

Subsidy and Productivity in the Privatised British Passenger Railway

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ABSTRACT

This paper gives an overview of subsidy reductions in the privatised passenger rail industry in Britain before focusing on productivity performance across the first four years under the privatised structure. Subsidy reductions are analysed in terms of the average annual percentage increase in passenger revenues and/or decreases in costs required to offset these reductions. Productivity is then examined through the use of a Tornqvist productivity index, with passenger train kilometres specified as the output, and labour, traction rolling stock and infrastructure specified as the inputs.

For the network as a whole, it is found that total productivity has risen on average by four per cent per annum over the post-privatisation period. Most gains have been achieved through labour reductions and increases in output from improved utilisation of existing inputs. Compared with the performance of the nationalised British Rail, gains made since privatisation are not as high as those made in the later period of public sector management. It is therefore concluded that it is commercialisation, i.e. the move towards a more market orientated organisation, rather than ownership form per se, that has been the key component in productivity gains.

1. INTRODUCTION

IN THE White Paper of July 1992 *New Opportunities for the Railways*, the then Conservative government stated its intention to, ‘...see better use made of the railways, greater responsiveness to the customer, and a higher quality of service and better value for money for the public who travel by rail’ (DoT, 1992, p1). It was argued that these benefits to the rail system would arise from the introduction of private sector management and through liberalisation of the market. The overall rationale was that the introduction of competition into the rail system and the provision of appropriate incentives to all parties would provide greater economic efficiency (Foster, 1994). This paper examines the issue of productivity changes that have resulted from such structural reforms in the passenger sector of the industry since privatisation.

2. BACKGROUND

The long held view concerning the economics of railway operation is that both infrastructure and services are indivisible components that constitute a natural monopoly, and hence returns to scale are significant and inexhaustible given the market size. An alternative view is that returns to scale and natural monopoly effects are solely associated with the infrastructure and not in the operation of services (Bradshaw and Aveline, 1996). This is sometimes referred to as the revisionist view (Preston, 1994). Following this logic, any restructuring of the industry should not be based around the necessity to maintain the infrastructure and services under the control of a single organisation, as an equally efficient (and hence productive) system can be produced under a more fragmented framework. The structure that subsequently emerged from privatisation of the British industry is unique and the most radical in Western Europe and broadly embraces the revisionist view. The actual framework is well documented elsewhere (see for example Curwen, 1997 and Nash, 1993). To briefly summarise, therefore, the industry consists of a matrix of contracts between a large number of different companies. Passenger services are divided into 25 time let individual units or franchises, 24 of which currently receive subsidy. Freight services, although originally privatised by commodity type, have now consolidated into two dominant operators. On privatisation, rolling stock was apportioned between three rolling stock leasing companies (ROSCOs), infrastructure maintenance into 14 units, and the infrastructure transferred into a single company (Railtrack) that was subsequently floated on the stock exchange. Two new public bodies were created, the Office of Passenger Rail Franchising and the Office of the Rail Regulator. The former, which has subsequently been integrated into the Strategic Rail Authority, was created to oversee the passenger franchising process, set minimum service standards and police the implementation of these standards by the new franchise holders. The latter was created to regulate fares on an RPI-X basis, promote competition, further the interests of consumers and ensure that network benefits continued.

The whole privatisation process netted some £5.2bn to the Treasury (Economist, 1999), with Railtrack (£1.9bn) and the ROSCOs (£2.6bn) raising the vast bulk of this sum. It also resulted in a considerable increase in the annual level of grant required to run passenger services, rising from a final year 'old' structure subsidy of £908m to a 'new' structure level of £2,264m, an increase of almost 150 per cent. This considerable increase in public costs arose primarily from the need to place all transactions on a formal contract basis and to enable Railtrack and the ROSCOs to fund (increased) investment in upgrading and modernisation. The requirement for a profit mark-up at various component levels within the industry i.e. on the infrastructure, rolling stock, maintenance functions etc., rather than the previous overall target under the nationalised regime to break-even (with subsidy) over all operations, has also significantly added to this cost. Such a level of increase is also consistent with observations made by some industry commentators that like-for-like work on the privatised railway is some 2.5 times higher than under the former British Rail (Ford, 2001).

Recent events, namely the court order placing Railtrack in administration, have brought to the forefront long held concerns over the whole fragmented structure of the rail industry. In particular, Railtrack's position will be detailed later in this paper.

3. THE ROLE OF SUBSIDY IN THE PRIVATISED INDUSTRY

Subsidy has a vital role to play in the privatised framework. Firstly, as in the past, it is used to preserve socially desirable services that otherwise would not be profitable in the open market.

This is consistent with the notion of a public service obligation under the old nationalised framework. Secondly, through negotiating year-on-year reductions in the levels of subsidy over the lifetime of the current franchises, train operating companies (TOCs) are actively encouraged to (a) increase revenue to make up for the losses in subsidy received and/or (b) reduce costs, again to make up for the subsidy decline. Thirdly, although the passenger franchise system can be argued to be consistent with the theory of contestability (Baumol, 1982), a further motivation behind the division of the industry was to open up the possibility of competing passenger and freight services on significant sections of the network (Glaister, 1995). It was argued that competitive on-line pressures would further enhance efficiency gains and service improvements and result in lower prices. Jones (2000), however, has noted a distinct shift in policy away from this promotion of on-line competition towards ensuring that subsidy reductions are maximised. This shift has also been reinforced by the (Shadow) Strategic Rail Authority stating that, although on-line competition will be given consideration in the forthcoming re-franchising process, this will only be in cases where passenger and taxpayers interests are protected (Strategic Rail Authority, 2000). It may be implied, therefore, that the Strategic Rail Authority seeks to minimise public funds spent on the rail system, albeit at the possible expense of productivity improvements that may have arisen out of the pressure of direct competition. Furthermore, there is a danger that this aim may contradict the first role highlighted above.

Table 1 reports a number of figures relating to subsidy. It shows the agreed opening franchise payments, the payments in year 7 of the franchise (which is the lifetime of 14 of the 25 franchises), the difference between the two and the length of the franchise let. Next, the revenue and costs in year 1, i.e. 96/97, of the new structure are shown. The last two columns report the net percentage gain in passenger revenue and the percentage decrease in costs required to make up the reduction in annual subsidy. All financial figures are expressed in 1997 pounds and train operating companies are divided between the former passenger business sectors of the nationalised British Rail.

The cumulative percentage of revenue is the year-on-year increase in revenue required to offset the reduction in subsidy. This is lower than the simple average percentage increase. As an example, Chiltern Railways would require an 8.4 per cent increase in revenue calculated on a simple basis (as shown in Cheek, 1997), compared to a 6.8 per cent year-on-year cumulative increase.

Table 1 shows that annual improvements in revenue required to meet subsidy reductions produce an overall average of 6.4 per cent p.a. to the financial year 03/04, with the former Regional Railways as a group required to make a particularly severe 10.9 per cent average annual improvement. Given that fares are currently regulated annually on an RPI minus one per cent basis, such increases in the main will have to come through increasing passenger numbers, and have been described by Nash (1997) as ambitious.

These figures however ignore the extent that revenues cover costs (cost recovery ratios - CRR) in different parts of the network. As an example, for the financial year 1995/96, these were 0.63, 0.69 and 0.27 for the former Intercity, NSE and Regional Railways groups respectively. Calculating Northern Spirit's CRR from Table 1 as $75.0/303.4 = 0.247$, then the 11.5 per cent annual improvement of revenue required to offset the decline in subsidy could equally be achieved through a 4.6 per cent year-on-year decrease in costs or increases in productivity.

Table 1: Subsidy Payment, Costs and Revenue, British Passenger Railway

Franchise	Subsidy				Financial Figures		Cumulative % of	
	96/97 £m	03/04 £m	Diff £m	Time Yrs	Rev £m	Costs £m	Revenue	Costs
<i>Former Intercity</i>								
Anglia Railways	41.0	6.3	34.7	7	41.4	82.6	9.1%	7.5%
Cross country trains	130.0	40.5	89.5	7	120.7	246.1	8.2%	6.3%
First Great Western	61.9	35.4	26.5	10	181.7	294.7	2.0%	1.3%
Gatwick Express	-4.1	-13.3	9.2	15	28.4	27.1	4.1%	5.7%
Great North Eastern	67.3	0.0	67.3	7	194.7	282.6	4.3%	3.8%
Midland Main Line	17.6	-6.3	23.9	12	52.0	87.6	5.6%	4.4%
West Coast Trains	94.4	-52.7	147.1	15	250.8	369.8	6.8%	7.0%
All Former Intercity	408.1	9.9	398.2		869.7	1390.5	5.5%	4.7%
<i>Former Network South East</i>								
Chiltern Railways	17.4	0.4	17.0	7	28.9	46.9	6.8%	6.2%
Connex South Central	92.8	5.3	87.5	7	132.8	223.2	7.5%	6.9%
Connex South Eastern	136.1	27.6	108.5	15	186.5	291.3	6.8%	6.4%
First Great Eastern	41.3	-9.5	50.8	7	130.3	164.4	4.8%	5.1%
Island Line ¹	2.3	1.0	1.3	5	0.8	3.1	21.5%	10.4%
LTS Rail	31.1	18.2	12.9	15	54.9	83.7	3.1%	2.4%
Silverlink	55.0	16.9	38.1	7	56.2	112.8	7.7%	5.7%
South West Trains ¹	63.3	35.7	27.6	6	221.2	358.3	2.0%	1.3%
Thames Trains	43.7	0.0	43.7	7½	131.6	129.4	4.2%	5.7%
Thameslink	18.5	-28.4	46.9	7	127.0	127.3	4.6%	6.4%
West Anglia Grt. Nrtm.	72.6	-25.5	98.1	7	129.2	193.3	8.4%	9.6%
All Former NSE	574.1	41.7	532.4		1199.3	1733.7	6.6%	5.6%
<i>Former Regional Railways</i>								
Cardiff Railway ²	22.5	13.6	8.9	10½	6.4	29.6	13.3%	5.0%
Central	204.4	132.6	71.8	7	71.5	246.1	10.4%	4.8%
MerseyRail	87.6	60.8	26.8	7	16.3	80.2	14.9%	5.6%
Northern Spirit	231.1	145.6	85.5	7	75.0	303.4	11.5%	4.6%
North West	192.9	125.5	67.4	10	47.3	230.5	13.5%	4.8%
ScotRail	297.4	202.5	94.6	7	109.9	370.7	9.3%	4.1%
Wales & West ²	84.6	39.2	45.4	10½	48.3	138.5	9.9%	5.5%
All Former Reg. Rails	1120.2	719.8	400.4		374.7	1399.0	10.9%	4.7%
All Railways	2102.4	771.4	1331.0		2443.8	4523.2	6.4%	4.9%

Notes: 1. Note that for Island Line and South West Trains the 'closing subsidy' under the column headed '03/04' actually refers to financial years 01/02 and 02/03 respectively, hence the cumulative reductions are calculated on 5 and 6 years respectively. 2. These franchises were extended by a maximum of 3 years and one month before they will be incorporated into the new Wales and Borders franchise (Strategic Rail Authority, 2001). Sources: Compiled from the Office of Passenger Rail Franchising (1997) and TAS (2000).

This relatively high figure in relation to revenue than the CRR would suggest is because subsidy reductions are calculated as average annual savings in costs required over the period reviewed and hence hypothetically do not vary over time. In other words, these can be thought of as fixed amounts per year. As a proportion of total costs, these 'fixed' decreases must be achieved on a decreasing base, therefore represent a higher percentage of costs. In terms of equivalent revenue gains, however, again these 'fixed' amounts would be achieved over increasing values of total revenue, and hence would represent a lower proportion of total revenue.

Performance in relation to subsidy reductions, however, cannot be simply assessed by isolating increases in revenue, productivity gains and reductions in costs and offsetting these against decreases in subsidy. In order to increase revenue a TOC may have to increase costs. If, however, unit costs and passenger numbers were to remain unchanged, subsidy reductions would require TOCs to achieve increases in productivity of between 1.3 per cent and 10.4 per cent, with a network average of 4.9 per cent, in each of the first seven years of the new structure.

4. PRODUCTIVITY ASSESSMENT

Productivity may be assessed using a number of alternative methods, either by simple univariate measures, such as labour productivity, or more complex multivariate measures that give an assessment of total factor productivity (TFP). Problems with the first group are well-known and well documented, see for example Cowie and Riddington (1996), and clearly a measure that gives an assessment of overall productivity changes that include the majority of inputs is preferable. The approach taken here is through calculation of a productivity index, a commonly applied method in the assessment of railway productivity (see for example Trethaway *et al.*, 1997). The figures shown in Table 2 relate to the average annual Total Factor Productivity (TFP) changes between the financial years 1995/96 and 1998/99 i.e. across four financial years but three time periods. It therefore includes an element of shadow running, as 12 TOCs were operating for most of the 1996 period as part of what remained of the publicly owned British Rail. The actual indices were calculated using the Tornqvist or translog index formula (Hensher and Waters II, 1993). This formulation imposes no underlying assumptions regarding the efficiency of the firm except its commercial orientation. In simple terms, the index weights changes in output by their relative importance to revenue (positive components) and sets these against changes in inputs weighted by their relative share of total costs (negative components) to give a measure of the change in productivity. The formal index is given below in equation 1:

$$\ln\left(\frac{TFP_k}{TFP_l}\right) = \sum_{i=1}^M \bar{R}_i \ln\left(\frac{y_{ik}}{y_{il}}\right) - \sum_{j=1}^N \bar{S}_j \ln\left(\frac{x_{jk}}{x_{jl}}\right) \quad (1)$$

where there are M outputs and N inputs, \bar{R}_i indicates the mean passenger revenue share of output y , between years k and l , and \bar{S}_j the mean cost share of input x_j , between years k and l .

This was calculated using labour, traction rolling stock and size of network as the inputs, as examination of the annual accounts revealed that these three inputs accounted for around 85 per cent of TOCs' costs over the period reviewed. Train kilometres were used as the

only output, as the two major sources of income, passengers and the Strategic Rail Authority, are both highly dependent on the production of train kilometres. Furthermore, specification of such an output better reflects what TOCs attempt to achieve. In an industry characterised by strict price regulation, public sector contracts and network congestion in many areas, TOCs are prevented from profit maximising through the production of technically efficient passenger kilometres, hence will attempt to sales maximise through the production of technically efficient train kilometres.

Table 2: Productivity Improvement, Passenger Rail Franchises, 1995/96 - 1997/98

<i>Franchise</i>	<i>1996/97</i>	<i>1997/98</i>	<i>1998/99</i>	<i>Average Annual TFP</i>
<i>Former Intercity</i>				
Anglia Railways	2.0%	1.6%	2.3%	2.0%
Cross Country Trains	-0.4%	1.3%	12.2%	4.2%
First Great Western Railway	4.7%	7.0%	2.5%	4.7%
Gatwick Express	5.1%	1.6%	5.3%	4.0%
Great North Eastern Railway	3.0%	5.9%	3.1%	3.9%
Midland Main Line	5.6%	5.2%	2.6%	4.4%
West Coast Trains	2.1%	5.5%	5.1%	4.2%
<i>All Former Intercity</i>	<i>3.1%</i>	<i>4.0%</i>	<i>4.7%</i>	<i>3.9%</i>
<i>Former Network South East</i>				
Chiltern Railway Company	8.1%	15.7%	2.1%	8.6%
Connex South Central	3.4%	9.1%	13.6%	8.6%
Connex South Eastern	4.4%	5.2%	2.3%	4.0%
First Great Eastern	0.9%	4.9%	9.0%	4.9%
Island Line	0.7%	2.8%	-0.5%	0.9%
LTS Rail	3.5%	6.0%	3.2%	4.2%
Silverlink Train Services	-0.8%	5.2%	4.9%	3.1%
South West Trains	7.6%	0.9%	0.9%	3.2%
Thames Trains	5.8%	8.2%	1.2%	5.0%
Thameslink	2.4%	4.3%	4.1%	3.6%
West Anglia Great Northern	-0.9%	0.2%	2.8%	0.7%
<i>All Former Network South East</i>	<i>3.2%</i>	<i>5.7%</i>	<i>4.0%</i>	<i>4.2%</i>
<i>Former Regional Railways</i>				
Cardiff Railway Company	2.3%	4.3%	3.6%	3.4%
Central Trains	2.5%	5.2%	8.5%	5.4%
First North Western Trains	2.2%	5.7%	14.9%	7.4%
Merseyrail Electrics	4.2%	2.6%	4.7%	3.8%
Northern Spirit	3.7%	7.4%	1.5%	4.1%
ScotRail Railways	2.7%	7.1%	5.9%	5.2%
Wales and West	2.4%	5.3%	2.4%	3.3%
<i>All Former Regional Railways</i>	<i>2.8%</i>	<i>5.4%</i>	<i>5.9%</i>	<i>4.2%</i>
Mean (Simple)	3.1%	5.1%	4.7%	4.3%
Mean (Network)	3.2%	5.5%	5.2%	4.6%

The actual data on train kilometres and network size were taken from the Office for Passenger Rail Franchising Annual Reports (see for example Office for Passenger Rail Franchising, 1999). Numbers employed and traction rolling stock figures were obtained from the relevant Railway Gazette Directories (e.g. Bushell, 1998) and confirmed by the Rail Industry Monitor (TAS, 2000). Finally, all financial figures came from the individual Annual Reports. The associated costs used for the three inputs were salaries and wages, ROSCO leasing charges and Railtrack access charges respectively.

Before examining the results, Tretheway *et al.* (1997) make two important practical observations regarding productivity measures. Firstly, output and input growth will vary from year-to-year, hence what is important is the overall trend over a number of years that best reflect TFP. Secondly, strong TFP growth does not necessarily correlate with comparable financial performance; the former relates to quantities of output and input, whilst the latter reflects the value of output and the cost of input. The following analysis, therefore, concerns trends, either across the four years reviewed or over the 25 TOCs. Some loose relationship between TFP performance and financial performance is, however, also identified.

The results from TFP estimation are shown in Table 2. This gives the figures over the periods 1996/97, 1997/98 and 1998/99, for each franchise again grouped under the previous British Rail sectors. Shown in the final column of Table 2 are the average annual changes in total productivity for each franchisee over the whole period. The results are also given for the average for the 25 franchises (simple), and the results for the total network, which was found by adding the outputs, inputs, revenues and costs for all 25 franchises.

Over the time periods shown, all TOCs have seen improvements in total factor productivity, ranging from an annual average figure of 0.7 per cent on the West Anglia Great Northern to just under 9 per cent on Connex South Central. For the whole passenger network, total productivity has increased by an average of 4.6 per cent per annum since 1996. Within the rail industry, however, major developments have historically tended to occur over a relatively long period of time. The productivity results shown in Table 2 therefore reflect short term gains. Despite the use of a multi-input index, in the majority of cases these are as a result of adjustment of only one of the inputs, namely labour. This has been reflected in significant reductions in staffing levels in TOCs since privatisation, with virtually all companies reducing staff in 1996, all except five in 1997 and finally only nine companies maintaining or increasing staff levels in 1998. Over the period reviewed, across all TOCs this has resulted in an average decrease in staff of around 4 per cent per annum. Early indications are however that this downward trend has been reducing, with staff levels only decreasing by 2 per cent in the last year reviewed. This also suggests that possibilities for continued improvements in total productivity using this measure are declining and hence TOCs may have to look at other measures if these trends are to continue in the medium to longer term. On the practical side, such staff cuts have led to shortages of skilled staff (notably drivers ²) and at the time of writing (Jan 2002), three TOCs are in dispute with staff over pay and the whole issue has become highly politically charged.

With regard to the rolling stock input, rolling stock levels have remained almost static over the period. This has occurred despite strong commitments at the time of the franchise lets for investment in new rolling stock. This much needed investment has been highlighted as one of the major advantages of privatisation of the railways (Cheek, 1997). It was argued that

having been freed from the financial constraints of the public sector, railway companies would be far more able to raise the required finance for such investment projects. Under the new structure, however, due to Railtrack's extensive train acceptance procedures there have been substantial delays in introducing new rolling stock onto the network. Indeed, over the whole period reviewed only 40 new traction rolling stock units were introduced, as against the 100 odd new units planned under the franchise lets. The limited sources of productivity gains therefore are not solely related to the relative shortness of the period reviewed, but also operational problems in the new industry structure. It also highlights that TFP improvements have been achieved despite ageing rolling stock, on what was already relatively old stock, but does nevertheless raise a question over the longer term sustainability of these improvements.

Despite these findings, the figures quoted in Table 2 should not be confused with a simple partial productivity measure of train kilometre per staff, as the Tornqvist index sets labour productivity changes in the context of other inputs used in the production process. As highlighted in equation 1, these are in effect weighted by labour's contribution to costs. This also makes intuitive sense as increases in output per member of staff, particularly in a capital intensive industry, will be a function of changes in the productivity of these other inputs, even where the actual number of units employed may not radically change.

For example, gains in productivity can equally arise from production of more output utilising the same level of inputs. This is an aspect in which TOCs have been fairly active through increasing service frequencies to successfully generate increases in passenger numbers, hence producing more train kilometres. Examining Table 2, the highest gains in productivity have generally been achieved by those companies that have expanded output by the most. In other words, they have implemented the largest increases in train kilometres and by implication have pursued the most 'expansionist' policies. Interestingly, such actions are not consistent with one of the major pre-privatisation fears that with such low CRRs, many TOCs would concentrate more on cost reductions through providing minimal services rather than revenue increases to meet subsidy shortfalls. Indeed, such measures are perhaps more reflective of a 're-investment' of productivity improvements in an attempt to increase passenger numbers.

It should also be highlighted that TOCs are not entirely responsible for these productivity figures, as one of the inputs, infrastructure, is not directly under their control. This input could, and perhaps should, be dropped from the analysis, but given that it is a major determinant of productivity and the largest single cost to TOCs (45 per cent in 1997), this makes little sense. Clearly Railtrack has had a central role to play and in particular its actions have directly effected the productivity of TOCs. Before detailing relevant recent events, it is worth considering some of the problems that have arisen during the period reviewed. Concerns regarding the position of Railtrack were raised early on by the TOCs themselves (see for example *Financial Times* 10/12/98). They argued that as the infrastructure company was (then) making large profits from routine track operation and track access charges, there may be a temptation for it to avoid the financial risks involved in more innovative rail schemes that increase track capacity. In order in part to alleviate these concerns, an investigation by the Office of the Rail Regulator set a ceiling on Railtrack's profits of between five to six per cent on its assets (ORR, 1998). This was followed by a full-scale review of Railtrack's incentives framework (ORR, 2000). Although historical, the above does illustrate that the regulation of Railtrack has proved particularly problematic under the industry structure. On October 7th 2001, how-

ever, Railtrack was placed in administration and the whole issue of the regulatory framework again brought under review.

Current government thinking as to the future of the infrastructure company is that Railtrack be replaced by a company without shareholders but run on a commercial basis. Consequently, the need for regulation would be reduced. Members of the Board would be initially appointed by the Strategic Rail Authority and would include key industry stakeholders. This it is argued would better achieve the public interest obligations of the rail network operator because rail passengers would have the highest priority rather than the need to increase shareholders' wealth. All profits from infrastructure operations would be re-invested in the infrastructure. Importantly, day-to-day control of the infrastructure would pass to the TOCs. This should better integrate the infrastructure into the market and would be consistent with the well-argued theoretical viewpoint put forward by Preston (2002) based upon transaction cost economics (Williamson, 1985).

At the time of writing (Jan 2002), the actual detail as to Railtrack's successor remains sketchy, but early indications are of a movement toward some form of re-integration of the infrastructure with services, with both Firstgroup (holder of three franchises) and Stagecoach (holder/major share of four franchises) proposing models of a vertically integrated railway (Haigh, 2001). With regard to TOC productivity, such models clearly make intuitive sense, as this would bridge the gap between one of the major inputs in production (infrastructure) and the market, and hence the performance of the infrastructure would be directly related to TOC profitability.

To return to the general debate, whether the productivity improvements shown in Table 2 are sufficiently large to meet the financial requirements of the franchise agreements remains to be seen. Purely on the cost reduction 'targets' shown in Table 1, however, (i.e. ignoring any gains in revenue), in terms of productivity improvements nine TOCs exceed these and another four are within one per cent.³ This is also reflected in profitability, with figures from TAS (2000) suggesting that taken as a whole TOCs made a 3.7 per cent operating profit on turnover in 1997/98, an increase from 1.7 per cent in 1996/1997. Four companies recorded losses, these including three of the six poorest TFP performers. Under the privatised regime therefore, improving productivity would appear to be one of the key determinants to maintaining profitability.

5. COMPARISONS WITH THE NATIONALISED BRITISH RAIL

For comparative purposes, Table 3 gives figures for the cumulative average annual growth in TFP for the privatised rail network between financial years 1995/96 and 1998/99 shown along with the performance of the nationalised British Rail (BR) over a number of relevant time periods. These latter figures were calculated again using the Tornqvist index with total train kilometres, i.e. passenger and freight train kilometres, specified as the output. Over the period reviewed however, passenger trains accounted for the vast majority of train kilometres, with around 77 per cent of the total in 1972 and over 87 per cent by 1990. The same inputs of staff employed, tractive rolling stock and infrastructure were used in the calculation. Nevertheless, these figures cannot be considered to be directly comparable to the current TOCs, however, because it is the percentage changes that are of interest, i.e. relative performance over time, direct comparability is not a major issue.

**Table 3: Average Annual Total Factor Productivity Changes,
Privatised and Publicly Owned Rail Systems.**

Total Factor Productivity Changes	
Britain's Passenger Rail (1995 - 1998)	4.6%
British Railways (1985 - 1990)	6.7%
British Railways (1980 - 1985)	0.9%
British Railways (1972 - 1980)	-0.2%

Source: Compiled from DoT Statistics (e.g. DoT, 1980)

Small, negative, factor productivity changes in BR during the 1970s reflect the perception of the railways at that time being in significant decline due to low levels of investment (Henshaw, 1994), general industrial unrest in Britain during that period and falling passenger numbers (see for example DoT, 1980). Particularly strong improvements followed sectorisation, i.e. the restructuring of BR into business units, in the latter half of the 1980s; TFP grew typically by 6.7 per cent p.a. in that period. This is consistent with the findings of Nash and Preston (1992), who indicated that the scope for private sector improvements in productivity in BR (or any subsequent hybrid) would be limited due to strong performance in the public sector. Furthermore, these results suggest that productivity improvements may be better explained by organisational reform, re-orientating management away from operations towards the market, rather than the introduction of private sector management *per se*. It is arguable, therefore, that the productivity gains achieved since privatisation may well have been equally attainable in the public sector.

Evidence from other privatisations would suggest that this is not a unique phenomenon. For example, Parker and Martin (1995) found that in eight out of eleven industries studied, TFP levels achieved since privatisation had at least been matched whilst the organisation was in the public sector. Furthermore, Boussofiane *et al.* (1997) in a related study of technical efficiency in nine industries over pre and post privatisation time periods, found improvements in seven in the period prior to privatisation, i.e. during the movement towards a market orientated company. Only in one example (the National Freight Corporation) was there an improvement in efficiency that was consistent with the transfer of ownership to the private sector. Importantly, however, improvements in efficiency/productivity within these industries occurred in the run up to the transfer of assets to the private sector, hence it is impossible to distinguish 'one-off' privatisation effects from a change in company orientation. Within the rail industry however, organisational reform occurred whilst rail privatisation was not on the political agenda, hence productivity improvements can almost solely be attributed to this change in organisational focus.

6. CONCLUSIONS

Three broad conclusions can be drawn from this analysis. First, these results suggest that TOCs over the period reviewed have been successful in increasing productivity, hence as a group they

have maintained profitability. Companies have earned profitable, but not excessive, returns from passenger rail operations. There has been, however, a strong suggestion of a subsequent shift in policy away from on-line competition after the franchises were let in order to enhance subsidy reductions. Furthermore, whether these positive trends can be continued (as they need to be) for the remainder of the franchise lets is questionable, given that most have been achieved through short run measures.

Secondly, comparisons with the nationalised British Rail strongly indicate that TFP gains have not significantly improved since privatisation, indeed performance has not been as strong as in the later years of nationalisation. It appears that the re-focusing of BR in the mid to late 1980s towards a more market orientated structure achieved gains in productivity better than that achieved by the (passenger) industry since formal privatisation. Alternatively, it may suggest that at the time of privatisation most of the immediate productivity gains in BR had already been achieved in the public sector. Gains since that time may simply be a continuation of this trend (albeit at a lower level). The actual change of ownership therefore does not appear to have improved productivity performance, at least not in the short term. In the longer term however, productivity improvements should result less from labour reductions and more from investment in both infrastructure and rolling stock.

Finally, Railtrack has had a large potential impact on TFP improvement on the passenger railway, however it has been 'protected' from the primary market by TOCs. In other words, Railtrack had little 'demand' risk. This had long been recognised by the industry as a major weakness in the privatised industry structure, but initial actions by the Rail Regulator to rectify this position proved to be ineffectual. In an earlier draft of this paper (see Cowie, 2001), concerns were raised over the sustainability of productivity improvements and Railtrack's position in the industry. Events that have followed and the subsequent fallout strongly indicate that this was indeed a major issue - ultimately, Railtrack could not maintain and support the system under the then existing financial arrangements. The future of the infrastructure appears to be moving towards a re-integration with services but ownership and investment responsibilities remaining with a centralised not-for-profit company. This would give individual TOCs more control over one of the major inputs of production and hence productivity gains should be enhanced. What needs to be addressed however is the financial arrangements under such a system. Clearly the current position of the infrastructure company and the imminent re-franchising of many of the existing TOCs give an opportunity for a complete re-evaluation of both the financing of the railways and the industry structure. Whether this will be taken or not remains to be seen.

ENDNOTES

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2. As an example, probably the worst case has occurred on Arriva Trains Northern, which was fined £2m in October 2001 by the Strategic Rail Authority (SRA) due to an excessive number of cancellations. The reason for these cancellations was primarily due to a shortage of drivers. The problem is so acute that the SRA has given the TOC various short-term concessions with regard to franchise commitments to allow time to resolve the problem.

3. Interestingly, it is the former BR regional railways TOCs that perform best under this measure, with five of the seven being at least within one per cent of their respective 'targets'.

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