which would result from this addition.

Organisation of transport pricing between different levels of government

The discussion about the assignment of pricing tasks to levels of government lead to the following conclusions.

Because of the global scope of for example the CO₂ problem and the global market for air and sea transport, it is recommended to try to organise fuel excise duties for these modes at the global level. Second-best option is to introduce fuel excise duties only for intra-Community transport activities.

The definition of pricing principles should be done at European level. In addition, some basic characteristics of pricing systems have to be set at European level (e.g. vehicle or passenger kilometres, weight of vehicles, emission, inter-operability etc.). In case a special pricing scheme for long-distance transport is not or not yet feasible, national pricing measures should be reviewed whether they do not discriminate between mode and nationality. Non-discrimination anyhow should be checked by European institutions. However the subsidiarity and proportionality principles pleads for the implementation of a pricing scheme for long distance transport on national or sub-national level.

In case of transport problems covering more than one country a pricing measure of some co-operating countries (e.g. 'Eurovignette') can be efficient. Co-operation between some countries also could be an option in case it is not feasible to reach an European agreement on a pricing measure.

Both the subsidiarity principle and the territoriality principle make clear that Member States could play a considerable role in defining and implementing transport pricing schemes at the national level. This entails both the setting of taxation and pricing levels and the design and implementation of pricing and taxation systems. However, as explained above, the setting of levels has to be in line with pricing principles laid down at the European level and system design has to be in line with European requirements. Nevertheless within these principles and requirements it should be feasible to reflect national policies in pricing systems and pricing and taxation levels.

Generally speaking, the subsidiarity principle pleads for the lowest level possible. This implies that especially in those cases where costs and problems caused by transport activities have a local or regional scope sub-national governments should have a major role in the design and implementation of pricing measures. This gives more possibilities for taking into account regional and local circumstances, and to implement regional and local traffic policy. This will improve social as well as political acceptability.

Acceptability requirements of technological solutions

Privacy

Privacy is highly protected on the basis of national constitutions and laws as well as supra-national laws and treaties. They all have to be considered when introducing a transport pricing system in a specific country.

Privacy in electronic transport pricing systems is only one and by far not the most important issues of public concern and it is shown that data registration is pacifically accepted in other sectors (e.g. credit cards) and even in the same transport sector (e.g. public transport pricing).

Protection of privacy can be ensured in electronic pricing system if the systems are designed according to the following principles:

- the principle of data-free movement
- personal identification of movements only for enforcement purposes
- taking over of all responsibility for bad functioning and manipulations of the system by the operator
- use of technological solutions such as cryptographic encoding, electronic signature, etc.
- data processed for internal functioning of the system must be immediately processed and erased.

It is finally shown that spin-over effects of electronic road pricing systems are relatively unimportant.

Acceptability requirements from technical systems from the functional point of view

The practical (functional) and technical characteristics of pricing systems may contribute to enhance or decrease acceptability.

It must be pointed out from the outset that it is not the aim of the PATS research to provide advice or recommendations on the most suitable technical-practical solutions, even because this would require the knowledge of the details of the concrete context in which a specific pricing instrument is supposed to be implemented. Thus, it is up to the decision maker – according to the particularities and within the limitations of the concrete situation - to choose among the available technical devices and instruments those that will improve the functionality of a particular dimension.

The role of PATS in this context is to indicate the decision maker - that already has a concrete idea on the pricing system to be implemented in a precise context – which acceptability concerns may be at stake and on which functional dimension she/he has to intervene in order to neutralise them. For this purpose a matrix is developed that highlights the different relationships that exist between the functional dimensions of a selected technical solution and the ‘acceptability requirements’.

Some very general recommendations resulting from the picture given by the matrix on how to intervene on the different dimensions of pricing systems in order to improve acceptability are given below.

Ideally a pricing system should be structured in a way to allow for the payment to be carried out in many different moments or occasions (e.g. pre-payment, payment at the moment of the consumption of the service, after the service, etc.). However, this convenience for the customer has to be balanced with the transaction costs for the provider. Efforts should be taken to avoid that customers have no alternatives to carrying out the payment in busy and crowded situations.

While price differentiation is certainly necessary in order to guarantee fair and efficient pricing, the complexity of the price structure to which it could lead has to be traded-off in terms of reliability, transparency and transaction costs. The price structure has also to be well matched with the available technical solutions in terms of payment instruments.

The pricing system should allow for a plurality of payment instruments. However the concrete number and type of accepted payment instruments should be balanced with transaction costs. In order to protect privacy there should be available a form of payment that does not register individual movements. This can be cash or equivalent such as electronic cash.

The moment of control in a pricing system must be chosen in a way to contribute to the effectiveness of the control. A trade off is necessary with transaction costs and possible negative influences on user friendliness.

Sometimes it may be necessary that pricing systems identify the client. In this case care must be taken that collected data on the client is only used for purposes that are essential to correctly carry out the pricing function.

A pricing system that allows for the registration of the transaction is in principle positive. However, care must be taken not to interfere with privacy or increase bureaucracy and transaction time.

Regarding the objective of transactions (e.g. single service, multiple service, seasonal ticket, etc.), taken duly into account transaction costs, the configuration of the pricing system and structure should allow for the greatest possible variety.

This report focused on the theoretical reasons behind acceptability of transport pricing policy. However one major conclusion of this research points to the fact that some of the components of acceptability are strongly dependent on individual perception and interpretation of policies. For this reason the theoretical basis developed here should be complemented with the results of the on-going empirical work, so that consolidated conclusions can be developed and presented in further reports of PATS research.

1. INTRODUCTION

This deliverable was produced by the following members of the PATS consortium:

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Transport pricing is currently a highly debated topic in the European Union. As shown in Deliverable D1, transport pricing (including taxation) in Europe calls upon many instruments, for the majority implemented for a long time and well accepted in their current use.

The Green Paper (European Commission, 1995) has achieved a detailed analysis of the current (un)fairness of the situation in the transport sector. Together with the White Paper (European Commission, 1998) and also in various national documents reviewed in Deliverable D1, they suggest changes in transport pricing to remedy this unfairness. This is why what is under discussion here is the acceptability of such *changes*.

Vis-à-vis the constraint of resources scarcity (e.g. space dedicated to transport, clean air, etc. and public money) and the environmental implication of transport, the stake today is to find new regulations and pricing instruments to improve the transport system efficiency. According to the prescription of economic theory, the two Commission documents propose the introduction of more pricing instruments into the current regulation of the transport system as well as more efficiency into pricing, particularly through the principle of marginal cost pricing.

First of all it is necessary to specify what is meant by taxation and pricing in this report (see Box 1). Since these instruments can indifferently be used to manage demand and raise funds, throughout the report unless specified, we use the generic term of transport pricing to designate both specific taxation and pricing.

Box 1
Glossary of taxation and pricing

Taxation includes all obligatory pecuniary contributions that are collected by public administrations and have no immediate and direct counterpart. It is basically used to cover public expenditure.

Taxation can be divided into direct taxation and indirect taxation, although this distinction can be sometimes arbitrary. Direct taxation consists of, among others, income taxation. Indirect taxes are taxes on consumption, whether they are general (e.g. VAT) or specific (e.g. fuel tax). Taxation is mostly based on the principle of non-earmarking of receipts, except for para-fiscal taxes that are used to finance directly specific organisations.

General as well as specific taxes can be used to finance public goods or services. On the other hand, demand management requires specific taxes (like those on fuel).

However, the economic thinking about taxation considers taxes more and more as a counterpart of collective expenses and social costs and is also concerned with economic distortions caused by taxation. Following the idea of the incentive character of taxes as it has been put forward by Pigou (1924), the tax system is considered as a parameter able to modify the behaviour of consumers, especially regarding pollution. In this way the distinction between taxation and pricing becomes blurred.

Pricing is based on the mechanism of supply (determined by the production costs of the good) interacting with demand (determined by the utility that the economic agents get from the consumption of the good) in a free market economy. However, prices in transport do often imperfectly reflect this interacting of supply and demand due to the involvement of the public authorities in the production. At the root of this failure are two main alternative reasons: real cost are often misperceived or simply disregarded; subsidies distort the interactive relation between supply and demand, whenever State interference is considered as necessary. The difference between taxation and pricing is that pricing is always a contribution with a counterpart rendered. A fee is a kind of pricing; it is the price for the use of a public utility. For instance, the payment of a fee can give the right to a temporary occupation of the public domain (for example of toll roads). However, receipts of fee collection (contrary to what usually happens with receipts from 'real pricing') are not systematically earmarked.

Pricing can thus be used to raise funds to make an activity of a transport operator profitable (e.g. coverage of investment and exploitation expenses). It can also be used to manage the demand (e.g. management of the congestion, internalisation of the externalities). It is the most straightforward instrument to implement the user pays principle.

Hence:

- ◆ taxation (general or specific) as well as pricing can be used to raise funds;
- ◆ only specific taxes (vehicle tax, fuel taxes, etc.) and fees or pricing are relevant to manage the demand.

The debate around these Commission proposals is all the more sharp since the decisions about pricing and regulation in transport touch fundamental aspects of our society, which cannot be left completely to the free market play. Indeed,

- transport infrastructure and associated public services are historically perceived as basic public goods and services: free access roads, public transport with regulated pricing and subsidies (basic service), etc.;
- given the place taken by motorised transport today, pricing touches what is perceived as a fundamental right, i.e. the right to travel, especially regarding the daily mobility;
- the modification of the pricing system (at the same way as for regulation) has consequences on the actors concerned: the relative competitive positions of the producers of infrastructure and transport operators, the ones compared to the others, between modes or countries, are called into question, just as the relative treatment of the users of various modes.

Both the Commission Green and White Papers mention in their title the word 'fair'. The objective exhibited is thus to lead to fair and efficient pricing of transport services and infrastructures.

While not trying to make here a detailed analysis of these two documents, it would seem that according to positions expressed in them, the efficiency (in its economic meaning) of pricing implies fairness, since it stands for non-discrimination which can only be achieved through differentiation.

However fairness is a very discussed concept: there are several definitions, with the result that the policy measures proposed in the two documents are not fair in the eyes of every actor concerned in the transport sector: that would explain their oppositions or at least their sharp criticisms.

The central assumption of this investigation on the socio-economic principles of transport pricing acceptability is that acceptability relies at least on the two conditions of efficiency and fairness: a policy measure that is perceived as insufficiently efficient and insufficiently fair is doomed to be rejected. The corollary of this assumption is that in order to be acceptable a transport policy must at least reach a minimal degree of efficiency and a minimal degree of fairness. By saying that, it is affirmed that there is not identity between efficiency and fairness and that the first does not involve the second automatically.

In addition, no prejudgement that these conditions are sufficient to guarantee the policy's acceptability is made.

As a working hypothesis, it is not possible to check it within this workpackage: only the empirical work undertaken in the WP3 will give elements of validation of this hypothesis.

The aim of this report is thus to explore the concept of acceptability mainly through the complex interplay between efficiency, fairness and feasibility of implementation.

Efficiency in its economic meaning relies on a rather solid theoretical basis, whereas there are multiple definitions of fairness that are subject to debate. This is why the report starts with the analysis of the efficiency of transport pricing. Chapter 2 investigates in detail what means efficient pricing of infrastructure and public transport services by including the cost coverage issue.

Then in Chapter 3 the political decision-making process and the debate about transport pricing is analysed in order to find the way of enhancing acceptability through the decision-making and to identify the main concerns of actors within the transport sector. One of the main conclusion relates to the paramount importance of equity issue from the point of view of every category of actors.

This leads in Chapter 4 to a more detail analysis of the dimensions of equity which are at stake in transport pricing. Three dimensions of equity are identified namely territorial, horizontal and vertical equity . Some contradictions are raised between these various dimensions and with the objective of economic efficiency which form the framework within which a compromise has to be found in order to enhance acceptability of pricing.

Then the institutional constraints are analysed in Chapter 5, regarding the organisation of transport pricing between different levels of governments.

Increasing efficiency and fairness in transport pricing mainly amounts to conceiving systems allowing time and space variable pricing that are also reliable, easy to use and preserve privacy: the issue of the requisite attributes of pricing systems from a functional point of view is addressed in Chapter 6.

Finally Chapter 7 synthesises these elements in a series of guidelines for enhancing acceptability of pricing in transport.

2. EFFICIENCY IN TRANSPORT PRICING¹

Efficient pricing of transport infrastructure (TI) and scheduled public transport (SPT) services is a necessary condition for maximising the social surplus, i.e. the sum of the producers' surplus (i.e. the profits of private and public transport enterprises) and the consumers' surplus (i.e. net benefit of consumption) for all goods and services, on the side-condition that all external costs are internalised. In the case of transport infrastructure the 'short-run' implies that the capacity is given: The TI capital costs are fixed, and the goal is to make the best use of the existing capacity. If such pricing principles were adopted, the pricing policy changes, presented below, could be applied for the most important transport infrastructure and scheduled public transport markets.

An underlying assumption of this work is that the long-run companion efficiency condition is that investments in transport infrastructure should be undertaken up to the point where benefits just exceed costs. One should keep in mind the linkage between the two conditions of optimal pricing and optimal investment² since this could be a factor of acceptability of transport pricing: the acceptability of a price likely to be conditioned by the existence of a related service.

The purpose of this chapter is to define the problem. By describing the broad lines of the structure of optimal prices for the use of transport infrastructure (TI), and scheduled public transport (SPT), and compare these with current prices, the reform potential is identified. It can be anticipated that the reform potential measured in this way is very great indeed. The next step is to look for the reason why current prices diverge from optimal prices. To the extent that the reason is difficulties to get acceptance for optimal prices, our problem is defined. The question of how these difficulties could be overcome, is the main task of PATS.

Optimal use of existing transport infrastructure means in standard economic analysis that the rate of capacity utilisation should be adjusted such that the marginal utility of further use equals the marginal cost of queuing and/or congestion, which mainly consists of passenger, goods and vehicle time inputs. There are also other costs involved, which do not, in the same way, critically depend on the rate of capacity utilisation, but on the behaviour of the drivers, the technical characteristics and conditions of the transport vehicles and infrastructure, and the quality of the fuel burnt. Traffic accidents, noise, exhaust emissions, and other externalities of transport production make up the latter cost category. Traditionally these costs have been contained by rules of the road, standards and regulations concerning transport vehicles and fuel, and information and education of the travelling public including drivers of private cars. However, this has proved insufficient, in particular, to solve the urban transport problem. Optimal congestion tolls, accident externality charges, and polluter payments could be the solution of the immense traffic and environmental problems of the big

¹ This section is based on a paper by Prof. Jan Owen Jansson, see the complete paper and the bibliographic references in Annex 1.

² The resolution of this problem of maximisation of the collective surplus can be found in several handbooks (see for example Small, (1992)).

cities of the world. The complementarity of pricing and regulation in the solution of urban traffic problems should, however, be emphasised; one of the conclusions is that an integration of road pricing and traffic calming theory is long overdue.

To obtain the optimal supply and patronage of scheduled transport services is a second, major objective of transport policy. Here the short-run problem involves both optimal pricing and capacity adjustment. In practice there are two different approaches to this end. One is to deregulate and privatise the SPT-sector as far as possible in the hope that unrestrained market forces will make the best of the situation. Another approach follows from the recognition that transport system co-ordination, and prices falling short of the operator's average cost are necessary conditions for maximising the sum of the producer's and the consumers' surplus. In the latter case a similar acceptability problem is facing SPT pricing policy as that of non-urban TI-services: optimal prices are typically well below the producer average costs.

In this chapter, the reason why current prices diverge from optimal prices will be considered to the extent that the main reason can be the difficulty to get acceptance for optimal prices, which is basically the same for TI- and SPT-services: *the nature of the products (services) makes production under constant returns to scale atypical*. The way to enhance acceptability and overcome these difficulties will be dealt with in subsequent parts of this research.

2.1. Transport infrastructure services

Optimal pricing is generally thought of as 'marginal cost pricing'. However, with a system definition including 'users' in the double role of suppliers of essential inputs as well as consumers of the output, the optimal price will be strictly different from the derivative of the total social cost with respect to output, or traffic volume (Q), which is the usual definition of the marginal cost. To avoid confusion, the prefix 'price-relevant' is introduced before 'marginal cost'. It should be equal to the price in optimum. The definition of the price-relevant marginal cost is the following in the case of TI-services.

$$MC = \frac{dTC}{dQ} - AC_{user} = MC_{prod} + Q \frac{\partial AC_{user}}{\partial Q} + MC_{ext}$$

For the discussion of optimal pricing of TI-services, it is appropriate in most cases to assume the transport infrastructure to be fixed. The relevant cost and output relationship to be considered is thus that between the costs of wear and tear, traffic control, etc. and the traffic volume, so far as the producer costs are concerned.

The first term, MC_{prod} is the least important of the three price-relevant MC-components above. In a recent survey (Jansson and Lindberg, 1997) the main conclusion both for road and rail-track operating costs – maintenance, repair, and restoration costs – is that for a number of reasons the price-relevant marginal cost falls well short of the producer average variable cost. The reasons are:

1. About a fifth of the operating costs is fixed, i.e. independent of the traffic volume, because of some overhead costs, and the minimum road-specific costs necessary to keep the road open to traffic;

2. the short-run marginal cost is falling with the traffic volume for activities like road resurfacing and reconstruction, and rail restoration;
3. some maintenance activities produce public goods, that is qualities that can be enjoyed by an unlimited number of road users. Clearing the road of snow, road information, grass cutting on the verges are some examples. Irrespective of whether these costs are increasing with the traffic volume or not, they are price-irrelevant, because the benefits for the existing traffic are increasing in parallel with the producer costs.

The middle term represents the influence on the costs of fellow transport system users that an additional user has. Mathematically the product of Q and the derivative of AC_{user} (the average cost user) with respect to Q equals the difference between MC_{user} and AC_{user} , and the latter formulation makes, of course, economic sense, too: AC_{user} is perceived as the private marginal cost, when a good number of independent transport consumers make use of the transport facility concerned, and it is the difference between the social and private marginal user costs that is price-relevant. In the exceptional case, the 'fellow transport system users' belong to the same concern as the additional vehicle considered, which means that the middle term vanishes from the MC expression. To be more specific, the charges that a separate rail track owner levies on the trains of the National Railways (i.e. national train transport enterprise) should not contain a congestion cost component, where no other train operators exist, provided, it should be added, that the train operator levies optimal fares on its passengers.

The transport system-external marginal costs represented by the third term of the MC expression above include a number of separate items, of which intersystem accident costs together with the emission costs are the most important in most cases.

According to the findings detailed in Annex 1 for **non-urban road transport** services fuel taxation is the cost-efficient pricing system for car traffic.

The current level of petrol prices in 'high-tax' European countries (around 1 Euro per litre) is typically above the total price-relevant marginal cost (MC). One reason why MC is well below the current price (petrol tax) in most cases is that the emission cost component in the petrol tax should be based on emission factors of cars equipped with catalytic converters. For non-urban car traffic the present petrol tax level may be justified only as part of an ambitious climate policy aiming at the target of successively reducing total CO₂-emissions.

For truck and bus traffic the diesel tax should be substantially raised to be in line with the price-relevant emission costs (Small and Kazimi, 1995). In addition, an electronic kilometre charging system should be introduced, which could be differentiated to reflect the marginal costs of road wear and tear. If such a tax is introduced, purchase and ownership taxes are superfluous for HGVs and buses as road pricing instruments. It should be emphasised that the price-relevant marginal cost of wear and tear is *less* than the average cost of road maintenance, repair, and resurfacing (see above). However, the progressiveness of the average costs of road maintenance, repair, resurfacing, etc. with respect to axle load is very pronounced.

If diesel-burning vehicles start to be able to clean their exhaust fumes in the same way as petrol-burning vehicles, or introduce much cleaner engines, the diesel tax should be lowered again to the 'best-practice' level, and the kilometre charges should be used also to reflect

the different emission costs in addition to the progressiveness in the costs of road wear and tear.

Generally speaking externality charges should go to the public purse, rather than to the Road Administration. However, as distinct from emission charges based on damage costs, the CO₂-tax could be viewed as a 'scarcity price' required to make a nation (or EU) meet a given CO₂-emission constraint. The revenue from such a charge could be set off against the deficit, which would typically arise after the introduction of optimal pricing of non-urban road services. However this is not to suggest that the tax revenue should be 'earmarked' for non-urban road financing, but only that in an accounting sense the CO₂-tax could be included on the revenue side of a hypothetical transport account. Such an account could be elaborated in order to address equity issues and questions about 'cost responsibility', by adding up the total costs and revenue of non-urban road transport.

For **urban road transport services** it is consistently found in studies of the price-relevant costs that the petrol tax level, let alone the diesel tax level, is generally too low in comparison to the level of the price-relevant marginal costs. However, the petrol tax should not be raised, because it would then become too high for non-urban car traffic. Instead a separate system of *road pricing* should be introduced, in the first place in big cities. Fuel taxes would be restricted to cover emission costs including the CO₂-tax, as well as the relatively low congestion and price-relevant accident costs applicable to non-urban road traffic.

Urban road user charges, which would double - at least - the generalised cost of motorists should be payable all day in the central city, and during rush-hours in the morning and afternoon on the traffic routes into/out of the central city. Partly as a complement, partly as a substitute to road pricing, depending on local conditions and preferences, *traffic calming* should be brought about by differentiated speed limit reductions, redesign and refurbishing of roads and streets consistent with safe mixing of cars and vulnerable road users. Complete pedestrianisation of some streets is probably also indicated in many cases. Behind this is the idea that the theory of road pricing should be differentiated between motor traffic roads, on the one hand, and central city streets (and residential areas), on the other hand. By such a division the significance of vulnerable road users (pedestrians, cyclists) will be recognised. By paying proper attention to the component in the pricing-relevant cost constituted by the accident externality charges, this division will come out as a matter of course.

It is also shown that **on-street parking** should preferably have higher fees than the level of parking-fees in nearby, off-street parking facilities, reflecting the opportunity cost of the land, and to discourage long-term parking in the streets. A difficult, and highly desirable target for urban parking policy is to eliminate most of the present far-reaching subsidisation (by employers, and tax-payers at large) of central city parking for urban car commuters.

For **rail track** services used by a monopoly train operator, access charges reflecting the scarcity of the rail track capacity are irrelevant. The single operator should be fully aware of the consequences for existing train traffic of additional trains in the rail network, and should be able to pass on this information to passengers and goods forwarders via the fares and freight rates. In this case the rail track charges should be related to *wear and tear* of tracks and other equipment in a similar way as the proposed kilometre charges on HGVs. Available evidence (Jansson and Lindberg, 1997) suggests that wear and tear charges will fall short of covering the total rail track repair and maintenance costs. The price-relevant

costs of air pollution (mainly of diesel-engines) and accidents should also be included, in the rail track charges, but that would be relatively small additions³.

In a case where many operators use the track, access charges can have an important role to play as regards track capacity allocation. The access charges would also help to recover some of the capital costs of the railways in that case. The exact amount of these charges cannot be generally stated, but has to be determined from case to case.

For the **seaport and airport** systems, the salient feature of optimal pricing is that a fairly constant level of charges for the use of the infrastructure is indicated, irrespective of plant size, apart from big-city facilities for which land for further expansion is very scarce and costly in terms of encroachment. Cross-subsidisation from the few big to the many smaller plants is acceptable, if a total system cost recovery requirement is imposed on the airport and seaport system respectively. This is a natural procedure where facilities are state-owned. Seaports are often municipality-owned, or private, which can mean that local taxpayers are supporting the smaller ports; this should not be deplored.

2.2. Scheduled public transport services

It is shown in Annex 1 that when it comes to pricing policy for the services offered by the transport vehicles using the transport infrastructure, it can first be noted that **scheduled public transport** stands out from the other forms of organising transport (hiring a vehicle, or buying a vehicle for one's own exclusive use) because of the 'Mohring effect'. It can further be observed that local bus, commuter train, and to some extent regional and interregional scheduled public transport (by road, rail and air) has much in common as regards optimal pricing. On the other hand, long-distance international airlines and intercontinental liner shipping pose quite different pricing problems, as will be pointed out below.

The economies of density of demand in **short- to middle-distance scheduled public transport** are pronounced, and the co-ordination problem in time and space is very important for this category. This speaks for public planning, and subsidisation in order to maximise the sum of producers' and consumers' surplus, in combination with competitive tendering for the production of the services specified in accordance with this goal, in order to achieve internal efficiency, too.

In the latter sector, i.e. **very long-distance scheduled public transport**, neither large non-exploited economies of traffic volume, nor route and timetable co-ordination pose big problems for the operators. 'Co-operative oligopoly', often leading to outright self-regulation (collusion) is the typical market form. The operators seem to solve the co-ordination problem reasonably well, but a new pricing problem is created. The pricing principle of 'charging what the traffic can bear' in order to perform intra-route cross-subsidisation yields inefficiency, without proper regard to the price-relevant marginal cost structure.

³ It should be borne in mind that rail (subject to whether they use electricity and how this electricity is produced) and inland shipping could have high emission of CO₂ per ton-km and be far more polluting regarding other emissions (Nox, etc) due to a much larger economic life of vehicles in these two sectors having a lot older technology.

Generally speaking, efficient peak-load pricing is deplorably rare in the whole scheduled public transport sector.

It can be concluded that there is no significant discrepancy between the High Level Group suggestions (HLG, 1999) regarding the options for charging users for TI operating costs.

3. THE POLITICAL DECISION-MAKING PROCESS AND THE DEBATE ABOUT TRANSPORT PRICING

Having analysed in the previous chapter the implications of efficient pricing and optimal investment in infrastructure and transport services, now the question of the acceptability is tackled firstly through the analysis of the political decision-making process and the political debate about transport pricing.

With this intention, in section 1, the interplay of the various categories of actors in the political decision-making process will be analysed in a theoretical way. This section aims to systematise the acceptability problem by means of a political economy of decision-making applied to transport and the environment.

Then this approach is applied to the reactions of the actors of the transport sector, mainly to the proposals of the already mentioned Commission Green and White Papers, which are examined in section 2. This analysis of the argumentation of the stakeholders will make it possible to emphasise the principal elements of agreements or dispute with these proposals. It will show the importance of the equity issue in their argumentation.

3.1. The acceptance of transport pricing instruments from the policy making point of view⁴

Though during the last few years, pricing instruments in environmental and transport policy have moved from being an academic proposal to integrating the policy programme of many parties across the whole political spectrum, the acceptance of these mechanisms in the political debate still seems to be rather moderate. As a result, the actual use of pricing instruments in order to internalise external costs is still very much limited and it is even questioned (e.g., OECD, 1989 and 1994; Frey and Schneider, 1997) whether these instruments will play a major role in future environmental and transport policy.

In this review it will be asked for the most relevant arguments given in favour for or against pricing instruments to internalise external costs. It will be concentrated on two lines of reasoning:

- (i) the literature on political economy of environmental policy stressing the analysis of the process of political decision-making and the incentives of the political agents in alternative institutional arrangements to implement alternative environmental instruments;
- (ii) the literature on fairness emphasising the importance of fairness arguments with respect to the acceptance of alternative allocation mechanisms (like the price system, bureaucratic procedures or voting mechanisms) rather than the concept of fairness itself.

There are many other possible reasons why incentive instruments as a means to internalise external costs have been applied so little for such a long time. However, it certainly would

⁴ This section is based on a paper by Prof. Hannelore Weck-Hannemann, see the complete paper in Annex 2.

be too simple just to refer to imperfect information on the part of decision-makers about the advantages of incentive-based instruments in such a context. On the contrary, there may be good reasons why politicians, voters and/or representatives of interest groups are rather reluctant to favour price instruments on a large scale in environmental and transport-related policies. It is the purpose of section 1 to point out these reasons. Specifically it will be concentrated on the analysis of politico-economic relationships and on the importance of fairness considerations.

First, the economic approach to analyse political decision-making processes is reviewed very briefly. Second, a selection of aspects which have to be taken into account when the acceptance of pricing instruments in the transport sector and their chances for implementation as a means of transport and environmental policy are considered.

3.1.1. Political Economy of Environmental and Transport Policy

The economic approach to explain political outcomes focuses on the process of political decision-making and the incentives of the various political actors to ask for and to actually implement alternative policy measures. The politico-economic approach has been applied to various policy issues, and particularly it has been tried to elaborate the prospects for implementation of alternative environmental policies (see, e.g., Buchanan and Tullock, 1975; Hahn, 1990; Frey, 1992; Weck-Hannemann, 1994; Gawel, 1995; Pearson, 1995; Congleton, 1996; Frey and Schneider, 1997).

For such an analysis of the politico-economic process and the chances for implementation of incentive-based instruments in environmental policy and, specifically, in the transport system, it is important to identify:

- the various **actors** being involved in or being affected by the political decision-making process;
- the **interests** of the various participants in the politico-economic process;
- the **influence** of the various (groups of) actors given the specific institutional setting;
- and finally, the relevant aspects determining the **acceptance** of various means of environmental policy, and especially pricing instruments.

In the following, these various issues will be discussed with specifically emphasising the acceptability of pricing measures in the transport sector.

3.1.1.1. Identifying the relevant actors in the political decision-making process

Political processes can be identified as (political) markets where both the actors on the demand side and the actors on the supply side interact. Policy instruments in the transport sector, just as policy measures in general, are determined in such a political market. In the political market for pricing instruments in the transport sector there are various (groups of) actors involved and/or affected and, therefore, can be identified as stakeholders:

- on the **demand side** of the political market
 - operators: producers of mobility;
 - users: consumers of mobility;
 - citizens as voters and taxpayers;

- producers of related goods and services;
- members of interest groups;
- on the **supply side** of the political market
 - politicians
 - and bureaucrats

with each at the various levels of political decision-making, i.e. urban/local, regional, national, supranational (e.g. EU) and/or international/global.

3.1.1.2. Identifying the interests and the impact of the various actors: institutional interactions

Pricing instruments in environmental policy related to the transport sector have to be determined by political decision-making. In order to know who are the winners and losers of alternative policy measures the specific interests of the various actors in this politico-economic process have to be identified. Related are the questions of (i) what are the incentives of various groups of actors to organise themselves according to their specific interests, and (ii) what are the possibilities of both the actors on the demand side and the actors on the supply side of the political market, respectively, to influence the outcome of the political decision-making process. According to the economic approach to explain human behaviour the outcome of this process is determined not only by the preferences and interests of the various actors but, even more importantly, by the restrictions, i.e. the institutional interactions and the institutional constraints.

When analysing the politico-economic interrelationship, at least four groups of actors and their institutional interactions have to be examined in more detail, i.e. voters, special interest groups, politicians, and public bureaucrats.

3.1.2. *Acceptance of Pricing Instruments: Selected Aspects*

For the question at hand, i.e. what are the most relevant determinants concerning the acceptance of pricing instruments in the transport sector, various aspects are considered to be essential. Generally, the self-interest and the specific restrictions of the relevant actors in the political decision-making process have to be taken into account. As a consequence it can be derived which instruments are expected to be favoured or hampered by the various actors. Besides concentrating on the relationship among actors within the institutional framework and focussing on efficiency considerations, the analysis has also to include fairness aspects, particularly when the acceptance of pricing instruments on the part of citizens as voters or taxpayers is one of the central questions addressed.

3.1.2.1. Acceptance of pricing instruments by politicians

In public choice theory the general economic approach to explain human behaviour is also applied to other actors, such as politicians, public bureaucrats and voters. The model states that the *homo oeconomicus* tries to maximise his or her utility subject to constraints. On the part of representatives in the government it follows from this assumption in public choice theory that (non-restricted) politicians have a self-interest in increasing their own income, their discretionary power and to weaken their budget constraint. Consequently, it is to be

expected that they favour instruments serving this purpose such as regulatory measures or pricing instruments being aimed at fiscal productiveness. Pricing instruments will be supported the more, the better it is ensured that these measures are linked with additional public revenues. Likewise it can be hypothesised that politicians prefer revenues, which go to the public purse providing them with flexibility in the use of these additional resources instead of having to return them to the citizens or the taxpayers (such as in the form of lump sum transfers, a reduction of taxes on labour or reduced social insurance payments) or to them for a specific purpose.

However, politicians in the government will be able to do so only when the re-election constraint is not too much binding, i.e. when the control by the electorate is restricted (as it is, e.g., by institutional deficiencies of the democratic system and limited incentives to participate in the decision-making process on the part of voters). In representative democracies the government is subject to election approval in time intervals only. Therefore, it is possible to exploit the election cycle. Unpopular policies will have a better chance to be implemented at the beginning of the legislature period because voters tend to discount the past quite quickly. As voters are oriented more towards the present, they evaluate the government almost exclusively according to its achievements shortly before the election. Thus within the first year(s) of the legislative period, the government can afford to pursue a policy which is favourable to themselves or some specific groups of society but, nevertheless, does not endanger re-election. Yet, the more binding the re-election constraint is (e.g., when approaching the end of the legislature term and re-election is uncertain), the more politicians have to take into account voters' interests and the less discretionary power they have to pursue a policy in line with their own goals.

Besides the re-election constraint the budget constraint has to be considered. The more restrictive the budget constraint, the more a government will be interested in relieving this restriction by getting additional resources. Pricing instruments, such as road pricing in the transport sector or an ecological tax reform, may well be a selection of the most suitable policies in this respect due to their purpose of internalising external costs. Given the already high shares of public revenues and public debt in most industrial countries, they at least have better chances to be accepted compared with other pricing or taxation instruments involving disincentive effects and social welfare losses such as taxes on labour or capital.

Given competition among alternative political parties and the re-election constraint politicians have to trade off benefits and costs (in terms of gains and losses in votes) when evaluating alternative policy measures. When balancing alternative interests of voters one against the other those interests which are well-organised, intensive and politically influential have a comparative advantage to be considered in the political contest. By making campaign contributions available to politicians using them in order to attract additional voters, special interest groups can afford to be successful although their preferred policies are not in line with the preferences of the majority of voters.

Politicians being confronted with such a trade-off are expected to favour those policy measures of which the benefits are highly visible and experienced directly and are attributed to the responsibility of government. On the other hand, costs are favoured to be spread widely or to arise in the future (e.g., public debt) and, therefore, are diffuse and less visible

for the individual voter (see, e.g., Frey, 1983; Weck-Hannemann, 1994 or Blankart, 1998, p. 481).

Given that benefits are preferred to be noticeable and costs should be as invisible as possible, it can be stated that:

- transport related as well as environmental policies are less promising than alternative policy issues (such as employment policies);
- regulation policies are more attractive than pricing instruments (such as direct controls compared to emission charges or tradable licences in environmental policies; see already Buchanan and Tullock, 1975, or Weck-Hannemann, 1994);
- pricing instruments may have a better chance to be implemented by politicians striving for political support when the benefits (revenues) are earmarked to the use of politically influential groups (e.g., operators and users in the transport sector) and/or the costs are spread to groups of voters who are not well organised and have little impact on the political decision-making process (e.g., foreigners; accordingly, it is reasonable that a vignette system on a yearly basis has better chances to be implemented than distance-related road pricing measures as in the former case foreigners are charged relatively more intensively than domestic groups of users) (for this argument see, e.g., Hahn, 1989 and Oates, 1995).

Citizens not only have a voice option (election/vote) in order to express their consent or discontent with governmental performance and policy issues, but they may also have an exit option, i.e. the opportunity to 'vote with their feet'. The exit option is the more likely to be relevant and restrictive, the more pronounced are the differences in (tax-) prices across nations or regions. Politicians at the regional and national level thus have an interest to implement pricing instruments in co-ordination and co-operation with other nations. Accordingly, they are expected to favour an EU-wide harmonised introduction of pricing measures. Special interest groups will support this concern in order to evade competitive pressure. Politicians and bureaucrats at the supranational level (i.e. EU) will favour this intention as well in order to increase their competence and to pin their hopes on getting an independent revenue source in the future.

In summary, pricing instruments may well serve the self-interest of politicians provided that additional resources are involved being at the disposal of politicians themselves. On the other hand, politicians may have to take care of the re-election constraint, i.e. they have no discretionary power to pursue their own goals. Given the latter as their initial position, pricing instruments may even so have a chance if they are introduced in such a way that well-organised groups are benefited most and the costs are spread to less influential and latent interest groups. Earmarking of revenues in this case may be an essential feature to achieve the respective aim on the part of politicians.

3.1.2.2. Acceptance of pricing instruments by public bureaucrats

Much in the same way as for political representatives officials in the public administration are expected to be interested in furthering their own interest. As profits in the public sector can not be appropriated personally public officials are expected to be interested in an increase of their discretionary power (*vis-à-vis* government and society) and in the budget constraint to be weakened (Niskanen, 1971; Migué and Bélanger, 1974). Contrary to politicians,

however, they are not faced with a re-election constraint. They are expected to favour policy measures, which have to be administered explicitly and which are able to provide the public sector with additional resources and revenues.

As a result, public officials will support pricing measures in transport and environmental policy provided that fund raising possibilities and administrative requirements are involved. Moreover, it can be hypothesised that they are in favour of pricing measures like urban and interurban road pricing, parking pricing, road vehicle taxes and fuel taxation but less for an ecological tax reform as the intention of the latter includes a revenue-neutral scheme and the reduction of other taxes. Bureaucrats in the general administration will prefer the general state budget as an appropriate revenue spending scheme, whereas public officials in the transport administration may well give preference to the coverage of infrastructure costs and transport service costs.

3.1.2.3. Acceptance of pricing instruments by interest groups

In applying the theory of interest groups to the transport sector, it follows that those instruments which favour well-organised groups and discriminate against latent interests will be advocated more intensively. Quite generally it can be hypothesised that users have a comparative disadvantage in organising their interests compared to producers and operators in the transport sector. Even worse will be the situation of those groups of actors which are negatively affected by the external effects caused by the transport system as the costs with which they are faced are rather indirect and the gains from an internalisation policy arise in the future and have the characteristic of a public good (i.e. the benefits of such an internalisation policy accrue to all but the costs of bringing about such a policy have to be borne by specific persons individually). Similarly, taxpayers are expected not to be very much successful in looking after their interests in an effective way.

Pricing instruments may serve the interest of various groups of actors depending on the use of revenues. Accordingly, operators can be expected to support pricing measures in the transport sector given that it is ensured that the revenues will be used to finance the infrastructure and the services to be provided. On the other hand, they will be less in favour of road pricing measures given that the purpose is explicitly and exclusively to internalise external costs combined with lump sum transfers or a reduction of other taxes. In comparison, pricing measures will be in the interest of taxpayers assuming that the tax load will be reduced due to additional revenues. And finally, incentive-based instruments may be accepted by users provided that in return the supply of goods or services is equivalent to the higher price to be paid, i.e. the equivalence principle applies.

All in all, acceptance of pricing instruments on the part of special interest groups is expected to be higher under the following conditions:

- the less pronounced the incentive effect of the pricing measures turns out (i.e. moderate changes in prices having only a limited incentive effect);
- the more likely it is for special interest groups to realise exceptions from the rule (e.g., when such groups which are particularly badly hit by these measures are excluded or at least admitted a reduced rate or a transitional arrangement);
- the more likely it is to put the load to latent interest groups or groups without voting rights (such as foreigners as users and/or producers of transport services);

- when earmarking of the revenues ensures that there are not only costs but also benefits (e.g., earmarking revenues from road pricing to the use of maintaining and improving the infrastructure of motorways means that there are benefits for the operators and users of the transport system);
- when instruments are assigned on the basis of individualistic property rights, and rents are therefore attributed exclusively (consequently, it can be expected that lobbying for such instruments is, as in the case of earmarked taxes, (*ceteris paribus*) more likely to be observed than to seek general taxes, quotas or subsidies).

Empirical evidence supports the notion that on the part of well-organised interest groups revenues should preferably not go to the public purse nor should be surrendered to taxpayers. Instead, they are preferred to be distributed to the road administration in order to cover the costs of infrastructure and transport services. As Rivlin (1989, p. 113) states, '(T)here is one apparent exception to the tax rule: taxes held in trust funds and earmarked to specific purposes can be raised. There was no perceptible backlash when the gasoline tax was raised (in the United States) in 1983, presumably because the increase was thought necessary to fix the roads.' The evidence (see Kirchgässner, 1993) referring to a referendum in Switzerland in 1993 is also in line with this argument: the earmarking of revenues for the purpose of maintaining and improving the infrastructure of motorways split up the opponents of the proposal and brought about the acceptance of higher fuel prices due to an increase in the duty on motor fuel.

Generally, it can be argued that earmarking helps to overcome the free-rider problem among interest groups: by dedicating tax revenues to a particular purpose, earmarking creates a proprietary interest in the tax and the revenue it generates on the part of the organised recipient groups. Using the example of federal fuel tax revenues in the United States, it is demonstrated (see Kimenyi et alii, 1990) that earmarking leads to increased tax revenues in contrast with general fund financing. Their empirical results are consistent with their argument that tax earmarking shifts special-interest incentives away from lobbying over shares of a given revenue pie toward lobbying for more revenues.

3.1.2.4. Acceptance of pricing instruments by citizens and voters

Economists generally favour the use of the price system over alternative decision-making mechanisms for the reason of its efficiency dominance. On the contrary, non-economists for the most part are more sceptical about the price mechanism and they even might reject it. Evidence for this general observation is summarised by Frey (1986; 1999, chap. 10). The author also points to the reasons for this discrepancy and relates them to four issues:

- (i) (Lack of information) Non-economists may have insufficient knowledge about economics. This lack of knowledge may well be rationally chosen and compatible with an unwillingness to adopt the economic point of view.
- (ii) (Conflict over income distribution) The use of prices is often blocked by interest groups who otherwise expect to lose in the distributional struggle. This set of reasons refers to political economy as argued before (i.e. lobbying by interest groups).
- (iii) (Fairness considerations) The price system is considered to be 'unfair' under identifiable conditions. For example, pricing is valued less fair as a device to ration

demand in a unique, fixed supply situation than as a decision-making procedure under recurrent situations. This explanation is based on both results of surveys and experiments, respectively (for a discussion see Kahnemann et alii, 1986 or Frey, 1999).

- (iv) (Crowding-out of intrinsic motivation) Individuals may fear that the price system leads to a destruction of morals and, therefore, is not only ethically unacceptable but also leads to inefficient results.

In the present case, i.e. the acceptance of pricing instruments by citizens and voters, the latter two arguments are particularly important. The following discussion, therefore, will focus on politico-economic and institutional aspects first (which is closely linked to the arguments given before), and then fairness aspects and the relationship between intrinsic and extrinsic motivation will be elaborated.

3.1.2.5. Institutional framework

Applying pricing instruments such as road pricing, fuel taxation or an ecological tax reform is connected with revenues for the state or some other authority. As has been argued in the case of taxes and duties, pricing instruments may have a better chance to be accepted and voted for by citizens under the following institutional conditions:

- when citizens/voters have confidence in the political system and they expect that politicians in the government are responsive to voters' interests. The more extended democratic rights of citizens/voters are and the more binding is the re-election constraint, the more a government can be expected to be responsive to the preferences of citizens (see, e.g., Weck-Hannemann, 1994; Frey and Schneider, 1997). On the other hand, citizens will not vote in favour of higher taxes or duties when they are afraid that government is non-responsive to their interests and uses the additional revenues in a wasteful and/or egoistic way (the latter refers to a Leviathan-type of government, i.e. budget maximising politicians and bureaucrats in the public sector who are not restricted by a re-election constraint; see Brennan and Buchanan, 1980).
- when the principle of fiscal equivalence or institutional symmetry is applied. Following the principle of fiscal equivalence requires that the group of beneficiaries of collective action corresponds to those covering the costs in order to ensure optimality in the allocation process (Olson, 1969). In addition, the concept of institutional congruence or institutional symmetry pays regard to the fact that there must be congruence in the political decision-making process not only between those who benefit from and those who pay the outlays but also with those being authorised to decide (Blankart, 1998). This third aspect of being involved in the political decision process in order to accept the political outcome might be of special relevance in the context of the acceptability of policy measures, and also in the case of pricing measures in the transport sector.

As a first conclusion with respect to the institutional framework, acceptance of pricing instruments can be expected to be the higher (lower) within the electorate (citizens/voters):

- the more (less) voters have a say in the matter of revenues (i.e. implementation of taxing or pricing instruments and fixing the type and the rate of these measures);

- the more (less) voters have a say in the matter of expenditures (decisions about the spending of revenues);
- and the more (less) the principle of fiscal equivalence and institutional congruence is realised.

The determinants mentioned so far are very much in line with a process-oriented and not with an outcome-oriented approach. They refer to the process of decision-making itself and not to the specific results. Additional aspects being related to the implementation of pricing schemes and the spending of revenues refer more, but not exclusively to the outcome. Accordingly, pricing instruments may have a better chance to be accepted and voted for by citizens:

- the more transparent are both the process of decision-making on the one hand and the specific pricing mechanisms themselves on the other hand;
- the better it is ensured that individual rights are protected and privacy of personal data is warranted;
- the more obvious it is that the pricing measure is not just another revenue raising tax or charge but an adequate means to supply private or public goods (i.e. either infrastructure or services in the transport sector) or to internalise external effects (e.g., incentive-based instruments for environmental protection).

An additional aspect of special importance is the question of the utilisation of collected revenues. During recent years, there has been an extensive debate in economics about the welfare and employment effects of ecological taxes (for a survey see, e.g., Goulder, 1995). At first, it is taken for granted that environmental taxation will provide a ‘green dividend’ which is due to an increase in environmental quality. The double dividend debate refers to the question whether an additional ‘blue dividend’ can be realised by reducing the distortions of the tax system and thereby increasing economic efficiency and possibly reducing unemployment. By using the revenue to cut distorting taxes (i.e. labour taxes) welfare gains can be realised in comparison to an increase of the tax share or a lump sum distribution of revenues. Consequently, an ecological tax reform has been demanded which introduces environmental taxes and cuts labour taxes while keeping government revenue constant.

In more general terms, such a ‘double dividend’ could possibly be realised whenever tax instruments are used to internalise (negative) external effects and subsequently, other distorting taxes are reduced in order to ensure revenue-neutrality. This desired ideal has been questioned, however, when it was shown (see Bovenberg and DeMooij 1994) that environmental taxation may even reduce employment and economic welfare instead of increasing economic efficiency. The main argument being based on traditional optimal taxation theory states ‘that - ceteris paribus - taxing a broad base will lead to less distortions than taxing a narrow base. If the environmental tax is ultimately borne by labour, taxing the narrow bases energy or CO₂ will lead to larger distortions than taxing the larger base labour’ (see Kirchgässner, 1998, p. 44). The reservation refers not to the weak form but to the strong form of the double dividend analysis. Whereas the corollary of the weak form of the double dividend hypothesis is that environmental taxes are more efficient instruments for environmental protection than environmental policy instruments that do not yield any revenues, the strong form of this hypothesis – which asserts that an environmental tax reform enhances not only environmental quality but also non-environmental welfare – is controversial (see Goulder, 1995). Gross efficiency costs (i.e. the efficiency effects

abstracting from environmental benefits) of substituting an environmental tax for a distortionary tax could be negative. As Bovenberg (1999, p. 440) concludes in an updated reader's guide: 'The overall message (...) is rather disappointing for those who expect substantial non-environmental benefits from green tax reform. The analysis shows that stringent conditions need to be met in order for an environmental tax reform to yield a double dividend.'

In summary, the results of the theoretical models on the double dividend of environmental taxation may not support the idea of an ecological tax reform; but just as little they provide decisive arguments against it. Yet, an ecological tax reform substituting a narrow for a large tax base has an additional advantage from a public choice perspective: whereas the possibility to substitute gives way to an excess burden, it also extends the scope for action for citizens and thus helps in forcing the politicians to pursue a policy being more in line with voters' preferences. As Kirchgässner (1998, p. 46) puts it into words: 'The narrow base of environmental and/or energy taxes compared to direct labour taxes provides the citizens with more possibilities to tame Leviathan, i.e. to control the government. If this leads to a government, which is more responsive to the preferences of citizens, we might even get a third dividend'.

Moreover, this reasoning is not restricted to the argument of a (more) narrow tax base compared to direct taxes. As Kirchgässner (1994) points out furthermore, proportional (indirect) taxes have the additional advantage of not increasing automatically with increasing private income and inflation as progressive (direct) taxes do. Rather, they usually have to be changed via explicitly changing a law thus ensuring a public discussion and leaving a relatively smaller leeway for Leviathan behaviour of governments.

Obviously, one could argue that pricing measures in transport systems could be beneficial for citizens/voters in quite a similar way.

From a public choice perspective, also earmarked taxes have the advantage that citizens have better control over the use of tax revenues. In comparison, standard economic theory states that earmarking of taxes is generally welfare-reducing. However, as Buchanan (1963) and Brennan and Buchanan (1980, chap. 7) argue effectively designed earmarking may limit the extent to which government can exploit the taxpaying public. This statement corresponds with the observations made by Rivlin (1989) for the United States: she expects that in the debate about what kinds of taxes are least objectionable the attention will shift from general revenues to taxes earmarked for particular purposes, from broad-based taxes to user fees, premiums, and narrowly based revenues, and from income taxes to consumption taxes. A related observation is made by Kirchgässner (1993) who attributes the approval of the proposal to increase fuel taxation in Switzerland to the earmarking of revenues to a specific purpose, and this purpose having been tolerated not only by special interest groups but also by the majority of the electorate.

3.1.2.6. Fairness considerations

According to Oberholzer-Gee et alii (1997), social acceptance of alternative allocation mechanisms is determined by two issues, i.e. competence and fairness. Whereas competence is largely assigned to the price system in that it ensures efficiency, random decision mechanisms can be described as the embodiment of fair allocation procedures in

realising the ideal of equal opportunities for all. Yet, the price system is not considered a priori as a fair allocation mechanism. Instead, there is empirical evidence in the form of questionnaires and experiments showing that fairness considerations are relevant in evaluating alternative allocation mechanisms and proving that the price system is evaluated to be less fair than alternative procedures.

Several experimental designs have been developed and used to study such issues as fairness and distribution in economically relevant situations, such as public goods or bargaining games (see, e.g., Ledyard, 1995; Sally, 1995; Frey and Bohnet, 1995 or Rabin, 1998 for a comprehensive discussion of this experimental evidence). This empirical evidence shows that people choose a co-operative strategy and resist to free-ride to a higher extent than theoretically expected when being confronted with public good type situations. They also pay regard to fairness norms, which turn out to be an important attribute of individual's behaviour when being faced with redistribution problems. Besides, empirical evidence has been collected to the effect that the use of prices is not considered to be fair even in well-defined excess demand situations in which most economists would strongly recommend the price system as an effective and efficient allocation mechanism (for a discussion see Frey 1999): Random surveys undertaken by Kahneman et alii (1986) and Frey and Pommerehne (1993) reveal that many people consider the use of prices to eliminate excess demand to be unfair; about 80% of the respondents evaluate a rise in price to cope with a situation of excess demand in such a way.

In a comparative perspective the price system even shows up more badly than other allocation mechanisms. In contrast, the traditional procedure of 'first come, first served' is considered to be fairer by the general population, as is an administrative rule like the distribution by local authorities acting 'according to their respective judgement'. Only the use of a random procedure is evaluated to be less fair than the price system in a situation of excess demand (see Frey and Pommerehne 1993; Frey, 1999). Quite similar results are obtained when asking for the acceptance of alternative siting procedures for locally unwanted public projects: whereas the finding of a location for the public project is beneficial for all, those people who will have the facility in their backyard will suffer from negative effects and, therefore, tend to oppose a site in their immediate neighbourhood. Given such a 'Not-in-My-Backyard' or NIMBY-problem, it has been asked whether alternative mechanisms to decide about the siting are considered to be acceptable (see Frey and Oberholzer-Gee, 1996 and Pommerehne et alii, 1997 concerning the siting of nuclear waste facilities). It turns out that the price system again is less acceptable due to fairness considerations compared to other procedures like an engineering approach, layman planning, democratic voting or lotteries.

Altogether, for a substantial number of economically relevant and also real-life situations it has been shown that neither pricing nor lotteries are socially acceptable. As Oberholzer-Gee et alii (1997) argue, however, lotteries are acceptable if they are applied to a set of efficient options, and the price system is accepted if the production of fairness precedes the use of prices. 'It is only when both requirements – competence and fairness – are met at the same time that the social acceptability of allocation principles is guaranteed' (Oberholzer-Gee et alii 1997, p. 91). This means that for pricing instruments to be acceptable, e.g. for implementation in the transport sector, the initial situation has to be acknowledged to be fair.

As a consequence, the economic view must extend beyond an outcome orientation (efficiency orientation) to include the valuation of processes and motives in a non-consequentialist view. Efficiency seems to be only part of the issue at stake and in particular, fairness considerations have to be taken seriously. Concerning the implementation of pricing instruments in the transport sector it has to be taken into account that the initial situation has to be acknowledged to be fair for these instruments being socially acceptable.

3.1.2.7. Crowding-out of intrinsic motivation

A clue to such an extension of economic theory is to consider the relationship between extrinsically given incentives arising from pricing instruments with intrinsic motivation. Pricing instruments are favoured due to their incentive effect. The extrinsic motivation being induced by changes in relative prices may, however, under identifiable conditions lead to a counterproductive effect: pricing may crowd out intrinsic motivation in the area in which pricing is applied, and it may also damage intrinsic motivation in areas in which pricing is not applied (these crowding-out and spill-over effects are extensively discussed by Frey (1997) who also refers to the conditions on which these effects are expected to occur).

While standard economic theory analyses human behaviour by taking basic preferences to be constant, it may alternatively be assumed that preferences are systematically affected by pricing or monetary incentive instruments. Introducing or more intensively using prices to influence individual behaviour may have a detrimental effect on preferences or, equivalently, on intrinsic motivation. In experimental psychology, this negative effect of monetary (external) rewards on intrinsic motivation has been extensively discussed under the heading of 'the hidden cost of reward' (Lepper and Greene 1978). The reason why external rewards decrease intrinsic motivation and corresponding activity has been attributed to a shift in the locus of control to an external source, which then guides behaviour. Many experiments have been reported analysing and supporting the crowding-out effect. The applications in economics refer to constitutional questions, various policy issues such as environmental policy, siting policy, social and organisational policy, work motivation and compensation policy (for a survey, see Frey, 1997).

The relation between intrinsic and extrinsic motivation is critical also for the present question, i.e. the acceptability of pricing instruments in the transport sector, and it is especially significant concerning environmental issues. There are important circumstances which can be identified in which individuals and firms pursue environmental ethics, and this behaviour can at least partially be attributed to intrinsic motivation (see Weck-Hannemann and Frey, 1995). Consequently, the crowding-out and spill-over effects become relevant when incentive instruments - being it charges or subsidies, likewise - are used to fight environmental pollution. The application of pricing instruments in the transport sector may undermine intrinsically motivated behaviour and ultimately, environmental conditions may not increase but even worsen depending on whether the destructive effect on intrinsic environmental motivation is stronger than the behavioural change induced by the relative price effect of the environmental instruments. In other words, the relative price effect in itself is not questioned at all. It is taken into account, however, that the domain of favourable outcomes may be restricted because the introduction of incentive instruments under identifiable conditions may lead to a countervailing effect. As an example, somebody using a bike due to intrinsic motivation to save the environment could start to use the car after the

introduction of pollution related taxes given that the disincentive effect of such taxes is lower than the effect of the erosion of intrinsic motivation. Generally, these effects are expected to be stronger for consumers than for firms taking into account that the latter cannot pursue environmental ethics if they are in a perfectly competitive situation.

The connection between intrinsic and extrinsic motivation may help to understand why environmental incentive instruments have been applied so little for so long time. While there are many politico-economic reasons why such instruments are not applied (as has been argued before), the argument here points to an additional reason: people may be aware of the damaging effects incentive instruments may have on environmental ethics. Thus, the concern about this counterproductive effect may be another reason for the reservation to use pricing instruments and their rather restrictive application in environmental policy, and also in transport policy (for a more sceptical view about whether intrinsic motivation is significant to explain environmental policy, see Gawel, 1999).

The analysis, finally, makes it possible to draw conclusions with respect to which environmental policy is desirable. In particular, the analysis suggests that there are definite limits to the application of pricing to fight pollution and elsewhere. Economic theory has (rightly) stressed the strong behavioural effects of relative price changes, but it has not considered sufficiently that there are areas in which incentive instruments may be much less effective due to the countervailing effect of crowding-out of intrinsic motivation. Economics has to acknowledge that behaviour is not solely motivated by extrinsic inducements, but to a significant extent also depends on intrinsic motivation. Taking such counterproductive effects into account results in the hypothesis that those environmental policy instruments are preferred by citizens which entail a moral condemnation of pollution (regulations and, even more so, subsidies that reward environmental conscious behaviour) compared to tradable permits or charges, which imply that no moral wrong is connected with pollution (for related arguments referring to the analogy between 'green taxes' and medieval indulgences, see Goodin, 1994). Altogether, incentive instruments should be modified in order to minimise possible crowding-out and spill-over effects. Pricing as an instrument should mainly be suggested for areas in which intrinsic motivation and environmental ethics is weak or non-existent in order to reduce disapproval by voters, and it should be applied in conjunction with statements stressing that a person's or firm's intrinsic motivation to supply public goods or to protect the natural environment is highly valued.

3.1.3. Outlook or: What can be done?

Various determinants influencing the acceptability of pricing instruments in environmental policy and, particularly, in the transport sector have been discussed in this section. The argumentation has concentrated on politico-economic reasoning and in addition, fairness considerations have been included and taken seriously.

In conclusion, the question is raised what can be done in general terms in order to increase the chances for pricing instruments to be accepted and to be finally implemented in the political process. The recommendations, however, are not at all straightforward. Instead they are basically relative in that they crucially depend on who is the addressee and what is the specific point of view of such addressees.

If, on the one hand, such advice is addressed to political decision-makers that are faced with a binding re-election constraint it mainly has to concentrate on how pricing instruments have to be packaged in order to be followed by politicians. In order to ensure political support, pricing instruments have to be made up in such a way that the support of influential interest groups can be maintained or gained and the burden involved for all concerned is the smallest possible and the less visible. From the point of view of citizens and voters, on the other hand, it is important that all relevant costs and benefits are stated explicitly and in a transparent way. Additionally, it is desirable that the pros and cons are weighted without distortion in the political decision-making process. The latter is best guaranteed if the principle of institutional symmetry is put to use. The reason for that is obvious: institutional symmetry means that both beneficiaries and those paying the costs are involved in the decision-making process and, therefore, none of them can exploit the other. The process itself ensures that all relevant arguments have a chance to enter in the discussion. This results in efficiency to be approximated endogenously, i.e. via the process and not via the evaluation of alternative outcomes.

Institutional symmetry is also in line with democratic principles, i.e. all people being involved have the possibility to participate in the decision process. Hence, the decision process itself has good chances to be valued and accepted as a fair allocation procedure.

In addition, efficiency and fairness can be realised even to a higher degree if decisions are made on a constitutional level, i.e. when individuals decide about (constitutional) rules which are to be applied later on in the post-constitutional level. The basic property of the constitutional level is that individuals are ignorant about their future position in society: they know the possible states of society with their different positions, but they do not know in which position they actually will be (see Brennan and Buchanan, 1985; Kirchgässner, 1994). Behind such a 'veil of ignorance' (Rawls, 1971) where decision-makers don't know their specific individual position but the social consequences of alternative policy programs brings about that decisions can be made unanimously. Unanimity and freedom of choice, however, are compatible with Pareto-superiority, i.e. Pareto-superior decisions are rendered feasible concerning not only allocation but also redistribution. Therefore, decisions on the constitutional level will enable fair and efficient rules. In order to lead to such fair and efficient rules, however, the 'veil of ignorance' has to be sufficiently strong. This may be seen as not being relevant for actual policy considerations. However, as Kirchgässner (1994) argues a sufficiently strong 'veil of ignorance' can be taken as approximated at least in the following real world situations: (i) if rules are discussed with respect to uncertain, future events; (ii) if individuals decide for their descendants; and (iii) if the time span is long enough between the decision about the rules and the coming into force of these rules. Acceptability of pricing instruments in the transport sector may be considered under these aspects, too, and the chances for the acceptance and implementation of such measures may be increased by focussing on such conditions as mentioned before. The implementation of pricing instruments thus can be furthered by assigning them as long-term general measures instead of discussing the issue in a predominantly short-term and concrete context.

3.2. Analysis of stakeholders arguments⁵

This section on stakeholder arguments is aimed at identifying the main stakeholders affected by transport pricing (the latter term is used here in a large sense to include taxation) as well as at analysing their principal arguments in favour or against it.

The key arguments of each stakeholder group in relation to transport pricing - summarised below - were expressed in the reactions to the EU Green Paper on Fair and efficient pricing (European Commission, 1995) and the White Paper on Fair payment for infrastructure use (European Commission, 1998) as well as in national papers and on other occasions⁶. First, it is necessary to point out that these arguments stem from reactions and protests to different and often not homogeneous pricing policies, measures and proposals and normally not just to the general idea of transport pricing. Second, the reactions rather refer to measures suggested on a policy level and not on concrete and already advanced field plans and projects to introduce transport pricing. Third, it is always difficult to group together very heterogeneous opinions and points of view without losing information. Finally, these arguments were collected already a few years ago and may have evolved.

First of all a look at the main points of argumentation is made with a cross analysis through the various categories of stakeholders in order to give a structured view of the debates. Then the political market approach of the previous section is applied to the different stakeholders to show how each group argues when facing the transport pricing issue. Finally we will give a synthesis of the main topics that need attention in the mind of the stakeholders.

3.2.1. *The general argumentation of stakeholders*

A quick look at the tables in Annex 2 from the point of view of the categories of stakeholders shows that most arguments on transport pricing stem from transport operators and the government sector. Users and the categories only indirectly affected did not widely react. This is not surprising since – as already mentioned – these are reactions and opinions on Commission and national policy papers, which are normally not readily available to the common citizen. If the arguments in relation to the implementation of a concrete measure such as the introduction of urban road pricing in city centre x had been considered, the reactions of the latter two categories would certainly not have lacked. However the citizens point of view will be more deeply investigated in WP3.

In addition, especially the operators, but also the government sector are normally more organised, often through representative organisations, and are able to react quickly and in a professional way. Thus they can be considered as a kind of opinion leaders in this sector, which makes them the first target in order to enhance acceptability.

Looking more deeply within each category, among the operators, it is probably the road sector that reacted most strongly, followed by public transport and rail. The opinions from the air and waterborne transport are more limited. This can probably be explained by the fact that the discussion on transport pricing today is very much concentrated on road. The

⁵ This structured analysis has been made by LET. The complete compilation by TIS as well as the bibliographic references are given in Annex 3.

⁶ Annexes to Deliverable 1 of this project.

arguments from the government sector came in a rather balanced way from all levels: local, regional and national.

A first analysis of the contents of the stakeholder statements shows a rather negative attitude in relation to transport pricing. It was also predictable that road transport, the transport industry, especially the automobile sector (summarised under the heading 'others') and the air sector would be more negative oriented than the governmental sector, public transport and rail operators since – as already mentioned – the current discussion focus mainly on road transport, thus this sector is expected to suffer more.

The arguments can be gathered into four categories which are of course inter-linked in the argumentation of stakeholders:

- the use of pricing in the transport sector : this relates to the issue whether or not more pricing should be introduced in the transport sector, whether other solutions should be applied, etc.
- the pricing strategy: the efficiency of the strategy with regards to other objectives within and outside the transport sector, equity and competitiveness, etc.
- the type of costs to cover and the calculation basis,
- the use of revenues issue.

3.2.1.1. The use of pricing in the transport sector

The first issue is whether or not the economic instruments should be the main or even only instrument to drive transport policy. This is disputed by many, and many stakeholders suggest complementary solutions to transport pricing.

Indeed a large majority of stakeholders agree with the general principles, i.e. user-pays principle and internalisation of external effects, and that something needs to be done to improve the efficiency of the transport system. However they all discuss the methods of its implementation, which means that we are far from an effective agreement.

Some stakeholders totally oppose to transport pricing and mention other measures that – according to their opinion – could replace transport pricing. The most often encountered suggestion is to use regulatory measures instead of the market mechanisms. Others believe that the improvement of the public transport supply or a more efficient railway system could lead to the same results as transport pricing.

Other complementary measures suggested include:

- the fostering of technological developments towards better environmental performance of vehicles, fuels, and greater traffic flows on roads;
- the improvement of the efficiency of all modes, especially through the promotion of greater managerial and commercial dynamism in rail, combined transport and inland navigation as well as the introduction of competition;
- the design of balanced land-use policies.

Some stakeholders also express a doubt on whether or not transport pricing can influence modal shift, an objective which is also sought in the Green Paper.

The risk of endangering the competitiveness of European economic sectors, to raise barriers to free trade, or to increase the consumers' bill without getting the expected benefits of pricing are also concerns expressed by many.

This shows that most stakeholders do not adhere systematically to the vision of transport pricing regarded as a decision that cannot be called into question. Most of them think that it must be made acceptable by using some suitable measures. Indeed a number of comments on transport pricing raise objection such as 'Is it or not an effective measure for each case?' 'Is it not possible to rather design a panel of measures among which one could choose the best adapted to the problem to solve?'

3.2.1.2. The pricing strategy

An issue that seems rather important relates to fairness. It is suggested that all modes should be treated equally, mainly in the light of fair competition. However, there are also arguments that recommend an intervention only for one or the other mode (especially the road sector since it is often considered the 'biggest polluter') or, on the contrary, concerns about possible discrimination to the detriment of road. Concern is shown about the exclusion of lower income groups from mobility and a disadvantage for more remote (peripheral and rural) regions.

In practical terms, as shown by the arguments of stakeholders, the debate on pricing focus mainly on the road sector. However public transport and rail operators and users fear that the implementation of marginal social cost pricing would involve high constraints in the coverage of their infrastructures and services running costs. More generally there is a fear that pricing could undermine the achievement of public service objectives.

Complementary recommendations for aspects to be taken into account when devising pricing measures from a practical point of view include:

- consideration of other EU policies and policies in other countries;
- differentiation of pricing strategies according to time, space, congestion, investment cost coverage, etc.;
- clear distinction between freight and passenger transport;
- necessity to consider global warming (CO₂);

3.2.1.3. The types of costs to cover and the calculation basis

A question or uncertainty that deserves particular attention relates to the type of costs to be covered.

The first issue relates to the coverage of infrastructure costs. Many stakeholders underline that marginal social cost pricing would not cover infrastructure costs in several cases, and some argue that the states should cover these costs.

The second issue relates to the external costs. There is an agreement on the fact that they should be taken into account. However there is no general agreement on their internalisation by the way of pricing. Some argue that this kind of internalisation is not suitable to improve the environment. Moreover the external or internal nature of congestion is strongly debated.

The third issue relates to external benefits of transport for which as many supporters as opponents to their internalisation are found.

Great concern is shown about the methodology for the cost calculation (thus the determination of the concrete price) proposed by the European Commission. The doubts

and insecurities are mainly related to the identification, qualification and quantification of external costs. The scientific soundness of current calculation methods and techniques is seriously questioned and people feel abandoned to the arbitrariness of decision-makers. Ongoing research (e.g. FISCUS research project⁷) will provide new developments on cost calculation methodologies.

3.2.1.4. The use of revenues from pricing

The analysis highlights that the question about the destination of the revenues from transport pricing is rather important.

Transparency in the use of the money is required by some stakeholders, who want to know what is happening with additional money. There is a fear that pricing is a pretext to only increase overall taxation.

Earmarking seems to be preferred even if some of the stakeholders recognise the efficiency loss that this implies. Often those who pay require becoming direct beneficiaries of the revenues.

Cross-funding to other sectors is sometimes but rarely accepted, depending on whether the respondent sees himself as a beneficial or not. Actors who are not direct transport operators such as transport related industry and services, or third parties like citizens and real estate business are against ideas such as ‘fiscal neutrality’ and ‘cross subsidies’: they are clearly opposed to any mechanism taxing their customers (especially road users) in favour of other transport modes or other public budgets.

However it would be illusory to believe that such a cross analysis through the various categories of stakeholders makes it possible to directly elucidate the points of convergence or divergence between actors, likely to render the conflicts harmless. It is the position of each actor in his overall consistency which must be examined for a better understanding of the reasons of agreement or rejection of the measures suggested with regard to transport pricing.

3.2.2. *Acceptability of pricing by the various actors*

For better seizing the factors which contribute to the acceptability (or not) of the pricing by the interest groups, it is useful to confront the theoretical approach of the political market which has been just developed (cf. section 3.1) with the stakeholders reactions. This approach in addition offers the opportunity of organising the analysis of the arguments of the interest groups.

This is why the previous distinction of actors on the demand and supply side are applied to the stakeholders for whom reactions are available:

- on the supply side of the political market
 - politicians at the various territorial levels of political decision-making
- on the demand side of the political market

⁷ FISCUS – Cost evaluation and Financing Schemes for Urban Transport Systems, research project co-financed within the 4th FP – 3rd call.

- operators: producers of transport services;
- users: consumers of transport (passenger and freight);
- producers of related goods and services;
- citizens and members of other interest groups;

Table 1 gathers, according to the analytical framework of the political market, the main stakeholders affected by transport policy that expressed reactions to the EU Green Paper and the White Paper.

	urban / local	regional	National	European	International
Supply side					
Governments					
central			x	x	
regional	X	x		x	
local	X			x	
Demand side					
Operators					
air transport					x
airport				x	x
others				x	
ports		x	x	x	
public transport			x	x	
rail transport			x	x	
road transport	x	x	x	x	
road infrastructure provider				x	
waterborne		x	x	x	
Users					
car users			x	x	x
freight transport user		x	x		
PT users			x		
users other modes				x	
shippers				x	
Producers of related goods and services					
chambers of commerce	x		x	x	
employers			x	x	
industrial activities	x		x	x	
Other interest groups					
consumers			x	x	
ecologists				x	
other citizens and economic representatives				x	

Table 1 : Groups of actors on the political market

In order to know who are the winners and losers of these policy measures the analysis of the reactions to the policy principles stated in the Green and the White Papers will be conducted for each group of actors, which has been identified in an isolated manner in order to better explain its reactions according to its specific interests.

These reactions can be distributed according to four categories' previously identified, i.e. *the use of pricing, the pricing strategy, the costs to cover, and the uses of revenues.*

The arguments of the various groups will thus be analysed on the basis of this classification by set of themes, which makes it possible to better highlight the aspects of these policies to which they are most sensitive.

3.2.2.1. Acceptability on the supply side: the politicians

The theoretical approach invites to see how the politicians, as intermediaries between the EU and their voters on various territorial scales, can express themselves with regard to the proposals of the Green and the White Papers. They are confronted with two main problems: which position to adopt with regard to the economic instrument to be able to promote or not its acceptability, and how to take into account at the same time the interest of the groups of voters?

With regard to the use of the economic instrument (cf. Table 2), the position of the politicians is rather balanced on all levels: local, regional and national. The agreement is limited: they accept *a priori* the principle of the economic instrument but with many reserves since they do not really share the first objective of the Green Paper, which consists in internalising the external effects. Their objective is to improve the transport system's efficiency and for them the measures to be undertaken must support a modal transfer. According to them the main aim of charging road users should be to encourage modal transfer from cars to public transport, cycling and walking and thus valid alternatives in these fields must be made available (regional and local levels). Regional politicians suggest to distinguish road users in 'necessary' (economically valid road transport as defined above, buses, commercial traffic, car poolers, emergency services, etc.) and 'unnecessary' (with reasonable alternative modes), and give priority to the first group. This is why, for them, the economic instrument cannot be used separately but in complement of regulations. The pricing forms should be part of a coherent integrated land use and transport strategy (regional level) or a strategy to adjust transport behaviour (local level). These reserves underline the limited range of the economic instrument which, according to them, cannot solely optimise the system of transport.

In addition to these limits, the politicians at the local and regional level underline the risks of weakening the competitiveness of the economic sectors and to increase the burden on the consumer. The interest of the various actors on the demand side is largely taken into account by the politicians at the various levels with a concern for equity. The politicians of the central government focus themselves primarily on this aspect. They agree with the user/polluter pay principle but require for all transport modes to be included and not merely road transport on which the emphasis is currently put. Moreover, this concern for equity is expressed by the denunciation of the various kinds of discriminations which the road pricing policy of the Green Paper involves: discrimination between the transport sector and the other economic activities, between the various transport modes, between the various types of infrastructures, between the social groups.

Arguments	Central	regional	local
<i>Use of pricing</i>			
economic instruments only			
economic instruments and regulation	Yes	yes	yes
pricing forms should be part of a coherent integrated land use transport strategy		yes	
pricing should be a part of strategy to adjust transport behaviour			yes
<i>but endanger the competitiveness of economic sectors</i>		yes	yes
<i>but increase consumer's bill</i>			yes
<i>pricing strategy</i>			
principle of road pricing		yes	yes
private car should be the main target due to external effects		yes	
focus on private car for modal shift		yes	yes
<i>all modes of transport should be included</i>	Yes		
<i>but loss of attractiveness of motorway</i>		yes	
<i>but discrimination between modes to the detriment of road</i>	Yes		yes
<i>but discrimination between transport sector and other economic sectors</i>	Yes		yes
<i>but induce social discrimination</i>	Yes		yes
<i>costs to cover</i>			
in favour of toll system where congestion is important			yes
infrastructure costs coverage by users	Yes		
<i>fiscal and pricing measures suitable to modal shift</i>	Yes		
in favour of marginal cost pricing if the state covers infrastructures costs			
but methodology is often unreliable and arbitrary	Yes		
<i>use of revenues</i>			
more attention to possibilities of reducing taxation elsewhere	Yes		

Table 2: The supply side of the political market: the politicians

With regard to the allocation of revenues it is little discussed, except for the central level. It is suggested to pay more attention to the possibilities that road pricing offers to reduce taxes elsewhere. However the central level expresses its *doubts on the use of earmarking because of little support by economic theory, being understood that it may sometimes be necessary for political reasons.*

It would seem that the main concern of the central governments is to prevent these measures of the Green Paper from discriminating too much the various groups of voters between winners and losers. On the two other levels, regional and local, these measures, in spite of certain reserves, appear to offer some opportunities of serving their own interest, which consists in making their transport system more efficient.

3.2.2.2. Acceptability on the demand side: the interest groups

The situation of these groups can be negatively affected on two levels. The first relates to the costs with which they are faced because of internalisation policy. The second is that the pricing instruments may serve the interest of various groups of actors depending on the use of revenues.

3.2.2.2.1 The operators

Following the theoretical approach, they can be expected to support pricing measures in the transport sector given that they are ensured that the revenues will be used to finance infrastructure and services to be provided. On the other hand, they will be less in favour of road pricing measures given that the purpose is explicitly and exclusively to internalise external costs combined with lump sum transfers or reduction of other taxes.

It is in this group that the positions with regard to the proposals of the Green Paper and White Paper are most heterogeneous (cf. Table 3). A large majority disapproves this policy, insofar as they consider themselves as losers. But to feel as a loser, i.e. to perceive a degradation of its own situation, can be defined according to two dimensions:

- one can consider oneself as a loser when compared to the period before the possible implementation of these measures (e.g. 'I pay more than before without drawing from it more benefit');
- one can also consider oneself as a loser comparatively to the others (e.g. 'I pay more than the others with regard to the costs that I inflict and to the advantages that I bring to the society').

Operators	air transport	airport	others	Ports	public transport	rail transport	road transport	road infrastr. provider	Water-borne
Use of pricing									
economic instruments only			no				no		
<i>economic instruments and regulation</i>		yes		Yes					
<i>in favour of taxation of transport</i>	no	no			yes				yes
<i>in favour of fiscal and economic instruments</i>	yes					yes			
<i>but endanger the competitiveness of economic sectors</i>			yes				yes		yes
<i>but endanger the competitiveness of European economic</i>				Yes					
<i>but increase consumer's bill</i>									yes
can influence modal shift			no						
<i>barrier to free trade and travel</i>		yes		Yes			yes		
can be both efficient and equitable				Yes					
Pricing strategy									
<i>principle of road pricing</i>					no	yes		no	
focus on modal shift				Yes					
<i>private car should be the main target due to external effects</i>									
<i>but too much emphasis on road freight transport pricing</i>				Yes			yes		
<i>but discrimination between modes</i>			yes	Yes	yes		yes		yes
<i>but discrimination between transport sector and other economic sectors</i>							yes		
<i>in road sector, necessity to distinguish between « public » and private</i>					yes				
<i>but induce social discrimination</i>			yes		yes				
<i>user pay principle for all modes</i>	yes	yes	yes			yes	yes	yes	yes
Costs to cover									
user pay principle to cover external cost	yes		no	Yes	yes	yes	no	yes	no
<i>focus on external costs where mobility problems are more urgent</i>									
internalisation suitable to improve environment	yes				no		no		
<i>but internalisation is suitable for modal shift</i>			no	No					
<i>can't cover total costs</i>									yes
<i>can't cover infrastructure costs</i>				Yes					
<i>marginal cost pricing should be accompanied by other policies</i>						yes			
<i>in favour of marginal cost pricing if the state covers infrastructures costs</i>				No				yes	
<i>but must take in account</i>		yes	yes		yes	yes	yes		

<i>external benefits</i>									
methodology is often unreliable and arbitrary		yes	yes				yes		

Use of revenues									
cross subsidies								no	
in favour to deficient lines, isolated regions		yes							
but pricing to justify increases taxation road			yes						
revenues must be earmarked within each mode								yes	

Table 3 : The demand side of the political market: the operators

Those which consider themselves as losers compared with their previous situation

The maritime ports operators a priori agree with the polluter/user pays principle but, in detail, show themselves rather hostile insofar as they consider themselves as losers on several aspects:

- located at the interface of an international and national traffic, they feel concerned with regard to their connections with their hinterland. They worry about the possible degradation of these connections which would result from too much emphasis on road freight transport pricing, since internalisation of external costs may lead to an overall increase of costs which would create a barrier to free trade and travel, and endanger the competitiveness of European economy;
- the choice of marginal cost pricing is an inefficient solution for them for the coverage of their infrastructure costs: since ports have high fixed and low variable costs, the use of only variables charges to recover infrastructures costs cause efficiency problems.
- more generally they feel doubts on whether a Community charging system based on marginal social costs would be appropriate as the principal instrument to deal with all the problems of the transport sector.

The waterborne operators also have a certain reserve with regard to the internalisation of the external costs as proposed in the Green Paper.

- As they fear to be a little forgotten compared to the rail in the modal transfer policy, they underline the difficulties in implementing pricing as long as the principle of equity between the modes is not guaranteed.
- They prefer a tax such as VAT to pricing, which has the advantage of applying to all modes.
- With regard to the efficiency, they highlight its negative effects on competitiveness of the economic sectors and the burden for the consumer, harming indirectly their activity.

Those which consider themselves as losers compared with the other operators

The operators of road transport and combined transport refuse the principle of pricing perceived as being against the principle of equity. They feel doubly victims of this policy of pricing related to the internalisation of the external costs:

- focusing pricing on road, as principal source of the external costs, strongly penalises this mode compared to the others. According to them this is wrongfully disregarding the benefit that road transport brings to the whole economy. However, they are favourable to the user pay principle applied to all modes for the coverage of total cost. They thus reject the user-pays principle to cover external costs, insofar as they do not regard

congestion as an external cost and insofar these congestion costs are already internalised by road users.

- the application of external costs will not automatically lead to a shift to rail transport. There are far more effective means of promoting low external cost objectives than charges.
- in terms of efficiency they do conceive marginal cost pricing as an inappropriate tool to reduce external costs and at the same time cover total cost.
- they consider themselves as 'robbed' with the reallocation of the revenues of pricing. The internalisation of the external costs is thus denounced as a pretext to increase revenues and the creation of cross-subsidies between modes.

Those which consider themselves as half winners, half losers compared with the other modes

The public transport operators have a divided position, insofar as they get advantages and disadvantages from this pricing policy:

- on the one hand, they are favourable to the internalisation of external costs insofar as it enables them to become again more competitive compared to other modes, in particular road. However they challenge the White Paper, in particular the refusal of the Commission to include private cars in the charging system on the argument (among other) that the private car does not compete with public transport. For them by excluding the private car from the charging system the objective of a rational use of infrastructure and environment improvement are jeopardised.
- in addition, they refuse the principle of road pricing, which according to them can be prejudicial in the name of equity: discriminatory with regard to competition with other modes if in road sector one does not make the difference between 'public' and 'private' transport because there are differences on the balance of external costs and benefits; discriminatory for the users because road pricing may exclude poor people from mobility. As a consequence a gradual increase of excise duties on mineral oil is preferred to road pricing since the latter has very high transaction costs.

Those which consider themselves as winners

The rail transport operators consider themselves as winners compared to the others.

- They are favourable both to the user-pays principle for the whole transport sector and to the internalisation of the external costs insofar as it can suppress a distortion of competition at the disadvantage of rail.
- They are against the «compensation elements» such as reducing taxes for road elsewhere because they may accentuate even more the unbalanced playing field between road and rail. They request that it must be taken into account that railways produce huge social benefits.
- They agree with marginal social cost pricing but it should be accompanied by other policies, e.g. national restructuring of railways and their financial revitalisation and needs to be more clearly defined and transparent in order to be successfully implemented.
- Their position of winner is reinforced with the prospect to get a significant part of the revenues of these economic measures.

The road infrastructure providers are also considering themselves as winners because their situation improves.

- They are in favour of the user-pays principle for all modes and not only for road users and the internalisation of external costs. They advocate it even more if those road revenues are received by road operators. Congestion charges on road traffic should not be used for cross-funding between modes (congestion related charges are paying for the development of the road network).
- However they make some reserves on the method of calculation of external costs which they consider debatable and the implementation procedure of these measures. For them it seems difficult, if not impossible, to apply the polluter-pays principle only to heavy goods vehicles (HGV) and public transport in a first phase. Private cars should also contribute.

Those who are favourable

Air transport operators accommodate pricing favourably insofar as it can be a substitute for the kerosene tax, which is likely to sap them. The internalisation of external costs is regarded as effective to improve the environment and preserving mobility of goods and people on the long term and it must apply to all modes.

The airports operators are also favourable to the pricing measures, since they considered themselves as favoured to some extent. However they express a certain number of reserves. They prefer the pricing measures to any type of further taxation of the aviation industry, which may create impediments to development of international travel and trade.

- They agree with the internalisation of external costs but think that fiscal and economic instruments are needed in addition to existing regulatory measures to control the impacts of aviation, namely noise and air pollution related charges.
- They dispute also the method of cost calculation. For them there should be equal treatment between modes and it is essential to analyse environmental costs, delays and other operational costs and external benefits (such as the impacts of airports on the areas where they are implemented). Price differentiation in time and space to reflect costs differences should allow for modulation for the benefit of isolated regions and to facilitate the development of airport networks.

3.2.2.2.2 Users

These interest groups as a whole express a definitely hostile attitude to the Green Paper, insofar as, for various reasons, they consider themselves as losers (cf. Table 4).

The car users consider themselves as losers compared to the others. They agree with the Green Paper on the principle of using an economic instrument to create an efficient transport system, but provided that it replaces existing taxation and that the incomes are earmarked specifically for transport investment. However they refuse pricing such as it is proposed by the Green Paper, for multiple reasons:

- they express their mistrust in relation to the pricing aim such as it is set forth: the pricing proposals presented are in practice used by Governments to justify increases in road taxation for general expenditure purposes, or to avoid rational investment in road infrastructure;
- they denounce the preference for pricing without having considered other mechanisms of reducing externalities (e.g. investments, management, regulatory and technological measures);

- as a principal target of the pricing, they reject it in the name of both efficiency and equity. Proposed tax burdens do not apply to other sectors: this creates economic distortions and inefficiency.
- they consider themselves as harmed, especially compared to the users of other modes: this involves negative social effects if pricing penalises drivers who have no other mode choice but the car;
- they do not agree with the internalisation of external effects and consider that the problems can be solved within the road customer community without political bodies.
- however they agree with road tolls where congestion is important. Indeed congestion is a local problem which must be solved locally. Within this framework tolls are acceptable, in particular if the revenues return to the road.

The freight transport users consider themselves as losers on two levels: as a main target of pricing measures and as disadvantaged by the principle of cost coverage. This is why, although *a priori* agreeing with the principle of internalisation of the external effects, they express reserves on what is proposed in the Green Paper:

- the imputation of the user cost is a healthy principle if users of all modes have to pay for it instead to be concentrated on road transport.
- there is necessity to recover total costs including the cost of equipment, operation and external costs. Therefore it is normal for them that the general public pays part of the costs of long lasting infrastructure.

As for the preference given to pricing as a single means of action, it is very disputed:

- in the name of the efficiency the fiscal instrument gets a more important place in the Green Paper than regulatory measures and it is suggested that a fair balance between the different measures should be found. The polluter-pays principle can in no way lead to a right to pollute brought by the payer and regulations must continue to play an important role to reduce external effects;
- they fear that the increase in costs of the road goods transport – which acts as reference for other modes – will reflect on all modes and endanger the competitiveness of the European products;
- the fiscal instrument is not always the best way to reduce external costs, notably in certain market segments where no alternative mode exists and where the operators are driven by a short-term policy.

The public transport users consider themselves as losers compared to their previous situation. What is important for them, is the price to be paid, which leads them to disagree with the principle of pricing. These users think that price must be non deterrents for users and operators. They are in favour of the taxation system to cover the investment.

The shippers express a rather unfavourable attitude to this policy. In theory, they favourably accommodate any initiative which improves the efficiency of any alternative to the road transport and supports the international market.

- However in the specific case of the Green Paper, they are hostile to the pricing instrument which seems to them not very efficient to achieve a modal transfer from road. For them, it is necessary that the pricing is accompanied by technically and qualitatively acceptable alternatives. Without such alternatives pricing will do nothing but increase the costs of transport to the detriment of the European economy.

- They do not approve the priority granted to the objective of internalisation of the external costs and deplore the little attention attached by the Green Paper to the benefits brought by road transport.

Arguments	car users	freight transport user	public transport users	shippers
Use of pricing				
Economic instruments only	no	no	no	no
Economic instruments and regulation	yes	yes	yes	
<i>In favour of taxation</i>			yes	
<i>But endanger the competitiveness of European economic</i>		yes		yes
<i>But increase user's and operator's bill</i>			yes	
Pricing strategy				
<i>Principle of road pricing</i>		no		yes
<i>If alternative is available</i>				yes
<i>But discrimination between modes</i>	yes			
<i>But discrimination between transport sector and other economic sectors</i>	yes			
<i>But discrimination between users</i>	yes	yes		
<i>Removal transport to use other modes is unfair and useless</i>	yes			
<i>User pay principle for all modes</i>		yes		yes
Costs to cover				
In favour for user pay principle to cover external costs	no	yes		no
In favour of toll system where congestion is important	yes	yes		
<i>But in favour of modal shift</i>				yes
<i>But internalisation is suitable for modal shift</i>				no
<i>In favour to cover total cost</i>		yes		
<i>But it must take in account external benefits</i>		yes		yes
<i>But methodology is often unreliable</i>	yes	yes	yes	
Use of revenues				
Revenue for transport investment	yes		yes	
<i>But pricing to justify increases taxation road</i>	yes			

Table 4: The demand side of the political market: the users

3.2.2.2.3 Producers of related goods and services

According to the approach of the political market, they are also supposed, as the operators, to be better organised to defend their interests, *vis-à-vis* pricing measures. Although not directly concerned with road pricing, they react rather negatively to these measures, taking into account the importance which they attach to the transport sector for the role it plays in the European economy (cf. Table 5). According to them Transport infrastructure must in principle maintain its essential role of serving as a «public» utility.

Industry has a reserved position. They agree with the policy of the Green Paper on several points:

- agreement on the user pay principle to encourage a true competition between modes. They are in favour of promotion of modal shift from private to public modes ;
- agreement on road pricing and internalisation of external costs to reduce harmful effects.

But in the name of efficiency, they are hardly favourable to the pricing principle for two reasons.

- First they underline that the principle of fair pricing tends to minimise the financial burden on the transport market but does not take into account other effects on society, such as increase of transport costs and thus negative effects on competitiveness and employment.
- In addition, with regard to the promotion of modal transfer, pricing measures alone are not seen as adequate because the price is only one of the elements which determines the modal choice and this must be supplemented by other elements like regulations or tax incentives.

The Chambers of Commerce have a hostile position because they consider that pricing will involve an increase in the costs of transport, which endangers the competitiveness of economic sectors.

- Taking the economic benefit brought by road transport into account, they do not want road pricing, which disadvantages this mode compared to the others.
- They do not want either an internalisation of the external costs, which they judge inefficient to improve the environment and to promote modal transfer.
- However they are in favour of a differentiated taxation inside each mode, provided that the user can have an alternative supply.

The employers have a hostile position since they are against the pricing approach within the framework of a sustainable mobility policy, which must preserve the competitiveness of companies.

- they are against the idea of a transfer of goods transport from road to rail. For them pricing is not a suitable tool to obtain this transfer, which needs to take a whole series of other parameters into account; moreover it can endanger the competitiveness of economic sectors and the European economy as a whole and increases the burden of the consumer.
- they are against the use of pricing alone for the reduction of the negative effects of the various modes. In this view the economic instrument can only be used together with other options (e.g. regulatory instruments, voluntary instruments).
- they do not agree with objectives of infrastructure funding and reduction of traffic congestion and pollution because linking of infrastructure costs to the wear and tear caused by transport and to the lifetime of the infrastructure leaves much room for different interpretations.
- according to them pricing of the environmental impacts of transport is impossible even on the theoretical level. It is also suggested that the various pricing principles in this field produce very different results.

3.2.2.2.4 Other interest groups

The consumers are hostile and reject the pricing policy because of both efficiency and equity (Table 5). First of all they do not perceive pricing as appropriate tool to cause a modal transfer. Moreover pricing creates discrimination based on income: this can be avoided through regulatory measures. Another argument is that of the incompatibility which they perceive between the obligations of public utility of transport and a strategy based only on efficient pricing.

The ecologists are favourable although feeling a certain contradiction between the objective of internalisation of the external effects and the need for not restricting the mobility of people and goods.

- they can only agree with this internalisation by pricing insofar as it meets their own aim. They think that it is a fair measure since road network is not sufficient to cover the increasing demand for traffic and society should not pay the cost of the impacts derived from car;
- however they express some reserves on the use of pricing because of its effects on the mobility of goods and people, considering that a general reduction to the citizens' trips is not desirable. They propose other solutions: instead of an ineffective policy for charging the road freight transport, it would be better to promote distribution systems based on electric vans and the rationalisation of market and company functions. Also, in certain cases it might be best to apply a policy of increased general fuel taxation instead of road pricing.

Other citizens and economic representatives have a reserved position. They agree in theory with the principle of internalisation of costs for all modes, but they express doubts with regard to the measures suggested in the White Paper on various points:

- even if the Commission affirms that the infrastructure costs to be imposed will not automatically be reflected in transport prices because firms will adjust their infrastructure use, this clearly seems to be inevitable in phases 1 and 2 of the White Paper.
- it must be ensured that imputing costs to user does not infringe one of the basic principles of the European Union, namely free circulation of persons and goods.

They express also reserves on the working method of the European Commission:

- an analysis of achievements with alternatives to the price is lacking.
- it fails to indicate the relative importance of the costs components for the different modes,
- the implementation of the charging system should be simultaneous across modes, in order to guarantee equal treatment.

	producers of related goods and services			Other interest groups		
	chambers of commerce	Employers	industry	consumers	ecologists	others
<i>Use of pricing</i>						
only economic instrument	no	No	no	no	yes	
economic instruments and regulation		Yes	yes	yes		
<i>but with fiscal incentive</i>			yes			
<i>in favour of increase general fuel taxation</i>					yes	
<i>doubt on capacity of other modes to respond to modal change</i>				yes		
<i>but increase consumer's bill</i>		Yes		yes		yes
<i>but endanger the mobility of persons and goods</i>				yes	yes	yes
<i>but lack of attention to the need of improving the accessibility of peripheral areas</i>						
<i>but endanger the competitiveness of economic sectors</i>	yes	Yes	yes			
<i>but endanger the competitiveness of European economy</i>		Yes				

Pricing strategy						
road pricing	no	No	yes		no	
private car should be the main target due to external effects					yes	
<i>in favour differentiated taxation within one mode</i>	yes					
<i>if alternative is available</i>	yes					
<i>but discrimination between modes</i>	yes				yes	
<i>but induce social discrimination</i>				yes		
<i>pricing in contradiction with public service objectives</i>				yes		
user pay principle for all modes		No	yes			yes
Cost to cover						
user pay principle cover external cost	no	No	yes		yes	
securing funding for infrastructure and reduction of external effects						
<i>but internalisation is suitable for modal shift</i>	no	No		no		
<i>but in favour of modal shift</i>			yes			
<i>users and community should pay to cover infrastructure costs</i>			yes			
<i>but to cover total costs</i>	yes					
in favour of marginal cost pricing	no					
<i>must take in account external benefits</i>	yes	Yes		yes		
<i>but methodology is often unreliable</i>	yes					yes
Use of revenues						
fiscal neutrality	against	No				
cross subsidies						
<i>but pricing to justify increases taxation road</i>		Yes				

Table 5 : The demand side of the political market: other actors

All these reactions highlight the many stumbling blocks facing the proposals of the Green Paper and the White Paper on behalf of the very large majority of the actors. The difficulty is all the more important since the links are close between the transport sector and the other economic sectors. Possibilities of alliances emerge between those which are directly concerned like the road sector and those which are indirectly concerned such as the producers of goods and services insofar as the interest of the ones serves also the interest of the others. This interdependence makes it particularly complex and delicate to conduct a policy of pricing which aims to be at the same time efficient and equitable.

3.2.3. *A synthesis by type of actor*

The politicians (on the supply side) are relatively above the conflict. They are in favour of a modal transfer from the road towards the other modes and advocate that a global solution that links transport and land use, integrating the economic instrument *and* regulations. They also have a preoccupation with equity (e.g. between all the modes, between the inhabitants and territories).

With regard to the other actors (demand side), beyond an agreement on the need for correcting the imperfections of the system, it is their future ('how much I will lose?') and relative situation compared to the other sectors ('am I getting disadvantaged compared to my competitors?') that counts. A summary of the main aspects of the positions of the ones and others shows this.

The operators claim that the revenues are used to finance infrastructure and transport services for their own mode, and are opposed to the transfers to other budgets which they do not control well, or to other modes (except the operators of rail). Among them port operators estimate themselves disadvantaged if road freight is taxed too much and if they must cover their fixed costs of infrastructures. The waterborne operators fear to be forgotten in the policy of modal transfer when compared to rail. The road and combined transport operators consider themselves as penalised compared to the other modes and think that it is a pretext to increase the revenues of the governments and to cross-subsidise the other modes: they ask for an equal treatment of all modes by means of the user-pays principle for the total coverage of costs. They insist that the revenues of the road must go to the road. Public transport operators want private cars to be included in the pricing policy right from the beginning (when compared to the phasing approach proposed in the White Paper). With regard to full cost recovery they want the specificity of the 'external' advantages which they bring as a public utility to be taken into account. The rail operators refuse possible compensations for the road and claim a financial revitalisation for their infrastructures. Air transport agrees with marginal social cost pricing if the aforementioned replaces a possible tax on kerosene. The airport operators agree with the internalisation of the external costs but claim the taking into account of the external advantages which they induce on the areas that they serve.

Car users agree with pricing if this replaces existing taxation and if the revenues go to investments in transport. They fear an over-taxation and consider themselves as harmed when compared to the other modes. The users of road freight agree with the principle of internalisation of the external effects but applied to all modes and not only to the road. They think that the financing of infrastructures with long life-span is to be achieved with public money. The users of public transport fear that fares changes slow down the use of this mode and also consider that the investments must be covered by public money. For shippers alternatives to road are needed, but pricing will do nothing but increase the costs and one must take into account the advantages of the road.

Among the producers of goods and services, industry thinks that the costs of transport will be increased, hence negative effects on the competitiveness of the European industry will arise. The chambers of commerce think in the same way and do not want to disadvantage road. The employers are also sensitive to the competitiveness issue.

Others citizens and economic representatives think that the costs of transport will increase and this will challenge the right to mobility of people and goods. Moreover they ask for an equal treatment between all modes and question the phasing approach proposed in the White Paper. Finally the consumers see in transport pricing a discrimination based on income.

3.3. Conclusion

The political economy approach of the transport policy developed in section 3.1 made it possible to clarify the analysis of the stakeholders argumentation by distinguishing the categories of supply and demand on the political market. It is not however possible to validate the whole conclusions of this approach with regard to the transport policy, given the limits of the materials on which the work is based: they are reactions to documents of general policy and not case studies on concrete implementations of particular measures.

However certain aspects can be confirmed, in addition to the fact that, as shown by the reactions, the operators and the producers are better organised than the consumers or the citizens to defend their own interests.

The politicians, between the constraint of budget and re-election, seek the system efficiency of transport as a whole - the problem of the internalisation of the external costs being obviously secondary for them. They are also worried about an (equitable) balance between transport modes, territories and inhabitants: this explains the different attitudes of governments according to the territorial level (local, regional or national) of their field of intervention.

The interest groups and particularly the operators and producers of infrastructures, as well as especially road users - as expected - argue for:

- a moderation of the incentive pressure of the price which touches them particularly,
- exemptions or compensations to this pressure of the price,
- the transfer of the recovery of fixed costs (road or public transport) on the public money, therefore taxpayers,
- the return of the revenues from taxes or pricing to their advantage.

In short, one can reasonably say that each category of actors agrees with the principles of user-pays and internalisation of the external costs, but in their theoretical aspects only. When considering the practical implementation, a certain number of conditions are posed. The efficiency of the proposals of the Green and White Papers is challenged by many actors, because there is a doubt that the internalisation by the price is efficient, and that pricing *per se* is sufficient to improve the situation. It is a well-known story and one can see there a disguised refusal of certain actors to assume their responsibilities. However, one can see also for others in this challenge a real concern with overall efficiency, in particular those which fear an increase in transport costs without real efficiency improvements - at least initially if there is no modal alternative to the road - or a loss in public transport services in some economically penalised areas.

This means that with regard to efficiency, they still remain to be convinced that pricing is an effective means to change behaviour (even if for the economists the answer is positive, within regard to the behavioural data in the medium and long term) and that the implementation of

the proposals of the Green and the White Papers will not involve a too negative effect on the economy as a whole.

But there is perhaps a more significant issue. Among the conditions posed a central one for each actor directly concerned is that there is no obvious discrimination to his/her detriment, whether compared to others or to his/her previous situation. The arguments of all these actors without exception, including those less directly touched (governments, consumers, etc.) refers to this question of equity.

The permanence of this topic constitutes a challenge due to the importance of the argumentation. Is the argumentation on the supposed (in)efficiency of transport pricing not a way of concealing a more serious concern, on behalf of each actor, namely that of the final balance-sheet in terms of improvement or degradation of its own situation. This concern plays a significant role, if not probably paramount, in the acceptability of the suggested measures. This justifies the more detailed interest given to these questions of equity in the next chapter.

4. THE DIMENSIONS OF EQUITY INVOLVED IN TRANSPORT PRICING

The analysis of the stakeholders' reactions has shown various dimensions of acceptability through the discussion of efficiency and equity of the measures suggested in the Green and White Papers. As shown in the previous chapter, indeed, primarily questions of equity arise. These are questions of equal treatment between modes or operators, of risk of aggravation of the inequalities between users or consumers, and questions of preserving the social and space solidarity at the various territorial levels, from local to European. The benefit and burden distribution between the actors is of course the central question.

There is a great diversity of conceptions of equity. The perception of the inequalities calls upon a complex mechanisms of comparison, function of the objective inequalities but also many other variables. A difference is sometimes seen legitimate, sometimes illegitimate, whatever its objective's extent. It must also be underlined that there is not *a* theory of equity but multiple meanings of the concept, resulting from the history of the human societies, or proposed by various social and human sciences, in particular philosophy or economics.

When seeking to analyse various dimensions of equity, highlighted by the reactions of the stakeholders, it is necessary to characterise the concept of equity in the way it will be applied in the transport field. With this intention a short detour is made to economics and philosophy, which mainly contributed these last years to renew the concept of equity.

4.1. How to characterise equity?

First of all the start is made from the economic approach of justice and equity. In the utilitarian vision of welfare economics, justice is a by-product of the research of greatest welfare for the greatest number. That results formally in the maximisation of the aggregated utility, sum of all the individual utilities by attaching the same importance to all the individuals (sum-ranking). This last approach is unaware of the possible inequalities in the distributions of the utilities and can even reinforce them. The criticism of this axiom yield intense debates without real conclusion (cf. Sen, 1987). Moreover, following the work of Arrow it is known that no logically infallible way to aggregate the preferences of various individuals and consequently solve the distribution problems (for a synthesis on the economics of welfare, see Feldman, 1987) exists.

In a more limited way, equity was also approached by economists, first of all by seeking to overcome the limits of the concept of pure equality. Allocation between n individuals of one part of the produced goods, equal for all, would lead to a situation where (a) each one would consume the same quantity of goods without regard to his/her actual preferences, (b) such a mechanism of egalitarian allocation would need a transfer of wealth of the most productive individuals to the least productive individuals, transfer which would destroy the incentives to produce. Beyond this impracticable concept of equality, equity is then defined as a situation of 'non-envy' (Foley, 1967; Kolm, 1972): an allocation is defined as equitable if no agent envies another, i.e. if no agent i prefers the bundle of goods of another agent j . However this definition, as Kolm himself recognises, comprises two types of problems. The first is the existence of a distribution of consumption goods and working hours both Pareto-

efficient and envy-free. This is due in particular to the fact that the characteristics of production are not all transferable (e.g. between Pavarotti or Ronaldo and anybody else): people do not have all the same productive ability and thus do not provide the same effort. The second problem is more of a philosophical nature, it raises the question of the moral relevance of searching to minimise the envy. This approach to equity as ‘non-envy’ thus seems to lead to a dead end.

Another approach consists in explicitly taking into account the inequalities of distribution of the goods, as proposed by Rawls in his theory of justice (1971). It consists in considering the principles of justice as being the subject of an original agreement in the society. The original position is supposed to represent the equality between the human beings, as legal entities, and the principles of justice which result from this are those to which all the individuals would agree as equal. These principles must be used as rules for all the subsequent agreements and specify the social forms of co-operation in which one can engage, and the forms of government which can be established.

The first principle called ‘principle of liberty’, and to which Rawls gives the priority, (‘each person is to have an equal right to the most extensive basic liberty compatible with similar liberty for others’) relates to the civil rights of the person. The second principle, including efficiency and equity according to Rawls, relates to the allocation of resources between the individuals, namely (a) the famous ‘principle of difference’ and (b) the principle of equality of opportunities. The benefit are measured in terms of ‘primary goods’, i.e. ‘rights, liberties and opportunities, income and wealth, and the social bases of self-respect’.

The work of Rawls largely renewed the approach of justice by the economists these last years, and the review of this work would lead well beyond what is necessary for the analysis as regards transport policy.

Indeed, beyond an answer coming from moral philosophy, the theory of Rawls enables to elaborate three dimensions of equity directly applicable to the transport field and its pricing. They are defined⁸:

- territorial equity, corresponding to the ‘principle of liberty’, in which the society must guarantee everywhere the access rights to the goods and the services;
- horizontal equity, corresponding to the ‘principle of equal opportunity’, which concerns the equal treatment between users and the user-pays principle.
- vertical equity, corresponding to the ‘principle of difference’, which explicitly takes into account the inequalities and its consequences as regards transport.

These three dimensions of equity are clarified and discussed hereafter.

4.2. Territorial equity and the principle of liberty

This form of equity follows from the ‘principle of liberty’ and expresses the duty of the society to guarantee individual and collective rights. This equity results from the inscription in space of the activities (e.g. residences, employment, industrial and commercial activities).

⁸ Litman (1997) evokes two types of equity, horizontal equity and vertical equity, without explicitly binding them to the theory of Rawls. We distinguish in addition *territorial equity*, because of the specificity of transport which conditions accessibility at the various points in space.

This principle thus leads to the guarantee of accessibility to the goods and the services. It must be stressed that this right relates to passenger transport but also to freight transport since the latter must be able to serve its customers on the whole territory.

Given the importance of the car in today's mobility, the right to 'go and come' guaranteed in the legal systems of several countries could be questioned by transport pricing schemes. It is recognised that such schemes would imply revisions of 'constitutional blocks' (see below). Since the right to mobility and the perception of road pricing as a threat to mobility are arguments raised by stakeholders, it is important to see what are the fundamental rights which have implications regarding transport and how the law can implement these rights.

The right to mobility or freedom to circulate is a basic right recognised in article 13 of the United Nations Declaration of Human Rights of 1948. The concept of free mobility marked very early the European collective conscience and is found in many constitutional texts (section 1). However, the exercise of this basic right requires the public authorities to implement legislative and regulatory instruments in order to guarantee it (section 2).

4.2.1. *'Free mobility' in some founder and constitutional texts*

The concept of 'free mobility' appears very early in a founder text of the United Kingdom - the Magna Carta of 1215 - in the form of a principle of free trade for the merchants:

*All Merchants (if they were not openly prohibited before) shall have their safe and sure conduct to depart out of England, to come into England, to tarry in, and go through England, as well by land as by water, to buy and sell without any manner of evil tolls, by the old and rightful customs, except in time of war.*⁹

In France in 1267, King Saint-Louis abolished abusive tolls and decided that the merchants cannot be constrained to pay them, if they find passage elsewhere (freedom of route). The history of tolls in France under the Ancient Regime will be that of a long power struggle between the royal authority and that of the lords for the control of the transportation routes and the progressive abolition of tolls in order to release the trade effectively. The right «to go and come» was also incorporated in the Declaration of the Rights of the Man and the Citizen in 1789. Tolls were abolished in 1793. However, this was only provisional. The need for resorting to extra-budgetary resources to finance the development of the infrastructures will come gradually to end toll prohibition around 1950.

The right to free mobility is also found in constitutional texts in some other countries of the European Union:

- ◆ Article 19 of the Spanish Constitution makes it very explicit as it determines that *'Spaniards have the right to choose their residence freely and to circulate on the national territory'*.
- ◆ In Greece article 5 of the Constitution determines that it *'is prohibited any individual administrative measure likely to restrict free travel or the free establishment in the country'*.

⁹ A translation of Magna Carta as confirmed by Edward I with his seal in 1297; <http://www.nara.gov/exhall/charters/magnacarta/magtrans.html>

- ◆ Article 16 of the Italian Constitution states that '*any citizen can circulate and remain freely on the territory in any area of the national territory ()*' and that '*any citizen is free to leave and to return there*'.
- ◆ In Portugal article 44 determines that '*the right to travel and to be established freely in any location of the territory is guaranteed to any citizen*'.
- ◆ Article 11 of the German fundamental law of Germany stipulates that '*all German enjoys the freedom of circulation and establishment on the whole of the federal territory*'. The limits to this 'free mobility' are strictly fixed.

4.2.2. *Implementing the right to mobility*

The Declaration of Human Rights of 1789 proclaims that human beings are born free and have equal rights. It has as its starting point the concept of natural rights that the individual has as a human being. Among these natural or fundamental rights like the equal access to places and employment, the freedom of speaking and writing, to print and publish its thoughts, to exert a religious worship and also the freedom 'of going and coming'. These natural rights, that are known as rights of the first generation, are rights of human beings vis-à-vis any authority. States cannot abolish nor reduce them.

This supposes that human beings can always benefit from their natural rights. However, the daily reality shows that the exercise of these rights is likely to remain theoretical. States must provide the means of really exerting these rights.

Hence, these rights are to be recognised and implemented within the framework of the law. This transformation of natural rights into legal rules makes that the implementation of these rights can vary between countries and in time.

Box 2: An example of the implementation of the right to mobility in France

Besides the Constitution, the French law on domestic transport (LOTI) defines in article 1 implicitly a 'right to transport'. This right is about 'the implementation of the provisions making it possible to make effective the right which any user has to travel and its freedom to choose the means of travel...'. Hence, the government has to ensure the actual exercising of this right.

The law transforms 'the freedom of travel' into a 'right to transport' which includes the freedom to travel *and* to choose the means of it. However, the right to transport cannot be enforced. It is also conditional on the payment by the user of the associated costs. Article 2 of LOTI determines that the government 'makes it possible to travel under reasonable conditions of access, quality and price as well as cost for the community, in particular by the use of transport modes open to the public'.

Individual needs are thus subordinated to the interests of the community. It is not a question of lowering the cost for the user but to ensure the exercise of this right 'under the economic and social conditions most advantageous for the community' (Article 1, paragraph 1).

This right to transport stated in the LOTI justifies public intervention in the sector (active policy). This implies the following set of missions that must be ensured by public authorities:

- ◆ the realisation and the management of infrastructure and equipment assigned to transport;

- ◆ the regulation of transport activities and the control of their implementation;
- ◆ the provision of information on the transport system;
- ◆ the development of research, studies and statistics likely to facilitate the achievement of the aims of the transport system;
- ◆ the organisation of public transport (passengers or goods), except for own transport operated by public bodies or private companies.

For the implementation of these missions, the law forces by no means to call upon the public sector; the procedures of execution of these missions vary largely between passenger and freight transport, the public sector being much more present currently in the first than in the second.

Guaranteeing this right to transport and the reference to the public utility characteristic of transport implies an equal access to public transport, both in space (a public utility of transport in any point of the territory) as in the quality of service and pricing (e.g. equal treatment of the users).

4.2.3. *The implications for transport pricing.*

The right to transport does not imply a right to free transport but a right to reasonable conditions of access, quality and price. The conditions of access are dependent on decisions of the (local) community which has to make a trade-off between the satisfaction of these needs and the associated costs. However since mobility is the condition sine qua non of the effective realisation of other rights such as education, work and so on, there are evident limits to the level of prices.

This means that one can ask the user to pay a price for the rendered service. However, this price level of access is conditioned by the territorial equity constraint and the possible adaptations of actors facing price increase. In fact the diagnosis depends on the burden which will be finally born by the transport users. This burden itself depends on the extent of the price increase, the speed of this increase, and the possibilities to escape from the price increase.

For example, if the case of the road is considered, pricing can take various forms. Facing these pricing forms various adaptations are possible (cf. Table 6), apart from mode change (carpool, public transport, etc.) and trip suppression when this is possible.

Pricing measure	Possible actions of avoidance (other than change of mode)
fuel tax	to reduce consumption by trip chain optimisation, destination change, vehicle change
kilometre-based charging	to reduce mileage by trip chain optimisation, destination change
peak-period toll	to change the hour of travel
route toll	to change route
cordon or area toll	limited

Table 6 : Various possible adaptations facing road transport pricing

In rural distant locations, it can be in the economic interest of the community not to provide relevant public transport but only a road infrastructure. In that case this poses a limit to the speed of increase of say fuel taxes or possible road pricing.

Since the change in car ownership by households needs on average several years, an increase in fuel tax needs to be staged during several years, to allow car users to adapt to the new situation by changing their car for less consuming ones. Otherwise the sharp increase that would be needed for instance in order to reduce greenhouse gases emissions would be a high and unbearable burden for people living in rural areas.

The financial burden of kilometre-based charging can be lowered by reducing mileage by trip chain optimisation or destination change. Here again the possible adaptation by rural residents are limited, unless the authorities provide costly public transport everywhere or rural areas are emptied of their inhabitants and economic activities.

On the contrary when relevant public transport alternative is available, mainly in urban areas or on interurban relations, significant increases in road user charging could occur without coming up against the constraint of territorial equity, provided that public transport prices stay within reasonable limits.

Other examples concern air transport serving peripheral areas with no real alternative. There again the necessity to serve these areas at reasonable conditions implies limits to the price increase that would follow from say user-pays principle. This is the same principle on relations where air transport and rail high speed train are in competition. For instance if air transport price is to be increased because environmental concerns or congestion in airport, the price of train would be the standard to judge the appropriateness to the territorial equity criterion.

Accessibility to different parts of the territory should be guaranteed and is not allowed to decrease too sharply after the introduction or increase of transport pricing. Hence, governments have to make sure that there are real alternatives to non-minor increases in modal specific transport prices.

This dimension of equity is mainly supported by governments, consumers, ecologists and some economic representatives of the society (economic and social advisors councils). It is also used as argument by certain operators who consider themselves particularly aimed at by the pricing measures, in which they see a risk for a barrier to free trade.

4.3. Horizontal equity and the principle of equality of opportunities

According to this principle, the society must guarantee an equal and impartial treatment to all citizens. This equal and impartial treatment first of all implies the application of the principles of non-discrimination between citizens, and *a fortiori* between users of transport modes. The legal principle of non-discrimination is fundamental in the EU and the Member States legislation and its implication as regards transport pricing will first of all be analysed. However equal treatment translated in economics leads naturally to the user-pays principle, i.e. of coverage by the user of the costs which he/she induces for the society. In the second place it will be shown that this equal treatment enters in conflict with economic efficiency.

4.3.1. *Non-discrimination and transport pricing*

Non-discrimination is embodied in article 2 of the United Nations Declaration of Human Rights where it states that '*Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status*'.¹⁰

The legal principle of non-discrimination is quite fundamental to both national and supranational legal systems. However, there is an important difference in the underlying logic and objectives of the non-discrimination principle in the national legal systems in Europe and the EU legal system. This has implications for the creation of socially acceptable transport pricing systems. The non-discrimination principle in the EU legal system prevents measures that might improve the acceptability (or fairness) of a proposed pricing scheme. The non-discrimination principle appears not to be synonymous for acceptability as acceptability may require discriminatory use of revenues or discriminatory differential pricing from an EU point of view.

This section gives a short overview of the current state of affairs concerning the concept of non-discrimination in the European national legal systems and the European context (EU) respectively. The insights will then be translated into the implications and problems for the organisation of socially acceptable transport pricing schemes.

4.3.1.1. Non-discrimination in national legal systems: equality

In national legal systems the principle of non-discrimination is usually provided for by the principle of equality. The difference between both principles is that the prohibition of discrimination is a negative obligation, while the equality principle is a positive obligation.

Almost all States admit that a principle of equality, very often comprising a non-discrimination principle that also applies to non-nationals, should constitute a basic motive of their legislation. However, their national systems do not prohibit discrimination in general.

¹⁰ It should be noted that this definition of non-discrimination does generally not prohibit price discrimination that is common to the transport sector. Price discrimination is based on the willingness to pay or charging what the traffic can bear. Hence, price discrimination is purely monetary (depthness of the pocket). It does not imply that people are treated differently just on the basis of distinctions such as mentioned in the Declaration.

States do not regard non-discrimination as an absolute right that applies to any situation. The principle of non-discrimination in national legislation is limited to well-defined situations. Hence, the principle of non-discrimination is not mentioned in the supreme laws. The principle of equality is used instead as a more relative concept. The definition and application of this principle to specific situations is often entrusted to courts and law-makers that are able to translate (into ordinary laws) the principle of equality into a more absolute provisions on non-discrimination in specified cases and conditions.

4.3.1.2. Non-discrimination in EC law

The principle of non-discrimination is especially important for the realisation of the main objective of the EC-Treaty, i.e. the realisation of the Internal Market comprising of an area without internal frontiers in which the free movement of individuals, goods, services and capital is ensured (art. 14). Hence, the principle relates to non-discrimination on the basis of nationality in order to prevent any distortion of competition and any other hindrance for the free movement of individuals, goods, services and capital. This has resulted into a very strong concept of non-discrimination.

Article 12 of the Treaty is the general provision that prohibits discrimination on grounds of nationality within the sphere of operation of the Treaty. With regard to transport pricing two situations can be distinguished. First, transport pricing is considered as a form of taxation. In this situation article 90 on non-discriminatory internal taxation will apply. Second, transport pricing is not considered as taxation but may restrict the free trade of goods and services. In this situation article 28 on restrictions to the import of goods and article 49 on the prohibition of restrictions to the provision of services apply.

Non-discriminatory taxation

Member States are free to establish the taxation system that they consider most suitable in relation to each product and to differentiate identical products on objective grounds consistent with the Treaty. However, the system must be free of any discriminatory or protective effect based on national grounds.

Free movement of goods

Article 28 provides for the prohibition of quantitative restrictions and measures having equivalent effect on imports and exports. If it is alleged that a national measure amounts to a measure having equivalent effect to a quantitative restriction on imports it will invariably be sufficient to show that it discriminates against imports.

Free movement of services

Article 49 provides that restrictions to provide services within the Community are prohibited in respect of nationals of Member States who are established in a State of the Community other than that of the person for whom the services are intended. Article 49 requires not only the elimination of all discrimination on grounds of nationality but also the elimination of all restrictions - even those applying equally to national and non-nationals alike – that might prohibit or restrict the activities of a service provider established in another Member State, where the latter lawfully provided the services in question.

4.3.1.3. Conformity of Green Paper proposal to the non-discrimination principle

The pragmatic interpretation of the equality principle in national legal systems does hardly have any consequences for the organisation of socially acceptable transport pricing systems. This is in sharp contrast to the strong non-discrimination principle of the EC-Treaty.

In articles 90, 28 and 49 of the Treaty discrimination is considered to exist when similar situations are treated in different ways (formal discrimination) or when different situations are treated in the same way (material discrimination), changing the relative competitiveness of products or services of different nationalities.

The Green Paper 'Towards fair and efficient pricing in transport' aims at charging vehicles for the total cost of each trip (so that the costs of infrastructure, emissions, accidents and congestion are covered) by taxes or prices that are at the point of use, so that only economically justified trips are undertaken and allocative efficiency is realised. There can be no violation of the EU principle of non-discrimination as long as this pricing rule is followed. The consistent application of this rule will lead to accurate relative prices between different modes and users, regardless of nationality.

To sum up, establishing such a non-discriminatory treatment is the kind of fairness that the Green Paper aims at. However, as shown below, this principle contradicts the efficiency principle based on social marginal cost pricing.

4.3.2. *The contradiction between fair pricing and efficient pricing*

The total cost responsibility of a particular transport user category should refer to the total cost $TC = TC_{\text{prod}} + TC_{\text{user}} + TC_{\text{ext}}$, comprising the producer costs, the user costs and the external costs. By dividing the total cost by the total traffic volume, we get the sum of the three average costs, $AC_{\text{prod}} + AC_{\text{user}} + AC_{\text{ext}}$.

When we speak of 'cost responsibility', we should withdraw AC_{user} which is already privately supported by the user. This means that the cost responsibility finally comprises the two average producer costs and external costs.

However optimal - or efficient - pricing supported by theory and advocated by the Green and White Papers is the marginal social cost and more precisely the price-relevant marginal cost (see section 2.2.1). As already said in this section, the price-relevant marginal *producer* cost falls well short of the *producer* average variable cost. Evidence given in Annex 1 (see section 4 of this annex) and also by Roy (1998) shows that there is no coincidence between full-cost recovery pricing and marginal social cost pricing.

Indeed, given the fact that the current cost recovery ratio is about 60-70% for roads and 50% for rail (Roy, 1998), the full cost recovery pricing would require a reduction in the price of the road use relative to rail. On the contrary, marginal social cost pricing would require an increase in the price of the road use relative to rail. To sum up, with regard to efficiency, full cost recovery pricing would involve over-pricing with under-use of rail, and under-pricing with over-use of road. This is not exactly what is searched for.

On the other hand, given the congestion and external costs that occur in urban areas, efficient pricing of roads would yield a significant over-recovery of infrastructure costs. As a

whole it is expected that this over-recovery on congested infrastructures (some urban roads, some airports, etc.) would balance the under-recovery for other infrastructures.

This problem is recognised in the White Paper (p. 15): marginal social cost pricing would not guarantee cost recovery for every individual infrastructure project, however it would generate sufficient revenues to fund the transport system's infrastructure capital costs as a whole and pay for further investments.

Part of the solution is implicit in this last note and in the formulation of the total cost responsibility. Since according to theory (Baumol and Oates, 1988), the sufferers of externalities should not be compensated for, the issue is whether or not the revenues from internalisation, be it congestion or other external effects, could help to cover infrastructure costs.

4.3.2.1. Infrastructure cost coverage with revenues from congestion pricing

The first solution which is advocated by Roy would involve implementation of congestion pricing in urban roads and hypothecation of the surplus for financing infrastructure of other modes. To maintain a kind of productive efficiency with cost recovery, the efficient price and the transfer would be defined in an *ex-ante* contract, in order to avoid returning to *ex-post* financing of deficits¹¹.

Of course this idea of transfer has been clearly foreseen by the operators, the infrastructure providers and the road users. They firmly reject the idea of cross-subsidies between modes (see above section 3.2). On the contrary, rail operators hope to get substantial funds from this mechanism in order to cover the fixed costs of their mode.

A second solution is related to the expected revenues from the internalisation of external environmental effects, as further explained in 4.3.2.2 below.

4.3.2.2. The possibility to set off an externality charging surplus against a transport infrastructure (TI) service pricing deficit

With regard to the threat of global warming, CO₂-emissions can be regarded as an extremely increasing cost externality. The marginal external cost is indeterminate up to the emission constraint imposed, where it becomes vertical. There are no sufferers of this externality to be compensated, as long as the emissions are kept within the limits. The whole revenue from CO₂ taxes can be set off against the total costs of the infrastructure used by the fossil-fuel burning modes of transport.

Evidence shows that in a number of European countries the total petrol tax excluding the CO₂-tax exceeds by far the price-relevant costs of non-urban car traffic (see Annex 1, section 7.2). In a number of European countries the price of petrol at the filling station is

¹¹ Such kind of contracts exist already, for instance, in France: in urban public transport, more than one-third of the contracts between the urban authority and the operator include *ex-ante* setting of the fares level and the subsidy by the urban authority, and making the operator bear both the industrial and the commercial risk. Despite the fact that these contracts only cover the provision of transport service, they could constitute the basis for further elaboration of 'intermodal' urban travel agencies covering services and infrastructure related to all modes.

about 1 ECU per litre, of which 0.8 ECU is tax, whereas the price-relevant cost on non-congested non-urban roads expressed per litre of petrol is no more than 0.2 ECU. This relation is to some extent disguised, i.e. by giving suggestive names to different tax components like 'energy tax', and by calculating the value-added tax *after* all other taxes have trebled the petrol price. The petrol tax is a very important source of revenue for central governments and a petrol tax reduction down to the level of the price-relevant marginal costs would be very difficult for financial reasons.

For urban and, in particular big city's road networks the picture looks quite different. The total petrol price is too low to cover the price-relevant marginal cost of congestion, accidents, noise, and emissions of NO_x, HC, CO, and VOC. Raising the petrol tax to bring the price of urban road use in line with the price-relevant cost is obviously not the right way to go. The urban net benefits of such a policy could easily be offset by non-urban drawbacks. On the contrary, separate urban road pricing is likely to be the right way. If that way is chosen, the remaining question concerning non-urban car traffic is: what should be done about the current excess tax on petrol in this sector?

The CO₂ tax is the crucial factor in this connection. For instance in Sweden the CO₂ tax is high in relation to international standards but it is still far too low for achieving the objective of substantial CO₂ emission reduction (unless something radical is done by other measures in other sectors using fossil fuels). Quadrupling the current CO₂ tax is probably necessary for keeping within the desired emission limits. This would wipe out the 'excess tax', but nothing else so far as non-urban car traffic is concerned. The only thing that would be achieved is that petrol taxes change names. The real effects of such an ambitious climate policy would arise in sectors other than interurban car travel, first of all in urban traffic, where road pricing would have to be introduced to match the price-relevant costs of congestion, accidents, and other externalities, since the petrol tax is mainly used to curb CO₂ emissions.

By combining prices for the TI-services and externality charges on fossil fuel, sufficient revenue over and above hypothetical compensation payments to the sufferers of the negative externalities can be created to cover the total producer costs. The main precondition for this happy state of affairs is, however, that the goal of reducing CO₂ emissions gets high priority, and the cost-efficient measure of a common CO₂ tax for all sectors and all countries to reach this goal is adapted. This precondition also implies that separate urban road pricing is introduced.

4.3.3. *Which perimeter has cost coverage to be about?*

The recognition of the difficulty in pursuing the goals of both efficiency and horizontal equity, at the level of a given infrastructure, should not bring to an acknowledgement of powerlessness. At the same time one should not stop at the note that the efficient pricing principle is likely to achieve a full cost coverage on the scale of the whole transport system. In this case, indeed, the deficits of the ones would be made up by transfers of the others, decided on the level of the central government, and the incentive to the productive efficiency would be lost: the risk is indeed always great of a dilution of the responsibilities of the operators and users, which would result in perpetuating the recurring deficits that the Commission wishes to see disappearing.

A first principle would be thus to decentralise as much as possible the control of the investments in infrastructures of transport according to both a space and multi-modal approach. This approach initially consists in co-ordinating the policy of investment no longer of transport modes considered separately, but of *services* of transport on a given area or a given relation. Then the financial (requirement for costs coverage) and pricing control (requirement for economic efficiency) would not thus be done anymore by mode but overall on the level of the service.

That would mean, for example, that within a given urban area instead of having, on the one hand, a policy of road investment following its own logic and, on the other hand, a policy of public transport according to another logic, a single manager of infrastructure would be in charge of managing a policy of travel service economically efficient and covering its costs. For example, the receipts resulting from congestion pricing (on roads and in public transport) would be used indifferently to cover the infrastructure costs of the various modes. The choices of investments would in addition be controlled by a cost-benefit evaluation comparing the various modal and even inter-modal alternatives.

In the same way one can imagine that on a corridor of national or international freight a single infrastructure manager is in charge of managing the infrastructures of road, railway and combined freight transport according to this same economic specification.

Moreover, in order to prevent that the transfers of receipts of pricing between operators and users of various modes are subject of continual political debates which would sterilise any investment decision, it is advisable to institutionalise such transfers by regulatory or legislative procedures.

This requires state of mind and institutional changes¹² whose one should not underestimate the difficulty. However, the predecessor of such agencies or 'transport funds' exists already even if they have only certain characteristics compared to the specification stated above (cf. Box 3).

Box 3: Examples of 'transport funds' in France

In France, the law for the development of the territory in 1999 created the 'multi-modal plans of collective services for passenger transport and for goods transport' at the national and regional levels. It is a change of approach compared to the previous laws which recommended a separate approach by mode. However these are only master plans to co-ordinate the investment policy. To finance these plans, the law set up a fund for the investment of ground transport and waterways (FITTVN). It is fed by a tax on motorway tolls (0.006 Euro per travelled kilometre) and a tax on the hydroelectric energy production in plants established on the inland waterways. The largest share comes from motorway tolls. This fund (about 0.6 billion Euro in 1998) is spent primarily for road and railways. Since 1998 the share of the railways has increased quickly until dominating. In that it was following the governmental orientations of 1997 towards a re-balancing in favour of rail. The taxes are

¹² the governmental levels of intervention will be discussed in chapter 5.

voted each year by the Parliament within the framework of the finance law. This fund is guided by considerations of financing and not of economic efficiency in a strict sense.

In big urban areas, there exist urban travel agencies devoted to public transport and funded by public subsidies, receipts from public transport users and the 'versement-transport', a tax levied on employers. Each agency generally contracts private operators on the basis of an *ex-ante* setting of the fare levels and the subsidy, and the operator bears both the industrial and the commercial risk.

4.3.4. *The fear of discrimination against transport users and operators as a whole*

The fact of levying taxes whose amount can reach important levels poses political problems that condition their acceptability. One of the main fears of these actors with regard to the introduction of pricing is that it will be considered as 'just another tax'. This is especially the case for road transport operators who fear discrimination between the transport and other economic sectors, road infrastructure providers who claim earmarking for their own infrastructures and car users who see in pricing a pretext to increase taxation.

Taxation has generally a clearly negative connotation while pricing does not. Non-earmarking, which is a standard for taxation, feeds fears of 'Predator State' as the receipts of the tax disappear in the depths of the public budget (see above section 3.1).

A first answer would be to choose for a mechanism of pricing rather than taxation. The implementation of new toll roads with a sufficiently high toll to guarantee fluidity or speed is a means of making the user pay for avoiding the congestion or gaining driving comfort. The price paid is the counterpart of a service rendered. This characteristic could explain the rather broad acceptance of the introduction of new toll roads, when they are added to the existing capacities without these last being amended. Similarly a new express public transport service is a clear counterpart to a higher price for users willing to use this service.

A further answer is possible within the 'transport funds' (see above). The use of revenues of congestion charging within the perimeter of such 'transport funds' with the specification of efficient pricing and cost coverage could be a way to defuse the criticism about 'just another tax'.

However this is not recommended for environmental taxes. Earmarking of pollution tax revenues to the transport sector involves the obvious risk of returning the money to the polluter and a lack of incentive not to pollute. It implies also some rigidity in the use of receipts whereas an optimal ecological policy can require a more global solution, while receipts could be used for reducing other taxes.

Nevertheless if earmarking to the transport sector is rejected for any reason something needs to be done to lower the feeling of 'double taxation'. In that case it is difficult to escape from an inventory of the current taxation system (see Deliverable D1), and a balance sheet of costs and tax revenues. There are for instance recurrent controversies about the status of fuel taxes which are an important source of revenues for governments. Road operators and users claim that the taxes they already pay can balance (in an accounting sense) current road infrastructure expenses or even the environmental costs of road transport. This is why a means to increase the acceptability of any drastic change in taxation would then have to

clarify the status of each current and future tax or price component (e.g. to cover pollution, noise, or a counterpart of a right of use, etc.).

This horizontal equity through the user-pays principle is central in the argumentation of the Green Paper. It finds a very strong echo in the question of discrimination with the operators and the users of the various modes, and to a lesser extent with the central and local governments.

4.4. Vertical equity and the principle of difference

This form of equity is related to the ‘difference principle’. It consists in judging the result of the policies in the view of the welfare of the most disadvantaged, which is necessary to maximise. Its translation in terms of transport policy implies to consider the travel conditions of the most socially penalised individuals or groups.

Given that the realisation of the social rights implies the right to transport (cf. supra) and that very often social and space segregation go hand in hand, the application of this principle consists in taking care that the situation (a) of the poorest categories (e.g. criterion of income) and (b) of the least best served areas is improved.

It is necessary to specify, however, that this principle of vertical equity applied in the geographical sense is not synonymous for that of territorial equity: indeed, according to the latter, it is the freedom of access that must be maintained on the whole territory, whereas according to the principle of vertical equity, it is the situation of access of the least best served areas which must be improved. The rich landlord living in a distant country will not have valuable arguments to ask for vertical equity but will have valuable arguments to ask for an access infrastructure maintained in good state according to territorial equity (principle of liberty).

4.4.1. The situation of most penalised people

How can transport pricing challenge the situation of the most penalised groups? The question can be treated by giving interest to the adaptability of behaviours *vis-à-vis* pricing measures, which can be very different (see Table 6).

A tax proportional to consumption (e.g. fuel taxes) or to mileage is generally regarded as a progressive tax but this can change according to the situations of captivity towards the car.

In general in Europe fuel taxes look progressive since, on the one hand, many poor households do not own a car and, on the other hand, among car owners wealthier households tend to drive more than poorer ones (Banister, 1994; Rothengatter, 1994). However given the fact that the use of the car is spreading among all levels of the population and that cars become more and more a necessity to access activities where no transport alternatives exist, the picture may be slightly changed. For instance, in the UK evidence suggests that the petrol tax is progressive within the UK population at large and regressive within the UK motoring population. However, it is less regressive than it might be expected in that latter population, since better off people tend to drive much further away than poorer people with cars (cf. IPRR 1998). The most serious problem hits poor rural motorists but

not rural motorists in general. The debate is more acute in North America where the car captivity is much higher, while also wealthier households travel more than poorer ones (for references on this debate, see Litman, 1997).

On the other hand, a fixed toll for each car trip into an area concentrating employment, for example, 2 Euro for the entry into the area would be regressive because it represents larger portion of income for a low-income driver than for a high-income one. This regressive effect could be counterbalanced by the fact that richer people travel more but reinforced because the latter would profit more in time savings due to their higher value of time. In parallel commercial businesses and users may be advantaged in the same manner because of time savings.

In the event of peak-period tolls, in addition to the regressive character of a fixed tax, the possibility of changing hours is in general larger for the upper management staff and more generally workers with higher incomes: that would also reinforce the regressive character of the tax.

In short, these examples show that there is no general answer on the progressive or regressive character of transport pricing. However transport pricing is likely to weigh down the invoice for the poorest. The principle of vertical equity thus implies to seek means of minimising these negative effects, even to redistribute the revenues from pricing in favour of the most socially penalised groups.

4.4.2. The situation of access to the most penalised areas

The economically most penalised groups are often concentrated in certain areas or certain districts of great agglomerations. In fact these areas are accessible for their housing because the land values are lower than elsewhere, often because they are distant and less well served by transport. Vertical equity relating to the most penalised groups thus implies to have a particular concern for transport services in areas currently least well served.

A study in the Paris Region (Polacchini and Orfeuil, 1999) shows some evidence on the expenses of households (tenants and homebuyers, for whom data are available) on both housing and transport. This region, like most European conurbations, is characterised by higher costs of housing in the central districts and a regular decrease when moving away from the centre. In this movement housing costs are decreasing but transport costs are increasing. With regard to the overall budget, housing plus transport, there is a decrease in this budget per square meter of dwelling, when moving away from the centre. However with regard to the proportion of the household budget taken up by housing and transport, there is an increase of this ratio when moving away from the centre.

Such figures suggest that a proper attention must be given to transport services in different areas of a conurbation or region: more specifically, the vertical equity principle implies that the service of the most service-disadvantaged areas must not be worsened.

4.4.3. Redistribution towards the penalised groups or areas

The various possible forms of redistribution allows for the minimisation of negative effects of transport pricing on the most socially disadvantaged groups and on areas most badly served.

Certain forms of redistribution consist in making indirect beneficiaries of the transport system bear the adaptation: for example, in case of congestion pricing this can be an incentive or regulatory actions towards the employers in order to make more flexible working schedules for their employees. That makes it possible to increase the adaptation margin of the latter so that they can reduce their burden.

Other forms of redistribution consist in making the most penalised groups benefit from revenues of pricing, that is to say:

- by a social pricing whether in public transport or on the road (fare reductions unemployed or low income people, etc.)
- by an increase in the quality and quantity of alternatives through public transport because it is the level of accessibility by alternative modes which will make acceptable in the view of equity measures, which would restrict automobile accessibility in certain areas,
- by a reduction of existing regressive taxes,
- by the improvement of social services in favour of the most penalised populations.

There are examples of redistribution in the case of road tolls such as the reduction of the taxes in Singapore related to the recent extension of the toll system. In Oslo (Norway) the receipts of the road toll are partly used to improve public transport. One also finds in the literature several proposals to facilitate the coalition of interests around transport pricing, on the basis of redistribution of its benefits, in the case of road user charging (Goodwin, 1989; Small, 1992).

These are general principles of redistribution or compensations, and several stumbling blocks are to be avoided in the implementation. It is necessary, for example, to take care to avoid compensations to motorists in general because this would destroy the incentive to change behaviour. In the same way the redistribution should not benefit of the central city which, at least in Europe, generally concentrates employment and the richest households. This type of redistribution would be perceived like an obvious racket of the ('rich') central city to the detriment of the ('poor') suburbs.

However, the allocation of revenues from transport pricing and fiscal measures can change the relative prices and, consequently, the relative 'competitive' positions of transport modes and users. This could raise a discrimination issue.

4.4.4. *A discrimination issue*

Social considerations can be a valid reason to deviate from non-discriminatory transport prices/taxes in order to increase the fairness/equity of a transport pricing system. This will be especially true for lower income groups that do not have a real alternative in terms of changing travel behaviour. Hence, a number of other relevant factors will have to be taken into account when designing socially acceptable pricing schemes, such as impact on income, availability of alternatives, etc. Since only nationals will benefit from the resulting compensatory measures, it is likely to violate the EU non-discrimination principle. However, such deviations from the efficient pricing rule may prove to be a *sine qua non* for getting a transport pricing scheme implemented.

This also immediately touches upon the issue of revenue spending. Relative prices will not change if prices are aligned to costs and the resulting revenues are used to cover those

costs. However, relative prices will change if certain transport users receive in one or the other way a (partial) refund of the price paid while others do not (i.e. similar to a direct decrease in price or tax). This constitutes discrimination for some transport users. It should be noted that articles 90, 28 or 49 of the EC Treaty prohibit such a measure if those transport users are from different Member States.

This can be a deliberate choice for social and acceptability reasons (see above), but it can also follow from the type of cost involved. Some costs do not have a real counterpart where to spend the revenues on (e.g. congestion costs). Besides, the national government's accounting system will not always allow for earmarking of revenues while simply increasing the general budget is no real option due to acceptability reasons.

In those cases, a general restitution of revenues to citizens may be appropriate. However, this will only concern nationals and may violate the non-discrimination principle, especially if it is done through a general reduction of income taxation instead of a reduction of less optimal forms of transport taxation.

In any case, compensations or restitution of revenues to certain income groups should not be imputed at the point where the costs are caused otherwise the social benefits of introducing transport pricing will diminish/vanish. However, the main risk of directly or indirectly compensating or returning revenues to certain income groups is that this 'fair' approach infringes articles 90, 28 or 49 of the EC Treaty as only nationals will be compensated.

This worry about vertical equity is expressed by central and local governments. It is also found within a category of operators, those of public transport. Moreover it is present in the consumers who fear a social discrimination based on income.

4.5. Conclusions

Three dimensions of equity were identified and certain contradictions among these dimensions and between them and the objective of economic efficiency were raised. The relationships between these dimensions of equity and efficiency are illustrated in Figure .

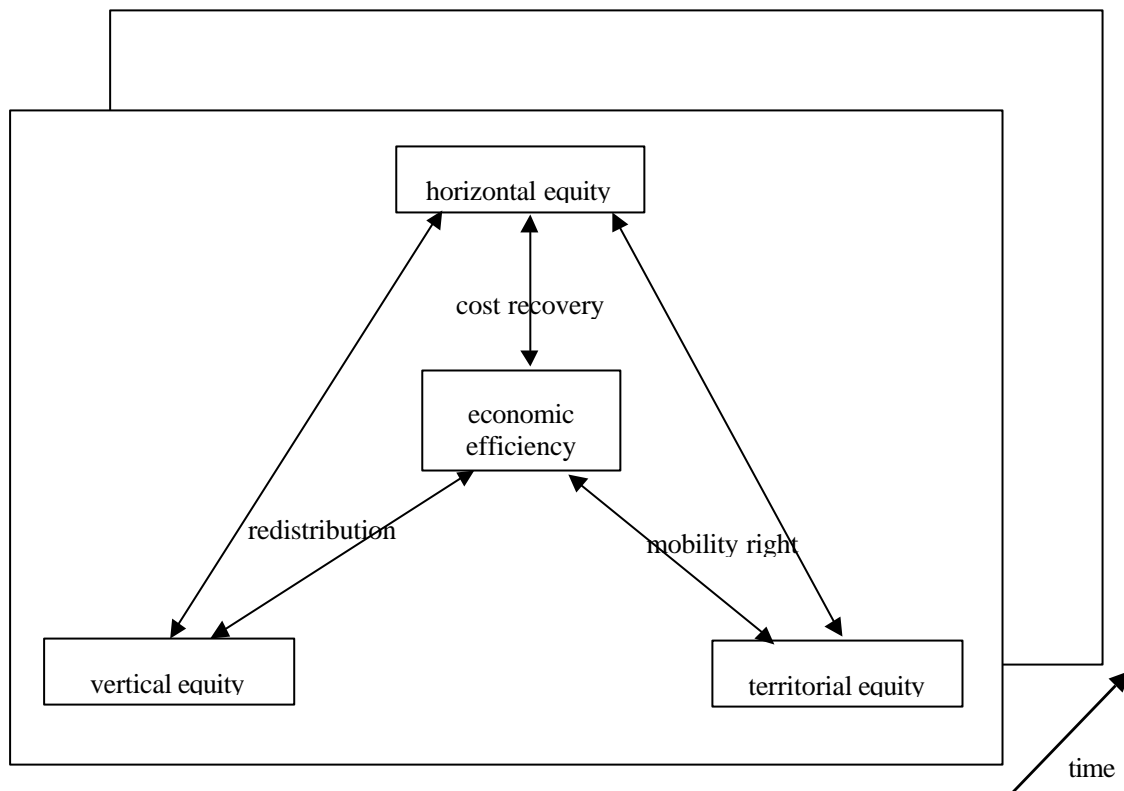


Figure 3 : Relationships between equity dimensions and efficiency

The economic efficiency and the horizontal equity can each one involve price increases going against vertical equity (attention paid to most penalised). Conversely, vertical equity requires mechanisms of redistribution or compensations, which challenge the economic efficiency of pricing and the user-pays principle of horizontal equity.

The economic efficiency and the horizontal equity can also each one involve price increases going against territorial equity, while challenging the right to mobility. Conversely, the preservation of this right requires investments and imposes limits on the prices, being likely to challenge the economic efficiency of pricing and the user-pays principle of horizontal equity.

Finally the economic efficiency and the user-pays principle of horizontal equity are generally incompatible, but some compatibility can be found within the framework of 'transport funds': horizontal equity is not required anymore mode by mode but from the point of view of a transport service within the perimeter of the 'transport funds'.

The implementation of changes in transport pricing implies the necessity to observe this framework in a longitudinal way along time according to the four entries of economic efficiency and equity:

- Economic efficiency implies changes in pricing, including pricing something that was previously perceived as 'free'. Some actors may consider themselves as losers, i.e. perceive a degradation of their own situation, when compared to the period before the implementation of the new pricing measure (e.g. 'I pay more than before without drawing from it more benefit'). Reluctance to such price increase can be in some cases overcome if higher quality or capacity is delivered. However pricing changes may conflict with the following equity dimensions.

- Territorial equity or principle of liberty, implies the free exercise of the right to mobility of people and goods. On the one hand, the maintenance of this freedom imposes obvious limits on the increase in transport pricing and, on the other hand, this freedom remains contained within the limits of the general interest of the society.
- Horizontal equity or user-pays principle, implies a better coverage of the costs by the users. However with pricing changes implied by this equity principle some actors concerned may consider themselves as losers comparatively to the others (e.g. ‘I pay more than the others with regard to the costs that I inflict and to the advantages that I bring to the society’).
- Vertical equity or principle of maximisation of the situation of most penalised groups or areas, implies that any policy which is likely to worsen the situation of the least advantaged groups or the least best served areas, or even which openly does not aim an improvement of these situations, is very likely to be rejected. It results from this that the principles of allocation of revenues from pricing play, by their more or less distributive character, a central role in the acceptability of pricing.

The governments and the different interest groups position themselves in various ways compared to these dimensions of equity, as shown in the analysis of the stakeholders reactions (cf. section 3.2). These relative positions are illustrated in italics in 4. The European Commission, the operators and users of the various modes and the governments are found around the question of horizontal equity. The European Commission and the governments are found around the topic of the economic efficiency, which reflects the *collective* character of this optimisation criterion. On the other hand, the governments, the public transport operators and the consumers are found around vertical equity. Finally, governments and consumers together with ecologists and other economic representatives are found around the topic of territorial equity.

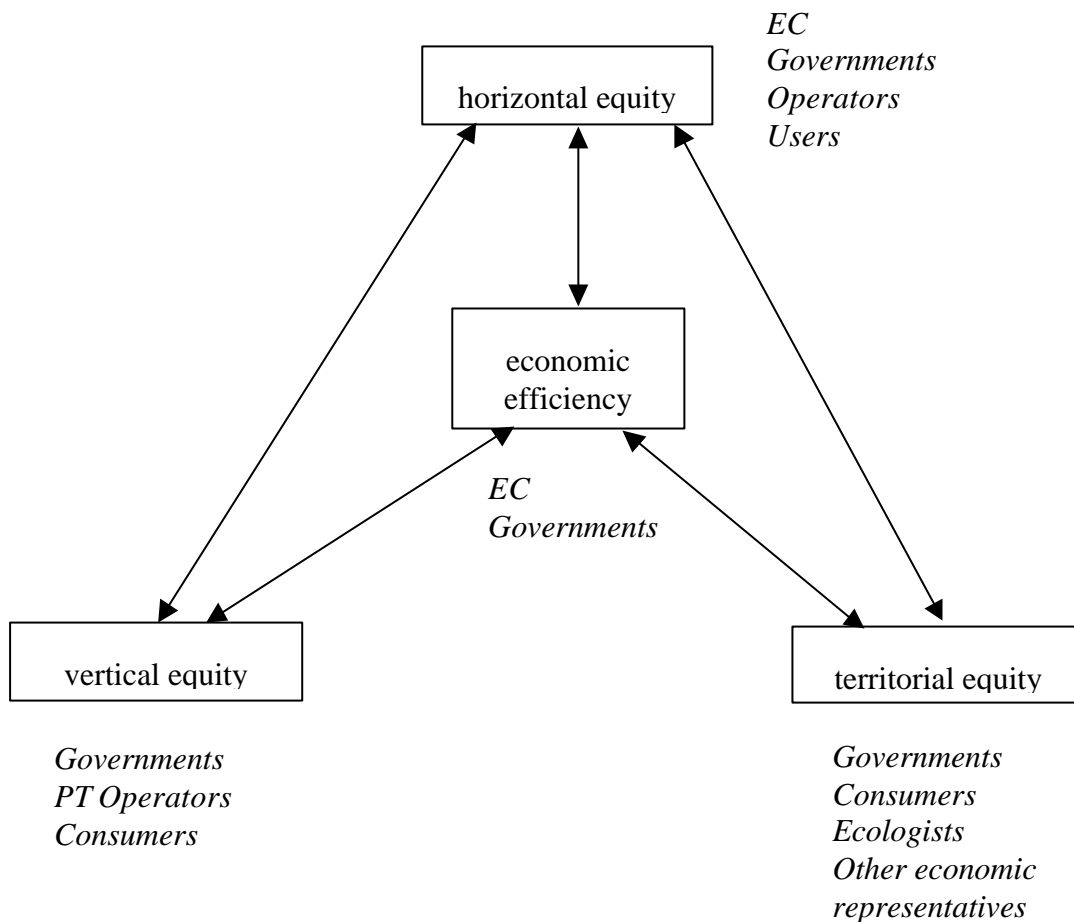


Figure 4 : Actors positions on the map of equity

However these three dimensions of equity are indivisible from the perception of the fairness of a transport policy. They are also related to the criterion of economic efficiency, which cannot be durably ignored. This set of contradictory constraints thus forms the framework for the definition and management of transport policies which aim at being both equitable and efficient. It results from these incompatibilities that one will obtain at best only an imperfect compromise between the economic efficiency and these three dimensions of equity.

A possible strategy consists in starting from the couple horizontal equity – economic efficiency around which the controversies between public authorities, operators and users are established. These controversies can be solved through the concept of ‘transport funds’ mentioned above, which combines the principles of efficient pricing and costs coverage in a perimeter defined by a given area or relation and a set of transport modes. The two former principles would form the heart of the specification of such ‘transport funds’. The two dimensions of vertical and territorial equity would be added to this specification, but with a political and financial commitment of the public authorities to cover the additional costs which would result from this addition.

5. ORGANISATION OF TRANSPORT PRICING BETWEEN DIFFERENT LEVELS OF GOVERNMENT¹³

As described in chapter 3, several relevant actors can be discerned in the policy-making process. On the ‘demand’ side operators, users, citizens, producers and interest groups are active, and the ‘supply’ side is dominated by politicians and bureaucrats. All these actors have their own interests, their influence on the outcomes of the policy-making process and their own ideas about acceptability. However, the outcomes of the policy-making process not only depends on actors but also on institutional constraints. As concluded in section 3.1 ‘the outcome of this process is determined not only by the preferences and interests of the various actors but, even more importantly, by the restrictions, i.e. the institutional interactions and the institutional constraints’.

This chapter goes deeper into institutional constraints in the field of transport pricing. Speaking about institutional constraints in transport pricing a fair and efficient task division between different levels of government is a key issue. For example, in many discussions on transport pricing the subsidiarity principle plays a role. Undoubtedly there are more institutional constraints than those related to different levels of government and their interaction. But especially in the field of transport pricing a fair and efficient task division between different levels of government is a complex issue because often transport related problems are not related to one specific geographical level. And in addition, currently several levels of government are active in the field of transport pricing.

This chapter highlights some important institutional constraints and discusses the roles that different levels of government could play in the implementation of pricing schemes in order to overcome these constraints.

Section 5.1 deals with different levels of government active in transport pricing. Section 5.2 describes some key principles that can be seen as guidelines for achieving an adequate task division between levels of governments. Section 5.3 focuses on some institutional constraints in the current task division in transport pricing and discusses recommendations how to overcome these constraints and how to avoid future constraints. In other words, this paragraph will describe which roles levels of governments could play in the implementation of transport pricing schemes within the boundaries of the principles described in section 5.2. In section 5.4 conclusions are drawn.

5.1. Levels of government

Several levels of government are to some extent involved in the implementation of pricing schemes in the transport sector. The European level is relevant because EU aims at harmonisation and non-discrimination. The European Community would like to establish a European-wide free transport sector with equal conditions for each Member State and all transport modes. The national level is important because the fiscal competence is normally

¹³ This chapter is based on a paper by Tjaco van den Berg and Arthur Gleijm, NEA Transport research and training; see the complete paper in Annex 4.

concentrated at the national central level and thus until now many transport pricing activities are initiated and implemented at Member State level.

Besides the European and the national level, the global level is relevant, especially concerning air transport pricing. A European duty on kerosene is likely to effect the competition position of Europe versus other parts of the world. Therefore the feasibility of a pricing measure implemented at a global level should be discussed. Another relevant level for the execution of pricing tasks is the level of co-operating countries. The 'Eurovignette', for example, is a common road user tax of six co-operating countries.

Looking at the sub-national level, the regional and the urban level are important. Several regions have special characteristics justifying specific attention. For example, the Brenner region in Austria is facing an enormous high level of transit transport. The urban level can be important because of the high level of transport activities in and around large cities. Many cities are confronted with congestion, noise and pollution problems.

So basically the following levels of government play a role in the discussion on transport pricing schemes:

- ◆ Global level
- ◆ European level
- ◆ Level of co-operating countries
- ◆ National level
- ◆ Regional level
- ◆ Urban level

In order to be able to grasp this complex problem, both some principles and perceived problems will form the basis for the discussion concerning what roles the different levels of government could play in the implementation of transport pricing schemes.

5.2. Principles

Annex 4 contains a summary of the current and planned legislation and policy concerning transport pricing and highlights some problems concerning the co-operation between levels of government. The two main institutional constraints are discussed in section 5.3. In the following sections some principles concerning the allocation of tasks to various levels of government are worked out in order to be able to clarify the related problems and to provide suitable decision-making tools.

5.2.1. Principles of subsidiarity and proportionality

Subsidiarity is a general principle, originating from clerical law. Historically this principle pleaded for laying responsibilities down at the lowest level possible. The EU adopted this principle concerning the relation between European and national responsibilities.

The principle of subsidiarity is formally laid down in article 3b of the Treaty establishing the European Community. This article states that *'in areas which do not fall within its exclusive competence, the Community shall take action, in accordance with the principle of subsidiarity, only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community'*.

The formulation of article 3b is far from concrete. Therefore, during the summit of Amsterdam, the Council discussed how this principle could be put into practice. The final outcome of this discussion is laid down in a 'Protocol on the application of the principles of subsidiarity and proportionality'. This Protocol gives three guidelines that have to be fulfilled in order to justify Community action. These guidelines are:

- ♦ The issue under consideration has cross-national aspects, which cannot be satisfactorily regulated by action by Member States.
- ♦ Actions by Member States alone or lack of Community action would conflict with the requirements of the Treaty.
- ♦ Action at Community level would produce clear benefits by reason of its scale of effects compared with action at the level of the Member States.

The reason behind this renewed interest in the subsidiarity principle has to do with 'shared competence'. In some cases, like the antitrust policy and the agricultural policy, the European Union has its own responsibilities. But in other cases, like the transport policy, the European Union only has shared responsibilities. In such cases the co-ordination between the European and national level is important. It seems that several national governments are reluctant about too much involvement of the EC with these issues. Therefore they strongly insisted upon an explicit statement concerning the subsidiarity principle. This led to the aforementioned Protocol, which is annexed to the Treaty establishing the European Community.

A related principle, also formulated in article 3b of the EC-Treaty, is the principle of proportionality. This principle is formulated as follows: any action by the Community shall not go beyond what is necessary to achieve the objective of this Treaty. One of the key elements of proportionality is that the instruments used to achieve an objective should be proportionate to the expected benefits of that policy. Nevertheless, this principle is still difficult to apply in practice. Therefore, this principle is also worked out in the 'Protocol on the application of the principles of subsidiarity and proportionality'. The principle of proportionality is laid down in two guidelines:

- ♦ The form of Community action shall be as simple as possible, consistent with the satisfactory achievement of the objective of the measure and the need for effective enforcement.
- ♦ Community measures should leave as much scope for national decision-making as possible, consistent with securing the aim of the measure and observing the requirements of the Treaty.

Now these general principles have to be applied to a transport pricing policy. In general, the subsidiarity principle pleads for a government level as close to the people as possible. Regional and national government are favourites with regard to pricing policy tasks, unless the Commission has sufficient arguments for Community action.

The following question is whether there are enough reasons for Community action in the field of transport pricing. Since the European Community has shared competence for action in the field of transport pricing, objectives like harmonisation and non-discrimination are important arguments for EU-involvement. Besides this, it is clear that transport problems have cross-national aspects, which cannot be satisfactorily regulated by Member States' actions, while action at a Community level would produce clear benefits by reason of its scale of effects.

For example, the problem of CO₂ emissions caused by transport activities most likely can be tackled more efficiently on a European level. In principle it can be concluded that according to the subsidiarity guidelines there are sufficient reasons for action at European level in the field of transport pricing.

The next question is how far these Community actions may reach. For this question the principle of proportionality is relevant. In this context, the principle of proportionality puts a limit to the scope of Community. According to it, Community actions have to be as simple as possible and have to leave as much scope for national decision as possible.

Therefore it can be discussed whether the complete design of a pricing scheme in the transport sector goes beyond what is necessary to achieve the described objectives. In principle it can be argued that definition and enforcement of basic principles of transport pricing and main requirements for a pricing scheme are enough to achieve the Community objectives. The determination of the pricing levels and the implementation of pricing schemes is likely to be a national or sub-national responsibility.

In conclusion it can be said that in principle the national as well as the European 'government' is competent to carry out transport pricing tasks. In general, following the principle of subsidiarity sub-national and national levels of government are the preferred levels for pricing tasks. However, objectives of EU-transport policy and cross-national problems caused by transport seem to be sufficient arguments for Community action. But the scope of Community action is limited by the principle of proportionality. From this point of view the competence of the European level might be limited to the definition of pricing principles. Implementation of pricing schemes should be a full responsibility of Member States.

5.2.2. *Non-discrimination principle*

Non-discrimination is a generally accepted principle. As already mentioned in section 4.3.1, this principle requires that comparable cases shall be treated in the same way and that different cases shall be treated differently. Applied to the problem of transport pricing, two sub-principles can be discerned. The first is non-discrimination between transport modes and the second is non-discrimination between EU Member States. Assuring non-discrimination between modes could be a European as well as a national task. If it becomes a national task, the European government has to control the proper implementation of this principle and, if necessary, to force Member States to implement non-discrimination regulations. To guarantee non-discrimination between EU Member States is pre-eminently a task for the European level, because it is impossible to let the Member States control each other in an impartial manner. Therefore, pricing principles have to be defined and enforced at European level with judicial measures if necessary.

In terms of transport pricing this means that defining of pricing principles should be best done on the European level. Control and enforcement of the application of these principles in all Member States and for all modes should also be carried out at European level.

5.2.3. *Harmonisation principle*

Harmonisation is one of the main objectives of the European Union in order to establish a common market. Harmonising the European market has to do with removing unnecessary barriers in order to make the European Union one level playing field. Therefore all useless differences between national regulations and institutions have to be removed.

If full harmonisation of transport pricing is an objective, it will be necessary to define the pricing principles at the European level. And besides the principles, it is necessary to fix some European wide system requirements. For example, if every country has its own system of road pricing and the systems are not mutually compatible, this would mean a strong barrier for a common market.

Thus, it can be concluded that defining pricing principles and at least some technical system requirements should be carried out at European level.

5.2.4. *Territoriality principle*

The European Commission also favours the territoriality principle. The Green Paper on fair and efficient pricing pleads for the principle of territoriality stating that 'revenues should flow to authorities within the countries where the costs are actually caused'¹⁴. So, this principle basically aims at linking revenues with Member States where the costs are caused. In case of a wider interpretation of this principle, revenues should flow to the authority within the Member State which are closest to the territory where the costs are caused. In some cases this principle can be applied easily. For example, in case of congestion problems costs are caused in urban area, so revenues should flow to the urban authorities. But in many other cases implementation is not that straightforward, because many problems are not limited to a clearly defined territory. For example emissions are produced at a specific locality, but all emissions together might form a regional problem and with a strong wind even an international problem.

Concluding it can be said that in general it is difficult to link costs and revenues to levels of government on the base of the territoriality principle. However, generally speaking it seems that more local (and to some extent regional pricing measures) like toll roads and urban congestion pricing are more in line with the territoriality principle than national measures like an annual vehicle tax.

5.3. Constraints deriving from the application of these principles to transport pricing

In this section two main categories of institutional constraints are addressed relating to the principles as worked out previously. These are:

- conflicting transport policies between levels of government, and
- different scopes of transport activities.

¹⁴ 'Towards fair and efficient pricing in transport', COM(95) 691, Box 8.1

5.3.1. *Conflicting transport policies between levels of government*

An important institutional constraint is the integration of European policy with regional/urban and national transport policies. Until now transport policy and pricing as a key instrument in this policy are, for an important part, in the hands of national and sub-national governments.

Concerning the problem of conflicting transport policies the principles of subsidiarity and proportionality are important. The question is whether a European pricing policy establishing for instance a fair and efficient pricing scheme internalising external costs, can be designed in such a way that there remains some policy freedom for national and sub-national governments to have their own transport policy.

From a European point of view the minimum responsibility at EU-level in order to achieve their objectives is the responsibility for the definition of pricing principles, definition of the main characteristics of pricing schemes and a common European method for fixing price and tax levels. Besides this, the European level must lay down some system requirements in order to ensure an integrated pricing system. If all Member States have their own pricing principles and their own pricing systems it will be impossible to establish a reasonable level of harmonisation and non-discrimination.

From a national point of view it is essential that Member States are free to set levels of prices and taxes. First of all, costs often differ per country, per region and so on, so fair pricing leads to differences in charge levels. Another point, which is more complicated, is that it would be very difficult to have a national transport policy concerning, for example, the promotion of public transport and the reduction of road transport, without the ability to influence the price levels. The same arguments apply to the urban level dealing with the pricing of urban transport, road pricing and parking pricing. Most of time such pricing policies are important for achieving urban transport policy goals such as solving congestion problems. The very problem here is the question whether there still will be freedom to use this kind of arguments within the framework of European defined pricing principles. Will it be allowed to have a stimulation measure for public transport in order to reduce congestion? Will a Member State be allowed to subsidise rail cargo transport in order to prevent congestion on main road transport axes?

From the regional point of view it is important that there is freedom to make, for example, a price differentiation between the different kinds of roads (e.g. highways and regional routes) in order to be able to grasp problems like overused short cuts and price-avoiding behaviour. Next to this, price differentiation between modes can be important when a so-called sensitive route is involved. The Brenner-route is such a sensitive route, with road transport raising huge noise and pollution problems. In such cases, effective and efficient regional transport policy without the freedom to fix prices is nearly impossible. The same questions as at the national level play a role. Is it allowed for a region to introduce substantially higher landing charges in order to reduce the regional noise problems?

As described above, pricing principles should be developed at European level. The definition of pricing principles covers amongst others the description of pricing measures and the costs which have to be the base for fixing price levels. For the national as well as the regional and local level the basic question is whether political priorities might be used for fixing charge and taxation levels. Both the subsidiarity and the proportionality principle do

not prevent such a freedom, because the European objectives of harmonisation and non-discrimination can be achieved together with a certain freedom for national and sub-national transport policies being translated into charging levels. However, it's obvious that there are limits to this freedom of national and sub-national authorities. It is clear that as a general rule foreign and domestic carriers have to be treated in an equal way. More discussion arises with regard to the equal treatment of transport modes. Should it be allowed to introduce (financial) policies in favour of specific modes and / or to the detriment of other modes? Ultimately this is a political question. But for a serious national, regional and urban transport policy, pricing instruments are essential.

Freedom in pricing for regional and urban authorities has a risk. Regions and cities often compete on the basis of regional or urban attractiveness. This competition would lead to price competition in the transport sector with regions or cities trying to have the lowest possible pricing level in order to be more attractive than the others. The same argument can be used in the discussion on national freedom. A related discussion is about remote areas. Is a financial policy to stimulate economic activity in remote areas a legal argument for reduction of transport prices in or to this area? Other example: are remote countries allowed to have lower transport prices in order to compensate a natural backlog in comparison with central-European countries? In all these cases the specific situation has to be taken into account and the European Commission should check whether these measures are causing unfair competition between countries and/or transport modes.

In conclusion, to reduce the problem of conflicting policies, the implementation of European tasks has to be combined with a certain policy freedom for Member States, regions and cities. Most important in this case is to leave responsibility for fixing the pricing levels to national and sub-national governments. These levels of government have to be free to increase or decrease the levels on the basis of national, regional and/or urban policy reasons. Nevertheless, there has to be some kind of supervision to prevent that the pricing instrument is used to reach objectives causing unfair competition between modes, countries, regions and urban areas.

5.3.2. *Different scopes of transport activities and problems*

The problem of different scopes particularly has to do with the principle of territoriality. The territoriality principle says that the resources from taxation and pricing measures have to flow to the authorities in the countries where the costs are caused. In certain cases this may lead to some problems. For example, if fuel excise duties are levied in order to recover national costs, it is a problem that trucks could cause costs in one country, while driving with fuel bought in another country. To overcome this constraint the European Commission proposed a system of kilometre charges, but still the problem of different scopes of transport activities and problems will remain.

The scope of solutions has to be more or less similar to the scope of the problems. Therefore, it is efficient to have separate pricing schemes for long-distance and short-distance transport, to have pricing measures for local problems at a local level and for national problems at a national level and so on. But there is an important barrier: how to integrate these pricing schemes and measures? A highly differentiated incoherent set of

pricing measures will not be efficient either. So a middle course will have to be found between the splitting up of tasks and the integration of tasks.

Several transport problems and transport pricing measures have different scopes, which makes it difficult to integrate these measures at one level of government. For example, the policy objective of full recovery of infrastructure costs implicitly pleads for national or sub-national pricing measures because these levels of government are almost always responsible for investments in infrastructure. But the objective of the internalisation of externalities sometimes pleads for other levels of government, depending on the territorial character of an externality. Congestion is often an urban problem, sometimes regional and in some cases a national problem, which causes national costs. But environmental problems also have an international character, for example the problem CO₂ emissions. It is nearly impossible to relate urban or regional transport prices with these problems in a fair and efficient way. Therefore these international problems (sometimes global problems) should be addressed on an international (or global) level. Air transport and sea transport are more or less global activities. Therefore a the global harmonisation of pricing and taxation levels seems to be the most efficient option. If this is not feasible, the next-best option will be to introduce duties and taxes only for intra-European transport activities. In this case the non-discrimination principle requires that both companies from Member States and from non-member states have to pay fuel excise duties for intra-European transport activities and have not to pay duties for inter-continental transport activities.

Concerning pricing issues in the inland transport sector there are differences between long-distance and short-distance transport. Long-distance transport is usually international transport, causing problems at an international level. Therefore, to avoid discrimination between countries, the European level should play a role in pricing this kind of transport. Short-distance transport is most of the time domestic transport, so it can be priced at a national level without causing discriminatory problems.

From the point of view of the subsidiarity principle it is a reasonable option to have different pricing schemes for long-distance and short-distance transport. However it causes some practical problems. First of all, it will be a problem to make a fair separation between long-distance and short-distance transport. In that case for example electronic charging systems should make difference between domestic and long-distance transport. Technically solutions can be found, but then other practical problems will arise, like fraud and privacy problems. A second problem is how to integrate different pricing schemes. If the pricing scheme for short-distance transport is not linked with that of long-distance, problems like double taxation and decreased harmonisation will arise. Another problem is the potential discrimination of small Member States, for which domestic transport is far less important than in large Member States.

In conclusion, it seems very difficult to resolve this kind of problems. On the one hand, pricing instruments have to be in the hands of the appropriate levels of government but, on the other hand, it is not efficient to split up transport pricing tasks too much because this can cause integration problems. The problem seems to be of high complexity even because it directly relates with the administrative and fiscal organisation of each country. The design of pricing and taxation measures has to find the middle course between the splitting of tasks to

different levels and the necessary integration between pricing tasks, and further research seems to be needed on this specific issue.

5.4. Implications for the organisation of transport pricing

In this final section some main implications are described following from the discussion about the assignment of pricing tasks to levels of government. For each level of public organisation is indicated which role could be played in order to reach an acceptable organisation of transport pricing.

Global level

Because of the global scope of, for example, the CO₂ problem and the global market for air and sea transport, it is recommended to try to organise fuel excise duties for these modes at a global level. Second-best option is to introduce fuel excise duties only for intra-Community transport activities.

European level

The definition of pricing principles should be done at European level. Harmonisation, non-discrimination between modes and countries and fair competition can never be reached without principles that apply on a European-wide basis.

In addition to the definition of pricing principles, some basic characteristics of pricing systems have to be set at European level. For instance, it is important for the pricing base to be everywhere the same (e.g. vehicle or passenger kilometres, weight of vehicles, emission etc.). If this is not the case, it seems impossible to reach a basic level of harmonisation and non-discrimination. At the European level special attention has to be given to pricing of long-distance transport. In case a special pricing scheme for long-distance transport is not or not yet feasible, national pricing measures should be reviewed whether they do not discriminate between mode and nationality. Non-discrimination anyhow should be checked by European institutions. But all European principles and requirements together still should leave some freedom to Member States to reflect national transport policy in pricing systems and pricing and taxation levels.

Especially the subsidiarity and proportionality principles pleads for the implementation of a pricing scheme for long distance transport on national or sub-national level. In order to guarantee a minimum level of harmonisation and inter-operability, some basic requirements of pricing systems have to be laid down at European level.

Level of co-operating countries

Currently on this level the 'Eurovignette' is regulated. In case of transport problems covering more than one country such a pricing measure of some co-operating countries can be efficient. Co-operation between some countries also could be an option in case it is not feasible to reach an European agreement on a pricing measure.

National level

Both the subsidiarity principle and the territoriality principle make clear that Member States could play a considerable role in defining and implementing transport pricing schemes. This entails both the setting of taxation and pricing levels and the design and implementation of

pricing and taxation systems. However, as explained above, the setting of levels has to be in line with pricing principles laid down at the European level and system design has to be in line with European requirements. Nevertheless within these principles and requirements it should be feasible to reflect national policies in pricing systems and pricing and taxation levels.

Regional and local level

Whether a Member State introduces pricing measures on a national level or a sub-national level depends on the public organisation of a country as well as on the scope of the problem and the costs caused.

Generally speaking, the subsidiarity principle pleads for the lowest level possible. This implies that regional and local governments could play an significant role in the implementation of transport pricing schemes. Especially in those cases where costs and problems caused by transport activities have a local or regional scope sub-national governments should have a major role in the design and implementation of pricing measures. Examples are pricing measures related to congestion and noise problems.

Next to this, implementation at the lowest level possible gives more possibilities for taking into account regional and local circumstances, and to implement regional and local traffic policy. This will improve social as well as political acceptability.

6. ACCEPTABILITY REQUIREMENTS AND FUNCTIONAL DIMENSIONS OF TECHNOLOGICAL SOLUTIONS

Efficient pricing in the transport sector is identified in EU policy documents as social marginal cost pricing (European Commission, 1995, 1998), which means that pricing instruments or systems should make it possible to link the level of pricing to the costs caused by the transport users, considering that some of those costs will vary according to the degree of use of the infrastructure or transport service, routes and schedules of passage, among other factors. This implies that the pricing strategy should allow for a high degree of differentiation, which is of the utmost importance in terms of fairness because it allows for the treatment of identical situations in the same way, and different situations in different ways, that is to say each one should pay according to his/her costs caused, leading also to a better perception of costs by the user and consequently to better choices, which means in practical terms the improvement of effectiveness. However, this first best solution is not always feasible in practise or may require the use of very sophisticated and expensive technical systems and devices.

If, on the one hand, these systems and devices may be crucial in order to guarantee the fairness and efficiency of transport pricing and thus enhance acceptability of a measure, on the other hand, their advantages may be outweighed by the costs of implementing and maintaining it, not only in the monetary sense but also in terms of complexity, transparency and adaptation effort that they impose to final users. This in turn will have an important reflection on the acceptability of the pricing policy itself, or at least in the effectiveness of its implementation. In addition, it should be pointed out that regarding such sophisticated, electronic systems there is also a fundamental right at stake. Indeed, their implementation could threaten the fundamental right to privacy protection. This issue is addressed in section 1, while section 2 deals with the functional dimensions of technological solutions from the acceptability viewpoint.

6.1 Privacy in transport pricing

6.1.1. General definition of privacy in constitutional texts

The protection of privacy is commonly considered to be a fundamental right implemented in numerous constitutional texts. Among others its importance is being acknowledged by the Universal Declaration of Human Rights of 1948 which states:

[Article 12] No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to unlawful attacks on his honour and reputation. Everyone has the right to the protection of the law against such interference of attacks.

Related concepts can be found in many constitutional texts of Member States of the European Union and others explicitly addressing the protection of privacy. For example, the Belgian constitution defines:

[Article 22] Privacy. (1) Everyone has the right to respect of his private and family life, except in the cases and conditions determined by law.

Accordingly, the Dutch Constitution states in

[Article 10] Privacy. (1) Everyone shall have the right to respect for his privacy, without prejudice to restrictions laid down by or pursuant to Act of Parliament. (2) Rules to protect privacy shall be laid down by Act of Parliament in connection with the recording and dissemination of personal data.

Where privacy issues are not explicitly addressed by constitution or a national statute, provisions referring to the above mentioned Universal Declaration of Human Rights can be found. In these cases, the principles laid down there form an integral part of the states' legislation. Examples are states such as Portugal or Spain which define:

Portugal

[Article 16] Fundamental Rights: Scope and Sense. (2) The provisions of the Constitution and laws relating to fundamental rights are to be read and interpreted in harmony with the Universal Declaration of Human Rights.

Spain

[Article 10] Human Dignity, Human Rights. (2) The norms relative to basic rights and liberties which are recognised by the Constitution shall be interpreted in conformity with the Universal Declaration of Human Rights and the international treaties and agreements on those matters ratified by Spain.

The protection of privacy has to be seen in context with the fundamental freedom and liberty rights of natural persons generally agreed upon. Privacy protection is limited if general constitutional freedoms of third parties might be affected. Accordingly, the German Fundamental Law (Grundgesetz GG) expresses:

[Article 2] Liberty. (1) Everyone has the right to free development of his personality insofar as he does not violate the rights of others or offend against the constitutional order or against morality.

The introduction of electronic transport pricing systems with their inherent necessity to collect and process personal data requires to consider the impacts on several of the fundamental rights above mentioned.

6.1.2. International legal rules on privacy in the context of processing personal data

6.1.2.1. U.N. General Assembly Guidelines for the Regulation of Computerised Personal Data Files

With regard to the processing of personal data the Member States of the United Nations agreed upon Guidelines for the Regulation of Computerised Data Files (G.A. res. 44/132). These guidelines suggest minimum guarantees on privacy to be provided for in national legislation. From these general principles for treatment of computerised personal data files (important for example for inhabitants registration, bank details, treatment of population

census data) one can derive the main requirements which have to be met by the design of electronic transport pricing systems and the necessary processing of personal data:

- (1) Principle of lawfulness and fairness, whereby any collection or processing of information in unfair or unlawful ways is prohibited.
- (2) Principle of accuracy, defining an obligation for persons responsible for the compilation or keeping of files to “conduct regular checks on the accuracy and relevance of the data collected”
- (3) Principle of purpose-specification, stating that “... the purpose which a file is to serve and its utilisation in terms of that purpose should be specified, legitimate... to ensure that none of the said personal data is used or disclosed ... for purposes incompatible with those specified...” Besides, it has to be guaranteed that “... the period for which personal data are kept does not exceed that which would enable the achievements of the purposes so specified.”
- (4) Principle of interested-person access. Upon this everyone shall have “...the right to know whether information concerning him is being processed and to obtain it in an intelligible form...”
- (5) Principle of non-discrimination, whereby data which are likely to give rise to discrimination, such as information on racial or ethnic origin, religious belief etc. should not be compiled.
- (6) Principle of security, ensuring that appropriate “...measures should be taken to protect the files against both natural dangers, such as accidental loss... and human dangers, such as unauthorised access...”

With regard to electronic transport pricing systems the Principle of purpose-specification (No. [3]) and the Principle of security (No. [6]) have to be addressed in particular, as they are essential in acceptability concerns.

6.1.2.2. EC-Directive

All of these minimum guarantees are provided within the EU by Directive 95 / 46 / EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data and its implementation in national legislation.

The fundamental principles laid down in Articles 6 and 7 provide a far-reaching protection, which can only be restricted upon the basis of specific exemptions and restrictions. These exemptions and restrictions are formulated in Article 13. As the protection of privacy is considered a fundamental human right any exemptions and restrictions on it must be regarded as a major interference. Accordingly, the subordination of the individual human right for protection of his/her privacy to other interests must only be allowed, if vital interests of national and public security, defence or the prevention, investigation, detection and prosecution of criminal offences are concerned (Art. 13 a-d). The safeguarding of important economic and financial interests may also be reason to restrict the scope of obligations and rights otherwise guaranteed (Art 13 e).

Given this brief summary of international legal rules, there are mainly two aspects to be discussed for electronic transport pricing systems:

(1) To what extent is the collection and processing of personal data technically and organisationally necessary for the functioning of electronic transport pricing systems?

(2) Do the aims to be achieved by the introduction of electronic transport pricing systems meet the conditions of an important economic or financial interest which would allow privacy-restriction measures?

6.1.3. *Privacy concerns in public attitude surveys*

Several authors indicate that perhaps the greatest barrier to the implementation of electronic transport pricing systems is public acceptability. Among the key issues which are addressed in public attitude surveys privacy and the potential invasion of privacy by electronic transport pricing systems is ranking very high in the public mind. However as important this matter might be, it also becomes obvious that privacy is one issue of public concern among others. It is not the one issue, which has so far impeded the general success of electronic transport pricing systems.

In this context, the surveys which have been carried out identify two main worries about privacy and electronic transport pricing systems:

- On the one hand the system's ability to identify and track individual movements of drivers raise privacy concerns. The potential disclosure or abuse of personal information feature strongly in public discussions.
- On the other hand, the record of individual movements has to be kept for later enforcement or checks. If no record is kept at all, concerns are expressed that drivers may be incorrectly charged without any proof.

The first problem of tracking and storing individual movements could technologically be met by keeping these information on a 'smart card', which is normally kept by the driver. Generally, this aspect occurs as a rather diffuse problem. With regard to private operators, citizens often assume a tendency for abuse of personal information. In reality, both private and public operators would have to follow the same legal principles. However, individual perception might still be connected with a diffuse worry concerning private operators. The second concern contains also a fairness aspect. As of today, however, a 'smart card' is still not a true complete solution, as the protection of privacy must also be guaranteed when personal data are transmitted. If this should be necessary, the available technological solutions (such as cryptographic encoding or electronic signatures) have to be used to prevent unauthorized access when transacting personal information.

As already mentioned, legislation has identified these concerns and recognised the protection of privacy to be a fundamental right. The implementation of privacy-enhancing measures in electronic transport pricing systems however, still remains an important issue in the public mind.

6.1.4. *Implications for electronic transport pricing systems*

6.1.4.1. Principles for electronic road pricing systems in Germany

In this section we will focus on Germany. The reason for this is that in Germany all issues of privacy and data protection are extremely sensitive. Thus, Germany might have the most discussed and detailed rules for protecting personal data in general.

Based on the implementation of international legal rules on privacy into German legislation, the German Federal Commissioner for data protection (Bundesdatenschutzbeauftragte) developed guidelines and requirements, which have to be met by electronic transport pricing systems. In an related analysis (BAST, 1995) was concluded that only pre-paid tolling procedures can adequately meet the privacy issue. The following discussion is based on BAST (1995).

It is generally agreed upon, that the technical means, which are used for collecting and processing the necessary information, must only allow the collection and processing of data that are essential and necessary for the functioning of the electronic transport pricing systems. The collection and processing of data must only take place under certain conditions, which have to be specified. Accordingly, one of the most important features of any electronic transport pricing system is its conformity with the concept of “data-free” use of road infrastructure. The system’s design must ensure that personal data of any driver, who is using the road infrastructure and fully paying the correct charge is not collected and stored. Thus, if charges are paid correctly, the use of road infrastructure has to be possible without generating information of personal character. Accordingly, the manner of payment must only require settlement data, which can be stored individually by the driver. This, on the other hand, must not lead to a situation, where drivers are forced to deliver proof of all individual movements without gap.

A continuous and general monitoring of drivers and their correct payment can not be accepted. With regard to privacy-enhancing measures the mere possibility of a continuous and general monitoring must be technically and organisationally eliminated. The personal identification of movement data can only be accepted within the scope of enforcement. This, however, implies indications of a possible violation of the correct payment.

As any sophisticated technology, also electronic pricing systems are subject to bad functioning (such as detection failures, incorrect charging etc.) and manipulations (unlawful manipulations on vehicle OBUs or smart cards, jamming of transmissions etc.). It has to be ensured that the electronic transport pricing system can reliably and quickly detect any manipulations or bad functioning. As long as bad functioning does not occur due to a manipulative or defective use by the driver (‘data-subject’), the controller has to carry all risks and costs, which result from a bad functioning of the system.

Technological solutions, such as cryptographic encoding or electronic signatures which are becoming increasingly available, should be used. This would avoid the necessity to protocol use and payment of individuals and ultimately avoid recognition of individual movements by the electronic transport pricing system. Communication protocols recording the flow of information between the vehicle to be charged and the installations of the electronic transport

pricing system must only be stored for the period of the communication itself. These protocols have to be erased after the end of the communication.

Any data, which are transmitted by the vehicle to installations of the electronic transport pricing system must not allow subsequent conclusions to the vehicle itself. In particular, the possibility to re-establish or identify connections to other settlement information of the same vehicle or control-data of other payments has to be eliminated. If there is a technical need to securely identify a certain vehicle during the communication itself, the necessary technical means shall not allow any further identification of the vehicle on other occasions. Otherwise, a simple comparison of the data, which were received by the system's installations could lead to the possible recognition of a certain vehicle and subsequently to the reconstruction of individual movement profiles. Therefore, it is necessary to immediately process the received data and finally erase them.

If the transmitted settlement data are recognised to be implausible or false, information on this has immediately to be delivered to the driver. The receipt that can be produced from the information available in the vehicle's equipment must be sufficient to proof that the charge was paid correctly.

The distribution of personal data on smart-cards and any other equipment in the vehicle must meet the interests of drivers and car-owners. The in-vehicle equipment has to enable the driver to easily check and understand the balance on his smart-card. Refunding of the available balance must be possible without reason and personal identification of the driver or disclosure of any information concerning him. A high security standard, which allows a reliable detection and prevention of any manipulations is therefore essential.

With regard to the charges the information on what a trip will possibly cost has to be easily accessible for the driver. He shall thus be enabled to estimate the approximate cost of his trip.

Any of the so defined procedures have legally to be implemented into national legislation. In particular, it has to be ensured that every party with access to the information of personal character will treat them lawfully and according to the statues mentioned above. Whoever will be designated controller of an electronic transport pricing system shall be monitored continuously to enforce the protection of privacy.

6.1.4.2. Privacy issues in public transport pricing

In the public acceptability discussion privacy issues are usually limited to potential violation of privacy within electronic road pricing systems. However, electronic ticketing will in future increasingly be introduced also in public passenger transport. An example are systems which contain electronic payment (non-cash payment), electronic ticket and automatic fare calculation (in particular for trip chains), the latter within check-in/check-out systems. The problem of collecting and storing data on personal movement profiles, as it was already addressed for electronic road pricing, hold also true for public transport. Thus, the same principles for avoiding the abuse of personal data discussed above are valid. A more detailed discussion of these principles is given in Henke (1999).

Apart from electronic ticket systems in public transport privacy problems can even occur today within traditional payment systems. They relate to enforcement practices in cases of

non-payment A recently discussed case from Berlin might demonstrate this even today existing, but not in the same manner as for electronic road pricing perceived problem. The urban transport company in Berlin, BVG, has outsourced the procedures of demanding the payments and enforcing. This outsourcing is an approach permitted by the legal rules for data protection¹⁵. The subcontractor stores the data of non-payers in separate files, one for the individuals to be demanded for payment, and another one for non-payers which have identified more than one time as non-payer (for legal steps against frequent non-payers). While this is so far in consensus with German law, a problem occurs since the subcontractor transfers the data to an information-bureau which answers inquiries of third parties concerning the solvency of individuals. Since there might be various reasons why a non-payer has not paid the fare (for example in case of the transferable Berlin subscription cards which was simply forgotten at home, or if the non-payer has some reasons to oppose against the fine) it is not feasible to use this data within a solvency inquiry. Another issue is that the data are stored longer than actually permitted by German law.

These violations of privacy in today's practice of enforcement in public transport are by far not so heavily discussed as in case of electronic road pricing, often they are even not known or simply accepted. This shows that the actual reason for non-acceptance of electronic road pricing might rather be found in the unwillingness to pay than in privacy concerns.

6.1.4.3. Positive effects of electronic road pricing systems (road safety)

Sophisticated electronic road pricing systems require the installation of equipment both on the tolled road network and in the vehicle liable to the toll. This equipment has per se impacts on the driver's behaviour and consequently on the traffic flow on the roads. The question which shall be briefly discussed here is whether there are positive "side-effects" (e.g. safety improvements on the tolled road network, reduction of speed limit infringements, tailgating etc.) that can be expected from the installation and operation of electronic road pricing systems. These "side-effects" could be resulting from the public's notion of being continually supervised on the tolled road network. Although research has up to now not explicitly addressed this issue several qualitative indications allow the conclusion that these effects are of limited nature only.

Firstly, as was shown above the protection of privacy issues is technically and organisationally possible and has to be ensured in order to gain public acceptance to the idea of spacious road tolling. Consequently, the electronic road pricing equipment is not designed to detect speed limit violations or other dangerous behaviour, let alone the prosecution of these offences. Because drivers are very aware of these limitations of electronic road pricing systems behavioural changes resulting in overall safety improvements cannot be expected. Even if the tolling systems would be enabled to detect speed offences or other violations, prosecution of these offences would only be possible if the drivers would violate the tolling conditions. Only then a track-down and processing of personal information would be lawful, though restricted to the enforcement of road pricing. Secondly, the long-standing operation of fixed or mobile devices, which are used to detect traffic offences (e.g.

¹⁵ It should be noted that the Berlin public transport system does not work with automatic ticket barriers as usual in Paris or London.

speed limit infringements) shows that neither the number nor the extent of these offences significantly reduced on the overall road network. Only within a very short range to the devices are drivers reducing their speed to the limit allowed. They immediately return to their original speed when the actual location of the traffic check is passed. As the locations of electronic road pricing installations will be clearly visible a similar behaviour can be expected, if the road pricing systems would be combined with speed surveillance devices.

Accordingly, it can be concluded that only limited (or no) safety improvements in connection with electronic road pricing systems can be expected. Even if the implementation of electronic road pricing schemes would be supported by the implementation of electronic traffic management systems these safety-related effects are unlikely to be important.

6.1.5. *Conclusions*

- Privacy seems to be one important issue in the public acceptance discussion of electronic road pricing systems. However, since individuals accept today other potential dangers of abusing information (credit cards), even related to transport (the example of public transport), the privacy issue does not seem to be the issue.
- Electronic Pricing Systems must be designed on the basis of principles discussed in sections 1 and 2.
- If national legislation has formulated principles and procedures beyond the scope of the mentioned international and European agreements, as it is the case in Germany, the design of any electronic pricing system has to meet the relevant requirements.
- Protection of privacy can be ensured in electronic pricing system if the systems are designed according to the following principles:
 - the principle of data-free movement
 - personal identification of movements only for enforcement purposes
 - taking over of all responsibility for bad functioning and manipulations of the system by the operator
 - use of technological solutions such as cryptographic encoding, electronic signature, etc.
 - data processed for internal functioning of the system must be immediately processed and erased.

6.2 **Functional dimensions of technological solutions**¹⁶

6.2.1 *Introduction*

Transport pricing systems differ very much in relation to the technologies they use. This is not only true if pricing systems in different sectors such as road pricing and public transport pricing are compared but also for systems in the same sector, e.g. public transport pricing

¹⁶ This section is based on a paper by TIS, see the complete paper and bibliographic references in Annex 5.

systems based on magnetic card technology, public transport pricing with contactless smart cards or with manual obliteration of paper tickets.

There are technically very complex systems (e.g. electronic road pricing systems), which are composed of a huge number of different technical components such as the on-board device, the control device, cameras, smart cards, transmission system etc. However, currently used road pricing systems – although complex - may also be much less technologically driven, with money collection done manually and having only automated ticket dispensers connected to automated barriers and computerised devices for determination of the price.

When looking at technical aspects of pricing systems in the light of acceptability it is necessary to realise that it is not the technology *per se* that influences acceptability but the way the technology contributes to structure and shape the different pricing-related functions, making them simpler to carry out, saver, more sophisticated, more difficult to understand or whatsoever. In other words, what mainly matters is how and when a function, e.g. payment, control, determination of payable amount etc. is to be carried out.

Consequently in this section the analysis of the impact of the technical aspects of pricing systems on their acceptability is carried out by breaking the system down into a number of elements that characterise each functional dimension. Breaking down the pricing process into elements that reflect these dimensions allows for the analysis of the potential of each of the elements to affect the acceptability of the pricing system. In other words, if a certain element of a functional dimension such as the moment of control or payment shows a high potential for influencing acceptability, the technical and practical elements that shape this dimension might largely contribute to increase or decrease the acceptability of a system. For instance, in relation to the payment function, if new pricing instruments such as smart cards are able to simplify the transaction or to increase the capacity of the pricing system to differentiate the price according to the costs caused by the user, this will enhance user-friendliness or the perception of fairness and is likely to influence the acceptability of the whole pricing system.

Knowing the functional elements that are particularly prone to be manipulated in terms of acceptability allows to select technical devices and instruments that improve the functionality of these specific dimensions and thus to increase the acceptability of the whole system.

It must be pointed out from the outset that it is not the aim of the PATS research to provide advice or recommendations on the most suitable technical-practical solutions, even because this would require the knowledge of the details of the concrete context in which a specific pricing instrument is supposed to be implemented. Thus, it is up to the decision maker – according to the particularities and within the limitations of the concrete situation - to choose among the available technical devices and instruments those that will improve the functionality of a particular dimension.

The role of PATS in this context is to indicate the decision maker - that already has a concrete idea on the pricing system to be implemented in a precise context – which acceptability concerns may be at stake and on which functional dimension she/he has to intervene in order to neutralise them. For this purpose a matrix is developed that highlights the different relationships that exist between the functional dimensions of a selected technical solution and the ‘acceptability requirements’.

This section addressing functional dimensions of technical solutions consists of three separate sub-sections. After the introduction, the second sub-section identifies a number of aspects that are important for the public in relation to the functioning of a transport pricing system and are thus prone to have an influence on the acceptability of the same. Evidence on these aspects - hereafter called 'acceptability requirements' - is gathered from the reactions to the Commission Green and White Papers and other research and literature in the field. In addition, the sub-section breaks down the normal pricing process in its functional dimensions and identifies a number of elements that characterise these functions. In this way, for instance, the payment function is broken down in the 'moment in which it is carried out', the 'payment instrument', etc. It should be noted that this is done on a conceptual basis without any precise pricing instrument in mind. It also introduces the matrix and presents the results of the expert judgement. The final sub-section of this section refers to these results and provides some general recommendations in order to improve acceptability through an intervention on the functional dimensions of pricing systems. Moreover, an overview of feasible technical solutions is included in Annex 5-B.

6.2.2 Acceptability requirements and functional dimensions of pricing systems

The state-of-art review carried out in WP1 of the PATS project showed that the technical-functional dimensions of pricing systems may have an important impact in terms of acceptability of pricing measures and policies. On the basis of that analysis, including among others the Commission Communication on Interoperable Electronic Fee Collection Systems in Europe, it was possible to identify a number of issues of major concern to the public that relate to the technical-functional dimension of pricing systems (for more details on this process and bibliographic references see Annex 5-A). Such concerns, if not satisfactorily met, may easily be translated in non-acceptability aspects of the pricing measure and trade-offs might be discussed to mitigate negative reactions

The acceptability concerns can be translated in the following 'acceptability requirements' for pricing systems considered in the light of their technical-functional configuration:

- Fairness or equity aspects, to be understood as the capacity of the pricing system to treat people in the same situation equally and people in different situations differently. This requirement depends strongly on the capacity of the system to differentiate according to use, time, type of user, local situation, etc.
- Reliability in setting the price means low or no possibility for error or unintended fraud, e.g. calculating errors as well as cheating (e.g. influencing the price determination process with wrong input data) in the price determination process.
- Reliability of the system in fee / fare collection requires, for instance, a low probability for errors in manual cash handling or automated debiting of the payable amount (e.g. collection of the wrong amount) or a low possibility of cheating (e.g. using plastic instead of real coins).
- User-friendliness in relation to the user is here understood in the sense of a transaction easy to be understood and quick and easy to be carried out (easy handling).
- Transparency and clearness are mainly related to the pricing structure, the amount to be paid and the amount paid.

- Protection of privacy, in the sense of non abuse of personal data during collection, storage and processing and non intrusion into the private sphere of individuals.
- Reasonable operating costs to be understood as the implementation costs for the service provider, such as expensive equipment for payment and control functions and the transaction costs for running the system. These costs will necessarily have to be reflected in the final price, thus have also an impact on the acceptability by the users (public).
- High degree of compliance (e.g. no incentive for cheating, no space for non-discovery of fraud, severe sanctions, easiness of enforcement).

As already mentioned, there is strong evidence that the technical-functional configuration of pricing instruments or packages influence their acceptability. It is therefore important to carefully structure and compose them under this aspect in order to mitigate most of these public concerns and meet the so-called ‘acceptability requirements’.

Since it is not the technology *per se* that influences acceptability but the way the technology contributes to the structuring and shaping of different pricing-related functions, the approach followed in this section consists of breaking down the normal pricing process into its functional dimensions and to identify a number of elements that characterise these functions.

An additional advantage of working with individual components or dimensions and not with complete systems is to be able to analyse very different pricing instruments or systems in relation to the potential for acceptability of each functional component. This allows for the outcome of this work to be applicable to all types of pricing instruments and packages related to all modes.

Under the functional profile, transport pricing is mainly characterised by the price determination, the payment itself and some form of control. Price determination depends largely on the object of the transaction and the price structure. The payment function is strongly influenced by the moment of time in which it is carried out and the instrument. The characteristics of the control function are often determined by the point at which the control is carried out. A pricing system may also lead to the identification of the client and the registration of the transaction. Based on this functional division, the following dimensions of pricing systems are identified:

- Object of the transaction;
- Price structure;
- Moment of Payment;
- Payment Instrument;
- Point of control;
- Identification;
- Registration of transaction.

‘Object of transaction’ refers to the transport-related service for which a monetary amount is paid. This service may be sold as a single (e.g. a single crossing on a tolled motorway), a multiple (e.g. 10 ticket coupon for public transport) or a periodical right (e.g. seasonal ticket).

Regarding the ‘price structure’ it is important to underline that the price may be expressed in a flat rate, it may be variable in relation to certain criteria or it may have a double component (variable and fixed).

The payment ('moment of payment') can be carried out before the consumption of the corresponding service, during consumption at admission or during consumption at exit or after consumption.

The payment is normally carried out with one of the following 'payment instruments':

- Cash - general money (e.g. notes and coins)
- 'Token' – specific 'money' (e.g. pre-acquired 'paper ticket' that gives the right to one or more public transport rides, train or air trips, the entrance into a city area (e.g. vignette or area license), etc.)
- Pre-charged smart-card / devices with general money (e.g. 'EC-Cash', 'PayCard' that can be used for the payment of all goods and services)
- Pre-charged smart-card / devices with specific 'money' (e.g. public transport ticket charged with a finite number of trips, kms, passenger air pass charged with a number of trips, etc.)
- Credit/debit card (e.g. 'Mastercard', 'Visa' / 'EC-Bank Card')
- Bank transfer or cheque
- Direct account billing / deduction (e.g. no-stop electronic road pricing, where the payable amount is directly deducted from the clients bank account, such as 'via verde')
- Advance account transfer to the service provider (e.g. in the Trondheim road pricing system where the clients can make a periodic advance payment to the account of the operator to be used each time the client uses the charged cordon).

It should be pointed out that 'Cash – general money' and 'Pre-charged smart-card / devices with general money' are identical in their substance (rights). What changes is the technical support in which this substance is incorporated. The same is true for 'Token – specific money' and 'Pre-charged smart-card / devices with specific money'.

An important differentiation for pricing systems is also the 'moment (point) of control'. This can be carried out at the moment of admission (check-in), at the moment of admission and exit (check-in and check-out), at the moment of exit (check out) and randomly. Random control can also be combined with some other form of control, e.g. check-in and random control in the underground system. The point of control is closely related to the type of control. This control may or may not lead to the 'identification of the client'.

Finally, after completion of a transaction there may be some form of 'registration' of the same made available to the client (e.g. receipt, the storage of the information in a database that is accessible to the client).

With the previously identified 'acceptability requirements', on the one hand, and the functional dimensions, on the other hand, a matrix is developed to highlight the different relationships that exist between the functional dimensions of pricing instruments and systems and the 'acceptability requirements'.

This matrix is used to identify the potential of each functional dimension to influence the different 'acceptability requirements' and to determine the elements of each pricing function that are most suitable to be influenced in order to enhance acceptability. It is filled in on the basis of expert judgement. The experts determine the impact that each functional dimension of the pricing process is likely to have on each of the above-mentioned 'acceptability requirements', by rating the first in relation to the latter on a scale from 1 to 5 (1= very low potential to influence and 5 = very high potential to influence 'acceptability requirements'. In

order to give an example, let us assume that regarding the price structure, the experts decide that fairness is one of the greatest public concerns at stake and thus this ‘acceptability requirement’ is most likely to be affected in positive or negative terms when taking a decision on the price structure. In this way the decision maker knows that she/he should pay particular attention on fairness and adapt a configuration and technology that contributes to enhance it. This can for instance be obtained through sophisticated technical devices that allow for a great degree of differentiation. In this case, however, costs will also be of major importance and trade-off have to be made on the basis of the concrete local circumstances. In this way the experts also determine the dimensions that are most important for the public and are thus greatly suitable to influence acceptability. This happens if a functional dimension is ranked very high on most or all ‘acceptability requirements’. These dimensions have to get priority and trade-offs should be made in their favour again based on the concrete local context.

As already mentioned, the development process of the matrix, the reasoning underlying the expert judgement as well as the analysis of the results are presented in Annex 5-A. Here we reproduce the matrix with the results of the expert judgement. These constitute the basis for the general recommendations - presented below - on how to structure each functional dimension of the pricing process from a technical-practical point of view.

<i>Acceptability requirements</i>	Fairness	Reliability		User friendliness	Transparency		Privacy	Operating costs	Compliance
		Price setting	Collection		Ex-ante information on price	Ex post information on price paid			
Object of transaction	4	2	1	4	3	2	1	4	2
Price structure	5	5	2	4	5	2	1	5	2
Moment of payment	1	4	5	5	4	1	4	5	4
Payment Instrument	4	1	4	5	3	3	4	5	3
Point of control	4	4	1	3	1	3	1	5	5
Identification of client	2	1	1	4	1	1	5	3	5
Registration of transaction	2	3	3	3	1	5	4	3	4

It has to be pointed out that since the matrix is filled in on the basis of expert judgement there will always be some elements of subjectivity. However, even if this rating can always be accused of ‘subjectivity bias’, the matrix still provides a valuable tool to systemise the reasoning process of the decision maker that is faced with the analysis of available options for a pricing instrument in a concrete environment. It gives him an important indication on the intensity (not the direction, which can only be assessed for a concrete instrument and context) of the impact of each technical-practical option that she/he chooses. It also provides him with a clear idea on what functional dimension he has to intervene if he want to improve the one or other ‘acceptability requirement’.

In this context it must be recognised that the different functional dimensions are strongly interrelated: for instance, the possibility of registration of the transaction (i.e. the provision of a receipt or access to a database) may depend on the point of control, the identification of the client and the payment instrument. Thus, if the aim is to increase transparency through the registration dimension, the decision maker has to look at these other dimensions, too.

Finally, it must also be emphasised that the ‘acceptability requirements’ are extracted from the analysis of the reactions to the Green and White Papers and other literature. This means that they do not refer to a specific pricing instrument or measure and that they are made in a conceptual level. In real life, acceptability concerns will not only vary in relation to different pricing measures and instruments but also with regard to place, population structure, culture and a number of other variables.

6.2.3. Results and recommendations

Considering the complete picture with the results of the expert judgement (see above) it is possible to conclude that the moment of payment, the price structure and the payments instruments are the functional dimensions of pricing instruments and systems that are most suitable to influence most of the above-identified ‘acceptability requirements’.

For the decision maker this means that these dimensions have to be particularly taken into account when deciding on the technical-practical configuration of pricing schemes or packages.

Based on the consideration that the payment at the moment of consumption (e.g. when boarding a bus, entering a tolled road or a parking garage) may imply a big hurry in carrying out the paying transaction, the reliability in price setting and money collection may be reduced. However, this is strongly dependent on the payment instrument (e.g. cash payment versus contactless smart card or direct account billing) and the price setting device.

The same is true for compliance since a transaction carried out in busy conditions provides more space for cheating and non-discovery of fraud. Moreover, the moment of payment influences the time available for information, thus a transaction carried out in calm conditions before or after the consumption of the service will normally give more room for the provision of information and may increase transparency.

The user-friendliness is certainly enhanced if the client is given a vast choice as to when to carry out the payment, while the provision of many possible payment moments (e.g. provision of parking or transport tickets in kiosk as well as from vending machines and possibly also from the driver or a parking warden) will increase the operating costs for providers. A common illustration of this problem is the fact that road tolls are often a cause of queuing at the road exit, which is perceived by the final user simply as a ‘queue to pay’ (and not obviously related with the use of higher quality roads), completely jeopardising the economic and social concepts behind road tolling.

Thus, the moment of payment in a pricing system should be such to avoid as much as possible the necessity that everybody has to pay at the same moment. The possibility to carry out the payment in many different moments of time has to be balanced with the operating costs for the provider.

If the price structure allows for a great degree of differentiation, for instance, according to the quantity, type and moment of use of transport infrastructure or a service, the perception of fairness is likely to increase, while it will be more demanding on reliability, transparency and operating costs. In terms of differentiation possibilities the price structure is closely linked to the payment instrument: technology driven paying instruments such as smart-cards and direct account billing are much more suitable to implement a differentiated pricing structure than traditional payment instruments. The degree of differentiation has also an important repercussion on user-friendliness because a high degree of differentiation requires sophisticated technical instruments in order to avoid potential negative impacts on user-friendliness. Indeed, for instance, charging public transport passenger according to the exact distance that they travel is only possible in a user-friendly way if the payment can be carried out through contactless smart cards or other electronic devices that allow for direct account billing.

Thus, while differentiation is certainly necessary in order to guarantee fair and efficient pricing, the complexity of the price structure has to be traded-off in terms of reliability, transparency and operating costs. The price structure has also to be well matched with the technical solutions in relation to the payment instruments.

The possibility to use a great variety of payment instruments enormously improves user-friendliness.

Also, as already mentioned, for certain types of pricing (e.g. urban public transport pricing) high levels of differentiation are conditioned to the use of payment instruments such as pre-charged smart cards or devices that allow for direct account billing or deductions from advance account transfers. In this sense fairness is largely dependent on the payment instrument.

As long as these technical payment solutions are not well disseminated, they may heavily impact on operating costs.

In rail transport differentiation is currently obtained by distance and class related tickets sold before the consumption of the service. This system requires strict controls in order to guarantee compliance and reliability in price setting (in the sense that the price corresponds to the distance effectively travelled). As soon as modern technological solutions become less expensive, the manual system may not anymore be justified in terms of operating costs. This last argument is also valid for the traditional manual road pricing system.

However, the protection of privacy will also have to be considered when deciding on the type of pricing instruments. Indeed while cash payments will in no way interfere with the individual sphere of the user, direct account billing is not possible without her/his identification. The interference into the private sphere can be neutralised if the client has a choice between cash payment and electronic means that imply identification. In terms of fairness the non-equipped user with the necessary payment devices has also to be respected. Both situations confirm the appropriateness of a plurality of payment means.

The type of payment means has also an impact on the reliability of fee/fare collection: in this sense cash payment leaves much more room for mistakes than automated deduction from smart cards or account debiting.

Since cheating is more difficult with modern payment instruments, the degree of compliance is higher if these are used.

Finally, in relation to transparency, the payment instrument influences the ex-post and ex-ante information available to the client in the sense that with automated debiting and deductions from pre-paid smart cards the exact price to pay or paid may not be known. Payment devices that show the paid amount and the remaining balance are already available but may still have a big incidence in terms of costs.

Thus, a pricing system should allow for a plurality of payment instruments. Cash (or equivalent, e.g. pre-charged smart card) payment should always be possible. The concrete number and type of accepted payment means has to be balanced with operating costs. This trade-off has to be made on the basis of a cost-benefit analysis in the concrete situation. For certain electronic payment instruments it may be necessary to take measures to guarantee transparency and the protection of privacy.

Control and compliance are interrelated: the more effective the control, the higher the compliance rate. Effective control may strongly depend on the moment in which this is carried out (e.g. at entrance and exit in public transport) as well as on the applied control system (e.g. permanent control versus random checks). It may therefore have a great importance in terms of operating costs. Another important positive relationship exists between effective control and fairness: The more effective the control, the higher the chances that people in the same situation are treated equally. Too much control, however, may negatively influence user-friendliness since the transaction may become time consuming. The moment of control also influences the reliability of price setting. For instance, with zone-based public transport pricing supported only by entrance control, a passenger may travel on more zones than those for which payment is carried out and thus the price setting is not correct anymore. Finally, the moment of control (especially the exit control) may favour the provision of the ex-post information to the client (e.g. through a receipt or a monitor) and thus improve transparency.

Thus, the moment of control in a pricing system must be chosen in a way that this contributes to the effectiveness of the control. Trade-offs with operating costs based on a cost-benefit analysis and with the possible negative influences on user-friendliness are necessary.

On the one hand, if a pricing system allows for the identification of clients, the protection of privacy may be at risk. On the other hand, the identification may positively effect the compliance rate because the incentive to cheat becomes smaller. Operating cost considerations may matter when deciding on this functional dimension but they are not a fundamental issue since identification may be a by-product of the control. Due to the fact that identification enhances compliance, fairness may also be increased.

Thus, in some cases the identification of clients may be necessary or desirable. If so, care must be taken that collected data on clients is only used for purposes that are essential to correctly carry out the pricing process.

The registration of transactions may play a very important role in relation to the ex-post information on the paid price. In this sense more transparency can be provided through a receipt handed over at the end of the consumption of the service or, if the client is identified,

by posting the receipt or providing access to a database. Registration may - but does not necessarily - interfere with privacy. Indeed, the provision of a receipt does not require the identification of the client. Registration may increase reliability because it constitutes a kind of supplementary check. Registration is certainly a deterrent to cheating. As with identification, registration can be a by-product of the control system and may therefore not largely incite on operating costs. Finally if the registration of the transaction, e.g. a receipt, a database to be consulted increases bureaucracy and transaction time it may negatively influence user-friendliness.

Thus, in principle a pricing system that allows for registration can be seen as positive. However, care should be taken not to interfere with privacy or increase bureaucracy and transaction time.

The object of the transaction (e.g. the right to a multiple-service incorporated in a seasonal ticket for a parking facility or public transport) may contribute to enhance user-friendliness. Indeed, it is much less time-consuming to buy at one seasonal ticket instead of daily individual tickets. However, since a seasonal ticket, for instance, does not allow for pricing according to the costs caused by the user, it may negatively impact the perception of fairness. The object of the transaction may be dependent on the available payment instrument and the control system, thus operating costs may become important. The object may influence transparency, for instance, in the sense that a single ticket/service payment makes it easier to perceive the exact price.

Thus, regarding the object of transactions, taken duly into account operating costs, the system should offer the greatest possible variety. In selecting the different objects user-friendliness has to be a concerns, while the interrelation with the payment instrument and control system has to be evaluated.

7. SYNTHESIS OF THE THEORETICAL BACKGROUND ON ACCEPTABILITY

This last chapter can be viewed as a series of basic recommendations based on the previous analysis in order to enhance the acceptability of pricing in the transport sector.

Therefore, this chapter successively addresses the issues of (a) efficiency in transport pricing, (b) ways of enhancing acceptability through the political decision-making process, (c) the dimensions of equity at stake in transport pricing, (d) the organisation of pricing between different levels of government, and (e) the acceptability requirements of technological solutions considered from the functional point of view.

7.1. Efficiency in transport pricing

Efficient pricing of transport infrastructure (TI) and scheduled public transport (SPT) services is a necessary condition for maximising the social surplus. The long-run companion efficiency condition is that investments in transport infrastructure should be undertaken up to the point where benefits just exceed costs. One should keep in mind the linkage between the two conditions of optimal pricing and optimal investment since this could be a factor of acceptability of transport pricing.

For non-urban road transport services fuel taxation is the cost-efficient pricing system for car traffic. The current level of petrol prices in 'high-tax' European countries (around 1 Euro per litre) is typically above the total price-relevant marginal cost (MC). For non-urban car traffic the present petrol tax level may be justified only as part of an ambitious climate policy aiming at the target of successively reducing total CO₂-emissions.

For truck and bus traffic the diesel tax should be substantially raised to be in line with the price-relevant emission costs. In addition, an electronic kilometre charging system should be introduced, which could be differentiated to reflect the marginal costs of road wear and tear. If such a tax is introduced, purchase and ownership taxes are superfluous for HGVs and buses as road pricing instruments. If diesel-burning vehicles start to be able to clean their exhaust fumes in the same way as petrol-burning vehicles, or introduce much cleaner engines, the diesel tax should be lowered again to the 'best-practice' level, and the kilometre charges should be used also to reflect the different emission costs in addition to the progressiveness in the costs of road wear and tear.

Generally speaking externality charges should go to the public purse, rather than to the Road Administration. However, as distinct from emission charges based on damage costs, the CO₂-tax could be viewed as a 'scarcity price' required to make a nation (or EU) meet a given CO₂-emission constraint. The revenue from such a charge could be set off (on the revenue side of a hypothetical transport account) against the deficit, which would typically arise after the introduction of optimal pricing of non-urban road services.

For urban road transport services the petrol tax level, let alone the diesel tax level, is generally too low in comparison to the level of the price-relevant marginal costs. However, the petrol tax should not be raised, because it would then become too high for non-urban

car traffic. Instead a separate system of *road pricing* should be introduced, in the first place in big cities.

Partly as a complement, partly as a substitute to road pricing, depending on local conditions and preferences, *traffic calming* should be brought about by differentiated speed limit reductions, redesign and refurbishing of roads and streets consistent with safe mixing of cars and vulnerable road users. Complete pedestrianisation of some streets is probably also indicated in many cases.

On-street parking should preferably have higher fees than the level of parking-fees in nearby, off-street parking facilities, reflecting the opportunity cost of the land, and to discourage long-term parking in the streets. Most of the present far-reaching subsidisation (by employers, and tax-payers at large) of central city parking for urban car commuters should be eliminated.

For rail track services used by a monopoly train operator, access charges reflecting the scarcity of the rail track capacity are irrelevant. The single operator should be fully aware of the consequences for existing train traffic of additional trains in the rail network, and should be able to pass on this information to passengers and goods forwarders via the fares and freight rates. In this case the rail track charges should be related to *wear and tear* of tracks and other equipment in a similar way as the proposed kilometre charges on HGVs. In a case where many operators use the track, access charges can have an important role to play as regards track capacity allocation. The access charges would also help to recover some of the capital costs of the railways in that case.

For the seaport and airport systems, the salient feature of optimal pricing is that a fairly constant level of charges for the use of the infrastructure is indicated, irrespective of plant size, apart from big-city facilities for which land for further expansion is very scarce and costly in terms of encroachment. Cross-subsidisation from the few big to the many smaller plants is acceptable, if a total system cost recovery requirement is imposed on the airport and seaport system respectively.

Regarding short- to middle-distance scheduled public transport the economies of density of demand in are pronounced, and the co-ordination problem in time and space is very important for this category. This speaks for public planning, and subsidisation in order to maximise the social surplus, in combination with competitive tendering for the production of the services.

In very long-distance scheduled public transport, neither large non-exploited economies of traffic volume, nor route and timetable co-ordination pose big problems for the operators. The operators seem to solve the co-ordination problem reasonably well, but a new pricing problem is created. The pricing principle of 'charging what the traffic can bear' in order to perform intra-route cross-subsidisation yields inefficiency, without proper regard to the price-relevant marginal cost structure.

Generally speaking, efficient peak-load pricing is deplorably rare in the whole scheduled public transport sector.

7.2. The political decision-making process and the debate about transport pricing

7.2.1. Enhancing acceptability through the political decision-making process

The general analysis of institutional interactions between the various actors both on the supply side of the political market (politicians) and the demand side (interest groups and citizens) lead to some basic conclusions regarding the way to enhance acceptability.

From the politicians viewpoint:

- it can be hypothesised that politicians prefer revenues which go to the public purse providing them with flexibility in the use of these additional resources instead of having to return them to the citizens or the taxpayers or to earmark them for a specific purpose;
- the more restrictive the budget constraint is, the more a government will be interested in relieving this restriction by getting additional resources by the means of pricing instruments.

Given that benefits are preferred to be noticeable and costs should be as invisible as possible, pricing instruments may have a chance if they are introduced in such a way that well-organised groups are benefited most and the costs are spread to less influential and latent interest groups. Earmarking of revenues in this case may be an essential feature to achieve the respective aim by politicians.

From special interest groups viewpoint, their acceptance is expected to be higher:

- when earmarking of the revenues ensures that there are not only costs but also benefits (e.g. earmarking revenues from road pricing to be used for maintaining and improving the infrastructure of motorways means that there are benefits for the operators and users of the transport system);
- when instruments are assigned on the basis of individualistic property rights, and rents are therefore attributed exclusively (consequently, it can be expected that lobbying for such instruments is, as in the case of earmarked taxes, (*ceteris paribus*) more likely to be observed than to seek general taxes, quotas or subsidies).

From the citizens viewpoint, acceptance of pricing instruments can be expected to be the higher:

- the more voters have a say – either be it in a representative or a direct democratic context - in the matter of revenues (i.e. implementation of taxing or pricing instruments and fixing the type and the rate of these measures);
- the more voters have a say via democratic rights in the matter of expenditures (decisions about the spending of revenues);
- and the more the principle of fiscal equivalence and institutional congruence is realised,

and additionally

- the more transparent the process of decision-making, on the one hand, and the specific pricing mechanisms themselves, on the other hand are;
- the more obvious it is that the pricing measure is not just another revenue raising tax or charge but an adequate means to supply private or public goods (i.e. either infrastructure or services in the transport sector) or to internalise external effects (e.g. incentive-based

instruments for environmental protection). The more obvious is the link between the tax or charge levied and the use of revenues, the higher the acceptance can be expected.

More generally, from the point of view of citizens and voters, it is important that all relevant costs and benefits are stated explicitly and in a transparent way. Additionally, it is desirable that the pros and cons are weighted without distortion in the political decision-making process. The latter is best guaranteed if the principle of institutional symmetry is put to use. The reason for that is obvious: institutional symmetry means that both beneficiaries and those paying the costs are involved in the decision-making process and, therefore, none of them can exploit the other. The process itself ensures that all relevant arguments have a chance to enter in the discussion. This results in efficiency to be approximated endogenously, i.e. via the process and not via the evaluation of alternative outcomes.

7.2.2. *Arguments and concerns of actors in the transport sector*

The politicians, between the constraint of budget and that of re-election, seek the system efficiency of transport as a whole - the problem of the internalisation of the external costs being obviously secondary for them -. They also have the preoccupation with an (equitable) balance between transport modes, territories and their inhabitants: this explains the various attitudes of governments according to the territorial level (local, regional or national) of their field of intervention.

The interest groups and particularly the operators and producers of infrastructures, as well as the road users especially, argue as expected for

- a moderation of the incentive pressure of the price which touches them particularly,
- exemptions or compensations to this pressure of the price,
- the transfer of the recovery of the fixed costs (road or public transport) on the public money, therefore taxpayers,
- the return of the revenues from taxes or pricing to their advantage.

In short, one can reasonably say that each category of actors agrees with the principles of user-pays and internalisation of the external costs, but in their theoretical aspects only. When considering the practical implementation, a certain number of conditions are posed. The efficiency of the proposals of the Green and White Papers is challenged by many actors, because there is a doubt that the internalisation by the price is efficient, and that pricing *per se* is sufficient to improve the situation.

This means that with regard to efficiency, it still remains to be convinced that pricing is an effective means to change the behaviours (even if for the economists the answer is positive, within regard to the behavioural data in the medium and long term) and that the implementation of the proposals of the Green and the White Papers will not involve a too negative effect on the economy as a whole.

However a more significant issue is that the arguments of all these actors without exception, including those less directly touched (governments, consumers, etc.), refers to the question of equity. This concern plays a significant role, if not probably paramount, in the acceptability of the suggested measures.

7.3. The dimensions of equity involved in transport pricing

Three dimensions of equity were identified namely

- territorial equity, corresponding to the 'principle of liberty', in which the society must guarantee everywhere the access rights to the goods and the services;
- horizontal equity, corresponding to the 'principle of equal opportunity', which concerns the equal treatment between users and the user-pays principle.
- vertical equity, corresponding to the 'principle of difference', which explicitly takes into account the inequalities and its consequences as regards transport.

Some contradictions were raised between these various dimensions and with the objective of economic efficiency (see Figure , page 75).

The economic efficiency and the horizontal equity can each one involve price increases going against vertical equity (attention paid to most penalised). Conversely, vertical equity requires mechanisms of redistribution or compensations which challenge the economic efficiency of pricing and the user-pays principle of horizontal equity.

The economic efficiency and the horizontal equity can also each one involve price increases going against territorial equity, while challenging the right to mobility. Conversely, the preservation of this right requires investments and imposes limits on the prices, being likely to challenge the economic efficiency of pricing and the user-pays principle of horizontal equity.

Finally the economic efficiency (marginal cost pricing) and the user-pays principle of horizontal equity are generally incompatible but some compatibility can be found within the framework of 'transport funds': horizontal equity is not required anymore mode by mode but from the point of view of a transport service within the perimeter of the 'transport funds'.

The implementation of changes in transport pricing implies to apply longitudinally this framework, according to the four entries of economic efficiency and equity:

- Economic efficiency implies changes in pricing, including pricing something that was previously perceived as 'free'. Some actors may consider themselves as losers, i.e. perceive a degradation of their own situation, when compared to the period before the implementation of the new pricing measure (e.g. 'I pay more than before without drawing from it more benefit'). Reluctance to such price increase can in some cases be overcome if higher quality or capacity is delivered. However, pricing changes may conflict with the following equity dimensions.
- Territorial equity or principle of liberty, implies the free exercise of the right to mobility of people and goods. On the one hand, the maintenance of this freedom imposes obvious limits on the increase in transport pricing and, on the other hand, this freedom remains contained within the limits of the general interest of the society.
- Horizontal equity or user-pays principle, implies a better coverage of the costs by users. However, with pricing changes implied by this equity principle some actors concerned may consider themselves as losers compared to others (e.g. 'I pay more than the others with regard to the costs that I inflict and to the advantages that I bring to the society').
- Vertical equity or principle of maximisation of the situation of most penalised groups or areas implies that any policy which is likely to worsen the situation of the least advantaged groups or the least well served areas or even which openly does not aim an improvement of these situations, is very likely to be rejected. It results from this that the

principles of allocation of revenues from pricing play by their more or less distributive character a central role in the acceptability of pricing.

These three dimensions of equity are indivisible from the perception of the fairness of a transport policy. They are also related to the criterion of economic efficiency, which cannot be durably ignored. This set of contradictory constraints thus forms the framework for the definition and management of transport policies which aim at being both equitable and efficient. It results from these incompatibilities that one will obtain at best only an imperfect compromise between the economic efficiency and these three dimensions of equity.

A possible strategy consists in starting from the couple horizontal equity – economic efficiency around which the controversies between public authorities, operators and users are established. These controversies can be solved through the concept of ‘transport funds’, which combines the principles of efficient pricing and cost coverage in a perimeter defined by a given area or relation and for a set of transport modes. The two former principles would form the heart of the specification of such ‘transport funds’. The two dimensions of vertical and territorial equity would be added to this specification, but with a political and financial commitment of the public authorities to cover the additional costs which would result from this addition.

7.4. Organisation of transport pricing between different levels of government

The discussion about the assignment of pricing tasks to levels of government lead to the following conclusions.

Because of the global scope of for example the CO₂ problem and the global market for air and sea transport, it is recommended to try to organise fuel excise duties for these modes at the global level. Second-best option is to introduce fuel excise duties only for intra-Community transport activities.

The definition of pricing principles should be done at European level. In addition, some basic characteristics of pricing systems have to be set at European level (e.g. vehicle or passenger kilometres, weight of vehicles, emission, inter-operability etc.). In case a special pricing scheme for long-distance transport is not or not yet feasible, national pricing measures should be reviewed whether they do not discriminate between mode and nationality. Non-discrimination anyhow should be checked by European institutions. However the subsidiarity and proportionality principles pleads for the implementation of a pricing scheme for long distance transport on national or sub-national level.

In case of transport problems covering more than one country a pricing measure of some co-operating countries (e.g. ‘Eurovignette’) can be efficient. Co-operation between some countries also could be an option in case it is not feasible to reach an European agreement on a pricing measure.

Both the subsidiarity principle and the territoriality principle make clear that Member States could play a considerable role in defining and implementing transport pricing schemes at the national level. This entails both the setting of taxation and pricing levels and the design and implementation of pricing and taxation systems. However, as explained above, the setting of levels has to be in line with pricing principles laid down at the European level and system design has to be in line with European requirements. Nevertheless within these principles and

requirements it should be feasible to reflect national policies in pricing systems and pricing and taxation levels.

Generally speaking, the subsidiarity principle pleads for the lowest level possible. This implies that especially in those cases where costs and problems caused by transport activities have a local or regional scope sub-national governments should have a major role in the design and implementation of pricing measures. This gives more possibilities for taking into account regional and local circumstances, and to implement regional and local traffic policy. This will improve social as well as political acceptability.

7.5. Acceptability requirements of technological solutions

7.5.1. Privacy

Privacy is highly protected on the basis of supra-national laws and treaties as well as national constitutions and laws. This means that when introducing pricing systems the legislation in this field for each relevant country has to be checked and its requirements met.

However, even if privacy is among the key issues which are commonly addressed in public attitude surveys, it has to be pointed out that privacy in electronic transport pricing systems is only one of the issues of public concern and that nowadays individual generally accept the potential danger of abusing information (e.g. credit cards) also in the transport sector (e.g. public transport pricing).

Privacy issues can easily be solved by smart-card technology and cryptographic encoding, or simply by allowing for cash payment besides an electronic option.

Transport pricing systems should allow for the possibility of 'data free' transport, i.e. the system design should ensure that personal data of a user that pays the correct price is not collected and stored. An electronic solution could be a debit card that stores individual movements and is kept by the user, possibly together with a credit system. A non-electronic solution could allow for cash payment together with an electronic payment option.

Information that needs to be collected and processed for the functioning of the system should only be collected and processed during the transaction, and discarded immediately afterwards.

The user should be able to control the information that is collected.

No great positive spin-offs of electronic road pricing systems in terms of safety improvements or traffic management can be expected.

7.5.2. Acceptability requirements from technical systems from the functional point of view

The practical (functional) and technical characteristics of pricing systems may contribute to enhance or decrease acceptability and it is very important for the decision maker to know which acceptability concerns may be at stake and on which functional dimension of a pricing scheme she/he has to intervene in order to neutralise them. In general terms, i.e. without referring to a pricing system to be implemented in a precise context, it can be said that operating costs, user friendliness, compliance and fairness are the most important

acceptability concerns in relation to most functional dimensions of the pricing system, while the other concerns (reliability, transparency and fairness) are only very relevant for certain specific dimensions. However, what is more important to know are the acceptability concerns for each single functional aspect and the functional aspects that are most prone to be manipulated in terms of acceptability. Again in general terms it can be said that these latter dimensions are identified in the moment of the payment, the price structure and the payment instruments. The matrix developed in chapters 6.2.2. shows, for instance, that the moment of payment is extremely important in terms of user-friendliness, reliability of the system, operating costs, compliance, privacy and transparency. This means that when the decision maker decides on this functional dimension she/he can and must work on all these acceptability concerns and try to find appropriate compromises among them in order to enhance acceptability. In terms of price structure the picture is similar: the extremely important concerns in this respect are fairness, reliability, transparency and operating costs and again it is the task of the decision maker to take them duly into account.

Some very general recommendations on how to intervene on the different dimensions of pricing system in order to improve acceptability are given below. These recommendations are in line with the Commission Communication on Interoperable Electronic Fee Collection Systems in Europe.

Ideally a pricing system should be structured in a way to allow for the payment to be carried out in many different moments or occasions (e.g. pre-payment, payment at the moment of the consumption of the service, after the service, etc.) and efforts have to be made to avoid as much as possible the necessity that everybody has to pay at the same moment of time, and thus busy and crowded situations arise. However, this convenience for the customer has to be balanced with operating costs for the provider.

While price differentiation is certainly necessary in order to guarantee fair and efficient pricing, the complexity of the price structure to which it could lead has to be traded-off in terms of reliability, transparency and operating costs. The price structure has also to be well matched with the available technical solutions in terms of payment instruments.

The pricing system should allow for a plurality of payment instruments. However the concrete number and type of accepted payment instruments should be balanced with operating costs. In order to protect privacy there should be available a form of payment that does not register individual movements. This can be cash or equivalent such as electronic cash.

The moment of control in a pricing system must be chosen in a way to contribute to the effectiveness of the control. A trade-offs are necessary with operating costs and possible negative influences on user friendliness.

Sometimes it may be necessary and desirable that pricing systems identify the client. In this case care must be taken that collected data on the client is only used for purposes that are essential to correctly carry out the pricing function.

A pricing system that allows for the registration of the transaction is in principle positive. However, care must be taken not to interfere with privacy or increase bureaucracy and transaction time.

Regarding the objective of transactions (e.g. single service, multiple service, seasonal ticket, etc.), taken duly into account operating costs, the configuration of the pricing system and structure should allow for the greatest possible variety.

This report focused on the theoretical grounds behind acceptability of transport pricing policy. However one major conclusion of this research points to the fact that some of the components of acceptability are strongly dependent on individual perception and interpretation of policies. For this reason the theoretical basis developed here should be complemented with the results of the on-going empirical work, so that consolidated conclusions can be developed and presented in further reports of PATS research.

8. BIBLIOGRAPHY

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