

Pricing Workshop

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Recent Developments in Road Pricing Policies in Western Europe

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The purpose of this short paper is to take a first look at the way recent developments in systems of taxes and charges for road transport relate to the aims of charging reform pursued by the European Union and more generally by European governments and in academic circles.

The accounts produced by the EC UNITE research program provide a starting point for a quantitative comparison of tax changes in relation to the marginal costs of infrastructure use and the total costs of infrastructure provision¹. Work underway for the ECMT to model an optimal scenario for transport charges and compare this to current taxes should further inform debate when results become available early next year.

New Charges and Planned Changes to Charging Systems

The most significant changes to charging systems currently concern heavy goods vehicles. This is also the sector where the response to incentives for efficiency generated by changes in charging systems is likely to be greatest, given the interest of hauliers in controlling costs and the capacity of logistics companies to adjust operations to changing cost structures.

The introduction of the Heavy Vehicle Fee in Switzerland has had a major impact on the freight transport market - described in detail in Ueli Balmer's paper for this Workshop.

The Eurovignette time based charge (fixed charge in Belgium) will be replaced by an electronic distance based charge in Germany under current government plans in 2003. Probably based on satellite tracking technology. The Netherlands, Belgium and Sweden are looking at the desirability of adopting similar systems to replace the Eurovignette.

The Czech Republic has announced it plans to adopt the German system or an equivalent interoperable system.

Austria plans to introduce a similar system in 2003/4 based on dedicated short wave radio road side technology.

¹ See website <http://www.its.leeds.ac.uk/projects/unite/>

The UK Treasury announced in the 2002 national budget that it plans to introduce a class differentiated distance based truck charge in 2004 with an offsetting reduction in VED (annual vehicle tax).

Dutch congestion charging plans are once again in suspension with the recent change of government.

Most other recent developments concern local charging schemes, congestion charging on motorway segments and cordon charges for city centre access in Rome and London.

Truck charges

Swiss HVF truck km charge	Introduced in January 2001. Differentiated by vehicle class (env/wear and tear) Partial compensating reduction in fixed charges. Earmarking of revenues to rail.
German truck km charge	Planned for 2003. Probably to incorporate satellite tracking. Average Euro 0.15/v-km raising Euro 3.4 billion/yr. ² Differentiated by vehicle class (env/wear and tear), To replace Eurovignette at a slightly higher level, with no further compensating reductions in other charges. No binding earmarking of revenues though much will go to transport bottlenecks, including on the railways.
UK truck km charge	Planned for 2004. To be differentiated by vehicle class (env/wear and tear). Fully compensating reduction of fixed charge (VED). No earmarking of revenues.

Congestion charges

French tolls	Paris-Lille A1 motorway (since 1992) and Paris-south west A10/A11 (since 1996) peak smoothing congestion charging, 3 tariff bands on holidays and Sunday afternoons (most trucks generally excluded from motorways in these periods).
UK M6Toll Motorway	27 mile bypass around Birmingham due to open early 2004. Operator is free to set tolls as they wish to recover total costs and avoid congestion. Charges to be announced mid 2003 may vary by time period if operator so decides.
Norwegian cordon pricing	Flat fee cordon for entry to several cities but differentiation for congestion management under consideration
London cordon pricing	From February 2003, £5 (Euro 7.8) / day, no differentiation Earmarking of revenues to busses. Residents & commercial vehicles exempt.
Rome cordon pricing	Since 2001, Euro 320 per year (Euro 1.2/ day) flat fee. Enforced during working days (morning peak to 5pm) only. No differentiation by vehicle class. Residents free. 45% discount for owners of public transport pass.

² Figures quoted from Transport Minister Kurt Bodewig, in an interview with Mercedes-Benz Transport Magazine in the second quarter of 2002.

EU Road Transport Pricing Policy

Most European transport economists believe that current systems of taxes and charges for road transport are deficient in that they do not reflect the marginal social costs of using road infrastructure.

The European Commission accepts this position and has promoted it through green and white papers, and already one directive, with growing acceptance in the other institutions of the Union.

- the 1995 Green Paper *Towards Fair and Efficient Pricing in Transport*;
- the 1998 White Paper *Fair Payment for Infrastructure Use: A phased approach to a common transport infrastructure charging framework for the European Union*;
- Directive 2001/14/EC *on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification*;
- the 2001 White Paper *European transport policy for 2010: time to decide*;

The European Commission seeks to promote principles for pricing that can be applied to all modes of transport and proposes short run marginal social costs — road wear and tear, short run environmental costs, external accident costs and congestion — as the appropriate basis for charges in an optimal system of transport taxes and charges. Fiscal reform should therefore move in this direction.

The Commission and Parliament are also concerned with raising increased revenues from road transport to fund investments in key road and rail links for the single market, and particularly for transit through the Alps.

These imperatives for reforming transport tax and charging systems will be given comprehensive legal form in the draft Framework Directive to be presented by the Commission in autumn 2002.

The rail infrastructure directive 2001/14/EC already takes short run marginal costs as the basis for charging, with social elements (environment charges) to be included on an optional basis and the addition of elements to cover long run infrastructure costs allowed on a case by case basis. The new framework directive is likely to follow a similar course, promoting short run marginal social costs as the basis for pricing, with mark ups provided for, though it will be for daughter directives, similar to 2001/14/EC, to set operational rules.

Optimal Charging Systems

An optimal transport pricing system, as described in *Efficient Transport Charges and Taxes, ECMT 2000*, would see a set of charges that resulted in road users being charged close to the moment of using the roads through charges that give clear signals of the marginal social costs imposed. The approach recommended by the ECMT (*Resolution 2000/3 on Charges and Taxes for Transport*³) for moving to more efficient systems of charges is to favour the development of territorial based variable charges (electronic km charges and variable tolls) to gradually replace flat rate national charges such as annual vehicle taxes. This also has benefits for avoiding potential international distortions in the competitiveness of haulage industries.

There would also be benefits if part of fuel taxation could be replaced by electronic distance charges differentiated by location. The predominance of fuel tax (which does not lend itself to differentiation by location within national borders) in current transport taxes probably results

³ See website www.oecd.org/cem/

in overcharging for the use of uncongested roads in some countries, penalising rural economies in particular.

For trucks the best instrument for reflecting road wear and many environmental costs is probably an electronic km charge differentiated according to vehicle characteristics and by type and location of road segment. Tolls can be differentiated in a similar fashion but can only be applied to selected parts of the road network. Both can be differentiated by time period to manage congestion.

CO₂ emissions will always be best charged for through fuel taxes, for all vehicles.

For cars electronic km charges may eventually prove efficient but the costs may be prohibitive in the short term given the number of vehicles to be monitored. Fuel taxes are the most readily available substitute for variable charges, complemented by differentiated fixed charges to provide environmental incentives.

Congestion costs will determine the point at which distance based pricing for cars becomes efficient. In the short term, limited congestion pricing in areas where congestion is most severe, on particular road sections and for access to some city centres might prove effective through variable tolls on motorways, cordon pricing and perhaps local network electronic distance charges.

In relation to accident costs, insurance probably provides the most efficient tool and is already used to cover part of the full costs. However, including an element to cover external accident costs in electronic km charges, where they are introduced, might prove useful, given the numbers of drivers that currently fail to ensure vehicles. It could also be useful in countries where transit traffic is a major part of truck traffic. For example in Germany taxes on vehicle insurance are designed to raise revenues to pay for emergency and hospital services related to road accidents. As the insurance applies only to trucks registered in Germany, foreign vehicles make no contribution to the tax.

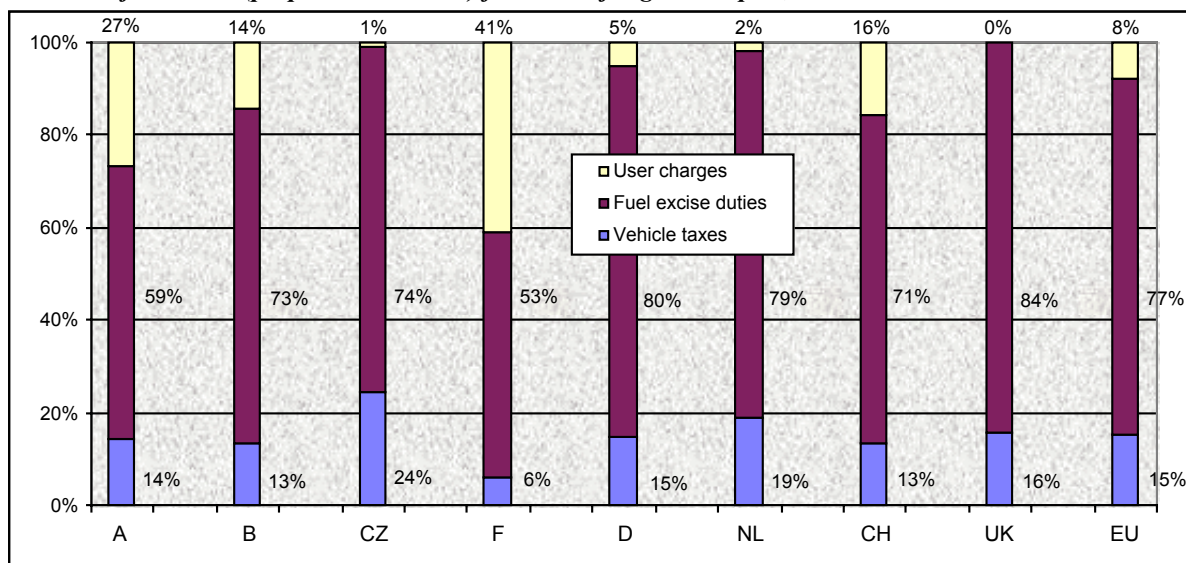
There is no case on efficiency grounds, at least from a narrow transport sector perspective, for taxes on fuels above levels that charge for the short run social costs of road use (though ease of collection is an argument for fuel tax in its own right especially in countries where other taxes are difficult to collect). Fuel taxes, which account for the bulk of current transport tax revenues (see figure 1) should therefore be expected to be reduced when new pricing instruments are introduced at levels that begin significantly to reflect marginal social costs.

Variabilisation of charges - replacing fixed charges with variable charges - is appropriate to the extent that marginal costs are not reflected in charging systems. But since fuel tax (a variable charge) accounts for such a large part of transport tax revenues, it will probably be more appropriate for new variable charges to replace part of fuel taxes rather than fixed charges, at least in countries where total social costs and total revenues are close to equilibrium.

There can be a remaining role for fixed infrastructure charges, since a large part of infrastructure costs are fixed. Where governments wish to cover total infrastructure costs in situations where marginal social costs fall below average costs (e.g. on the railways, or on roads in the absence of congestion) fixed charges are the best instrument for cost recovery.

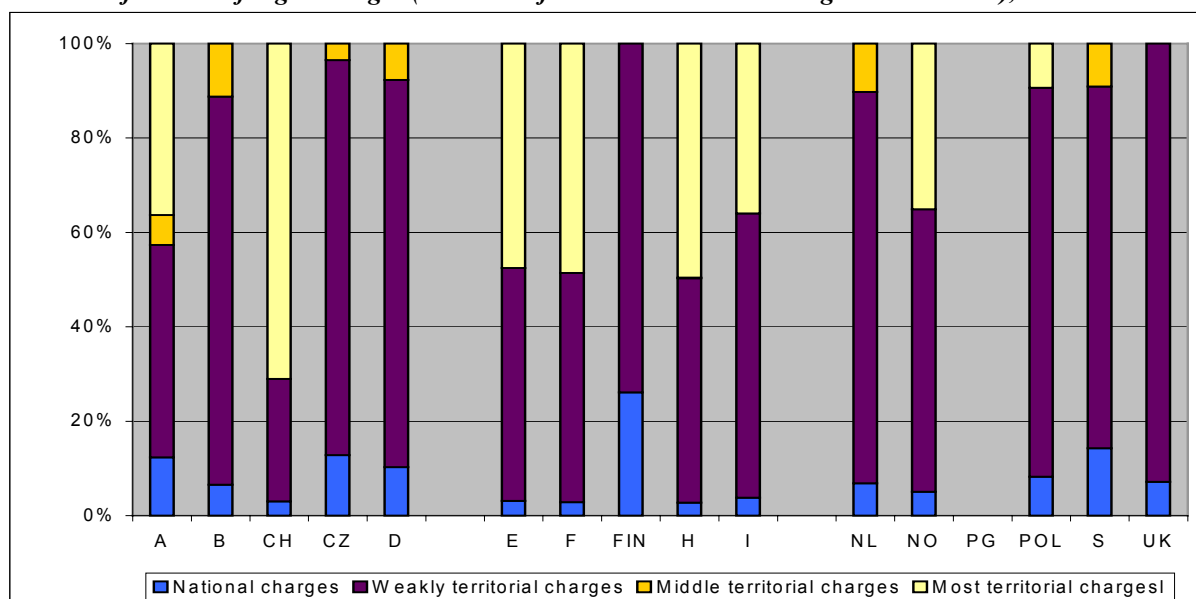
Figure 1. Structure of Road Freight Charges

Structure of revenues (proportional shares) from road freight transport, 1998.



Source: *Efficient Transport Taxes and Charges, ECMT 2000.*

Structure of net road freight charges (calculated for standard domestic long distance hauls), 2001.



Source: *ECMT work in progress.*

Relation of recent pricing reforms to EU policy and optimal charging structures

Table 1 summarises the taxes and charges applicable to road haulage in a selection of European countries in 2001. A quantitative feel for the significance of these charges is given by the UNITE research program. So far UNITE has published accounts for Switzerland and Germany on its website <http://www.its.leeds.ac.uk/projects/unite/> giving figures for road costs and revenues from different categories of charge for all road vehicles combined. UNITE also provides figures for the allocation of total costs between different vehicle categories although it makes no attempt to allocate variable costs. Comparing these figures allows a number of

preliminary observations to be made about the contribution of some of the tax changes covered above to the aims of EU transport policy.

Swiss HVF

The introduction of the HVF marks a complete change in Swiss road charging policy. The level of the charge was the subject of negotiation with the European Union and was initially calculated on the basis of covering social costs (in combination with fuel and other applicable taxes).

With the introduction of the HVF on 1st January 2001, the previous flat-rate vignette system was replaced with a distance charge. As before, vehicles with a total authorised weight of more than 3.5 tonnes are liable to the charge. The charge is worked out on the basis of three factors:

- the number of kilometres covered on Swiss territory
- the total authorised weight (towing vehicle plus trailer), in other words the full charge is imposed even for empty runs
- vehicle emissions (assigned to one of three categories)

To calculate the charge, the number of tonne-kilometres (distance covered x total authorised weight) is multiplied by the pricing rate, ranging from 1.42 to 2 Swiss centimes, depending on the Euro 0-III emissions category of the vehicle.

The introduction of the HVF was accompanied by an increase in the total authorised weight from 28 to 34 tonnes. In a second stage in 2005, the pricing rate will be raised to an average of 2.5 Swiss centimes and the total authorised weight will be increased to the normal European limit of 40 tonnes. A quota is applied in the period from 2001 to 2005 to provide for the authorisation of trips by 40 tonne vehicles (the quota was not fully taken up in 2001). A second quota is available to hauliers carrying light goods or making "empty" trips.

The average charge for transiting Switzerland from Basle to Chiasso will rise to SFr 325 in 2008, a level close to the current cost in motorway tolls of travelling from Basle to Italy through France via the Frejus pass.

On the basis of interim findings from monitoring by Swiss authorities in conjunction with the EC DESIRE project it was possible to draw three provisional conclusions in mid 2002 (see: *National Policies for Shifting Freight from Road to Rail*, ECMT Website www.oecd.org/cem/ forthcoming) or *Fair and Efficient* at the Swiss Federal Office for Spatial Development web site <http://www.are.admin.ch/are/de/verkehr/lsva/index.html> .

- With the introduction of the HVF the trend for a steady increase in vehicle-kilometres travelled by heavy goods vehicles through Switzerland has been broken, at least temporarily. In comparison to the previous trend, vehicle-kilometres fell by around 8 % in the first seven months of 2001;
- This effect can be ascribed chiefly to an increase in efficiency in the road haulage sector. An essential contribution to this must have been made by the improvements in logistics and better utilisation of vehicles;
- The HVF has encouraged the trend towards low-emission vehicles.

This impact has been achieved as the change in taxation made in 2001 was large. The HVF is very roughly of the order of 20 times larger than the flat rate fee it replaced, and at the same time the raising of the weight limit from 28 to 40 tons offers substantial productivity gains in the future. The HVF is now a larger element in the charges paid by large trucks per vkm than fuel taxes, and Switzerland has diesel taxes at the upper end of the range in Europe.

The UNITE accounts suggest that in 2005 revenues from the HVF will be equivalent to around half of the variable costs of roads in Switzerland (applying the German split for fixed and variable costs), though no indication of what part should be allocated to trucks is given. Figure 1 shows that the new charge greatly increases the share of variable charges compared to fixed charges applied to trucks.

The HVF is differentiated according to the environmental class of vehicles, Euro 0-III, but is not levied in a way that differs with location according to environmental sensitivity. Similarly it is not differentiated with respect to accident risks (e.g. by location or class of road) or congestion.

Overall the HVF is the most significant step towards more efficient systems of charging for the use of roads so far taken or in preparation in Europe. The charge equates to nearly three times the fuel tax incurred when running a fully loaded 40t truck. In comparison, road tolls for trucks in France or Spain cost roughly the same as the tax due on the fuel consumed if one assumes a truck uses motorways for half of the distance driven, (an all motorway journey would imply tolls totalling twice the fuel tax paid).

In the wider Swiss context, truck charges account for a small part of road transport revenues compared to cars, and the impact of the HVF is rather lost in the overall UNITE accounts.

German km charge

Similar to the Swiss HVF, the German electronic truck km charge will replace a flat rate vignette, with the aim of improving the efficiency with which hauliers use the road network. Its other prime aim is to secure more equitable treatment of domestic and foreign registered trucks than is the case with the Eurovignette.

The details of the system are still to be finalised but introduction of the new charge was approved by both chambers of parliament in March 2002. The current Minister estimates the charge to average Euro 0.15 per v-km (one third the rate of the Swiss HVF) differentiated by environmental class of vehicle. He estimates annual revenues of Euro 3.4 billion (50% more than the figure used in the UNITE accounts).

Partial earmarking of the revenues to a national transport bottleneck relief program has been announced by the Government and the Minister of Finance has announced that there will be no offsetting reduction of fuel taxes or other charges, beyond replacement of the Eurovignette. Hauliers had lobbied for a reduction in respect of the ecology tax levied on fuel and programmed to increase year on year. Lobbying was also fuelled by the high German taxes on the insurance hauliers pay on vehicles and goods carried, designed to cover emergency and hospital services related to road accidents.

The technical aspects of collection are the subject of a commercial tender, and there is a currently a court challenge to the legality of the tender awarded. The system selected will, however, probably incorporate satellite tracking technology, allowing for spatial variation of charging at a later stage. The parliamentary elections in Germany in autumn 2002 may also have a bearing on the final details of the scheme.

There is also an outstanding issue of whether the charge will apply to the whole road network or only to motorways, and if the latter, as seems likely, how the potential of a major diversion of trucks to secondary roads will be guarded against.

The impact of the new charge, as currently envisaged, will be less than in Switzerland, due to the difference in level of charges and also to the change in loaded vehicle weight that accompanies the Swiss scheme.

Cost recovery, is an important additional policy objective in Germany, and the new charge will play a significant role, covering around 17% of costs allocated to trucks according to UNITE accounts, and possibly as much as 25% according to revenues expected by Minister Bodewig.

UK km charge

The British Government announced its intention to introduce an electronic truck km charge in 2005 in a statement accompanying the 2002 national budget. One motivation is to ensure foreign registered trucks contribute more to taxation in the road haulage sector. The system is expected to incorporate satellite tracking and charge according to route as well as distance. The initial level of the charge will however, be relatively modest, as the statement included a commitment to introduce an offsetting reduction in Vehicle Excise Duty, the fixed annual vehicle tax. VED was reduced sharply in 2001 to levels similar to those applied in Germany and Switzerland. It now accounts for under 10% of tax revenues from haulage against over 90% from fuel tax.

Congestion charges

Truck km charges

In order to be able to have a major impact on congestion, the UK km charge would need to offset some of the duty on diesel as well as part of vehicle excise duty.

Though none of the truck km charges introduced or planned are designed to manage congestion, the expected incorporation of satellite tracking systems in Germany and the UK make this feasible in future phases of development.

Congestion charging is very much the coming issue for the Swiss HVF and other electronic truck km charges as recent studies tend to estimate congestion costs as higher than external accident or environmental costs, at least for countries. The UNITE accounts, for example, estimate future congestion costs for Germany at five times the level of variable infrastructure costs (and approaching the level of variable and fixed infrastructure costs combined). Despite the low number of trucks versus cars in total traffic, their marginal impact on congestion can be large in many situations. Their speed and acceleration characteristics mean that an additional truck on a motorway nearing saturation is associated with much more congestion than an additional car (the French Laboratoire d'Economie des Transports uses a congestion equivalence factor of 6 cars for one truck on average).

Motorway tolls

Motorway tolls also offer the potential for differentiation by time period to manage congestion. The EC EUROTOLL research project examined their capacity to influence demand in the short term through a number of experiments and modeling exercises.⁴ The experiments all concerned French motorways. Peak congestion smoothing tolls have been applied since 1992 to the A1 motorway approaching Paris from the north (note there are no tolls on motorway sections in and around cities with one exception in Paris, the A14). On Sunday afternoons and national holidays there are three charging bands designed to smooth the peak in car traffic returning from weekend and holiday trips. Trucks are not affected as most categories are banned from using French motorways from 10pm on Saturdays until 10pm on Sundays. A similar scheme has applied to the A10/A11 motorway approaching Paris from the south west since 1996.

The impact of the tolls, monitored by EUROTOLL, was a 4.4% reduction in the peak traffic on the A1 motorway and a 12% spread in the peak on the second motorway. The peak traffic

⁴ Seereport by Lionel Clement in *Tolls on Interurban Road Infrastructure*, Round Table 118, ECMT Paris 2002.

reductions were brought about almost entirely by changes in departure times, and in neither case were journeys prevented or traffic diverted to other routes to any significant degree. It should be noted that these changes were possible because severe congestion was limited to peak periods and not a permanent feature of the roads in question.

France has also applied differential toll rates to parallel routes in two cases, the A6 and new A5 motorways connecting Paris and Lyon, and the A7 and new A75 offering alternative routes for holiday traffic from Paris to the south of France. The new, less direct routes are tolled at lower rates encouraging rerouting of traffic to relieve motorways congested during holiday departure periods. Between 15 and 20% of the users that could change to the A5 were found to have used the new roads as a result of the difference in tolls. Between 25 and 37% (depending on period) of users able to switch routes used the A75 during the period when it was toll free. In both cases there were reductions in the number of peak congestion periods.

None of the experiments with differentiated tolls examined in the EURO TOLL program were able to assess the potential long term impact of charging for congestion on chronically congested roads where alternative routes are not available.

Another instructive experiment with congestion tolling is expected in the UK, where the country's first tolled motorway will open in 2004. The road is being built to provide an alternative route for through traffic to the heavily congested part of the M6 motorway that passes through Birmingham. As well as serving the country's second city the M6 links London to the large industrial centres and conurbations of the north west centred on Manchester.

The new road is being built with private finance by Midland Expressway Ltd who have a concession to operate the motorway for 50 years. The company has complete freedom over the setting of tolls on the road. The rationale behind the concession is that because the road will be in competition with a parallel free-to-use motorway, then Midland Expressway should be free to set tolls at such a level that they keep the route uncongested and recover their costs as they see fit. The company will announce the charges to be applied 6 months before opening of the road, currently planned for early 2004.

Cordon pricing

The Norwegian Ministry of Transport is currently reviewing the cordon pricing systems for entry to a number of cities to assess the potential and desirability of modulating tariffs to manage congestion. Cordon pricing was introduced in order to generate revenues to cover the cost of heavy road investments (often tunnels), and the use of pricing signals to manage demand would be a major change in policy in an area where public opinion is highly sensitive.

The other prime example of cordon pricing is in Rome, where electronic fee collection gates have been in operation for entry into the historic centre since October 2001. The main impact of the system has been to enforce pre-existing regulations limiting the entry of vehicles to the centre. Enforcement of the limitations has improved dramatically with illegal entry dropping from 36% to 18%. The system is not calibrated ideally for congestion management. It applies from 6am to 5pm. The charge has been a major impact on the morning traffic peak with traffic 20% lower in November 2001 compared to November 2000. In the evening peak, from 5pm to 8pm, traffic is only very slightly down. Increased congestion through diversion of traffic has only been reported on one quadrant of the trunk routes just outside the cordon. Outside the cordon traffic has otherwise remained unchanged.⁵

⁵ See EC PROGRESS project 2000-CM.10390, *City of Rome Schemes*, Sta spa - Mobility Agency of the City of Rome.

The Rome experience asks as many questions as it provides answers. The level of charge, Euro 1.2 per day, applied as an annual lump sum has certainly proved effective in changing travel behaviour, in the limited area of the historic centre. Traffic levels in the city as a whole, however, have been little affected and little can be concluded about the potential impact of a city wide charging scheme.

London will see a much larger cordon pricing charge, Euro 7.8 per day, introduced for access into the central areas of the city from February 2003. The charge will apply from 7am to 6.30pm Monday to Friday and its purpose is to reduce congestion and emissions and raise money for investment in public transport (especially buses). Levying and enforcement will be similar to the Rome scheme with electronic gates and video surveillance, but the fee will be payable on a daily basis. The design of the scheme is simple. More targeted schemes, with differentiated charges and including congested radial access routes to the centre were considered but rejected in order to avoid delay in the introduction of charges. Many vehicles were exempted from the scheme in order to secure acceptance, especially commercial vehicles that make up a large part of central London's traffic. Monitoring of the results will, however, yield valuable information on the potential for cordon pricing to manage congestion because the area of application is large and covers a large number of business locations that generate a significant part of overall transport demand.⁶

Conclusions

The Swiss HVF and the truck km charges planned in Germany, Austria and the UK, and under consideration for the other Eurovignette zone countries Austria and the Czech Republic, are significant steps towards creating systems of road transport charges that better reflect the social marginal costs of infrastructure use. They fit well with the goals of the European Commission, to be formalised in the Framework Pricing Directive, and with the ECMT Resolution on Charges and Taxes in Transport.

Although the revenues associated with the Swiss and German truck km charges are small compared with the overall social marginal costs of road use, they are significant in relation to the costs that can be allocated to trucks, to the extent that cost allocation methods have been established⁷. For transit through Switzerland of a 40t truck, the new Swiss heavy vehicle fee equates roughly with the tax payable on the fuel used for the trip.

The new truck km charges have the advantage of being a variable charge that is differentiated according to environmental performance (at least to design standards) of vehicles. Fuel taxes, the main type of variable charge available, can not be differentiated in this way.

The German and UK systems, as currently conceived, have the advantage of incorporating satellite tracking technology which opens the way for charges to be differentiated by time period and location, making spatially differentiated charging for externalities possible across the road network.

The km charges could be developed to partially substitute for fuel taxes, enabling charges to be linked to costs (generally lower in rural areas and higher in urban areas) without the loss of

⁶ See <http://www.cclondon.com/WebCenterBranded/StaticPages/index.htm>

⁷ The accounts being produced by the EC UNITE research program provide a starting point for a quantitative comparison of tax changes and policies in relation to the marginal costs of infrastructure use and the total costs of infrastructure provision. The accounts could usefully be developed further to provide a basis for drawing firmer conclusions in relation to different groups of road user, starting with a split between cars and trucks.

revenues or erosion of the variable part of overall transport charges that fuel tax cuts on their own entail.

Spatially and temporally differentiated km charges would also be an ideal approach to congestion charging. The introduction of the German and UK truck km charges will bring the possibility of managing congestion through charging across the whole road network much closer.

Experience with congestion tolling on motorways demonstrates that in the short term large impacts on congestion peaks can be achieved through peak spreading. Where parallel routes are created, differentiated tolls can also have a strong effect in moving traffic to the less congested route. However, none of the modulated motorway tolls in place, or planned with certainty, test the impact of congestion pricing on chronically congested roads where alternative routes are not available. The potential impact of such tolls on long term welfare therefore remains a subject for modeling rather than observation.

Experience with cordon pricing is also for the moment too limited to be conclusive — the area inside the Rome cordon is too small to have a major impact on traffic across the whole city. The London cordon pricing system to begin operation in February 2003 will prove much more instructive.

Table 1: Taxes and other charges on road haulage (40t 5 axle articulated trucks) in some European countries (in Euros), 2001

Charges	Type	Countries														
		A	B	CH	CZ	D	E	F	Fin	H	I	NL	NO	PL	S	UK
Vehicle tax, €/year	Tax	2747	818	2063	1300	1881 E1	600 incl. bus. tax	707 Axle tax	3225	642	697	940	1177 incl. env. tax	910	2202	2008'
Fuel duties €/l (diesel)	Excise duty	0.28	0.29	0.51	0.24	0.42	0.27	0.38	0.26	0.31	0.38	0.33	0.34	0.26	0.18	0.74
Add. Environ. taxes €/l	Ecotax	—	—	—	—	—	—	—	0.0003	—	—	0.02	0.06	—	0.18	—
Eurovignette €/year	Flat rate basis	—	1400*	—	—	1400	—	—	—	—	—	1400	—	—	1400	—
Other vignettes €/yr		1400 StraBA**	—	***	354	—	—	598°	—	—	—	—	—	—	—	—
Tolls (highways), €/km (mean)	Distance pricing	—	—	—	—	—	0.16	0.18	—	0.19	0.10	—	0.12 urban	0.02	—	—
Tunnels, passes, bridges, €/single case		109 Brenner	—	112 Gd Saint Bernard	—	—	20 Cadi	143 Mt Blanc	—	—	—	—	—	—	—	—
User charges as €/v-km	Distance + weight pricing	—	—	0.44 HVF°°	—	—	—	—	—	—	—	—	—	—	—	—
VAT on diesel (%)	Tax	20	21	7.6	22	16	16	19.6	22	25	20	19	24	22	25	17.5
VAT on tolls (%)		—	—	—	—	—	16	6 no refund	—	12	n.a.	—	n.a.	7	—	—
VAT refunds	Refund	✓	✓	✓	✓°°°	✓	✓	✓ diesel only	✓	✓	✓	✓	✓	✓	✓	✓
Rebates	Discount	—	—	—	✓	—	—	✓ axle tax	—	—	✓ Toll refund	—	—	—	—	—

* Obligatory yearly vignette for vehicles registered in Belgium.

** Euro I Category.

*** former RTPL was replaced in 2001 by a distance-weight related charge (HVF, see below).

° In the case the axle tax does not apply.

°° 40 t, Euro I Category.

°°° No refund for CZ trucks when hauling abroad.

' 6 axle trucks (76% of 40t artics), trucks with fewer axles attract much higher rates of VED.

Table 2: *Relation of recent pricing reforms to EU policy and optimal charging structures*

Electronic Truck km Charges:	Switzerland 2001	Germany 2003	United Kingdom 2004
Charging msc close to point of use:			
User charge for wear and tear	Yes - rising to around half of variable costs (for trucks and cars together)	Yes - around half of variable costs (for trucks and cars together)	Yes
Approximate marginal charge for env costs	-	-	-
Approximate marginal charge for acc costs	-	-	-
Congestion charging	-	-	-
Demand Management:			
Variabilisation of fixed charges	Yes - replaces fixed user charge (will account for 8% of total road revenues in 2005 compared with 65% from fuel taxes incl. VAT)	Yes - replaces Eurovignette (will account for 3% of total road revenues compared to 80% from fuel and other variable taxes)	Yes - partially replaces fixed annual vehicle tax
Congestion charging	-	-	-
Infrastructure costs:			
Raising revenues from foreign users	Yes	Small increase compared to Eurovignette	Yes
Increasing revenues earmarked for roads	-	Probably yes in practice	-
Cross subsidising road to rail	Yes	-	-
Achieving full cost recovery	6% of total road infra costs in 2005, share allocated to trucks difficult to estimate due to costs of upgrading roads to take 40t trucks	7% of total road infra costs, 17% of the share allocated to trucks	Costs and revenues believed in balance in UK overall already

Congestion charges:	Rome Cordon October 2001	London Cordon February 2003	French tolls
Charging MSC close to point of use:			
User charge for wear and tear	-	-	Yes
Approximate marginal charge for env. costs	-	-	-
Approximate marginal charge for acc. costs	-	-	-
Congestion charging	-	-	Yes One motorway on Sundays
Demand Management:			
Variabilisation of fixed charges	-	-	-
Geographical differentiation of fixed charge	Yes	Yes	-
Congestion charging	Only partial alignment of charges with peak traffic demand	-	Yes Access to Paris from north
Infrastructure costs:			
Raising revenues from foreign users	-	-	Yes
Increasing revenues earmarked for roads	-	-	Yes
Cross subsidising road to public transport	-	Yes	-
Achieving full cost recovery	-	-	Yes