

**Separating Railway Infrastructure and Operations:
the British Experience**

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INTRODUCTION

It remains to be seen how well vertical separation will work in the railway industry. As in electricity, a key issue is whether enough benefits of effective competition can be realized to outweigh additional costs of coordination in a deintegrated regime, for example, in relation to quality control. The complex economic characteristics of rail services, and especially the difficulties of contract specification and enforcement, suggest that efficient and competitive franchising will be difficult to achieve (Armstrong, Cowan, Vickers, 1994, pp.357-358).

1. In April 1994 railway operations and infrastructure in Great Britain were separated. A new organisation, Railtrack, became responsible for the provision of track, signalling, electric power supply, stations and other infrastructure. In late 1994 the UK Government announced its intention to privatise Railtrack, apparently by early 1996. This paper will consider the experience to date with this new organisational structure. In particular, it will consider: the methods used to determine track charges; the initial set of charges announced; the role of the Rail Regulator in assessing both the structure and level of charges; and an overall assessment of the likely success of the complicated new organisational arrangements.

RAILWAY SERVICES IN BRITAIN UP TO 1994

2. Britain's railways were nationalised in 1948, when the four main private railway companies (and a few smaller ones) were brought under public ownership. The only other railway services of any significance at all on mainland Britain were the London underground services operated by London Transport, itself a nationalised organisation. British Rail has undergone various organisational changes during its existence. Since the 1974 Railways Act, subsidies for passenger services have been provided under the Public Service Obligation (the PSO) from Central Government, and through subsidies from the Passenger Transport Executives in the main conurbations outside London. The 1974 Act stabilised the passenger network after a period of substantial route closures in the 1960s and into the early 1970s. The most significant change since then has been the internal re-organisation of management into business sectors. This in turn culminated in the Organising for Quality (OfQ) reorganisation just before privatisation.
3. Table 1 shows financial results for the different business sectors in 1993/94. The InterCity sector had not been eligible for subsidy since 1988, and so the subsidised railway consisted of Network South East and Regional Railways. Network South East provided commuter rail services around London, and in and beyond most of the South East region of the country. In 1993/94 its services accounted for 43.4 per cent of passenger-kms operated on BR. Regional Railways provided all other services outside Network South East and the InterCity routes, including commuter services outside London, rural services and some long-distance cross-country services. The sector accounted for 19.1 per cent of passenger-kms in 1993/94, and had an operating ratio

between fare revenue and operating costs of 0.46 in that year.

4. InterCity was organised into route-based divisions based on the main routes (East Coast Main Line; West Coast Main Line; Great Western; Midland Main Line; InterCity Cross-Country; Anglia; and Gatwick Express). It accounted for the remaining 37.5 per cent of passenger-kms, and had an operating ratio of 1.12 in 1993/94, a year in which the economy was still adversely affected by recession.
5. The remaining sectors handled freight and parcels. Trainload Freight dealt with full trainload traffic for the coal (and electricity generation), steel, construction and oil industries. It had been suffering losses of traffic with the declining market for power station coal following electricity privatisation, but nevertheless had an operating ratio of 1.25 in 1993/94. The other businesses have not been profitable. Railfreight Distribution (RfD) handled traffic for the automotive, chemical and other industries, and was responsible for the Freightliner container business (which largely handles short-sea and deep-sea maritime traffic) and the limited amount of train ferry traffic to and from Europe. RfD has also been responsible for the development of facilities and services for handling freight traffic through the Channel Tunnel, which opened for through rail freight traffic in 1994. RFD's business has always been vulnerable to competition from road hauliers, and, despite successive reorganisations, it has not succeeded in covering costs. Neither has the parcels business, whose main traffics were BR's own premium parcels traffic (Red Star) and mail traffic for the Post Office handled by Rail express systems.

RAILWAY PRIVATISATION IN BRITAIN

The system of privatisation

6. The railways will be one of the last former nationalised industries in Britain to be privatised. One of the main reasons for the delay has been the need to provide subsidies to support unprofitable passenger services. A form of privatisation has therefore had to be devised which provides a continuing mechanism for injecting subsidy into the system in order to avoid the need for large-scale route closures. Because of the need for subsidy, the railways could not be seen as a source of large-scale revenue from privatisation sales as were the telecommunications, gas, electricity, water and other formerly-nationalised industries.
7. A variety of methods were proposed for privatising British Rail. These included the "BR plc" option, which would privatise BR as a single unit; the "sector" option, which would sell off the existing business sectors; the "regional" option, which would set up a number of route-based companies; the "track-authority" option, which would create a separate private track company which would allow competition on its network; and the "franchising" option, which would franchise out rail services to separate private sector bidders. As

I have shown (Dodgson,1994b), all of these options presented problems. However, the system eventually chosen combines important elements of the "track authority" and "franchising" options.

8. The British Government produced a White Paper on railway privatisation in July 1992 (Department of Transport, 1992a). This was followed by a number of documents clarifying the proposals (see in particular, Department of Transport, 1992b, 1993a, 1993b, 1993c), and a Railways Act which passed into law at the end of 1993. The main provisions of this Act came into operation on April 1st 1994.
9. As noted in the introduction to this paper, British Rail has been split into two organisations. Railtrack took over responsibility for railway infrastructure in the form of track, signalling, electric power supply, stations and light maintenance depots. It co-ordinates timetables, and operates the signalling systems. Railtrack is a public sector organisation which was set up initially as a subsidiary of the British Railways Board but became independent in April 1994. In late 1994 the Government announced its intention to privatise Railtrack by floating it on the stock market. Railtrack is required to cover its costs by charging for its facilities and earning a commercial rate of return on its assets.
10. Two other new organisations have been created. The Office of Passenger Rail Franchising (OPRAF) and its Director General are responsible for franchising out rail passenger services and channelling government subsidy funds to the successful bidders. The Office of Rail Regulation and the Railway Regulator are responsible for ensuring that access to the network and track charges are fair, that competition is promoted, and that consumer interests (including network benefits) are protected. The Regulator licences train operators and the managers of railway infrastructure, and he approves access agreements or requires changes. He can also require Railtrack to provide access where they are reluctant to do so.
11. The Health and Safety Executive (HSE) oversees railway safety matters. All train operators are obliged to produce a railway safety case demonstrating that they have systems in place to manage their operations safely. These safety cases need to be validated by Railtrack before operations can begin. Railtrack and the HSE monitor safety performance. Railtrack's own safety case is validated by the HSE.

Passenger services

12. All present rail passenger services except for charters and the Eurostar Channel Tunnel services will be franchised in due course. To this end, the passenger business has been divided into twenty five separate components. Until these businesses can be transferred to the private sector, they have become the responsibility of new train operating units (TOUs) formed within BR. The Franchising Director issued a pre-qualification document for the first

eight franchises in December 1994. These eight service groups account for over 40 per cent of passenger traffic on British Rail.

13. Thirty-seven companies expressed interest in these services by the initial deadline in March. As well as management teams, these organisations included bus companies and Virgin. Other major companies thought to have applied to pre-qualify include British Airways, Sea Containers, Southern Water, and London and Continental Railways. The deadline for applications to pre-qualify for the Great Western, South West Trains, and London Tilbury and Southend services was extended to April 13. OPRAF then issued the invitations to tender for these three services in May, with responses required by July 28th. The deadline for applications to pre-qualify for the remaining five of the first group of eight franchises was extended to June 2, with invitations to pre-qualify for the next (as yet undecided) group expected to be issued before the end of the year.
14. Train operating units, and the franchised train operating companies which will succeed them, will pay track access charges to Railtrack. These track access charges have initially been negotiated between the Franchising Director and Railtrack, and have then been modified and approved by the Railway Regulator. In effect, the Franchising Authority will underwrite the access charges, though in later rounds Railtrack will bear some of the risk. Train operating units/companies will also lease their rolling stock. To this end three rolling stock leasing companies, each owning some 3.500 passenger vehicles, have been formed within British Rail. The Government aims to offer these companies for sale to the private sector by the end of 1995. Passenger train operators will also need access to passenger stations as well as to track and signalling. The leasehold of these stations is vested in Railtrack, who will lease out the stations to the services using them. Railtrack is also considering selling/leasing major station sites to independent companies.
15. In principle, a bidder for franchise might bid a positive sum to win the contract to operate the service. However, the level of track charges announced for the franchise groups were such that the Franchise Director is likely to have to pay subsidy for all but one of them. This is still likely to be the case after the Regulator's subsequent reduction in charges for 1995/96. The contract between OPRAF and the franchisee will specify minimum service standards, such as the minimum frequency, punctuality and reliability. It was originally expected that there would be some limits on franchisees' abilities to raise fares in those cases where, as in the London commuter area, rail services had monopoly power. However in May 1995 the Government and the Franchising Director announced much more general fare controls. From 1996 to 1999 there can be no real fare increases on three major ticket types throughout the rail system: these are Saver tickets (one type of cheap fare ticket), standard returns where no Savers are available; and all standard weekly season tickets. From 1999 to 2003 these fares must be reduced by one per cent per annum below the Retail Price Index. In London the average price of a wider range of tickets (all standard seasons, standard singles, unrestricted standard returns,

and London Travelcards) will also be covered by these controls. In addition fare changes in London will also be subject to performance incentives. These controls, widely interpreted as an attempt to reduce opposition to rail privatisation, reverse previous government policy in regard to real levels of rail fares, and further reduce franchisees' freedom of action.

16. An original aim of splitting off infrastructure from operations was to encourage competition on the network, in other words to make the provision of rail services (as opposed to infrastructure) more contestable. To this end, "open access" competition was to be encouraged. However, such competition will be limited in the early days of franchising so as to encourage franchise bids. The limits on open access competition were set out in February 1995 (ORR, 1994e). There will be two stages. From the approval of the last train operating unit's long-term track access argument, until March 31st 1999, operators will nominate a list of point-to-point flows. These will be protected from open access competition. Then, in a second period, from 31st March 1999 up to 31st March 2002, protection will be more limited. Operators will nominate a revised list of flows about a year before this second period starts: new entry would then be permitted up to a threshold level of 20 per cent of the total revenue these flows represented. Operators would then have to choose how many flows to nominate: if they nominated too few flows then they would leave some potentially contestable markets without protection; however if they nominated too many flows they would leave a bigger share of their contestable revenue open to competition.

Freight and parcels services

17. BR's freight and parcels services are being sold to the private sector. Red Star Parcels were offered for sale in 1993, but there were no acceptable bids. Trainload Freight services have been reorganised by adding in contract services from Railfreight Distribution, and by dividing the sector into three separate regionally-based organisations (Loadhaul, Mainline, and Transrail) which have taken over responsibility for the various depots operated by Trainload Freight, for the freight locomotive fleet, and for existing long-term freight haulage contracts that run beyond 1994. These three companies will be offered for sale to the private sector. They will operate by paying negotiated track access charges to Railtrack. They will be free to compete with each other, and will also face the possibility of competition from new private sector rail freight companies securing access to the network through "open access" provisions.
18. The position of the unprofitable Railfreight Distribution is less certain. The European business will be privatised once the Channel Tunnel freight services are established. The private sector has been invited to submit proposals for the loss-making Freightliner business. Rail express systems, which signed a new long-term contract with its main customer, the Post Office, at the end of 1993, has been offered for sale to the private sector.

CHARGING FOR ACCESS TO THE NETWORK

Charging principles

19. Rail users pay access charges to Railtrack. There is an important distinction between "administered" and "negotiated" charges. The "administered" charges are the charges for the TOUs/TOCs agreed between OPRAF and Railtrack, and then modified and approved by the Regulator. "Negotiated" charges apply to all other traffics, and are again subject to approval by the Regulator. Income from access charges and from other sources of revenue, mainly property, will have to cover Railtrack's costs, and earn the Company an acceptable rate of return on the replacement value of its assets. This rate of return was set by Government at 5.1 per cent (on assets valued at £6.5 billion on a modern equivalent asset value basis) in 1994/95, the first year of Railtrack's operation, and was to rise to 8 per cent per annum over four years. However this requirement has now been superseded by the Regulator's decision on the level of rail track charges for the period from 1995/96 to 1999/2000 (see section 4.3 below).
20. One clear principle which emerged from the Government's discussion document on access charges which was published early in 1993 (Department of Transport, 1993b) was that all train operators should pay at least the avoidable costs of the infrastructure they use. This seems to be a sensible rule, but it raises two main questions. The first is that of determining the avoidable costs of any particular type of traffic; the second is that of deciding how to charge for the remaining Railtrack costs which cannot be allocated as "avoidable" to any of the train operators. The second problem is particularly important because the access document noted that work "carried out by British Rail and the Government's advisers Coopers and Lybrand has confirmed that the majority of rail infrastructure costs are 'common', that is, they cannot be uniquely attributed to a particular operator or class of operator" (Department of Transport, 1993b, p.9).
21. Railtrack charges avoidable costs under a number of categories. Two types of usage-related charges, track usage charges, and traction current charges cover operators' short-run avoidable costs (and a third type, peak charges, may be introduced at a later stage). Directly attributed fixed costs cover the long-run incremental costs (LRICs) that arise specifically because of the infrastructure requirements of the particular operator.
22. The remaining charges have to cover non-avoidable, or common, costs. Railtrack has devised three categories into which to allocate these common costs:
 - (1) **common costs incurred for the use of specific sections of track.** These are costs which cannot be counted as avoidable to any of the users of a specific section of route when that route is used by the trains of more than one operator.

- (2) **common costs which can only be identified to a geographic area.** These are costs such as those of power signal boxes which control a number of routes used by different train operators.
 - (3) **network costs.** These are the costs of providing the network which cannot be allocated more specifically to individual routes or geographic areas.
23. **Track usage charges** reflect the costs of wear-and-tear on the track, and vary in practice with the type, weight, number and speed of trains. British Rail engineers have for a long time had matrices which show the differential maintenance costs of different types of track by gross train weight, line speed and axle weight. This track maintenance matrix method is known as mini-MARPAS. The track usage charges levied by Railtrack are based on national averages per train-mile for particular types of rolling stock. However, such costs only account for three per cent of total track charges (ORR, 1994d).
 24. Of the usage-related charges, **traction-current charges** would seem to be the most straightforward. However, electric trains are not fitted with traction current meters, though the Regulator has said that it is desirable that in the longer run they should be, so computer models have had to be developed to predict the consumption used by different types of stock under different types of operating condition and at different times of the day. Consequently, operators are charged on the basis of their train-mileage, using tariffs which vary according to geographical zone, time-of-day, time-of-week and year, and modelled consumption rates for each type of train configuration. Traction current charges account for six per cent of total track charges (ORR, 1994d).
 25. **Peak charges** are said to be related to the costs of access to the network when infrastructure is congested at peak times. The basis on which to assess such charges has not yet been determined, though economic theory would suggest that the appropriate charge in such circumstances where capacity is fixed is the access payment which the marginally-excluded service would have been prepared to pay.
 26. There has been considerable experience in measuring the avoidable costs of infrastructure that form the basis of **directly attributed fixed costs** i.e. long-run incremental costs. Under the 1974 Railways Act freight services were not eligible for subsidy, which was directed specifically at passenger services under the Public Service Obligation system. Nevertheless, freight was treated reasonably generously because only those track and signalling costs specifically incurred for freight traffic were to be allocated to the freight businesses. This meant it was necessary to determine such freight avoidable costs. These costs included not only the infrastructure costs of those sections of route used only by freight trains, but also such costs as those of refuge loops needed to sidetrack freight trains, marshalling yards, freight depots, and the track and signalling facilities needed to gain access to them.

27. The measurement of avoidable costs was taken further with the establishment of sector management in the 1980s. Now it was necessary to establish the avoidability of track and signalling costs where trains from two or more passenger sectors shared the same route. The approach adopted was to establish a hierarchy of users on each section of route. Because of the provisions of the 1974 Railways Act, freight was always the marginal user. If the route carried freight trains, then avoidable freight costs would be allocated to the freight sector. Initially passenger costs were then allocated according to the prime user method. Any costs which could be avoided if the passenger trains belonging to the lowest passenger sector in the hierarchy no longer ran would be allocated to this sector, and all remaining track and signalling costs at the end of this process would be allocated to the "prime user". Later BR adopted a modified method, the "sole user" method. Under this, the hierarchy of users remained the same, but the first in the hierarchy would determine the track and signalling costs necessary for its traffic, the next in the hierarchy would determine whether any additional costs would be needed for its trains, and so on. This method would therefore identify any surplus capacity costs.
28. These techniques, and the data that had to be generated to implement them, have been used to assess long-run incremental costs. Railtrack assesses for each section of route the long-run costs that would be avoided if a particular traffic were not to be carried: that is to say, each operator is treated as if they were last on the network. The cost estimates for franchised services are based on the cost of the modern equivalent infrastructure needed to support the services run by the individual TOU over and above that required for other TOUs using the same infrastructure, whereas costs for freight operators are assessed on the basis of existing costs which would be avoided. These procedures have led to about half of fixed access costs being allocated to this category (Bolt, 1995). Common costs account for the remainder.
29. The Government's access document rejected the alternative of allocating common costs by charging all train operators a standard charge per traffic unit. This would be unsatisfactory because some potential users would not be able to pay such fees, so that their traffic would be lost, and then the remaining common costs would be loaded onto the remaining operators. In practice common costs are allocated by a mixture of "administered" and "negotiated" methods. For the franchised services with their administered charges the method is formula-based, with sub-zonal costs (about half the total) allocated on the basis of passenger vehicle-miles, and zonal and national costs (the other half of the total) allocated on the basis of revenue (ORR, 1995a). For open access and freight operators, common costs are to be recovered in so far as possible by negotiation (though in practice it seems most common costs will be recovered from the franchised sector).

1994/95: the first round of administered (but unregulated) charges

30. The Government announced the first set of provisional access charges for

1994/95 for twenty-four BR train operating units in Parliament early in 1994. These initial charges were not subject to approval by the Regulator. The provisional charges totalled £2,183 million (see Dodgson, 1995a, for a breakdown and analysis in terms of unit costs), but in the event actual charges levied on the TOUs were close to £2 billion. Since Railtrack's total costs in 1994/95 were £2.4 billion, this means that £400 million was raised from freight and open access passenger services, and from activities (mainly property income) which are excluded from regulation. Of the total of £2,410 million Railtrack costs in 1994/95 (Office of the Rail Regulator, 1995a), £1,500 million are given as operating costs, £560 million as asset renewals on a modern equivalent asset value basis, and £350 million as return on capital.

31. Table 2 shows a breakdown of the provisional 1994/95 access charges for the train operating units in the three former business sectors. Charges per route-km were highest for the densely-trafficked Network South East lines, with lower charges for former InterCity and Regional Railways routes. InterCity trains require higher speed and quality track, but use routes which have fewer trains than Regional Railways. Access charges per train-km were highest for InterCity, then Network, then Regional Railways. Because of the differences in passenger loadings, the position for access costs per passenger-km was reversed, with former Regional Railways highest, then Network, then InterCity.
32. The last column of Table 2 shows that access charges were likely to account for around 75 per cent of passenger revenue for former InterCity services, and around 80 per cent for former Network South East ones. On former Regional Railways services passenger revenue only accounted for half of access costs. All the former InterCity routes except the Gatwick Express had access costs accounting for more than 70 per cent of passenger revenue, implying the Government will have to pay subsidy for their operation in the private sector. (On the Gatwick Express service access costs only account for one-third of revenue.) On former NSE services access costs varied from around 60 per cent to around 125 per cent of revenue, again implying the need for Government subsidy. On former Regional services access costs varied from around 160 to around 280 per cent of passenger revenue and the need for subsidy is not in doubt.
33. What was particularly striking about these charges was how little they varied with output. As noted in section 4.1 above, traction current charges accounted for six per cent of total costs. (Fifty-two per cent of passenger train mileage is electric: 52 per cent on InterCity, 88 per cent on Network South East, and 17 per cent on Regional Railways). Track usage charges accounted for approximately three per cent of costs (even when traction current is excluded from total costs). LRICs were also not broken down by sections of route. For example InterCity Midland Main Line's total charge of £45 million was broken down into five categories: fixed track access (86 per cent of the total, and not disaggregated in any way); station track access (a single charge for each station); depot leases (a single charge for each of the

two depots); station operator (as opposed to access) charges; and track usage (broken down by vehicle type). Since this TOU does not use electric traction, only the last category varies with usage and accounted for only 3.75 per cent of track access charges for the TOU. Other non-electric TOUs had variable costs closer to one per cent of total access charges.

1995/96: the second round of administered charges: the Regulator steps in

34. In July 1994 the Regulator issued consultation documents on competition for passenger services (ORR, 1994a) and track access charges for passenger services (ORR, 1994b). These were followed by a consultation document on track access charges for freight services in October 1994 (ORR, 1994c). The Regulator's policy statement on the structure of passenger charges was published in November (ORR, 1994d), and was followed by policy statements on competition for passenger services in December (ORR, 1994e), the level of passenger access charges in January 1995 (ORR, 1995a) and access charges for freight services in February 1995 (ORR, 1995b).
35. The main responses of train operating units to the consultation document on track access charges were to: oppose the use of MEAVs for calculating depreciation charges for assets which in some cases would not be replaced; argue that depreciation charges should be closely related to actual replacement spending by Railtrack; agree that an (RPI-X) per cent formula should be used to regulate Railtrack's future access charges; complain that access charges were basically fixed, with very little variability; complain about the lack of transparency in charges ("only be a slight exaggeration to say that current track access charges from Railtrack are as transparent as concrete": InterCity Midland Main Line response); and argue that Railtrack should bear some of the revenue risk faced by train operators.
36. In his policy statement on the structure of charges the Regulator criticised the lack of variability in charges. He also believed there was a need for greater transparency of charges, and for Railtrack to share some of the risk of reduced profits if train operating companies' revenue were to fall. The Regulator proposed some immediate changes in the measurement of short-run variable costs, including basing charges on actual rather than budgeted train-miles, incorporating the effects of regenerative braking (which feeds current back into the system) into traction current charges, and removing anomalies in the 1994/95 charges. In addition traction current charges are to be indexed to the published index of electricity prices paid by industrial users, so as not to dull Railtrack's incentives to negotiate prices with electricity suppliers.
37. These modifications appear to be sensible but clearly do not address the main issue, which is the great mass of fixed charges. Here the Regulator requires a process where variability of costs becomes more transparent. Railtrack is to be required to disaggregate the elements of its existing fixed charges. In particular, the Regulator expected Railtrack to provide information to operators (based on the mini-MARPAS system) on the LRICs of running their

services on different sections of route (i.e. geographically, though not by each individual service provided by the operator) from April 1995. From the same date he also expected Railtrack to break down each TOU's share of Railtrack's zonal and national overheads, with separate identification of components such as general management, British Transport Police, and insurance. In addition, train operators are to be able to require Railtrack to provide "what if" analyses which investigate the impact on track and signalling costs of changing services, with information on the appropriate lead times. In the Regulator's words "Better information will be a solvent which helps to break down the mass of fixed costs" (ORR, 1994d, p.3). In order to facilitate this process of re-negotiating existing access rights, there will be a process of arbitration to determine benefit-sharing which will be binding on Railtrack (and subject to final approval by the Regulator).

38. The policy statement on the level of charges (ORR, 1995a) required Railtrack to reduce its charges in 1995/96 by 8 per cent in real terms from their 1994/95 levels, and by 2 per cent per annum thereafter up to 2000/01. The two per cent (ie the X in the RPI-X) was based on the Regulator's assessment that Railtrack could secure improvements in operating costs of 3 per cent per annum, and that there was scope for significant savings in infrastructure maintenance costs (largely supplied under contract from BR Infrastructure Service companies). The remaining six per cent of the eight per cent first year reduction was a reduction in return on capital. The Regulator did not accept that an 8 per cent rate of return on a modern equivalent value of capital was necessary. He refused to take a view on the value of Railtrack's assets nor on the appropriate rate of return, basically arguing that this was a matter for the market to decide. Instead the overall reduction in the return on capital element of charges was based on his assessment of the balance between his various duties towards securing the financial future of Railtrack and duties towards protecting the interests of railway users, and promoting efficiency in the provision of rail services, the use and development of the network, and the achievement of competition in the provision of rail services. These regulatory decisions on levels of access charges will eventually feed through to Railtrack's stock market valuation when it is privatised.
39. The Regulator also accepted that access charges should cover depreciation on a current cost basis so as to enable Railtrack to renew infrastructure assets in modern equivalent form. However he also appreciated that Railtrack might have incentives not to renew, but to let capital quality deteriorate. Consequently the Regulator is to monitor Railtrack's performance at a national level: in practice this may prove to be difficult. Finally the Regulator ruled that variations in net income from Railtrack's property income projections are to be shared with train operators. A further regulatory review of access charges will be conducted in the year 2000, for implementation from the 2001/2002 financial year.

Freight access charges

40. The Regulator's consultation document on freight charges was published in October 1994 (ORR, 1994c), and the resulting policy statement emerged in February 1995 (ORR, 1995b). The consultation document stressed both the need to ensure that freight traffic willing to pay its avoidable costs was not priced off the railway, and the need to ensure that Railtrack recovered all its freight-specific common costs, so that there was no cross-subsidization from the passenger business to the freight business. The Regulator proposed that freight access charges should be at or above the avoidable cost floor for the freight flow in question, and below any ceiling (perhaps based on standalone costs) agreed to determine the maximum access charges for that flow.
41. Avoidable costs consist of track usage charges and where appropriate traction current charges (but only 12 per cent of freight train-miles are electrically-hauled), plus the long-run costs for the freight flows which, as for passenger services, are taken as fixed. Ceilings were initially based on a Railtrack calculation of a "reference charge" derived from a national average estimate of the costs of a freight-only line. These reference charges determined prices for only a limited number of existing contracts, but for a higher proportion of total revenue.
42. Any contribution to common costs should be such as to ensure that Railtrack should be able to recover its total freight-specific costs, and would be value-based (i.e. reflecting the value, hence willingness-to-pay, to the rail freight user). Railtrack had estimated that the sum of the avoidable costs of each individual freight flow accounted for about half of its total freight-specific costs, and over half of all current freight flows are carried at the avoidable cost floor calculated for each individual flow. Despite this, Railtrack had also calculated that its 1994/95 income from rail freight users was approximately equal to its freight-specific costs. However, for 1995/96 it projected total freight revenue to be below its best estimate of total freight-specific costs.
43. In addition, the consultation document argued that to avoid unfair discrimination, the freight access charges should not be materially different from those charged to other customers competing in the same final market. The consultation document also suggested the possibility of using an (RPI-X) formula to regulate future freight access charges, and that the Regulator should require Railtrack to publish information on levels and trends in freight costs and revenues, though not at the level of individual flows.
44. The following policy document (ORR, 1995b) adopted the broad principles of the consultation document. It required that freight charges should be negotiated, but broadly non-discriminatory between competitors, and that charges should lie between a floor of avoidable costs and a ceiling of standalone costs which would be incurred by a notional efficient competitor. The charges should be value-based, and enable Railtrack to recover its total freight-specific costs plus any expected contribution to the shared common

costs of its passenger and freight services (though freight revenues are not expected to make any such contribution up to 2000/01).

45. Some adjustments are to be made to avoidable cost floors. No return on existing assets are to be included in avoidable freight costs - if the assets cannot earn an adequate return, they should be written down. Avoidable costs on single user freight-only lines should not include any costs, such as maintenance of road bridges, which would still have to be incurred by Railtrack even if it closed the line. Some long run costs are excluded from cost floors for freight traffics which share the line with other freight flows.
46. The Regulator will review freight charges which are more than fifty per cent of Railtrack's initial "reference charge" calculation of standalone costs. Railtrack is then required to assess standalone costs using specific data wherever available, and should relate them to the costs of an efficient operator who may have opportunities for attracting other existing freight flows. The Regulator expects standalone cost calculations to be based on the costs of operating the line in question, rather than constructing new facilities. It is clear that major problems remain in calculating and interpreting such standalone costs.
47. An (RPI-X) formula is not to be applied to freight access charges: instead the Regulator expects efficiency improvements to be shared with freight operators through the process of negotiating charges. The Regulator also believes that more published information on freight access costs is needed, and was to discuss requirements with Railtrack: possible candidates included total income from freight access charges, volumes of freight traffic by commodity, Railtrack's total freight-specific costs broken down by function such as maintenance, renewals, traction current, signalling, etc, and a single scatter diagram showing a representative range of avoidable cost floors and access charges per gross tonne-mile.

CONCLUSIONS

48. This paper has reviewed the progress so far in deriving access costs for the use of rail infrastructure in Britain. The charges derived have been based on economic principles rather than on systems simply related to traffic units such as train-miles or tonne-miles. However, if the hope of the architects of this aspect of rail privatisation was that the result would be a set of charges which varied widely so as to give good signals for the optimum use of the existing network, and for investment or disinvestment in the network, then such hopes must so far be disappointed.
49. However, the charges devised so far have been developed by a process of planning rather than through the operation of the market. The hope must be that once services are actually in the private sector, then real market pressures of negotiation and re-negotiation will start to break down the mass of fixed

costs quite quickly. This appears to be the Regulator's hope, though the negotiation process might turn out to be slow and cumbersome in practice. This may in part result from the monopoly power which Railtrack possesses: train operators (with the notable exception of Eurostar) are not going to be able to build their own infrastructure to by-pass Railtrack's charges. Railtrack also knows that governments may be unwilling to countenance major route closures for political reasons, so that if Railtrack loses some traffic the remaining common costs will ultimately be loaded onto the franchising bill. Operators also have the right to appeal to the Regulator to set access charges if they cannot agree charges with Railtrack, but again the process may turn out to be time-consuming (certainly in comparison with the alternative of simply using deregulated freight or passenger road transport).

50. Another uncertainty, clearly highlighted by the Regulator's fears that Railtrack might not re-invest its replacement cost depreciation, is the question of charging for quality, in terms of factors such as the reliability of signalling equipment and the quality of ride. Defining quality, as opposed to defining quantity in terms of such factors as train-miles or vehicle-miles, is a difficult matter.
51. There also remain questions about the level of charges. The Regulator's reduction in the level of charges early in 1995 was at the time interpreted as a tough response. However, the Regulator was working very much in a vacuum, with no clear idea of the value of Railtrack's assets (except for the Government's valuation of £6.5 billion, which was widely regarded as over-valued at the time). The reduced charges may still imply a relatively high valuation of Railtrack's assets since the main guarantee of the earning power of those assets is these self-same administered charges for franchised services which are now, in effect, underwritten by the government for the next six years.
52. Finally, as the quote at the beginning of this paper indicates, there remain serious fears about whether vertical dis-integration of railways is a good idea. Recent developments in the theory of access charging (see, for example, Vickers, 1995) concentrate on the question of finding optimal access charges, based on principles such as efficient component pricing, which ensure that competition with the "upstream" infrastructure owner in the provision of "downstream" services is fair and which do not lead to inefficient by-pass of the "upstream" operation. Access charges on Britain's railways do not lead to the first problem, because the "upstream" infrastructure provider Railtrack does not compete in final (i.e. "downstream") markets. But the aim of this was to achieve competition in the provision of train services, which so far has not happened. Hence there may be few benefits to be offset against the costs of co-ordination. It does seem that these costs of co-ordination are significant: after all if we wanted to know what kind of industrial structure free markets would provide for rail services, we knew the answer to this question by about 1830! In addition, vertical dis-integration can increase charges as successive operators in the vertical chain each add mark-ups to prices (Else and James,

1994). Finally, when (or if) open access for passenger services eventually arrives, there are difficult issues - considered in the consultation document on competition in passenger services (ORR, 1994a), but set aside when the limits on open access competition were announced - on determining fair charges for open access operators who will compete with subsidised franchisees. Some form of access deficit charges might be appropriate for this in principle, but they would be extremely complicated to devise in practice.

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Table 1: BRITISH RAIL, SECTOR RESULTS, 1993/1994

	The Passenger Railway		The Freight Railway			
	The Subsidised Railway	Network South East	Regional Railways	Intercity	Trainload Freight	Railfreight Distribution
Revenue* (£m)	1114.6	374.8	896.8	432.1	159.5	78.4
Costs (£m)	1043.2	817.3	798.9	346.8	221.7	92.5
Operating (revenue/cost) ratio	1.07	0.46	1.12	1.25	0.72	0.85
Operating surplus (loss) before subsidy (£m)	71.4	(442.5)	97.9	85.3	(62.2)	(14.1)
Subsidy* (£m) Revenue grant	0	458.4				
Capital grant	371.9	84.0				

* Revenue excludes subsidy

+ Also included in revenue grant is £32.9 million for British Transport Police and £25.4 million ("other"). Therefore total PSO and Passenger Transport Executive revenue grant in 1993/94 was £516.7 million. To this must be added the £455.9 million capital grant shown in the table, plus £28.3 million included in "exceptional items". BR also received a grant of £32.1 million towards the maintenance of level crossings under EEC Regulation 1192/69.

Source: British Railways Board Annual Report and Accounts 1993/94

Table 2: PROVISIONAL ACCESS CHARGES FOR PASSENGER BUSINESS SECTORS, 1994/95

	Access charge (£m)	Access charge per route km per annum (£)	Traffic density: av. no. of trains per day	Access charge per train-km (£)	Access charge per pass-km (pence)	Access charge Passenger revenue
Intercity	644	80,360	25	8.79	5.65	0.76
Network South East	840	215,600	97	6.10	6.36	0.80
Regional Railways	699	84,750	46	5.02	12.05	2.03
Total	2183	108,290	48	6.23	7.18	0.97

Notes: Access charges are provisional charges at 1994/95 price levels, and include electric traction current and station leasing charges.

Traffic densities and charges per train-km and per passenger-km are based on 1993/94 service and passenger levels.

Passenger revenue for 1994/95 has been estimated on the basis that there will be no change in real revenue between 1993/94 and 1994/95.

Passenger revenue includes ticket revenue only, and so differs from the revenue figures in Table 1.