



SIXTH FRAMEWORK PROGRAMME

Project contract no. 006293

IMPRINT-NET Implementing pricing reforms in Transport - Networking COORDINATION ACTION

Thematic Priority 1.6.2 "Sustainable Surface Transport "
Objective 3.4.1 "Research to support the European Transport Policy"

D3 Pricing reforms in the rail sector

Submission date: 14th of October 2008

Start date of project: 1st of July 2005

Duration: 36 months

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Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	X
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Acknowledgement

We are indebted to the expert group members who gave their time willingly to present papers and contribute to discussions. Whilst this report is an outcome of the meetings of the group the opinions and conclusions expressed within are those of the authors. They cannot be taken to represent those of each expert group member, their organisation or the European Commission.

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Executive summary

The overall aim of Expert Group 2 was to bring together researchers, policy makers and stakeholders (including both industry and environmental groups) in a series of 4 1 day seminars, in order to synthesise information on research and practice and build consensus on the issue of pricing the use of rail infrastructure.

More specific objectives are:

- seeking consensus on the determination of marginal social cost (concentrating on controversial issues such as split of infrastructure costs between fixed and variable, allocation of variable costs to measures of use, variability of cost elasticities, treatment of congestion, scarcity, accident and environmental costs);
- to examine research and experience on the impact of differences in pricing structures and levels
- considering barriers to efficient pricing in the rail sector and ways of overcoming them;
- highlighting particular problems of certain member states (e.g. poor infrastructure, high transit traffic, lack of government funding) and ways of overcoming them.

We will discuss the evidence and recommendations relating to each of these objectives in turn.

Determination of marginal social cost

Over the last 10-15 years, a lot of theoretical research has been done, and empirical evidence compiled on the estimation of marginal social costs for the railway sector. We would emphasise that the substantial challenges remaining are not first and foremost on the analytical side of the problem. The primary task is rather for railway administrations to compile data in a form which makes it available for systematic analysis. In the absence of such information, it will be impossible for both the administrations themselves, and for the scientific community, to advise the Commission and Member States further about the appropriate level and structure of infrastructure charges.

Evidence has been produced on wear and tear costs using both econometric and engineering methods. Generally this indicates that the marginal cost of wear and tear is not more than 30% of average maintenance and renewal costs. However, it was concluded that it would be useful to provide more detailed guidance on the proportion of costs that are typically variable for different cost categories - as disaggregated as possible. This would be especially useful for newer regulators which have not had the benefit of their own research programme.

For scarcity costs, a lot less evidence exists. Auctions have been widely researched in other industries, but comparatively less so in the railway application. Experiments are needed to test whether auctions are a practical way of allocating capacity. Further efforts should be made to examine the relative merits of capturing capacity costs via different means – eg,

use of posted scarcity prices, mark-ups, reservation fees and auctioning. This whole area should be informed by a review of the extent to which capacity problems exist on different parts of the European rail network.

Evidence was now available on how to measure and value the costs of air pollution, noise and greenhouse gases; these costs vary substantially with the type of traction and characteristics of the rolling stock . Therefore the rail industry should take steps to incorporate environmental components to its charging regimes by means of differentiated charges, without raising the average level unless these costs are fully included in charges for competing modes as well.

For accident costs, the principal issue seemed to be external costs at level crossings. Where there is significant use of level crossings, efforts should be made to estimate the associated external cost and incorporate this in charges for those route-sections.

There is a lack of evidence on the extent to which timetable planning and real time signal operating and control costs are variable with traffic volumes, although what evidence exists suggests that the marginal costs for these cost categories are small. Further research is needed to understand where marginal timetable planning costs might be significant and, in such cases, to estimate the scale of cost involved. The marginal costs at nodes and hence the charges for access to nodes; marshalling yards and stations, also require future consideration.

Impacts of pricing structures and levels.

We found a shortage of evidence on the impact of levels and structures of infrastructure charges but it seems that the levels are particularly important for commercial freight and passenger (including especially high speed operators for whom charges are often very high) operators, and where regional services are funded by regional bodies which may be particularly sensitive to necessary subsidy levels. Mark-ups should only be imposed after careful consideration of the most efficient way of doing so and of their consequences for the market position of railway undertakings in the market segment in question.

,The structure of charges can be important in encouraging the use of rolling stock which imposes lower social costs. Therefore, charges should be sufficiently differentiated to reflect differences in the costs caused by different types of vehicle.

Barriers to efficient pricing in the rail sector and ways of overcoming them;

It is recognised that pure marginal social cost pricing will only be possible where governments are willing and able to fund the difference between marginal and average infrastructure costs; otherwise mark-ups will be needed. Mark-ups on infrastructure charges, if done well, can help the industry by both recovering more costs and maintaining incentives towards efficient use of the infrastructure; where services are franchised then it

is appropriate for mark-ups to be applied as part of a two part tariff. Infrastructure managers should set out more clearly where mark-ups are applied and, in such cases, how these mark-ups have been calculated.

A particular issue arises in international corridors where the determination of mark-ups by individual national infrastructure managers in an uncoordinated fashion may lead to charges which do not reflect the market position of rail relative to competing modes.

There is consensus that it would be more efficient for all infrastructure managers on an international corridor to set one mark-up in consideration of market conditions rather than individual mark-ups.

We heard evidence that some stakeholders were seeking to negotiate on the level of charge even where it was based on marginal social cost. We considered that, whilst consultation with stakeholders was important, negotiation should be confined to two areas: the level of mark-up and the assumed level of efficiency of the infrastructure manager, and hence to the overall level of costs that it incurs and seeks to pass on to operators. This should, clearly, feed back into the discussion of actual baseline marginal costs and require some agreement on what efficiency improvements it may be necessary and appropriate for the infrastructure manager to make. To ensure that this is not at the expense of performance, efforts should be put into ensuring effective performance regimes are introduced on a widespread basis.

Particular problems of certain member states (e.g. poor infrastructure, high transit traffic, lack of government funding) and ways of overcoming them

We heard arguments that some Central and Eastern European rail infrastructure managers were using high charges for freight to try to cross subsidise socially desired passenger services for which governments were unable or unwilling to pay. We concluded that whilst it may be reasonable to impose higher markups on freight than on passenger services if the market position allows it, freight services should not be expected to pay high markups to support infrastructure costs that are only incurred because of the presence of passenger services. Concentrating resources on international routes should be a key priority for those Central and Eastern European railways that are severely financially constrained.

Overall conclusion

Overall the group considered that current EU legislation is generally adequate, and care should be taken to ensure that any revisions do indeed improve it. However, despite the progress made on this issue in recent research projects, clearer evidence on best practice in rail infrastructure charging is needed

1. Introduction

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More specific objectives are:

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The starting point from the point of view of EC policy is the implementation of rail infrastructure charges in line with directive 2001/14. This directive allows for charges to be based on marginal cost, but with specific mark-ups in different circumstances. Its implementation has involved a great deal of effort in different countries to devise suitable charging systems, with a considerable degree of diversity of response. Some countries have adopted very low charges based broadly on short run marginal cost whilst others have adopted much higher charges based broadly on long run marginal cost and incorporating the allowed for mark-ups. Some countries have several different charges disaggregated according to route, train type, time period etc, whilst others have much less disaggregated charging structures. In addition, some countries have adopted charges that are apparently not in line with the directive. What emerges is a wide variety of charging regimes in different parts of the EU which, it is believed, leads to distortions in both the level of rail traffic and the routeing of international traffic. A DGTREN stakeholder workshop concluded that it was the high level of charges in certain countries rather than diversity of structure of charges that was the real problem.

The reasons underpinning the different approaches to the directive, and the impact that such a mix of charging regimes has, are important questions to understand in greater depth. Perspectives on these questions are likely to differ between government and industry, and, within the industry, between freight and passenger sectors.

There is also new research in the area of measurement of the marginal social cost of rail infrastructure use, e.g. within the GRACE project, which is serving to inform charging levels and structures. Findings from this research, including specific work looking at

generalisation of cost estimation, may be an important means of developing a greater degree of consensus on the subject and a greater degree of harmonisation of charging approach across the EU.

2. Brief history of the EG

The Group was formed in late 2005/early 2006 and grew to comprise 21 members: 3 from infrastructure manager organisations, 5 from government or regulatory bodies, 4 from stakeholder groups and 9 researchers. The full list of members is set out in annex 1. Each Expert Group programme is composed of four seminars, which are held twice a year. Each seminar involves around 15 Experts each, selected in order to guarantee a wide coverage of the transport sector in terms of geographical provenance and working area.

The group has met four times, in the spring and autumn of 2006 and 2007. The first meeting, held on 8 February 2006, served as an introduction, and included presentations providing an overview of research findings, the European Commission's current position, and a review of infrastructure charging practice in selected member states. The second meeting, held on 15 September 2006, went further into detail on the measurement of wear and tear costs, scarcity costs, data requirements and charging practices in Austria and France. The third meeting, held on 20 April 2007, considered regulatory and investment issues, whilst the final meeting, held on 28 November 2007, discussed conclusions and recommendations. The agendas for all of the meetings are included as an annex, and the reports of each seminar are available on the project website.

The original objectives and content of the four meetings are outlined below:

EG2-1 “Overview of issues and state of the art”

- Presentations on review of research, on measurement of marginal social cost, EU Policy, experience of key member states (Britain, France, Germany, Austria).
- Overview of the issues to be considered and planning of the programme for future seminars. This drew on findings from IMPRINT-EUROPE and, more recently, the work of the ECMT rail group. As background, results from the recent reviews of this area conducted by ECMT and by DGTREN were presented and discussed.

EG2-2 “Cost Measurement and Charging Approaches”

- Identification of the marginal wear and tear costs, external congestion and scarcity costs, external accidents costs, environmental costs of rail infrastructure use.
- Understanding the implications of cost levels and cost structures for efficient charge levels and structures;
- Understanding the impacts of more efficient rail infrastructure charges, including the impacts of greater harmonisation of charging regimes and the impact on end-user prices, particularly in relation to the freight market.
- Considering the need for greater transparency and implications in terms of infrastructure expenditures monitoring

EG2-3 “Investment, Subsidy and Regulatory issues”

- The role of rail infrastructure charges in cost recovery and the generation of rail investment funds;
- The process for agreeing infrastructure charges and the need for an independent regulator to oversee charge-setting and dispute resolution, including the implications for setting charges in the presence of franchising.
- The need for European guidelines on cost calculations (e.g. methodology, conditions or needs for harmonisation, etc) Particular problems of financing rail infrastructure under severe budget constraints.

EG2-4 “Conclusions”

- Review of previous seminars and attempt to pull together overall conclusions
- Identification of factors which might promote consistent moves from existing to more efficient and harmonised charges.

3. Cost Measurement and Cost Drivers

3.1 Problems and Definitions

Directive 2001/14, on allocation of railway infrastructure capacity and levying of charges (CEC, 2001), determines that charges must be based on ‘costs directly incurred as a result of operating the train service’ (CEC, 2001). This is widely interpreted as meaning that charges should be based on short run marginal social costs.

Given the situation in a railway network as it is at a certain point of time, short run marginal cost is defined to be the consequences for costs from adding a train to, or subtracting a train from the current level of traffic. That is, short run marginal cost pricing advocates charging the incremental, or marginal, cost of use of the existing, i.e. fixed in the short run, infrastructure by the train concerned, given the assumption that all other trains on the network are running. That is, the infrastructure charge for operating a particular service should be the additional costs imposed by that service, given that all other services are operating and are paying for the additional costs which they each impose.

The definition could alternatively be stated in terms of variation in train km or in gross ton km; in either case, it may vary with the characteristics of the train including its weight.

Short run marginal cost pricing is widely accepted as the most effective means of promoting the efficient use of existing infrastructure. However, there are criticisms of the principle which lead to some experts proposing that the principle be modified to account for such criticisms, but which lead other experts to argue for alternative pricing principles to be adopted in its place.

The costs generated when an additional train uses the infrastructure are comprised of five main elements:

- Use-related wear and tear costs – the costs associated with maintenance and renewal activities that are required as a direct consequence of damage to the infrastructure resulting from the passage of trains;
- Congestion costs – the costs associated with ‘knock-on’ or ‘reactionary’ delays on the network, whereby a delay to one train has a [‘knock-on’ effect that causes subsequent trains to be delayed, which increases as capacity is utilized ever more intensively;
- Scarcity costs – the opportunity cost of network capacity, which again intensifies as capacity is utilized ever more intensively;
- External accident costs – the external costs associated with fatalities, injuries and damage to property resulting from rail accidents; and

- Environmental costs – the costs associated with rail-related noise, local air pollution and CO2 emissions.

In connection with use-related wear and tear costs, there are differing views on the distinction between maintenance and renewal costs. Essentially maintenance involves attention to existing assets and renewals involves replacing them, but in practice minor renewals may take place as part of planned maintenance and be recorded as maintenance cost. The problem this leads to is that if the proportion of costs that is variable differs between renewals and maintenance, different definitions will lead to different degrees of variability of costs for each category between railways

Congestion and scarcity in relation to rail should be clearly distinguished from how they relate to road. Congestion costs on a scheduled mode manifests itself as reduced reliability. There is a cost imposed on other operators of increasing capacity utilisation additional to that captured by the performance regime as a result of the reduced ability of the network to recover from delays. Scarcity costs on a scheduled mode manifests itself as an opportunity cost in terms of the value of the best alternative use for the train path.

3.2 Cost Components

Wear and Tear costs – econometric analysis

There is a growing body of robust econometric analysis to estimate marginal wear and tear costs and studies for different national railways display a degree of convergence in their results. In particular, the studies presented to the Group show a degree of consistency in implied elasticities of maintenance costs with respect to traffic density, with values for Sweden and Finland in the range 0.133-0.175, Austria of 0.27 and France of 0.37. It is possible to use this elasticity relationship to identify the marginal cost, via its relationship with average cost. However, there is no one single preferred econometric approach and the data available varies in nature from one study to another.

Discussions identified three areas of concern:

- Falling cost elasticity;
- Benchmarking of usage elasticities;
- renewals issues.

In relation to the issue of falling cost elasticity, a number of the studies reviewed find that the proportion of costs variable with traffic falls as traffic density increases. Prior expectations were that the proportion would rise as fixed costs became less significant. Hence, the evidence that indicates that marginal costs are falling as traffic volumes increase, and are falling at a fast rate the more traffic there is, is counter-intuitive.

In contrast, the French study considered found that, on average, marginal cost increases with the volume of traffic. This seems, however, to depend on the traffic mix and on the average level of traffic – marginal costs are decreasing at first and then increasing as traffic levels rise and it is perhaps because the average segment has high traffic levels that the study shows marginal cost rising with the volume of traffic. It is not entirely clear whether this is an artefact of the study method (which differs from the other studies reviewed) or if it is a phenomenon that should be explained. A number of possible explanations were discussed. For example, it was highlighted that the French adopt quite an extreme balance of maintenance versus renewal activity, in that the practice in France is to maintain rather than renew the infrastructure. Another intuitive potential explanation for this pattern was put forward in relation to possessions. That is, maintenance work needs to be undertaken between the operation of services on that infrastructure and, hence, the same amount of work has to be divided in different sessions according to the level of traffic. High traffic levels imply shorter possessions and a bigger proportion of time spent setting up. So this means that the cost of a certain amount of work could rise with the level of traffic on the infrastructure.

In relation to benchmarking, it was noted that benchmarking marginal costs for different countries tends to be problematic due to the inherent differences between countries and the differences in the econometric studies undertaken. A number of issues were raised that might impact on such benchmarking, and which may need to be controlled for.

Firstly, different econometric studies sometimes use different model formulations and sorts of data, and this was highlighted as a potential source of the variation between different studies. For example, the French study estimates a Box-Cox model, which is significantly different from the approach other studies have used. However, it was noted that translog and other formulations were also estimated for France, and found similar results.

The cost data on which the studies are based may be recorded or reported in different ways. For example, some of the cost that is variable is sometimes not included in the cost data set modelled. Alternatively, it was noted, in specific relation to the French study, that the French data includes some overhead on the recorded time and materials costs. This may raise the ratio between marginal cost and average cost, and thus might be one part of the source of the difference between the results for France and elsewhere.

Comparisons of results from different studies often seek to benchmark the mean marginal cost. However, it was highlighted that it is important to remember that the distribution of marginal cost is substantial, so it is perhaps not appropriate to benchmark on the mean values. For example, the marginal cost, averaged over the whole national rail network may be substantially different from the average for different categories of line. Therefore, it may be necessary to establish some other means of benchmarking that recognizes the range of marginal cost. This could include looking at standard deviations and percentiles so as to examine the variability.

The average marginal wear and tear costs for Britain are notably higher than elsewhere. It was noted that, as yet, this finding is not adequately explained, though a number of potential explanations were put forward in discussion. Firstly, it could in part be due to the issue, raised in the previous paragraph, that the average can be greatly affected by the underlying distribution of marginal cost values and it may be that the British network has a higher proportion of relatively high marginal cost sections as compared with other networks. Secondly, it may be that there are generally higher marginal costs in Britain, perhaps due to higher safety standards. Thirdly, it was suggested that it may be due to the fact that the British railway system is not in 'steady state'; there is a lot of back-logged investment throughout the network. However, doubt was cast on this suggestion given that this backlog mainly relates to renewals rather than maintenance.

The level of investment in quality and technology are also issues. The definition of quality standards differ across different railways in Europe and drawing meaningful comparisons, for the purposes of comparing costs, can be highly problematic. In addition, maintenance strategy could differ in relation to quality standards and the distribution of maintenance spending across the network. For example, a constraint on total maintenance budget might mean that high traffic density lines are maintained to a greater standard than low traffic density lines, which has the effect of increasing apparent marginal cost on the high quality, high traffic lines. It was noted for example that traffic density is quite different in France as compared with Sweden and Finland. The Life-Cycle Cost approach was suggested as a possible means of accounting for these differences, and worthy of further investigation. Furthermore, other things being equal, high specification technologies tend to be associated with a higher initial investment cost and a subsequently lower level of maintenance cost, as compared with lower specification technologies. The overall wear and tear costs of a particular railway will depend on the mix of technologies employed on that rail network.

The deterioration of the track depends on the initial quality level and on subsequent maintenance. Some of the studies attempt to control for quality. However, this is generally limited to controlling for variations in the quality of different parts of the national rail network under consideration. It is a different level of issue to try to control for variations in quality between different countries.

The approach to maintenance, in particular how to balance treatment of causes or of consequences, also has a potentially big impact on marginal cost. For example, a big part of maintenance cost is tamping. If this is done on poor subsoil, you need to do it every six weeks; as compared with if you have good subsoil, then you might only need to do it every 3 or 4 years. So the infrastructure manager's decision as to whether to treat the consequence, by undertaking tamping on a frequent basis, or the underlying cause, by treating the subsoil, has potentially major impacts.

In relation to renewals, the distinction between maintenance and renewals costs differs between countries, as does the extent to which items such as maintenance of structures are treated as infrastructure cost and included in the model. Renewals are highly problematic since they depend on cumulative traffic rather than traffic in the year in question. There was

discussion during the meetings of the DG TREN Task Forces and the ECMT Rail Group as to whether renewals are a relevant part of marginal cost. Insofar as additional utilization will bring forward the date at which the infrastructure will need to be renewed, it would seem clear that such 'accelerated' renewals are part of marginal cost, but there is not a consensus on this. It was highlighted that there are lots of different definitions of what constitutes renewals spending and what constitutes investment, linked to differences regarding financial lifetimes and technical lifetimes of the assets. It was agreed that it is important to try further to understand the differences between different estimates.

There is relatively little work examining maintenance and renewals costs together, as the majority of the work has concentrated exclusively on marginal maintenance costs. However, it seems clear that maintenance costs are related to renewals. For example, the French study found, firstly, that maintenance cost increases with age of rail and of sleepers (but age of rail seems to have more impact on cost than sleepers) and, secondly, it appears that the maintenance cost increases significantly with time since renewal. This means that an infrastructure manager's policy towards balancing maintenance and renewal investment will directly impact on marginal maintenance costs. For example, where an infrastructure manager favours maintenance expenditure over renewals, one would expect to observe relatively high marginal maintenance costs.

Those studies that have included renewals costs have done so in different ways. One study included renewals costs as an aggregate variable in the same model with maintenance costs. However, concerns were expressed that without track geometry data, you don't know whether the infrastructure is being maintained to a constant level and that using one or two years worth of data, whilst it may be adequate for maintenance, is not sufficient for analyzing renewals. For example, in any given year the infrastructure manager could decide to do lots of maintenance and not much renewal and then, next year, vice versa. Therefore, a longer time series of data is needed. Another approach to analyzing renewals (on-going at the time of the meeting) looked at survival estimates, relating the age of the track to how much traffic has run on it; this follows on from theoretical work by Newbery and subsequently Lindberg.

Another approach, which examines maintenance and renewals costs together, is that of 'life-cycle costing'. This starts from the viewpoint that maintenance and renewal costs cannot be considered separately as they are interlinked. The approach also includes costs of operational hindrance, incorporating consideration of possession time. Detailed engineering assessments of how different types of rolling stock impact on different types of infrastructure exist and are used, in conjunction with unit cost rates for different maintenance and renewals activities, to operationalise life-cycle cost modelling and make estimates of marginal wear and tear costs.

Wear and Tear costs - Engineering Models

In contrast to econometric approaches to the estimation of marginal wear and tear costs, it is also possible to make use of engineering models of how different types of rolling stock

impact on different types and elements of the infrastructure. Opinion is that actual wear and tear cost very much depends on the characteristics of the vehicles, in particular on the interaction of the train and the track. This analysis enables different charges for different types of train to be estimated; in far more detail than would be possible from econometric analysis. Work for Austria using this approach was highlighted. This found that unsprung mass and the steering capability of bogies were crucial factors. These figures have fed into the Austrian charges, such that locomotives that have reduced maintenance costs have reduced charges. This is achieved by every loco having a plus or minus factor applied to the infrastructure charge.

Scarcity Costs

Scarcity costs arise where there are bottlenecks – be they spatial and/or temporal - on the rail network, and operators competing for the use of that scarce capacity. Where there is competition for network capacity, it is thought that scarcity costs can be significant. Whilst there are currently only a few declared congested sections of the rail network in the EU, this may be for political reasons (to avoid having to commit expenditure to improve capacity). The actual extent of scarcity may well be much more than is declared. A Europe-wide review of the situation is required to clarify this issue.

A small number of studies have sought to estimate scarcity costs on particular corridors, with a view to estimating a scarcity charge for that section of the network. Such scarcity charges should be paid irrespective of whether the slot is used and might be particularly relevant for freight traffic where paths are often reserved but not used.

Rather than estimating them, it was noted that scarcity costs could be revealed by incentivising the operators to reveal the true value of them running a train, and it was suggested that an auction can be a very good mechanism for doing this. That is, if the auction is set up in the correct way, operators would submit bids which would supply the information required to decide on an efficient allocation of capacity across the rail network, expressed in the form of the timetable.

The sort of auction mechanism that might be used in the context of rail capacity was discussed. The required information would involve, for each interested operator, the ideal departure time, two or more alternative departure times and corresponding values for each. Optimising software would then develop a timetable which would be shown to the operators for them to decide whether the outcome suits them or whether they would like to adjust the values of their departure times. The process would then iterate until no operator wants to change their bid.

It was explained that this process was tested in 2002 with 8 operators in Sweden. The passenger operators pulled out after two rounds of the auction as they feared what was going to happen and what it was going to mean for them, though there was more success in engaging freight operators as they saw it as a means of getting access to the network that had been difficult to obtain.

It was felt that defining the auction in this way appears to overcome most of the previously stated objections to auctioning of rail capacity. That is, it does not seem that different to the process undertaken in Britain (and elsewhere), whereby the operators indicate what their network capacity requirements are and then the infrastructure manager examines what is possible, draws up a draft timetable and then iterates towards a timetable that is agreeable to all operators; the principal difference being that the auction involves assigning values to the operators' preferences.

Concern was, however, expressed as to whether there is any indication that the auctioning process will iterate to an equilibrium, particularly given all of the complementarities and complexities of an inter-connecting rail system. In response, evidence was cited from the US radio spectrum auctions, which succeeded in achieving an equilibrium amidst similar levels of complexity. Another concern expressed was whether it is possible for operators using public money and operators using private money to compete on an equal basis. More generally, it is difficult to predict the outcome of auctions, so making access to parts of the rail network subject to an auction introduces greater uncertainty into the rail system.

There must be competition for paths in order for scarcity charges or for auctions to be valid. Where there is a dominant incumbent operator, for example, there may be a problem with them buying up all paths to prevent new entrants. Furthermore, if there is only one operator, there is no actual need for an external scarcity charge as this issue is internal to the operator.

The auctioning approach to arriving at a timetable was contrasted with the approach in Switzerland, where it has been decided that there should be 'clock-face' timetabling and there are half hourly trains from everywhere to everywhere. It was suggested that the Swiss system is not optimised and requires subsidy in order to achieve their timetable. Nevertheless, the question remains of how to ensure the linkages and interchanges which seem to be required in a rail system and whether the need to link with other trains actually imposes so many restrictions on the timetable as to largely remove the flexibility within the auctions.

It was noted that there are a lot of politics involved as there will be losers from the process. Some years ago, it was suggested to the French government that they use auctions to assist in allocating rail capacity and they were totally against it. However, it was noted that Germany has provision to use auctions for allocating slots where agreement cannot otherwise be reached.

Other Cost Components

Rail is a relatively environmentally-friendly mode of transport. However, rail infrastructure charges could incorporate environmental components to incentivise and reward further improvements to rail's environmental performance. Research into the air pollution and noise costs has advanced and is, in some countries, being incorporated into

charging regimes. Concerns were expressed that mark-ups for environmental cost might be abused by member countries to bring in revenue, by one country arguing that they value noise, for example, more highly than other member countries. It was felt that this could be mitigated by charging through a bonus/malus system, though it was also highlighted that sometimes places have genuinely higher environmental marginal costs, eg Alpine regions.

The issue of the marginal costs of train planning, signalling etc was highlighted as an under-researched cost category. There was a perception that, in the short run, these elements do not vary very much, but there is a need for more evidence on these aspects of cost. However, adding additional trains to a busy route can require a major re-planning exercise, so the cost is not always trivial. Evidence was cited from a French study that the variable part of these costs is small but not zero.

The relationship between accident costs and marginal maintenance costs was highlighted as an area in need of further research. The decision on what standard the infrastructure should be maintained to is influenced by concerns relating to rail accidents. This has been particularly notable in Britain since the Hatfield accident focused attention on the accident risks associated with particular aspects of infrastructure wear and tear. Some argue that this attention has resulted in an overly cautious approach of maintaining the infrastructure to an unnecessarily high standard so as to all but eliminate the accident risks associated with wear and tear.

Valuation of rail infrastructure assets was also highlighted as a big issue in measuring total cost, and how the assets are valued - sometimes very old assets - will greatly affect cost structures. This is a matter of concern when it comes to ensuring that mark ups on marginal cost are not unreasonably high.

3.3 Issues

Regarding wear and tear costs, the econometric and engineering approaches to cost assessment each have their strengths and weaknesses. The econometrics approach is strongly grounded in theory but is backward-looking in nature, whilst the engineering approach is less theoretically grounded but more forward-looking in its nature.

In combination, econometric studies should be undertaken to provide useful evidence on overall cost elasticities and marginal costs, whilst engineering studies should be used to provide evidence on differentiation of marginal cost according to the relevant parameters. The approaches are therefore to be seen as complements to, rather than substitutes for each other and closer collaboration between rail economists and railway engineers should be encouraged on this topic.

Evidence from econometric studies of maintenance costs suggests an elasticity below 0.3 in most cases (the elasticity may be interpreted as the ratio of marginal costs to average costs).

Renewals are an important part of marginal cost, and are a lot greater in total magnitude than maintenance costs, but it is more difficult to estimate the marginal costs of renewals and fewer studies exist. Those that do exist suggest an elasticity considerably below one.

Many countries currently have no evidence on marginal costs. *It would be useful to provide tables which show what proportion of costs are typically variable for different cost categories - as disaggregated as possible. This would be especially useful for newer regulators which have not had the benefit of their own research programme.*

Scarcity is also a part of marginal cost. If an operator applies for one or more slots, but is denied access or is given a different slot than demanded, scarcity is said to be at hand. If there are significant bottlenecks throughout the European rail network, then to implement low marginal cost charges based on wear and tear costs alone does not make sense, either in terms of efficiency or cost recovery.

Charges that ignore the presence of scarcity costs will be distortionary. Firstly, they will be ineffective in allocating scarce capacity across the network. Secondly, they will generate less revenue to go towards recovering industry costs, leading either to the need for government to raise more revenue through other distortionary taxes in order to support the rail industry, or to a shortfall in rail industry funding and consequent reductions in service. Thirdly, it will become difficult to estimate the expected benefits from capacity enhancements in a Cost Benefit Analysis framework. This will systematically distort decisions away from measures such as partial double tracking, switches etc. that would ease the pressure on bottlenecks,

Therefore, charging regimes based on the marginal cost pricing paradigm should always seek to reflect the costs of these bottlenecks, in addition to the costs of infrastructure wear and tear.

As an alternative to pricing by way of posted prices, auctions may serve to reveal these scarcity costs in some situations. Auctions are most appropriate where there is competition for capacity between operators handling different types of traffic, and where appropriate taxes and subsidies reflect the externalities involved (otherwise auctions may recover private values but these will need adjusting to give social values).

Auctions are often seen as unduly complex, but if appropriately organised appear to be quite feasible. An iterative procedure, in which train operating companies bid not just for a particular path, but for alternative (earlier or later) paths that may be equally or less valuable would smoothen the process. It is also feasible to allow bidders to modify their bids in the light of actual allocations. This sort of process is not very different to some existing capacity allocation processes.

Auctions have been widely researched in other industries, but comparatively less so in the railway application. Further efforts should be made to examine the relative merits of

capturing capacity costs via different means – eg, use of posted scarcity prices, mark-ups, reservation fees and auctioning.

This whole area should be informed by a review of the extent to which capacity problems exist on different parts of the European rail network.

Environmental costs should be considered in a cross-modal context; the rail infrastructure charging Directive specifically provides for environmental charges to be levied on rail only when they are also levied on other modes. However, there is evidence that differentiating charges according to the environmental impact of the rolling stock concerned does have a positive impact on the nature of the rolling stock used. The rail industry should take steps to incorporate environmental components to its charging regimes by means of differentiated charges without raising the average level.

Accident Costs are largely internalized in that the costs are borne by the railway industry either directly or through insurance. However, there may be an element of external cost involved in level crossing accidents. Where there is significant use of level crossings, efforts should be made to estimate the associated external cost and incorporate this in charges for those route-sections.

Although many countries directly charge for Timetable Planning Costs and for signal operation and real time traffic control, it is on the basis of average cost. Whilst little empirical evidence was available, it is likely that in certain situations, the marginal cost of allocating additional paths will be material. Further research is needed to understand where marginal timetable planning costs might be significant and, in such cases, to estimate the scale of cost involved.

The Group has focused on track-related infrastructure rather than considering charges at nodes. The marginal costs at nodes and hence the charges for access to nodes; marshalling yards and stations, require future consideration.

4. Impacts of Existing and/or Envisaged Practices

4.1 Overview of existing charging practices

Concern was expressed that, at present, there is a big variety of charging structures and levels amongst existing systems. It appears that most charging systems comply with Directive 2001/14, but that the different systems reflect different circumstances related to the cost base of the network (technology, density etc) cost recovery requirements and different interpretations of the detail of the Directive; be that in relation to the definition or structure of the charge, the method of cost estimation and/or the method of cost accounting. Some infrastructure managers are focused on cost recovery and have little or no regard to marginal cost (MC) as they do not receive any government subsidy. At the other end of the scale, there are countries where the charges are actually below MC, and when the infrastructure manager seeks to bring them up to the level of MC they face strong opposition from the operators.

In the context of this wide range of practices, the Commission has a great interest in how to give the necessary tools to the infrastructure managers and regulators so as to assist them and ensure that they abide by the rules, at least in broad terms. DG TREN commissioned the RAILCALC project to analyse existing cost accounting and track access charging systems and to assess these against management and regulatory objectives. The RAILCALC website offers both reviews of existing approaches and recommendations on best practice.

Charge Differentiation

The legislation permits various forms of charge differentiation, so long as it is linked to the principles of cost-relatedness and non-discrimination. However, the detail of how these should be interpreted is still being tested at present. The various charge-differentiation practices were discussed, firstly in respect of creating 'appropriate' incentives for operators and infrastructure managers and, secondly, in respect of ensuring sufficient funds to finance maintenance and renewals expenditure. Three motivations seemed to emerge:

1. Differential charges designed to incentivise train operators;
2. Differential charges designed to incentivise infrastructure managers;
3. Differential charges resulting from mark-ups to assist with cost-recovery.

The first set of differentiations considered were supplements and reductions in relation to weight classes and vehicle types. Analysis of cost drivers has served to highlight that different vehicles have differential impacts on the infrastructure, and it was argued that charge differentiation according to these impacts could be used to incentivise investment in appropriate quality of rolling stock and subsequent maintenance.

Britain has had access charges by vehicle type since 2001; covering hundreds of vehicles and it is believed that they have had a behavioural effect, both on manufacturers and operators. Concern was expressed that such charges should not become too complex and difficult to operationalise, but it was not clear at what actual point the complexity does become a problem. In Austria, it was highlighted that, in an effort to make the system readily operationalisable, differentiation was based on the measurements that every loco has to be subjected to for its initial certification. Any particular loco is given one mark and it keeps this throughout its operational life. It was noted that the differentiation could be refined further. For example, it is actually the bogies that are the important cost driver for freight vehicles, whilst for passenger the bogies are a proportion of the cost driver

In general there is little scarcity pricing on European railways, even time of day differentiation is rare. There are, on some railways, mark-ups on the basic infrastructure cost that are often based on some notion of scarcity, but insufficient emphasis is placed upon formally estimating the costs involved. Auctioning of capacity is already possible on some railways (eg in Germany), but there is little actual experience. Experimentation is needed to test whether auctions are a practical way of offsetting capacity.

It was also suggested that charge differentiation should be used to give incentives in other directions. For example, the plus-minus mechanism could also be used in relation to environmental costs. There is, for example, a noise-related dimension to charges in Switzerland that appears to have had an impact on the type of rolling stock used; for instance there has been a 30% increase in the use of quieter freight cars in the space of a year. There is also an air pollution charge in Sweden, though there doesn't seem to have been any evidence produced of whether it has had any impact.

Noise was cited as a prime example of where such incentives could be beneficial. It was highlighted that there are bogies that exist that generate much less noise and involve lower wear and tear but they are not being introduced in Europe because they cost more and there is no incentive for the operator to incur that expense. In the absence of a noise-related component to charging, an infrastructure manager has an incentive to sell as much capacity as possible, irrespective of the associated increases in rail-related noise. It was suggested that it would be more economic not to create noise rather than to protect people from its impacts, and hence noise charges might be a means of balancing the incentives. The starting point is that you should be able to calculate noise costs, then input these into the charges. There is a good deal of existing research calculating external costs. The evidence is that passenger traffic uses very good rolling stock, that emits less noise, and that the major component of rail-related noise is associated with freight traffic and this is where charges might be focused.

However, it was highlighted that noise levels are determined not only by the type of rolling stock but also by the standard of the infrastructure itself. Hence, there is scope for dispute between operator and infrastructure manager as to what the cause of the noise is. It was suggested that some form of EU standard in relation to the infrastructure was required, and

that this might be a more appropriate means of optimizing noise emissions than via charging.

In Switzerland the differentials were set by trial and error, but within the EU they would have to be based on cost measurement. Austria is now considering charges differentiated by noise.

Concerns were expressed on how to balance the incentives to operators and those to the infrastructure manager regarding wear and tear and environmental cost. For instance high charges on routes which had high marginal cost due to poor quality track would remove the incentive to infrastructure managers to improve quality. Sometimes it might be better for the infrastructure manager to take action to address a particular problem rather than the operator, or vice versa. For example, it might be better to move the railway track in order to mitigate a noise problem, rather than to change the locos. There is a need to set up the incentives so that both the infrastructure manager and the operator behave well. This might be facilitated by moving away from the assumption that infrastructure charges are necessarily passed straight through from operators to infrastructure manager. It was, for example, suggested that infrastructure managers should not receive the environmental charge; otherwise they would be generating income from attracting polluting trains. So you could have one set of charges to operators to incentivise them, and another menu of prices to incentivise the infrastructure manager.

The aim of mark-ups is to improve cost recovery with least possible distortion of traffic patterns. The first obvious possibility is to differentiate between broad categories of freight and passenger

traffic. However, this can be taken too far. For example, there is evidence that in Poland, Czech Republic and Slovakia the balance of access charges has been shifted to freight so as to reduce infrastructure charges for passenger services. Whilst this assists passengers (and governments subsidising passenger services), it makes it more expensive to run freight trains than it should be. In contrast, in several western-European member states the balance is shifted in the other direction. The efficacy of these freight-passenger differentials was questioned, and whether there is room to accommodate both of these policies within a European context. Economic theory suggests that intermediate services should not be charged for financial reasons since this may unduly distort resource use. Rather, such taxation should be directed towards final consumption. This argues against such mark-ups on rail freight.

Differentiating charges by commodity is a second major possibility. The same vehicle would be charged differently according to what commodity is being carried, based on the elasticity of demand relating to that commodity; e.g. iron and coal trains are charged higher than general merchandise. However, the extent to which commodities can be identified by the infrastructure manager is limited, particularly where wagonload traffic is still important and one train may carry a whole range of commodities.

One difficulty in determining appropriate charges is in determining the mark up for local

passenger services, which are often subsidised by regional rather than national government. On the one hand regions are reluctant to see rail services reduced, which might indicate a high willingness to pay; on the other hand their financial resources are often stretched so, as one would expect, they try to negotiate low charges.

Differentiation according to different parts of a network was also discussed. In France, for example, comparisons of the cost of maintenance with the level of charge give very different ratios in different parts of the network. On the oldest part of the network, where there is low density of population, cost of maintenance is more than 500 times that elsewhere on the network, and payment is ten times less. There is an objective in France for the revenues from access charges to exceed costs before 2012. Hence, mark-ups above marginal cost have been implemented for charges on several of France's highly trafficked lines in order to raise revenue, but concerns were expressed about adding further to these mark-ups in order to raise further funds, as the mark-up is already six times marginal cost in some places. In fact, it was estimated that, from a welfare point of view, infrastructure charges are already quite close to the 'Ramsey second best' on the high speed lines. A further, more general, concern was expressed that mark-ups could serve as a barrier to entry, depending on how they were implemented.

Low density lines really identify one of the dilemmas throughout Europe. When consideration is given to the few people who use these trains then it seems clear that too much expenditure is being allocated to them. However, political reasons probably mean that there will be little change, and highly-trafficked lines will continue to cross subsidise the rest of the network in countries where explicit subsidies to the infrastructure manager are not given.

Where charges are highly variable with traffic volumes, a high degree of financial risk is borne by the infrastructure manager. Charges have to be set on the basis of projected traffic levels and if these fall short of actual traffic levels the infrastructure manager may be in severe financial difficulties. Two part tariffs offer some protection from this but are generally opposed as being discriminatory.

The Railcalc project argued that the long term aim should be to move towards activity based costing with each type of traffic paying not just its short run marginal costs but all the costs associated with it, unless explicit subsidies were given for that type of traffic, as a way of improving incentives for infrastructure managers to plan and execute their responsibilities efficiently. It also saw slot auctions as not just reflecting scarcity but also contributing to cost recovery by differentiating charges according to willingness to pay.

4.2 Impacts

It is necessary to consider the impact of charges, because if they have none then a simple structure of charges aiming at the required level of cost recovery is likely to be the best

solution However, impacts cannot be readily observed because it is necessary to know the counterfactual – what would happen with a different structure or level of charges.

The impacts of charging will depend on the competitive and ownership contexts prevailing. If, in effect, one agency of government charges another agency of government then, other things being equal, one would expect the impact to be less than if it is a private company that is facing the charges.

This seemed to be born out in findings from a survey of stakeholders undertaken by the DIFFERENT project. One of its findings was that, in general, impacts were more readily observed in the freight market, in which private operators have a much greater presence, than in the passenger market, which tends to be subject to much greater government involvement. However, there is also evidence to show that regional government is sensitive to price, eg in Germany.

It was noted that in some countries (e.g. Britain) the impact of changes in rail infrastructure charges on operators is considerably dampened by franchise agreements which simply pass increases in charges on to government, though even in this case there might be a long term impact on the volume of service the government demands.

It was noted that the British regulator has had a lot of interest in the structure of rolling stock-related charges from rolling stock manufacturers. In essence, it was felt that cost reflective charges were leading manufacturers to take the infrastructure cost implications of their rolling stock designs into account as they design new rolling stock, and that this mechanism was hard to directly observe but would have real impacts over a medium to longer term.

At the national level, it is clear that the objectives of charging differ across different systems and it may be possible to make a link between differing objectives and differing practice. However, the point was made that whilst different countries do different things, the important question for the European Commission is whether countries are doing things that damage international movements; principally freight. It was argued that this should be the European concern, and not whether a country is doing something that reduces its own welfare. The EU's objectives in relation to rail infrastructure charging are set out in the rail infrastructure charging directive and it is these that should be kept in focus when considering impacts.

In fact, there is a serious concern that the great variety of charge levels is leading to market distortions and having detrimental effects on traffic volumes in some countries. Latest evidence on this was cited, showing a number of eastern European infrastructure managers increasing freight charges still further and reducing passenger charges. High freight charge levels in central European transit countries are likely to have a significant impact on international freight movements. Even in the Baltic region, where freight charges are, at present, not so important in relation to international flows as traffic on these lines will be at the end of a long haul, high charges may still have significant consequences for domestic

freight, and their significance at an international level may increase if the overall pattern of east-west freight leads to a greater role for the region.

Indeed, the DGTREN Task Force found that there was less concern about the differences in structure as compared with differences in overall charge levels. It was, for example, noted that Railnet Europe through the website (www.eicis.com) provide a quick means of calculating charges for international traffic.

Nevertheless, it was suggested that differences in the structure of charges could be important in some cases. For example, whilst differences in structure between different single part tariffs might be of relatively little significance, the difference between a two part tariff and a single simple tariff is likely to be significant, for instance in its impact on smaller operators. Moreover the structure of charges may lead to high charges for particular types of traffic – for instance charging per gross tonne km leads to high charges for heavy bulk freight compared to charges per train kilometre. The example of the Netherlands was noted where there are very low average charges, but a move to charging per gross tonne km means a big increase in charges for coal and steel trains.

4.3 Issues

Consideration is needed as to how much impact charges have on train operators and on customers. It is generally believed that quality is at least as important as cost and we need to keep this broader perspective in mind.

It is widely believed that the failure of track access charges to adequately differentiate has led to the use of poorer quality rolling stock and this has consequences for infrastructure costs. Hence, attention should be given to the impacts of charges on rolling stock quality, the consequences for infrastructure costs, and the extent to which infrastructure charges could give appropriate incentives. This is where engineering analyses are required to complement econometric studies of costs for maintenance and renewal.

Most passenger operations are under PSOs, leaving the train operators themselves limited flexibility to respond to infrastructure charges. Furthermore, it would appear that national public authorities responsible for determining service levels are not themselves responsive to price. Regional authorities purchasing rail services may, however, be more price-sensitive. In particular, if regional authorities want to buy more services then scarcity charges maybe a significant driver of behaviour.

Sensitivity to charges seems to be greatest amongst commercial passenger operators, such as operators of high speed trains and freight operators, many of whom are private companies. However, it is unclear whether this is a feature of the freight market or a factor of them being private companies.

In conclusion then more evidence is needed on the impact of levels and structures of infrastructure charges but it seems that the levels are particularly important for commercial freight and passenger operators, and where regional services are funded by regional bodies, whilst the structure of charges can be important in encouraging the use of rolling stock which imposes lower social costs. Therefore, charges should be sufficiently differentiated to reflect differences in the costs caused by different types of vehicle, and mark-ups should only be imposed after careful consideration of the most efficient way of doing so and of their consequences for the market position of railway undertakings in the market segment in question.

5. Barriers to Implementation of Pricing reforms

5.1 Institutional context, role of regulation

DGTREN is interested in how to incentivise infrastructure managers to perform better but without imposing too much additional cost. There is some experience of performance regimes but this is limited. Except in rare cases, infrastructure services are not put out to tender so in most cases the incumbent prevails. It was noted that whilst all infrastructure managers (except for a time Estonia and Railtrack and, on some definitions, Network Rail in Britain) are in the public sector, their status and objectives vary, some being seen very much as social services and others as commercial enterprises.

The role of the rail regulator and the inter-relationships between regulator, ministry, infrastructure manager and operating companies was discussed in some detail. There was a common perception that the role of the regulator differed in different countries, in terms of:

- the functions it performed;
- the degree to which it acted in a pro-active or reactive manner; and
- the degree to which it acted independently from the ministry.

As an example, the roles of the different stakeholders were outlined for the Netherlands. Firstly, the Ministry places conditions on the infrastructure manager, as well as having a concession with the main passenger operator, NS. The Infrastructure Manager develops the infrastructure charging framework. It does so in relation to what it sees as being the principal cost-drivers: train km, tonne km and stops at stations. The Regulator undertakes an informal review of the infrastructure charges to confirm that they comply with EU and national law, and the Infrastructure Manager then publishes the charges in its Network Statement. The Regulator then examines the Network Statement and the Access Agreements as a whole, to satisfy itself that these are ‘non-discriminatory’.

The charging regime introduced in 2006 meant, on average, a threefold increase in charges for freight services (and sometimes as much as a ten fold increase) and it was felt that there was a tension between infrastructure tariffs and what the market will bear. Whilst the Infrastructure Manager stated that the charges set out in the Network Statement represented a minimum and were, hence, non-negotiable, the freight operator argued that the infrastructure manager is obliged, by national law, to negotiate and so filed a complaint to the regulator. The regulator judged that the interested parties do have to negotiate on the content of access agreements, and that this includes the infrastructure charges. Undertakings can negotiate separately or together, but the lowest result is what has to be offered to everyone. So for freight, the charges published in the network statement in fact served as a starting point for negotiation between the Infrastructure Manager and the

operators, with the regulator present during negotiations to ensure fair play. The outcome was that the negotiated tariff has a higher train km component and a lower tonne km component. There are also discounts for very heavy trains (though this discount is due to be phased out by 2011). However, the infrastructure manager did not accept the judgement that charges should be negotiable and the case is now at court.

Hence, passenger access charges cover marginal cost, whilst the freight tariffs are below marginal cost and, therefore, generate the need for a subsidy. This subsidy is channelled to the Infrastructure Manager from the government, and its level was calculated based on a corridor analysis study. The tariffs were recalculated in such a way as to ensure no decrease in volume of freight.

It was highlighted that if you allow negotiation, then there is scope for strategic behaviour on the part of all concerned. It was suggested that it was questionable to calculate charges on the basis of a set of cost drivers – in this case train km; tonne km and stops - but then to negotiate and allow movement away from those cost drivers, as this sends out confused signals to operators. In response, it was argued that the tonne km charge component is still there, but it is subsidised according to a formula, and that this subsidy is justified on the grounds that other modes are not being charged their marginal costs. However, it was pointed out that for wear and tear, the Directive does not allow charges to be below marginal wear and tear costs; explicit time limited subsidies are however permitted in response to under charging on other modes.

It was highlighted that negotiation was also a key part of the process of charge-setting in Britain prior to 2001, though only in relation to mark-ups - not in relation to going below marginal cost. There were, however, concerns about market power and that the resulting charges were not transparent. In addition, the negotiation process was very time consuming, involving many stakeholders, and led to train operators being very secretive about demand for services. For these reasons Britain moved away from this to a published set of charges - though with considerable consultation and discussion in the run-up to publication – and subsidy is treated separately on an explicit and transparent basis.

It was further explained that mark-ups are currently the subject of consultation in Britain, as part of the UK government's requirement that freight operators should pay the full costs of freight only lines. This requirement has to be implemented in line with the Directive, which states that mark-ups can only be introduced where the market can bear it. Given that the profit margins on rail freight are fairly modest, there has been concern about introducing the mark-ups so as not to damage the market. The process for calculating and consulting on the mark-ups has been led by the ORR, with supporting analysis from the infrastructure manager and in consultation with the freight operators. It was concluded that only coal and nuclear traffic could bear a mark-up without significant loss of traffic.

The view was expressed that if you allow negotiations then you must allow the infrastructure manager to include mark-ups; the negotiations would then relate to the mark-ups and not to the baseline marginal costs. It was also noted, however, that there is a

difference between discussion and negotiation. It was argued that state owned monopolists, such as infrastructure managers, should not be permitted to simply present a set of charges, without explanation or justification. It is fair that stakeholders have the opportunity to comment and probe and the infrastructure manager respond in order to justify what they have done and correct any errors. This is perhaps different to negotiation but still important.

It was also suggested that a more effective way of arguing for negotiations might be on the basis of whether the costs are those of an efficient infrastructure manager. In Britain, for example, an assessment is made of the efficiency of the infrastructure manager, and charges are calculated on the basis of the infrastructure manager improving its level of efficiency over time.

There was particular discussion about the competitive framework and, in particular, whether the integrated nature of operators such as DB hampered competition. It was highlighted, however, that there were, five years ago, steep increases in the presence of external operators and that external operators are now operating on 50% of DB Netz's network. For example, two CONNEX affiliates in the northern region operate ca 20% of passenger traffic in that region. Some consolidation in the market seems to be taking place, but there is quite a bit of competition from outside of DB, both from other railway companies and from road transport. In relation to the latter, it was noted that there has been some positive impact on rail traffic resulting from the introduction of the hgv charging scheme, but that it is difficult to accurately estimate the extent of this.

The question of grandfather rights was raised, but it was highlighted that, in Germany, grandfathering ceased at the end of the last timetable period. However, there is a remaining issue of how to prioritise users for paths. On the one hand, operators quite naturally wish – for instance through framework agreements – to have some guarantee of their allocation of paths for future years; on the other hand this might be seen as limiting competition. Where they invest heavily in rolling stock, they do not expect to have to go to an annual auction to obtain the paths to run it, as that involves them in a lot of risk.

5.2 Barriers to overcome for efficient pricing

There is widespread interest in international benchmarking of performance and costs. Data collection via the international agencies, such as the UIC and the European Commission, via their research efforts to support studies of how to do marginal cost estimation, have contributed considerably to knowledge in this area. For example, the UIC-led project for benchmarking infrastructure costs provides interesting results. However, it conceals the identities of the participants making it difficult to draw lessons from it. Furthermore, there was concern that such comparisons should only be made in knowledge of the full situation, as low infrastructure costs might well be associated with poor quality and with building up problems for the future. Hence, life cycle costs and quality of service must be examined.

For example, exercises to benchmark costs could be complemented with compilation of track quality data, often collected separately for other purposes, in order to control for differences with respect to service standard.

Hence, the analysis of rail costs is only as good as the data available for it and data availability is often a barrier to independent performance monitoring and to further research to understand the differences in overall costs and gain greater confidence in the estimates of marginal cost. It was felt that a useful guiding principle would be that appropriate data should be made available to those with legitimate needs to access it. This would mean making underlying data for track analysis available to organisations required to monitor infrastructure performance and those seeking to undertake independent research. However, a number of reasons were highlighted why, in some situations, data is not being made available.

One of the problems was felt to be that the data requirements haven't been defined in common terms. There has been little attempt to gain consensus about what should be provided and to set this down explicitly.

It was also highlighted that there is a reluctance to prepare data whatever the subject. However, it was argued that the sort of databases that regulators and research analysts need is nothing different from what any profit maximising business would need, or any public agency would need to maximise achievement of its objectives. If the management of the business doesn't know how much it costs to maintain the track as a function of the traffic levels then how can they efficiently manage their business? In fact, it was thought that in many cases infrastructure managers actually themselves may not have the information to calculate marginal cost and, where this is the case, this should be urgently addressed.

Confidentiality is also often cited as a reason for not making data available. However, the confidentiality issue needs to be examined closely. Why would any of this data really be confidential, particularly given the large scale of public funds involved?

Clarification was sought on what Directive 2001/14 requires in terms of information provision. It was stated that the directive requires motives to be given for charges and the infrastructure manager is required to provide cost information to the regulator, but there is no obligation to publish this information; hence the Directive cannot be used as a tool to make this information publicly available. Thus, improved access to data is not yet required under the directive, though it is possible that a requirement to publish such information may be suggested in the forthcoming Communication on implementation of the rail package. However, it was recalled that the Commission sought to legislate for access to data when developing the 2001 directives and met with resistance; and even if the Commission reopened this issue for legislation, it is doubtful that the result would be different now.

More specifically, there is an EU-wide legal obligation for member states to ensure that infrastructure managers and operators publish balance sheets and operating accounts, as well as network statements in the case of infrastructure managers. However, government

accounting data, the sort of data reported on in the accounts, is generally not what is needed as it doesn't relate to business operations. Furthermore, there are many different formats and aspects included amongst the network statements, and whilst it was suggested that they could include a standard set of information, concerns were expressed that the network statement is a document for clients rather than regulators or outside observers, and it is already too cumbersome, so there would be resistance to laying down further specifications.

There is also an obligation for member states to make sure that the infrastructure manager controls their costs, with due regard to the quality of infrastructure; this is a legal obligation since directive 2001/14. This can be pursued either via regulatory measures or via entering into multi-annual contracts with the infrastructure manager. It is expected that DG TREN will soon ask certain countries how they put these obligations into affect.

It was noted that some member states have introduced additional legal powers to enable their rail regulators to obtain information and that this can work effectively. A number of participants cited the case of Britain, where experience of making information public is judged to have been beneficial. It has fostered a great deal of scrutiny and there is great interest from the train operators as to whether their infrastructure manager is performing well. In Britain there had originally been elements of commercial confidentiality under Railtrack with regard to track access contracts for freight operators. Some freight operators were being charged different charges based on what the market could bear, so Railtrack didn't want different operators to know what one another were being charged as it would damage their negotiating position. Nevertheless, a lot of information was made available during the time of Railtrack, and that has grown further since the phasing out of negotiated track access charges (in favour of a set of published charges) and the establishment of Network Rail.

A principal mechanism for making cost-related information available in Britain is via the Office of Rail Regulation (ORR). They publish a lot of such information on their website, as does the infrastructure manager itself, Network Rail, as part of its regulatory requirement. This is part of a wider ethos, whereby huge amounts of cost information for the British regulated utilities is put in the public domain. It was noted that these are all private sector companies but – in the case of Network Rail - in receipt of public money.

It is important not to underestimate the political and administrative challenge involved in securing better access to better data. Further legislation may not be necessary, as sufficient pressure may be exerted through the existing legislation, but there needs to be agreement on what data is required. The Commission, CER and EIM could play important leadership roles in enabling this to happen.

Definitions and interpretations

A number of terms are commonly used but seem to often have differing interpretations. A number of these were highlighted above (see section 3.1), but additional terms were highlighted as follows:

Market Segment

Market segments are identifiable parts of the market with different elasticities. In the passenger sector, this usually means distinctions such as international, long distance, regional and suburban; for freight the distinction is usually by major commodity categories, including containers, bulk (iron ore, coal, grain etc) and wagon-load traffic.

Non-discriminatory

Charges are non discriminatory if they charge the same for a given traffic flow regardless of who the operator is. Thus differences by market segment are permissible so long as incumbent's sectors are not designated as unique market segments as a means of discriminating against new entrants. Differentiation according to time of day is also non-discriminatory; this includes any charging to account for scarce track capacity.

Costs and expenditures

Expenditures are actual cash outlays, both on maintenance and (re-) investment. Costs refer to the actual use of a resource. It is first and foremost for capital investment where the distinction matters, cost referring to the reduction in value due to the use and passage of time. Cost may in some instances be approximated by accounting depreciation. It was suggested that where pricing systems are required to recover all costs, including depreciation, if infrastructure managers value and depreciate their assets appropriately, then depreciation ought to provide the funding to keep the system going.

Differing interpretations of these fundamental terms is one cause of the diversity of charging regimes observed throughout Europe. Agreement should be sought on these fundamental terms.

Particular problems of certain member states (e.g. poor infrastructure, high transit traffic, lack of government funding) and ways of overcoming them

The question of how adequacy of finance to maintain quality can be ensured, particularly in relation to some of the Central and Eastern European railways is vital. Market share in several Central and Eastern European countries has dropped substantially, leading to a pressing efficiency case to reduce the scale of the rail networks and concentrate the limited finances on the parts of the network that merit it. But closing lines is politically difficult and saves money for the future (it will not necessarily save much now, as they are not receiving much now). Whilst it may be reasonable to impose higher markups on freight than on passenger services if the market position allows it, freight services should not be expected to pay high markups to support infrastructure costs that are only incurred because of the presence of passenger services.

Smooth border crossings should be a priority. If the European focus is on international traffic, then ensuring that there is adequate infrastructure for such traffic and appropriate administrative procedures for toll clearance etc will be part of promoting the international movement of traffic. Concentrating resources on international routes should be a key

priority for those Central and Eastern European railways that are severely financially constrained.

5.3 Issues

Infrastructure managers will be under more and more pressure in the future to raise a greater degree of revenue towards cost recovery. Mark-ups on infrastructure charges, if done well, can help the industry by both recovering more costs and maintaining incentives towards efficient use of the infrastructure. However, if done badly, mark-ups can seriously damage the industry.

There are clear theoretical results relating to second-best pricing that could inform how mark-ups should be applied. Where services are franchised then it is appropriate for mark-ups to be applied as part of a two part tariff. In this situation, as long as whoever wins the franchise pays the same fixed cost, there is no discrimination, and decisions as to what trains to run are not distorted. Moreover it may be possible to ensure that the fixed charge varies in accordance with long run avoidable cost, thus giving appropriate signals to funding bodies regarding long run service specification and investment.

With on-track competition it is much more difficult to design a 2-part tariff that is non-discriminatory and so a single charging structure is needed. In the presence of on track competition, mark-ups should be implemented as part of the variable charge. The use of different mark-ups for different clients competing for the same traffic constitutes discrimination and differentiation should therefore concentrate on market segments.

In examining whether or not the market segment can bear the additional cost of mark-ups, it is necessary first to define market segment and, second, to determine whether a particular market segment can or cannot bear the cost. Market segments relate to identifiable sets of traffic with a similar price elasticity of demand, whilst knowledge of the price elasticity provides evidence on ability to pay without distortion of traffic levels.

In practice however, it is often not clear how the mark-ups are implemented. Infrastructure managers should set out more clearly where mark-ups are applied and, in such cases, how these mark-ups have been calculated.

There is consensus that it would be more efficient for all infrastructure managers on an international corridor to set one mark-up in consideration of market conditions rather than individual mark-ups.

Different countries have different processes for establishing their charging frameworks. In Britain the Regulator has taken a hands-on role in the determination of the charging framework and setting of charges, where as, in contrast, in the Netherlands the

infrastructure manager has taken the lead role in charge-setting and operators take responsibility for challenging charges, with the Regulator then adjudicating.

The level and structure of baseline marginal costs should be the subject of discussion and consultation amongst stakeholders. Through such discussion and consultation, some level of agreement should be sought on what the baseline marginal costs actually are, even if this is thought by some to be too high once translated into a charge.

It is not appropriate for stakeholders to enter into negotiations in relation to what proportion of baseline marginal costs should feed through into the charges, eg on the grounds of what the market can bear. Negotiation on charges should be confined to the level of mark-up.

Discussions amongst stakeholders should also relate to the level of efficiency of the infrastructure manager, and hence to the overall level of costs that it incurs and seeks to pass on to operators. This should, clearly, feedback into the discussion of actual baseline marginal costs and require some agreement on what efficiency improvements it may be necessary and appropriate for the infrastructure manager to make.

There is a clear role for the regulator in forcing the infrastructure manager to invest and behave more efficiently. Performance regimes are important ways of giving incentives. The perception is that most countries have not introduced them yet, so efforts should be put into ensuring effective performance regimes are introduced on a widespread basis.

There was an open question as to whether incentives to promote more efficient infrastructure management should be incorporated in infrastructure charges. That is, if it is true that high quality infrastructure means low charges then this gives good incentives to operators but perhaps perverse incentives for infrastructure managers; but if you have high charges for high quality then this gives perverse incentives to operators.

6. Recommendations for the adoption of pricing reforms

6.1 Overall Conclusions

It is believed that there is a lot of inter-action between the economics and politics when discussing the setting of charges, with mark-ups, cost recovery and incentives to operators and infrastructure managers being key issues. The basic framework of Directive 2001/14 is however clear, and should be used as a basis for reducing the risk for political meddling in policy implementation.

It is clear that charging practices differ across different countries, as often do charging objectives and circumstances of the railway. It may be that there are links between practices, objectives and circumstances that can be ascertained. If so, given a particular set of objectives and circumstances, it may be possible to provide guidance on the most appropriate structure of charges.

It should also be possible to provide more guidance on in which circumstances it is appropriate to apply mark-ups and how to do it. However, whilst different countries do different things, the question is in what circumstances this actually matters.

The important European concern is whether countries are doing things that damage international movements, not whether a country is doing something that reduces its own welfare. But the problem is that this could not be known up-front. The benefit of a comprehensive framework for pricing is that it will increase the chances for any and all countries that their resources are appropriately used. Subsidiarity does not change this basic fact.

Hence, what sort of convergence should be being sought?

At present, the principal international movements relate to freight, so the above argument would lead to a focus on convergence amongst freight charges. It is likely that this divergence in approach, and associated cross-subsidisation, is damaging to the European rail industry. Further efforts should be made to understand and quantify this issue. However, it is likely that some degree of convergence is required to promote international freight traffic.

Current EU legislation is generally adequate, and care should be taken to ensure that any revisions do indeed improve it. The legislation permits infrastructure managers to charge what they need to finance their operations so long as it is between marginal cost and average cost and so long as they can justify it to their stakeholders. But is it clear that two

part tariffs are permitted, and even recommended, for franchised services? Is it clear that freight should not pay passenger avoidable costs? However most problems are to do with implementation and either tighter regulation and/or the passage of time would serve to resolve them.

Whilst the RAILCALC project has made a valuable start on this, clearer evidence on best practice in rail infrastructure charging is needed

6.2 Key Recommendations

1. The starting point for rail infrastructure charges should be a charge per gross tonne km to reflect marginal wear and tear costs. In the absence of specific evidence for the country concerned, this might be approximated as 30% of average track maintenance and renewals cost. Where there is a wide variety of types of rolling stock in terms of axleweights, speed and unsprung mass, engineering formulae may be used to weight the different types of rolling stock according to the equivalent damage per gross tonne km they do. Where data exists, it may also make sense to segment charges according to the type of track (e.g. high speed, other main lines, secondary lines, low density lines), as there is evidence that marginal costs are lower the higher the quality of the track.
2. The direct impact of delays is best represented through penalties imposed as part of a performance regime in which responsibility for delays is attributed to the party causing them, so that correct incentives are given. However, there is an indirect impact of operating at high levels of capacity utilisation in that the presence of additional trains reduces the possibility of recovery and causes knock on effects. Where these can be measured, they may be reflected in an additional charge per train km, varying by track section and time of day/day of week.
3. Where infrastructure is scarce (i.e. when there is excess demand for slots between competing operators), it is reason to consider additional charging. One option is to charge for the reservation of slots. A complementary mechanism is to use cancellation charges to reduce the risk that slots are being reserved without actually being used. At an initial stage of the time tabling process there is also good reason to post prices for using track sections during parts of the day/week where demand is high relative to capacity. The posted price may be estimated as the net benefit of the marginal train priced off the system at that location and time. We believe there is a case for such charges on many stretches of track not currently declared as being capacity constrained. As a consequence, scarcity may today be understated because operators do not request slots they know they cannot get. In the longer run, it is reason to develop more sophisticated mechanisms for handing capacity allocation.
4. Currently there is only evidence of external accident costs in the case of level crossings; a charge may be levied varying by route section to reflect these costs.

5. Charges for noise and local air pollution should also vary with type of rolling stock, time of day and location (a simple urban/rural split may be adequate). Greenhouse gases are best charged for by a tax on fuel (or, in the case of electricity, through participation in the European emissions trading system, as is already the case). It is important that such charges are levied, in order to give appropriate incentives regarding types of rolling stock to use, regardless of whether they are levied on other modes. A failure to levy charge for environmental impacts in other modes is best corrected by action on those modes. If this is not done, it is still appropriate to charge rail and to combine this with a specific payment to train operators to reflect the benefit of reduced externalities elsewhere. Letting such payments reflect the volume and nature of traffic carried and the degree to which it is diverted from road, air or water, will give more appropriate incentives than a general failure to charge for them on rail.
6. Where there is a need to raise more money from users, either to pay for specific pieces of infrastructure investment or to finance infrastructure as a whole, this should be raised in the least distorting way possible. Where services are subsidised and there is no issue of open access competition, this is best done through a two part tariff. In this situation, the fixed element may be based on the avoidable cost of the capacity required, specified in a long run track access agreement running in parallel with the contract securing the services in question. This will give appropriate incentives to the funder of the services and the infrastructure manager, and remove cross-subsidisation of social services by commercial. Otherwise, it will be necessary to impose a mark-up per train kilometre, varying with market segment. (This is better than a mark-up on reservation charges, which may hit small entrants to the market harder than established operators). For this purpose, market segments may be defined as high speed passenger, inter-urban passenger, suburban passenger, rural passenger, bulk freight and inter modal. More detailed segmentation may be possible, subject to limitations on the degree to which infrastructure managers are able to verify commodities carried. In the passenger sector, it may also be appropriate to vary the charges by time of day and day of the week, to reflect the lower price sensitivity of commuter and business travel relative to leisure.
7. Infrastructure managers should be encouraged to work together to set appropriate tariffs on major international corridors where mark-ups are applied. Mark-ups should be set in relation to market conditions, and the resulting revenue shared in agreed proportions.
8. The process of setting infrastructure charges should be overseen by a regulator independent of day to day political control and with a remit to ensure that charges reflect as far as practical marginal social cost, that mark-ups are set in the least distorting way possible and that total revenue is adequate for an efficient infrastructure manager to maintain and renew the required infrastructure.

6.3 Further research

A number of issues requiring further research were identified above; these may be summarised as follows:

- quality measurement and monitoring;
- external accident costs;
- appropriate differentials between freight and passenger.
- Continued development of mechanisms for bottleneck charging
- further evidence on the impacts of charges;
- cost categorisation and variability;
- exploration of the cost drivers at a more detailed level;
- tax treatment of railways in different countries.

ANNEX I: MEETING I - AGENDA AND MEETING REPORT -

Programme for First Meeting

Overview of issues and state of the art

Date: Wednesday 8 February 2006

Venue: the NH Grand Place Arenberg Hotel - Rue d'Assaut 15. Brussels 1000.

Location: Gare Central station

09:30	Introductions; objectives and methods of working of the group (Jan-Eric Nilsson (Chair) & Chris Nash)
10:00	Current EU Policy Position (Frank Jost, DG TREN)
10:45	Coffee Break
11:00	Current state of research (Chris Nash and Bryan Matthews)
11:45	Experience of Key National Governments Paul McMahon, ORR (Britain)
12:45	Lunch
13:45	Experience of Key National Governments Wolfgang Bohrer, DB Netz (Germany)
14:45	Other contributions from the group
15:15	Tea
15:30	Key issues for future meetings
16:30	Close

LIST OF ATTENDANTS

Name	Affiliation
Jan-Eric Nilsson, Paul McMahon	VTI Sweden (Chair) Deputy Director of Economic Regulation at the Office of Rail Regulation, UK
Peter Veit	Graz University of Technology, Erzherzog Johann University
Katalin Tanczos	Budapest University of Technology and Economics, Hungary
Ms Konchevski	Head of Infrastructure Budget, Latvian Railways, Latvia
Thomas Remond	RFF, France
Emile Quinet	ENPC, France
Torben Holvad	European Railways Agency (ERA)
Chris Nash	University of Leeds, UK
Bryan Matthews	University of Leeds, UK (Rapporteur)
Steve Perkins	ECMT
Lou Thompson	Thompson, Galenson and Associates, LLC USA
Wolfgang Bohrer	DB Netz, Germany
Yves Crozet	LETT, France
Edward Calthrop	CER
Tuomo Suvanto	Ministry of Transport and Communications, Finland
Frank Jost	DGTREN
Andrea Ricci	ISIS, Italy (in attendance as Project Coordinator)

REPORT OF THE DISCUSSION

1. Introduction

This is a report of the discussions at the first IMPRINT-NET Expert Group on Rail Infrastructure Charging, held in Brussels on 8 February 2006. The aim of the Group is to bring together researchers, policy makers and stakeholders in a series of 4 1 day meetings, in order to synthesise information on research and practice and build consensus on the issue of pricing the use of rail infrastructure. In doing so, it seeks to draw from and build upon findings from the High Level Group, IMPRINT-EUROPE, the ECMT rail group and the DGTREN Task Forces.

Experts are invited to participate in the group in their personal capacity, rather than as representatives of particular organisations, and 'Chatham House' rules will apply so as to encourage the free and open exchange of views. Short reports of each meeting will be prepared and circulated amongst the group to serve as a record and to help to inform each subsequent meeting. Towards the end of the project, each of the reports will then serve as input to a final report summarising the conclusions of the group as a whole.

The objectives for this first meeting were to provide an overview of the state of the art and to discuss the issues that should be considered in the subsequent meetings. It comprised presentations on:

- EC policy;
- The state of relevant research;
- Experience in Britain; and
- Experience in Germany.

This report focuses on the discussions sparked by these presentations, but groups the issues raised by theme, rather than in the chronological order in which they were raised on the day. The slides from these presentations, along with the Agenda for the meeting, a Research Briefing note, a background note on the workings of the group and a host of information and links relating to the overall project are available via the project website (www.imprint-net.org).

The key issues to be considered in subsequent sections are:

- cost measurement
- setting charges
- monitoring infrastructure manager performance
- competition issues

We then try to sum up some conclusions, which mainly focus on issues to be considered further in future meetings.

2. Cost Measurement

The probable components of the marginal social cost of rail infrastructure use are often identified as:

- Marginal wear and tear cost;
- Marginal congestion and scarcity costs;
- Marginal environmental costs; and
- Marginal accident costs.

Much of the discussion concerned maintenance wear and tear costs, which are the most widely recognised element of marginal social cost. Work to estimate marginal wear and tear costs using the econometric approach has found some degree of consistency in implied elasticities of maintenance costs with respect to traffic density, with values for Sweden and Finland in the range 0.133-0.175, Austria of 0.27 and France of 0.37. It is possible to use this elasticity relationship to identify the marginal cost, via its relationship with average cost. The question, however, was raised as to whether there is a ready explanation for the difference in estimates for France and for Sweden. It was suggested that this was possibly to do with one or more of the following:

- Level of investment in technology – other things being equal, high specification technologies tend to be associated with a higher initial investment cost and a subsequently lower level of maintenance cost, as compared with lower specification technologies. The effect that the level of technology has on the overall wear and tear costs of a particular railway will depend on the mix of technologies employed on that rail network;
- Infrastructure quality and traffic density – The definition of quality standards differ across different railways in Europe and drawing meaningful comparisons, for the purposes of comparing costs, can be highly problematic. In addition, maintenance strategy could differ in relation to quality standards and the distribution of maintenance spending across the network. For example, a constraint on total maintenance budget might mean that high traffic density lines are maintained to a greater standard than low traffic density lines, which has the effect of increasing apparent marginal cost on the high quality, high traffic lines. It was noted for example that traffic density is quite different in France as compared with Sweden and Finland. The Life-Cycle Cost approach was suggested as a possible means of accounting for these differences, and worthy of further investigation;
- Estimates relating to different categories of cost - for example, the distinction between maintenance and renewals costs differs between countries, as do the extent to which items such as maintenance of structures is treated as infrastructure cost and included in the model. Renewals are highly problematic since they depend on cumulative traffic rather than traffic in the year in question. There was discussion during the meetings of the DG TREN Task Forces and the ECMT Rail Group as to

whether renewals are a relevant part of MC. Insofar as additional utilization will bring forward the date at which the infrastructure will need to be renewed, it would seem clear that such 'accelerated' renewals are part of MC, but there is not a consensus on this. It was highlighted that there are lots of different definitions of what constitutes renewals spending and what constitutes investment, linked to differences regarding financial lifetimes and technical lifetimes of the assets.

It was agreed that it is important to try further to understand the differences between different estimates.

Another approach to estimating marginal wear and tear costs makes use of engineering models of how different types of rolling stock impact on different types and elements of the infrastructure. Opinion is that actual wear and tear cost very much depends on the characteristics of the vehicles, in particular on the interaction of the train and the track. This analysis enables lots of different charges for different types of train to be estimated; far more than would be possible from econometric analysis. Work for Austria using this approach was highlighted. This found that unsprung mass and the steering capability of bogies were crucial factors. These figures have fed into the Austrian charges, such that locomotives that have reduced maintenance costs have reduced charges. This is achieved by every loco having a plus or minus factor applied to the infrastructure charge.

Further clarification was sought on how these cost measurement figures relate to track access charges. In response, it was stated that the Swedish, Finnish and Austrian studies fed directly into those countries' charging regimes. The French work has not fed through as yet, but the French Ministry is undertaking a review at present.

The issue of the marginal costs of train planning, signalling etc was highlighted as an under-researched cost category. There was a perception that, in the short run, these elements do not vary very much, but there is a need for more evidence on these aspects of cost. However, adding additional trains to a busy route can require a major replanning exercise, so the cost is not always trivial.

The relationship between accident costs and marginal maintenance costs was highlighted as an area in need of further research. The decision on what standard the infrastructure should be maintained to is influenced by concerns relating to rail accidents. This has been particularly notable in Britain since the Hatfield accident focused attention on the accident risks associated with particular aspects of infrastructure wear and tear. Some argue that this attention has resulted in an overly cautious approach of maintaining the infrastructure to an unnecessarily high standard so as to all but eliminate the accident risks associated with wear and tear.

Valuation of rail infrastructure assets was also highlighted as a big issue in measuring total cost, and how the assets are valued - sometimes very old assets - will greatly affect cost structures. This is a matter of concern when it comes to ensuring that mark ups on marginal cost are not unreasonably high.

3. Setting charges

Concern was expressed that, at present, there is a big variety of systems in place. It appears that most of these comply with Directive 2001/14, but that the different systems reflect different circumstances related to the cost base of the network (technology, density etc) cost recovery requirements and different interpretations of the detail of the Directive; be that in relation to the definition or structure of the charge, the method of cost estimation and/or the method of cost accounting. Some infrastructure managers are focused on cost recovery and have little or no regard to marginal cost (MC) as they do not receive any government subsidy. At the other end of the scale, there are countries where the charges are actually below MC, and when the infrastructure manager seeks to bring them up to the level of MC they face strong opposition from the operators.

Consequently, there is a great variety of charge levels and a serious concern that the level of charges is having detrimental effects on traffic volumes in some countries. Latest evidence on this was cited, showing a number of eastern European infrastructure managers increasing freight charges still further and reducing passenger charges. High freight charge levels in central European transit countries are likely to have a significant impact on international freight movements. Even in the Baltic region, where freight charges are, at present, not so important in relation to international flows as traffic on these lines will be at the end of a long haul, high charges may still have significant consequences for domestic freight, and their significance at an international level may increase if the overall pattern of east-west freight leads to a greater role for the region

The DGTREN Group found that there was less concern about the differences in structure as compared with differences in overall charge levels. It was noted that Railnet Europe through the website (www.eicis.com) provide a quick means of calculating charges for international traffic. Nevertheless, it was suggested that differences in the structure of charges could be important in some cases. For example, whilst differences in structure between different single part tariffs might be of relatively little significance, the difference between a two part tariff and a single simple tariff is likely to be significant, for instance in its impact on smaller operators. Moreover the structure of charges may lead to high charges for particular types of traffic – for instance charging per gross tonne km leads to high charges for heavy bulk freight compared to charges per train kilometre. The example of the Netherlands was noted, where there are very low average charges, but a move to charging per gross tonne km means a big increase in charges for coal and steel trains.

A question was raised regarding what differentiation the directive permits. It was highlighted that the important principles are cost-relatedness and non-discrimination, though the detail of how these should be interpreted is still being tested at present. A number of possibilities were highlighted:

- Higher charges for greater reliability - for freight it is possible to offer a train operator a higher quality path at a higher charge, compared with a lower quality

- Particular supplements and reductions in relation to weight classes – should charges vary with the actual weight of the train as opposed to the planned weight, and can this be readily measured (as it can in Sweden, where all trains file information on their actual weight, length, types of rolling stock etc before leaving their origin station)?
- Differentiating charges by commodity –the same vehicle would be charged differently according to what commodity is being carried, based on the elasticity of demand relating to that commodity; e.g. iron and coal trains are charged higher than general merchandise.

One difficulty in determining appropriate charges is in determining the mark up for local passenger services, which are often subsidised by regional rather than national government. On the one hand regions are reluctant to see rail services reduced, which might indicate a high willingness to pay; on the other hand their financial resources are often stretched so, as one would expect, they try to negotiate low charges.

Where charges are highly variable with traffic volumes, a high degree of financial risk is borne by the infrastructure manager. Charges have to be set on the basis of projected traffic levels and if these fall short of actual traffic levels the infrastructure manager may be in severe financial difficulties. Two part tariffs offer some protection from this but are generally opposed as being discriminatory.

It was noted that in some countries (e.g. Britain) the impact of changes in rail infrastructure charges on operators is considerably dampened by franchise agreements which simply pass increases in charges on to government. Though even in this case there might be a long term impact on the volume of service the government demands.

It was noted that a charge based on environmental cost might influence the choice of vehicle, of running time or such like, which might be important in incentivising minimisation of environmental costs within rail. There is an air pollution charge in Sweden, but there doesn't seem to have been any evidence produced of whether it has had any impact. A contributor added that there is a noise charge in Switzerland that is being iterated in order to achieve a particular target; the first charge didn't achieve that target so they are trying another charge level. He added that Austria is now considering charges differentiated by noise. It was also noted that infrastructure managers should not receive the environmental charge, otherwise they would be generating income from attracting polluting trains.

In the context of this wide range of practices, the Commission has a great interest in how to give the necessary tools to the infrastructure managers and regulators so as to assist them and ensure that they abide by the rules, at least in broad terms. The question was raised as

to whether the Commission is developing guidelines on best practice relating to cost calculation and to mark-ups above MC, given that one or two of the states have quite transparent processes that could serve as such. It was argued that there is a good deal of research available and that the Task Force reports provide a guideline. It is a question of making this information available to those who require it and ensuring that a dialogue is fostered to provide specific feedback to improve the guidance over time.

4. Monitoring Infrastructure Manager Performance

DGTREN is interested in how to incentivise infrastructure managers to perform better but without imposing too much additional cost. There is some experience of performance regimes but this is limited. Except in rare cases, infrastructure services are not put out to tender so in most cases the incumbent prevails. It was noted that whilst all infrastructure managers (except Estonia and, on some definitions, Network Rail in Britain) are in the public sector, their status and objectives vary, some being seen very much as social services and others as commercial enterprises.

A question arose of how to achieve better performance when the incumbent holds most of the information that the state or its regulator would require to judge its performance. There are strong demands to make cost information public and allow different regulatory bodies to compare the performance of different infrastructure managers. This is not yet foreseen under the directive, though it is possible that a requirement to publish such information may be suggested in the forthcoming Communication on implementation of the rail package.

Clarification was sought on what Directive 2001/14 requires in terms of information provision. In response it was stated that the directive requires motives to be given for charges and the infrastructure manager is required to provide cost information to the regulator, but there is no obligation to publish this information; hence the Directive cannot be used as a tool to make this information publicly available.

The question was raised as to whether the infrastructure managers actually themselves have the information to calculate marginal cost. In fact, it was thought that in general the answer to this was no. Nevertheless, it was argued that most infrastructure managers would or should be collecting, as part of their normal operation, information on expenditures, traffic and other variables which could be used to calculate marginal cost and that if they are not then this should be urgently addressed.

A number of participants cited the case of Britain. In Britain there had originally been elements of commercial confidentiality under Railtrack with regard to track access contracts for freight operators. Some freight operators were being charged different charges based on what the market could bear, so Railtrack didn't want different operators to know what one another were being charged as it would damage their negotiating position. Nevertheless, a lot of information was made available during the time of Railtrack, and that has grown further since the phasing out of negotiated track access charges (in favour of a set of published charges) and the establishment of Network Rail. This is part of a wider

ethos, whereby huge amounts of cost information for the British regulated utilities is put in the public domain. It was noted that these are all private sector companies but – in the case of Network Rail - in receipt of public money.

A principal mechanism for making cost-related information available in Britain is via the Office of Rail Regulation (ORR). They publish a lot of such information on their website, as does the infrastructure manager itself, Network Rail, as part of its regulatory requirement. So even if it is difficult to ask the infrastructure managers themselves to publish the data, pressure could be placed on the regulators to publish the data provided to them. Concern was, however, expressed that asking regulators to make available information that they had been given in confidence could be unfair and subject to legal challenge. Experience in Britain of making information public is judged to have been beneficial. It has fostered a great deal of scrutiny and there is great interest from the train operators as to whether their infrastructure manager is performing well.

It was highlighted that the UIC leads a project for benchmarking infrastructure costs. However, there was concern that such comparisons should only be made in knowledge of the full situation, as low infrastructure costs might well be associated with poor quality and with building up problems for the future. Hence, life cycle costs and quality of service must be examined. For example, exercises to benchmark costs could be complemented with compilation of track quality data, often collected separately for other purposes, in order to control for differences with respect to service standard.

5. Competition

There was discussion about the competitive framework and, in particular, whether the integrated nature of operators such as DB hampered competition. It was highlighted, however, that there were, five years ago, steep increases in the presence of external operators and that external operators are now operating on 50% of DB Netz's network. For example, two CONNEX affiliates in the northern region operate ca 20% of passenger traffic in that region. Some consolidation in the market seems to be taking place, but there is quite a bit of competition from outside of DB, both from other railway companies and from road transport. In relation to the latter, it was noted that there has been some positive impact resulting from the introduction of the tolling scheme, but that it is difficult to accurately estimate the extent of this.

The question of grandfather rights was raised, but it was highlighted that, in Germany, grandfathering ceased at the end of the last timetable period. However, there is a remaining issue of how to prioritise users for paths. On the one hand, operators quite naturally wish – for instance through framework agreements – to have some guarantee of their allocation of paths for future years; on the other hand this might be seen as limiting competition. Where they invest heavily in rolling stock, they do not expect to have to go to an annual auction to obtain the paths to run it, as that involves them in a lot of risk.

CONCLUSIONS AND OPEN ISSUES FOR THE NEXT SEMINAR

Conclusions

An initial list of key issues emerging from the research, which might form the basis for discussions at subsequent meetings of this group, were highlighted. These included the need for agreement on:

- efficient means of incorporating mark-ups on charges above marginal cost;
- a consistent accounting framework (consistent with the various elements of cost that we want to look at);
- consistent methodologies for all elements of cost;
- the relevance of different cost categories.
- The impact of different structures, mark-up mechanisms and overall levels of charge on operators (we don't have very good evidence as yet, though the DIFFERENT project will look at this);
- The relationship with investment (train operators would not welcome low charges if the cost of that was a declining network).

It was suggested that we should start by focusing on the available information. What information is there? What can easily be done with the information available? Can we establish a consistent accounting framework and consistent methodologies? A recent paper prepared for ECMT on a consistent accounting framework was highlighted to the Group, and it was agreed that this be circulated.

It was argued that we need to give consideration to a number of terms commonly used but which often seem to have differing interpretations:

Costs and expenditures (tied up with the approach to depreciation);

Maintenance and renewals;

Market Segment (the Directive refers to market segment but there appears not to be any clear and widely accepted definition of it).

Mark-ups, cost relatedness and non-discrimination (does the use of different mark-ups for different clients constitute discrimination and should differentiation, therefore, concentrate on commodities?).

It would be useful to have some clearer definitions and, perhaps, guidelines in relation to these three aspects. For example, on the first of these, it was noted that not everyone seems to have the same understanding of the difference between expenditures and costs. It was suggested that if infrastructure managers value and depreciate their assets appropriately, then depreciation ought to provide the funding to keep the system going. But what was the appropriate approach? The fear is that valuation in the accounts is not based on appropriate principles, and hence depreciation won't provide the funding. This seems to be an issue worth going into in more detail.

It was generally agreed that this Group should review findings from cost calculation studies, without going into great depth regarding the technical aspects of methodology. The different methodologies should not necessarily be seen as alternatives to one another but complements. We actually need a mix of different approaches. For example, cost allocation, informed by econometrics, with the detail provided by the engineering models.

The GRACE project is undertaking more research on cost calculation and is holding a seminar on its interim findings in the autumn. The suggestion was to invite those interested in the technical detail to the seminar and perhaps arrange the next meeting of this Group on an adjacent day. This would allow the more technical discussion to take place at the GRACE seminar, and the broader review of findings to take place within this Group.

It was suggested that we should consider how much impact charges have on train operators and on customers. It is possible that quality is at least as important as cost and we need to keep this broader perspective in mind. Linked to this, it was noted that there has been a lot of research concerning impact of different types of rolling stock on infrastructure costs. It was suggested that from the mid-1990s the failure of track access charges to adequately differentiate has led to the use of poorer quality rolling stock and that this has consequences for the infrastructure. Hence, it would be useful to discuss the impacts of charges on rolling stock quality, the consequences for infrastructure costs, and the extent to which infrastructure charges could give appropriate incentives.

There was discussion about the extent to which the Group should consider charges to account for scarcity costs. It was suggested that auctioning, the oft suggested solution to accounting for scarcity, was mainly of theoretical interest and that the group should concentrate on more practical issues such as wear and tear. On the other hand, given that there are mark-ups and that these are often based on some notion of scarcity cost, and given that auctioning is already possible in Germany, it was agreed that we should discuss the issue of how to address scarcity costs, including the use of mark-ups, reservation fees and how to make auctioning work (as opposed to its theoretical niceties). This could be informed by a review of the extent to which capacity problems exist on different parts of the European rail network.

It was noted that infrastructure managers will be under more and more pressure in the future to raise a greater degree of revenue towards cost recovery. This leads us back to the issue of mark-ups, which done well can help the industry but if done badly can seriously damage the industry. There are theoretical results relating to second-best pricing, but it is not clear how the mark-ups are implemented in practice. A sensible review of what we understand about the mark-ups that exist is needed. For example in Germany, where the approach is to charge according to full cost recovery (after government grants for renewals and new projects), mark ups seem to have been carefully designed so as not to price off too much traffic (and it was noted in passing that such FC- approaches might sometimes be quite close or even identical to MC+ approaches, depending on how the mark-ups are designed). A concern was expressed, however, that it is difficult to understand the impacts, in particular to analyse the traffic that has been priced off. There was also discussion of

whether mark-ups should be implemented as part of the variable charge, or via a two part tariff. Agreement was sought on an earlier argument, that the structure of charges should depend on the type of market in place. The hypothesis was put forward that where you have franchising then two part tariffs are appropriate, but where you have competition in the market then you need a single charging structure.

Clarification was sought as to whether the Group should consider the costs at nodes and hence the charges for access to nodes; marshalling yards and stations. Whilst no strong view was expressed, there was a feeling that we should focus on track-related infrastructure rather than be distracted onto considering charges at nodes.

Finally, it was suggested that environmental charging is one area we should consider in the cross-modal discussions. Whilst there are arguments for introducing environmental charges purely based on incentivising the use of less environmentally damaging rolling stock and rail operations, it is also important for rail to charge for environmental costs in order that the other modes, where it is more significant, are not able to put forward the argument that imposing an environmental charge on them would be unfair. Thus there is an argument that environmental charges be imposed simultaneously on all modes.

ANNEX II: MEETING 2 – AGENDA AND MEETING REPORT -

Programme for Second Meeting

Charging for Infrastructure Wear and Tear and Scarcity Costs

Date: Friday 15 September 2006

Venue: the NH Atlanta Hotel, 7 Boulevard Adolphe Max, Brussels 1000.

Location: Metro 'De Brouckere'

- | | |
|-------|---|
| 09:30 | Introductions; objectives and review of outcomes from First Meetings
(Jan-Eric Nilsson (Chair) & Bryan Matthews (Rapporteur)) |
| 9:45 | New Estimates of Infrastructure Wear and Tear costs
Emile Quinet (France)
Phil Wheat (Britain)
Mats Andersson (Sweden)
Saara Pekkarinen (Finland) |
| 11:15 | Coffee Break |
| 11:30 | Cost Drivers of Rail Infrastructure
Peter Veit |
| 12:15 | Open Discussion |
| 12:45 | Lunch |
| 13:45 | Reporting and Data Requirements for Effective Management and Regulation of Rail Infrastructure
Lou Thompson |
| 14:30 | Scarcity Costs and Auctioning
Jan-Eric Nilsson (VTI) |
| 15:15 | Tea |
| 15:30 | Review of Infrastructure Charges in France
Yves Crozet (LET) and Thomas Remond(?) (RFF) |
| 16:15 | Open Discussion |
| 16:45 | Close |

LIST OF ATTENDANTS

Name	Affiliation
Jan-Eric Nilsson	VTI, Sweden
Bryan Matthews	ITS, University of Leeds, UK
Chris Nash	ITS, University of Leeds, UK
Phil Wheat - ITS	ITS, University of Leeds, UK
Lou Thompson	Thompson, Galenson and Associates, LLC, USA
Katalin Tanczos	Budapest University of Technology and Economics, Hungary
Mats Andersson	VTI, Sweden
Peter Veit	Graz University of Technology, Erzherzog Johann University
Patrizia Fagiani	ISIS, Italy
Ad Toet	CER, Belgium
Emile Quinet	ENPC, France
Paul McMahan	Office of Rail Regulation, UK
Saara Pekkarinen	University of Oulu
Tuomo Suvanto	Ministry of Transport and Communications, Finland
Torben Holvad	European Railways Agency (ERA)
Yves Crozet	LETT, France
Frank Jost	DGTREN
Dan Wolff	European Infrastructure Managers Association
Ms Konchevski	Latvian Railways, Latvia
Edwin Huijsman	Dutch Ministry of Transport and Water Management
Hilbert Klok	Dutch Office of Transport Regulation.

REPORT OF THE DISCUSSION

1. Introduction

This is a report of the discussions at the second IMPRINT-NET Expert Group on Rail Infrastructure Charging, held in Brussels on 15 September 2006. The aim of the Group is to bring together researchers, policy makers and stakeholders in a series of 4 1 day meetings, in order to synthesise information on research and practice and build consensus on the issue of pricing the use of rail infrastructure. In doing so, it seeks to draw from and build upon findings from the High Level Group, IMPRINT-EUROPE, the ECMT rail group and the DGTREN Task Forces,

Experts are invited to participate in the group in their personal capacity, rather than as representatives of particular organisations, and ‘Chatham House’ rules will apply so as to encourage the free and open exchange of views. Short reports of each meeting will be prepared and circulated amongst the group to serve as a record and to help to inform each subsequent meeting. Towards the end of the project, each of the reports will then serve as input to a final report summarising the conclusions of the group as a whole.

The objectives for this second meeting were to explore, in detail, the range of studies measuring the marginal costs of infrastructure wear and tear and scarcity, to examine the implied data requirements and discuss examples of implementation. It comprised presentations on:

- Econometric and engineering-based estimation of marginal wear and tear costs;
- Approaches to scarcity costs;
- Data requirements; and
- Experience in France.

This report focuses on the discussions sparked by these presentations, but groups the issues raised by theme, rather than in the chronological order in which they were raised on the day. Many of the slides from these presentations, along with the Agenda for the meeting and a host of other background papers, information and links relating to the overall project are available via the project website (www.imprint-net.org).

The key issues to be considered in subsequent sections are:

- Wear and tear costs
- Scarcity costs
- Data requirements
- Charge differentiation and mark-ups

We then try to sum up some conclusions, which mainly focus on issues to be considered further in future meetings.

2. Wear and Tear Costs

A series of presentations gave details of studies to estimate the marginal cost of infrastructure wear and tear in different countries. Whilst all of the studies employed robust econometric analysis, it was clear that there was no one single preferred econometric approach and that the data available for the different studies varied in nature from one study to another. This said, the studies did display a degree of convergence in their results. Discussions identified three areas of concern:

- Falling cost elasticity;
- Benchmarking of usage elasticities;
- renewals issues.

Falling Cost Elasticity

A number of the studies reviewed find that the proportion of costs variable with traffic falls as you increase traffic density. Prior expectations were that the proportion would rise, or at least remain constant. Hence, the evidence seems to indicate that marginal costs are falling as traffic volumes increase, and are falling at a fast rate, though there is no ready intuitive explanation of why this might be.

In contrast, the French study found that, on average, marginal cost increases with the volume of traffic. This seems, however, to depend on the traffic mix and on the average level of traffic – marginal costs are decreasing at first and then increasing as traffic levels rise and it is perhaps because the average segment has high traffic levels that the study shows marginal cost rising with the volume of traffic. It is not entirely clear whether this is an artefact of the study method (which differs from the other studies reviewed) or if it is a phenomenon that should be explained. An intuitive potential explanation for this pattern was put forward in relation to possessions. That is, maintenance work needs to be undertaken between the operation of services on that infrastructure and, hence, the same amount of work has to be divided in different sessions according to the level of traffic. So this means that there could be a difference between the amount of work and the cost of work, according to the level of traffic on the infrastructure.

Benchmarking of Results

It was noted that benchmarking marginal costs for different countries tends to be problematic due to the inherent differences between countries and the differences in the econometric studies undertaken. A number of issues were raised that might impact on such benchmarking, and which may need to, somehow, be controlled for.

Different econometric studies sometimes use different model formulations and sorts of data, and this was highlighted as a potential source of the variation between different studies. For example, The French study estimates a Box-Cox model, which is significantly different to the approach other studies have used. However, it was noted that Translog and

other formulations were also estimated for France, and found cost recovery ratios roughly in the same range.

The cost data on which the studies are based may be recorded or reported in different ways. For example, some of the cost that is variable is sometimes not included in the cost data set modeled. Alternatively, it was noted, in specific relation to the French study, that the French data includes some overhead on the recorded time and materials costs. This may not change the relation between marginal cost and average cost, as the overhead applies to them both, but that overhead might be one part of the source of the difference between the results for France and elsewhere.

Comparisons of results from different studies often seek to benchmark the mean marginal cost. However, it was highlighted that it is important to remember that the distribution of marginal cost is substantial, so it is perhaps not appropriate to benchmark on the mean values. For example, the marginal cost, averaged over the whole national rail network may be substantially different from the average for different categories of line. Therefore, it may be necessary to establish some other means of benchmarking that recognizes the range of marginal cost. This could include looking at standard deviations and percentiles so as to examine the variability.

The average marginal wear and tear costs for Britain are notably higher than elsewhere. It was noted that, as yet, this finding is not adequately explained, though a number of potential explanations were put forward in discussion. Firstly, it could in part be due to the issue, raised in the previous paragraph, that the average can be greatly affected by the underlying distribution of marginal cost values and it may be that the British network has a higher proportion of relatively high marginal cost sections as compared with other networks. Secondly, it may be that there are generally higher marginal costs in Britain, perhaps due to higher safety standards. Thirdly, it was suggested that it may be due to the fact that the British railway system is not in 'steady state'; there is a lot of back-logged investment throughout the network. However, doubt was cast on this suggestion given that this backlog mainly relates to renewals rather than maintenance.

The deterioration of the track depends on the initial quality level and on subsequent maintenance. the actual quality of track is dependent on the initial quality, and deteriorates according to different parameters, at different rates over time. Some of the studies attempt to control for quality. However, this is generally limited to controlling for variations in the quality of different parts of the national rail network under consideration. It is a different level of issue to try to control for variations in quality between different countries.

The approach to maintenance, in particular how to balance treatment of causes or of consequences, also has a potentially big impact on marginal cost. For example, a big part of maintenance cost is tamping. if you do it on poor subsoil you need to do it every six weeks; as compared with if you have good subsoil, then you might only need to do it every 3 or 4 years. So the infrastructure manager's decision as to whether to treat the

consequence, by undertaking tamping on a frequent basis, or the underlying cause, by treating the subsoil, has potentially major impacts.

Much of the work in this area has concentrated on estimation of marginal maintenance costs; there is relatively little work examining maintenance and renewals costs together, though it seems clear that maintenance costs are related to renewals. For example, the French study found, firstly, that maintenance cost increases with age of rail and of sleepers (but age of rail seems to have more impact on cost than sleepers) and, secondly, it appears that the maintenance cost increases significantly when the last renewal is an old one. This means that an infrastructure manager's policy towards balancing maintenance and renewal investment will directly impact on marginal maintenance costs. For example, where an infrastructure manager favours maintenance investment over renewals, one would expect to observe relatively high marginal maintenance costs.

Those studies that have included renewals costs have done so in different ways. One study included renewals costs as an aggregate variable in the same model with maintenance costs. However, concerns were expressed that without track geometry data, you don't know whether the infrastructure is being maintained to a constant level and that using one or two years worth of data, whilst it may be adequate for maintenance, is not sufficient for analyzing renewals. For example, in any given year the infrastructure manager could decide to do lots of maintenance and not much renewal and then, next year, vice versa. Therefore, a longer time series of data is needed. Another approach to analyzing renewals (on-going at the time of the meeting) looked at survival estimates, relating the age of the track to how much traffic has run on it; this follows on from theoretical work by Newbery and subsequently Lindberg.

Another approach, which examines maintenance and renewals costs together, is that of 'life-cycle costing'. This starts from the viewpoint that maintenance and renewal costs cannot be considered separately as they are interlinked. The approach also includes operational hinderence, incorporating consideration of possession time. Detailed engineering assessments of how different types of rolling stock impact on different types of infrastructure exist and are used, in conjunction with unit cost rates for different maintenance and renewals activities, to operationalise life-cycle cost modeling and make estimates of marginal wear and tear costs.

3. Scarcity Costs

Scarcity costs arise where there are bottlenecks – be they spatial and/or temporal - on the rail network, and operators competing for the use of that scarce capacity. Where there is competition for network capacity, it is thought that scarcity costs can be significant.

It was noted that scarcity costs could be revealed by incentivising the operators to tell you the true value of them running a train, and it was suggested that an auction can be a very good mechanism for doing this. That is, if the auction is set up in the correct way, operators would submit bids which would supply the information required to decide on an

efficient allocation of capacity across the rail network, expressed in the form of the timetable.

The sort of auction mechanism that might be used in the context of rail capacity was discussed. The required information would involve, for each interested operator, the ideal departure time, two or more alternative departure times and corresponding values for each. Software would then develop a timetable which would be shown to the operators for them to decide whether the outcome suits them or whether they would like to adjust the values of their departure times. The process would then iterate until no operator wants to change their bid.

It was explained that this process was tested in 2002 with 8 operators in Sweden. The passenger operators pulled out after two rounds of the auction as they feared what was going to happen and what it was going to mean for them, though there was more success in engaging freight operators as they saw it as a means of getting access to network that had been difficult to get access to.

It was felt that defining the auction in this way appears to overcome most of the previously stated objections to auctioning of rail capacity. That is, it does not seem that different to the process undertaken in Britain (and elsewhere), whereby the operators indicate what their network capacity requirements are and then the infrastructure manager examines what is possible, draws up a draft timetable and then iterates towards a timetable that is agreeable to all operators; the principal difference being that the auction involves assigning values to the operators' preferences.

Concern was, however, expressed as to whether there is any indication that the auctioning process will iterate to an equilibrium. Particularly given all of the complementarities and complexities of an inter-connecting rail system. In response, evidence was cited from the US radio spectrum auctions, which succeeded in achieving an equilibrium amidst similar levels of complexity. Another concern expressed was whether it is possible for operators using public money and operators using private money to compete on an equal basis.

The auctioning approach to arriving at a timetable was contrasted with the approach in Switzerland, where it has been decided that there should be 'clock-face' timetabling and there are half hourly trains from everywhere to everywhere. It was suggested that the Swiss system is not optimised and perhaps quite heavily subsidized in order to achieve their timetable. Nevertheless, the question remains of how to ensure the linkages and interchanges which seem to be required in a rail system, and does the need to link with other trains actually impose so many restrictions on the timetable as to reduce the flex within the auctions?

It was noted that there are a lot of politics involved as there will be losers from the process. some years ago, it was suggested to the French government that they use auctions to assist in allocating rail capacity and they were totally against it. However, it was noted that

Germany is proposing to use auctions for allocating slots where agreement cannot otherwise be reached, and it was agreed to seek further information in subsequent meetings.

4. Data Requirements

It was noted that data collection via the international agencies, such as the UIC, whose study is interesting but conceals the identities of the participants, and the European Commission, via its research efforts to support studies of how to do marginal cost estimation, have contributed considerably to knowledge in this area. Despite having come a long way with regard to cost estimation in the last few years, further research is, nevertheless, needed to understand the differences and gain greater confidence in the estimates. However, better data is needed to do this; the modelling of rail costs is only as good as the data available for it.

It was felt that the underlying data for track analysis should be made available to those with legitimate needs to access it, such as organisations required to monitor infrastructure performance and those seeking to undertake independent research. However, a number of reasons were highlighted why, in some situations, data is not being made available.

One of the problems was felt to be that the data requirements haven't been defined in common terms. There has been little attempt to gain consensus about what should be provided and to set this down explicitly.

It was also highlighted that there is a reluctance to prepare data whatever the subject. However, it was argued that the sort of databases that we need as analysts is nothing different from any profit maximising business would need, or any public agency would need to maximise its objectives. If the management of the business doesn't know how much it costs to maintain the track as a function of the traffic levels then how are they managing their business? Indeed, in a lot of cases, the data analysts would like access to is the data that the regulator should have; if the regulator doesn't have the data then they cannot do their job. So the data that researchers seek is data that the railway is (or should be) collecting already. Furthermore, if there is work required to 'prepare' the data it is often researchers who do this.

Confidentiality is also often cited as a reason for not making data available. However, the confidentiality issue needs to be examined closely. Why would any of this data really be confidential, particularly given the large scale of public funds involved?

Ultimately though, if a regulator or analyst wants a piece of information that the operator is not required to make available, then it was felt that that data will not be made available. Including provisions relating to making data available within legislation was suggested, but it was recalled that the Commission sought to do this when developing the 2001 directives and met with resistance; and even if the Commission re-opened this issue for legislation, it is doubtful that the result would be different now.

Currently, there is a EU-wide legal obligation for member states to ensure that infrastructure managers and operators publish balance sheets and operating accounts. It was also highlighted that there are lots of network statements available from the national infrastructure managers. However, , government accounting data, the sort of data reported on in the accounts, is generally not what is needed as it doesn't relate to business operations. Furthermore, there are many different formats and aspects included amongst the network statements, and whilst it was suggested that they could include a standard set of information, concerns were expressed that the network statement is a document for clients rather than regulators or outside observers, and it is already too cumbersome, so there would be resistance to laying down further specifications. It was noted, however, that some member states have introduced additional legal powers to enable their rail regulators to obtain information) and that this can work effectively.

There is also an obligation for member states to make sure that the infrastructure manager reduces their costs, with du regard to the quality of infrastructure; this is a legal obligation since directive 2001/14. This can be pursued either via regulatory measures or via entering into multi-annual contracts with the infrastructure manager. It is expected that DG TREN will soon ask certain countries how they put these obligations into affect.

There is widespread interest in international benchmarking and growing demands for access to better data for this purpose. Justification should be given as to why the data is needed and the operators should be incentivise to make it available. One means of doing this would be to include access to data in the multi annual contracts as a quid proquo; “you give us this and we will give you that”. By way of example, it was noted that the British regulator recently fined Network Rail for not maintaining their asset condition data base in respect of information on freight only lines to an acceptable level, and they are now improving this data set.

It is important not to underestimate the political and administrative challenge involved in securing better access to better data. Further legislation may not be necessary, as sufficient pressure may be exerted through the existing legislation. but there needs to be agreement on what data is required. The Commission, CER and EIM could play important leadership roles in enabling this to happen.

5. Charge-differentiation and Mark-ups

Charging practices were discussed, firstly in respect of creating ‘appropriate’ incentives for operators and infrastructure managers and, secondly, in respect of ensuring sufficient funds to finance maintenance and renewals expenditure.

The life-cycle cost modeling makes a clear case for having a steady and consistent approach to maintenance and renewals; however, whilst this makes economic sense, the difficulty is that cutting maintenance expenditure in any particular year saves money there and then, whilst maintaining quality saves money over the longer term. once you drop maintenance in one or two or more years, it is very expensive to bring it back; and if you

don't bring it back then you reduce the lifetime. Analysis of cost drivers has served to highlight that different locos have differential impacts on the infrastructure, and it was argued that charge differentiation according to these impacts could be used to incentivise investment in quality, proper renewal and subsequent maintenance.

In Austria, a system of penalties and rewards has recently been introduced, whereby locos are given values according to the impact they have on the infrastructure. Every loco coming into Austria gets a mark of 1, 2 or 3. It is very early to comment on the impacts that the scheme has had. Slight differences have been observed in locos coming from private companies or coming from abroad (they tend to send locos that are subject to lower access charges), but in the main, the locos are those of Austrian railways, and they cannot respond in the short term as they have just invested in locos. It has been advertised that the differentials between the bonus minus system will increase over time, and it is expected that further impacts will be observed.

Britain has had access charges by vehicle type since 2001; covering hundreds of vehicles and it is well known that they have had a behavioural effect, both on manufacturers and operators. Concern was expressed that such charges should not become too complex and difficult to operationalise, but it was not clear at what actual point the complexity does become a problem. In Austria, it was highlighted that, in an effort to make the system readily operationalisable, differentiation was based on the measurements that every loco has to be subjected to for its initial certification. Any particular loco is given one mark and it keeps this throughout its operational life.

It was noted that the differentiation could be refined further. For example, it is actually the bogies that are the important cost driver for freight vehicles, whilst for passenger the bogies are a proportion of the cost driver. However, it was also noted that higher infrastructure charges should not be sought where the cause of higher cost is weak subsoil; this would give the wrong incentives.

It was also suggested that charges should be used to give incentives in other directions. For example, the plus-minus mechanism could also be used in relation to environmental costs. Noise was cited as a prime example of where such incentives could be beneficial. It was highlighted that there are bogies that exist that generate much less noise and involve lower wear and tear but they are not being introduced in Europe because they cost more and there is no incentive for the operator to incur that expense.

Differential noise charges already exist in Switzerland, where there are add-ons and deductions according to the noise output of different locos. Initially the differentials were very small and little impact was observed, and so the differentials were doubled and impacts were observed; there has been a 30% increase in the use of quieter freight cars in the space of a year. In Switzerland the differentials were set by trial and error, but within the EU they would have to be based on cost measurement.

Concerns were expressed on how to balance the incentives to operators and those to the infrastructure manager regarding wear and tear and environmental cost. Sometimes it might be better for the infrastructure manager to take action to address a particular problem rather than the operator, or vice versa. For example, it might be better to move the railway track in order to mitigate a noise problem, rather than to change the locos. There is a need to set up the incentives so that both the infrastructure manager and the operator behave well. This might be facilitated by moving away from the assumption that infrastructure charges are necessarily passed straight through from operators to infrastructure manager. So you could have one set of charges to operators to incentivise them, and another menu of prices to incentivise the infrastructure manager.

Differentiation according to different parts of a network was also discussed. In France, for example, comparisons of the cost of maintenance with the level of charge give very different ratios in different parts of the network. On the oldest part of the network, where there is low density of population, cost of maintenance is more than 500 times that elsewhere on the network, and payment is ten times less. There is an objective in France for the revenues from access charges to exceed costs before 2012. Hence, mark-ups above marginal cost have been implemented for charges on several of France's highly trafficked lines in order to raise revenue, but concerns were expressed about adding further to these mark-ups in order to raise further funds, as the mark-up is already six times marginal cost in some places. In fact, it was estimated that, from a welfare point of view, infrastructure charges are already quite close to the 'Ramsey second best' on the high speed lines. A further, more general, concern was expressed that mark-ups could serve as a barrier to entry, depending on how they were implemented.

Low density lines really identify one of the dilemmas throughout Europe. When consideration is given to the few people who use these trains then it seems clear that too much expenditure is being allocated to them. However, political reasons probably mean that there will be little change, and highly-trafficked lines will continue to cross subsidise the rest of the network.

CONCLUSIONS AND OPEN ISSUES FOR THE NEXT SEMINAR

The estimation of marginal infrastructure costs is a long learning process. Having reviewed the evidence on marginal wear and tear costs (I.E. regular maintenance costs), it is clear that good progress has been made in recent years and that the results seem to be stabilising. The range of cost elasticity estimates is being narrowed down, effectively to below 0.5. This said, it is important to understand why there are the observed differences, in particular between the results for France as compared with elsewhere. Furthermore, the analysis of marginal renewal (I.E. reinvestment) costs is still in its infancy.

The econometric and engineering approaches to cost assessment each have their strengths and weaknesses and there is some debate about how best to blend their usage. In particular, the econometrics approach is strongly grounded in theory but is backward-looking in nature, whilst the engineering approach is less theoretically grounded but more forward-

looking in its nature. There does, nevertheless, seem to be a useful complementarity between the engineering and econometric studies, with the econometrics providing the evidence on overall cost elasticities and marginal costs, and the engineering providing evidence on differentiation of marginal cost according to the relevant parameters. However,

However, if there are lots of bottlenecks on the European rail network, then to implement low marginal cost charges based on wear and tear costs alone, ignoring the presence of scarcity costs, is actually distorting. Charges that reflect the costs of these bottlenecks, as well as the costs of wear and tear, are required. In general there is little scarcity pricing on European railways, not even in relation to time of day differentiation. As an alternative to pricing, auctions may serve to reveal these scarcity costs in some situations. There are a lot of inter-actions between the economics and politics when discussing the setting of charges, with mark-ups, cost recovery and incentives to operators and infrastructure managers being key issues.

A series of issues for further consideration were identified:

- quality measurement;
- environmental and accident costs;
- finance, efficient mark ups and regulation;
- finance problems in eastern Europe.
- differentials between freight and passenger.
- evidence on the impacts of the charges;
- cost categorisation;
- exploration of the cost drivers at a more detailed level;
- tax differentials in different countries.

ANNEX III: MEETING 3 –AGENDA AND MEETING REPORT -

Programme for Third Meeting

Processes, Impacts and Finances

Date: Friday 20 April 2007

Venue: the NH Grand Place Arenberg Hotel - Rue d'Assaut 15. Brussels 1000

Location: Gare Central station

- | | |
|-------|--|
| 09:30 | Introductions; objectives and review of outcomes from previous Meetings
(Jan-Eric Nilsson (Chair) & Chris Nash) |
| 9:40 | The Role of the Regulator
(Hilbert Klok, Dutch Office of Transport Regulation) |
| 10:20 | The Role of the ERA
(Torben Holvad, ERA) |
| 11:00 | Tea/Coffee |
| 11:10 | The RAILCALC Project
(Rosario Macario, TIS) |
| 11:50 | Quality figure NOISE within track access charging"
(Stefan Marschnig, Graz University of Technology) |
| 12:30 | Lunch |
| 13:30 | Setting Freight Charges in Britain
(Paul McMahon, ORR) |
| 14:10 | The Impacts of Rail Infrastructure Charges
(Bryan Matthews, ITS) |
| 14:50 | Tea/Coffee |
| 15:00 | Charging in the presence of severe financial constraints
(Katalin Tanczos, BUTE) |
| 15:40 | Closing discussion |
| 16:30 | Close |

LIST OF ATTENDANTS

Name	Affiliation
Jan-Eric Nilsson,	VTI Sweden (Chair)
Paul McMahon	Deputy Director of Economic Regulation at the Office of Rail Regulation, UK
Peter Veit	Graz University of Technology, Erzherzog Johann University
Stefan Marschnig	Graz University of Technology, Erzherzog Johann University
Katalin Tanczos	Budapest University of Technology and Economics, Hungary
Hilbert Klok	Office of Transport Regulation, the Netherlands
Roald Leuven	Office of Transport Regulation, the Netherlands
Marie Fabbriotti	Ministry of Transport, the Netherlands
Torben Holvad	European Railways Agency (ERA)
Chris Nash	University of Leeds, UK
Bryan Matthews	University of Leeds, UK (Rapporteur)
Rosario Macario	TIS, PT
Lou Thompson	Thompson, Galenson and Associates, LLC USA
Christian Vogle	DB Netz, Germany
Yves Crozet	LETT, France
Frank Jost	DGTREN
Riccardo Enei	ISIS, Italy (in attendance as Project Manager)

REPORT OF THE DISCUSSION

1. Introduction

This is a report of the discussions at the third IMPRINT-NET Expert Group on Rail Infrastructure Charging, held in Brussels on 20 April 2007. The aim of the Group is to bring together researchers, policy makers and stakeholders in a series of four 1 day meetings, in order to synthesise information on research and practice and build consensus on the issue of pricing the use of rail infrastructure. In doing so, it seeks to draw from and build upon findings from the High Level Group, IMPRINT-EUROPE, the ECMT rail group and the DGTREN Task Forces.

Experts are invited to participate in the group in their personal capacity, rather than as representatives of particular organisations, and ‘Chatham House’ rules will apply so as to

encourage the free and open exchange of views. Short reports of each meeting will be prepared and circulated amongst the group to serve as a record and to help to inform each subsequent meeting. Towards the end of the project, each of the reports will then serve as input to a final report summarising the conclusions of the group as a whole.

The objectives for this third meeting were to explore the processes related to the setting of rail infrastructure charges, the impacts arising from the implementation of different rail infrastructure charging regimes and the links between infrastructure charging and rail finances, particularly in relation to Central and Eastern European countries. It comprised presentations on:

- The roll of the rail regulator;
- the role of the ERA;
- the status of the RAILCALC project;
- the role and impact of charges related to noise;
- the impacts of different charging regimes;
- the process of setting mark-ups and their possible impacts; and
- Rail infrastructure charges and rail finances.

This report focuses on the discussions sparked by these presentations, but groups the issues raised by theme, rather than in the chronological order in which they were raised on the day. The slides from these presentations, along with the Agenda for the meeting, a Research Briefing note, a background note on the workings of the group and a host of information and links relating to the overall project are available via the project website (www.imprint-net.org).

The key issues to be considered in subsequent sections are:

- The role of the regulator;
- Negotiations, discussions and consultation;
- Differentiated charges and the process of setting mark-ups;
- Existing practice and impacts;
- Incentivising noise-reduction;
- Charging and financing in New Member States.

We then try to sum up some conclusions.

2. The Role of the Regulator

The role of the rail regulator and the inter-relationships between regulator, ministry, infrastructure manager and operating companies was discussed in some detail. There was a common perception that the role of the regulator differed in different countries, in terms of:

- the functions it performed;

- the degree to which it acted in a pro-active or reactive manner; and
- the degree to which it acted independently from the ministry.

The roles of the different stakeholders were outlined for the Netherlands. Firstly, the Ministry places conditions on the infrastructure manager, as well as having a concession with the main passenger operator, NS. The Infrastructure Manager developed the infrastructure charging framework. It does so in relation to what it sees as being the principal cost-drivers: train km, tonne km and stops at stations. The Regulator undertook an informal review of the infrastructure charges to confirm that they comply with EU and national law, and the Infrastructure Manager then published the charges in its Network Statement. The Regulator then examines the Network Statement and the Access Agreements as a whole, to satisfy itself that these are ‘non-discriminatory’.

Whilst in Britain, for example, the Office of Rail Regulation (ORR) has taken the lead role in a consultative process for setting of rail infrastructure charges. It led the consultation process that established the initial framework for charges in 1995 and has led the Periodic Reviews of this framework since then. This has involved close liaison with the infrastructure manager, the train operators and other stakeholders, with each presenting relevant evidence and then proposals of what should happen to charges. In a spirit of openness and transparency, much of this written evidence and debate has been made publicly available via ORR’s website.

It was suggested that, at least in part, the balance of responsibilities in Britain has been influenced by the turmoil and change that has occurred in relation to infrastructure management in Britain. Railtrack had only recently been created at the time of the establishment of the initial charging framework, and it was taken into administration very shortly after the first Periodic Review and establishment of the revised charging framework in 2001. Network Rail has taken a gradually increasing role in the on-going Periodic Review process, and it is envisaged that this shift will continue into the future.

At the European level, the wide-ranging work on Europe-wide rail harmonization being undertaken by ERA was highlighted. This focuses on safety and inter operability, and includes development of common safety indicators, the facilitation of cooperation among national safety and national investigation bodies, the harmonisation of safety certification and the Development and revision of technical specification of interoperability (e.g., in relation to persons with reduced mobility). ERA also fulfills a monitoring and economic assessment role, but it was highlighted that the Agency does not have decision-making powers; instead, it makes recommendations to the European Commission. In discussion it was noted that harmonisation is important, but it isn’t seen to be happening.

3. Negotiations, Discussions and Consultation

It was explained that the charging regime introduced in the Netherlands in 2006 gave rise to

a perceived tension between infrastructure tariffs and what the market will bear. On average, the new regime meant a threefold increase in charges for freight services (and sometimes as much as a tenfold increase). Whilst the Infrastructure Manager stated that the charges set out in the Network Statement represented a minimum and were, hence, non-negotiable, the freight operator argued that the infrastructure manager is obliged, by national law, to negotiate and so filed a complaint to the regulator. The regulator judged that the interested parties do have to negotiate on the content of access agreements, and that this includes the infrastructure charges. Undertakings can negotiate separately or together, but the lowest result is what has to be offered to everyone.

So for freight, the charges published in the network statement in fact served as a starting point for negotiation between the Infrastructure Manager and the operators, with the regulator present during negotiations to ensure fair play. The outcome was that the negotiated tariff has a higher train km component and a lower tonne km component. There are also discounts for very heavy trains (though this discount is due to be phased out by 2011). However, the infrastructure manager has not accepted the judgment that charges should be negotiable and the case is now at court.

The resulting passenger access charges cover marginal cost, whilst the freight tariffs are below marginal cost and, therefore, generate the need for a subsidy. This subsidy is channeled to the Infrastructure Manager from the government, and its level was calculated based on a corridor analysis study. The tariffs were recalculated in such a way as to ensure no decrease in volume of freight.

It was suggested that it was questionable to calculate charges on the basis of a set of cost drivers – in this case train km; tonne km and stops - but then to negotiate and allow movement away from those cost drivers, as this sends out confused signals to operators. In response, it was argued that the tonne km charge component is still there, but it is subsidised according to a formula, and that this subsidy is justified on the grounds that other modes are not being charged their marginal costs. However, it was pointed out that for wear and tear, the Directive does not allow charges to be below marginal wear and tear costs; they can be discounted but only in relation to external costs on other modes.

The view was expressed that if you allow negotiations then you must allow the infrastructure manager to include mark-ups; the negotiations would then relate to the mark-ups and not to the baseline marginal costs. Furthermore, it was highlighted that if you allow negotiation, then there is scope for strategic behaviour on the part of all concerned.

It was highlighted that negotiation was a key part of the process of charge-setting in Britain prior to 2001, though only in relation to mark-ups - not in relation to going below marginal cost. There were, however, concerns about market power and that the resulting charges were not transparent. In addition, the negotiation process was very time consuming, involving many stakeholders, and led to train operators being very secretive about demand for services. For these reasons Britain moved away from this to a published set of charges - though with considerable consultation and discussion in the run-up to publication – and

subsidy is treated very separately.

It was also suggested that a more effective way of arguing for negotiations might be on the basis of whether the costs are those of an efficient infrastructure manager. In Britain, for example, an assessment is made of the efficiency of the infrastructure manager, and charges are calculated on the basis of the infrastructure manager improving its level of efficiency over time.

However, there is a difference between discussion and negotiation, and it was argued that state owned monopolists, such as infrastructure managers, should not be permitted to simply present a set of charges, without explanation or justification. It is fair that stakeholders have the opportunity to comment and probe and the infrastructure manager respond in order to justify what they have done and correct any errors. This is perhaps different to negotiation but still important.

4. Differentiated Charges and the Process of Setting Mark-Ups

It was suggested that, in general, differential charges might be expected to have low level impacts, except in relation to high speed trains. There is, particularly in France, strong yield reservation on high speed lines and where the elasticities of demand are well-understood, as is the case in France, this can be a very profitable business. It was thought that there is scope for more differentiation on high-speed lines.

A distinction was drawn between the quality of the track and quality of service. If you have higher quality of track then the marginal costs associated with that will, the evidence suggests, be lower, but if you have higher quality of service then this will incur additional costs. So it would be possible to also differentiate charges for different levels of service. Indeed, the DIFFERENT project found that stakeholders would be prepared to pay more in infrastructure charges in return for higher standards of service. The additional costs associated with increased quality of service are, however, not properly understood as yet.

It was explained that mark-ups are currently the subject of consultation in Britain, as part of the UK government's requirement that freight operators should pay the full costs of freight only lines. This requirement has to be implemented in line with the Directive, which states that mark-ups can only be introduced where the market can bear it. Given that the profit margins on rail freight are fairly modest, there has been concern about introducing the mark-ups so as not to damage the market.

The process for calculating and consulting on the mark-ups has been led by the ORR, with supporting analysis from Network Rail, the infrastructure manager, and in consultation with the freight operators. The process has required stakeholders to agree on how to define market segment and on how to determine whether operators can bear the cost.

Market segment was, in the end, defined in terms of the type of freight commodities, e.g. ESI coal, construction products, intermodal, spent nuclear fuel; etc. Then, modeling work

was commissioned to look at whether operators could bear the costs, focusing on the impacts on market profitability and environmental effects of transferring rail to road. The government has accepted that the mark-ups should only apply to freight only lines that are used by coal and nuclear traffic.

5. Existing Practice and Impacts

An outline of the RAILCALC project was given. This is a consultancy project on calculation of charges for rail infrastructure, with a focus on the 2001 directives. It is working in close collaboration with infrastructure managers and has the objectives to develop best practice guidance and to achieve some degree of harmonisation.

The starting point is that charges should:

Relate to costs incurred;
Provide appropriate economic incentives;
Avoid discrimination.

There are 3 stages of work:

1. Diagnosis – this involves data collection, inventory analysis, a state of the art review and establishment of an evaluation framework. The review includes looking at other sectors to see how they have dealt with charging issues;
2. Best practice review - identifying best practices; in relation to cost structures and charging calculation; and
3. Implementation – developing a road map for good practices.

The review so far has found a wide diversity of different practices. These have been organized into a typology of current practice. Once the different practices are more fully understood, it is believed that some hidden mechanisms for subsidy will be identified. It is difficult to identify clear similarities amongst different countries, or to bundle countries together in terms of their practice.

It was reiterated that good information on costs is needed both for pricing and for analysis of maintenance costs;

In terms of issues for future examination, incentives to infrastructure managers is important. If, for example, it is true that high quality infrastructure means low charges then this gives good incentives to operators but perhaps perverse incentives for infrastructure managers. On the other hand, if you have high charges for high quality then this gives perverse incentives to operators.

Performance regimes were identified as important ways of giving incentives. However, the

perception is that most countries don't have them. It was clarified that there are approximately ten countries where performance regimes are implemented, and a number that are in the process of being implemented. There have been a lot of teething problems experienced. It was highlighted that performance regimes are required by the directive, so if they are not implemented the Commission will be obliged to take action. Furthermore, it was argued that pressure should be for change in institutions as well as in charges; best prices won't achieve anything if the institutions are wrong.

A number of presentations were made that touched on the issue of what impacts rail infrastructure charges have. Firstly, a point was made that different infrastructure managers have adopted a wide variety of charging systems, with some systems, for example, overcharging international traffic in comparison to domestic traffic, and this lack of homogeneity causes market distortions. It is clear that objectives differ across different systems and it may be possible to make a link between differing objectives and differing practice

However, the point was made that whilst different countries do different things, the important European question is whether countries are doing things that damage international movements; principally freight. It was argued that this should be the European concern, and not whether a country is doing something that reduces its own welfare. The EU's objectives in relation to rail infrastructure charging are set out in the directive and it is these that should be kept in focus when considering impacts.

The question was raised as to whether it was possible to observe directly the impacts of particular regimes of infrastructure charging. It was noted that efficient charges may actually have no observable impact, and that this could be an indication that things were being run smoothly in the first place. However, we certainly would expect charges that incorporated mark-ups to have impacts.

The impacts of charging will depend on the competitive and ownership contexts prevailing. If, in effect, one agency of government charges another agency of government then, other things being equal, one would expect the impact to be less than if it is a private company that is facing the charges. This seemed to be born out in findings from a survey of stakeholders undertaken by the DIFFERENT project. However, there is also evidence to show that regional government is sensitive to price. It was suggested that a distinction should be made between commercial and bureaucracy, and that the aim should be to make public companies behave commercially.

One key finding from the DIFFERENT work was that freight operators tended to be much more sensitive to infrastructure charges than passenger operators. It was suggested that this might be especially the case given that most freight operators are private companies, whilst there is still a good deal of public sector involvement in passenger operations.

It was noted that the British regulator has had a lot of interest in the structure of rolling stock-related charges from rolling stock manufacturers. Manufacturers have, over a

number of years, made approaches to the ORR to comment on and seek to respond to the differential charges for different classes of rolling stock. In essence, it was felt that cost reflective charges were leading manufacturers to take the infrastructure cost implications of their rolling stock designs into account as they design new rolling stock, and that this mechanism was hard to directly observe but would have real impacts over a medium to longer term.

6. Incentivising Noise-Reduction

The question was also raised as to whether track access charges can be used to incentivise noise reduction. An infrastructure manager has an incentive to sell as much capacity as possible, but the more they sell the more rail-related noise there is. It was suggested that it would be more economic not to create noise rather than to protect people from its impacts, and hence noise charges might be a means of balancing the incentives.

The starting point is that you should be able to calculate noise costs, and then input these into the charges. There is a good deal of existing research calculating external costs, but estimates vary in a very wide range. The evidence is that passenger traffic uses very good rolling stock, that emits less noise, and that the major component of rail-related noise is associated with freight traffic and this is where charges might be focused. The revenues from this should only go to the infrastructure manager if similar types of charge exist on other modes; otherwise, they should go to government.

However, it was highlighted that noise levels are determined not only by the type of rolling stock but also by the standard of the infrastructure itself. Hence, there is scope for dispute between operator and infrastructure manager as to what the cause of the noise is. It was suggested that some form of EU standard in relation to the infrastructure was required, and that this might be a more appropriate means of optimizing noise emissions than via charging. However, evidence was cited from Switzerland, where they have introduced noise-related mark-ups on charges and this has led to changes in the fleet towards quieter rolling stock designs.

7. Charging and Financing in New Member States

The difficult situation regarding infrastructure charging and the rail market in New Member States was explored. Clearly, railway spending budgets are limited and not in line with the scale of spending required to maintain and operate the scale of networks that exist in some of the New Member States, nor to undertake significant new investment. Consequently, the networks are deteriorating and out of line with the current pattern of transport demand. It was noted that in some countries, market share has dropped from 80 to 25%.

This presents something of a major dilemma. New basic infrastructure needs to be constructed and made available, whilst it is also probably necessary to reduce the overall scale of the rail network and to concentrate on keeping the main 40% of the current

network in better condition. However, the new investment is needed before it is even possible to consider shrinking the rail network, but funding for this investment is missing.

It was suggested that in Hungary the government has sought to preserve a railway with too many lines, with decades of minimal investment. This has resulted in, for example, main lines having serious speed restrictions. At the same time, the financial climate means that rail infrastructure charges are designed for full cost recovery.

The argument was put forward that the size and scale of some rail networks is simply out of date and that some or much of the capacity in some places is not needed any more. This would lead to proposals for shrinking networks - closing particular lines - in particular places, in order then to concentrate on the parts of the network that merit it. For example, if the rail agency were to look at the economics of each line, they would be able to take a view on shrinking and rationalising the network. The reluctance to do this, however, is not confined to new member states; it was indicated that Network Rail in Britain also have uneconomic lines that they will not close. Hence, it was recognized that closing lines is politically difficult. In addition, closing lines saves money for the future and will not necessarily save much now, as they are often not actually receiving much funding now.

The recommendation was put forward that the New Member States concentrate on getting their railway border crossings sorted out. If they don't, it was suggested, there is no point in pouring money into rail infrastructure that people won't use. There is evidence to show that international traffic flows exist, but they are not travelling by rail because of border crossing problems. There was agreement with this, and the further suggestion was made that countries keep and concentrate on logistic centres and particular higher quality lines, not to distribute on the entire 7000 km poor quality network.

It was suggested that if the freight operators were privatized then this will improve efficiency and make funds available for the infrastructure. However, evidence was discussed that governments of Poland, Czech Republic and Slovakia have shifted infrastructure charges on to freight, so as not to require passenger services to pay so much. This makes it more expensive to run freight trains than it should be. The question was then raised as to whether it is acceptable that freight pay more charges and passengers pay very little, as in Eastern Europe, in contrast to Western Europe where it is more or less the other way around. Alternatively, is there room for both of these policies to co-exist within the EU?

CONCLUSIONS AND OPEN ISSUES FOR THE NEXT SEMINAR

Dialogue between stakeholders in relation to the charging framework was felt to be important. However, the form that dialogue takes will necessarily vary and this requires some further clarification.

Different countries have different processes for establishing their charging frameworks. For example, there was a contrast between the approaches of the British and Dutch regulators, whereby in Britain the Regulator has taken a hands-on role in the determination of the

charging framework and setting of charges as compared with in the Netherlands where the infrastructure manager has taken the lead role in charge-setting and operators take responsibility for challenging charges, with the Regulator then adjudicating.

It was clearly felt that the level and structure of baseline marginal costs should be the subject of discussion and consultation amongst stakeholders. Through such discussion and consultation, some level of agreement should be sought on what the baseline marginal costs actually are, even if this is thought to be too high once translated into a charge.

On the other hand, it was not generally felt to be appropriate for stakeholders to enter into negotiations in relation to what proportion of baseline marginal costs should feed through into the charges, e.g. on the grounds of what the market can bear. Throughout Europe there is divergence on this issue, with some favouring the discounting of charges according to what the market will bear, and others favouring the explicit provision of subsidy to assist with payment of charges. However, the latter is the only way of allowing operators to pay less than marginal cost that is legal under the EU Directive.

Nevertheless, it was felt that there is scope for negotiations (in contrast with discussion and consultation) in specific relation to mark-ups or capacity and capability in a long term access agreement

The government requirement in Britain for freight operators to pay full costs of freight only lines has given rise to several interesting issues concerning the calculation and setting of mark-ups. In examining whether or not the market segment can bear the additional cost of the mark-ups the Regulator, who has led the process, has had to address questions of how to define market segment; and how to determine whether a particular market segment can or cannot bear the cost. It has maintained a dialogue with the freight sector, which is naturally enough resistant to being charged more, throughout the process and there appears to be a reasonable prospect of a negotiated agreement on the mark-ups being reached.

More generally, price sensitivity does seem to be greatest amongst freight (mainly private) operators, though it is unclear whether this is actually due to them being private companies or because most passenger operations are under PSOs and the public authorities responsible for determining service levels are not themselves responsive to price.

Discussions amongst stakeholders might also relate to the level of efficiency of the infrastructure manager, and hence to the overall level of costs that it incurs and seeks to pass on to operators. This could, clearly, feedback into the discussion of actual baseline marginal costs and require some agreement on what efficiency improvements it may be necessary and appropriate for the infrastructure manager to make.

There may be a clear role for the regulator in forcing the infrastructure manager to invest and behave more efficiently. Performance regimes are important ways of giving incentives, but the perception is that most countries have not introduced them yet.

There was an open question as to whether incentives to promote more efficient infrastructure management should be incorporated in infrastructure charges. That is, if it is true that high quality infrastructure means low charges then this gives good incentives to operators but perhaps perverse incentives for infrastructure managers; but if you have high charges for high quality then this gives perverse incentives to operators.

It is clear that charging practices differ across different countries, as often do charging objectives and circumstances of the railway. It may be that there are links between practices, objectives and circumstances that can be ascertained. If so, given a particular set of objectives and circumstances, it may be possible to provide guidance on the most appropriate structure of charges. It may also be possible to provide more guidance on in which circumstances it is appropriate to apply mark-ups.

However, whilst different countries do different things, the question was raised as to in what circumstances this actually matters. It was argued that the important European concern is whether countries are doing things that damage international movements, not whether a country is doing something that reduces its own welfare.

Hence, the question was raised as to what sort of convergence should be being sought? At present, the principal international movements relate to freight, so the above argument would lead to a focus on convergence amongst freight charges.

There is a strong perception that, in eastern Europe, freight pay more charges and passengers pay very little, whereas, in western Europe, the reverse is true. This raised the question of whether such cross-subsidization is responsible and whether there is room for both of these policies, with the suggestion that some degree of convergence is required to promote international freight traffic.

The issue of how adequacy of finance to maintain quality can be ensured was identified as a key question, particularly in relation to some of the Central and Eastern European railways. It was highlighted that market share in several Central and Eastern European countries has dropped substantially, leading to a pressing efficiency case to reduce the scale of the rail networks and concentrate the limited finances on the parts of the network that merit it. But closing lines is politically difficult and saves money for the future (it will not necessarily save much now, as they are not receiving much now).

Border crossings were also identified as a priority. If the European focus is on international traffic, then ensuring that there is adequate infrastructure at the border crossings will be part of promoting the international movement of traffic. Concentrating resources on these border crossings should, it was suggested, be a key priority for those Central and Eastern European railways that are severely financially constrained.
lack resources

It was also argued that there should be pressure for change in institutions as well as in charges. Best prices won't achieve anything if institutions are wrong.

It was suggested that the current EU legislation is adequate. The legislation permits infrastructure managers to charge what they see fit so long as it is between marginal cost and average cost and so long as they can justify it to their stakeholders. Where problems exist, it was suggested that these were to do with implementation and that either tighter regulation and/or the passage of time would serve to resolve them.

It was agreed that the final meeting will seek to both draw conclusions and identify recommendations. It will also need to provide some updates on latest developments, e.g. in relation to RAILCALC and perhaps CATRIN. It was suggested that the best way forward would be for the Group Leader, Chair and Rapporteur to take responsibility for drawing up a short document in advance of the meeting setting out provisional conclusions and recommendations to serve as a starting point for discussion, comment and criticism. It was also suggested that Group members be asked to provide a brief statement of what they expect to happen next regarding rail infrastructure charges in their country, and comment on how this compares with what they think should happen.

ANNEX IV: MEETING 4 – AGENDA AND MEETING REPORT -

Programme for Fourth Meeting

Conclusions and Recommendations

Date: Wednesday 28 November 2007

Venue: the NH Grand Place Arenberg Hotel (Rue d'Assaut 15. Brussels 1000.

Location: Gare Central station

09:30	Introductions; objectives and review of outcomes from previous Meetings (Jan-Eric Nilsson (Chair) & Chris Nash)
9:45	Consensus, Conflict and Conclusions Chris Nash, ITS-Leeds
10:15	Open Discussion
11:00	Tea/Coffee
11:20	Key Issues for the New Europe Paul Guitink (Advisor for Central and Eastern Europe, CER) (TBC)
11:50	Stakeholder Perspectives EIM speaker (TBC)
12:10	Stakeholder Perspectives Gunnar Alexanderson (CER)
12:30	Open Discussion
13:00	Lunch
14:00	Update on The RAILCALC Project (Rosario Macario, TIS)
14:30	What Happens Next in Europe? TBC
15:00	Tea/Coffee
15:15	Recommendations and Way Forward Chris Nash, ITS-Leeds, and Jan-Eric Nilsson, VTI
15:45	Closing discussion
16:15	Closing Remarks Frank Jost, DG TREN
16:30	Close

LIST OF ATTENDANTS

Name	Affiliation
Jan-Eric Nilsson,	VTI Sweden (Chair)
Paul McMahon	Deputy Director of Economic Regulation at the Office of Rail Regulation, UK
Dan Wolff	European Infrastructure Managers Association
Gijs Winters	European Infrastructure Managers Association
Katalin Tanczos	Budapest University of Technology and Economics, Hungary
Hilbert Klok	Office of Transport Regulation, the Netherlands
Roald Leuven	Office of Transport Regulation, the Netherlands
Marie Fabbriocotti	Ministry of Transport, the Netherlands
Stephen Perkins	International Transport Forum
Chris Nash	University of Leeds, UK
Phillip Wheat	University of Leeds, UK (Rapporteur)
Rosario Macario	TIS, Portugal
Lou Thompson	Thompson, Galenson and Associates, LLC USA
Emile Quinet	ENPC, France
Gunnar Alexandersson	CER
Paul Guitink	CER
Kostas Rigas	CER
Dominique Bouf	LETT, France
Raimonds Graudins	Latvian Railway,
Vicenc Pedret	DGTREN
Frank Jost	DGTREN
Frederik Rasmussen	DGTREN
Ilaria Scarso	DGTREN
Riccardo Enei	ISIS, Italy (in attendance as Project Manager)

REPORT OF THE DISCUSSION

1. Introduction

This is a report of the discussions at the fourth and final IMPRINT-NET Expert Group on Rail Infrastructure Charging, held in Brussels on 28 November 2007. The aim of the Group is to bring together researchers, policy makers and stakeholders in a series of four 1 day meetings, in order to synthesise information on research and practice and build consensus on the issue of pricing the use of rail infrastructure. In doing so, it seeks to draw from and build upon findings from the High Level Group, IMPRINT-EUROPE, the ECMT rail group and the DGTREN Task Forces.

Experts are invited to participate in the group in their personal capacity, rather than as representatives of particular organisations, and ‘Chatham House’ rules will apply so as to encourage the free and open exchange of views. Short reports of each meeting will be prepared and circulated amongst the group to serve as a record and to help to inform each subsequent meeting. Towards the end of the project, each of the reports will then serve as input to a final report summarising the conclusions of the group as a whole.

This report focuses on the discussions sparked by these presentations, but groups the issues raised by theme, rather than in the chronological order in which they were raised on the day. The slides from these presentations, along with the Agenda for the meeting, a Research Briefing note, a background note on the workings of the group and a host of information and links relating to the overall project are available via the project website (www.imprint-net.org).

The key issues to be considered in subsequent sections are:

- Definitions
- Evidence on marginal wear and tear costs
- Scarcity, Congestion and Environmental-Related Charges
- Cost Recovery and Mark-Ups
- Implementation issues
- International Traffic

We then try to sum up some conclusions.

Definitions

A number of definitional issues had been highlighted throughout the series of meetings. That is, there are a number of terms that appear to be used and interpreted differently by different stakeholders and in different countries. It was suggested that it would be helpful to highlight the most important terms for which this applies and, where possible, to agree common interpretations. The most important terms highlighted were as follows:

Maintenance costs versus renewal costs - the issue is not with the theoretical definitions but with the fact that reporting varies across countries. It was agreed that short run marginal cost should comprise maintenance costs and the present value of the cost of bringing forward renewals as a result of increments in traffic. However, it was also highlighted that different infrastructure managers can adopt quite different balances between maintenance and renewal activities, the example being given of France, who were said to maintain rather than renew their infrastructure.

Market segment – the question is how to interpret this in relation to the EU directive? The consensus in the group seems to be a segment of market for which there is a unique elasticity of demand. It was also suggested that international traffic should be a segment too. However, Concern was expressed, in relation to freight, about this leading to identification of market segments according to commodity, as this would imply different access charges by commodity. The concern was, firstly, about the implications of both the infrastructure manager and the freight company charging Ramsey prices and, secondly, about whether the infrastructure manager could actually know what commodities are carried (and Ramsey pricing by commodity would be particularly difficult if there was substantial wagon load traffic).

Non-discrimination – this is Important for the purpose of levying mark-ups on marginal cost. The consensus seems to be that for a given market segment (as defined above) all operators should be charged the same. However, the Directive may actually imply a more stringent definition than this. For example, in cases where the incumbent operator is integrated with the infrastructure manager and the incumbent's sectors are designated as unique market segments. New entrants operate in other segments. This leaves the infrastructure manager free to discriminate against new entrants which would not be allowed by the directive.

Cost versus expenditures – the distinctions here are more clear, although finding data on costs as opposed to expenditures is difficult;

Congestion - On a scheduled mode this manifests itself as reduced reliability. There is a cost additional to that captured by the performance regime;

Scarcity – on a scheduled mode this manifests as an opportunity cost for the forgone path.

Evidence on marginal wear and tear costs

Research in this area is converging in relation to estimates of cost elasticities; and marginal cost can be inferred from a knowledge of cost elasticity and average cost. A range of studies have shown that:

The Elasticity of maintenance cost with respect to usage is less than 30%

The Elasticity of renewal costs with respect to usage is less than 100%

Some new evidence was presented in relation to operations costs. The estimated elasticity of cost with respect to usage in this work was 0.11. This would indicate that only 11% of costs are variable with small increments of traffic. This is interesting given that some charging systems assume all operations costs are variable with traffic. However, concern was expressed that a long run cost function may have been estimated (given that staff numbers are used as a proxy for cost, and staff numbers may be determined by signalling equipment etc).

Whilst most of the empirical work thus far has focused on maintenance costs, there is consensus that renewals are part of marginal wear and tear costs. They are actually a lot more significant than maintenance cost in expenditure terms and also are likely to have greater elasticities. Therefore, renewals costs are a very important area for further empirical research.

It was suggested that there is a need to link engineering research (which is often very specific) to economic research. In particular, economists should seek to provide guidance to engineers on what aspects to focus on. In this context, new work was presented on lateral forces for track damage, and it was noted that this has prompted proposals for further disaggregation of charges in Britain by curvature of track.

Availability of data is the key driver for analysis. It was noted that there is sometimes a lack of will on the part of infrastructure managers to disclose data, but it was also suggested that it is sometimes very difficult for infrastructure managers to provide the data. Nevertheless, this data is useful not only for researchers interested in marginal wear and tear costs, but also for infrastructure managers themselves seeking to understand their costs and the implications of changes in traffic; so it is in their interests to collect it. It was agreed that, whilst we can not agree unanimously that all data should be published, if someone has a legitimate need for the data they should get it, so long as the format of the data is appropriate and not too complex.

Finally, it was proposed that it would be useful for tables to be provided which show what proportion of costs are variable by different cost categories; this should be done for as disaggregated cost categories as is possible. This would be especially useful for newer regulators which have not had the benefit of their own research programme.

Scarcity, Congestion and Environmental-Related Charges

It has been discussed that scarcity might be addressed by either specific posted prices designed to reflect the opportunity cost of slots or by making operators reveal their willingness to pay for slots through an auction mechanism. It was clarified that, in either case, competition is Required for these solutions to be effective. For example, in cases where there is a strong incumbent, releasing a path to a competitor may not have benefit, merely abstracted revenue. Also, there may potentially be a problem with the incumbent buying up all paths to prevent new entrants entering the market. Furthermore, if there is

only one operator, there is no actual need to take external action to resolve scarcity issues, as any scarcity is internal to the operator.

The scarcity charge is very relevant for freight traffic where paths are often reserved but not used. It was proposed that scarcity charges should be paid irrespective of whether the slot is used. However, concern was expressed that a reservation charge creates a two part tariff which may be outlawed as it is discriminatory. In response, it was argued that, while it could be seen as a two part tariff it reflects true marginal cost and not a mark up and so is non-discriminatory

One expert predicted that scarcity charging would be an easy fix. Operators would pay only a small amount but use the infrastructure a lot more effectively. However, in relation to service procured using a PSO: If regional authorities want to buy more services then scarcity charges maybe a significant driver of behaviour. It is difficult to predict the results of auctions without knowing the specific circumstances of the application. There are different objectives of infrastructure managers from case to case. This leads to different behaviour.

In relation to congestion, it was highlighted that the Capacity Charge in Britain is to be reformed. It will now differentiate between time and place; something that was always envisaged but which has, until now, proved very difficult to implement.

It was observed that there are currently only a few declared instances of congested sections of the rail network in the EU. However, it was suggested that this may be for political reasons, eg to avoid having to commit expenditure to improve capacity (even though it was recalled that the Directive requires infrastructure managers only to study capacity enhancement and not necessarily to commit to undertaking it).

Environmental-related charges, in the form of mark-ups on the wear and tear-based charges, were discussed. Concern was expressed that such mark-ups for environmental cost could be abused by member countries to bring in revenue by saying that they value noise etc more highly than other member countries. It was suggested that this could be mitigated by charging through a bonus/minus system, as in Switzerland and Austria. It was also highlighted that sometimes places do have genuinely higher environmental marginal costs eg Alpine regions.

Cost Recovery and Mark-Ups

It was argued that charging cannot be separated from financing issues. Some countries, particularly some of the newer member states, have significant financing difficulties and this has a strong bearing on charging policy. Issues were cited in a number of countries. For example, in Hungary rail cargo operations have just been sold off but the funds will not be channelled directly back into the railways. In Latvia Debt has increased due to cheaper credit and capital has been sold off due to the disposal of peripheral services as part of

reforms, resulting in a worsening financial situation; it was, however, agreed that the Baltic states were different from other new members.

The RAILCALC project has included a review of charging mechanisms in relation to cost recovery. Long run marginal cost pricing would, in principle, cover total cost, but doubts were cast on this suggestion due to the presence of economies of scale. Medium term pricing, another proposal, seems to be an approach based on avoidable cost, but there remains an issue of how to cover the joint costs.

In Britain, government has specified that the costs of freight-only lines should be covered by charges to freight operators. This has resulted in analysis to determine market segments where mark-ups might be applied, and to determine appropriate levels for such mark-ups. Limited ability to pay has meant that mark-ups will only be applied on coal and nuclear waste traffic.

Concerns have been expressed about charges being heavily weighted towards freight traffic in some countries (in particular, some of the central European, transit, countries) and heavily weighted towards passenger traffic in other countries. It was felt by some that freight charges should not be used to subsidise passenger charges, or vice-versa. However, such cross subsidisation is very difficult to prove as there can often be claims that the charges do to some extent reflect marginal cost. Indeed, one expert argued strongly that so long as all services cover marginal cost then large mark-ups on either freight or passenger is not cross subsidy.

Nevertheless, there are clear examples where the level of the charge is too high since it results in the exclusion of particular market segments. Channel Tunnel charges were cited as a particular example of this.

In all of this, it is important to introduce market segmentation so that the government and other funders can see what the situation is. However, as mentioned above, it was an overall conclusion that discrimination in freight is very difficult. The more difficult it is to discriminate in a market segment the more damaging to economic efficiency.

Implementation issues

A number of experts stated that they felt that, in general, the Directive is adequate as it stands. However, various clarifications would be useful to assist with consistent and more harmonious implementation, eg in relation to scarcity charges and in relation to when a two part tariff is allowed (considering the market structure - open access versus exclusive rights).

It was suggested that RAILCALC and IMPRINT-NET should give clear views on how to assess marginal costs. However, it was also argued that infrastructure managers should be free to have some form of flexibility in setting charges, and that it is difficult to specify a methodology for the level of charges as there are many country specific issues. Hence, RAILCALC has not looked at this.

Nevertheless, it was agreed that there is little excuse for countries not to provide some form of marginal cost estimates. Even if a country has no engineering or econometric evidence, they can still use a cost allocation approach and adopt variability proportions from other countries.

Furthermore, there was some scepticism as to why infrastructure managers did not conduct research into their incremental costs, as knowing their costs should be central to running an effective business. In response, it was suggested that, because many infrastructure managers do not have to recover all costs, they have little incentive to control them. But it was also highlighted that infrastructure managers have to show that they are financially sustainable, even if some funding comes from government, and if they do not know about their costs then it will be difficult for them to demonstrate financial sustainability.

It was suggested that many of the new infrastructure managers are still learning, which perhaps explains why they have not got a grip on costs as yet. Also, even where new countries can and have calculated charges, they are often not in a financial position to be able to implement them.

Several experts highlighted that the objectives of the infrastructure manager are very important in relation to how charges are implemented. If the infrastructure manager is acting as a business their objectives and actions may be very different to if they are maximising social surplus. Furthermore, infrastructure managers may not have such simple objectives as is often assumed, and this may be an important barrier. Indeed, what the objectives of the infrastructure manager are was a theme running through the whole meeting.

Finally, politically motivated factors are also key drivers of different charging systems across countries. It was recalled that there is competition between modes and so a level playing field is required. Also, externally-driven capacity enhancement plans are sometimes too burdensome.

International Traffic

At present, the international market is very small. The major market is still domestic passenger. However due to the expansion of the EU there is more potential for international travel, and this is where implementation of sensible and harmonious charges is most important.

There was consensus that, where mark-ups are required, it would be more efficient for all infrastructure managers on an international corridor to set one mark-up, rather than individual mark-ups set by different infrastructure managers in isolation. Also, there is a need for slot assembly across countries, via some form of 'one stop shop'.

It is important to consider barriers to international traffic which can be political and physical as well as just pricing. This is especially relevant for east/west Europe movements.

For example, the vicious circle claim may not be entirely true since the state of the infrastructure may not influence demand that much. For example time at border crossing points greatly outweighs transit time through some states.

Conclusions and way forward

- The Directive is, in general, adequate but there are issues regarding its implementation.
- Those countries which treat the infrastructure manager as a business have a problem with adopting marginal social cost pricing in terms of cost recovery.
- Defining market segments is key to achieving non-discriminatory mark-ups.
- Provided the infrastructure manager is acting as a business it does not matter whether it is publicly or privately owned – the firm still needs to know its costs.
- It must be remembered that funding is often public money and so there is a need for transparency.
- Marginal cost charges do not give incentives for firms to reduce costs.
- The regulator should use efficient marginal costs rather than actual costs to determine charge levels.
- Overall, information from the infrastructure manager is the key for any of this to be determined.
- The policy context is very important.
- The objectives of the infrastructure manager can effect the willingness and ability of it to price by marginal social cost.
- Infrastructure managers do not have an excuse as to why they have not moved further in developing marginal cost information/pricing.
- The Directive is still valuable for infrastructure managers to develop charges in a range of circumstances.
- Would it be desirable to legislate more to force implementation?
- how does new infrastructure and rolling stock impact on costs?
- There seems to be new issues regarding auctioning, congestion costs, climate change costs, safety costs and 2 part tariffs.

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