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July 1997

**PASSENGER RAIL STATISTICS FOLLOWING
THE PRIVATISATION OF BRITISH RAIL**

**GA WHELAN, CA NASH, JM PRESTON
& MR WARDMAN**

Passenger Rail Statistics Following The Privatisation of British Rail

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the privatisation of British Rail**

GA Whelan, CA Nash, JM Preston and MR Wardman

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1. Introduction

In common with other major industries, the rail industry requires significant amounts of high quality information for successful operation. Information relating to the demand and supply of rail services is required to ensure that appropriate services are provided at minimum cost. Given the recent explosion of information technology, data on demand and supply is readily accessible and much improved. The benefits to the industry arising from such improvements should be maintained under the new organisational structures brought about by the 1993 Transport Act. It is the aim of this note to outline current sources of information and key statistics and raise the issue of what provisions are being made to ensure that they are maintained in a consistent and compatible format following privatisation.

2. The Need for Good Information

At present there is a whole host of people who make use of information on the demand and supply of rail services. Following privatisation, the franchising process will further warrant that relevant information be made available to potential franchisees, financiers and industry watchdogs. Those associated with the rail industry need to continue to monitor trends in rail business not only to make an assessment of the privatisation process but also as a means to continually advance knowledge.

At a macro level, the government has an obligation to formulate a national transport strategy. As part of this strategy it must examine the role that the railways play in the national economy. Statistics that accurately reflect patterns of movement of people and freight together with information on operating efficiency are necessary for the development of efficient policies. More recently, two governmental organisations formed under the 1993 Transport Act, the Office of Passenger Rail Franchising (OPRAF) and the Office of the Rail Regulator (ORR), have been charged with the franchising and regulation of passenger rail services respectively. OPRAF is not only responsible for advising the Secretary of State on the granting of franchises to train operators, it also has responsibility for issuing Passenger Service Requirements (PSR) and allocating subsidy to services. This process places individual routes under greater scrutiny than hitherto. The ORR on the other hand has the responsibility to ensure that the interests of everyone associated with the rail industry are best served in the privatised environment. This task ranges from granting operating licences to franchisees to determining where and when open access services will be permitted. Like OPRAF, the ORR will need detailed and accurate information to operate successfully. Whilst both organisations have extensive powers to require provision of data, it is necessary to ensure arrangements to maintain its quality and coverage. Now that the industry is moving from public to private ownership, the Monopoly and Mergers Commission (MMC) and the Office of Fair Trading (OFT) have new and extended roles to play. Both organisations need to be well informed to ensure that anti-trust regulations are upheld.

Following privatisation, the practice of monitoring performance is likely to be maintained, if not improved, by the 25 separate Train Operating Companies (TOCs). However, if towards the end of the franchise life the franchisee no longer wishes to operate the franchise or perceives that he/she will be unsuccessful in the next round of tendering, there is a danger that monitoring may be reduced if not altogether ceased. Procedures must be put in place to ensure that this does not occur.

Outside the industry there are several organisations that have vested interests in rail business. Among these, rolling stock and infrastructure manufacturers, business developers, academics and local government planners all make use, to some extent, of published sources of rail statistics. Following privatisation it is important to ensure that these organisations are able to continue to gain access to relevant information so they can continue to monitor and assess rail services. There is enormous interest worldwide in the British Rail privatisation process and

researchers will want to monitor its success so as to advise on the need for further change at home and overseas.

3. Existing Sources and Types of Information

The rail industry has a complex structure and produces a diverse range of product output mix. This mix currently includes: Intercity, cross country and commuter passenger services, trainload freight, parcel delivery, railfreight distribution, property development and letting, station management and, engineering and maintenance services. This range of services creates difficulties in monitoring and assessment. Following privatisation the industry will be fragmented into over 60 separate organisations, each with their own objectives and operating practices. Arguably product diversity will increase still further. The fragmentation of the industry has the potential to hinder the monitoring of rail services unless procedures and, if necessary, legislation are implemented to ensure certain key statistics are collated and made available to relevant bodies. At present, information on demand and supply is published annually in Transport Statistics GB (HMSO), International Railway Statistics (International Union of Railways, UIC) and individual company accounts. It is imperative to outside researchers that the statistics published therein should continue to be collated and made available following privatisation. What follows is a list of indices that we believe are important in monitoring and assessing rail services. Statistics are shown together with their relevance and application.

3.1 Information Relating to the Demand for Rail Passenger Services

Measuring the demand for rail services is not a straightforward task. Demand typically varies over different routes, different subsections of routes, different directions of travel and across different time periods. It is therefore important to have data on flows over many levels of aggregation. Because rail travel currently makes up a very small percentage of total travel in the UK, random sampling of households to gain information on individuals' travel behaviour and preferences is impractical. Rather, rail researchers rely on existing data sources such as guard counts, ticket sales data and on-board surveys. Indices that reflect passenger demand are: passenger journeys, passenger train kilometres, ticket type and fare levels.

(a) Passenger Journeys & Passenger Train Kilometres

When analysing demand it is important to draw a distinction between the number of passenger journeys made and the number of passenger train kilometres travelled. At an aggregate level the two indices can give different indications of changes in demand when there is a change in average journey distance. This issue does not arise when assessing demand between two points

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but it can be a problem at route or sector levels. Currently, data on passenger journeys and passenger train kilometres are gathered via guard counts, the CAPRI information system (see below) and, in PTE areas, continuous on vehicle surveys (COVs).

(b) Ticket Sales

Ticket sales data are important in the analysis of rail business for two principal reasons. The first is to give an indication of passenger demand, farebox revenue and the breakdown of rail business in terms of journey purpose, and the second is to give an indication of how concessionary travel subsidy can be allocated. In the UK, rail operators use price differentiation to maximise revenue. Here, ticket type is used as an (albeit imperfect) proxy for journey purpose and different price elasticities of demand are estimated accordingly. Ticket sales data (excluding Apex, Super Apex and Daypex travel) however, can do very little to reveal the time of travel or the day of the return leg of the journey. It is therefore necessary to augment knowledge with guard passenger counts to give an indication of the exact distribution of passengers between trains. With regard to subsidy allocation, ticket sales data provides only a partial solution since it reveals nothing of the use made of local authority travel cards. This information must be gathered via regular on-board surveys.

The most important source of ticket sales information is the CAPRI (Computer Analysis of Passenger Receipts and Information) system. This system is a set of computer programmes that receives and provides information via a network of ticket machines installed in stations, travel agents and portable machines used on trains. This system has led to considerable improvements in both the quality and quantity of ticket sales data. However, whilst the ORR has made promises to ensure through ticketing will be maintained, a break down in ticketing arrangements especially in the advent of open access operators could severely damage origin-destination data. Similarly, the employment of ticketing restrictions, TOC specific concessionary fares and railcards could lead to distortions in rail ticket sales data.

(c) Fare Indices

Fares are undoubtedly important determinants of the demand for rail travel and although the impact of fare change on demand has been the subject of much research, there is an uneven spread of knowledge across different areas of the industry. Using a variety of aggregate and disaggregate modelling approaches, researchers have found fare elasticities to be dependent upon many interacting factors, including: journey purpose, distance of travel, time of travel, change over time, ticket type, the degree of competition in the market, as well exogenous factors such as secular trends. It is imperative to record and make available to those monitoring demand information on fare levels both in regulated and more importantly unregulated areas of rail business so that knowledge can continually be updated and improved.

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Although the Franchise Director has limited fare increases on season and standard tickets to the level of inflation for the first two years of the franchise life and the level of inflation minus one percent (RPI-x) thereafter, it is still unclear what procedures the Office of the Rail Regulator, OPRAF or the Department of Transport are setting up to ensure that fares can be adequately monitored at an appropriate level following privatisation. It is clear from experience in the deregulated local bus market that this is a particularly difficult issue to deal with satisfactorily. What will happen in the rail industry is arguably more important than the local bus industry.

The multi-product nature of the rail industry means it will be too great a task to record and monitor all fare levels. There is a need for an efficient manner of sampling to determine a basket of fares that typifies levels across the industry. The basket should contain an appropriate mix of journey types (intercity, regional, south eastern and local services) and be weighted according to ticket type and availability (assuming, of course, that ticket types remain similar at TOC level). The collation of fare data and maintenance of an appropriate data base needs careful consideration.

3.2 Information Relating to the Supply of Rail Passenger Services

In monitoring and assessing the supply of rail services it is useful to draw a distinction between operating and financial performance, and service quality. As the rail industry moves into the private sector the latter will become increasingly important for two reasons. Firstly, since the government has the long term aim of removing/reducing the prop of subsidy and hopes that many areas of rail business will be self financing and secondly since investors in rail business will demand a return on their assets. A further factor important in judging the success of rail policy from the point of view of the passenger is that of service quality. Aspects of quality such as safety, speed, frequency, reliability, punctuality, load factors and quality of rolling stock remain at the forefront of everyone's minds since they are often the main criteria on which rail services are judged by its customers. The two levels of performance are dealt with in turn.

(a) Operating and Financial Performance

The operating and financial performance of the rail industry are very much interlinked with each other and with the demand for rail services. For the purpose of this note we take operating performance as the physical aspects of capital and labour productivity and financial performance as monetary flows resulting from rail operations.

(i) Operating Performance

Usually, the operating performance of an industry is assessed by analysing capital and labour productivity. Capital productivity is composed of two distinct components: rolling stock and infrastructure. With regard to rolling stock, the 1993 Transport Act set in place proposals for

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three rolling stock leasing companies (ROSCOs) to operate as the main suppliers of rolling stock to the industry. It is important to monitor the composition of the fleet to look not only at the quantity and type of rolling stock but also its age. Care must be taken to take account of refits. With regard to infrastructure, statistics on route and track length, number of stations and their utilisation in terms of train kilometres are the most important factors.

In what is perceived by many to be a tightly regulated environment with a high proportion of fixed costs, improvements in labour productivity at both managerial and operational levels is seen as a way to improve profitability. Consequently, this is an area of great interest and one which needs to be closely monitored. The standard index used to measure labour productivity is usually taken to be train kilometres per member of staff. Because some areas of the rail business are more labour intensive than others, this index needs to be disaggregated according to the type of traffic.

(ii) Financial Performance

Because the government has the long term aim of reducing subsidy and with private investors in rail business demanding a return on their capital, the profitability of the railways will be increasingly important. The key index of financial performance is total receipts divided by total cost, i.e. the cost recovery ratio. Ideally, cash flow should be broken down into cost for fuel and power, track access charges, rolling stock leasing charges, staff costs (operations, administration and terminal), capital investment, track and rolling stock maintenance, farebox revenue, revenues from property sales and leasing, and payments from OPRAF or local authorities.

(b) Service Quality

There are various procedures being implemented to maintain service quality in the new organisation. The ORR will not grant operating licences to anyone who has not had a safety case validated by Railtrack. It has given assurances of maintaining clear timetabling arrangements and through ticketing under the new organisational structures. At the same time the franchise director has laid down minimum service level requirements that are typically some 70-90% of existing service levels and may specify other aspects of service quality such as maximum load factors. Service quality is, however, a complex issue to define. We have identified five key areas that give an indication of service quality.

Safety

The lack of vertical integration in the industry has prompted fears that more difficult communications and inexperience on the part of some organisations may damage safety. To ensure that the railways are a safe place for passengers and rail-staff, safety must be monitored and regulations enforced. The standard index used to reflect safety is the number of accidents over a given time period, disaggregated according to type (personal injury, deaths and damage to property) and severity. The use of a single index to reflect safety can sometimes be misleading and therefore additional indices showing equipment failures and number of potentially dangerous incidents are important. Presumably the Railways Inspectorate will continue to collect and publish such statistics; it is important that they remain comprehensive.

Journey times and Frequency

The obligation to publish a comprehensive national timetable has been placed upon Railtrack. Those interested in monitoring journey times and service frequencies will have access to published timetables.

Punctuality and Reliability

Under the Citizens' Charter, punctuality and reliability of train services are monitored at each station. Passengers on services that do not meet pre-determined standards are entitled to a refund of a given percentage of the value of their ticket. Although this system clearly has transparent faults, some form of monitoring of punctuality and reliability is undertaken. This may not be the case in the privatised network. Although operators are required to implement Citizen's Charter type arrangements and data will also be collected as part of the performance regime, it is not clear what will be published.

Load Factors

Information relating to load factors is not only important in determining utilisation of rolling stock it also has implications for passenger comfort. Where minimum service levels are not specified by the Franchise Director, reduced frequency and increased load factors may be seen as a way to improve profitability. Monitoring quality of service in a "deregulated" environment must therefore involve a consideration of load factors.

Rolling Stock Quality

The quality of rolling stock is seen by many to be an important factor in influencing the demand for rail services. In addition to taking account of the quality of stock under commercial performance, monitoring of stock in terms of comfort, cleanliness and reliability from the customers perspective must be undertaken.

Table 1: Summary Statistics

Data Item	Measurement	
Operations		
Passenger Traffic	Number of Trip/Passenger km	
Train Kilometres	Number of train kms	
Rolling Stock	Numbers, composition and age; vehicle km	
Infrastructure	Length of track, double/single, power supply, electric current, number of stations (manned, partially manned or unmanned) usage	
Staff numbers	Operations, administration, contract staff	
Costs and Revenues		
Costs	Staff	Operations, administration, contract staff
	Infrastructure	Access charges
	Rolling Stock Charges	Leasing Costs
	Fuel Costs and other Materials	
	Maintenance	Infrastructure, rolling stock
	Total Costs	
Revenues	Ticket Sales	Revenue by type of ticket
	Property Leasing	Numbers and type of property
	Miscellaneous	Advertising revenue, catering services etc.
	Total Receipts	
Investment	Personnel, rolling stock, infrastructure	
Government Support	Payments by OPRAF and local authorities	
Service Quality		
Safety	Number, type and severity of accidents. Number of dangerous incidents. Number of cases of equipment failure	
Journey Times and Frequency	Timetable	
Punctuality	Percentage of trains arriving at station within target	
Reliability	Percentage of scheduled trains running	
Load factors	Percentage of trains exceeding target load factors	

In what will be, or be perceived to be, a competitive environment, train operating companies will have new objectives and operating practices and will be naturally circumspect about publishing information on demand and supply. Safeguards must be made to ensure that core data arising from different TOCs are compatible with each other and with existing sources of information. Data must be collected in the same manner, using the same definitions and have the same format. Gaps in the supply of information no matter how small can often cause serious problems in analysis. It is a matter of great urgency that measures are put in place to insure that the issues outlined in this note are adequately dealt with.

4. Summary and Conclusion

The complexity of the rail industry creates difficulties in monitoring and assessing its performance. On one hand, indices that are too aggregate in nature will at best fail to reflect trends fully and at worst be misleading. On the other hand, indices that are too disaggregate will be costly to collect and assimilate and almost impossible to interpret meaningfully. The aim therefore must be to strike a balance between the two. The table below summarises the statistics or indices that we believe should be published, at the level of the individual franchisee as well as in aggregate, not only so that an assessment of the privatisation process can be made but more importantly so that researchers can continue to improve their knowledge and understanding of the industry.