



Implementing Pricing Reform in Transport – Effective Use of Research on Pricing in Europe

Additional Seminar on Charges for Heavy Goods Vehicles

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1. Introduction

The aim of this additional seminar was to seek views and attempt to build consensus on the appropriate steps forward to take on the charging of heavy goods vehicles, in the light of the proposals from the European Commission for the amendment of the 1999 Directive on the Eurovignette. The seminar took the form of three sets of papers plus a round table and final conclusions. Each of these will be reported in turn.

2. Charging Principles and Cost Calculation

2.1 The proposed Directive on HGV charges (Eddy Liegois, European Commission)

The presenter outlined that there were many reasons why the European Commission was focussing on tolls. He explained that transport users have the right to know what they are paying for and why and having tolls on infrastructure use may enable transport undertakings to make rational decisions which take account of all transport costs. Toll is believed to be one solution to the problem of financing major transport infrastructure projects. It was believed that a change is needed more on the structure of the tolls and the way in which they are applied to the various user categories, than on the level of tolls.

The new proposal came about as Directive 1999/62/EC needed to be supplemented with rules which ensured fair competition between operators and adequate functioning of the internal market. This initiative was announced in the White paper of the Commission on European transport policy for 2010.

The proposed Directive aims to cover the main road network consisting of the TEN network and competing roads. If charging applied only on the TEN network, traffic could be diverted to parallel trunk roads or other major roads. The proposed Directive applies to lorries over 3.5 tonnes as compared with the 12 tonnes weight of lorries in the current Directive. These vehicles also cause damage to infrastructure and contribute to the increase in congestion. Outside the scope of the EU framework, member states will be free to apply tolls (in compliance with the rules of the treaty) on roads other than those of the main road network and on small-sized lorries, private cars and other vehicles.

The presenter explained that the objective is to design a fairer charging system ensuring sustainable transport without imposing additional burdens on transport operators. Toll is needed that better reflect the costs of transport. These costs include the costs of constructing, operating, maintaining and developing the network. Total infrastructure costs consist of costs of damage and investment costs. Charges for investment costs in the proposed Directive are limited to new infrastructures to avoid inclusion of costs that have already been covered, and special provision needs to be made to take into consideration the existing concession contract rights. Another cost is the uncovered costs of accidents. Costs of accidents run into billions of Euros and an incalculable human cost. Toll is proposed to include the costs that are not covered by insurance and that are borne by social security or society. A common methodology is proposed for calculating the

components of cost in order to ensure a consistent, harmonised application of toll systems. Charging of infrastructure use is not primarily intended to raise new revenue. There is the possibility for member states to offset the burden of a new infrastructure charging system by reducing annual vehicle tax.

The aim is towards a more differentiated charging system. The system has to provide economic incentives for transport operations through a structure which more effectively integrates external and infrastructure costs. Member states may vary the tolls according to the vehicle type (road damage class and EURO emission class), the time of day and the level of congestion. However member states must vary the tolls from July 2008, according to the concerned road in the network, depending on the environmental sensitivity of the area, the population density or the accident risk.

The system's acceptability to users and public opinion depends on how the revenue is used and the transparency of the usage. The revenue from the charging of infrastructure must be used for the benefit of the transport sector. It should be used particularly in the road sector and in the transport sector as a whole, taking into account the balanced development of the transport networks. Tolls may contribute to the development of alternative modes of transport. It is believed that the system will contribute to the realisation of major infrastructure projects of the trans-European network. There is the possibility to apply mark-ups to tolls in the case of roads in sensitive areas, particularly in mountainous regions such as the Alps and the Pyrenees, for cross-financing the investment costs of other transport infrastructures of a high EU interest in the same corridor and transport zone. The maximum mark-up should be equal to 25% of the average toll and the mark-up must be authorised by the commission. The proposed Directive sees the need for an independent infrastructure supervision authority in order to oversee the operation of the national charging systems, to verify the use of the financial resources from tolls on transport infrastructure and to promote the synergies between the different sources of funds.

There are believed to be many benefits of charging. Charging may achieve a more efficient market with a level playing field between transport operators in different parts of the EU. An efficient charging system can replace systems which ration transit rights in sensitive areas and lead to a more transparent and less discriminatory system. The use of less congested networks would be encouraged and the logistical chain would be optimised, resulting in a more rational use of infrastructure. Charging can lead to a gain for the European economy and the environment, as it is an incentive to the replacement of the more polluting vehicles and the development of clean technologies, and also it promotes the usage of alternative modes of transport particularly rail/road services. Charging would provide support for the financing of infrastructure, as trans-European projects can no longer be funded only by public budgets.

Liegeois concluded the presentation stating that the proposed Directive provides a framework that will enable member states, with regard to the subsidiarity principle, to give economic incentives to transport through a price structure that better reflects the

costs to society. The community framework was considered to be an important complement to the internal market, guaranteeing sustainable freedom of movement.

2.2 Charges for Heavy Goods Vehicles: EU policy and key national developments (Chris Nash, Bryan Matthews and Batool Menaz, ITS, Leeds)

The presentation argued that existing charges for heavy goods vehicles do not adequately reflect the costs of transport, and there was seen to be a need for a change in the system. In interurban road transport, in contrast to urban transport, the treatment of freight transport is very important. The marginal social costs of freight transport by HGVs depend on several factors: congestion, which varies with traffic volume; road damage, which is sensitive to axle load and road quality; and accident and environmental costs, which vary with geographical location. Existing pricing schemes do not take into account these dependencies. Fuel taxes do not increase with vehicle (and particularly axle) weight. Fixed annual charges fail to charge for distance travelled at the margin. And the current insurance system does not internalise the external accident cost in a proper way. In terms of supplementary charges, currently there are three Europes: Eurovignette countries, countries with tolls on specific roads, and countries with no direct road charging at all.

The Eurovignette Directive aimed to limit competition problems within the road freight sector caused by the existence of very different methods and levels of charging for infrastructure use in different countries. However the Eurovignette currently is limited to motorways, it is only related to the infrastructure cost of providing those roads and excludes external costs, and it is based on time rather than distance travelled.

The presentation looked into the proposals for revised HGV charging in three European countries; Switzerland where the charge is already in force, Germany where the charge was expected to come into force at the end of 2003 but was postponed and is expected to come into force sometime in 2004 and Britain which hopes to implement the charge by 2006.

The Swiss Heavy Vehicle Fee (HVF) was implemented to cover the high costs of HGVS on the roads. It took 20 years from the first approaches to introduce the HVF. The first step was to introduce a flat fee and finally a distance based fee was accepted and put into force in 2001. The level of the HVF was calculated in three steps. The first step was to calculate the uncovered costs of heavy traffic which consist of uncovered road infrastructure costs, air pollution, noise and accidents caused by HGVs. This amounts to 750 million Euros. The second step was to calculate total transport performance which amounts to 47 billion tonne kilometres. The final step was to fix the rate as a ratio. The first step was divided by the second step (750 million Euros / 47 billion tonne-kilometres) to give 1.6 cents per tkm. The fee was introduced in two stages, 1.6 cents/tkm (0.01 Euros) in 2001 and 2.5 cents/tkm (0.016 Euros) in 2005. HGVs with total admissible weight over 3.5 tonnes were taxable. The HVF was calculated by: Rate*Distance travelled in Switzerland*Weight of vehicle*Emissions Factor. Data for calculating the fee is obtained in two ways. Each domestic vehicle is fitted with an On Board Unit

(OBU) which registers kms travelled using a tachograph. OBU also stores admissible weight and emission category. Data is transmitted to the Swiss Customs Authority (SCA) each month for billing. For unequipped vehicles, the fee is registered using an ID card at special terminals for HVF clearance. Data on distance is obtained by the driver submitting actual mileage when entering and leaving the country on a form. When leaving the country, the fee is paid by cash, fuel credit cards or through an account with the SCA. The Impacts of the Swiss HVF so far include an increase of 45% in sales of new HGVs in 2001 as the new vehicles belonged to the lowest and cheapest emission classes, more concentration in the haulier industry, less vehicles on the roads as there was a fall of 5.6% in motorway traffic in 2001 after the introduction of the HVF, and a stable modal split with no significant impact on rail transport performance. In terms of revenue, the gross revenue of the HVF in 2002 was 600 million Euros, the costs were roughly 8% of gross revenue (45 million Euros) and the net income of the HVF was 525 million Euros.

The goal of the German tolling system for HGVs is to improve the modal split and to double railway freight transport. The idea is to have a combination of tolling and public-private-partnership models. Having private operators running the system may ensure cost-effectiveness and consumer friendly behaviour. The operator has to pre-finance the system. The features of the German charge are that it applies to all lorries weighing 12 or more tonnes using German motorways and may subsequently extend to highways, it is based on the number of kilometres travelled, the charge is differentiated by the number of axles, pollutant emission categories, and possibility of differentiation through location and time of use in the future, the toll rate is set by the regulator and the average toll rate is 12.4 cents per kilometre. Revenues generated by the toll will be spent on infrastructure projects for roads, railways and waterways. The benefits of the German charge are believed to be a more precise application of the user pays principle for domestic and foreign road users, fairer competition between roads and railways, additional revenue for the funding of transport infrastructure, more efficient use of transport capacities, additional relief for public budgets by switching from tax funded to user funded infrastructure, and it is an emission related toll which contributes to the protection of the environment.

The British proposal is to introduce the HGV charge in 2006. It is aimed to ensure fairness and efficiency as all road users have to pay at levels which reflect the costs they impose. The charge will try to achieve positive effects on transport and the environment, as it should reflect the costs of climate change, local air quality, road maintenance, safety, traffic congestion and noise. There will be off-setting tax cuts through fuel duty reductions for lorry operators when the charge is introduced. The main characteristics of the charge are that it will apply to lorries weighing over 3.5 tonnes, will apply to all lorry operators (including foreign) using UK roads, will apply on all UK roads with the potential of a different rate for motorways and the potential to vary according to the time of day. It will vary by lorry type in terms of emission category and weight.

The conclusions drawn are that none of these proposals really implement the EC's stated policy of marginal social cost pricing. In each case they rely on some sort of allocation of

total cost to determine the average level of toll. In Switzerland, these costs include environmental costs but not congestion. In Germany, as required by the current and proposed Directive, neither environmental nor congestion costs are taken into account in the overall level of charges, but charges are differentiated according to the pollution category of the vehicle. In Britain, there is no explicit method of calculating the level of the charge, but it will be differentiated by vehicle type (including environmental characteristics) and offset by a reduction in fuel tax, thus maintaining the current overall level of charge. In all cases the use of revenue is tied to the transport sector.

The emerging systems offer the potential for charging which reflects the costs of road use much more accurately, by permitting a charge directly related to kilometres travelled, and which may be differentiated by vehicle type and in time and space. The two main criticisms of it are thus the constraints on the overall levels of charge and the earmarking of revenue to the transport sector. The reasons for these constraints appear to be largely concerned with acceptability, although also perhaps a desire to prevent individual governments from responding to incentives they may have to overcharge HGVs. On balance, it appears likely that all these developments will significantly improve the efficiency with which HGVs are charged for their costs, and thus give better incentives in terms of the types of vehicles used, the times and locations of their use and the competitive conditions between vehicles registered in different countries. But considerable inefficiencies may remain in terms of the overall level and degree of variability of charges and in terms of the way the revenue is used.

2.3 Estimating Infrastructure Costs (Heike Link, German Institute for Economic Research, DE)

Dr Link examined evidence on both total and marginal infrastructure costs. Since the current proposals cap charges on the basis of total costs, both are relevant for policy purposes. On total costs there are a number of issues regarding the appropriate way of measuring capital costs. The consensus is that this should be done by using the perpetual inventory method at current prices, and this is the approach used in the UNITE project. It is still necessary to choose a rate of interest, and practice on this varies a lot between countries, and to allocate the total between heavy goods vehicles and other traffic. To the extent that much of the cost is joint there is no unique scientific way of doing this, and current practice varies greatly between countries.

For the measurement of marginal costs, there are essentially two approaches, the engineering approach and the econometric approach. The engineering approach relies on dividing total cost into fixed and variable elements, and allocating the variable costs in accordance with the most appropriate cost drivers. The resulting average variable cost is used as an approximation to marginal cost. Unfortunately there is no complete consensus on either the division into fixed and variable cost or the correct cost drivers to use to allocate variable cost. Both practice and the resulting cost allocations vary somewhat between countries.

Ideally, the econometric approach would resolve these issues with the use of actual data. Unfortunately, the facts that traffic volumes by different types of vehicle tend to be correlated, and that data for individual stretches of road are very limited, make this approach problematic. The UNITE project obtained data for econometric studies of Austria and Germany and for a mixed econometric/engineering cost study of Sweden, but the results were somewhat contradictory.

It does not seem likely that sufficient data will be forthcoming for the successful use of econometric methods for every country, so a mixture of econometric and engineering approaches may be the best way forward. The econometric approach may give some idea of cost elasticities, which are then transferable using engineering cost data. The UNITE results suggested typical cost elasticities for roads of a little less than one, but with lower elasticities where pavements were particularly strong and/or traffic light. Further research on this issue is needed.

2.4 Estimating External costs (Gunnar Lindberg, Swedish National Road and Transport Research Institute, SE)

Gunnar Lindberg reviewed recent progress in estimating the external costs of road traffic. He explained that whereas the predominant approach in the past had been top down – estimating the total external costs of the country as a whole and allocating them between vehicle types, current methodologies emphasised bottom up approaches. In these approaches detailed modelling produced estimates for individual circumstances. This was much more valuable than top down approaches given that external costs vary a great deal in time and space. However, it left open the question of how far this variation could or should be reflected in prices – how much price differentiation in time and space was worthwhile.

In the case of environmental costs the established methodology now is the impact pathway approach, which models in turn the level of emissions from vehicles, their concentration or deposition in the atmosphere and the consequent damage they do to human health, plants and buildings. These are valued on the basis of willingness to pay studies, for instance in the case of health many studies had investigated the willingness to pay to reduce the risk of death or ill health. Whilst the results remain open to dispute, a much greater degree of consensus about both methods and valuations existed now than a few years ago. In general the bottom up results of more recent studies were to be preferred to the top down results of earlier studies where differences exist.

Also in the case of accidents, much progress had been made in deriving a theoretically correct approach around which a consensus was being built. This approach sees the external cost as the result either of some elements of accident costs being borne by third parties (e.g. police, national health services) or of increases in risk to other road users as a result of additional traffic of a particular type. The so-called risk elasticity (the increased risk of accidents as a result of a one per cent increase in traffic of a particular type) was a central element in estimating external accident costs. On the basis of the best evidence we

have on these elasticities, the external costs of accidents are much smaller than was thought a few years ago. However, more evidence is needed.

In the case of congestion, a major issue is the degree to which pricing will lead to changes in behaviour in terms of time, route, mode or extent of travel, and thus in turn change the external cost of congestion. An experiment with a fleet of instrumented vehicles to charge the actual external cost of congestion was described.

In conclusion, whilst various areas of requirements for further research were identified, it was stated that methods of quantifying external costs had greatly improved in recent years and reasonably reliable estimates could now be made.

2.5 The proposed Directive on HGV charges – A review (Per Kageson)

This paper aims to review the EC's proposed Directive on HGV charges. It was explained that the current Directive acts as a barrier to introducing nation wide kilometre charging schemes therefore an amended Directive is needed. Kageson describes the proposed Directive as 'broader in scope than the current directive in terms of vehicles, roads and cost elements and it provides an improved structure for the differentiation of charges and tolls.'

The paper outlines the background of the current and proposed Directives. It looks into whether the proposed Directive will make it possible for member states to use tolls or charges to internalise the social marginal costs of road transport, and whether the proposed Directive reaches the correct balance between what needs to be regulated at a European level and what should be left to the member states to decide.

Improvements that will be made in the proposed Directive include making kilometre charging possible on motorways, extending coverage to all vehicles above 3.5 tonnes of gross vehicle weight, more comprehensive vehicle categorisation to avoid distortion to competition, inclusion of external costs of accidents, application of the road tolls on the main road network, member states may differentiate toll rates according to environmental sensitivity, population density and accident risk, and the tolls may be extended to apply to the entire national road network. Kageson explains that the weakness of the proposed Directive is that in many cases, member states are restricted in decision-making, where they should be allowed to make their own decisions according to the Treaty's principle of subsidiarity, and the proposed directive may prevent member states from introducing a charging system that fully reflects the social marginal costs of air pollution and congestion. The subsidiarity principle is also violated by forcing member states to use the tolls for recovering fixed costs and to earmark revenues for infrastructure investment. It was argued that the Directive should leave it to the member states to decide on how they want to finance new infrastructure in order to comply with the principle.

Kageson argued that after over ten years of research, there is still no common consensus on the size of road transport externalities, but it is much better understood now than previously. It was believed it was now necessary to start to learn by doing and that 'there

is no risk that a shift from kilometre charging will turn out to be a move from bad to worse'. Current heavy road traffic charging mechanisms were considered to be distorting to trade and competition, and not correctly reflecting the social costs. Therefore improvement of the schemes could be obtained by feedback from experiences with kilometre charging based on social marginal costs. Kageson concluded by claiming that the proposed Directive is an improvement on the current situation but does not fully reflect the ambitions of 1998 White Paper and may lead to inefficiently low charges throughout Europe.

2.6 Inter urban tolls: a toll road operator's viewpoint (Malika Seddi, ASFA, FR)

Seddi, the speaker from ASFA which is the French association of toll road operators, explained that the French toll road network consists of 11 toll road operators covering around 7900 kms. It is a growing economic sector with annual revenue of 5.5 billion Euros and 18,000 permanent staff of which 48% collect the tolls, 30% are operational staff and 22% are administrative staff. There are 525 toll plazas, 4100 toll lanes, and transactions are made by 166 million HGVS and 829 million private cars. It costs around 7.5 million Euros per km to build a motorway on an easy terrain and up to 20 million or more Euros per km to build on a mountain.

It was explained that it was vital for the user to pay for the costs and tolls were seen as important to quickly finance resources. Tolls were regarded as a 'fair tool for the financing of infrastructure' and have many advantages. Tolls enable 7800 kms of roads to be built without tax revenue. It is seen as a fair system as only the users pay, the toll is only used to finance the infrastructure, it is considered to be an efficient source of financing and a solution for sustainable development. Tolls were well accepted by the French people (63% were for the construction of interurban motorways) because they believed it would enable them to achieve a better service. Toll operators pay large amounts of tax which represents income to the state. The fact that the tolls pay for the roads frees up government funds for spending in other areas.

The toll rate for HGVs is less in France at 12 centimes in comparison to other countries such as 70 centimes in Switzerland and 22 centimes in Austria. The French HGVs only pay to use the toll motorway network and not for use of national roads. Seddi explained that a balance is necessary by increasing progressively the HGV tariff on existing toll roads by applying tariff modulation according to the traffic congestion and to reach equilibrium with the non toll road by applying a specific rate based on distance travelled.

Seddi argued that using tolls to finance road infrastructure opens up new opportunities for charging HGVs on national roads as well. This is believed to be consistent with the approach of the European Commission and leads to many benefits such as the integration of external costs of transport, rationalisation of itinerary choices and creation of new resources.

2.7 Discussion

A discussant asked whether earmarking of road use revenue was seen as bad economics, whether it was an important concept and if not, then why have it there? Chris Nash responded by saying that there has been a lot of evidence that when an initial start is made on a reform process, lots of compromises are made. One of the compromises made is probably earmarking revenue and another is to go for something simple. As people get more used to reforms and as they adapt to them, what has already been done becomes more acceptable and further development becomes more feasible. These developments include greater sophistication, and maybe removing some of the constraints such as the constraints on how revenue is used. In the short-run, earmarking may not be seen as a problem if there are lots of good projects to do with the revenue as it helps to get the proposals through, however in the long run, the chances are that it will fade away.

Kageson argued that the issue of public acceptance may sometimes call for earmarking the money (such as in London in the introduction of congestion charging) but it is a different matter to tell the member states that it is mandatory to earmark money, even if they do not need it to secure public support for the scheme. It was argued that it should be left to the member states to decide if they want to earmark revenue in a non-distorted way. If they wanted to, then they should be left to do so however the rest should not be forced to do the same.

An alternative approach to the issue of earmarking revenues was discussed by Braathen to be to make the simultaneous announcement of two different policy measures which are not legally linked. For instance, when introducing a new charging scheme, it could also be announced at the same time that expenditures on building roads or building railways would be increased, without making the formal link. By making the formal link, it was believed that unwanted rigidities in the fiscal system would be introduced, but some of the acceptance benefits would be achieved from an earmarking approach through this combination of announcing at the same time some increase in expenditures.

Freedom of choice of the countries as to what they were going to do was discussed. A discussant said that in many tolls collected such as in Italy, Slovenia and Hungary, a view was that tolls were mainly an instrument of repayment of investment. On the other side infrastructure charges are supposed to be instruments which include external costs. The distinction between these two elements had to be drawn, as to whether charges were based on investment or external costs and the real concepts had to be identified. It was argued that the system of charging should be mixed. The objective of member states is to repay investment, whilst taking into account the externalities. This involves reconciling the two elements.

A discussant asked how comparable are the results in terms of different charge levels? There was the need for the harmonisation of calculation principles and methodology. However it was argued that even if the same methodology is applied for calculating transport externalities, the risk is three times higher for member states with the highest risk per vehicle kilometres than the lowest, and there are differences in maintenance costs and timeatic costs. By necessity, the underlying costs which the charges should be based

on differ even if the same methodology is enforced throughout the entire EU road network.

It has been discussed that the proposal would improve vehicle categorisation, but a criticism from a representative of vehicle manufacturers was that the vehicle categorisation did not appropriately reflect the damage classes. It was asked why it was thought that the classification in the proposal was seen as an improvement? It was argued that categorisation is seen as an essential element. It would not be a good move to have different categorisations for different member states as it would be difficult for member states to adopt. The improvement in the proposed Directive was that it covered all different classes of vehicles according to the emission standards.

It was asked whether we have a consensus on methodology, and whether reaching consensus is enough. It has been said that there is variability and uncertainties in estimating external costs. An issue that was raised was whether it was enough to go from the constraints on the level of charges to only a system with methodology recommendations. High unreliability of estimates is seen as dangerous as these marginal cost estimates can be used as a background for monopolistic pricing. The response was that it was not the issue of uncertainty but more of an issue of bad studies. In reality, costs vary between road types, driver types etc. There is the need for variability to represent the true differences in cost. A statement was made that 'external costs have no basis of fact' which was found to be depressing. The least consensus was on infrastructure costs and there was a lot more consensus on environmental costs, as the methodology was there and there was reasonable consensus on lower bands. On infrastructure cost consensus was not reached even after lots of research. It was stated that the proposed Directive was a good step forward but it may be better if there were no numbers and no methodology, since both are out of date. Work has been done over many years and now there is better understanding of marginal costs in road transport.

Earmarking may be an issue for acceptability by member states. It was argued that member states want to have freedom on how to use revenue from marginal cost pricing of infrastructure. There was the need for transparency of acceptance of the system. People are likely to pay more to use roads which are in a good condition. For earmarking, it was suggested that the objective was to ensure that there is a high level of maintenance for infrastructure. It was seen as important to have clear earmarking just for the roads, otherwise the right level of maintenance for the roads will not be achieved and there will be absence of the capacity which is essential even in the scientific field to reduce congestion costs because otherwise the state will act as a monopolist on the infrastructure and may spend the revenue as they want to. The view that elections will find the right solution was not shared by the discussant as it was believed that long term investments fell short in elections as each politician had a period of five years and nobody had success for the infrastructure as a whole.

It was discussed whether the decrease in motorway traffic due to the charging will lead to movements to other transport networks and improvements in traffic safety that would be needed for other road users such as pedestrians and cyclists. A discussant stated that if

roads are slower and congested, then most vehicles will be willing to pay to stay on the motorways. Long-distance lorries in many cases will be prepared to pay to be able to stay on the main network.

3. Impact of new infrastructure charging regimes

3.1 Environmental taxes and competitiveness (Nils-Axel Braathen, OECD, FR)

The presenter explained that taxes on motor vehicle fuels exist in all OECD and many other countries. These taxes came into use at an early stage, particularly for fiscal reasons. In some countries several different taxes are levied on petrol and diesel. There is sometimes differentiation according to the environmental criteria and there are often lower rates for HGVs and public transport. There are three main categories of motor vehicle taxes; taxes on first-time purchase of vehicles, annual taxes levied on the right to use the vehicle and charges more directly linked to the road use. Motor vehicle taxes are often introduced primarily for fiscal reasons and the categories have environmental impacts and can be environmentally adapted in relation to engine size or power, vehicle weight and CO₂ emissions according to vehicle type certification.

It was explained that competitiveness is an important issue. For an individual business enterprise, competitiveness is primarily seen as the ability to produce products that are either less expensive or better than those of other (domestic or foreign) firms. Application of the concept of competitiveness to industrial sectors or to whole economies was argued to be more controversial. The main reason is that it is necessary to take account of the macroeconomic adjustment mechanisms (such as exchange rate changes) that would be driven by a deteriorating trade balance or rising output prices. Braathen argued that the principle of comparative advantage implies that a country can always trade successfully in some commodity, even if its firms are inefficient or have environmental taxes or regulations, while this is not the case for an individual business enterprise.

The presenter explained that assessing the impact of environmental taxes on competitiveness requires a clear specification of what is the alternative baseline policy against which the impact is being assessed. Two relevant dimensions are the impact on the government budget (is the comparison done on a revenue-neutral basis?) and the impact on the environment (is the comparison between two ways of achieving an equivalent standard of environmental protection?) The competitiveness impacts of taxes applying to HGVs was discussed in terms of direct impacts on road transport companies in different countries, direct impacts on road transport versus other transport modes, and indirect impacts on other sectors and on different regions depending on their transport intensities.

When looking at the impacts on road transport companies, differences between countries in terms of fuel tax rates were believed to be unlikely to have very large impacts on the competitiveness of transport companies involved in international freight, as they will all try to buy their fuel where it is cheapest. Firms involved in international freight could

gain an advantage compared to firms only operating in a high-tax country. Large differences between countries in taxes on the purchase of heavy motor vehicles could have stronger impacts on international competitiveness. However, differences in other taxes of relevance to the transport firms (labour, profits, etc.) could cancel out much of the differences in vehicle costs. It was argued that road user charges based on criteria such as tonne-kilometres driven, location of road use, congestion levels and environmental characteristics of the vehicles would not distort international competitiveness of the firms. Firms using 'clean' vehicles would obtain an advantage, but that would be an intended outcome and not a distortion. Braathen stated that the aim should be to cover marginal social costs, not to charge (foreign) firms for average infrastructure costs. If it was deemed that foreign users should pay 'their share' of infrastructure costs, it was considered to be better to use fixed annual charges for these purposes.

When considering the impacts on road transport versus other transport modes, the presenter explained that in order to achieve a welfare optimum, it was necessary to correct two types of market failure in transport: the under-pricing that follows from the absence of taxes on externalities, and the over-pricing that follows from the absence of transfers to cover fixed costs. These two current deviations from optimal prices were not believed to offset each other as the first was most acute in the case of congested urban roads, and the second was most acute in the case of rail. To correct one without the other would result in a sub-optimal outcome. It was argued that increased taxes or charges on road transport would weaken the competitiveness of this mode compared to rail, air and water transport. Recent ECMT work strongly indicates that such a shift in favour of rail would be welfare enhancing. Optimal prices for using trucks on urban roads were estimated to be around 40% higher in peak periods than the prices prevailing in 2000. Non-taxation of air transport was considered to remain a problem.

Braathen explained that increased road transport taxes or charges would affect other sectors of the economy differently, depending on their road transport intensities. In most cases, road transport costs only constitute a minor share of total costs. Therefore, there are likely to be modest impacts on different sector's competitiveness. Increased charges on road transport in congested or polluted areas in the centre of Europe were believed to cause higher transport costs for firms in peripheral parts of the continent in reaching their markets. It was argued that such cross-border freight should be charged in the same way as local trucks; based on non-discrimination, economic efficiency and environmental effectiveness. On the other hand, charging should be based on marginal social costs, and not be used as a means to recover average infrastructure costs. It was argued that large distances from peripheral regions to the markets represent a real comparative disadvantage that from the perspective of economic efficiency, should not be subsidised away. Transport infrastructure in these regions should instead be improved, if that passes normal cost-benefit analyses and additionally, regional development policies could be applied to address income distribution concerns.

3.2 Regional impacts and peripherality issues (Nils Schneekloth, University of Kiel, DE)

Dr Schneekloth presented results from a computable general equilibrium model of Europe as a whole of the effects of internalising externalities from heavy goods vehicles. The model includes households and firms, products are diversified and there is a tradeable good which is subject to economies of scale, so imperfect competition is present. Both freight and passenger transport costs enter into firms' costs, and affect the location of production. The changes in heavy goods vehicle charges were taken from the RECORDIT project, with a supplementary charge for environmentally sensitive areas.

With no recycling of the revenues, naturally the result of charging heavy goods vehicles their marginal social cost is to reduce GDP and economic welfare. The results across Europe showed considerable variation in the level of reduction with some sign that the core tended to do better and the periphery worse. When these charges were combined with accelerated completion of the Trans European Network proposals, the result remained a negative impact on GDP and welfare with the periphery still tended to disbenefit most. This seems to indicate that the use of revenue is a key issue in terms of whether there are benefits from marginal social cost pricing and that earmarking revenue for use in completion of the Trans European Networks might not be a good thing.

3.3 Trans-Alpine issues (Stefan Suter, ECOPLAN, CH)

The presenter considered the Alps as a sensitive area and looked at the consequences for pricing. The possible criteria to define sensitive areas were said to be through the environment, economy and society. For the environment, it was through the ecological value of the relevant area, exposure of the ecosystem to pollutants and resilience of the ecosystem. For the economy it was through regional economic power, importance of tourism and primary production, the need for protection from natural perils, the importance of the transport network for the economy and the reliability of the transport network. And for society, it was through the benefits of transport for the local population, the importance of the region as a recreation area and the valuation of the area by society.

The Alpine specific costs of road freight transport consisted of infrastructure costs, accident costs and environment costs. Infrastructure costs depend on the road gradients, the weather and climate conditions, and difficult maintenance and reconstruction work. Accident costs depend on road gradients, weather and climate conditions and more serious consequences of accidents. Environmental costs depend on topographical conditions, road gradients, weather and climate conditions, and the severe consequences of damages.

The first estimates of the Alpine-specific mark-up from the PETS Alpine freight case study on marginal costs gave approximately 20% for infrastructure costs, 10% for accident costs and 50% for environmental costs. The mark-up is in total approximately 35%, and without environmental costs, it is 19%.

From the impacts of the new charging regimes, the preliminary conclusions were that there was a need for action, both inside and especially outside the Alps. The impact on

modal split and volume level with the proposed price levels was very limited and negative in the case of Switzerland. The productivity gains and new concepts in rail transport were seen as very important, and additional pricing measures were needed and justified.

The presenter compared ALP-NET results with the new Eurovignette directive. In terms of improving acceptability, not only efficiency issues had to be considered but also equity and participation issues. The role or limits of economic theory in policy making was that there was no expert mechanism, but scientific support to decision making. The ALP-NET results showed that there was a variety of objectives and variety of instruments and policy measures, the objectives had to be set by politics, and pricing and financing instruments were needed. In terms of the role of social marginal cost pricing (SMCP), there were implementation problems with difficult price signals, practicability, effectiveness and efficiency issues and SMCP was an important sign post for differentiation of charges. The Alps and others had to be recognised as sensitive areas and there should be burden limits and not just mark-ups. Cross-financing was regarded as legitimate and useful within well defined rules. It is a distributional as well as efficiency issue and earmarking should not be made exclusive to the transport sector. Cross-financing to rail was argued to maximise the modal shift, and to allow for a greater transfer for a lower price. It was argued that if you wanted to achieve the same transfer without investing the finances in rail, then road prices would have to be much higher, therefore cross-financing may provide a more politically feasible or more sensible way of achieving the goal of a higher modal share for rail. For harmonisation of pricing schemes, Suter explained there should be territoriality and non-discrimination. Harmonisation was needed in cost calculation and there was the need for full cost recovery including environmental costs.

4. Implementation Issues

4.1 Using revenues for cost recovery and cross-financing (Kallistratos Dionelis, ASECAP, BE)

Dionelis explained that transport is a policy instrument. There are three Europes; peripheral, central and new Europe and they all have different priorities. Central Europe wants to use more demand centred transport policy, peripheral Europe wants to use transport as cheaply as possible and new Europe is concerned with how to find the funding to build the infrastructure. ASECAP tries to face these realities and considers the road service as a product. There is somebody that produces and sells the product and there is somebody that that buys this product. The two forces of demand and supply have to find a balance.

The presenter explained that reinvesting the money in the same area is the logic of a functioning fair market. There are many implications of artificially increasing the price of the product, by political or environmental considerations. It has a political and social message, and it aims at a double target. With a higher price, the road product becomes more expensive therefore it is less attractive to consumers and the market decreases. The

consumers will then have to consider other alternatives to road use such as rail. Dionelis said that in the long run, the rail infrastructure will develop using revenues of the road market. It may provide a similar quality of service as the road network at a similar price. However the rail solution has two elements; the rail infrastructure and the rail companies. Questions raised are can the given infrastructure meet the requirements of the customers of the rail companies and can the rail product compete with the road product in terms of quality and price in given areas of Europe? If this cannot be done, the road market will be the winner and will balance again at higher prices given that the transport cost will always affect the final price of the transported product.

Dionelis believes that the consumer will choose the service to use on the basis of quality, and road is considered to have the highest quality. Therefore there will be continuity in high demand for road as consumers are not considered to choose services on the basis of cheaper prices. Dionelis therefore believes cross-financing is not acceptable.

Suter argued that the current situation is vague and this should be clarified. The Swiss people voted in a referendum in favour of cross-financing so it is acceptable. However Dionelis argued there are different democracies around Europe. It may seem that cross-financing means that prices in road services are higher than they should otherwise be. If the money was spent on road, it could be used to invest in decongestion; however some would say that cross-financing leads to lower prices on roads because it facilitates greater transfer to rail so higher prices are not needed for roads to achieve the same decongestion.

4.2 Pricing and efficiency within the road haulage industry: The Road Haulier's Perspective (Wim Smolders, IRU)

Smolders believed that the road haulage sector is seen as efficient. Road pricing is believed to be efficient in theory, but the conditions under which the theory holds must be borne in mind. There are no efficiency gains if there is the same level of congestion but with more cars and fewer HGVs.

Efficiency aspects of pricing were explained in terms of six issues. Firstly for production and trade; smaller distances lead to concentration, there are lower economies of scale, less international economic integration and more isolated areas. Secondly, for transport efficiency, in theory there are less congested roads which lead to higher transport speeds. Marginal road transport demand disappears and there is rerouting, diversion effects, reallocation of activities and faster depreciation of fleet. Thirdly, road traffic. It was argued that if you promote safety, decongestion and cleaner vehicles, this cannot be done by just charging for lorries. Just charging for lorries may make them heavier. Research on the ratio between new registrations in countries with tolls and without tolls showed that there were more LGVs in countries with tolls which is in conflict to the European Commission's view. Fourthly, the pricing and payment methods need to take account of the commission's proposal, national industrial policy, enforcement costs and the system's own costs. Fifth is who should pick up the bill? Is it just the haulier's problem, or should industry guidelines be developed or should the state intervene to facilitate

implementation? And finally, where is the quid pro quo? This relates to issues such as the use to which the money is put to. People want better roads with more dedicated lanes and more environmental incentives for the transport industry. It was argued that why not put an end to lorry bans? Some countries force lorries to drive at the most congested times as lorries are banned at night time and the weekend. A distinction may be needed to be made between professional diesel and non-haulage related diesel if compensatory reductions in tax on diesel are made.

5. Round Table Discussion

A discussant explained that correct road pricing may address central road pricing problems. If externalities related to transport in central Europe are corrected (based on marginal social cost pricing), then central Europe should lower their transport activities. Peripheral areas should not specialise in activities that are transport intensive.

A question was raised about what do we do about the transportation costs as a final element factor of the total final price? If transport costs increase by 100%, and if these transport costs are just a small percentage of the final price, this will have no effect on demand. Won't this encourage monopoly pricing of infrastructure?

Nash explained that previously in IMPRINT seminars, it had been discussed whether there was the need for a road regulator, and whether an independent regulator would give the road transport industry more confidence in pricing and use of revenue etc. In a way, the draft Directive was thought to introduce such an independent body which oversees how the money is used. There is a lot of debate on how the revenue should be used. Understanding how the money is used is not an easy task because governments are putting a lot of money into road infrastructure, rail infrastructure etc and you need to know whether this is additional spending. It was seen as important to know what governments would have spent anyway in different sectors as there was always the fear that the funding that may have been earmarked for transport infrastructure was actually used as a way of enabling governments to withdraw some of the funding they would have otherwise provided. The question raised was whether this supposed independent body which aimed to look at how revenue was used was seen as necessary for giving some comfort about the system or was it really too difficult?

Transport was said to be a matter for society as a whole. The state has to think carefully about policy and what it wants to achieve. If this responsibility is given to the regulator, the state has to ensure that regulators play fairly and respect the rules and pay attention to the priorities. If they can do this, it may then be feasible to have a regulator. It was believed that these independent regulators in each country should have to meet the European regulator which regulates them, but the issue is where does the regulation stop? There may be lots of independent regulators and the regulator may be an independent body safeguarding the rules of the game but not actually making policy. If the regulator prioritises certain issues, it may go too far. There may be some useful tasks for an independent body as a body is needed to supervise parliament's usage of public money.

However Parliament should be responsible anyway for public money, and there is criticism of having some kind of independent body which tries to over-ride decisions made by parliament. Such a body may not turn out to be so independent and would be a focus point of lobbying activities from the transport sector, car user sectors etc. it would not necessarily represent all interests of the country in an equal and fair way.

6. Conclusion

The workshop was concluded by final comments from Chris Nash. It was explained that the proposed Directive helped to focus minds and it was believed by nearly everybody to be a good step forward. It was discussed that we are now in a position where the existing Eurovignette Directive acts as a barrier. There are lots of people wanting to do things such as kilometre based charges and many of these are ruled out by the existing directive. To that extent, the faster the proposed Directive becomes law, the better. Although it is seen as to fall a long way short of the ideal, it is very difficult to judge what the ideal actually is.

It may be easy to argue between the ideal versus the good. What really matters is how far those departures from the ideal really cause big problems in terms of distortions, such as loss of benefits. The Directive has a lot of constraints such as constraints on the ceiling of charges, differentiation, the way revenue is used etc. What really matters is how big the losses that those constraints lead to are, and this is unknown.

Another issue is that on the whole, it is believed that giving appropriate incentives regarding the type of vehicles to use, the way to use them, where to use them and when to use them will generate more benefits than giving appropriate incentives via the absolute level of charges (demand for road haulage is inelastic, and that transport charges on average are a small part of the final delivered price of the product) and the issue of a level playing field between road and rail. In Britain in 2000, the road hauliers blockaded oil refineries in protest of fuel prices due to fuel taxation. The government's substantial reduction in taxes to HGVs led to privatised rail freight having financial problems therefore they had to subsidise them as a second best measure.

On the other hand, there has been a lot of debate on cross-financing. The concept of the use of revenue is seen as very important. Marginal social cost pricing does lead to some specific worries. In simple models, marginal social cost pricing should yield enough benefits to be able to compensate any losers and still leave a net benefit. In practice however, it is more complicated. For the issue of cars and light vehicles, research suggests that we can get some benefit from appropriate pricing of HGVs even if we do not price cars and light vehicles appropriately. But there is a lot of sympathy with it being unfair and inefficient to correct prices for some of the users and do nothing about the rest. This leaves a real dilemma for the Commission; do they say that they have to become active on the charges for the private car as well and will the Council of Ministers agree that, or do they say that they can do nothing about commercial transport and they have to leave it all to the member states. How do you get that right?

There is the issue of peripherality. More efficient pricing was believed to push up prices more in the core countries that are more congested and actually makes them push it down in the more peripheral regions, but nevertheless this seminar confirms the worry that more efficient pricing may be relatively damaging to peripheral regions. If that is so, the answer is not to abandon more efficient pricing; the answer may be to find other ways of compensating peripheral regions. The standard result that marginal social cost pricing can benefit everyone may not necessarily hold when you have economies of scale and imperfect competition. This may be something that needs further investigation. With regard to the issue of sensitive regions, there are all sorts of factors, in areas such as the Alps, which mean that the usual measurement of marginal environmental costs leaves a lot of costs out; this is an issue which needs tackling. If prices are totally wrong, this will make everything worse rather than better. It is seen as unfortunate that the Alps are major transit countries, as there is the continued fear that transit countries may have an incentive to exaggerate social costs by charging pricing prices that are too high for their own benefit to the detriment of Europe as a whole. With the whole issue of subsidiarity, if it is all left up to individual member states, they may have an incentive to do things which are good for them but bad for Europe as a whole. A move to more efficient pricing and compensating losers may benefit everyone.

On conclusion, a question was raised is the new Directive a step on the implementation path to marginal social cost pricing or is the new Directive a new direction? It appears to be on the implementation path of the 1998 White Paper on infrastructure charges. The new step may be a case of compromise on the grounds of acceptability. We have to wait and see and are unsure about the end outcome.

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