



RAIL ACCESS PRICING: AN EXAMINATION OF THE UK APPROACH

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Abstract

This paper provides an analysis of the access charging system implemented within the new structure of Britain's railways. It highlights the importance of the chosen access pricing regime and identifies the theoretical optimum for such a system. It identifies a number of issues within the latter system that appear to conflict, either with the specified objectives of the access pricing system, or with the more general objectives of rail privatisation. Possible solutions are proposed which could provide an improved access pricing framework. The proposals will enable a more balanced position between road and rail alleviating environmental problems related to the increased car use.

INTRODUCTION

The passing into law of the 1993 Railways Act signified one of the most radical periods of upheaval in the railway industry in Britain for nearly forty years. However, this reorganisation is only the most recent in a long line of upheavals, usually furthered in a bid to improve profitability, accountability or efficiency, within the perceived anachronism of a subsidised public-sector railway operator. It is, of course, axiomatic that this latest policy will succeed where the others have failed. The implicit irony is that the traditional perception of success in this context, the delivery of substantial reductions in public support for the railways, is now, at a time of increasing concern over the growth in road transport and its concomitant environmental problems, inimical to the broader needs of society. One of the most significant changes engendered by the Act, is the separation of infrastructure management and provision, from the operation of train services. A new privately-owned company, Railtrack, owns and manages the vast majority of track, signalling and other operational infrastructure. Railtrack will be responsible for the provision of track access rights, together with an appropriate charge to the train operating companies (TOCs). The 1993 Railways Act requires that the access charging system is specified such that the avoidable cost of a particular traffic borne by Railtrack is covered and that the fixed costs of the system are covered. Thus, the access charging system will in effect result in all Railtrack's costs being covered through the charges paid by the train operating companies.

This paper provides a brief review of the new structure of Britain's railways. It highlights the importance of the chosen access pricing regime and identifies the theoretical optimum for such a system. It continues by detailing the administered methodology that has been employed by Railtrack for the calculation of its first-cut prices. It identifies a number of issues within the latter system that appear to conflict, either with the specified objectives of the access pricing system, or with the more general objectives of rail privatisation. Possible solutions are proposed which could provide an improved access pricing framework. The proposals will enable a more balanced position between road and rail alleviating environmental problems related to the increased car use.

THE NEW STRUCTURE OF RAILWAYS

The provision of passenger railway services on the British mainland, has, since the nationalisation of the railways in 1946, been the ultimate responsibility of a single, vertically-integrated company, British Rail. The 1993 Act, and the concomitant reorganisation, led to those services being partitioned into twenty-five Train Operating Companies (TOCs). These TOCs are operated by private companies in the form of franchises. The development/organisation of the franchises are the responsibility of the Office of Passenger Rail Franchising (OPRAF) along with redistribution of public subsidies.

However, the most significant change engendered by the Act, is the separation of infrastructure management and provision, from the operation of train services, or in the vernacular of the professional, the process of vertical separation. A privately-owned company, Railtrack, owns and manages the vast majority of track, signalling and other operational infrastructure. Railtrack also owns, and hopes to maximise the income from the former property portfolio of British Rail, including stations, operational railway land, buildings and installations. Although, its primary responsibility will be the operation of the track and the provision of access rights, together with an appropriate charge, to the train operating companies, subject to the approval of the Rail Regulator.

THE CURRENT ACCESS CHARGING SYSTEM

An important element, that is central to the success of the new structure, is Railtrack's choice of infrastructure access price regime. The precise details of such a system will, to a certain extent, determine the relative attractiveness of a particular franchise, the relative attractiveness of open-access operations and, more generally, the relative attractiveness of rail, *vis-a-vis* other competitive modes.

The general principles for any charging system were originally specified by the Department of Transport in the 1993 Green Paper *Gaining Access to the Rail Network - The Governments Proposals*, see Department of Transport (1993). This document specified two main conditions, see Office of the Rail Regulator (1994a):

- in the case of open access and freight services, the charges must cover their avoidable cost. Beyond this, any additional charge should reflect the operator's willingness to pay, subject to the charges not being discriminatory. In the case of freight services, they should also be below the ceiling price for the particular service group, which would be agreed in advance with the Regulator;
- for franchised passenger services (including shadow running), access charges will be administered within a regime which aims to cover all the costs of Railtrack, which are not expected to be covered by contributions from non-franchised services or other revenue sources (such as rent from property, or the sales of property assets, etc.).

The latter charge, that appertaining to franchised passenger services, has two elements; Firstly, the variable element, which represents the usage related charges and comprise approximately 9% of the total charge. And secondly, the fixed charges, which comprise the operator-specific fixed costs of a particular service, station access charges and a portion of Railtrack's common costs. It is believed that these fixed costs are expected to account for the remaining 91% of the total charge.

Short-run variable charges

The short-run variable, or usage-related, charges comprise three elements - track usage charges, traction current charges and peak charges.

Track usage charges

In the Office of the Rail Regulator (1994c) it is stated that charges for track usage will account for approximately 3% of the total track access charge. This element is designed to recover the direct maintenance costs of the usage of the infrastructure, attributable to a particular operator, for the wear and tear caused by individual trains running over a particular type of track. These costs reflect the type of locomotive, the speed, the type and composition of the train, and the service pattern. They are based on predictions about the impact on short-run incremental costs of marginal increases in the number of trains of a given type run on the network. These predictions were originally based on a model, first developed by British Rail engineers to measure the effect of different factors on track maintenance and renewals.

Traction current charges

The traction current charges, for the relevant operators, are expected to account for 6% of the total track access charge. Dodgson (1994) notes that they appear to be the most straightforward element

within the total access charge, in that they are merely designed to reflect the cost of electricity, purchased by Railtrack, for traction purposes. However, the problem, as Dodgson (1994) indicates, is that electric trains do not contain any mechanism for recording their fuel consumption (a deficiency shared by the great majority of diesel trains), thus the methodology utilised for calculating the appropriate charge for each operator is not straightforward. The traditional approach involved estimating the proportion of electricity consumed by each sector. The first step was an attempt to calculate the annual fuel consumption rate for each traction unit at sub-profit centre level. It then utilised forecast data for train composition, and planned train miles, to estimate a forecast consumption rate per planned train mile (currently, actual rather than planned train miles are applied). This figure would try to also reflect specific local features that might influence electricity consumption.

Peak charges & hardwired charges

It is envisaged that some form of peak charging system will be implemented, although as yet the details of any proposed system has not been made public. OPRAF (1994) states, in its response to the Regulator's consultation document, that the introduction of differential charges that reflect the quality of planned access, the certainty of clock-face services, or fixed time through running, is a worthy aim that reflects the value of those services to certain operators. This proposal seems to raise the implicit possibility of the development of a form of two-tier access pricing system; on the first tier, there are those operators who demand temporal certainty and are willing to pay for it, and on the other, those operators who, either choose not to buy, or cannot afford, the full service, and face an access path with approximate timings. The development of such a system, whilst not engendering any theoretical opposition, raises the possibility of some interesting political difficulties on the routes into Waterloo, or St Pancras International, where domestic commuter trains will be in conflict with international services.

Fixed and Common Costs

Fixed and Common Costs cover three broad categories: Long Run Incremental Costs (attributable to individual train operators), Common Costs (not attributable to individual train operators) and Station & Depot Access Charges.

Long Run Incremental Costs (LRIC)

This element of the access charge represents the long run cost of maintaining and renewing the railway infrastructure, that can be directly attributed to the operations of an individual TOC. They are an approximation to the concept of the long run avoidable costs of the service. They are calculated on a last-on basis by estimating the cost of modern equivalent infrastructure, that would be needed to support the services run by an individual TOC, over and above that required for other TOCs using the same infrastructure. It has been described as a bottom-up system, thus avoiding the problem of non-identification of excess capacity, inherent in some of the former top-down costing systems. On average, the LRIC are held to comprise 37% of the total access charge, see Office of the Rail Regulator (1994a). Although, the density of train operations, over a particular piece of infrastructure, is a significant factor in ascertaining the relative importance of this element, within the total track access charge.

Common costs

These elements comprise the total residual costs, which cannot be directly attributed to any particular operator and, thus, are common to all the operators. They account, on average, for

approximately 43% of the total charge. These residual costs fall into three broad categories Dodgson (1994):

- common costs that relate to a particular route - these are the common costs that concern a particular piece of infrastructure, or track, that cannot be directly attributed to any individual operator;
- common costs that relate to Railtrack's zonal costs - these are the common costs that concern a particular geographical area covering more than one route (e.g. emergency teams, power boxes etc.);
- common costs that relate to Railtrack's network costs - these are the costs that appertain to the provision of the network, that do not fall into any of the other categories e.g. headquarter costs etc..

The Regulator's Consultation document, Office of the Rail Regulator (1994a), notes that 50% of the common costs arise at sub-zonal level, and are to be allocated between the operators on the basis of planned vehicle miles, whilst the remainder, those costs arising at zonal or national levels, are allocated between relevant operators on the basis of actual, rather than anticipated revenues.

Station & depot access charges

The last element of the track access charge reflects the charge for access to stations and depots. Railtrack owns the freehold of the vast majority of stations and, thus, is responsible for structural and other heavy maintenance, and the renewal of capital. These costs (on an Modern Equivalent Asset Value basis and including a rate of return) are to be recovered from the operators who use the facility. The charge is believed to amount to approximately 12% of the total track access charge and is distinct from the charge, that would be required, for leasing a station from Railtrack. The latter would not form part of the track access charge.

Problems relating to the current structure of access charges

The 1993 Railways Act provides Railtrack with a number of specific objectives in respect of the choice of access pricing system. The favoured system must ensure the following:

- that the avoidable cost of a particular traffic is covered;
- that the common (or average fixed costs) of the system are covered;

These requirements indicate that those costs, both variable and fixed, that can be attributed to a particular service, should be allocated to that service. The remaining fixed costs, the residual that cannot be directly attributed to any particular operator, could be allocated in one of two ways. The first way would be the theoretical choice, a form of ramsey pricing, where the costs would be allocated with respect to the specific demand characteristics of the particular market. It has been suggested that such an approach is, essentially, an extension of the traditional railway approach of charging what the market will bear. However, a significant problem with such an approach is that it could leave a large share of fixed cost unaccounted for, engendering a need for an explicit subsidy to Railtrack. The alternative approach, and the chosen course of Railtrack, is some form of administered system - where the costs would be allocated to particular traffic on the basis of some form of mechanistic formulae. The Department of Transport Green Paper from 1993 explicitly acknowledges the dangers of an administered system., see Department of Transport (1993). It asserts that such a system is inefficient, as it loads equal charges on all types of traffic irrespective of ability to pay. The concomitant is that the marginal traffic may choose to stop running, thus leaving the majority of the common cost elements, within the charge, to be allocated in greater proportions to

the remaining traffic. An unfortunate spill-over that, sadly, appears to have been borne out by subsequent experience. In this way problems are present for both approaches. The preferred option is to a large extent dependent on the Government's attitudes to the railway industry. If it is judged more important to minimise public subsidies to the railways than to maximise the role of the rail mode then the administered approach would support that objective. On the other hand if it is considered to be more important to provide comprehensive rail services which can be an alternative to the car then a Ramsey pricing based cost allocation is the preferred option. This property is caused by pricing rules being different in terms of the degree of charges being set according to what the market can bear and (related to this) the need for subsidies. Furthermore, although the standard Ramsey pricing approach does not guarantee a complete allocation of fixed costs it is not enough reason to reject it. Research is needed to examine the possibility of developing a cost allocation procedure with the attractive elements of the Ramsey pricing approach and complete allocation of fixed costs. An alternative to improved cost allocation procedures is represented by increasing the variable elements in the access charges. Indeed, the Regulator has established a framework for achieving greater variability in the access charges by setting up procedures to be followed for changing or amending access agreements, see Office of the Rail Regulator (1994c). This opens for the possibility that the access charge rather will reflect the value an operator assigns to a given network segment than the cost of operating and maintaining the network segment. However, this path does also involve the risk of double charging the train operating companies for access to the network: once in the initial fixed charge and again when the capacity is traded. This raises the whole problem of the extent of control which the Regulator can exercise with respect to Railtrack. It seems likely that it will be difficult for the Regulator to control the information provided from Railtrack on cost structure and access charges. There appears to be the possibility for asymmetric information regarding these aspects to the advantage of Railtrack. Therefore, Railtrack is in a strong position to utilise its monopoly. This indicates that the Regulator has to be given a strong position to control Railtrack in terms of performance and financial criteria and the possibility to impose fines if needed in order to secure that Railtrack acts in a way consistent with the objectives laid down for the railway industry. The present structure does not provide the Regulator with sufficient instruments to take a strong position with respect to Railtrack.

A second major issue, linked to the previous one, relates to the possibility of discrimination in the system. Theoretically, discrimination can be defined in two ways; either, the charging of different prices to similar markets or sections of the market, or the charging of similar prices to different markets or sections of the market. In the Department of Transport Green Paper from 1993 *"Gaining Access to the Rail Network - The Government's Proposals"* it is suggested that the most appropriate form of access charging will be a form of market pricing, subject to the avoidance of unfair discrimination between individual operators, see Department of Transport (1993). However, it is possible to identify ways in which discrimination can occur in the new access charging system. In theory, discrimination could occur in the following ways. In the case of the first interpretation, the charging of different prices to similar markets, or sections of a market, discrimination could, theoretically, occur wherever different TOCs, which are engaged in similar markets, face significantly different access prices. If there are no significant differences between the peak and off-peak demand elasticities of two TOCs, is there any theoretical support for differential access pricing? It seems a little paradoxical that apparently similar TOCs like Gatwick Express and the former NSE TOCs serving Gatwick Airport, with similar demand elasticities, should pay differing access prices. Gatwick Express TOC pays an access charge per train mile of £5.71, in contrast with South Central TOC, or Thameslink TOC, which pay access charges per train of £7.75 and £7.54 respectively, see Dodgson (1994). In the case of the second interpretation, it could be asserted that discrimination might exist in the new system in two places; firstly, different TOCs running different rolling stock down the same corridor, facing very different elasticities, could face broadly similar fixed charges (excl. LRIC). Secondly, within a particular TOC, it is feasible that segments of the market, with

different elasticities, that run down the same corridor will face broadly similar access charges. The incentive for price discrimination can be reduced with appropriate instruments in place to detect price discrimination and if needed impose fines on Railtrack. This requires that the Regulator has access to all relevant data concerning Railtrack's price decisions and can undertake an independent audit of these data. Even in this case it will be difficult to conclude whether price discrimination has taken place. A further complication relates to the problem of defining whether price discrimination is fair or unfair. It is only the latter case which represents a problem. The disadvantages of existence of price discrimination have to be compared to the advantages: if the alternative to a price discriminating monopoly is a pure monopoly then the price discriminating monopoly will represent the optimum.

In addition to the more general concerns discussed above, there are a number of specific issues that relate to the details of Railtrack's chosen system: The first concern relates to the calculation of the usage related charges. The Regulator, in his policy statement on the structure of charges for franchised passenger services, acknowledges the potential difficulties of utilising a model that was originally designed for engineering purposes for the calculation of access prices, see Office of the Rail Regulator (1994c). The resulting charges are based on national averages for particular types of rolling stock and their computation requires a degree of implicit averaging, apparently manifest in all the variable costs, that raises concern over the methodology. Although, Railtrack has pledged to address any concerns, the issue will remain until a more acceptable method of ascertaining actual usage costs is identified. According to the Regulator, it is likely to take several years to design and implement new systems for calculation of track usage costs, see Office of the Rail Regulator (1994c).

A second concern relating to the variable costs involves the calculation of the traction current charge. Dodgson (1994) highlights that one of the problems with the calculation of the traction current element of the charge, is that electric trains do not carry meters to register the exact extent of their consumption, thus, British Rail developed a complex allocation procedure to apportion the expected consumption. This traditional approach, detailed earlier, was, essentially, a management accounting cost allocation approach and its utilisation in ascertaining an appropriate traction charge for each relevant TOC is questionable practice. In addition, there are a number of other specific issues that relate to the steps utilised in the methodology; these reflect concern over issues as diverse as the calculation and interpolation of the specific fuel consumption rates, to the actual age of those rates utilised. A further concern relates to the apparent lack of consideration given to the differing regional costs of electricity. Overall, the problem with the calculation of traction current charges is one of insufficient data which could be solved by selecting a range of different train types equipping these with meters. The information from these could serve as the basis for more accurately measured consumption levels.

A further issue relates to the specific method of allocation of the residual common costs, comprising the remainder of Railtrack's costs at subzonal, zonal or national level. The methodology apportions the costs between the disparate train operators on the basis of budgeted passenger vehicle miles for the sub-zonal costs and budgeted passenger revenue for the zonal and national costs (prior to subsidy). This approach raises a problem that has been a feature of a number of railway costing systems from the Cooper formula onwards, namely the assumption of a degree of homogeneity between different services that is entirely inappropriate. The averaging, inherent in any administered system, required because of the endemic problem of common costs in the industry, is actually an implicit form of cross-subsidy, a problem of the old approach that the new system was meant to resolve.

AN ALTERNATIVE ACCESS CHARGING SYSTEM

In this section we will suggest alternative ways of specifying the access charging system. The proposed access charging system is aimed to work towards the objective of enhancing the role of rail within the transport market. The alternative access charging system is assumed to be implemented in a situation where it is possible to allocate subsidies directly to Railtrack. This provides immediately two possibilities with respect to the level of access charges:-

- the access charges do not need to be established at break-even levels;
- the access charges do not need to be established at levels to allow for infrastructure investments.

These possibilities can, if utilised, have important impacts on the level of access charges as the access charges could be set at lower levels compared to the present situation. In this way the position of rail could be improved relative to other modes as the cost of use of rail infrastructure would converge towards the cost for alternative modes. As a side effect this would improve the financial position of the TOCs making franchises more attractive to potential bidders.

A basic principle for the alternative access charging system

The development of the proposal for an alternative access pricing system is based on the assumption that if the train operating companies are to be charged for infrastructure use then users of other modes will be charged for use of their infrastructure as well. The present situation is characterised by an access charging system for the train operating companies letting them pay the full costs incurred by Railtrack without similar systems in place for other modes. This introduces an imbalance between rail and other modes to the disadvantage of rail. As rail can be considered to provide a potential solution to the problems related to increased car use, it is unfortunate that the current access charging system implies that the rail mode is in a disadvantaged competitive position. Therefore, we propose a system where it is assumed that other modes pay for access to their infrastructure.

The cost basis for the alternative access charging system

The identification of the relevant cost basis to be applied in the access charging system will together with the principle of similar charging procedures for rail and competitive modes determine the overall structure of the new system. It is important to notice that several possibilities with respect to the choice of cost basis exist and the chosen one by the Regulator represents thus just one option. The current cost basis includes the full costs incurred by Railtrack in operating and maintaining the rail network but excludes any other costs incurred elsewhere in the economy as the result of maintaining and using the rail network.

A useful step in the choice of a new cost basis is to identify the different cost categories regarding operation and use of the rail network. Table 1 offers an overview of the different costs for the rail network.

Table 1 - Social costs of operation and use of rail infrastructure

	Costs Incurred by Railtrack	Other Costs Incurred by Society
Short-run Variable Costs	Maintenance Costs, Electricity Costs	Pollution and Accidents
Fixed and Common Costs	Sub-zonal, zonal and National Common Cost Long Run Incremental Costs	Administrative Costs of Regulation and Safety, Other Environmental Costs

The table shows that the costs can be divided according to two dimensions: who incur the costs and the variability of costs. In the first column costs incurred by Railtrack are listed while the costs incurred by the society are shown in the second column. The cost categories in the first row of Table 1 vary according to the activity of the train operating company, while the components in the second row are fixed at least in the short-run with respect to the activity of the train operating companies.

Private or social cost basis

In the current access charging system only cost categories in the first column of Table 1 are considered. This system is thus based on what we will characterise as a private cost basis. However, as the operation and use of the rail network implies other costs to the society it can be argued that such costs should be taken into account in the access charging system. In this way externalities of the operation and use of the rail network will be internalised in the decision making process of the train operating companies. A so-called social cost basis will characterise the inclusion of these costs. A social cost basis will support a view of the rail system in terms of the possibilities to promote social objectives rather than private objectives such as short-term profitability.

Marginal social costs or average social costs

In addition to the decision regarding the use of a private or social cost basis is the choice about which costs to include in the access charging system according to the second dimension of Table 1. Costs of operating and using the rail network can be grouped as short-run variable costs and fixed and common costs according to whether they depend on the activity level of the train operating companies. The train operating companies should be charged for variable costs irrespective of who incurs the costs as these costs are related directly to the activity of individual train operating companies. In other words Railtrack or the society would have avoided these costs if train operating companies had decided not to provide train services. Therefore, the alternative access charging system will include a track usage charge to cover Railtrack's maintenance costs for the wear and tear caused by individual trains using a particular track. In addition, as Railtrack incurs the electricity costs related to train operators running electrified services it is appropriate that these operators are charged for their costs. Both components are included in the present access charging system: Track Usage Charge and Traction Current Charge. It is likely that these components will be calculated in a similar way as in the present system since they will be based on the same data. Furthermore, the train operators will be charged for the costs of pollution and accidents incurred by society as the result of their service activity. Obviously, it is difficult to obtain precise measures for these effects regarding individual operators' contribution but provided that other modes pay for these costs it is appropriate that rail operators are charged. Therefore, the difficult question relates to whether or not the fixed and common costs should be included in the access charging system. At the outset it should be mentioned that the analysis of this aspect will not be restricted by the requirement in the 1993 Railways Act that Railtrack's fixed and common costs have to be covered in the access charging system. Below, we will simply examine the arguments for and against inclusion of fixed and common costs in the access charging system and then recommend what we consider most appropriate. A separate examination will be undertaken for fixed and common costs incurred by Railtrack and fixed and common costs incurred elsewhere in the economy in order to keep the analysis as simple as possible.

Fixed and common costs incurred by Railtrack

The main argument for inclusion of the fixed and common costs incurred by Railtrack in the present access charging system is the aim of making Railtrack commercially viable. In the present structure this commercial viability is achieved through imposing access charges on the train operating

companies at such a level that revenue subsidies are necessary for all train operating companies to be able to operate in a market environment. It is, indeed, an open question why it is better to give subsidies to the train operating companies in order to make Railtrack commercially viable rather than provide Railtrack with a direct subsidy. Therefore, we will examine these costs more closely, in terms of what they contain, who benefits from these costs and who should accordingly fund them, in order to decide whether they should be included in the access charging system.

As described above the fixed and common costs incurred by Railtrack cover roughly two types: (i) common costs, (ii) long-run incremental costs. The first component can, as mentioned be further disaggregated into sub-zonal, zonal and national common costs. These costs do not depend on the use of the rail network by individual train operators but rather on how the network is operated and maintained by Railtrack. Therefore, these costs are regarded as fixed costs from the point of view of the train operators, as Railtrack will incur these costs independent of the activity of the train operators. The common costs incurred by Railtrack can, however, be changed if Railtrack changes the way it operates and maintains the rail network. It should be mentioned that although the individual train operators' activity do not influence the common costs, it remains a possibility that the aggregated activity level can have an impact on these costs. For instance, if total train kilometres increases it might be necessary for Railtrack to increase several common cost components such as emergency teams and security staff, but the link between this cost increase and individual train operators would be insignificant. The long-run incremental costs reflects the costs in the long term of maintaining and renewing the railway infrastructure attributable to the operations of an individual train operator. These costs do not depend on the individual train operator's activity pattern unless train operation cease completely on a specific segment of the network. From the point of view of TOCs these costs are fixed. Railtrack can, however, change these costs by adjusting its renewal investment policy. Common costs and long-run incremental costs are thus regarded as fixed by the TOCs and both are only weakly or not at all related to their activity level, rather they are related to how Railtrack operates and maintains the rail network.

Having established the nature of the fixed and common costs incurred by Railtrack we will now consider who benefits from these costs. Three groups can potentially benefit from the activity undertaken by Railtrack in relation to the operation, maintenance and renewal of the rail network:

- Train Operating Companies;
- users of train services (passengers, users of freight services);
- non-users (general public, travellers from other modes, business).

Obviously, the train operating companies derive benefits from a good maintained or renewed rail network as it improves the competitive position of rail compared to other modes. However, the train operating companies only benefit to the extent that they can pass the benefit on to the direct users of train services, i.e. that it is possible for the TOCs to sell train services. Therefore, we can concentrate on the following two groups: users of train services; non-users. Users of train services benefit from the maintenance of the rail network as it is a precondition for undertaking any rail journey. Furthermore, to the extent that maintenance or renewal of the network result in improvements of train journeys, such as increased reliability, comfort, reduced journey times, users will benefit. In addition to the benefits derived by users of train services, it is possible that non-users benefit as well. These benefits are the result of externalities in relation to the operation and maintenance of the rail network. For instance, if a renewed rail network implies that travellers switch from car to rail then the non-switchers benefit from reduced congestion and the general community benefit from reduced pollution. The fixed and common costs incurred by Railtrack can be covered through fares paid by the users of train services, or from government subsidies.

The first approach implies that these costs are passed on to the users of train services. Alternatively, these costs will have to be covered by the Government through subsidies with taxpayers being ultimately levied these costs. At this stage it should be noticed that the first approach implies that these costs are included in the access charging system for the train operating companies while the second approach does not require this. Two possibilities are available for that model: (i) subsidies to the train operating companies (i.e. the access charging system includes fixed and common costs), (ii) a direct subsidy to Railtrack for these costs (i.e. the access charging system excludes fixed and common costs). If it can be concluded that only the users of train services derive benefits from the fixed and common costs incurred by Railtrack then there would be a strong case for arguing that this group should be charged for these costs. This would then imply that the fixed and common costs should be included in the access charging system. However, as discussed above it seems very likely that non-users also benefit from these costs. Therefore, a system where users of train services as well as non-users (taxpayers) contribute to cover these costs seems appropriate corresponding to the distribution of benefits for these groups. As described above this does not remove the possibility for a system where the fixed and common costs are included in the access charging system provided that these costs are not passed fully to the users of train services but covered partly through subsidies to the train operating companies. Two problems emerge from the inclusion of these costs in the access charging system:

- subsidies are politically uncertain;
- the limited scope for train operating companies to benefit from renewal investments.

Subsidies to the train operating companies are viewed as an uncertain income source influenced by political mood changes. Inclusion of fixed and common costs increases the need for subsidies and thus also the share of TOC income from this uncertain source. Therefore, it is possible that potential bidders will consider the franchises less attractive with inclusion of these costs compared to a system without the costs. This in turn would imply franchise agreements on less advantageous terms for society or problems in obtaining franchisees in all cases. The other problem concerning the inclusion of fixed and common costs in the access charging system refers to the specific costs in relation to renewal of the rail network. The benefits from a renewed rail network are likely to be spread over a long time period. However, the franchise period might be too short for the TOCs to reap the benefits from the renewed infrastructure. The immediate solution would be to extend the franchise period but this would be at the expense of reduced competition in the provision of train services. As one of the objectives with privatisation of BR is to introduce more competition in this sector, a longer franchise period would not represent a viable solution. Therefore, it can be argued that at least the costs related to renewal of the rail network should not be included in the access charging system. A better alternative is represented by giving Railtrack a subsidy for renewal investments.

Fixed and common costs incurred by Society

Before examining in detail how to take into account these elements in the specification of the access charging system we will briefly consider the fixed and common costs incurred elsewhere in the economy as the result of the operation and use of the rail network. These costs can be grouped as follows:

- costs incurred as the result of the operation of the rail network;
- costs incurred as the result of the aggregated use of the rail network.

The first group involves the interaction between Railtrack and society while the second group is concerned with the interaction between train operating companies overall and society. Both cost

categories are caused by the existence of negative externalities of operation and use of the rail network. Two possibilities exist for how to deal with these costs:

- the costs can be distributed on different segments of taxpayers;
- the costs can be distributed to the users of train services.

However, both possibilities can be ignored since these costs should already have been considered as part of non-users benefits, included as negative benefits. If we take them into account again non-user benefits would be double-counted. Obviously, it is possible that the non-users' positive and negative benefits are distributed on different groups. These imbalances can be corrected by tax instruments redistributing the positive and negative benefits. However, this issue is not of relevance to the specification of the access charging system for train operating companies and will, accordingly, not be considered further at this stage.

Specification of the alternative access charging system

The discussion above highlighted a number of issues which should be taken into account in the specification of an access charging system for train operating companies. These issues can be summarised as follows:

- variable costs incurred by Railtrack or elsewhere in the economy should be included;
- fixed and common costs apart from renewal investments incurred by Railtrack can be partly included in the access charging system according to the net benefit distribution among users and non-users of train services;
- costs in relation to renewals of the rail network will be covered through a direct subsidy to Railtrack;
- fixed and common costs incurred elsewhere in the economy are taken into account as part of (ii).

These points suggest two possibilities for the specification of the access charging system:

- Marginal social cost access charging system; or
- Adjusted marginal social cost access charging system.

Marginal social cost access charging system

The first possibility implies that only variable social costs are considered in the access charging system. Train operating companies are charged for the marginal social costs caused by their use of the rail network. Fixed and common costs incurred by Railtrack are to be covered through a direct subsidy to Railtrack. Ultimately, this subsidy will have to be based on tax revenues. Both users and non-users of train services will contribute towards the funding of these costs as taxpayers. The main advantages of this specification are the correspondence between this system and the welfare theoretic recommendations for pricing rules as well as its simplicity. Furthermore, this system provides the possibility for a firm public funding of renewal investments of the rail network which could lead to an improved competitive position for rail. One problem concerning this system is to secure optimal subsidy levels, i.e. how to control Railtrack. Without control instruments in place the suggested system can lead to increases in subsidy levels beyond the ideal level. However, if the public authority controlling Railtrack is given an active role in the decision on subsidy levels then it would be possible to achieve optimality. This active role could be supported through an integrated appraisal of spending plans for different modes aiming to allocate the resources in the best possible way given the funding restrictions and the stated transport policy objectives.

Adjusted marginal social cost access charging system

This specification is similar to the previous one apart from that fixed and common costs incurred by Railtrack are to be included in the access charging system (excl. costs of renewal investments). The inclusion of these costs in the access charges could be based on a ramsey pricing rule such that fixed and common costs are allocated on train operating companies according to the price elasticities they face in the market. Train operating companies with a high price elasticity should bear a relatively small share of these costs while train operating companies with a low price elasticity should have a relatively larger share. As a ramsey pricing rule does not secure full allocation of fixed and common costs it might prove necessary to provide Railtrack with a subsidy in addition to the subsidy for renewal investments. Implicitly, this system assumes that non-user benefits are restricted to the activities in relation to the renewal investments and not to other fixed and common costs. The main advantage of this system is again the firm support for renewal investments. Similar to the first mentioned system the main problem is how to secure optimal subsidy levels but proper planning arrangements can provide a possible solution.

Choice of access pricing system

The choice between these two systems depends to a large extent on the distribution of benefits among users and non-users of train services with respect to the fixed and common costs. If non-users of train services derive significant benefits from these costs then the marginal social cost approach is the preferred option, otherwise the adjusted marginal social cost approach should be chosen. Both systems represent improvements compared to the present access charging system. The improvements include the following:

- firm support for renewal investment
- equal charging procedures for rail and competitive modes
- promoting social objectives
- social cost basis

The two proposals for access charging system take into account the variable costs incurred by Railtrack and elsewhere in the economy and thereby allow for the use of rail infrastructure based on social optimality. This alternative charging system would change the nature of the Government's funding of the railway industry. In contrast to the present situation where Railtrack generates a profit and the train operators are the recipients of subsidies, the proposed system could lead to the train operators generating profit while Railtrack is subsidised.

CONCLUSIONS

This paper has reviewed the details of the access pricing system, chosen by Railtrack and highlighted a number of issues relating to the calculation of the access charges. The system, not surprisingly, given the complexity of many of the issues, appears to resemble a compilation of available, and easily applicable, practice that has been traditionally utilised in the railway industry. The resulting *potpourri* of a methodology, inevitably, raises a number of concerns. These range from the relatively superficial, which are in the process of being alleviated or addressed, to those of a more fundamental nature, which appear to reflect the constraints, or requirements, imposed on Railtrack, and which are more difficult to address. However, the choice of access pricing system has a more important, and unfortunately neglected, role, than the mere commercial success of Railtrack, or more generally, the success of rail privatisation. The choice of access pricing system, or the factors that raise the level of prices, have a significant role to play in the social efficiency of the rail

industry, within the overall transport market. The dogmatic pursuit of commercialisation within the rail market, combined with a failure to address a fundamental issue relating to the underpricing of the road based modes, is inimical to the broader social good. The concomitant environmental problems of that imbalance are likely to increase unless a similar policy of infrastructure, are introduced in the rest of the transport market.

Therefore, this paper has suggested alternative ways of specifying access pricing system to be implemented with the aim to give rail an increased role in the transport market. Train operators are to be charged according to either their marginal social cost including cost of pollution and accidents or their adjusted marginal social costs (the adjustment being the result of including fixed and common costs, apart from renewal costs, incurred by Railtrack). The train operating companies will only be charged if other competitive modes are charged on the same basis. The advantage of these access charging systems is that both contain the possibility to give rail an improved position relative to other modes and thereby can alleviate the environmental problems related to the expected increase in car use. However, this will be only be achieved if infrastructure user charges are applied across all modes.

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