



Developments in Rail Policy in the EU

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1. BACKGROUND

Until the mid 1980s, progress within the European Community towards a Common Transport Policy was extremely slow. Essentially the reason for this was that key members, such as France and Germany, had heavily regulated road haulage, bus and air sectors, both with the aim of protecting their rail systems and of protecting domestic operators from foreign competition. New entry into the industries, fares and services were all strictly controlled. Some steps were taken towards harmonisation of the terms of competition and regulation of subsidies, and international transport within the community became easier - for instance permits for international road haulage within the community became more readily available. However, in 1985 the Commission was taken to the European Court of Justice for failing to achieve a Common Transport Policy. Since then progress has been much more rapid, with measures towards the 'completion of the market' involving transport extensively. Road haulage and air transport have essentially been deregulated throughout the Union, so that the barriers which prevented an operator based in one member state from operating to or through another have largely disappeared. Trans European Networks have been planned for all modes of long distance transport, and a start made on funding the most urgent requirements, particularly in High Speed Rail, where previously the main developments had been at the national level. Yet major problems remain. Amongst the key problems are the implementation of pricing policies which achieve a level playing field between the modes and across member states, and reform of the railway and local public transport sectors. We will concentrate on these issues in this paper. For a general review see Kiriazidis (1994).

The next section provides a brief review of the development of EC rail policy. We then turn explicitly to the issues of pricing of rail infrastructure and services, before examining the empirical research evidence on what efficient pricing in this sector would mean for rail traffic. We then examine what has happened in practice in terms of rail reform within the EU before reaching our conclusions.

2. DEVELOPMENT OF RAIL POLICY

For many years, railways in most of Europe have been seen as a problem. They have steadily lost market share and required high increasing levels of subsidy (on average in recent years of the order of 50% of total cost). The response of the Commission to this situation was to encourage governments to reorganise railways as autonomous commercial bodies (in a number of countries the railways were still run directly by government departments), with separate and realistic

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accounts and with social obligations minimised but appropriate recompense paid where such obligations were maintained. Governments were not to interfere with market mechanisms by providing subsidies to railways except under specific conditions. Three regulations were critical in this process. These were:

1191/69 on Public Service Obligations

It is under this regulation that in general the largest sums of money were paid, both for obligations to operate particular services and for tariff obligations either in general or regarding particular groups of travellers.

1191/69 on Normalisation of Accounts

Under this regulation, railways were compensated for elements of cost which other modes do not have to bear. French railways received a contribution to general infrastructure costs under this heading.

1107/70 On Aids to Transport

Generally, this regulation covered obligations excluded from 1191/69, such as other tariff obligations, for instance on non-rail subsidiaries, and financial difficulties arising from excess capacity. A number of railways receive support for tariff obligations under this heading.

Despite these measures, the Commission perceived continued major problems in the rail transport field. The most obvious of these is the continued loss of market share, particularly for international traffic. But behind this was thought to lie a number of problems in terms of organisation and control:

- (i) The fact that rail operators were still largely nationally based, with complicated arrangements requiring inter company negotiations regarding through traffic between countries. This is believed to affect the flexibility and quality of service offered to the customer, compared with situations in which the entire operation is under the control of a single operator.
- (ii) Growth in the level of financial support for rail services, together with the continuation of a system whereby compensation for social obligations was still largely provide ex post, with such compensation often being inadequate and not clearly identified with particular obligations. At the same time railways still frequently had totally unrealistic balance sheets containing inherited debts which bear no relation to the earning power of their assets.
- (iii) Inadequacy in the capacity and quality of infrastructure, particularly regarding the ability to operate high speed passenger and combined transport freight services on international routes. In some cases, the problem was a sheer lack of capacity, but more often it was difficulties such as inadequacies of speed and loading gauge. Where bottlenecks on one system led to loss of traffic by its neighbours, the Community as a whole clearly had a special interest.
- (iv) Following on from this, there remained the general problem of technical harmonisation, for instance in terms of systems of signalling and electric traction, which lead to difficulties in terms of through running and mass production of rolling stock. In the case

of the Iberian peninsula there is of course the particular problem of different track gauge from the rest of the community.

In 1989, the Commission issued proposals for a radical shift in Community rail policy. (CEC, 1989). These comprised the following:

- (i) Proposal for a Council Directive on the development of the Community Railways;
- (ii) Proposal for a Council Regulation on public service obligations (amending 1191/69);
- (iii) Proposal for a council Decision concerning the establishment of a network of high speed trains;
- (iv) Proposal for a Council Directive amending 75/130 on the establishment of common rules for certain types of combined carriage of goods between Member States.

This section will comment on each in turn.

(i) *Development of the Community Railways*

The key elements in this proposal required firstly increased commercial and financial independence and realistic balance sheets. Secondly, and more controversially is the requirement for rail operators to establish separate divisions for infrastructure and operations, to require the infrastructure to be accessible to other operations, on fair and equal terms and to implement a system of charging for the use of infrastructure (based on train kilometres, speed, time, axle weight, etc) which facilitates this in the context of fair competition between modes

(ii) *Public Service Obligations*

The aim of this amendment was to require replacement of generalised public service obligations by contracts, spelling out clearly the services to be provided and the prices and subsidies to apply. The key issue is the extent to which a more formal contractual arrangement leads to a more transparent and effective relationship between government and railway.

(iii) *High Speed Lines*

The proposal here was aimed at ensuring compatibility between proposals of the Member States. Since then the Commission has taken a more proactive approach towards filling missing links to the Trans European Network (including that from London to the Channel Tunnel) and the funding of a multi-year European infrastructure programme (albeit on a limited scale) has made a contribution in this respect.

(iv) *Combined Transport*

The key proposal here was to require governments to remit vehicle excise duty (VED) in respect of the period for which road goods vehicles are engaged in combined transport. Since VED is generally charged on tractor units, the remission applied only to the time such vehicles are on "rolling motorway" type trains (which can not operate in Britain because of the loading gauge, although they operate through the Channel Tunnel).

These proposals were partly implemented in Directive 91/440. Legal rights of access to railway infrastructure in EC countries were established for:

- international groupings of railway undertakings - defined as two or more operations from different countries wishing to run international services between the Member States where the undertakings are based
- any railway undertaking wishing to run international combined transport goods services between any Member States.

However, by the time the Commission issued its next White Paper on Railways (CEC, 1996) relatively little progress had been made and virtually no open access operations had emerged. The Commission argued for stronger actions to open up the railways to market forces, including:

- separation of infrastructure management and transport operations into distinct business units, rather than merely accounting separation;
- open access for all freight and international passenger services;
- introduction of market forces into domestic passenger services, possibly by competitive franchising
- establishment of 'freight freeways' with 'one stop shops' for access to the infrastructure.

Whilst a number of countries have indeed separated infrastructure from operations and some (Great Britain, Germany, Netherlands) introduced open access, so far the effects remain small. Attempts by the Commission to secure agreement on wider liberalisation measures, such as open access operation for the whole of the rail freight market, have so far been unsuccessful. In 1998, the Commission published a draft Directive on rail infrastructure pricing and allocation of slots, designed to provide equal access for new entrants to the market, but it has yet to be implemented.

The role of the Commission in local public transport has always been regarded as secondary to its role in long distance transport, and many of the Commissions measures explicitly exclude urban and suburban railways. Obviously the first concern has always been to promote international transport, and to ensure that charges for the transport of freight do not distort the terms of competition between member states. Neither of these arguments holds in the case of local public transport. Yet in 1995, the Commission issued a Green paper entitled 'The Citizens Network' dealing with exactly this issue (CEC, 1995a).

The paper argues that it is important to make public transport more attractive, in order to reduce dependence on the car and to extend the transport choices of those without a car, available. The role of the Commission in this is said to be to 'inform, to promote and to enable. In other words the Commission will undertake research and disseminate good practice. It also hints that other policy levers will be used - for instance it will favour for assistance with funding Trans European Network infrastructure which is well integrated into the local public transport network.

One key issue in the view of the Commission is organisational. It argues that the best way of achieving efficient and attractive public transport which meets social needs and is well integrated is the competitive tendering of concessions to operate parts of the network. This contrasts with both the British deregulated bus market and the typical continental publicly owned monopoly operator. It is however more akin to the situation regarding buses in London, as well as the franchising of rail passenger services throughout Great Britain.

3. RAIL INFRASTRUCTURE PRICING

It has long been the declared aim of the commission that pricing policies should be developed which promote economic efficiency. This requires prices which reflect marginal social cost. Originally, this was seen mainly in terms of charging for the use of infrastructure according to marginal operation and maintenance costs, but more recently the concern with environmental problems has led to an emphasis on the external costs of transport as well - congestion, accidents and environmental costs.

In 1995 the Commission published a Green Paper entitled ‘Towards Fair and Efficient Pricing’(CEC, 1995b).

The basic argument of this paper was as follows:

- prices should reflect costs
- some costs – environmental, accidents, congestion and infrastructure provision and maintenance – are only partly covered or not covered at all
- these costs could be very large - 250b ecu p.a.

The following White Paper (CEC 1998) explicitly adopted the target of marginal social cost pricing, and set out a timetable for its phased introduction. But the argument as to how this could be implemented in the case of rail transport, and indeed that as to whether it was desirable at all, continues. One of the reasons for this debate is the fact that rail infrastructure charges are seen as relevant to a number of policy objectives. These objectives will be reviewed before the key alternatives put forward are considered further.

Overview of Objectives

A number of different objectives for rail infrastructure charges may be identified. A typical list, drawn from those put forward at the ECMT’s 107th Round Table on Transport Economics (ECMT Round Table 107, 1998). which was devoted to the issue of User Charges for Railway Infrastructure, would be:

- promoting efficient use of the infrastructure
- promoting efficient investment in and development of the infrastructure
- recovering the costs of providing the infrastructure, including adequate funding for investment.
- promoting efficiency of operators, for instance through facilitating competition
- harmonisation of the terms of competition between modes

Not all these objectives can be adequately fulfilled with a single policy instrument. At the ECMT’s 107th Round Table there was general agreement that the most important objective was efficient use of the infrastructure, although this should be achieved in the way which least damaged other objectives, in terms for instance of incentives for efficient development of the network and the scope for promoting competition amongst train operators.

The first part of this section will provide a general review based around the objectives set out above and drawing on the papers and discussion at ECMT’s 107th Round Table. We will then look at the key alternative approaches to be found in the ever-growing literature on this issue.

Efficient use and development of infrastructure

The basic principles for the efficient use of infrastructure are that, in the absence of capacity constraints, operators willing to pay the extra costs they impose by their use of the infrastructure should be allowed to use it, whilst in the presence of capacity constraints the capacity should go to the operator and type of traffic for which it has the most value. This of course does presuppose that what the operator is willing to pay represents the social value of

the train, so that any external benefits or costs have already been taken account of by taxes or subsidies from the government.

This approach to pricing is essentially that labelled by economists as short run marginal cost pricing; in other words charging the incremental cost of use of the existing infrastructure by the train concerned. This would cover the wear and tear cost, plus any costs imposed on other services in terms of delays or retiming to accommodate the train concerned. In the presence of a capacity constraint, this cost would have added to it the value of any train which could not be run as a result of lack of capacity.

This concept is often contrasted with that of long run marginal cost, which represents the additional cost of an extra train when the infrastructure is optimally adapted to the demand in question. It is well known that if the infrastructure were optimally configured, the two concepts would give the same resulting value, since the infrastructure would be improved to the point at which the cost of the extra capacity exactly matched its value in terms of relieving congestion and permitting additional trains to run. The general perception that short run marginal cost is below long run is only true in the presence of excess capacity; the reverse is true when capacity is scarce.

In practice, indivisibilities and the time lags involved in adapting infrastructure to volume mean that differences between short and long run marginal cost are likely. In this case, the theoretically correct approach is to price at short run marginal cost, whilst adapting the infrastructure in accordance with the outcome of social cost-benefit analysis of alternative schemes. In this way, the optimal use of existing infrastructure can be guaranteed, whilst over time, the quantity and quality of infrastructure would be optimised, and the price adapted accordingly. It is also arguably easier to measure short run marginal cost than long run, which - in the presence of indivisibilities - may only be approximated as the average incremental cost of specific capacity enhancing measures which may vary greatly in cost from place to place. However, strong arguments in favour of the long run marginal cost pricing are also put forward. Specifically it may give a value which is more stable over time, not fluctuating with day to day changes in the level of congestion, and thus aid planning by the train operating company. Linked to this is the fact that many operators, both freight and passenger, seek contracts running for a number of years in order to justify specific investments in rolling stock or fixed equipment such as terminals. One solution might be to charge long term contracts on the basis of long run marginal cost, but to sell paths on the 'spot' market at short run marginal cost.

This would also help overcome the problem of short run marginal cost pricing that it makes it more profitable for a commercial rail infrastructure company to constrain capacity to force the price up than to invest in expansion. At least if it is regulated to charge long run marginal cost this incentive is removed, although it is still not clear that the appropriate incentive to invest will exist. It may be far more appropriate therefore if long run marginal cost pricing is seen as part of a long run contract which also specifies the infrastructure investment to take place, although such contracts may be difficult to negotiate if several operators are involved.

It may also be doubted whether it really is the case that short run marginal cost is easier to measure than long, particularly in the context of capacity constraints, where alternative operators' valuations of the slots concerned must be appraised. In point of fact, the Commission appears to have adopted a compromise whereby short run marginal cost is the

basis of charging, but the average incremental cost of new capacity rather than the opportunity cost of the slots should be the basis of charging for capacity constrained sections.

Budget constraints

It is generally agreed that railways are subject to economies of traffic density such that any form of marginal cost pricing will typically fail to recover the total cost of providing, maintaining and operating the infrastructure. One solution to this is a contribution from the state. However, some see this as dangerous in terms of the incentives to efficiency; some as inequitable and some fear that it might prove inadequate to fund an appropriate level of investment. In any event it is generally accepted that government funds have a shadow price above one, so that it is appropriate to seek to recover more than simply the marginal cost of infrastructure use from rail operators.

In order to achieve this with the least possible damage to efficiency, the standard Ramsey pricing argument would justify raising price above marginal cost in inverse proportion to the elasticity of demand for the service in question. However, it would be difficult to do this in a fixed tariff for more than a limited number of categories of train. Much finer differentiation would be possible if individual negotiations between infrastructure provider and train operator were permitted. It should also be pointed out that the application of Ramsey pricing to an intermediate good is not straightforward; it is the effect on the prices and service patterns in the final market that matter, and that is difficult to predict and appropriately allow for.

The generally advocated alternative to Ramsey pricing is two part tariffs (of course, the two may be combined as well). The attraction of two part tariffs is that the fixed part may be related to ability to pay, but still leave the operator free to raise the necessary cash in the way that loses them the least traffic, without the distorting effect on service levels that a surcharge on the charge per train kilometre has. The difficulty is that if the fixed part is the result of a tariff, it almost inevitably favours large operators against small (even if there is a fixed charge per route kilometre, as in France and Germany, it favours the operators who have a lot of traffic on the particular route, although it is not as damaging to the prospects of entrants as a large fixed charge for an entire network, as in Britain).

Promoting competition

The generally advocated position regarding promoting competition is that tariffs should be simple, transparent and not discriminate between operators. This immediately conflicts with some of the earlier considerations, which suggested that charging for peak capacity, investment and price differentiation may all be best implemented by means of individual negotiations between infrastructure provider and train operator.

It seems that this is the area in which the most obvious trade off is to be made. If it is really seen as crucial to have a simple transparent tariff to promote new entry, then a good deal in terms of efficiency of the use and development of the network may have to be sacrificed. On the other hand, if new competition is less of an issue, perhaps because competition for the market in the form of a franchising system is seen as the most effective way of promoting efficiency in operations, rather than competition in the market, then perhaps simplicity and transparency are not so important.

One suggestion is that if there were any discrimination, it should favour new operators, as they face other barriers to entry in any event. Making paths available at short run marginal cost to new operators might therefore be appropriate. This is consistent with offering paths at short run marginal cost on the spot market, whilst negotiating a higher rate for longer contracts, although in this case the benefit new operators received from a lower price might be outweighed by the increased uncertainty about long term access.

The Commission appears to have concluded that it is in the freight market that new entry is most important and that rail is in the weakest competitive position. Thus it proposes that for freight, a strictly marginal cost pricing approach should be adopted with no supplementary measures to raise additional revenue.

Harmonisation across modes

A number of speakers at the Round Table spoke of the need to harmonise pricing systems between modes to achieve a level playing field. That is of course an important efficiency objective, and a failure to follow efficient pricing rules on competing modes will certainly influence the appropriate pricing rule for rail. One confusion should be avoided however. It is not the case that a failure to follow efficient pricing on road or air transport leads to a case for adopting the same inefficiencies on rail, and it is certainly not the case that one should aim for the same relationship between revenue and total cost on all modes. The ratio of marginal social cost to average cost differs between modes and so would the ideal ratio of revenue to total cost. Distortions on one mode certainly lead to a case for varying the price on other modes from marginal social cost, but it will only be optimal for the ratio of the prices to equal the ratio of marginal social cost if there is a fixed amount of traffic to allocate between the modes. This is certainly not true of passenger traffic although it may be a more reasonable approximation for freight. For passenger traffic there is a trade off. Lowering price on rail to offset underpricing on road or air will have the benefit of attracting passengers to divert, but a cost in terms of generating new passengers who value the benefits at less than the marginal social cost. The higher the ratio of generated traffic to diverted the closer the price of rail should stay to marginal social cost.

It will be seen from the above, that whilst greatly illuminating the issues, theoretical considerations alone cannot resolve the question of the most appropriate approach to charging for the use of rail infrastructure. Much depends on the institutional setting in terms of ownership, competition and regulation, and there are still trade-offs to be made which will vary from case to case.

The key alternatives

So far the discussion in this section has rested heavily on the papers and discussion at ECMT Round Table 107. There are many other studies of this issue, including studies for the Commission and for the Community of European Railways, which will be referred to in what follows. It has already been seen that there are broadly two approaches to this problem.

The first relies on pure marginal cost pricing, with subsidies to cover the difference between this and average cost. This approach is advocated by Roy (1998). It is relatively straightforward to estimate the marginal cost in terms of wear and tear and accelerated

renewals of additional train services. Unplanned delays caused to other operators may be charged for by the ex post payment of compensation, as under the Railtrack performance regime in Britain (OPRAF, 1996), or by ex ante prices developed by means of simulation using models such as the MERIT model of Railtrack (The modelling approach is claimed to be superior, as it identifies the full congestion cost of additional trains on the network, including the impact of reduced recovery possibilities from delays with other causes, whereas actual measurement is confined to delays directly caused by the train in question). Extra pollution also can be forecast, and valued as discussed for instance in CAPRI (1998). The big issue is how to charge for the 'opportunity cost' of scarce track capacity. Of course this only really becomes an issue where there is more than one train operator; with only one operator such costs are internalised in any case.

The most attractive solution to this problem in theory is to 'auction' scarce slots. There are many practical difficulties however, including the complicated ways in which slots can be put together to produce a variety of types of service, and the possibility of lack of adequate competition to ensure a competitive price. In practice it is therefore usually accepted that any degree of price rationing of scarce slots will have to be on the basis of administered prices rather than bid prices, although it might be possible to allow for a degree of 'secondary trading' in which slots change hands between operators at enhanced prices, and/or to organise a degree of bidding for prepackaged sets of slots.

A second possibility is to simply impose a price and see what happens to demand, and then iterate until demand equals capacity. The risk is, however, that serious distortions may occur whilst the price is adjusting, and that strategic game playing may occur to force the price down by withholding demand, where competition is not strong.

A third approach, recommended by NERA (1998) and endorsed by the Commission, in its proposed Directive, is to identify sections of infrastructure where capacity is constrained and to charge the long run average incremental cost of expanding capacity. However, this is a very difficult concept to measure (the cost of expanding capacity varies enormously according to the exact proposal considered, and it is not easy to relate this to the number of paths created, since they depend on the precise number and order of trains run). However, this appears to be a popular approach and is under consideration, for instance, in both Britain (ORR, 1998) and France, at least for modest capacity enhancement measures as opposed to major projects.

Given the difficulties with all these approaches, it may be that the best way of handling the issue is to permit direct negotiation between operators and the infrastructure manager over the price and allocation of slots, including investment in new or upgraded capacity. It is appreciated that it is difficult to ensure that this does not lead to the abuse of monopoly power, particularly when the infrastructure manager and the operator are part of the same company. An independent regulator is certainly needed but their job is far from easy.

A rather different approach is to charge operators prices that collectively cover the full cost of provision of the infrastructure, with any subsidies being channeled to the train operators. It is generally accepted as desirable that the prices of individual slots remain as close as possible to marginal cost (second best theory suggests that any divergences from marginal cost pricing, such as Ramsey pricing, are better applied in the final product market than on the intermediate good of transport infrastructure - Diamond and Mirrlees, 1971). Thus the

obvious solution is the application of two-part tariffs, with the fixed part reflecting the avoidable cost imposed by the operator concerned plus some allocation of joint costs. Such a two part tariff exists for the franchised passenger operators in Britain (ORR, 1994), and a similar type of tariff was subsequently negotiated by the major freight operator (ORR, 1997)

The problem with this approach is, of course, how to determine a fixed charge for new operators that will not discourage them from entry if they are more efficient than existing operators but will conversely not give them an advantage over existing efficient operators. The theoretical answer again is well known but difficult to implement - it is to charge them an amount equal to any surplus over avoidable costs that they take away from existing operators. (Baumol, 1983). In the absence of the necessary knowledge to implement this, it may be reasonable to allow entrants to choose between paying on the same two part tariff as incumbents (with the fixed part being a charge per route kilometre, so that overall size per se does not give the incumbent an advantage on any particular route) or paying the average cost per train kilometre paid by the incumbent. This at least represents the level of surplus that on average the incumbent is required to earn. It is broadly the approach recommended by Cooper and Lybrand (1998) and now being adopted in Germany.

By contrast, an approach based on charging average costs for all slots may be much simpler, but it does run the risk of discouraging provision of services which could more than cover their marginal cost. This was a serious criticism of the approach originally adopted to track access pricing in Germany (Link, 1998).

Whichever of the above systems of charging is implemented will leave an issue as to the incentive given to infrastructure providers to adapt the quantity and quality of the infrastructure to future needs. This is perhaps most readily addressed via the 'two-part' tariff approach, whereby changes in the infrastructure required by operators or subsidy providers may be reflected in changes in the fixed element of the two part tariff. Again, it would seem difficult to do this in any way other than by the negotiation of a commercial contract between the two parties.

4. PRICING OF RAIL SERVICES

By contrast with infrastructure pricing, relatively few studies deal with the principles to be adopted in the pricing of rail and other public transport services. One of the few studies that do consider this issue is PETS (1998).

According to this, the marginal cost of handling additional rail traffic comprises the additional operating costs plus any additional infrastructure costs; providing that one of the above recommended approaches to infrastructure pricing has been adopted the latter will be appropriately reflected in additional charges paid by the train operator for use of the infrastructure, as will external costs such as environmental effects. However, it also includes the marginal cost imposed on other rail users. Where increased traffic leads to a more frequent service, this effect will be negative.

The marginal cost of carrying extra traffic will probably be lowest where it is possible to increase capacity simply by operating longer trains. Even if more trains have to be operated however, their extra cost will partly be offset by resulting improvements in the timetable for existing customers. This effect is likely to be greater for passengers than freight, and for short distance services than long, since any inconvenience of not having a train at exactly the

desired time is a greater part of generalised cost the shorter the journey. The marginal cost of additional capacity is obviously likely to be greater in the peak, when capacity is fully utilised, than in the off peak when it is not. Charging extra for scarce infrastructure slots will reinforce this difference between peak and off peak charges.

A pure marginal cost pricing approach would therefore differentiate between peak and off peak, as well as between other determinants of marginal cost such as the quality of rolling stock and on-board services provided. To the extent that the financial performance of such a regime is unacceptable, price differentiation is likely to be the appropriate way forward. In the freight sector, it is possible to differentiate to a high degree, since many customers are large enough to make it worth negotiating an individual price. Provided that any infrastructure charges are appropriate, this may leave little case for further subsidies for rail freight services, except on second best grounds if road haulage is not appropriately priced. For passenger services, differentiation can take place in terms of origin, destination, class and time of travel, person type (e.g. pensioner, child, family group) and when the booking was made (at least in terms of longer trips where booking ahead may be reasonable). But such differentiation will almost inevitably be cruder than for freight, because it is not feasible to negotiate a separate price with each passenger.

5. EMPIRICAL RESULTS

When the Commission first embarked on a policy of promoting internalisation of externalities through marginal social cost pricing, it was widely believed that the effect would be to assist the rail mode share because of its much lower level of external cost. A number of research studies undertaken as part of the EU 4th Framework have now produced empirical results which enable this proposition to be tested.

Of these, STEMM conducted a number of case studies of both passenger and freight traffic with an emphasis on multimodal traffic. Scenarios including both pricing to internalise externalities and infrastructure investment were tested, and some general conclusions may be drawn. The results suggest some benefit to rail from full internalisation of costs on other modes, but that improvement of rail service quality is more important. Infrastructure improvements should be combined with environmental charges in order to generate greater benefits for rail and intermodal transport.

A key part of the TRENEN II project involved the development and implementation of the TRENEN urban and inter-regional models, numerical static optimisation models designed to analyse the welfare implications of various transport pricing and regulatory policies. Taking infrastructure as given, both types of model were designed to measure the gap between present and efficient prices for all modes and the potential of the different pricing instruments in improving transport pricing. The different pricing reform scenarios were compared with two benchmarks: the reference case, corresponding to unchanged pricing policies, and the optimal pricing scenario. The results from four urban case studies (Amsterdam, Brussels, London, and Dublin) and two interregional case studies (Belgium and Ireland) are summarised below.

In the urban case studies, as expected, peak car prices were found to be well below their efficient level; off peak car prices were more efficient. The change required in bus and rail fares varied with the current level of subsidy, but tended also to be upwards. Nevertheless,

rail would certainly gain market share. This was not necessarily so, however, in the interregional case studies, where in Belgium, and especially Ireland, it was estimated that – because current rail subsidies were excessive – a move to efficient pricing of freight traffic would induce a further switch of traffic to road.

Five case studies relating to strategic transport routes in Europe are being carried out within the PETS project. These case studies assess the practical consequences of moving to a more appropriate price structure and level (ie prices for transport use which more effectively reflect the social costs that transport users impose on others) and the implications for modal shares for the year 2010 under several different local environments.

The main feature of the marginal social cost pricing policy scenarios appears to be that, whilst the price of car is not significantly changed, the prices of bus and train trips are lower than those in the ‘business as usual’ (BAU) situation, because existing pricing is aimed at cost recovery rather than efficiency. This decreases car mileage slightly and increases public transport mileage. Another feature is that, because they are a relatively substantial source of external effects, the costs of heavy goods vehicles in all three scenarios are higher than in the BAU situation. This leads to a situation in which the use of rail for freight transport is more attractive.

The differences in conclusions from these in TRENEN may well be because PETS case studies tend to be in countries with such lower existing rail subsidies than the TRENEN inter-regional case studies.

None of the above case studies considers the issue of peak pricing for rail services. However, PETS D2 does discuss the results of earlier work by Jansson. This concludes that appropriate peak pricing is very important in the passenger market. This plus provision of subsidies to allow passenger prices to reflect economies of scale provides big social benefits.

From these case studies some overall conclusions may be drawn:

- (i) whilst a move to more efficient pricing will benefit rail market share in a lot of circumstances, particularly in urban areas, this is not invariably the case. In some cases, excessive subsidies mean that efficient pricing will raise rail charges to the extent that rail loses market share to road;
- (ii) it is often the case that improving rail quality of service and investment in rail infrastructure are more important for rail market share than internalisation of externalities. This appears to be particularly true for freight.

6. RAIL REFORM IN PRACTICE

In this section we will concentrate on those European railways where the pace of change has been fastest – Germany, the Netherlands, Sweden and Great Britain. In most others, the basic step of separating infrastructure from operations, at least in an accounting sense, has taken place, and in some – such as France – a separate infrastructure manager has been established. But at the practical level it does not appear that these reforms have had much effect to date.

Germany

Before January 1 1994, German railways came under two national organisations, Deutsche Bundesbahn (DB-former West German railway) and Deutsche Reichsbahn (DR-former East German railway), both operating in their former territories. They now operate as a single company, Deutsche Bahn AG (German Rail plc), and have been split into an entrepreneurial area with three commercial businesses (responsible for passenger, freight and infrastructure) and a public sector one (responsible for other tasks), with an ultimate aim of privatising the former, but probably not until well after the year 2000. A new organisation was created, a Federal Railway Office, to handle state tasks such as approving construction plans for a new railway line. The rest of the public area remained in the Federal Railway Property.

From the point of view of the introduction of competition, there are two key developments. The first is the regionalisation of local passenger services. This process transfers the power to determine local rail services and the responsibility to finance them from a national to a regional level (to state governments known as Lander). This is a key feature of the restructuring process, see Ridley and Terry (1992). Previously, the Lander were a powerful lobby for the retention and improvement of rail services, payment for which came from Federal funds. Now the Lander have to set a service level and enter into a contract with a railway operator. For this, they receive funding from the Federal government, which can be used to provide rail or road transport. They are entitled to franchise these out to operators other than DBAG, and already, some regional services have been franchised to private railways, or to consortia including DBAG and private railways (Germany has always had a number of private local railways, often operating passenger services under contract to local authorities).

The second key feature is the introduction of open access. In principle this is available to all freight and passenger operations (though in the case of foreign operators only on a reciprocal basis). Charges are set by the infrastructure division of DBAG but regulated by the Federal Railway Office. Charges for the use of the infrastructure are based on a tariff which varies with the nature of the rolling stock and of the route, and the length of the contract, and is designed to cover all costs other than those investment costs borne by the state. Initially, this tariff involved a high marginal cost for additional train kilometres and a large quantity discount which greatly favoured DBAG. Following protests from the states, a lower marginal charge for additional train kilometres has now been introduced, and the charging system modified into a two part tariff (Link, 1997).

Whilst there is now in theory complete open access for third parties in Germany, the nature of the access charging regime (high charges, and a quantity discount favouring the existing large operator) has discouraged entry, and only a handful of private freight operators have taken advantage of this possibility. Mostly these have been existing short haul private railways.

Netherlands

For many years up to the early 1990s railways in the Netherlands were subject to a high degree of government intervention at every level. Netherlands Railways (NS) did not have the freedom to decide its own fares, levels of service or investment plans. This type of arrangement was as a result of the Dutch government's concern for a national strategic transport plan. However, several events led to reform in public transport administration, resulting in a more market oriented independent NS. These events included the report of the Wijffels Committee (1992), which urged the government to give NS more scope to operate as

an independent business, and to create distinct organisational divisions within NS, as well as European policy measures.

The gist of the government's reforms is that NS will retain full responsibility for the operation of rail services, with the freedom to set levels of service, fares and investment necessary for operations. All other aspects of rail provision such as infrastructure management will be managed by the government or the government via a third party. Passenger services are being separated into commercial and social, with the latter subject to competitive franchising. NS commercial passenger services will eventually be privatised. NS Freight has complete commercial freedom, and is able to set freight rates as it chooses. It is now proposed to merge the freight operations of NS with those of DBAG, creating the first of what are expected to be two or three major international rail freight operators dominating the European scene.

Currently there is open access to the infrastructure at zero charge, although it is proposed to introduce charges in the year 2000. New entry has nevertheless been limited to a small number of freight services, and a single passenger operator (Lovers Rail) which forms the only open access passenger operator of which we are aware anywhere in Western Europe to operate in competition with the incumbent rather than on a franchise basis.

Sweden

Until 1979 the Swedish railways network operated without subsidy, and the whole rail system was one of the most efficient and cost effective in Western Europe (BRB and The University of Leeds, 1979). However, in the eighties concern about falling market share and increasing subsidies led to the 1988 Transportation Act.

This act was based upon a 'road model' under which:

- (a) The rail network was divided into a trunk system of main arteries and county lines.
- (b) Rail infrastructure became the responsibility of a new state agency Banverket (BV), who leased track access to train operators on a marginal social cost basis. BV has responsibility for new investment, maintenance and acts as regulator over safety and scheduling matters.
- (c) Statens Järnvägar (SJ) became a train operating and marketing organisation, for both passenger and freight operations. It retained ownership of terminals and rolling stock, also maintaining operating rights over trunk routes for passenger traffic, and trunk and county routes for freight traffic (excluding iron ore).
- (d) The 24 county public transport authorities (CTA's) would set the level of passenger service to be operated on county lines and could choose contractors other than SJ to operate local and regional services.
- (e) If SJ or the CTA's did not wish to exploit their transportation rights (not run a service) then the government (trunk lines) and BV (other lines) can award such rights to other operators.
- (f) Infrastructure charges paid by train operators would be consistent with the pricing regime employed by the road authority, namely marginal social cost.
- (g) The state would provide grants for new investment.

Initially all train operators paid an access charge equal to the marginal social cost. The charge was in two parts (i) a fixed element, expressed as a rate per rail vehicle axle (ii) a variable element, related to vehicle tonne-km, differentiated by type of vehicle to reflect different amounts of wear and tear on the track structures. The charge also includes environmental costs (diesel exhaust pollution) and accidents. However, the charges for freight traffic have since been abolished on the argument that this counteracts the effects of undercharging for road freight.

Initially two principal challenges arose to SJ's monopoly of provision, BK-Tag and Linjetag. Both operated bus services under contract for CTAs in south and central Sweden and provide maintenance services for other bus companies. Although both firms bid for contracts, only BK-Tag was successful in winning contracts in (1) Smaland and Halland (1990) and (2) Borlange (1992).

SJ responded to the competition by cutting its tender prices by an average of 30%, and regained the contract from BK-Tag. However these results have encouraged the Swedish government to the extent that they are extending the franchise system to regional and longer distance services. An international consortium including BK-Tag has now won two major franchises - the Stockholm commuter services and the West Coast Main Line, again at substantially lower prices than those bid by SJ, (indeed in the latter case without subsidy).

Great Britain

After strong improvements in the later 1980s, the performance of British Rail began to deteriorate in the early 1990s. The then Conservative government saw its policy of privatisation as having been very successful and determined to extend this policy to rail. The process was virtually complete by the time it lost power to the Labour Party in May 1997.

A key feature of privatisation in Britain has been a degree of vertical separation unparalleled elsewhere. The intention is to create competitive markets for the supply of inputs into the production of rail services wherever possible, even when the services themselves remain a monopoly. Wherever monopoly is involved, continued public regulation takes place by an independent regulator.

The infrastructure has been placed in the hands of a new company (Railtrack) which was privatised in the form of the sale of shares in May 1996. Passenger rolling stock was placed in the hands of three companies, now privatised by outright sale, which lease it to the operators. Passenger train operations were placed in the hands of 25 train operating companies, and their management franchised out for periods of 7-15 years (the longer periods being applicable where major investment was required). Since they lease stations and rolling stock, and pay for access to the tracks owned by Railtrack, these companies generally own virtually no assets; this was of course a deliberate attempt to remove one substantial barrier to entry. Track renewal and maintenance work and rolling stock heavy maintenance was placed in the hands of a number of companies which were then sold outright, and now have to compete for the contracts to undertake this work. A recent update of experience so far is contained in Nash (1997).

Two new government bodies were created - the Office of Passenger Rail Franchising (OPRAF), which is responsible for franchising out passenger services, and the Office of the Rail Regulator (ORR) which has various duties the most important being the licencing of

train operators and regulation of the prices and terms of track access agreements. OPRAF specifies minimum service levels and (for certain categories of fare) maximum fares and then invites bids in terms of the minimum subsidy required for each year of the franchise.

Currently, open access for passenger services is limited to routes with no through service or which account for a very small part of the franchisee's income. This was to protect franchisees and thus ease the franchising process. Some competition does exist, however, where two or more franchises serve the same pair of points, and price competition has broken out in a number of corridors. The Regulator has declared his intention of progressively moving to increased open access over the period 1999-2002, and there is considerable interest in new open access operations. From September 1999, competition will be allowed for up to 20% of each franchisee's revenue, provided that the Regulator is satisfied that this will benefit consumers and not merely duplicate existing services. There is complete open access in the freight sector, at negotiated access charges. These are subject to the approval of the Regulator, who has the power to reduce them if he regards them as unreasonable; he does this with reference to the 'stand-alone' costs of freight service. After three years of open access, only two new freight operators have appeared, both hauling their own traffic over short distances on a single route (one of these has since sold out to the main freight operator in order to realise the economics of pooling their equipment).

The immediate effect of the reform was a large increase in subsidies resulting from the move to the train operating companies paying commercial rates for the use of infrastructure and rolling stock. However, these charges both enabled the government to sell these businesses for several billion pounds and provided adequate income to fund replacement investment, which previous subsidies had failed fully to do. The franchising process itself has been hailed as a major success, with franchises awarded to a number of new entrants to the railway industry (mainly but not exclusively from the bus industry) committing themselves to improved services with a halving of subsidies over a seven year period. These new entrants essentially take control of the existing operating company, including its staff, but are then free to negotiate changes in wages and conditions. On the other hand, there have been problems with some franchisees failing to achieve their required performance standards, and Railtrack failing to achieve the expected levels of investment. In the former case, the franchise agreement provides for penalty payments, but in the latter the Regulator has had to take additional powers to force Railtrack to produce and to adhere to appropriate investment plans.

7. CONCLUSIONS

The Common Transport Policy has made enormous strides in the past decade. Much has been done to open up road haulage and air transport to competition, and a start has been made on reforming the railways. However, there remain serious problems ahead. There is so far no agreement on how to internalise externalities into transport prices, and there is strong opposition to doing so from a number of member states. The pace of change in the rail sector remains slow, and the long desired improvement in its performance is only coming through in patches. Finally over much of the Union nothing has yet been done to introduce competitive bidding for the operation of local public transport; although in many countries a high quality network already exists it is at high public expense.

Regarding pricing policies, we have seen that marginal social cost pricing would certainly benefit rail market share in urban areas, and on long distance passenger services particularly at the expense of air. The evidence for freight is more mixed however; in some cases, removal of excessive subsidies could actually switch traffic to road. What is more important for rail mode share, particularly for freight traffic, is to increase efficiency and quality of service. That is what open access was intended to do.

We have seen however that despite the efforts of the Commission, little has been achieved in terms of introducing on-track competition in the rail sector. What has been achieved in some cases is a combination of commercialisation, deregulation and even privatisation, together with deregulation increasing competition from other modes. Experience to date suggests that attempts to introduce on-track competition or to make rail markets contestable, will have limited success, especially where the incumbent operator controls the infrastructure. This might suggest that any solution should involve separating infrastructure from operations in different companies. However, there are advantages in terms of planning and investment in continued integration of infrastructure and operations, so the case is not clearcut.

There is a much better record of success with franchising arrangements for passenger services which involve competition for the market rather than in the market. Competitive bidding forces companies to reveal information about costs which they will conceal under a traditional regulatory regime. What is less clear is what form of franchising (short or long contracts, vertically integrated or operations only) is best. It is also the case that such an approach is likely to involve the continued need for extensive government regulation of the sector. Prices and conditions of access to the infrastructure; prices, levels and quality of passenger service and the relations between passenger operators in terms of ticketing, information and connections, are all likely to require continuing regulation given that operations are undertaken by a franchised monopoly. All these are features of the current British approach, which deserves continued careful observation as the most radical attempt to find an alternative approach to rail provision to the traditional vertically-integrated railway.

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