

Contents lists available at [SciVerse ScienceDirect](http://www.sciencedirect.com)

Research in Transportation Economics

journal homepage: www.elsevier.com/locate/retrec

Evaluating the long term impacts of transport policy: The case of passenger rail privatisation

John Preston ^{a,*}, Dawn Robins ^b

^aTransportation Research Group, Civil, Maritime and Environmental Engineering and Science, Faculty of Engineering and the Environment, University of Southampton, Highfield, Southampton SO17 1BJ, UK

^bGeography, Faculty of Social and Human Sciences, University of Southampton, UK

ARTICLE INFO

Article history:
Available online xxx

Keywords:
Passenger rail
Privatisation
Welfare analysis

ABSTRACT

Britain's national rail system was 'privatised' as a result of the 1993 Railways Act, with most of the organisational and ownership changes implemented by 1997. This paper examines the long term impacts of these changes. A key issue when examining long term changes is that of the counterfactual – what would have happened if the changes had not occurred? A simple econometric model of the demand for passenger rail services was developed and used in conjunction with extrapolative methods for key variables such as fares and train km to determine demand-side counterfactuals. Extrapolative methods were also used to determine counterfactual infrastructure and train operation costs. Although our results are sensitive to the assumptions we have made concerning the counterfactual they suggest a number of impacts. Since privatisation, rail demand has grown strongly but our analysis indicates that transitional disruptions suppressed demand by around 9% over a prolonged period (1992/3 to 2005/6), whilst the Hatfield accident reduced demand by about 5%, albeit over a shorter period (2000/1 to 2006/7). A welfare analysis suggests that although consumers seem to have gained as a result of privatisation, for most years this has been offset by increases in costs. An exception is provided by the two years immediately before the Hatfield accident. Overall the loss in welfare since the reforms were introduced far exceeds the net receipts from the sale of rail businesses. Thus although the reforms have had advantages in terms of lower fares and better service levels than otherwise would have been the case, this appears to have been offset by increased infrastructure and train operations costs. The source of these high costs remains an area of speculation but appear to be related to aspects of both market and regulatory failure.

© 2012 Elsevier Ltd. All rights reserved.

1. Introduction

Transport, as in many other sectors, exhibits a relative paucity of policy evaluation and where such evaluation does occur it tends to focus on short run effects. Rail privatisation in Great Britain is no exception. There was a slew of studies of the early effects (e.g. Harris & Godward, 1997; Pollitt & Smith, 2002; White, 1998) but there have been no studies in recent years. There are good reasons for this – 'evaluation research is tortured by time constraints' (Pawson, 2002). The effects of a policy change are distorted by exogenous variables such as changes in population and income and are overtaken by other policy initiatives. Undeterred, this paper draws on the recent work of Robins (2012) and attempts to evaluate the long terms impacts of the privatisation of passenger rail services in Great Britain. This paper consists of the following

sections. In the next section, a brief history of rail privatisation is outlined. A key issue is the date at which the policy intervention is deemed to have started. In section 3, trends in key variables are outlined, with a particular focus on passenger kilometres, fares, train kilometres and costs. In section 4, a methodology is outlined for determining the counterfactual – what would have happened if privatisation had not occurred? This consists of the development of a simple econometric model of rail demand and extrapolative models of key variables such as fares, train kilometres and costs. In section 5, this methodology is applied to undertake a cost–benefit analysis of rail privatisation for the period 1995/6 to 2008/9. In section 6, the implications of these findings are discussed and, in section 7, some conclusions are drawn.

2. A brief history of rail privatisation

There are a number of detailed histories of the events surrounding the privatisation of the railways in Britain (Freeman & Shaw, 2000; Gourvish, 2002; Harris and Godward, op cit.; Shaw,

* Corresponding author. Tel.: +44 0 23 8059 4660.
E-mail address: jpreston@soton.ac.uk (J. Preston).

2000; Wolmar, 2001, 2005). Privatisation began in the 1980s with the disposal of ancillary businesses such as hotels (1981–1984), ferries (1984) and rolling stock manufacturing (1987–1989). Attention then switched to privatisation of the core business (Redwood, 1988), with the Centre for Policy Studies promoting a solution based on horizontal separation (Gritten, 1988) and the Adam Smith Institute favouring vertical separation (Irvine, 1987). The Government outlined its intentions with a White Paper in 1992 and the Railways Act in 1993.

'Privatisation' was a policy package, which had a number of inter-related elements. The first was that passenger operations were horizontally separated into 25 Train Operating Companies and a model of off-the-track competition was introduced to be administered by the Office of Passenger Rail Franchising (OPRAF). These services were franchised to the private sector between February 1996 and March 1997. The second was that the rail business was vertically segregated, with operations split from infrastructure. A new track authority (Railtrack) was established in April 1994 and privatised in May 1996 through a flotation on the stock market. Three rolling stock leasing companies (ROSCOs) were created and sold privately, whilst something over 60 other businesses were created and sold to the private sector, including infrastructure maintenance and renewal and rolling stock maintenance. The third was that open access competition would be permitted. However, for passenger services this on-the-track competition would be moderated so as to encourage competition for the franchises. One of the architects of the reform process believed that over time the majority of passenger services would be supplied by open access operations, with franchising providing a back stop for socially necessary services (Foster, 1994). Fourth, a new regulatory body, the Office of the Rail Regulator (ORR) was established to regulate Railtrack (and hence ensure fair track access charges) and to regulate competition between operators. Open access competition has remained heavily regulated, albeit with some loosening over time (see Preston, 2009). It should be borne in mind, when we refer to privatisation we refer to the broad policy package initiated by the 1993 Railways Act.

Moreover, this policy package is not static. In particular, the election of a Labour administration in May 1997 resulted in a series of policy shifts (see Preston, 2008a). In opposition, Labour opposed privatisation and called for a 'publicly owned, publicly accountable' railway, although at least one observer believes that Labour was in fact complicit in the privatisation process (Engle, 2011). However, their 1997 manifesto stated 'Our task will be to improve the situation as we find it, not as we would wish it to be'. What this amounted to was the abolition of OPRAF and the creation of the Strategic Rail Authority (SRA), created by the 2000 Transport Act, but in shadow running mode before that (Gourvish, 2008), and the launch of the Ten Year Plan for Transport in July 2000, with ambitious plans for increasing rail investment. However, these plans were largely overtaken by the Hatfield accident of 17 October 2000, which revealed serious shortcomings in track maintenance procedures that resulted in a series of speed restrictions across the network and hastily arranged remedial engineering works. As detailed by Preston (2002), this led to a dramatic deterioration of Railtrack's finances, so that it was placed into receivership in October 2001 and replaced by Network Rail, a company limited by guarantee, in October 2002. The Hatfield accidents also exposed weaknesses in the franchised TOCs, with around a half failing, and having over time to be re-let (Preston, 2008b).

As a result of these events, a White Paper (The Future of Rail) was published in 2004 and a Railways Act passed in 2005. This resulted in the abolition of SRA, with rail operations being brought under the direct control of the Department for Transport (DfT). At

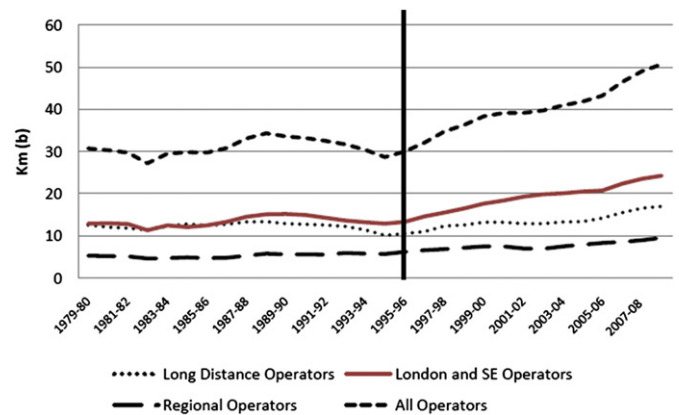


Fig. 1. Passenger kilometres by sector.

the same time some regulatory functions of the ORR¹ with respect to Network Rail's performance and capacity transferred to the DfT, although ORR retained responsibility for determining track access and charges and became responsible for safety regulation, a hot potato that had already been passed from Railtrack to the Health and Safety Executive. These arrangements were further refined by yet another White Paper in 2007, Delivering a Sustainable Railway, in which the DfT would draw up a High Level Output Specification (HLOS) for five year control periods (the current control period, CP4, runs from 2009 to 2014) and issue a Statement of Funds Available (SOFA). The ORR then determine how much of the HLOS Network Rail can deliver.

This analysis suggests at least four periods to the 'privatisation' era covered by this paper. The first, 1992 to 1995, was the preparatory phase. The second from 1995 to 2000 was the initial privatisation phase, in which OPRAF and Railtrack are key players. The third, from 2000 to 2005, is the Hatfield phase in which OPRAF is replaced by SRA and Railtrack by Network Rail. The fourth phase is the post Hatfield phase, commencing in 2005, associated with greater control of the railways by DfT. A fifth phase, with an emphasis on budgetary control, may have been initiated by the Conservative Liberal Democratic Coalition Government that came to power in May 2010 and published a Rail Command Paper in March 2012 (DfT, 2012), but this is beyond the scope of this paper.

3. Key trends

A large amount of useful data is published by ORR, principally in National Rail Trends and as a result some of the key trends in the privatised passenger rail market are relatively well known and have been reported at previous conferences (Nash & Smith, 2007; Preston, 1999; White, 2001). With respect to demand, measured in terms of passenger kilometres, we can see from Fig. 1 that there is a clear break in the long run series around 1995/6. Between 1979/80 and 1994/5 total demand was down slightly (by 7%) but between 1995/6 and 2008/9 there has been strong growth (of 69%). Between 1979/80 and 1994/5 the demand for long distance services was down around 20%, the demand of London and South East services had barely changed and the demand for Regional services had increased slightly (by 8%). Since 1995/6 all three sectors have seen strong growth, with London and the South East up 82%, Long Distance services up 62% and Regional services up 53%. An

¹ The Office of the Rail Regulator became the Office of Rail Regulation in 2004, as a result of the 2003 Railways and Transport Safety Act.

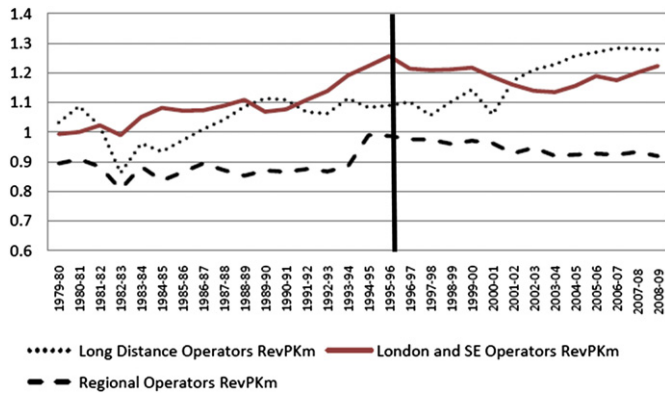


Fig. 2. Real revenue per passenger km (£ per 10 km, 2008 prices).

important question, and one we will examine in the rest of the paper, is the extent to which this demand growth can be attributed to privatisation.

Fig. 2 shows that prior to 1995/6, there had been a trend for real mean fares (measured by revenue per passenger km) to increase, particularly for London and the South East. However, privatisation was also accompanied by fares regulation. The price of season tickets and saver returns on long distance services (or the equivalent day return ticket) were protected. Initially, fare increases of baskets of fares were limited to RPI (1996–1998), then by RPI – 1% (1999–2003). Following the financial crisis instigated by Hatfield this was increased to RPI + 1% (2004–2011) and there was a proposal for this to be increased to RPI + 3% from 2012 (Steer Davies Gleave, 2011), although this has since been dropped. It should be noted that the revenue measure used here is really one of yield. Improved yield management techniques may be responsible for the rise in long distance fares, particularly since Hatfield. Overall, between 1979/80 and 1994/5 real fares increased by 13%. Between 1995/6 and 2008/9, they increased by only around 4%.

Fig. 3 shows that there has been long term growth in Regional and London and South East services (measured in terms of train km) but there was a slight decline in Long Distance services up to 1995/6 but there has been an increase since. Overall between 1979/80 and 1994/5 there was an 8% increase in train km, but since 1995/6 there has been a 34% increase. It should be noted that data on seat km are not available and train km is only a proxy measure of increased capacity.

Fig. 4 (based on Smith, 2006) shows that in terms of total costs per train kilometre, there was a decrease between 1979/80 to 1995/6 in real terms of almost 20% but since the Hatfield accident there was a large increase of almost 60% up to 2003/4 but there have been

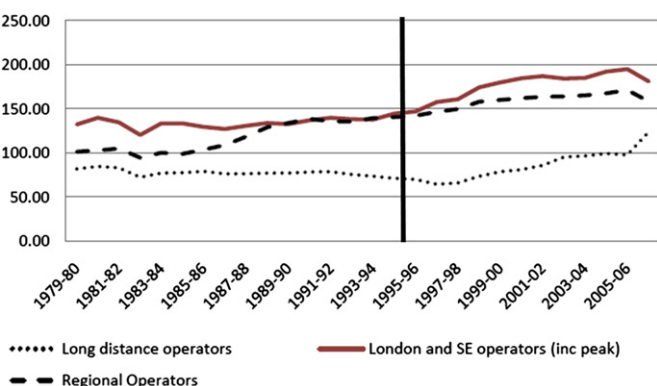


Fig. 3. Train km (millions).

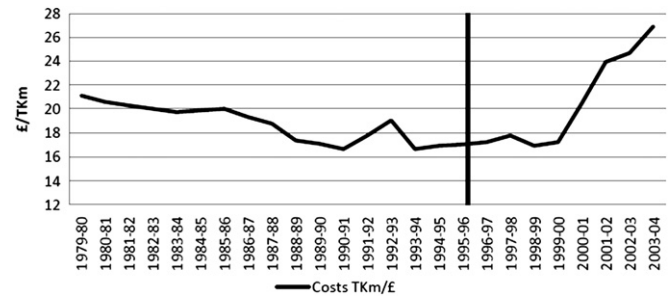


Fig. 4. Total costs per train km (£, 2008 prices). Source: Smith (2006).

costs decrease since. This cost explosion has been accompanied by an increase in Government support. This fluctuated around the £2 billion mark (in 2008 prices), although there is a downward spike around 1995/6 as a result of the receipts from privatisation sales (Fig. 5). Following the Hatfield accident there was a rapid increase to £7 billion in 2006/7, although there has been some fall back since.

4. A methodology for determining the counterfactual

Building on the work of others (e.g. Wardman, 2006), this methodology consists of a demand forecasting model to determine the extent to which changes can be associated with the privatisation policy package and to assess changes in consumer surplus and total revenue. Extrapolative moving average models are used to determine the counterfactual trends in fares, train kilometres, operating costs and capital costs. The demand forecasting model was based on a simple negative exponential or semi-log time series formulation as follows:

$$\ln PKM_t = \alpha + \beta RPKM_t + \gamma TKM_t + \delta GDP_t + \theta PRIV + \mu HAT + \rho STRIKE \tag{1}$$

where PKM_t = Passenger Kilometres in year t , $RPKM_t$ = Real Revenue per Passenger Kilometre in year t , TKM_t = Train Kilometres in year t , GDP_t = Real Gross Domestic Product in year t , $PRIV$ = Privatisation Dummy Variable (1992/3 to 2005/6), HAT = Hatfield Dummy Variable (2000/1 to 2006/7) and $STRIKE$ = Strikes Dummy Variable (1982/3 and 1991/2). The estimated coefficients of equation (1), using data from 1979/80 to 2008/9, and some diagnostic statistics are given in Table 1.

All parameters are statistically significant (at the 1% level), the model explains over 98% of variation in the data and autocorrelation does not appear to be a problem. Over 100 different model specifications were tested, in particular with respect to functional

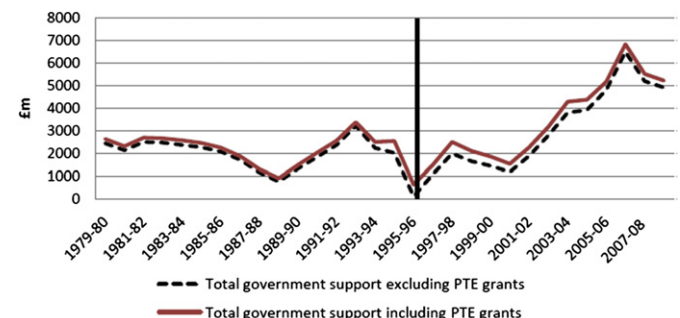


Fig. 5. Total government support to the rail industry (£ million, 2008 prices).

Table 1
Forecasting model parameters.

Coefficient	Value	t-statistic
α	2.923	17.106
β	-5.690	-2.817
γ	0.0024	7.093
δ	3.68762E-07	3.614
θ	-0.092	-8.575
μ	-0.051	-3.117
ρ	-0.063	-3.283
Adjusted R ²	0.983	
Durbin–Watson	1.453	

form (linear and log linear models were also tested), the specification of the independent variables (e.g. the reciprocal of TKM was tested), the use of lagged variables, alternative explanatory variables (e.g. car ownership, car journey times, petrol prices) and alternative specifications of the Dummy Variables. The model given in Table 1 was believed to be the most parsimonious.

The dummy variables in the model indicate that privatisation suppressed demand between 1992/3 and 2005/6 by around 8.8% ($1 - \exp \theta$) whilst the Hatfield accident suppressed demand between 2000/1 and 2006/7 by a further 5.0% ($1 - \exp \mu$). The strikes in the years 1992/3 (ASLEF) and 1991/2 (Signalmen) were estimated to reduce demand by around 6.1% ($1 - \exp \rho$). A feature of the negative exponential specification is that demand elasticities are directly proportional to the relevant policy variables. At the mean values in the data, the elasticity of demand with respect to RPKM was computed to be -0.62, with respect to TKM it was calculated to be 0.90 and with respect to GDP it was found to be 0.39. These values are broadly consistent with some other studies (e.g. Whelan, Harvey, & Cartmel, 2010), although less consistent with others (e.g. Wardman, 2006). In particular, our fare and income elasticities are low (in absolute terms) and we are not able to model the impacts of car competition, in part due to multicollinearity between TKM, GDP and car competition variables at our aggregate level of analysis. It is possible that our approach is overestimating the impact of TKM on the growth in passenger demand and underestimating the impact of external factors such as income and car competition. It is thus possible that our approach will overestimate the benefits of the privatisation package.

The counterfactual estimates for fares, train kilometres and infrastructure and train operating costs are based on trend analysis of five year moving averages (after Burton, Carrol, & Wall, 2002) and are illustrated by Figs. 6–9. It can be seen that the counterfactual assumes strong growth in both fares and train km but with the fares growth being greater than the actuality but train km growth being

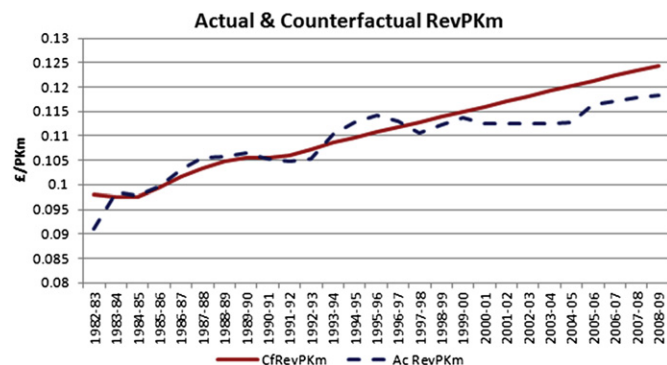


Fig. 6. Actual and counterfactual revenue per passenger km (£, 2008 prices).

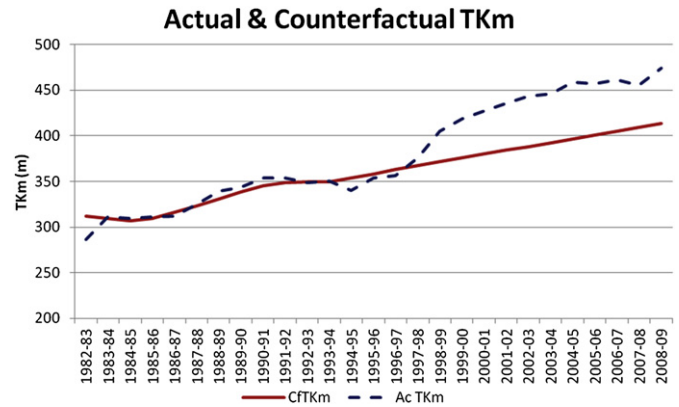


Fig. 7. Actual and counterfactual train kilometres (millions).

less. The counterfactual also posits declining infrastructure and train operating costs per train kilometre whereas the actuality has been strong growth. Infrastructure costs consist of renewals (which exhibited the strongest growth), maintenance and other operating costs whilst train operating costs consist of operating costs and rolling stock capital costs. These cost calculations are based on the work of Smith (1996/7 to 2006/7) (Smith, 2006; Smith & Wheat, 2007), with the series extended using company accounts and the TAS Rail Industry Monitor. An important issue is the period of time over which our counterfactual trends are estimated. We use a relatively long period (five year moving averages from 1982/3 to 1994/5) which picks up the impacts of the commercialisation of British Rail. If we used a short period (for example the five years from 1988/9 to 1992/3 used by Pollitt and Smith (2002)), it is likely that the welfare impacts of privatisation would be enhanced as there is some indication that the benefits of commercialisation were diminishing over time, although the impacts of the Organising for Quality (OfQ) reforms that were implemented in the early 1990s but were largely pre-empted by the privatisation process, are unknown (Gourvish, 2002, 382–3).

One of the key indices is the change in passenger kilometres. The actual change between 1994/5 and 2008/9 was 77%. Equation (1) forecasted a slightly lower growth of 70%, whilst equation (1) run with our counterfactual estimates of fares and train km and with actual GDP forecasts growth of 22%. This suggests that around 69% of the demand growth since 1994/5 can be attributed to privatisation, in part due to fares that were lower and service levels that were higher than they otherwise would have been. The rest of the growth would have happened anyway, in part due to increasing incomes.

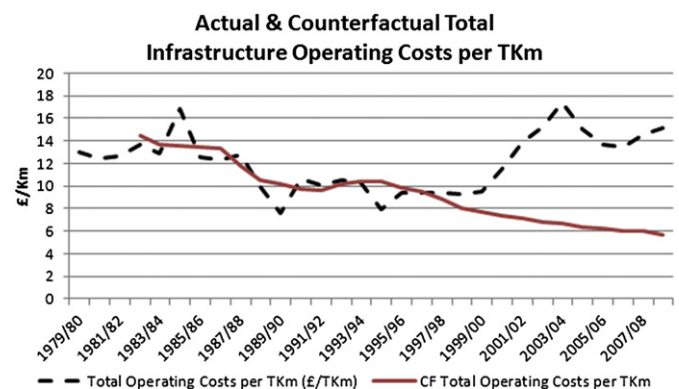


Fig. 8. Actual and counterfactual infrastructure costs per train km (£, 2008 prices).

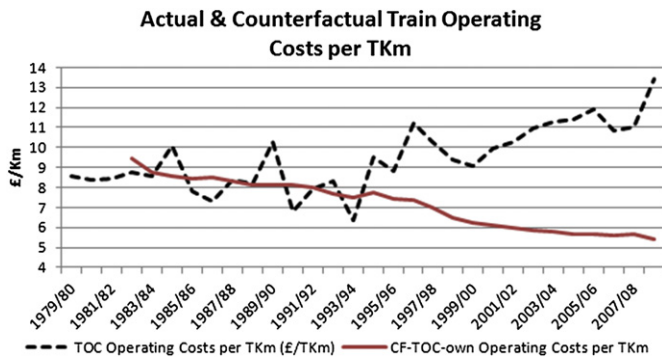


Fig. 9. Actual and counterfactual train operating costs per train kilometre (£, 2008 prices).

5. A cost–benefit analysis of rail privatisation

Our welfare analysis was informed by previous studies (principally Boardman, Laurin, Moore, & Vining, 2009, but also Jones, Tandon, & Vogelsang, 1990). Our principal measure was:

$$\Delta W = \Delta CS + \Delta TR - \Delta TC \quad (2)$$

where W = Welfare, CS = Consumer Surplus, TR = Total Revenue, TC = Total Costs. All values are expressed in 2008 prices and Δ refers to the difference between the actual outcome and the counterfactual.

Consumer surplus can be estimated directly from equation (1) as:

$$CS = \int_{RPKM}^{\text{Max}} PKM \, dRPKM = -\frac{1}{\beta} PKM$$

The results of this analysis are given by Table 2. Overall, using Present Values based on the Treasury's 3.5% discount rate it can be seen that over the period 1995/6 to 2008/9 consumer surplus has increased by around £12 billion. Operators have also benefitted from increased revenue of around £3 billion. The big ticket item is the large increase in costs that is estimated to be almost £40 billion. Overall the welfare loss is estimated to be almost £25 billion. By contrast, the construction cost of the proposed HS2 line between London and Birmingham is estimated as being up to £17.4 billion (2009 prices) (Cm 7827, 2010).

Table 2
The welfare effects of rail privatisation (£ billion) (2008 prices).

	Change in revenue	Change in total industry costs	Change in consumer surplus	Welfare change
1995/96	0.036	-0.059	0.132	0.227
1996/97	0.061	0.705	0.270	-0.373
1997/98	0.111	0.845	0.684	-0.051
1998/99	0.185	1.099	0.940	0.027
1999/00	0.257	1.407	1.163	0.014
2000/01	0.210	3.244	0.999	-2.035
2001/02	0.231	5.058	1.083	-3.744
2002/03	0.247	5.699	1.117	-4.335
2003/04	0.268	7.132	1.195	-5.669
2004/05	0.319	6.594	1.371	-4.911
2005/06	0.354	5.788	1.298	-4.136
2006/07	0.482	5.037	1.906	-2.649
2007/08	0.572	5.593	2.257	-2.764
2008/09	0.630	7.461	2.579	-4.252
Totals	3.957	55.077	16.993	-34.652
Present Values	£2.84	£39.84	£12.34	-£24.65

These losses might be offset by the one off benefits of the sale of assets. However, when the costs of sales and capital and debt write offs are taken into account, these only amount to around £1.22 billion (2008 prices, Present Value) (based on Gourvish, 2002). Moreover, these receipts would need to offset the not inconsiderable transitional costs of setting up the new organisational structure (including ORR, OPRAF and Railtrack), estimated, on a comparable basis, at £0.65 billion (based on Harris & Godward, 1997). The net balance to Government is thus only £0.57 billion.

If we consider the three post-privatisation periods outlined in section 2, between 1995 and 2000 there was virtually no welfare change – by contrast Pollitt and Smith (2002) found a modest welfare improvement over a corresponding period. However, between 2000 and 2005, there was a large welfare loss of almost £16 billion, with this reducing in the period 2005 to 2008 to a loss of almost £9 billion (all figures expressed in terms of Present Values).

Overall Table 2 shows that users are net gainers (by around £12 billion) but the rail industry (including Government) loses (by around £37 billion). However, within the industry there are some gainers. The private Train Operating Companies have been profitable over the period (with average returns varying between 1.2 and 4.8% – TAS (2010)), with total profits around £1.62 billion (in Present Value terms). The ROSCOs and other ancillary businesses have also traded profitably over this period but we are not able to quantify these amounts. The big loser then has been Government, with an increased exposure over the period of something in the order of at least £38 billion.² If we assume there is a deadweight loss of this additional public funding burden and that the shadow price of public funds is around 1.20 (after Dodgson & Topham, 1987), then there is an additional welfare loss of £7.6 billion to take into account. This is likely to exceed any benefits of the reforms not included in our welfare calculations, such as the environmental benefits of increased rail usage. Using data from Balcombe et al. (2004), Brand and Preston (2003) and Sansom, Nash, Mackie, Shires, and Watkiss (2001), we estimate that in 2008/9 the road congestion relief benefits of the privatisation package could be equivalent to around £138 million, whilst the benefits from reduced air pollution, carbon and noise emissions and accidents amount to around £25 million (Present Value, 2008 prices). In combination, this represents a modest 6% uplift on the increase in consumer surplus estimated for 2008/9.

6. Discussion

Pawson (2002) cautions against the 'ruthless arithmetic extraction of net success'. In welfare terms, the calculations presented above seem to suggest that privatisation has been a policy failure. However, it should be clear that the results of our analysis are predicated on a number of assumptions we make in our methodology to deal with the counterfactual, particularly with respect to the extrapolation of key trends, and the determination of the base year. Future work will undertake sensitivity tests to assess the robustness of our findings.

Our work suggests a mixed pattern of winners and losers. Users have clearly benefitted overall, in part due to regulated fares that are lower than they otherwise would have been, but perhaps also due to innovations introduced by the private sector, such as new services and tickets and changes to retail distribution (in particular telesales and web-based sales). Further analysis to break down the benefits to users by service group would be useful, but it seems

² $37.0 + 1.62 - 0.57 = 38.05$. Note this assumes that railways were just breaking even prior to privatisation.

likely that London and South East commuters will have been the big winners from fares regulation.

The big loser has been Government (and ultimately the taxpayer) as costs have increased dramatically. In 2008 prices, our analysis is indicating that total industry costs increased from around £6.5 billion in 1994/5 to £13.9 billion in 2008/9. This is an increase of 114%, although it should be borne in mind that over this period train kilometres increased by 39% – indicating a unit cost increase of around 54%. The reasons for this increase are something of a puzzle, although more detailed analysis is required to assess the role of external factors (such as rising input prices) and to untangle the impact of pecuniary transfers. The 1992 White Paper did not set targets but it was the intention that industry costs should reduce as private sector disciplines were brought to bear. Although this did seem to happen in the immediate aftermath of privatisation, at least for train operations (Cowie, 2001, 2009), these costs reflected the winner's curse and subsequent cost increases were therefore inevitable (see also Preston, 2008b).

Foster (1994) believed the move from a monolithic state system of command and control to a market driven contractual system would lead to cost reductions whereas Preston (1996) raised concerns over the likely increase in transaction costs. Merkert (2010) estimates that for Train Operating Companies transaction costs increased as a percentage of operating costs from 2.9% in 1996/7 to 4.3% in 2007/8. However, this analysis takes place after the key reforms were introduced with Fig. 9 suggesting a large increase in unit operating costs between 1994/5 and 1996/7. It is likely that transaction costs will also impact on the provision of infrastructure but it seems that measurable transaction costs only explain a part of the cost increases since privatisation.

Another possible explanation is that of double marginalisation – the creation of upstream and downstream monopolies will lead to the extraction of excessive rents (Else & James, 1994). However, excessive rents do not seem to have been a feature of the reforms not least because track access charges and fares are regulated.

A further possible explanation might be provided by losses of horizontal and vertical economies of scope. Ivaldi and McCullough (2008) found that there could be a 20%–40% loss of technical efficiency if operations were separated from infrastructure and a 70% reduction if on-rail operations were separated. However, these findings were for US freight railways and are unlikely to be transferable to British passenger railways. Moreover, other studies have mixed findings with respect to the impacts of horizontal and vertical separation (Mizutani & Uranishi, 2011). The McNulty review (DfT and ORR, 2011) has indicated that cost savings of 30% are feasible for the British rail system. Based on our calculations, this would amount to savings of some £4.2 billion in 2008/9 and would be almost exactly the same as the welfare loss for that year (as shown in Table 2).

7. Conclusions

Our initial conclusion is that the privatisation package has been welfare negative and that the most likely cause has been the complex and fragmented nature of the supply-side arrangements. Some further reforms of these arrangements are probably warranted. There are, however, other narratives that can be offered. Supporters of the policy reforms would point out that privatisation was showing some modest welfare gains up to 2000 or was, at worst, welfare neutral. The Hatfield accident changed that, and although the causes of the accident could be related to the changes in infrastructure maintenance procedures instigated by privatisation, the response was to take both infrastructure and train operations more firmly under public control (Glaister, 2004). This viewpoint would see the welfare losses from 2000 onwards as

reflecting the failure of Governmental intervention, not privatisation. The counter argument is that any welfare gains achieved up to 2000 were as a result of both Train Operating Companies and Railtrack adopting business practices that could not be continued in the long run – the subsequent business failures were a direct consequence of the privatisation (Wolmar, 2001, 2005).

Another narrative would focus on the failure of the counterfactual to take into account the role of historic underinvestment. Our counterfactual approach assumed that infrastructure renewal costs would remain broadly constant but the reality is that they increased strongly after privatisation and accelerated after Hatfield and are continuing at relatively high levels. This could be seen as the market correcting decades of underinvestment by the inefficient nationalised railway and a substantive explanation for the so-called cost explosion. Counter arguments here might include the nature of the initial infrastructure contractual regime that encouraged renewals over routine maintenance, the large increases in the unit costs of renewals under Railtrack and accusations of gold plating by Network Rail (Preston, 2002, 2008a).

Although an academic argument at one level, determining the narrative that identifies the key contextual factors and attributes the appropriate mechanisms to the outcomes found here is crucial to any future policy recommendations, particularly with respect to the roles of the private and the public sectors. However, it seems evident that the privatisation process has exhibited features of both market and regulatory failure. The complex organisational structure of the industry has increased costs, both directly through transactions and indirectly through losses of scale efficiencies and unclear principal–agent relationships. This has been exacerbated by the need to rectify under-investments in infrastructure which has arguably been a long standing area of regulatory failure. The benefits that have accrued to consumers and others as a result of private sector initiatives do not seem to have been sufficient to outweigh these cost increases.

Acknowledgements

This research was undertaken by Dawn Robins as an Economic and Social Research Council Collaborative Award in Science and Engineering PhD Studentship (2006–2009), with the support of Oxera and with a secondment to the House of Commons Transport Committee. This studentship was supervised by Professor Stephen Pinch (Geography) and Professor John Preston (Civil Engineering), with Dr. Andrew Meaney (Oxera) being the industrial mentor. We are grateful for the comments from two anonymous referees.

References

- Balcombe, R., Mackett, R., Paulley, N., Preston, J., Shires, J., Titheridge, H., et al. (2004). *The demand for public transport: A practical guide*. TRL Report 593. Wokingham: TRL.
- Boardman, A. E., Laurin, C., Moore, M. A., & Vining, A. R. (2009). A cost-benefit analysis of the privatization of Canadian national railway. *Canadian Public Policy-Analyse De Politiques*, 35(1), 59–83.
- Brand, C., & Preston, J. (2003). Which technology for urban public transport? *Proceedings of the Institution of Civil Engineers: Transport*, 156, 201–210.
- Burton, G., Carrol, G., & Wall, S. (2002). *Quantitative methods for business and economics* (2nd ed.). Harlow: Pearson Education Ltd.
- Cm7827. (March 2010). *High speed rail*. London: Department for Transport.
- Cowie, J. (2001). Subsidy and productivity in the privatised British passenger railway. In *International Conference on Competition and Ownership in Land Passenger Transport*, Molde (Thredbo 7).
- Cowie, J. (2009). The British passenger rail privatisation: conclusions on subsidy and efficiency from the first round of franchises. *Journal of Transport Economics and Policy*, 43(1), 85–104.
- DfT (Department for Transport), & ORR (Office of Rail Regulation). (2011 May). *Realising the potential of GB rail*. Final Independent Report of the Rail Value for Money Study. London: DfT and ORR.
- DfT. (2012 March). *Reforming our railways: Putting the customer first*. Cm 8313. London: DfT.

- Dodgson, J., & Topham, N. (1987). Shadow price of public funds: a survey. In S. Glaister (Ed.), *Transport subsidy*. Newbury: Policy Journal.
- Else, P., & James, T. (1994). Will the fare be fair? An examination of the pricing effects of the privatization of rail services. *International Review of Applied Economics*, 8(3), 291–302.
- Engle, M. (2011). *Eleven minutes late: A train journey to the soul of Britain*. London: Pan Macmillan.
- Foster, C. (1994). *The economics of rail privatisation centre for the study of regulated industries*. Discussion Paper 7. London: CIPFA.
- Freeman, R., & Shaw, J. (2000). *All change. British railway privatisation*. Maidenhead: McGraw Hill.
- Glaister, S. (2004). *British rail privatisation – Competition destroyed by politics, Competencia en el Transporte Ferroviario*. Madrid: Fundación Rafael del Pino.
- Gourvish, T. (2002). *British rail 1974-97: From integration to privatisation*. Oxford: Oxford University Press.
- Gourvish, T. (2008). *Britain's railways 1997–2005 labour's strategic experiment*. Oxford: Oxford University Press.
- Gritten, A. (1988). *Reviving the railways: A Victorian future?* London: London Centre for Policy Studies.
- Harris, N., & Godward, E. (1997). *The privatisation of British rail*. London: Railway Consultancy Press.
- Irvine, K. (1987). *The right lines*. London: Adam Smith Institute.
- Ivaldi, M., & McCullough, G. (2008). Subadditivity test for network separation with an application to US railroads. *Review of Network Economics*, 7(1), 159–171.
- Jones, L. P., Tandon, P., & Vogelsang, I. (1990). *Selling public enterprises: A cost-benefit methodology*. Cambridge, Mass.: MIT Press.
- Merkert, R. (2010). Changes in transaction costs over time – the case of franchised train operating companies in Britain. *Research in Transportation Economics*, 29(1), 52–59, (Presented at Thredbo 11).
- Mizutani, F., & Uranishi, S. (2011). *Does vertical separation reduce cost? An empirical analysis of the rail industry in OECD countries*. Discussion Paper 28. Graduate School of Business Administration, Kobe University.
- Nash, C., & Smith, A. (2007). Passenger rail franchising: British experience. In *International Conference on Competition and Ownership in Land Passenger Transport*, Hamilton Island (Thredbo 10).
- Pawson, R. (2002). Evidence-based policy: the promise of 'Realist Synthesis'. *Evaluation*, 8(3), 340–358.
- Pollitt, M., & Smith, A. (2002). The restructuring and privatisation of British rail: was it really that bad? *Fiscal Studies*, 23(4), 463–502.
- Preston, J. M. (1996). The Economics of British rail privatization: an assessment. *Transport Reviews*, 16(1), 1–21.
- Preston, J. M. (1999). An overview of public transport in the UK and forecasts for the new millennium. In *International Conference on Competition and Ownership in Land Passenger Transport*, Cape Town (Presented at Thredbo 6).
- Preston, J. M. (2002). The transaction cost economics of railways. *Trasporti Europei*, 20/21, 6–15.
- Preston, J. M. (2008a). Is Labour delivering a sustainable railway? In I. Docherty, & J. Shaw (Eds.), *Traffic jam: 10 years of 'sustainable' transport in the UK*. Bristol: Policy Press.
- Preston, J. M. (2008b). A review of rail franchising in Britain 1996/7 – 2006/7. *Research in Transportation Economics*, 22(1), 71–77.
- Preston, J. M. (2009). Competition for long distance passenger rail services: the emerging evidence. In *Presented to the 18th International symposium on transport economics and policy: The future of interurban passenger transport. Madrid. 17 November*. Paris: International Transport Forum/Organisation for Economic Co-operation and Development. <http://www.internationaltransportforum.org/Proceedings/Symp2009/index.html>.
- Redwood, J. (1988). *Signals from a railway conference*. London: Centre for Policy Studies.
- Robins, D. (2012). *Evaluating the long term impacts of transport policy: the case of passenger rail privatisation in Great Britain*. PhD Thesis, School of Geography, Faculty of Social and Human Sciences, University of Southampton.
- Sansom, T., Nash, C., Mackie, P., Shires, J. D., & Watkiss, P. (2001). *Surface transport costs and charges: Great Britain 1998*. London: DETR (Department of Environment, Transport and the Regions).
- Shaw, J. (2000). *Competition, regulation and the privatisation of British rail*. Aldershot: Ashgate.
- Smith, A. (2006). Are Britain's railways costing too much? Perspectives based on TFP comparisons with British rail 1963–2002. *Journal of Transport Economics and Policy*, 40(1), 1–44.
- Smith, A., & Wheat, P. (2007). A quantitative study of train operating companies cost and efficiency trends 1996 to 2006: lessons for future franchising policy. In *European Transport Conference*.
- Steer Davies Gleave. (2011). *Rail value for money study. Research project on fares. Final report: Analysis, recommendations and conclusions*. London: DfT and ORR.
- Wardman, M. (2006). Demand for rail travel and the effects of external factors. *Transportation Research Part E-Logistics and Transportation Review*, 42(3), 129–148.
- Whelan, G., Harvey, A., & Cartmel, J. (2010). A time series analysis of rail demand in Great Britain. In *European Transport Conference*.
- White, P. (1998). Financial outcomes of rail privatisation in Britain. In *European Transport Conference*. London: PTRC.
- White, P. (2001). An independent review of rail privatisation in Britain. In *International Conference on Competition and Ownership in Land Passenger Transport*, Molde (Thredbo 7).
- Wolmar, C. (2001). *Broken rails. How privatisation wrecked Britain's railways*. London: Aurum Press.
- Wolmar, C. (2005). *On the wrong line. How ideology and incompetence wrecked Britain's railways*. London: Aurum Press.