pteg
the voice of urban transport

July 2014

A heavy load to bear?

Towards a fairer allocation of rail industry costs for regional rail

The Passenger Transport Executive Group (***pteg***) represents the six strategic transport bodies which, between them, serve more than eleven million people in Greater Manchester (Transport for Greater Manchester), Merseyside (Merseytravel), South Yorkshire (SYPTE), Tyne and Wear (Nexus), the West Midlands (Centro) and West Yorkshire (West Yorkshire Combined Authority). ***pteg*** is also a wider professional network for Britain's largest urban transport authorities.

This report forms part of ***pteg***'s wider role in stimulating debate around broader policy issues of relevance to transport, and in particular around the economic value of regional rail networks. We hope that it will help to generate ideas, discussion and feedback and therefore welcome any comments you may have on the points it raises. You can find our contact details on the back cover of this report.

pteg.
the voice of urban transport

Executive Summary

It's the common currency of the rail debate that regional networks require high subsidies. A quick look at the Office of Rail Regulation's public subsidy league table[1] couldn't be clearer in its inference. Running regional railways is expensive for the taxpayer whereas Inter-city and London commuter services are not. Indeed, the two latter can make money for the taxpayer. Rail freight too pays its way. Case closed.

However, these subsidy figures are, to some extent, a construct. The railway, as a whole, costs £15.3 billion a year and requires £6.3 billion in government-supported funding. How this overall cost is allocated to particular users is a decision that could be taken in different ways.

This paper shows how the current allocation methodology unfairly attributes a disproportionate share of the railways' overall costs to regional networks. This, in turn, makes regional services look expensive to the taxpayer in a way that distorts the debate about their wider economic, social and environmental benefits. Our analysis also illustrates how what appear to be objective subsidy levels are in fact a construct based on a series of debateable assumptions.

There are four key ways in which the current cost allocation methodology loads the dice against regional rail:

- Light weight regional trains are allocated track maintenance and renewal costs as if they caused equivalent impact as Inter-city trains, when, in reality, a typical inter-city train causes twenty times the infrastructure damage per mile as the most basic regional train.
- In order to (rightly) keep freight off the roads, the substantial damage that freight trains cause to infrastructure (up to sixty times that of the most basic regional train) are largely ignored. However, the knock on effect is that many of these costs are (wrongly) allocated to regional rail.
- Regional rail gets a small share of investment but a disproportionately high share of investment costs. In 2012/13, regional operators contributed 30% of fixed track access charges and were allocated 32% of Network Rail's overall financing costs but only received 20% of investment.

[1] Available at http://orr.gov.uk/publications/reports/gb-rail-industry-financial-information-2012-13

- Rail network overheads (such as head office functions, signalling, ICT and so on) are allocated in proportion to train mileage. Economic theory suggests it makes more sense to allocate such costs in proportion to commercial revenue, which is current practice in many countries. Prior to privatisation, British Rail went further and allocated the majority of these costs to what was deemed to be the prime user (typically Inter-city services).

We propose a fairer and more defensible approach to cost allocation, which addresses the sources of bias highlighted above. This approach would create a more level playing field for regional rail and ensure that the national debate and key decisions are informed by robust evidence.

Our fairer allocation of costs suggests that, in 2012/13, infrastructure subsidy for the Inter-city network was, in fact, over double the figure suggested by the Office of Rail Regulation's estimates. In contrast, infrastructure subsidy for regional rail was half the ORR estimate.

Taking infrastructure and operating subsidy together, our figures show that regional rail networks go from receiving an estimated 58% of total government support to a considerably smaller share of 28%.

1

A heavy load to bear? Towards a fairer allocation of rail industry costs for regional rail

01 Introduction

The national rail network receives billions of pounds in public subsidy. Regional networks are often portrayed as the reason why this is the case. In reality, every part of the network is subsidised by the tax-payer. Moreover, the notion that regional networks receive substantially more subsidy than Inter-city services and the London commuter network hinges on debatable assumptions.

'if regional rail was to receive a more equitable share of total infrastructure spending this would improve its performance and the overall financial sustainability of the regional network'

In this paper, we dissect available information on rail infrastructure spending to highlight where traditional assumptions are skewing subsidy figures against regional rail. We propose an alternative approach and show that this would more than halve regional rail's share of government backing for the rail industry, from 58% to 28%. This difference is due to (a) an allocation of maintenance and renewals costs which better reflects track damage by different types of vehicle, (b) a recognition of the full financial costs of capital investment and (c) an allocation of overheads in proportion to passenger revenues.

We argue that if regional rail was to receive a more equitable share of total infrastructure spending this would improve its performance and the overall financial sustainability of the regional network.

The paper is structured as follows:

- **Section two** provides some context by setting out how much the rail network costs and where its funding comes from
- **Section three** drills down on the assumptions employed to allocate infrastructure costs
- **Section four** challenges the current approach to the allocation of maintenance, renewals, operations and financing costs
- **Section five** summarises the subsidy estimates from our proposed alternative approach and concludes the paper.

This report is part of ***pteg***'s on-going work to demonstrate the value of regional rail networks and to improve the contribution which they make to the UK economy.

2

02 How the railways are funded

In 2012/13, total spending by Network Rail and franchised train operators came to over £15.3 billion.

Half of these costs were funded from the fare-box.

Just over a quarter was funded by a direct grant from central government to Network Rail.

The remaining funding came from other commercial income and borrowing of £2.3bn by Network Rail.

Table one and figure one summarise the cost structure of Great Britain's national franchised passenger railway network. In 2012/13, total estimated expenditure was £15.3bn. Of this, around 10% represents Network Rail's financing cost, essentially the interest payment on past borrowings. The remaining £13.8bn is split 54%:46% between infrastructure spending and franchised train service operations.

Just over a quarter of infrastructure spending went towards major new investment (usually referred to in the rail industry as *enhancements*). The remaining three quarters were split between (a) on-going maintenance and operations, and (b) larger scale maintenance projects (usually referred to in the rail industry as renewals).

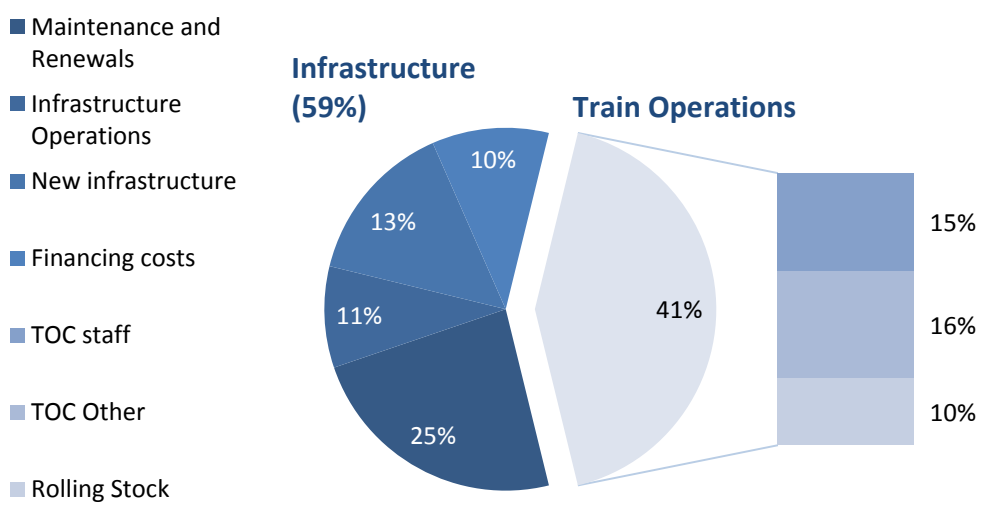
***Table one**. Overview of GB railway costs (£billion, current prices), 2012/13*

		Expenditure (£bn)	Sub-total
Network Rail (infrastructure)	Maintenance	1.0	
	Renewals	2.8	
	Operations + other	1.7	
	Enhancements	2.0	
	Financing cost	1.5	
			9.0
Train operating costs	Staff	2.3	
	Rolling Stock lease charges	1.5	
	Other[2]	2.5	
			6.3
TOTAL			**15.3**

***Source**: **pteg** analysis of ORR GB rail financial analysis 2012/13 and Network Rail's 2012/13 accounts.*

[2] Key cost categories are track access charges, traction costs, maintenance activities outside rolling stock lease contracts and overheads. Traction electricity is included under Network Rail's operations costs and the figures exclude intra-industry payments such as track access charges.

‘Figure one. Rail industry cost structure



Where does the money come from?

The way in which the part-privatised railway is funded can appear complex to the outside observer. However, if we exclude transfers which take place within the industry, then there are three key sources of income:

- Fare-box;
- Other commercial income;
- Government grants.

A fourth category, borrowing, effectively means using future income to fund expenditure today and so it can be argued that it will eventually need to be repaid using income from the three funding sources above.

As one would expect, train operating companies (TOCs) tend to generate most of their income from passenger fares. In some cases, however, this significantly exceeds operating costs and TOCs make a premium payment to government. In other cases, fares income doesn’t cover operating costs and TOCs receive a subsidy payment to cover the difference. Overall, government makes a small financial gain of £38m from franchised train operations expenditure of £6.3bn. It is important to bear in mind, however, that TOCs only make a relatively small contribution to the cost of providing track and stations.

The bulk of TOC costs associated with payments to Network Rail are known as track access charges[3]. At present, track access charges cover only a small fraction of total infrastructure costs. The majority of Network Rail funding comes, in fact, from a direct grant from central government. In addition, Network Rail can finance expenditure by borrowing from financial markets. Since April 2014, Network Rail has been formally classified as a state-owned company and hence this type of funding mechanism essentially amounts to government borrowing.

To make things yet more complicated, both Network Rail and TOCs receive a considerable amount of commercial income from sources other than the fare-box. These include, for example, real estate and on-board catering.

Table two and figure two summarise the amount of income received from different sources. The figures show that half of the rail network's total costs are funded from the fare-box with a further 9% coming from other sources of commercial income. Government directly contributes around a quarter, mainly through direct grants to Network Rail, whilst an additional 15% was raised through (government-backed) borrowing by Network Rail.

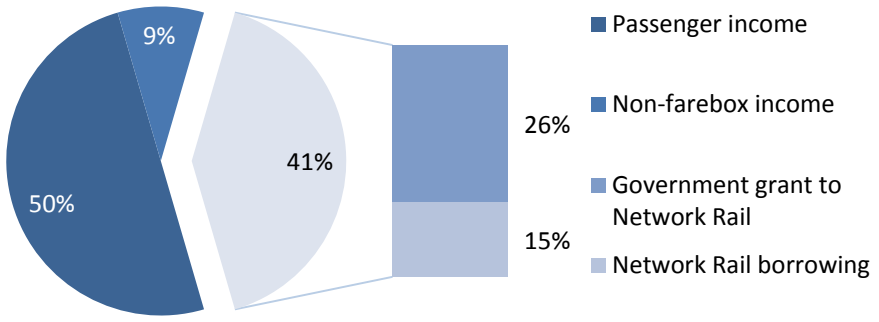
Table two. *Rail industry funding sources 2012/13*

		Income (£bn)	Sub-total
Fare box income	Passenger income	7.7	
			7.7
Other commercial income	Train Operating Companies (TOCs)	0.7	
	Network Rail	0.6	
			1.3
Government grants	TOC subsidy/(premia)		*(0.04)*
	- Department for Transport	(0.9)	
	- Welsh Government	0.1	
	- Transport Scotland	0.4	
	- TfL, PTEs and other	0.3	
	Network Rail grant		*4.0*
	- Department for Transport	3.7	
	- Transport Scotland	0.3	
	- Other	0.01	
			~4.0
Borrowing	Network Rail[4]		***2.3***
TOTAL			**15.3**

[3] In practice, there are also other financial flows between TOCs and Network Rail, the most important of which are in the form of compensation payments known as Schedule 4 and Schedule 8. These occur when the actions of either a TOC or NR have been deemed to have had a negative impact on the operations of another user of the track. One example is the case of a broken down train, which might prevent other services running on a given section of track.

[4] Note that the amount of borrowing in a given year does not necessarily match financing costs, which represent interest payments on accumulated past borrowing.

Figure two. Rail industry funding sources



N.B.: Net TOC subsidy is a negligible figure and so is not represented in this chart

*Source: **pteg** analysis of ORR GB rail industry financial analysis 2012/13*

Table two shows a negligible net payment by government to TOCs. However, there are significant differences between the financial position of individual franchises, with some making substantial premium payments (such as inter-city operators) and others (such as regional and commuter operators) receiving the majority of their revenue through subsidy. In net terms, however, passenger income more than covers train operating costs. We next discuss how fare-box revenue contributes towards infrastructure spending.

A significant proportion of TOC revenues (£1.7bn[5]) is passed on to Network Rail in the form of **track access charges**, which aim to recover part of the cost of infrastructure provision. Freight and open access operators also contribute to infrastructure upkeep but at a much lower rate. For example, in 2011/12, their total contribution came to £77m.

Track access charges cover just 20% of infrastructure costs. Network Rail's remaining expenditure is funded by a £4.0bn direct grant from central government plus £2.3bn worth of government backed borrowing. Taking both grant funding and supported borrowing, the government's contribution equated to 70% of infrastructure costs.

[5] Of this amount, £1.1bn are in the form of fixed track access charges and the remaining in the form of variable, or traffic related, charges.

6

How track access charges work

Track access charges represent payments by train operators to Network Rail, which have two key purposes:

- To incentivise efficient behaviour. For example, by reflecting the additional cost to Network Rail due to extra traffic.
- To help Network Rail recover its costs.

Access charges are structured so as to reflect two key types of cost associated with rail infrastructure. **Avoidable costs** refer to the additional wear and tear and any other operating costs which could be avoided by Network Rail if a given train was no longer running. **Fixed costs**, on the other hand, represent the proportion of Network Rail's expenditure which would need to be incurred regardless of how much traffic was running on the network. There are few examples of true fixed costs as it is often possible to cut back on most forms of expenditure if no traffic was actually running on a section of track. Fixed costs are therefore thought of as the cost associated with providing the current level of infrastructure before the additional wear and tear, due to traffic, is taken into account.

Avoidable costs are partly recouped through variable charges, which are further made up of vehicle usage charges (directly reflecting the varying levels of wear and tear caused by different types of train operating at different speeds); capacity charges (tantamount to a congestion charge and varying across the network); station and depot lease charges; electrification asset usage charges (a contribution towards the upkeep of the asset base); and traction charges (in the case of electric trains). **Fixed costs are partly recouped through fixed charges**. The difference between total fixed costs and the income from fixed charges is made up by a lump-sum grant from central government plus borrowing by Network Rail.

At present, fixed charges represent a larger proportion of TOC payments to Network Rail, although the balance between these varies significantly by operator. For example, Inter-city operators tend to pay a much larger share in variable costs due to the speed and weight of trains. About half of variable charges go towards energy costs (traction), with vehicle and capacity charges representing the other two largest items.

In total, track access charges cover just 20% of infrastructure costs. This suggests that the majority of Network Rail's costs are considered to be fixed or are, at least, shared jointly between two or more operators.

The rationale for the majority of fixed and shared costs to be borne by government is based on the premise that this incentivises train operators to make more efficient use of capacity. Once infrastructure is in place there is little benefit to society if it's left unused.

03 How public subsidy for the railways is allocated under the current system

According to estimates by the Office of Rail Regulation, the Inter-city network receives 23% of total public funding, the London and South East network 19% and regional networks 58%.

In the previous section, we showed that the tax-payer supports 26% of the total cost of Great Britain's railway network, or 41% if government-backed borrowing is included. This means that there is a substantial public stake in the rail network. It's not surprising then that there is considerable debate on how this money is spent. A good understanding of subsidy flows is also important for the rail industry itself, in order to identify efficiencies and improve its financial sustainability over time.

'Allocation of fixed and shared costs is heavily skewed against regional rail. This gives a misleading impression of the distribution of subsidy across the network'

In this section, we set out the Office of Rail Regulation's published subsidy estimates. In subsequent sections, we go on to discuss how these figures are arrived at. We will argue that the approach to the allocation of fixed and shared costs is heavily skewed against regional rail services and that this gives a misleading impression of the distribution of subsidy across the network.

Table three summarises the level of net public funding for each of the three main markets which make up the national rail network, Inter-city (IC), London and South East (LSE) and Regional. While it has been possible to estimate the level of operating subsidy at the level of individual TOC for a number of years, it is only recently that the ORR has been able to produce disaggregate figures for infrastructure subsidy. This work is, of course, to be welcomed as it contributes towards the objective of improving transparency within the rail industry.

If we look first at operating subsidy, the figures suggest that companies operating IC and LSE services make a positive contribution to the Exchequer. However, once infrastructure costs are taken into account it becomes clear that every part of the rail network requires a degree of public funding. In absolute terms, the ORR's figures suggest that IC, LSE and Regional networks receive, respectively, 23%, 19% and 58% of total public funding. Looking at subsidy per passenger-kilometre (the indicator which tends to be most frequently used by the rail industry) the disparity between Regional services and other parts of the rail network becomes clear.

Even if we take these figures at face value, it should be noted that there are good a-priori reasons for why regional networks would be expected to receive a higher degree of public funding than other types of service. Crucially, regional networks operate smaller, slower trains across a larger and more dispersed geographical area. As a result, unit operating costs are higher and load factors lower than on other types of service (see table four). This also makes it more difficult to charge higher fares, as rail is in a weaker competitive position relative to other modes. Not only that, but average household income levels are also lower than, for example, in London and the South East commuter belt.

This logic helps explain why franchise subsidy is so much larger for Regional networks than for IC and LSE services (which, in fact, collectively pay a net premium to government). But what is perhaps more surprising is the relatively high infrastructure subsidy, which the ORR figures suggest regional networks receive. This result is contradicted by our own analysis of investment over the period 2009-2014 (see section four), which shows that Network Rail spending has been heavily skewed towards the LSE network. We also know that regional trains tend to cause much less infrastructure damage than heavier, longer and faster IC and LSE trains.

In the next section, we explore the assumptions underlying the allocation of infrastructure costs by the ORR.

Table three. *Operating and infrastructure subsidy by market segment, 2012/13*

	Inter-city	London South East	Regional[6]	2012/13 Total
Franchise subsidy pence / passenger-km*	2p	2p	-10p	
Infrastructure subsidy (p/pax-km)	-6p	-6p	-12p	
Total (p/pax-km)	-4p	-4p	-22p	
Total grant funding (£m)	909	782	2,324	4,016
Borrowing		*Un-allocated*		2,300

***Source**: **pteg** analysis, based on ORR GB rail financial analysis 2012/13*

** pax-km refers to Passenger kilometres in this and subsequent tables.*

N.B.: fares income attributed to franchise operations; transfers between TOCs and NR excluded from the assessment of infra subsidy

[6] The Regional market is defined as the following set of train operating companies: First Scotrail, Arriva Trains Wales, Northern Rail, Trans Pennine Express, Merseyrail and London Midland.

Table four. Average yield and load factor by market sector (2012/13)

	Inter-city	London South East	Regional
Fare-box income (pence/pax-km)	13.3	14.4	10.6
Average load factor (pax-kms/train-km)	143	131	65

04 How infrastructure costs are allocated under the current system

The way in which infrastructure costs are allocated is open to debate. We argue that the current approach in effect dumps a disproportionate share of the industry's overall costs on regional rail networks.

For example, Inter-city trains are estimated to produce twenty times the amount of track damage as the most basic regional train (a Pacer). Yet, they are allocated equal shares of maintenance and renewals costs.

Regional rail networks contribute 30% of fixed track access charges and were allocated 32% of financing costs but received only 20% of new investment in 2012/13.

In effect, the subsidy which the regional network is estimated to receive from government is 'paying' for new infrastructure elsewhere.

The way in which infrastructure costs are allocated is complex. In this section we break down what those costs are, how they are currently allocated and on what basis. We identify those areas where current assumptions are questionable and artificially inflate the level of subsidy estimated to be received by Regional networks.

Background

Rail infrastructure is typically shared by very different services, ranging from two-car stopping trains to high-speed inter-city services and twenty-wagon 1,000-tonne coal trains. Each type of train will have different infrastructure requirements and different impact on the infrastructure itself. For example, in order to reach consistently high speeds, inter-city services need straight alignments and gentle gradients, which require a large number of tunnels, cuttings, embankments and viaducts. Freight trains need robust infrastructure and frequent maintenance. Lighter commuter trains, on the other hand, typically operate at much lower speeds and cause considerably less wear and tear.

On the other hand, Network Rail performs certain functions which support the network as a whole and bear no relationship with the volume, or mix, of traffic on the network. This would include the majority of head office functions, as well as some activities related to signalling, strategy and planning.

These examples illustrate some of the difficulties in determining the proportion of infrastructure costs which are directly incurred by different operators. As a result, infrastructure cost allocation necessarily relies on a large number of assumptions and simplifications, many of which are open to debate.

Network Rail cost structure

Table five and figure five summarise Network Rail's cost structure, split into five key cost categories, and apportioned to the three main passenger markets following the ORR's GB rail financial analysis.

Figure five shows that maintenance, renewals and financing costs are split in roughly equal proportions between the three market segments. Operations costs are comparatively higher in LSE, which reflects the higher use of electricity traction in this part of the country[7]. The greatest difference between the three markets occurs in the case of enhancements where expenditure is comparatively higher on IC and LSE networks relative to the regional market. In the rest of this chapter, we examine the assumptions employed to allocate each of these cost categories between markets.

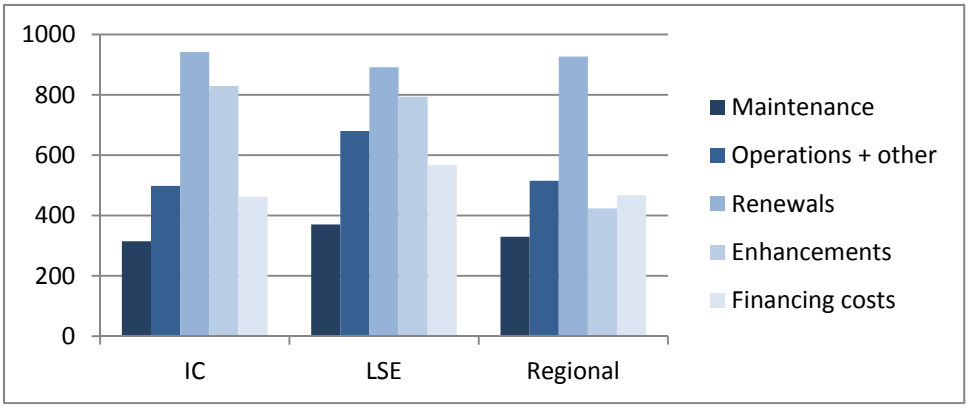
***Table five**. Network Rail cost structure, allocated by market sector (£ million)*

	IC	LSE	Regional	Total
Maintenance	315	370	329	1,014
Operations and other costs	498	680	515	1,693
Renewals	942	891	927	2,760
Enhancements	829	794	423	2,046
Financing costs	462	567	468	1,497
Total	3,046	3,302	2,662	9,010

*Source: **pteg**'s analysis of ORR's GB rail financial analysis 2012/13*

[7] Operations includes the cost of electricity traction supplied to operators.

Figure five. Network Rail cost structure, allocated by market sector



Maintenance

Maintenance refers to general day-to-day upkeep of the railway to address on-going wear and tear to track, signals and the power supply.

Network Rail's regulatory accounts report the cost of maintenance activities at the level of individual operating units, effectively, the geographical base which individual maintenance staff and machinery are attached to. Given this high level of disaggregation we therefore expect that the ORR's cost allocations accurately represent the geographical distribution of maintenance costs across the country. However, it is less clear how costs are allocated between different operators. Our analysis of the ORR's financial data suggests that maintenance costs correlate most closely with train-kms operated.

Using train-kms to allocate maintenance costs implies that every train has similar characteristics. In reality, longer, heavier and faster trains are likely to cause a disproportionate amount of infrastructure damage[8].

Network Rail and the ORR have funded a considerable amount of research to better understand the level of infrastructure damage which is imposed by various types of train under different operating conditions[9]. This research strongly suggests that wear and tear increases more than linearly with axle weight and operating speed.

[8] See, for example, http://orr.gov.uk/__data/assets/pdf_file/0017/1772/freight-vuc-morgan-tucker-jun12.pdf

[9] For more information on this work please see http://www.networkrail.co.uk/conclusions-on-the-allocation-of-the-variable-usage-charge.pdf and http://www.networkrail.co.uk/The-variable-usage-charge.pdf.

Level of infrastructure damage imposed by different types of train

Based on Network Rail data[10], we estimate that a diesel inter-city train[11] produces around 20 times the amount of track damage as the 'Pacer' trains[12], which predominate across much of the regional rail network. A freight train carrying coal or construction materials produces 40 to 60 times the amount of track damage as a 'Pacer'.

'Pacer' train

'Inter-city trains are estimated to produce twenty times the amount of track damage as the most basic regional train. Yet, they are allocated equal shares of maintenance and renewal costs'

As shown in table six, the ORR's current allocation of maintenance costs, based on train-kms, over-states the share of costs incurred by regional rail services by a factor of two, relative to an allocation based on research into wear and tear.

Table six. *Evidence of train wear and tear v ORR allocation of maintenance costs*

	IC	*LSE*	*Regional*
Share of maintenance costs (ORR analysis)	32%	36%	32%
Estimated share of track wear and tear[13]	54%	31%	15%

[10] Our analysis is based on Network Rail's Variable Usage Charge price list for CP5, which we take to be proportional to infrastructure damage imposed by vehicles operated.
[11] IC225
[12] Classes 142 and 144
[13] Taken to be proportional to the Variable Usage Charges (VUC) imposed on each group of operators. VUC income by operator obtained from Network Rail's Regulatory Accounts.

Renewals

Renewals can be thought of as large scale maintenance. Once a section of track has served a certain threshold volume of traffic it becomes more cost effective to renew the entire infrastructure all at once rather than to rectify wear and tear through on-going maintenance activities. It would therefore seem reasonable to use estimates of wear and tear by different trains as a proxy for the share of renewals expenditure which each operator incurs. Table seven shows that the ORR's cost allocation more than doubles the renewals expenditure allocated to regional networks, relative to an allocation based on estimates of wear and tear.

Table seven. *Estimates of train wear and tear v ORR allocation of renewals costs*

	IC	*LSE*	*Regional*
Share of renewals (ORR)	*33%*	*32%*[14]	*35%*
Estimated share of track wear and tear[15]	*54%*	*31%*	***15%***

[14] The one complication in using wear and tear as a proxy for renewals costs is that there may be no need for renewals in cases where the infrastructure is being significantly upgraded. In such instances, the cost of this investment would appear under enhancements rather than renewals. Indeed, looking through the figures in tables six and seven it seems that the scale of new investment in the London SE network reduced the expenditure on renewals. In order to settle this point, it would be necessary for Network Rail to provide more information on the allocation of renewals costs.

[15] Based on VUCs

The infrastructure impact of rail freight

Although freight traffic represents a relatively small proportion of overall traffic on the network[16], ORR and Network Rail research suggest that freight is responsible for a large proportion of track wear and tear, and hence maintenance and renewals costs. Nevertheless, the ORR's allocation of infrastructure costs largely ignores the role played by freight.

Although there are sound policy reasons for Government to treat rail freight favourably[17], ignoring the impact of freight traffic in the allocation of costs inevitably leads to distorted estimates of subsidy levels for passenger services. This is particularly critical for regional networks where lightweight passenger trains often share the track with much heavier freight trains and therefore the impact of freight traffic is likely to be most felt.

For example, on some rural lines, such as Settle-Carlisle[18], there are comparable volumes of passenger and freight trains, with freight tonnage significantly exceeding passenger tonnage.

The effect of leaving freight rail freight out of cost allocation is to overestimate the actual level of public support going towards regional services while underestimating the value for money achieved from that subsidy (which should include the external benefits from rail freight).

At the same time, it is often forgotten that many of the wider economic and social arguments in support of rail freight could be equally made for commuter trains on regional networks. In fact, it could well be argued that commuter trains should be treated in a similar way to freight as they have an even more positive impact on road congestion. If that were to be the case, then the ORR's analysis would show Inter-city services receiving a much larger proportion of public subsidy.

The treatment given to freight highlights the fact that the allocation of rail costs is as much a political as a technical decision. Estimates of public subsidy, which necessarily rely on subjective cost allocation rules, therefore need to be interpreted with care.

---

[16] Freight traffic is usually measured in gross tonne miles (28 billion per year across GB) whereas passenger traffic is measured in train miles. This makes it difficult to compare the two types of traffic. However, based on some assumptions about vehicle tonnage, train composition and load factors, we put the proportion of freight mileage at around 5-10% of passenger train mileage. Less than 10% of freight tonnage originates in London and the South East, whereas London commuter services represent close to 38% of all passenger train-kms. This means that freight represents a much more significant proportion of traffic on regional and Inter-city networks.

[17] Rail freight can have a positive impact on highway congestion, road maintenance costs and air pollution by reducing the amount of freight traffic which travels by road (http://www.networkrail.co.uk/aspx/10439.aspx). However, because many of the social costs incurred by road freight are not paid for by operators, there is a strong second best argument for subsidising rail freight.

[18] Other obvious examples include Carlisle-Newcastle,Doncaster-Cleethorpes - which is shared with the access route to the port of Immingham - other parts of the network around Hull and Humberside, parts of South/West Yorkshire and several routes in the Midlands

Operations

Operations include most recurring forms of expenditure which do not fall neatly into either maintenance or renewals, such as[19]:

- Head office (eg: HR, ICT, Finance, Procurement, Planning/Development, Pensions and Insurance, Utilities).
- Other overheads (eg: British Transport Police, contribution to the cost of regulatory bodies).
- Signalling.
- Operations management (eg: control centre, station staff).
- Traction electricity.

Table eight. *Breakdown of Network Rail operations expenditure (source: Network Rail accounts)*

		Expenditure 2012/13 (£m)	Share of operations
'Controllable opex'	Head Office	479	34%
	Signalling	233	16%
	Operations management	227	16%
'Non-controllable opex'	Traction electricity	264	19%
	Other overheads[20]	223	16%
Total (£m)		1,426	

[19] Network Rail accounts and ORR's analysis of rail financial information distinguish between controllable and non-controllable operations expenditure (opex), where the former includes head office, signalling and operations management, and the latter includes traction electricity and other overheads. It is implicit in this distinction that Network Rail has no control over the cost of electric traction or other overheads whereas it may be able to drive efficiencies in the other three areas.

[20] Includes rates, British Transport Policy costs, RSSB and ORR fees

Traction electricity costs are passed on to individual TOCs directly by Network Rail[21] . The figures in table nine show that LSE operators, which tend to run predominantly on electrified tracks, naturally attract a greater share of traction costs.

Other operations costs are allocated broadly in line with train-kms. This approach is debatable and, at the very least, provides a misleading idea of the true cost of providing regional rail services.

We start by looking at signalling costs. Although trains-kms represent a good starting point for cost allocation, this ignores the role played by traffic density and operating speed on the need to provide ever more sophisticated systems and greater number of specialised staff. Some rural rail lines do rely on outdated signalling systems which require a high number of signalling staff. However, when comparing two parts of the network benefiting from similar technology, the more congested area would be expected to need a greater number of signalling staff per train movement. However, we would agree that more research and greater transparency is needed to better understand the drivers of signalling costs.

In the case of overheads and operations management, it is even more difficult to justify an allocation on the basis of train-kms. In both cases, it can be argued that marginal changes in train-kms would leave expenditure largely unchanged. As such, the use of train-kms as an allocation method is essentially arbitrary. Both British Rail and many present day European railways have employed instead a **prime user principle** whereby shared costs are allocated to the most profitable operations (or, put differently, those most able to bear the costs)[22]. The reasoning behind this approach is that if unprofitable services were to be removed from the network, prime user services would need to bear the full costs. Allocating costs to the prime users therefore gives a more accurate idea of their underlying profitability.

In table nine, we illustrate how the cost share of regional networks would change if overheads and operations management were allocated in proportion to passenger revenue or if IC and LSE services were treated as prime user[23]. In the first case, the costs allocated to regional operators would fall by 43%. In the second case they would fall by more than two thirds.

[21] This is done in the form of Traction Electricity Charges, which are published by Network Rail.
[22] This is consistent with the Ramsey-Boiteux pricing concept from economic theory, which shows, under certain conditions, that the most efficient resource allocation results from a price structure where the mark-up on marginal costs is proportional to the willingness to pay of each user.
[23] In both cases, signalling costs are allocated in proportion to train-kms.

Table nine. *Operations costs: ORR v **pteg** allocation method*

	IC	LSE	Regional
Share of operations costs (ORR allocation)	28%	40%	32%
Share of traction user charges	*24%*	*62%*	*14%*
Share of other operations costs	*29%*	*35%*	*35%*
Share of operations costs (*pteg* allocation)	35%	48%	**17%**
Share of operations costs (IC and LSE treated as prime users)	39%	53%	**8%**

Enhancements

Investment in new or improved infrastructure is known as enhancements.

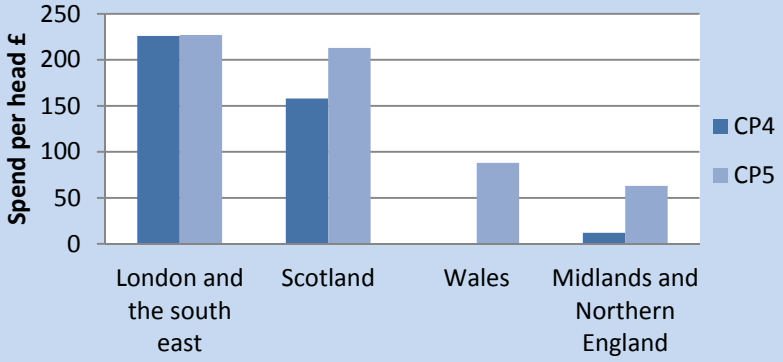
In contrast with other types of infrastructure spending, enhancement schemes tend to take place on discrete sections of the network and are, in the main, identified individually in Network Rail's regulatory accounts. Cost allocation therefore becomes a more straightforward task as it is relatively easy to determine which operators tend to benefit the most from the investment.

Invest to save?

As shown on table ten and figure six, investment in new or enhanced infrastructure was heavily skewed towards London/South East and the Inter-City network. Based on the ORR's estimates, regional rail networks received only 21% of total investment in 2012/13. In 2011/12 the figure was even lower, at around 18%. In contrast, regional operators ran 32% of train-kms and contributed 30% of Network Rail fixed track access charge income.

Our detailed analysis of identifiable expenditure on regional rail networks between 2009 and 2014 shows that the North and the Midlands attracted a fraction of the spend per head as LSE and Scotland. This disparity is largely set to continue into Control Period 5 (2014-2019).

Figure six. Regional investment spend per head of population[24]



Our analysis highlights an important inconsistency between the allocation of overall infrastructure costs and the way in which investment in the network is prioritised. This matters because investment is a key driver of future cost savings and revenue growth. For example, improvements in line speed can lead to a more efficient use of rolling stock and staff by TOCs, as well as growth in demand and revenue yield[25].

[24] ***pteg*** analysis of regionally identifiable enhancements expenditure in Network Rail accounts. Figures exclude expenditure which mainly benefits Inter-city services.
[25] Yield refers to revenue per pax-km travelled.

Enhancement spending doesn't reflect the full cost of infrastructure investment. Because some of this spending is funded through borrowing, Network Rail also pays interest on this money. As Network Rail puts it:

- "*all investment is funded through the raising of debt or from operating cash flow*"[26];
- "*Network Rail borrowed principally to fund part of its £4.5bn investment programme in the year*"[27].

In 2012/13, financing costs represented three quarters of the money actually spent on enhancements and around 10% of total rail industry expenditure. The allocation of financing costs therefore makes an important contribution to public subsidy estimates.

Borrowing allows Network Rail to fund investment now, in anticipation of the additional income (or efficiency savings) which this will generate in the future. It therefore seems to make sense to allocate financing costs in proportion to the amount of investment which different parts of the network receive[28]. To the extent that borrowing now will increase the cost, and potentially crowd out, future investment in other parts of the network, then this opportunity cost should also be recognised.

The allocation of financing costs artificially inflates the regional networks' share by more than 50%

In reality, the ORR's financial analysis allocates financing costs on the basis of train-kms. Because of the very large disparity in investment spending across the network, this artificially inflates the amount of subsidy received by regional network by more than 50%. At the same time, the ORR treats borrowing much as commercial income rather than government support (see box on next page). Together these two decisions depress the actual public cost of enhancements on IC and LSE networks, while shifting some of the future interest payments onto regional networks.

Table ten. *Allocation of enhancement spending and financing costs*

	IC	LSE	Regional
Share of enhancement spending in 2012/13	40%	39%	21%
Share of enhancement spending in 2011/12	28%	54%	18%
Share of financing costs (ORR allocation)	31%	37%	32%

Financing costs

[26] NR regulatory accounts, p.13
[27] NR regulatory accounts, p.15
[28] Or, better even, the proportion of accumulated investment which they have received in the past. However, given that large scale borrowing by NR is a relatively new phenomenon, this is unlikely to make a significant difference at present.

Network Rail borrowing

The ability to borrow gives Network Rail the flexibility to anticipate future growth in demand, to put resources into ‘invest to save’ schemes or to vary the amount of discretionary spending between one year and the next.

However, borrowing today implies lower actual expenditure in the future, especially given the small proportion of Network Rail income which comes from the fare-box and hence the limited scope for future fare box income growth. One can also see from table one that financing costs are a relatively large proportion of Network Rail’s expenditure. This will impact further on Network Rail’s ability to fund future investment schemes from what is largely a fixed funding settlement from government.

From April 2014, Network Rail has been re-classified as a state-owned company and its borrowings have formally become part of government debt. This change makes it clearer that borrowing by Network Rail is effectively the same as a direct grant funded by government borrowing.

05 An alternative and fairer approach to cost allocation for regional rail

Rail infrastructure allocation is far from an exact science and clearly more work needs to be done to understand cost drivers.

However, it is clear that the current method is heavily skewed against regional railways. Our alternative approach would create a more level playing field for regional rail and ensure that the national debate and key decisions are informed by robust evidence.

Our fairer allocation of costs suggests that, in 2012/13, infrastructure subsidy for the Inter-city network was, in fact, over double the figure suggested by the Office of Rail Regulation's estimates. On the London commuter network, the figure was 50% higher than ORR estimates. In contrast, infrastructure subsidy for regional rail was half the ORR estimate.

Taking infrastructure and operating subsidy together, our figures show that regional rail networks go from receiving an estimated 58% of total government support to a considerably smaller share of 28%.

In this paper, we have analysed the cost structure of the British rail network to show how the Office of Rail Regulation arrives at its estimates of public subsidy for regional rail.

Although rail infrastructure cost allocation is far from an exact science, this report has highlighted a number of areas in which the current approach seems to be clearly skewed against regional rail networks. We therefore propose an alternative approach which we believe offers a more realistic, robust and effective method.

Maintenance and renewals

Maintenance and renewals costs are allocated in proportion to train-kms without taking into account the level of damage inflicted on the infrastructure by different types of service. We propose to allocate these costs in proportion to the estimates of track wear and tear by train type, which have been produced through years of ORR and Network Rail sponsored research.

Although we have been unable to allocate costs to freight services due to lack of sufficiently disaggregate information, it is important that this is taken into account in future analysis by the ORR.

Operations

Network Rail overheads and operations management costs are currently allocated in proportion to train-kms even though marginal changes in services operated would have virtually no impact on these types of spending. We propose to allocate these costs in proportion to passenger revenues and would encourage the ORR to consider the move to a prime user charging approach.

Enhancements and financing costs

Financing costs are currently allocated in proportion to train-kms even though this output has, at present, no direct bearing on investment spend and hence on borrowing by Network Rail. We propose to allocate financing costs in proportion to current investment spend and to treat government-backed borrowing by Network Rail as public funding for the railways. Although we are unable to take into account past investment spend our analysis of the past two years shows that there are likely to be important fluctuations over time. As such, we would encourage the ORR to reflect past investment spend in the allocation of financing costs should this information be available.

'Regional rail networks go from receiving more than half of all government funding to a share of just over a quarter'

Our fairer allocation of costs, shown in table eleven, suggests that, in 2012/13, infrastructure subsidy for the Inter-city network was, in fact, over double the figure suggested by the Office of Rail Regulation's estimates. On the London commuter network, the figure was 50% higher than ORR estimates. In contrast, our estimate of infrastructure subsidy for regional rail is half the ORR's figure.

Taking infrastructure and operating subsidy together, our figures show that regional rail networks go from receiving more than half of all government funding to a share of just over a quarter. Regional rail passengers still receive the highest level of subsidy per passenger-km but it now becomes clear that this is driven by operating subsidy rather than infrastructure spending. Real subsidy levels are also shown to be much closer between Inter-City, London South East and Regional networks than previously thought.

The low level of infrastructure spending in regional networks also goes a long way towards explaining the high level of operating subsidy. Investment and the quality of infrastructure play a key part in the ability of train operating companies to grow demand and generate additional revenue. They are also a determining factor of train operating costs. For example, an increase in line speed can reduce rolling stock and staff costs, while making future frequency enhancements cheaper to deliver. In that sense, it is reasonable to expect that decades of under-investment in regional rail infrastructure will lead to a widening gap in terms of subsidy requirements relative to other parts of the network.

It would take a relatively small increase in demand and yield (or, conversely, a fall in unit operating costs) to bring regional rail subsidy in line with subsidy on the rest of the network. This should not be difficult to achieve given the relatively low mode share of rail in the regional market and the rampant growth observed following service improvements. However, it would require Network Rail and central government to think of regional networks as an asset in which it is worth ***investing to save***.

'The low level of infrastructure spending in regional networks goes a long way towards explaining the high level of operating subsidy'

Table eleven. Government funding estimates by market segment (2012/13)

		IC	LSE	Regional
	TOC operating subsidy (pence / pax-km)	2p	2p	-10p
ORR estimates	Infrastructure subsidy (pence / pax-km)	-6p	-6p	-12p
	Total govt. support (p / pax-km)	-4p	-4p	-22p
	Total (£billion)	£0.9 billion	£0.8 billion	£2.3 billion
***pteg* estimates**	Infrastructure subsidy / pax-km	-14p	-10p	-7p
	Total govt. support, including Network Rail borrowing (p / pax-km)	**-12p**	**-8p**	**-17p**
	Total gov. support, including Network Rail borrowing (£billion)	**£2.8 billion**	**£1.8 billion**	**£1.8 billion**

Recommendations

The analysis in this report shows how important it is to have a good understanding of rail infrastructure costs in order to make informed policy decisions. Current evidence puts an unduly negative spin on regional networks by failing to acknowledge the large amount of investment which has gone towards Inter-city and London commuter networks, or the huge volumes of rail freight which make use of regional networks.

Although the Office of Rail Regulation (ORR) and Network Rail have made remarkable progress in recent years to increase industry transparency, there is still a long way to go. As a next step, we would encourage the ORR to consider our proposed cost allocation approach and to reflect our suggestions in future editions of its Great Britain rail financial analysis. In particular, we suggest that:

- The allocation of maintenance and renewals costs should reflect the amount of damage inflicted by different types of service on the infrastructure.
- The allocation of overheads follows a prime user principle or, at least, reflects the fact that a large proportion of costs do not vary directly with traffic.
- The allocation of financing costs reflects past infrastructure investment.

In some areas, such as the infrastructure impact of rail freight or the cost of signalling, we feel that there is the need for more research in order to get a better understanding of how these costs are spread across the network.

Finally, we would call on the Department for Transport to acknowledge the potential role of greater investment in regional networks as a way of reducing future levels of operating subsidy and supporting industry and freight. It is important to remember that despite low levels of investment, many parts of the regional network have grown at a record rate over the past decade. Moving from ‘managed decline’ to an ‘invest to save’ strategy could help capitalise on this trend.

pteg

Wellington House

40-50 Wellington Street

Leeds

LS1 2DE

T 0113 251 7204

F 0113 251 7333

E info@pteg.net

W www.pteg.net

This document is available to download at:

www.pteg.net/resources