



THE ROLE OF INCENTIVES IN THE GB RAIL INDUSTRY

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GLOSSARY

Abbreviation	Description
ABC	Activity Based Costing
BR	British Rail
CBA	Cost Benefit Analysis
CLG	Company Limited by Guarantee
CP3	Rail periodic review in respect of period 2004/5 - 2008/09
CP4	Rail periodic review in respect of period 2009/10 - 2013/14
CRFIM	Cost Reflective Financial Indemnity Mechanism
DfT	Department for Transport
FIM	Financial Indemnity Mechanism
GB	Great Britain
HMG	Her Majesty's Government
HMT	Her Majesty's Treasury
LRMC	Long Run Marginal Cost
MFI	Management Financial Incentives
MIP	Management Incentive Plan
MO	Market Operator
NR	Network Rail
ORR	Office of Rail Regulation
P&L	Profit & Loss Account
PPP	Public Private Partnership
PTE	Passenger Transport Executive
RAB	Regulatory Asset Base
RPI	Retail Price Index
SO	System Operator
SRMC	Short Run Marginal Cost
TDR	Test Discount Rate
TOC	Train Operating Company
UK	United Kingdom
WACC	Weighted Average Cost of Capital
WTP	Willingness to Pay
WW	Welsh Water

1. INTRODUCTION

1.1. Study objectives

As part of the 2008 Periodic Review (CP4), ORR is undertaking a thorough and wide ranging review of the incentives framework both for Network Rail (NR) and for the wider GB rail industry. This will establish the incentive framework for Network Rail for the period to 2014, but the effects of the framework will extend well beyond then. Although no significant changes in the industry structure or NR's financial structure are envisaged in the next control period, ORR intends that its decisions in CP4 should be consistent with an appropriate longer-term vision and strategy for the railway industry.

In connection with this review ORR has asked CEPA to undertake a short high-level 'think piece' on the role of incentives in the GB rail industry. In particular, ORR has asked us to consider:

- The relevance of traditional corporate financial regulatory incentives to NR, and therefore the relevance of a RPI-X style regulatory framework.
- Alignment of incentives between NR, customers, users and funders to deliver required improvements in efficiency, performance, capacity and capability, and the impact of the structure and means of financing of the GB rail industry.
- The role of management incentives.
- The balance of 'carrots' and 'sticks'.

1.2. Structure of report

The paper is structured as follows:

- Section 2 sets out the background to the analysis.
- Section 3 sets out the economic principles that should guide ORR when setting the structure and level of prices across the GB rail industry.
- Section 4 considers the incentives generated by incentive regulation on: a privately-owned equity company; a company limited by guarantee (CLG) funded by debt; Network Rail (NR) taking into account the existence of the government financial indemnity mechanism (FIM) and the CLG corporate structure.
- Section 5 considers how the incentives acting on NR would change if certain adjustments were made to the way NR's allowed revenues are set and to the terms on which the FIM is provided.
- Section 6 focuses on the incentives acting along the value chain between NR and the train operating companies (TOCs).

- Section 7 sets out our conclusions

Annex A sets out further analysis of what a cost reflective FIM guarantee fee is and how it affects incentives.

1.3 Important notice

This paper is the product of a short assignment to produce a high level ‘think piece’ intended to help facilitate informed debate on the incentive framework for NR and the wider GB Rail Industry. It is not, nor does it purport to be, a detailed study of the rail industry. It relies on a limited review of publicly available documents and information provided to us by ORR. We held discussions with ORR and DfT but not with the other stakeholders with an interest in GB Rail. None of the comments in the paper should be taken to imply any judgement about the performance of Network Rail or its management.

Our analysis draws on general economic principles to assess the likely responses of actors in the GB Rail Industry to the incentives created by the particular corporate structure and financing arrangements that apply to NR and the GB rail industry.

2. BACKGROUND

2.1. Current incentive regime

Our understanding of the current GB rail incentive regime is based largely on briefings by ORR.

2.2. High-level comparison of the incentive regime with other regulated industries

The ways in which RPI-X style price regulation transmits incentives to improve efficiency, performance and capacity to regulated equity companies is well understood.

- Incentives to improve **operating efficiency** are generated by setting medium term (usually 5 year) allowed revenues to fund operating costs at levels which demand continuous operating performance improvement. The ‘carrot’ for the providers of capital is that ‘outperformance’ can be retained as higher profit. The ‘stick’ is that ‘underperformance’ reduces returns on capital below the opportunity cost of capital.
- Incentives to maintain and improve **capital efficiency** are generated by setting medium term allowed revenues to fund capital costs (i.e. depreciation and the cost of capital) at levels which require sustained improvements in capital efficiency over time. This is achieved by setting allowed depreciation and the allowed weighted average cost of capital (WACC) at levels judged appropriate if the company is to efficiently implement the capital programme required to deliver the agreed output specification.

If the price cap parameters are correctly set, this methodology ensures that the charges paid by customers reflect the efficient cost of providing the output specification. It also ensures that the company faces incentives to invest efficiently because it can earn the opportunity cost of capital on its investments only if it implements the capital programme efficiently. The sharp improvements in performance over time of most price-cap regulated industries strongly suggest that these incentives have worked effectively in most industries.

Almost all the companies to which incentive regulation has been applied are ‘conventional’ equity companies, funded by both equity and debt capital. There is one exception – Welsh Water – which is a CLG. It has no issued share capital and all of its external finance is sourced in the debt markets.

NR is also subject to RPI-X incentive regulation. However, there are some important differences from an equity company that bear directly on the likely response of NR and providers of capital to incentive regulation, namely:

- NR is a CLG ‘owned’ by its members who are responsible, among other things, for providing corporate governance and whose powers include hiring and firing the Board of Directors.

- In CP3 NR's allowed revenues were set to give NR revenues sufficient to fund its debt service costs and generate a significant surplus to be used to finance on-going capital investment.
- NR benefits from a full faith and credit guarantee (the Financial Indemnity Mechanism, FIM) from the UK government. Therefore it can borrow at fine margins over the government bond rate. In this regard it is unique among the regulated businesses. There is no guarantee fee payable by NR to government to reflect the value of the guarantee.
- GB rail has a highly fragmented structure and incentives must be conveyed along the value chain by way of contractual agreements (e.g. between NR and the TOCs). This complication is largely absent and/or the contractual interfaces are much simpler in other price regulated businesses.
- Significant parts of the rail system are loss-making and both NR and/or some of the TOCs require public subsidy if the services are to remain open. Ensuring that the way these subsidies are paid does not unduly blunt incentives is an important concern in the rail industry.

Other relevant characteristics of GB rail, which it does have in common with some of the other regulated industries, are:

- NR is a single national entity. Therefore, unlike in the water industry, there are no readily available comparators that can be used to benchmark efficiency and performance. In this respect NR is similar to the gas and electricity transmission systems which are also single national networks owned by a single company.
- Capital expenditure requirements of NR during CP3 were large, substantially exceeding the annual depreciation provision and annual operating cash flow. Therefore, there was a substantial increase in FIM exposure over the period.

In GB rail, there is significant uncertainty about the scope to achieve further future operating and capital efficiency improvements and about the level of future capital investment that will be required. To address these uncertainties there is a provision for reopening the regulatory determination if actual expenditure varies by more than 15% from expected expenditure. If the trigger is hit then ORR would undertake a review of the causes and allow an increase in allowed maximum user charges if the facts warranted it, in which case customers would pay higher charges. However if ORR considered that no increase in charges was warranted and NR had to borrow more to deliver the agreed output specification then there would be an increase in the government's FIM exposure. The marginal risks are taken by the government and not the providers of finance to NR.

3. ECONOMIC PRINCIPLES

In this section, we set out the economic principles that in our view should guide ORR when setting the structure and level of prices across the GB rail industry, recognising that they must be constrained by their statutory duties.

The aim is to deliver the volume and quality of railway services such that at the margin social benefit is equal to social cost, and that cost is minimised. In short, the railway should deliver what the public wants, efficiently. The problem of delivering this can be divided into two parts:

- How is social value or willingness to pay signalled to the providers?
- What incentive do those providers have to respond efficiently to those signals?

In a competitive market, willingness to pay (WTP) is revealed in purchasing decisions for services already available, and by entrepreneurs/market researchers endeavouring to discover potential WTP for services that might be developed or expanded. The incentive to respond is the ‘carrot’ of profits so earned, and the ‘stick’ is loss of profit and ultimate exit for responding less effectively than competitors. For rail (as to a greater or lesser degree in other regulated sectors), each of these steps is problematic.

3.1. Signalling willingness to pay (WTP)

At the margin, WTP for existing services is communicated by users paying fares or freight charges to TOCs, who in turn signal their WTP for track access and use by being willing to pay access and usage charges.

The usage charge is conceptually the simplest but may only cover 30% or so of the total costs, with the balance being the track (or path) access cost (to cover fixed costs and scarcity charges on congested elements).

A good estimate of congestion costs should be added to the usage charge, varying by path route and possibly by time of day. The residual costs are likely to present the most obvious problems, as estimating total WTP cannot easily be done just from the marginal WTP. There are methods for doing this (standard in cost benefit analysis for transport projects), but one must query whether in practice the rigour of that approach is actually adopted when deciding on the subsidy to provide to the TOCs when bidding for franchises.

The first conclusion is that more should be done to improve the estimates of the excess of the total social value over users’ actual payments in fares. Unless there are reliable ways of computing WTP for each service, the railway as a whole will not deliver value for money.

3.2. Incentive to respond to signals

The next step - assuming that the correct signals are fed to the TOCs and via them, in the TOCs' willingness to pay the track and path access and usage charges, to NR - is whether NR has the right incentives to respond efficiently to provide the services demanded, and to provide the information to ORR and the ultimate subsidy payers, on the basis of which they can approve the charges and the appropriate levels of service.

Here a key problem is that there are many principals involved with differing objectives. Another problem is that TOCs bid for franchises and sign a contract with the franchising authority that gives them various rights and obligations, but they are also subject to a license regime, and may be further affected by future legislation (for example over the number of train paths available after major new investments have been underwritten by a new set of contracts).

The fragmented nature of ownership makes explicit the need to align incentives of the various actors so that they collectively deliver an efficient response to the WTP signals. It is often argued the fragmentation is further complicated by a safety regime that, in comparison with equally safe Continental systems, is costly, cumbersome and time-consuming.¹ The problem of coordination is discussed below after first setting out principles for setting the marginal usage price signals correctly.

3.2.1. Setting usage charges

Setting correct usage charges is a key first step to aligning incentives. These should cover both the marginal cost of wear and tear of the train on the track, and an estimate of any significant congestion costs.

Wear and tear costs

The marginal cost of wear and tear caused by the train running on the track appears to have been underestimated in the past, judging by the significant increase in maintenance and renewals relative to the amounts specified pre-Hatfield. Usage costs vary significantly both by train and track type, and one of the problems appears to be that in a fragmented structure, broad access rights without appropriate track use charges can lead to very inefficient track use. Routes that in the past have been lightly used (e.g. by Sprinter trains with low axle weights) were appropriately (and cheaply) maintained to a standard safe for such axle weights. If heavy coal-carrying freight trains are granted access to such lines, then they can impose extremely high costs (in terms of repairs) and may require expensive upgrades if they are to continue to be used (although only justified if a cost-benefit test suggests that the future heavy use justifies such an investment and if users are willing to pay

¹ Kemp, Roger (2005) "Safety regulation of nuclear new-build – what can we learn from the rail industry?" EPRG Winter Seminar, Cambridge, see:

<http://www.electricitypolicy.org.uk/events/winter05/programme.html>

the extra costs). Granting freight unlimited track access at a low and uniform usage charge (varying by vehicle type but not by route) is a recipe for serious allocative inefficiency (choice of route and mode) and excessive costs.

It is important to note that there is a significant asymmetry in setting these marginal usage costs. If they are set too low, then there are two costly consequences: revenue will not cover the costs incurred, and more important, demand will increase and precipitate demands for extremely expensive enhancements. On the other hand, an overestimate of marginal usage costs would seem to have fewer damaging consequences, as the rival transport mode, road, has very considerably higher usage charges than costs². The implication is that it would be better to move to higher usage charges at the expense of lower access charges. It should be reasonably simple to devise a move that at constant volumes leaves rail users with no higher charges, although this may be complicated by the current approach under which freight operators (and other open access users) do not currently pay a fixed charge. One might nevertheless justify an increased variable charge even if this could not be offset by a reduced fixed charge, as such users would appear to be paying less than their fair share of the fixed and common costs of the network. Any rebalancing could be made at the same time as a switch to greater benefit and cost sharing between users and NR (which again would lower access charges and raise usage charges) as discussed later.

More generally, subsidising rail users (passengers and freight) can create significant distortions, for example in encouraging excessive commuting that leads to urban sprawl, hollowing out city centres, as well as building a political constituency for increased expenditure and more subsidies on rail as overcrowding (rationing space by discomfort rather than price) increases. In some parts of the network the subsidy per passenger mile is far in excess what would be needed to provide acceptable alternative public transport by coach and bus, but if local authorities have to subsidise these services they will clearly prefer to see increased central government support instead. It is also somewhat perverse on income distributional grounds to concentrate subsidies that are fiscally costly on the very small fraction of the population that regularly use rail and who are of well-above average income levels.

Activity based cost (ABC) accounting is one way towards estimating usage costs, complemented with various predictive models (such as T-SPA) and international experience. Monitoring outcomes (wear and tear as a function of a proper measure of usage, something

² See Newbery, D.M. (2005) 'Road User and Congestion Charges' ch 7 pp 193-229 in S. Cnossen (ed.) *Theory and Practice of Excise Taxation* Oxford: OUP. To be more precise, private cars pay substantially more than the full social costs of providing the infrastructure (operations and maintenance and return on and depreciation of the capital value of the road network at replacement cost (not the arbitrary RAB as used for the rail network that seriously understates the replacement cost), together with accident, noise and environmental costs, mostly through the fuel excise tax. Heavier vehicles pay a higher vehicle excise duty to compensate for the shortfall between the heavier damage they inflict on the road surface and the revenue from the fuel duty. Road damage costs caused by heavy vehicles are a very small fraction of the total road costs (about 5%).

like Equivalent Standard Axle Loads used for roads) against predictions should allow these estimates to be refined. Costs can then be benchmarked across the regions and internationally to improve information for setting future charges and revenue caps.

Congestion costs

As demand grows relative to capacity, the relevant marginal cost for setting price shifts from the short-run marginal cost (SRMC) to the long-run marginal cost of expanding capacity (LRMC), which is typically very much higher than the SRMC. Efficient network use requires that capacity constraints are priced to ration the capacity efficiently, with a lower bound set at the congestion charge (i.e. the extra costs visited upon the whole system in terms of delays, reduced reliability etc of having one more train path through the bottleneck), and the upper bound related to the LRMC (and typically above it to reflect the option value of not investing yet).

There is a conceptual distinction between congestion charging (which exists at present in that operators are charged for consequential delays that they cause) and charging to ration capacity through a scarcity charge, as discussed as a possible future way of setting track access charges.³ Rationing scarce capacity by price becomes important when several different users require access to the scarce facility, and not all services demanded can be accommodated. The capacity of a section of track or facility is limited by safety considerations, in that any failure must not lead to an accident. As the frequency of use builds up towards the capacity limit, it is likely that there will be increasing congestion costs and charges, but these may still be below the level at which the price would ration demand to capacity. Ideally the right to use the track at a certain time would be priced in the associated access charge so that demand (given the usage charge for wear and tear and congestion) did not exceed capacity. If this scarcity price (plus the congestion charge that would be avoided by expanding capacity) exceeded the LRMC of expansion, then there would be a *prima facie* case for expansion.

These prices could be determined by market mechanisms (e.g. auctions for access to bottlenecks) or by computing the probabilistic risk of delays caused by incremental use of different train types at different moments in the timetable, and comparing these costs with the LRMC of expansion (if these can be estimated). ORR is consulting on how best to implement scarcity charges starting with an industry workshop in July 2006, with the aim of reaching a decision by the end of 2006, as set out in ORR (2006).

³ Office of Rail Regulation (2006), *Periodic Review 2008: Structure of track access and station long term charges*, June 2006, p27 et seq. As ORR puts it at 3.5: “Without a scarcity charge there is no direct financial incentive on operators to minimise the number of paths that they hold as charges are paid only when paths are used. Potentially this could lead to the allocation of paths being inefficient or investment to increase network capability being incurred earlier than it otherwise would be.”

3.3 Aligning incentives

It is useful to distinguish three different activities that NR influences: (i) operating the existing network efficiently for users; (ii) maintaining the existing network to the appropriate quality of service; and (iii) enhancing the network.

Cost efficiency ought to be a general requirement in all aspects of operation. Network performance is measured by the value delivered by the services offered, and if these can be increased (e.g. by improved reliability and fewer delays, or by running more or longer trains through bottlenecks) at no extra cost, then the existing network is operating inefficiently.

Efficient maintenance requires that the total system cost (including the cost of delays or cancellations to users) is minimised (in present value terms, subject to reasonable safety constraints). This in turn requires efficient possessions (and they ought to be guided by efficient charges for the cost of delays or cancellations to users). Improved asset stewardship ought to be a part of an efficient maintenance regime, so that assets are repaired or replaced if and only if it is cost-effective, or necessary on safety grounds (and where continued operation at the higher cost is still justified).

Accommodation for future growth requires efficient investment and a proper cost-benefit analysis (CBA) of the desirability of meeting demand rather than pricing it off the system (which should happen if WTP falls below the LRMC, with the added complication of dealing with possible lumpiness).

To summarise, simplicity of incentives means that they are tied to the value delivered (or the cost imposed), and that means better measures of WTP and marginal costs, based on good information and modelling, refined over time by monitoring outcomes against predictions, and benchmarking (against past BR experience, across regions, and internationally). That should deal with an overemphasis on NR's delay minutes rather than system performance.

Promoting cost-justified expansion and investments undertaken by others is more difficult. It probably requires that the final users (passengers or commercial enterprises using stations, new customers for new services) have to make it attractive to NR by expressing both a demand and WTP for that demand. Unfortunately much of this demand and WTP is hard to identify. What would passengers be willing to pay for adequate cycle parking at stations, better public transport access to and from stations, and more attractive surroundings at these stations? Who should reflect that potential WTP? PTEs or the TOCs (who face little local competition from other similar facilities)? Reflecting such WTP ought to be part of devolution, and requires a dialogue in which NR states the cost of improvements and the local representatives (PTEs, etc) decide whether they consider it value for money (compared to other local transport expenditures) given their budget constraints.

4. INCENTIVES ACTING ON NETWORK RAIL

Incentives acting on a company's risk bearers may be financial or non-financial. Corporate financial incentives act on the risk bearers encouraging them to act to increase 'gain' and minimise 'loss'. Corporate non-financial incentives acting on risk bearers may include inducing actions to avoid criminal negligence (e.g. in the safety area) and acting to enhance or protect the reputation of the firm (e.g. its social responsibility and environmental stances). Similarly, management incentives may be financial or non-financial.

In this section we consider the corporate financial incentives, corporate governance and management incentives acting on NR and the expected response to them.

Our approach to this has been first to consider the incentives acting on a regulated "equity" company; then the incentives acting on a CLG (using Welsh Water as the exemplar). We then consider the incentives acting on NR initially taking as a given the current corporate structure and financial indemnity arrangements (i.e. a CLG benefiting from the FIM).

4.1. Regulated equity companies

4.1.1. Corporate Financial Incentives

Corporate financial incentives act on the owners and providers of finance to the regulated business. The regulator seeks to set the price controls for a 5 year period such that an economic and efficient company can just earn its weighted average cost of capital.

It is important to note that:

- Corporate financial incentives act on the parties that are bearing the risks
- How parties respond to these incentives depends on two things – their rights and powers (which are determined by the governance arrangements – see below) and on their objectives and attitudes to risk. The objectives and attitudes to risk of equity providers differ significantly from those of lenders. Attitudes to risk may also differ between different classes of equity provider – 'growth' companies tend to attract a more risk loving group of shareholders whereas regulated companies tend to attract equity providers with a somewhat lower appetite for risk. Hence the responses to downside and upside risk will generally differ as between equity and debt providers and possibly between different classes of equity provider.

Owners

The owners (shareholders) have an incentive to act to ensure that actual performance is no worse than that expected by the regulator (because if it was then the achieved return on equity would be lower than the opportunity cost of equity). They also have an incentive to act to achieve performance better than that expected by the regulator because the achieved return on equity will then be higher than the cost of equity (so long as there is not full

‘clawback’ of out-performance achieved over the 5 year period). They have an incentive to encourage management to invest in all profitable growth opportunities (so long as superior marginal returns are not fully clawed back by the regulator). Therefore shareholders have an interest in the long-term growth in profitability of the company for, even if they plan to sell their shares in the short to mid-term, the value they realise will depend on the market’s expectations of future profit growth.

Lenders

Lenders to an equity company also take risk on the company when they lend to it without the benefit of a third party guarantee. The lenders, like the shareholders, have an incentive to act to avoid downside risks and thereby maximise the likelihood that their loans will be serviced in accordance with the terms of their loan agreements. However, unlike shareholders, they are not incentivised to encourage investment in growth opportunities because they do not (usually) participate in profit upside. Indeed they may have a bias against investment to exploit growth opportunities, preferring to see available cash flow applied to funding debt service reserves.

Senior lenders are highly risk averse and, if and when they need to act to protect their loan exposure, they typically seek to limit discretionary investment, maximise free cash flow and use it to repay their loans.

4.1.2. Corporate Governance

Owners

The rights and powers of the principal risk takers (the equity providers) are set out, inter alia, in the Companies Act and the Memorandum and Articles of Association of the company. The shareholders may act in General Meeting (Ordinary or Extraordinary) to take fundamental decisions about the company – e.g. to hire and fire the Board, approve or reject major financial transactions and approve or reject Executive Director remuneration proposals. The corporate governance arrangements are the mechanism by which the principal risk bearers exercise control over the company to achieve their objectives. One key aspect of this is the right to approve proposed management incentive plans for senior managers.

Lenders

The rights and powers of lenders are set out in the loan agreements and in insolvency legislation. Unless and until a company breaches loan covenants and/or defaults and/or becomes insolvent the powers of lenders are limited. However if default does occur they will have a range of permitted responses to protect the value of their loans. These may include the right to change the Board of Directors, to approve the investment programme and, in some cases, the right to ‘step-in’ and effectively take over the company. In administration,

lenders have senior claims over cash flow ahead of shareholders. Highly geared companies often find that the powers of corporate lenders increase – and the de facto powers of the shareholders decrease – as covenant thresholds and default conditions are approached. This is because management will typically act in priority to ensure that loan default and the potentially adverse consequences for them do not arise. In those circumstances management responses will tend to reflect the wishes of risk-averse lenders rather than growth focused shareholders.

4.1.3. Management Financial Incentives

Most equity companies have approved management financial incentive (MFI) schemes. These create a direct link between achievement of corporate objectives and the remuneration paid to managers. Beneficiaries may be limited to the senior management team or in some cases may include a whole tier of senior and middle management.

The aim of MFIs is to align the financial interests of management with those of the owners – thereby encouraging management to deliver the shareholders’ objectives. Typically MFI packages have three components – a salary and pension (paid regardless of performance), an annual bonus linked to short-term performance and a long-term incentive scheme linked to longer-term performance of the company.

There are many different specific formulations of long-term incentive schemes but they tend to have in common an attempt to ensure that management does not focus on short-term profits to the exclusion of shareholder value over the medium and longer term. Listed companies will often link long-term remuneration to share price performance over the medium term whereas unlisted companies tend to use measures such as earnings per share growth and/or growth in valuations of the company over the medium term undertaken by an independent accounting firm.

Price-controlled ‘equity’ companies may devise long-term incentive schemes that reward management by reference to ‘out-performance’ against medium term performance targets set, in effect, by the regulator.

MFIs may have well-aligned incentives but they may nevertheless have weak ‘impact’. If the performance-related remuneration is a small percentage of total remuneration then the impact on behaviour may be very limited because the value of the upside and/or the cost of the downside to the beneficiary are too small. On the other hand very heavily performance-related MFIs, unless well designed, can induce perverse behaviour by management (e.g. undue focus on growth of earnings per share rather than fundamental value).

Almost all MFI schemes are asymmetric, meaning that management receives a large share of total remuneration unconditionally (salary/pension contribution). If performance is particularly poor, the worst that management can do under the MFI is not receive any performance-related pay. To express serious dissatisfaction with senior management shareholders and lenders must resort to firing them. Therefore a key feature of MFI

packages is the duration of managers' contracts and the precise nature of the rights of shareholders to fire the senior team and on what terms.

Reputational risk

In addition to financial management incentives there are clearly other non-financial incentives that affect management behaviour. Reputational risk is a major concern for many senior managers. Achieving success in the eyes of peers and the financial markets is important to many. Being fired for perceived failure is obviously something managers will work hard to avoid. In companies where there are significant health and safety issues and major interfaces with the general public e.g. rail, airlines, gas and electricity – avoidance of 'trial by tabloid' is also a major concern. In regulated equity companies senior managers have to balance the reputational risks with the need to keep the shareholders and lenders happy, as well as being aware of the personal financial consequences of hitting or missing performance targets set out in the MFI scheme. A "good" reputation derives from both achieving strong financial performance and being seen to be a socially responsible corporate citizen.

4.2. Incentives acting on companies limited by guarantee

What is a CLG? CLGs differ from equity companies in some important respects. Instead of shareholders there are 'members' appointed to perform broadly the role of shareholders in General Meeting, namely they hire and fire the Board, approve or reject major financial transactions and approve or reject proposed remuneration arrangements for the senior management team. In that sense they perform the role of owners. However they have no capital at risk, often are not paid (or paid very little) to perform the role and they rarely have any personal liability for the actions of the CLG and its management.

Unlike equity companies, the people performing the functions of the owner are not the people taking the risks. Nor do members necessarily represent a particular constituency (unlike e.g. a mutual where the members are the customers)⁴. If they expect to serve for a limited period, they may not take as long-term a view of the company as a shareholder, particularly if there are pressing short-term issues that can be resolved that avoid embarrassment to current members at the expense of future difficulties that will be left to future members to address.

The most relevant example of a regulated CLG is Welsh Water (WW). Previously an equity company, it was converted into a CLG in 2001 and the equity capital was returned to the shareholders. Key relevant features of WW are:

⁴ CLGs in the past were most often not-for-profit entities which received funding as grants from government and charitable foundations. The role of members was to ensure governance oversight of the entity to ensure its management acted in accordance with its constitution and applicable legislation. This sort of CLG took very limited risks.

- It has members with the powers of a CLG broadly as listed above. The members are responsible for ensuring the company acts in accordance with its constitution and that it acts in a manner likely to be in compliance with the terms of its licence. The members can be thought of as the guardians of the public in Wales in relation to the provision of water services.
- WW has no share capital. It finances its capital programme from external borrowing and the build-up of internal cash flow.
- WW is a licensed entity regulated by Ofwat in the same way as equity company licensees. In particular it is subject to the same price control regime – prices are set to allow revenues sufficient to finance an equity company with a notional ‘optimal’ debt/equity ratio. The notional gearing used in PR04 by Ofwat was 50-60%. Hence WW is able, if it operates efficiently, to generate earnings over its actual cost of debt, reflecting the allowed equity risk margin on notional equity. These retained earnings remain in the company and constitute a risk cushion to absorb adverse shocks, should they occur. These retained earnings can be thought of as ‘belonging’ to customers – since they can be used only to improve or expand the business or reduce customer tariffs below the maximum allowed levels.

4.2.1. Corporate financial incentives

Fundamentally, there are no corporate financial incentives acting on the members because they are unaffected financially by whatever outcome arises. Rather, it is reasonable to suppose that their behaviour will be driven to a considerable extent by concerns about reputational risk. They will wish to be associated with an industry with high safety standards that is achieving reasonable short-term improvements in performance (during the period when they are members). They may be less concerned with exploitation of profitable investment opportunities and longer term performance.

In the case of WW, the only external parties with capital at risk are the lenders. They have strong incentives to act to avoid loss but have no particular interest in performance upside and are likely to have a predilection against risky investment in growth opportunities. Indeed WW has committed not to undertake certain types of investment as a condition of its agreements with lenders. When the CLG was created there were concerns that the absence of a significant equity risk cushion would increase the risks imposed on customers. The concern was that Ofwat may be forced, in circumstances where WW was in financial distress, to increase customer charges and effectively make customers pay for the company’s poor performance. However, Ofwat has made it clear that it would not do this. The risks will remain with the lenders in the event of financial distress. Ofwat retains the power to use Special Administration to protect the public and ensure consequential costs of failure fall squarely on the finance providers, not the customers.

4.2.2. Corporate governance

Unlike an equity company, where the equity providers (shareholders) take most of the business and regulatory risks and control the company, in a CLG the members act as the owners and control the company, but they do not have any financial risk exposure.

The lenders who provide most of the risk capital can exercise their rights on a graduated basis as loan covenants are breached, loan default occurs and/or insolvency is threatened. Often their rights will allow them to effectively over-rule the members on all matters that otherwise would be the members' responsibility e.g. composition of the Board, deployment of cash flow etc. The lenders will typically respond to default in a way that mandates (so far as permitted by the regulator) a reduction in all discretionary investment, operating the business for cash and use of all available cash to repay the lenders as a priority. This may or may not correspond with the longer-term interests of customers. In effect, the members in such circumstances have responsibility without power – they can be over-ruled by lenders (and sometimes the regulator) if and when default occurs.

4.2.3. Management financial incentives

The structure of management financial incentives in a CLG generally mirror those of an equity company – with a balance between non-performance related remuneration, annual bonuses linked to short-term performance and a longer-term incentive scheme that is typically linked to delivery of longer-term performance targets. Clearly the long-term incentive scheme cannot be linked to growth in the share price but it may be linked to achievement of longer-term performance targets agreed with the members and reflecting the operating and capital performance targets set by the regulator.⁵

The reputational risks facing the senior management of a CLG such as WW are similar to those facing senior management of an equity company in the same sector. However, whereas the manager in an equity company must balance shareholder expectations of value growth against concerns about 'trial by tabloid', the manager of a CLG does not have to be concerned about shareholder expectations. It is possible that this will lead to a more risk-averse approach and greater focus on reputational aspects of performance rather than on maximising efficiency and financial performance over the medium and longer term.

4.3. Network Rail – assuming no change in industry and financing arrangements

As discussed in Section 2 above, NR differs from regulated equity companies in two important ways:

- It is a CLG. The Board and senior management are formally accountable to its members, and

⁵ We understand that ORR has recently had reviewed the MFIs used by regulated equity companies to see whether they offer ideas suitable for adoption by NR

- It benefits from a Financial Indemnity Mechanism (FIM) which is in effect a full faith and credit guarantee from the UK government. Our understanding is that the FIM effectively has no time limit and no maximum amount. There is no guarantee fee.

Other relevant features of NR are:

- NR is subject to RPI-X style price cap regulation. In CP3 maximum prices for use of the network were set to enable NR to generate a significant surplus over its (FIM guaranteed) cost of debt. ORR is currently considering the appropriate basis for setting maximum charges in CP4. Options available to it range from setting prices such that NR generates a small surplus over its cost of (FIM guaranteed) debt to setting prices to allow NR to earn its weighted average cost of capital based on notional gearing (as is the case for Welsh Water).
- The magnitude of NR's capital programme in CP4 is subject to considerable uncertainty. NR has 'bid' a level of capital expenditure considerably higher than was assumed by ORR in its 2005 consultation document.⁶ As things stand any external funding requirement will increase the government's FIM exposure.
- The Department for Transport (DfT) and Transport Scotland provide public subsidy to NR and some franchisees to reduce the cost of rail travel for passengers on certain sections of the network. They have a strong requirement for certainty about the expenditure commitments that they will incur in Q5 to fund these subsidies.
- Because debt issued by NR benefits from the FIM, its cost of debt is a small margin over equivalent long term gilts (currently a premium of about 20 basis points). FIM exposure is accounted for as a contingent public sector liability. It is referred to in a note to the DfT departmental accounts. FIM exposure was £21 billion as at 31 March 2005.
- There are management financial incentive schemes in place applicable to senior and middle management. We understand that the MFIs are approved by the Remuneration Committee of the Board and we assume the members approve the MFI scheme for Board level management. Government is not involved in the design or approval of the MFIs. We understand that ORR has reviewed the MFIs and that they regard them as fit for purpose.
- The members of NR provide oversight of the company and its management. The Secretary of State (SOS) for Transport is the only member from central government. The SOS is a Special Member with certain rights set out in the Articles of

⁶ 'Periodic Review 2008 – Initial Assessment of NR's Revenue Requirement and Consultation on the Financial Framework' ORR 2005

Association which do not include replacing the Directors or changing their financial packages.

- Under the arrangements that will apply in CP4 the government sets out the specification of high level outputs it expects NR to deliver and the funding that is available. ORR gives a view about whether available funding is sufficient to deliver the output specification and, if not, and the specification is not revised by government, ORR decides which outputs the railway should provide given the available funding.

4.3.1. Corporate financial incentives and corporate governance

All external finance raised by NR currently benefits from a full faith and credit guarantee from the government. Therefore, unlike a regulated equity company or a CLG such as Welsh Water, the providers of capital to NR bear none of the business and regulatory risks. The FIM drives a wedge between the parties taking the risks (government/taxpayers) and the parties to whom the company and its management are accountable (the members of NR).

If NR's operating performance is below expectations and internal cash generation is lower than expected then it may have to increase its external borrowing. Similarly if its capital efficiency is below expectations then it may be forced to borrow more to finance its capital programme to deliver the output specification. In either case the extra borrowing benefits from the FIM and the government's guarantee exposure increases pound-for-pound. Therefore the whole of the incremental performance risk falls on government/the taxpayer.

With an equity company or a CLG that does not benefit from a government guarantee, the regulator uses RPI-X regulation to improve company performance. It does this by setting maximum prices over a 5-year period such that the company must deliver sustained improvements in operating and capital efficiency if the providers of risk capital are to earn their opportunity cost of capital. In the case of NR, in contrast, failure by the company to achieve target performance improvements increases the financial exposure of government via the FIM. If the regulator puts very strong pressure on NR, the cost of failure to achieve demanding targets is not borne by those able to exercise control over the company and its management.

The corporate governance position is as follows:

- Members of the NR formally are responsible for exercising control over NR and its management but they are not at financial risk.
- Lenders can lend to NR without any interest in, or concern about, the operating efficiency or profitability of its capital programme, likely revenue from users – or anything else. Contrast this position with lenders to Welsh Water which have a

strong interest in performance and outcomes because loan repayments depend on good performance.

- Government – the real risk taker has essentially no control over the actions of NR and its management. The only member appointed by the risk-bearer (the Special member) is precluded from acting to replace the Directors or change their financial packages.

Although there are no effective corporate financial incentives acting on NR's members (because they bear no risk), provided they act to advance the purposes of the company and are effective, some of the benefits of ownership may be achieved. If they constitute a cohesive, well-informed group, they may be able to offer effective challenge to and control over the executive team. However, they may well place highest priority on short-term performance at the expense of longer term performance improvement.

The corporate financial incentives acting on NR are akin to those acting on a 100% State-owned enterprise except that government cannot direct management because of the separation of risk-bearing and control. Management behaviour may well incline towards risk aversion, seeking to establish relaxed performance targets (and never over-or under-achieving them) and bidding for high capital spending programmes without worrying over-much about their profitability.

In summary, the position of NR is extremely odd. The risk bearer (government) cannot act if performance is poor. The lenders do not care if performance is poor. The members can act but are not subject to any financial risk. The regulator can act but if it punishes the company it ends up hurting the government/taxpayers because it is they that bear the consequential costs.

For so long as the current arrangements apply, NR and its management are not subject to the pressures to perform that are normally imposed by the providers of risk capital. Therefore, ORR is likely to have to provide much stricter oversight over NR than would be necessary if the providers of capital were also the risk bearers.

As things currently stand, within the constraint of total allowable revenues, NR can borrow up to a high debt/RAB ratio with all debt benefiting from the FIM. The marginal cost of debt even at very high debt/RAB ratios is little more than the government bond rate. If it does so, it is in the knowledge that net investment increases the RAB and therefore the expected future revenues that it will be allowed to service the debt. It also knows that if the investment proves to be unprofitable, then the costs will be borne by the government via the FIM or by users in the form of higher user charges. None of the costs of poor investment decisions fall on the providers of capital to NR.

In these circumstances, NR is subject to perverse incentives to invest whenever the expected return on new investment exceeds its cost of borrowing (little more than the risk free rate). Its marginal cost of (FIM-guaranteed) finance is well below its risk adjusted cost of capital. When this is taken together with the existence of public subsidies for rail users that induce

over-use of track assets, serious distortions in the level and pattern of rail investment can be expected. In general NR will be subject to incentives to over-invest in capital assets that qualify for inclusion in the RAB.

4.3.2. Management financial incentives

In the absence of meaningful corporate financial incentives, a greater burden must be placed on well designed MFIs to influence management behaviour. Since the government is taking the risk it would be logical if it were approving the MFIs. However, as explained above, it is unable to do so in practice. At present ORR has sight of the Management Incentive Plan (MIP), and can deem it to be non-compliant with the network licence if the MIP gives rise to perverse incentives or is likely to lead to undesirable results, but it is not directly involved in designing or approving the MIP.

In these circumstances there is a strong case for ORR playing a more active role in the design and approval of the MFIs and MIP, acting in the public interest for so long as the current arrangements remain unchanged. ORR should satisfy itself that the incentives in, and impact of, the MFIs is likely to cause the management of NR to deliver the short and medium term corporate performance targets established at each Periodic Review.

ORR is considering whether, in addition to well-designed MFIs, there is a greater role for new “reputational mechanisms” aimed at strengthening non-financial incentives on management. In our view, it is unlikely that new ‘reputational mechanisms’, even if they could successfully be designed, would help, much if at all. Concerns about reputational risk tend to induce risk-averse behaviour, leading management to seek to agree ‘soft’ targets that can be over-achieved. Greater emphasis on reputational risk mechanisms may well lead to even greater risk aversion.

5. THE IMPACT OF CHANGES TO THE FINANCING ARRANGEMENTS

Currently NR is price cap regulated on the basis that allowed revenues in CP3 include an allowed cost of capital sufficient to cover the cost of debt and generate a significant surplus that is retained in the company and used to fund investment. The basis on which it will be set in CP4 is the subject of ORR consultation. Options range from, allowing revenue sufficient to fund the weighted average cost of capital of a notionally geared equity company, to allowing revenue sufficient to fund just a small cash flow cushion over the FIM-guaranteed cost of debt.

The cost of capital of any business is determined by the systematic risks to which the business is exposed. The risks may be on the demand side (volume, price) or on the supply side, but are not affected by the way in which the assets are financed⁷. The greater the systematic risks, the higher is the risk premium required by providers of capital to the business. If the allowed revenues are ‘correctly’ set to remunerate the risk-adjusted cost of capital then: (i) user charges will approximate the long run marginal cost of providing the services and therefore send appropriate demand signals to users; and (ii) there will be efficient investment incentives because the company will only wish to undertake investment whose expected return exceeds the marginal cost of capital (approximated by the allowed weighted average cost of capital).

Currently NR raises external finance on the back of the FIM and there is no government guarantee fee payable reflecting the risk transfer from the providers of debt capital to government. The existence of the FIM does not reduce the risk of the cash flows generated by the business. It simply shifts them from private sector lenders to the public sector. The ‘correct’ guarantee fee – reflecting the value of the risk transfer – is an amount equivalent to the risk premium that would otherwise be payable to private sector providers of capital if the FIM was not available.

In this section we consider the implication for NR, government and users of possible changes to the current arrangements for financing NR. The options considered are:

- Option (i) Leaving the FIM unchanged and reducing allowed revenue to the level that funds NR’s (guaranteed) cost of debt.
- Option (ii) Retaining the FIM in its current form, setting allowed revenues to fund NR’s estimated risk adjusted cost of capital but capping the FIM exposure.
- Option (iii) Retaining the FIM, levying a charge for the FIM that reflects the value to NR of the risk transfer and setting allowed revenue to NR to the level that funds its estimated risk-adjusted cost of capital.

⁷ Except for tax shield effects which must be taken into account.

- Option (iv) Retaining the FIM, levying a charge for the FIM that reflects the value to NR of the risk transfer, setting allowed revenue to fund NR's risk-adjusted cost of capital and capping the FIM exposure.

5.1. Option (i) Leaving the FIM unchanged and reducing allowed revenues to the level that funds NR's guaranteed cost of debt

Since FIM-guaranteed debt issued by NR costs little more than the risk-free rate and there is no guarantee fee, one option would be to reduce allowed revenue to the level that just covers NR's actual FIM guaranteed cost of debt. This approach would reduce NR's internal cash flow and retained earnings. If the reduction in track user charges was passed on to rail users then prices would fall. If the reductions were not passed on to users of those parts of the network that benefit from public subsidy then the public subsidy bill would fall.

The consequences of adopting this approach would be:

- Track user charges would be lower than the true economic cost of the services provided because the cost of capital embedded in the charges would be lower than the 'correct' risk-adjusted cost of capital. The economic subsidy to rail users would increase. Users would 'over-use' the network because the cost to them of extra use of the track would be lower than the marginal costs incurred by NR.
- Incentives for efficient investment would be distorted because the marginal cost of finance to NR would be lower than the true marginal cost of capital. This could lead to over-investment and 'gold-plating' and further bias in favour of rail investment at the expense of other transport infrastructure. This problem is particularly acute in the case of NR because the government only specified a high level output (not the least cost way of achieving it), so under-pricing capital will over-encourage substitution of costly capital-intensive solutions over other approaches to efficiently delivering the specified outputs.
- The external funding requirement of NR would increase (because internal cash flow would be lower and possibly capital expenditure higher). Therefore the guarantee exposure of government via the FIM would increase by an almost equivalent amount to the reduction in internal cash flow. There would no longer be a buffer in the form of retained surpluses, so adverse cost shocks or unplanned expenditures would precipitate an unexpected increase in FIM exposure. The magnitude of the government's contingent liability would increase and become more unpredictable.
- If the reduction in track user charges on subsidised parts of the network were not passed on to rail users then the departmental authorisation to fund public subsidy would go down. However, the total public subsidy would have increased overall. There would be a transfer of the government's liability from on-balance sheet

funding (in the form of the DfT departmental authorisation) to off-balance sheet FIM exposure.

- NR would become even more directly a creature of the public sector and controls over its activities and spending would need to be even more direct. The corporate governance arrangements that separate NR from government would appear even odder. ORR would need to resort to even closer supervision of NR, acting in the public interest, since government would not be able to do so directly (so long as the governance arrangements remained as they are). Regulation of NR by ORR would become more akin to annual cost-plus regulation with all that goes with that in terms of weakened efficiency incentives. The current public finance accounting treatment of NR debt may be called into question.
- NR would have no incentive to ever reduce reliance on FIM-guaranteed debt because the FIM under-prices the risks taken by the taxpayer and hence will always be much cheaper than all alternative sources of risk capital.
- Therefore it would be much more difficult to get back to a situation in future where NR funds some or all of its external funding requirement directly from the debt markets without a government guarantee. Cash flow cover on outstanding debt would be negligible and expected returns on new capital investment would be lower than the cost of capital because track user charges remained below the long run marginal cost of providing the services

This option has no merit if it is the government's intention to: (i) retain strong incentives on NR to improve operating and capital efficiency; (ii) make transparent the amount of public subsidy being provided to rail transport users; and (iii) retain the possibility of a gradual transfer of risk taking from the taxpayer with an increasing proportion of NR's external funding requirement secured without the FIM guarantee.

5.2. Option (ii) Retaining the FIM in its current form, setting allowed revenues to fund the risk-adjusted cost of capital but capping the FIM exposure

In this option the risk-adjusted cost of capital is estimated using the same methodology as is used by other UK regulators. It involves determining the weighted average cost of capital (WACC) of a company with a notional debt: equity ratio. The price cap includes allowed revenues sufficient to generate this allowed WACC on the capital included in the company's Regulatory Asset Base (RAB). This is the approach used, for example, to set allowed revenues for the all-debt financed CLG, Welsh Water. The valid rationale is that the cost of capital is a function of the cash flow risks not of the particular financing strategy adopted.

If this approach were chosen for NR, it would generate significant retained earnings because the allowed WACC would be significantly higher than the FIM-guaranteed cost of debt.

The current arrangements applying to NR - an uncapped FIM and price cap re-opener provisions – do not impose a ‘hard budget constraint’ on NR. Option (ii) would cap the maximum allowed FIM exposure, thereby imposing a hard budget constraint. Once the FIM cap was reached, NR would have to seek additional debt from the private capital markets without the benefit of the FIM guarantee. The consequences of adopting this approach would be:

- Track user charges would be set at levels reflecting the true opportunity cost of capital. If these were reflected in rail user charges there would be improved incentives for efficient utilisation of the assets.
- Providers of non-guaranteed debt would share in NR’s business and regulatory risks, restoring at the margin some more ‘normal’ corporate financial incentives acting on non-guaranteed providers of debt finance. As a result scrutiny of, and interest in, the performance of NR by the debt markets and ratings agencies would increase. NR would have to sustain good performance to avoid ratings downgrades or loan covenant breaches, and this may have a beneficial impact on overall performance. However, it may cause NR to become more risk-averse and conservative in its investment strategy to reduce the risk of a rating downgrade.
- If the relatively higher track user charges were passed onto rail users NR’s surplus would be significantly greater than in option (i). As a result the external funding requirement and likely FIM exposure would be lower. The larger amount of retained earnings may induce NR to invest in sub-economic opportunities, to ‘gold-plate’ and/or more generally to relax cost discipline.
- If the relatively higher track user charges were not passed onto rail users of subsidised parts of the network, the public subsidy funding may rise initially. However, this on-balance sheet increase in public subsidy (caused by failure to expose rail users to the true costs of service provision) would be off-set by a reduction in off-balance sheet FIM exposure.
- Over time this option will change NR’s behaviour in ways that are likely to bring benefits and costs for rail users. The benefits arise from better incentives for efficient utilisation of the network and stronger oversight of performance from non-guaranteed providers of debt finance. The costs arise from the large surplus and related risks of over-investment in sub-economic opportunities and loss of cost discipline.

The FIM cap could be set by government in parallel with ORR’s price control determination. Over the price control period the FIM cap could rise, remain unchanged or reduce over time. Reducing the FIM over time is a mechanism to strengthen incentives on NR to maintain cost discipline because it would need to be able to raise an increasing proportion of its total debt without the benefit of the FIM guarantee. Over time FIM

exposure could be eliminated entirely and replaced with non-guaranteed debt, resulting in a NR that looked not unlike Welsh Water.

The amount of non-guaranteed debt that could be raised over a price control period would be a function of the amount of surplus generated. Once the FIM cap had been reached poor performance by NR would ‘squeeze’ internal cash flow and reduce access to non-guaranteed debt (as well as potentially resulting in a rating downgrade). This would be a clear indication that NR was under-performing but could result in a cut in socially-beneficial investment unless ORR agreed to ‘underwrite’ NR finances by adjusting upwards track user charges.

If this approach was pursued it would be necessary to rank the respective claims of FIM-guaranteed and non-guaranteed lenders over NR cash flows. More non-guaranteed debt would be raised on more favourable terms if the debt service claims of non-guaranteed lenders ranked ahead of FIM-guaranteed lenders. However this would reduce to some extent the benefit of external oversight by non-guaranteed lenders.

This option has merit if it is the government’s intention to (i) retain incentives for efficient utilisation of network assets; (ii) gradually strengthen oversight of NR by risk-bearing debt providers; (iii) facilitate a transition to the position where the FIM guarantee is reduced and ultimately eliminated. Ultimately NR could look like Welsh Water with a high debt/RAB ratio and none of its debt guaranteed by government. This option is considerably more attractive if the FIM cap is reduced steadily over time.

5.3. Option (iii) Retaining the FIM, levying a cost-reflective FIM fee and setting allowed revenues to the level that funds the risk-adjusted cost of capital

Option (iii) involves setting allowed revenues to fund the risk-adjusted cost of capital and retaining the FIM. However, in this case a cost-reflective FIM guarantee fee is paid by NR to the government reflecting the value to it if of access to the FIM.

What is the true cost of risk transfer?

The cost of capital of regulated assets is determined in comparable regulated industries as the weighted average cost of debt and equity of a “notionally” or “optimally” geared company. The actual capital structure of the regulated company is not relevant. In the water industry the approach is applied in the same way to set allowed revenues for the 100% debt-financed Welsh Water and regulated equity companies with debt/equity ratios that differ from one another and from the notional gearing used to set the WACC.

Table 1 shows illustrative numbers broadly in line with the estimates used to determine the allowed WACC in recent relevant regulatory determinations of broadly comparable regulated industries⁸. In this case the debt premium (the difference between the real cost of debt of

⁸ These values are used to illustrate the concepts. Appropriate values for the regulated rail industry, although not very different, will differ. Taxation costs are ignored here for simplicity.

the regulated company and the risk free rate) is assumed to be 1% pa. The equity risk premium (the difference between the real cost of equity of the regulated company and the risk free rate) is assumed to be 4.5% pa (7% cost of equity less the 2.5% risk free rate). In this example the WACC is 5.075% and the allowed revenues relating to the cost of capital are 5.075% x RAB per annum.

<p><i>Table 1: Post-tax 'vanilla' WACC</i></p> <p>WACC = $g \cdot \text{COD} + (1-g) \cdot \text{COE}$ Notional gearing = 55% Real cost of debt, $r_f + \text{DP} = 2.5 + 1 = 3.5\%$ Real cost of equity, $r_f + \text{EP} = 2.5 + 4.5 = 7\%$</p> <p>WACC = $(0.55)(3.5) + (0.45)(7) = 5.075\%$</p> <p><i>Notes: DP = debt premium EP = equity premium</i></p> <p><i>If allowed revenues are based on the post-tax vanilla WACC then estimated actual tax payments should be separately added to allowed revenues.</i></p>
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For now, assume that these illustrative figures are the appropriate values for NR. Allowed revenues to fund the cost of capital would be set each year equal to the WACC times the RAB. With an unlimited FIM in place what is the cost of risk transfer from NR's debt providers (who bear no risk) to the government (which bears most of the risks via the FIM)? In the case illustrated in Table 1 the risk transfer margin is $(0.55)(1) + (0.45)(4.5) = 2.575\%$ per annum. The annual cost of risk transfer is 2.575% times the RAB⁹.

Structuring a cost-reflective FIM guarantee fee

A cost reflective FIM guarantee fee could be structured to approximately replicate the incentives acting on an equity company with the notional gearing appropriate to a business with NR's business and regulatory risk. This could be achieved by structuring a two-part guarantee fee as follows:

- The first part of the fee would replicate the cost of risk transfer relating to the debt portion of the notionally geared company. Using the illustrative numbers in Table 1, the first part of the guarantee fee would be 1% (the notional debt risk premium) on 55% of the RAB. This amount would be paid annually in full to the government.
- The second part of the fee would replicate the cost of risk transfer relating to the notional equity portion of the capital in the company. Again using the illustrative numbers in Table 1, the second part of the guarantee fee would be 4.5% (the notional equity risk premium) on 45% of the RAB. This part of the guarantee fee would accrue as a charge in NR's profit and loss account each year. An agreed

⁹ This is a close approximation. It assumes all the risk is transferred and the guaranteed cost of NR debt is the risk free rate. In practice NR pays a small premium over the risk free rate.

portion of the second part of the guarantee fee would be paid annually in cash to the government and the unpaid portion would be a liability of NR payable to the government at a future date. This unpaid portion would increase the cash resources available to NR to finance new investment. The portion of the second part of the fee that was retained in the company would be set over the five year price control period with the aim of providing sufficient retained earnings to enable the company to finance the agreed investment programme without incurring excessive debt gearing if it operated efficiently

The mechanism of the two-part guarantee fee and its impact on NR are illustrated quantitatively in Annex A.

Consequences of adopting the cost-reflective FIM

The consequences of adopting this approach would be:

- Average track user charges would be set at the correct level so there would be appropriate incentives for users to use the network efficiently. Rail network users (other than those benefiting from public subsidies) would not be subsidised in the way that they would be if allowed revenues were set to fund only the FIM guaranteed cost of debt.
- There would be stronger incentives acting on NR to invest efficiently. This is because the marginal cost of finance now becomes the weighted average cost of capital (after accrual of the two-stage guarantee fee) and so NR will have incentives to invest only if the expected return on investment exceeds the WACC. Investments that earned returns less than the WACC would reduce reported earnings net of the guarantee fee.
- The proportion of the second part of the guarantee fee that was retained by NR could be calibrated to achieve a target level of FIM exposure over the price control period.
- There would be much stronger incentives on NR to wean itself off FIM-guaranteed debt. This is because the two-stage guarantee fee would apply only to the portion of the RAB that benefited from the FIM. NR could be expected to make much more strenuous efforts to access the non-guaranteed debt market to refinance a significant portion of its FIM-guaranteed debt, because the new debt would be cheaper and profitability and earnings and net cash flow would improve if FIM exposure was reduced.
- Over time the government would accrue value reflecting the value of the FIM to NR over time. This would be paid to government/taxpayers when NR's net funding requirements reduced.

Option (iii) provides stronger incentives for operating and capital efficiency than either options (i) and (ii) or the current arrangements. It strengthens oversight of NR performance by providers of debt capital and facilitates a transition to reduced reliance on the FIM and greater reliance on external funding from non-guaranteed debt providers. Ultimately NR would be in a position very similar to that of Welsh Water today, i.e. a public interest CLG subject to arms length regulation, effective pressures to improve operating and capital efficiency and firm oversight by risk-bearing providers of debt capital.

5.4. Option (iv): Retaining the FIM, levying a FIM fee, setting allowed revenues to fund the risk-adjusted cost of capital and capping the FIM

Option (iv) is option (iii) plus a cap on the maximum FIM exposure. If the FIM cap reduced over time this would ‘force’ NR to move towards reduced reliance on the FIM – and therefore greater reliance on more non-guaranteed debt – more quickly. This would further strengthen oversight of management performance by lenders and rating agencies. It would ensure progressive reduction of FIM exposure over time and hasten the time when NR is fully financed by the private capital markets without any FIM guarantee.

All of the benefits of option (iii) would accrue but more rapidly if the reducing FIM was set at levels that demanded greater performance improvement from NR. This ‘harder’ budget constraint than in option (iii) would accelerate the transition to a situation where NR looks like Welsh Water today.

6. INCENTIVES ACTING BETWEEN NR AND TOCS

The fragmented structure of the rail industry creates additional challenges even if NR's providers of capital finance were bearing the business and regulatory risks in the same way as a regulated equity company. In a fragmented industry structure there is the problem of co-ordination of production and investment decisions by the different players. Co-ordination of investment and alignment of incentives has to be achieved through contractual undertakings between the parties within a framework of total system regulation.

There are three types of rail operator – franchised passenger operators (TOCs), open access passenger train operators and freight operators. For track access the TOCs pay a fixed and variable usage charge. The variable charge is based on vehicle km and is fixed at the time the franchise agreement is signed. Open access and freight operators pay only the variable charge but they pay the currently prevailing rate set from time to time.

Here we focus in particular on the relationships between NR and the TOCs. A more extensive analysis should consider the incentives acting on all the rail industry players to evaluate whether they are subject to incentives likely to drive behaviour in the direction of improved efficiency and lowest total system cost.

Our observations here reflect only a general knowledge of the structure of the access charges and franchise agreements. In the short time available for this assignment we have carried out only the most cursory review of the relevant documents.

6.1. The problem

We understand that a key problem is that the incentives acting on the TOCs and on NR separately may lead them to act in a way that does not minimise total system costs. NR shares in little of the revenue benefits resulting from improving the quality of rail services. The TOCs gain little benefit from adjusting their use of the network to avoid imposing high marginal costs on NR. Therefore, NR has little incentive to help the TOCs maximise revenue and the TOCs to help NR maximise total system costs.

An example highlights the nature of the problem:

- If TOCs only pay usage charges per vehicle-km and not per passenger-km, then NR receives less revenue per hour from scheduling high occupancy stopping commuter trains through bottlenecks compared with low occupancy express services (which can be scheduled at high frequency). A minor capacity upgrade (e.g. a flyover or signalling upgrade) may not be justified on existing or standardised costs per train, but may become attractive if higher occupancy trains were willing to pay (and were charged) more than the average, justifying an expansion in capacity.

The cause of this problem is a charging structure that does not share revenues and costs between NR and the TOCs. It appears that there are many similar examples of actions and

investments which would benefit the system as a whole but which do not currently take place, because of mis-alignment of incentives along the value chain.

6.2. Solutions with the current industry structure

While the fragmented industry structure remains as it is, solutions must lie in improving the incentives acting on TOCs (set out in the franchise agreements) and the incentives acting on NR (rewarding them for actions that benefit the system as a whole). Given that the DfT sets out the system of incentives that apply to the TOCs in the franchise agreements and ORR sets the incentives acting on NR in the price control, there will need to be a co-ordinated approach to improving incentives in ways that will result in lower total system costs for any given output specification.

Over sight of the process will have to be jointly provided by DfT and ORR. It would be highly desirable if, after industry-wide consultation, agreed principles for improving incentives across the network could be published by DfT and ORR. They would then constitute the framework within which franchise agreement terms and price regulation specifies tariff structures were framed.

In general the key principle should be that the network provider (NR) and network users (TOCs etc) should share in the benefits and costs of delivering the least cost railway services in accordance with the government's output specification and funding availability. For example, the application of this principle to the example set out in paragraph 6.1 would suggest a solution as follows:

- A better measure of outputs e.g. passengers-kms Charges per passenger-km should be time and route dependent (reflecting the relevant network congestion). Such charges would be a better measure of WTP and provide better signals to NR and network users for sensible operating and investment decisions.
- Benefit and cost sharing between NR and the TOCs. The TOCs should bear a share of the marginal costs they impose on the network provider and NR should share in the marginal revenue earned by the TOCs arising from NR's actions. This type of risk sharing arrangement is common practice in private sector transactions between parties whose businesses are closely inter-dependent.

With the current industry structure – where NR is a monopolist and franchisees are exposed to little if any track cost risks, it is unlikely that a satisfactory outcome will be achieved unless there is a sustained effort by DfT and ORR to improve incentives. These challenges will remain for so long as the industry structure is fragmented irrespective of whether the current FIM remain unchanged or whether the options discussed earlier were adopted.

6.3. Solutions involving change of the industry structure

There are no easy answers to aligning incentives in a fragmented rail industry. Significant improvements can be achieved relative to where we are today. However, contractual co-ordination in a complex industry such as rail will always be imperfect. That is why in comparable industries in the private sector structural integration (i.e. common ownership) is the most common solution.

If NR and the TOCs were in common ownership then the total system costs and benefits would be “seen” by the owner and actions and investments would be taken ‘neutrally’, wherever justified within the network to maximise net value added. The contractual co-ordination problem would be solved. But the re-integrated rail industry would be a monopoly requiring regulation by ORR. Were this to happen, ORR would have to regulate the rail industry without the benefit of arms length UK benchmarks against which efficiency and performance could be assessed. The position would then be similar to electricity and gas transmission which are also regulated sole notional monopolies.

A further structural evolution might be to create a series of regional integrated track/TOC companies operating under licence and with a national system operator tasked with train scheduling and a national market operator concerned with ensuring access rights and payments for access across the network. This structure would replicate, in some respects, the arrangements that currently apply in the electricity and gas distribution industries in the UK and in most Continental railways. This model overcomes the NR/TOC co-ordination problems and, by creating separate regional businesses, facilitates much more effective benchmarking to enable ORR to regulate the industry more effectively. However, there are formidable implementation challenges facing this option.

7. SUMMARY AND CONCLUSIONS

7.1. Current structure and financing of NR and GB rail

The distinctive characteristics of the current arrangements applying to the GB rail industry are:

- NR is a company limited by guarantee 'owned' by its members. The members bear no financial risk.
- NR is wholly financed from internal cash flow and debt provided by the private sector debt markets. All NR debt benefits from the FIM so lenders to NR bear no financial risk.
- The FIM is effectively not capped in amount and there is no guarantee fee to reflect the risk transfer from the lenders to government/taxpayers.
- The government sets the output specification it expects NR to deliver and the public funding that is available. ORR sets allowable revenues over the five year price control period at levels sufficient for an efficient network business to deliver the output specification. If that proves not to be possible and the government does not revise the output specification, ORR decides which outputs NR should provide given available funding.
- In CP3 allowed revenues were set to allow NR a significant cash flow margin in excess of the (FIM guaranteed) cost of debt. An issue for CP4 is whether allowed revenues should fund NR's estimated risk adjusted cost of capital or just the actual cost of (FIM guaranteed) debt.
- The government provides public subsidy to parts of GB rail to reduce the cost to passengers of using those parts of the railway system.
- The industry structure is fragmented with franchise companies (TOCs and others) operating train services in accordance with franchise agreements entered into with government. They pay regulated network user charges to NR.

7.2. NR Incentives with current arrangements

The incentives acting on NR derive from the complex interplay of its CLG status, the powers of government and ORR, the existence and term of the FIM and the contractual interface between NR and the other players in the railway industry particularly track users.

The analysis of the incentives acting on NR indicates:

- The incentives to improve operating efficiency are weak. If NR under-performs against ORR's target operating efficiency improvements – and therefore generates less internal cash flow than expected – it can absorb the shortfall by running down the 'surplus' and borrowing more at very low marginal cost because all debt issued by NR benefits from the FIM.
- The incentives to improve capital efficiency are also weak. If NR over-spends its capital programme to deliver the output specification, it can borrow additional amounts whose marginal cost is very low because of the FIM.
- There are perverse incentives acting on NR likely to result in distortions in the level and pattern of rail investment. Over-investment in maintenance and renewal of the rail infrastructure and 'gold plating' of capital programmes may result.
- If NR and its management do under-perform the members can act but they are not subject to any financial risk, the lenders do not care (because they are fully guaranteed via the FIM) and the government (which bears the business risks via the FIM) cannot act because its Special Member cannot vote to change the Directors or their remuneration. The government has no control rights despite taking the business and regulatory risks via the FIM.
- If ORR sets tighter performance targets for NR with the aim of inducing better performance and NR fails to fully respond and under-performs then the consequence is likely to be higher than planned NR borrowing and therefore higher than expected FIM exposure. The costs imposed on NR by ORR end up being paid by the government/taxpayer.
- The management incentives plan (MIP) to which management is subject can be used to create incentives acting on management to deliver the regulatory performance targets. However their impact is limited because only a portion of remuneration is performance-linked.
- For so long as the current arrangements apply - with a free, uncapped FIM and absence of control rights for the risk-bearer – NR and its management are subject to weak pressures to perform. Therefore ORR is likely to have to provide much closer oversight over NR's operating and capital performance than would be necessary if the parties bearing the risks had recourse to the usual control mechanisms giving them the power to act in the event of unsatisfactory performance.

7.3. NR Incentives with revised arrangements

The impact on NR incentives of revised financing arrangements are considered.

Option (i) Leaving the FIM unchanged and reducing allowed revenue to the level that just funds NR's (FIM guaranteed) cost of debt. The consequences of adopting this approach would be:

- Track user charges would be set below the full cost of service provision with perverse incentives for users to use the network inefficiently.
- Inefficient incentives to over-invest, to 'gold-plate' and inappropriately substitute capital-incentives solutions to deliver the output specification.
- The magnitude of the government's FIM exposure would increase and become more unpredictable.
- Reduced ability of ORR to create effective drivers for improved NR performance because consequential costs (of failure to perform) would fall directly on government via the FIM.
- No incentives to ever reduce reliance on the FIM (because it is free and uncapped) and therefore no route to reduced reliance over time on the FIM and greater reliance on non-guaranteed debt finance.

Option (ii) Retaining the FIM in its current form, setting allowed revenues to fund the risk-adjusted cost of capital but capping the FIM exposure.

The consequences of adopting this approach would be:

- Track user charges would be set to reflect the true opportunity cost of capital. There would be better incentives for efficient utilisation of network assets.
- NR's performance would be subject to greater scrutiny by non-guaranteed debt providers with potential induced performance improvements.
- The higher retained surplus (than with Option (i)) may encourage investment in sub-economic opportunities, 'gold-plating' and more generally cause NR to relax cost-discipline.
- Over time FIM cap could be lowered and eventually eliminated entirely leaving NR to finance itself. This would leave it in a similar position to Welsh Water today.

Option (iii): Retaining the FIM, levying a cost-reflective FIM fee and setting allowed revenue to fund the risk-adjusted cost of capital. The consequences of adopting this approach would be:

- Average track user charges would be set at the correct level so there would be appropriate incentives for users to use the network efficiently. Rail network users

(other than those benefiting from public subsidies) would not be subsidised in the way that they would be if allowed revenues were set to fund only the FIM guaranteed cost of debt.

- There would be stronger incentives acting on NR to invest efficiently. This is because the marginal cost of finance now becomes the weighted average cost of capital (after accrual of the two-stage guarantee fee) and so NR will have incentives to invest only if the expected return on investment exceeds the WACC. Investments that earned returns less than the WACC would reduce reported earnings net of the guarantee fee.
- The proportion of the second part of the guarantee fee that was retained by NR could be calibrated to achieve a target level of FIM exposure over the price control period.
- There would be much stronger incentives on NR to wean itself off FIM-guaranteed debt. This is because the two-stage guarantee fee would apply only to the portion of the RAB that benefited from the FIM. NR could be expected to make much more strenuous efforts to access the non-guaranteed debt market to refinance a significant portion of its FIM-guaranteed debt, because the new debt would be cheaper earnings and net cash flow would improve if FIM exposure was reduced.
- Over time the government would accrue value reflecting the value of the FIM to NR over time. This would be paid to government/taxpayers when NR's net funding requirements reduced.

Option (iii) provides stronger incentives for operating and capital efficiency than Options (i) and (ii) and the current arrangements. It strengthens oversight of NR performance by providers of debt capital and facilitates a transition to reduced reliance on the FIM and greater reliance on external funding from non-guaranteed debt providers. Ultimately NR would be in a position very similar to that of Welsh Water today, i.e. a public interest CLG subject to arms length regulation, effective pressures to improve operating and capital efficiency and firm oversight by risk-bearing providers of debt capital.

Option (iv): Levying a cost-reflective FIM fee, setting allowed revenues to fund the risk-adjusted cost of capital and setting a reducing FIM cap over time. The consequences of adopting this approach would be the same as option (iii) except that the transition to lower reliance on the FIM and greater NR reliance on non-guaranteed debt would be more certain and potentially more rapid.

7.4. Incentives acting between NR and TOCs

Even if the incentives created by the CLG/FIM arrangements were improved, the fragmented structure of the rail industry would continue to pose difficult challenges. The problem is that incentives separately acting on NR and the TOCs may lead them to take

operational and investment decisions that do not minimise total system costs or maximise total rail user net benefits. This problem arises because rail network users do not share many of the costs imposed on NR by their use of network and NR does not share much, if any, of the additional revenue deriving from provision of a better service for rail users.

If the current industry structure remains as it is, an improvement in alignment of incentives between the network owner and network users should be found through:

- A co-ordinated approach led by DfT to improve incentives in ways that are likely to result in overall reductions in total system costs and increases in net user benefit. This will require close co-ordination of the terms of franchising agreements (for which DfT is responsible) and the structure of network user charges (for which ORR is responsible).
- Agreement on the key principles that should guide the design of franchise agreements and network charges with the aim of improving incentives acting between NR and network users. A key principle should be that the network provider and network user should share in the benefits and costs of delivering the lowest total system costs and highest net user benefits.

There are no easy answers to aligning incentives in a fragmented rail industry. Nevertheless significant improvements over the current position can be achieved without structural change. If in due course it became apparent that sufficient benefits were not being achieved then alternative structural solutions may need to be considered. Two possible solutions are mentioned. The first involves re-integration of network ownership and network usage to create a vertically integrated railway business. The second involves the creation of a series of regional vertically integrated companies with national arrangements to facilitate open access across the network and a notional system operator, similar to the current arrangements in gas and electricity distribution in the UK and many Continental railways..

7.5. Addressing the Terms of Reference

The TORs set out some specific questions that we were asked to address:

Relevance of traditional corporate financial regulatory incentives to NR, and therefore the relevance of a RPI-X style regulatory framework

The RPI-X style regulatory framework is relevant for NR in some respects and not in others. The regulatory framework involves the regulator taking a medium term view of the regulated business and setting the maximum average price trajectory for a period, typically of 5 years, at levels that would enable an economic and efficient business to earn its cost of capital. The building block approach employed involves the regulator forming judgments about the extent of improvements in operating and capital efficiency that an efficient business ought to be able to achieve. It also involves forming a judgment about the weighted average cost of capital of an efficiently financed business with the risk characteristics of the licensee. These

aspects of the RPI-X style regulatory framework remain entirely relevant and appropriate for NR.

Other UK regulators of capital intensive network businesses (e.g. Ofgem, Ofwat) have further developed the earlier simple versions of RPI-X regulation to address a number of perceived shortcomings. Innovations that have been adopted include greater intra-period flexibility (logging up/down, interim reviews etc). The regulators are also currently consulting (on a joint basis) about possible further regulatory innovation to deal with the problem of ‘regulatory commitment’, meaning the timing mismatch between the 5 year price setting cycle and the longer term tenor of capital finance. It is likely that some of the innovations already adopted by other regulators – and possibly some that result from the ongoing consultation - will prove to be directly relevant to the rail industry.

However, so long as NR is a CLG and the FIM remains in its current form, there are other aspects of the RPI-X style regulatory framework that are not relevant. As noted earlier, incentive regulation of an equity company works by punishing risk bearers (shareholders and lenders) if the company fails to achieve regulatory performance targets. With NR, failure to achieve regulatory performance targets punishes the government (and therefore taxpayers) through an increase in the FIM exposure, or rail users (if price re-opener provisions are triggered). Equally, if NR undertakes unnecessary and unprofitable investments financed with (guaranteed) debt then it is the government (taxpayer) and/or users that pay the costs, not the providers of finance. Moreover the government cannot exercise control over the company’s activities (despite the fact that it is bearing the risks).

We conclude that the approach of setting a 5 year price control trajectory and then adopting a hands-off stance is not appropriate for ORR when regulating NR. So long as the current arrangements remain unchanged ORR will need to retain close oversight of NR’s performance against operating and capital performance targets set at the Periodic Reviews.

If the changes to the FIM suggested earlier in options (iii) and (iv) were adopted then ORR’s approach to regulation of NR could evolve to become very similar to the approach adopted by network regulators of debt financed CLGs (such as Welsh Water) that operate without a government guarantee.

Alignment of incentives between NR and users to improve efficiency, performance and capacity

Even if NR were an equity company the alignment of incentives in a fragmented industry structure would not be straightforward. The report concludes that much more could be done within the existing industry structure to improve incentives operating on NR and users to maximise total system net benefits. In general this will be achieved by inserting well designed revenue and cost sharing mechanisms into the contractual interfaces between NR and track users. Since currently DfT is responsible for franchising agreements, close co-operation between ORR and DfT will be needed to develop a consistent approach that will improve outcomes.

While the FIM arrangements remain as they currently are, NR is subject to weak incentives to improve the alignment of incentives across the network with the aim of maximising total system net benefits. Therefore DfT and ORR may need to be pro-active in bringing NR and users together to consider which improvements in incentives might be beneficial. It may also need to be pro-active in driving through improved contractual arrangements between NR and users, if the potential benefits are to be realised in practice.

Even if the FIM arrangements were changed as suggested earlier in this report, alignment of incentives within the current industry structure will be difficult to achieve. If efforts to improve incentives through improved contractual provisions proved insufficiently effective, corporate restructuring options may ultimately need to be pursued.

The Role of Management Financial Incentives

With the current FIM/CLG arrangements, the financial incentives in the management incentive plan assume greater importance. Normally the risk bearers approve the MFIs, seeking to ensure they operate to maximise the likelihood of achieving the risk bearers' objectives. Since the risk bearer (the government) cannot approve the MFIs for NR's management, in our view ORR acting in the public interest should be actively involved in the design and approval of the MFIs. The MFIs should be (and we understand are) structured to align the financial interests of management with achieving short and longer term performance targets agreed with ORR. This should continue to be the case throughout future price control periods.

If options (iii) and (iv) were adopted then ORR would not need to be so closely involved in approval of the MFIs.

The Balance of 'Carrots' and 'Sticks'

Incentive regulation of an equity company balances the 'carrot' of retention of out-performance against the 'stick' of returns below the cost of capital (value destruction). This balance cannot be retained for NR with the FIM in place in its current form because the 'stick' beats the government/taxpayer (the principal risk bearer) and/or network users. Therefore in reality ORR has no stick to beat NR with.

With current arrangements, ORR can only use the 'carrots' and 'sticks' in the MFIs. That is why it needs to be able to approve the terms of the MFIs. It is also why ORR needs to be more closely involved in oversight of NR than would be necessary if the principal risk-bearer was in a position to exercise control over NR in the event of poor performance.

If options (iii) and (iv) were adopted then ORR could exercise its powers in the same way as would be appropriate for a CLG that did not benefit from the FIM i.e. in the same way as Ofwat regulates Welsh Water.

ANNEX A – FURTHER ANALYSIS OF THE COST REFLECTIVE FIM GUARANTEE FEE

The risk on NR's assets is the same regardless of how the assets are financed. The risks are a function of the business and regulatory risks to which the assets are subjected, not the means of financing them. The cost of risk bearing can be assessed using the usual CAPM-WACC framework. The approach adopted by most regulators in other sectors is to estimate the weighted average cost of capital of a “notionally” or “optimally” geared company.

When NR became a CLG, benefiting from the FIM guarantee, the risk on the assets and the cost of risk transfer did not change. What changed was who bore those risks. Hatfield did change (increase) the cost of capital (and therefore the cost of risk transfer) but it would have changed it regardless of the financial structure and of who bore the risks.

Therefore:

- Allowed revenues for NR should continue to be determined using the CAPM-WACC framework appropriate for a regulated notionally geared equity company.
- The allowed WACC can be estimated using the same approaches as are used by regulators in other sectors (taking account of any appropriate differences in “notional” gearing and relative systematic risk, reflected in the beta). Setting allowed revenues at this level will ensure there are incentives acting on network users and NR to invest efficiently and user charges will be set at the level that reflects true economic costs.
- A cost reflective guarantee fee should be levied on NR to reflect the true cost of risk transfer payable to the party bearing the risks (i.e. the government via the FIM).
- The cost reflective charge should be structured so far as possible to introduce incentives acting on NR and network users that replicate those operating on a regulated company with an efficient capital structure that does not benefit from the FIM.

This Annex illustrates how this can be achieved. Table A.1 sets out the assumptions used in the analysis. The values of the input assumptions used to calculate the WACC are the same as those used in the report. A real WACC of 5.075% is derived from input assumptions of a real risk free rate of 2.5%, a real cost of debt of 3.5% (therefore a debt risk premium of 1%), a real cost of equity of 7% (therefore a real equity risk premium of 7-2.5=4.5%) and a notional debt/RAB ratio of 55%. Note that the assumption of notional gearing of 55% is purely for illustration of the concept, there is no implication that this is the appropriate value for the rail infrastructure business. The assumed RAB value is £30 billion and hence the allowed revenue relating to the WACC (5.075% x £30,000) is £1,522.5 million pa. It is also assumed for illustrative purposes that a ‘debt related’ FIM fee of 1% pa on the whole of the

FIM is introduced into the current FIM arrangements, described in the tables as the ‘old’ arrangements. There is currently no such FIM guarantee fee.

Table A 2 sets out the structure and amount of the cost-reflective guarantee fee using these WACC assumptions. The first part of the fee (relating to the notional debt) is 1% of the notional debt paid annually in cash. The second part of the fee is 4.5% of the notional equity (45% of £30000). The whole of this accrues in the year in which the risk is incurred but only a portion is paid in cash in that year. In this illustration 1/4.5 of the notional equity fee (1/7th of the return on notional equity) is assumed to be paid annually in cash and the balance of this part of the fee is retained in the company and reinvested.

Table A.3 illustrates the effect of introducing such a cost reflective FIM fee. In example 1 the allowed revenue is $5.075\% \times £30000 = £1522.5$ million. The debt/RAB ratio is by assumption 100% (RAB=debt=30000). With the “old” arrangements (assuming a FIM fee of 1% charged on actual debt) the allowed revenue is £1,522.5 m, the cost of finance including FIM fee is $3.5\% \times 30000 = £1,050$ m and the accrued and cash surplus is £472.5m.

With the ‘new’ cost reflective FIM fee the accrued fee = 165 (1% x notional debt) + 607.5 (4.5% x notional equity) = 772.5 and the total cost of finance is 1522.5 leaving an accrued surplus in the P&L account of zero. This is because the accrued FIM charge in this case exactly equals the allowed WACC applied to the RAB (by assumption). The assumption is that 1/4.5 of the accrued notional equity FIM fee is paid out in cash (135). Hence with the ‘new’ FIM the net cash flow is £472.5 million which is the same as in the “old” arrangement. This is because (by assumption) the cash cost of the notional equity FIM fee is the same as the cash cost of the fee on actual debt in the “old” arrangement.

Example 2 shows a more realistic case where the actual debt/RAB ratio is assumed to be two-thirds (20,000/30,000). In the “old” arrangement the accrued and cash surplus is $1522.5 - (3.5\% \times 20000) = £822.5$ m. With the ‘new’ cost reflective FIM the accrued cost of the FIM is $165 + 607.5 = 772.5$ and the total cost of finance is 1272.5 . The accrued surplus in the P&L account is £250 m. The net cash flow with the new FIM is $1522.5 - 500 - 165 - 135 = £722.5$ m. The accrued surplus of £250 m and the reduced net cash flow reflect the “inherited” £10,000 m of RAB that is “free” to NR because it did not incur a cost reflective FIM fee.

Table A4 shows the marginal impact of the cost-reflective FIM fee. In this example the RAB increases by £5,000 m and is financed with FIM-guaranteed debt. The extra allowed revenue ($5.075\% \times 5000$) is 253.75 m. With the “old” arrangement the surplus increases in accrued and cash terms by 78.75 m (because the marginal revenue - the WACC x 5000 - increases much more than the marginal cost of finance ($3.5\% \times 5000$)). However, with the cost-reflective FIM fee the change in the accrued surplus is zero. The change in cash flow depends on how much of the accrued FIM charge is assumed to be paid out to the risk bearer. In this example the net cash flow is by assumption the same as with the ‘old’ FIM.

With the “old” arrangement NR has an incentive to invest (and increase the RAB) whenever the marginal return on investment exceeds the (low) marginal cost of guaranteed debt – there will be a strong incentive to over-invest. With a cost-reflective FIM this investment distortion is removed.

Table A1: Assumptions for analysis of the WACC/risk margin of notionally geared equity company

$$\text{WACC} = g.\text{COD} + (1-g).\text{COE}$$

$$\text{COD} = 2.5 + 1 = 3.5\%$$

$$\text{COE} = 2.5 + 4.5 = 7.0\%$$

$$\text{WACC} = 5.075\%$$

Table A 2: Description of the FIM risk transfer fee

- 2 part FIM fee
- 1st part- debt premium (over risk free rate) on notional debt
 - = 1% x 55% x RAB
 - paid annually in cash
- 2nd part
 - equity risk premium (over risk free rate) on notional equity
 - = 4.5% x 45% x RAB
 - only part paid in cash (assumed 1% x 45% x RAB)

Table A.3: Examples 1 & 2

Example 1

- RAB = 30,000 Allowed revenue = 1,522.5 Debt = 30,000

Example 1

	Old	New
Interest	750 (2.5% x 30,000)	750 (2.5% x 30,000)
FIM (Debt)	300 (1% x 30,000)	165 (1% x 55% x 30,000)
FIM (Equity)		607.5 (4.5% x 45% x 30,000)
of which cash		135 (1% x 45% x 30,000)
of which accrued		472.5
<u>Surplus</u>	<u>472.5</u> (1,522.5 – 1,050)	<u>0</u>
<u>Net cashflow</u>	<u>472.5</u>	<u>472.5</u>

Example 2

- RAB = 30,000 Allowed revenue = 1,522.5 Debt = 20,000

Example 2

	Old	New
Interest	500 (2.5% x 20,000)	500 (2.5% x 20,000)
FIM (Debt)	200 (1% x 20,000)	165 (1% x 55% x 30,000)
FIM (Equity)		607.5 (4.5% x 45% x 30,000)
of which cash		135 (1% x 4.5% x 30,000)
of which accrued		472.5
<u>Surplus</u>	<u>822.5</u>	<u>250</u> (2.5% x 10,000)
<u>Net cashflow</u>	<u>822.5</u>	<u>722.5</u>
		Δ Cash Flow = (1% x 10,000)

Table A.4

Marginal impact of FIM fee

- RAB increases 5,000
- Extra allowed revenue = $5.075\% \times 5,000 = 253.75$

Marginal impact of FIM fee

Line Item	Old	New
Δ allowed revenue	253.75 (5.075% x 5,000)	253.75 (5.075% x 5,000)
Δ interest	125 (2.5% x 5,000)	125 (2.5% x 5,000)
Δ FIM debt	50 (1% x 5,000)	27.5 (1% x 55% x 5,000)
Δ FIM equity		101.25 (4.5% x 45% x 5,000)
of which cash		22.5
of which accrued		78.75
<u>Δ Surplus (P&L)</u>	<u>+ 78.75</u>	<u>0</u>
<u>Δ Net cashflow</u>	<u>+ 78.75</u>	<u>+ 78.75</u>

ANNEX B – EFFICIENT INVESTMENT DECISIONS

Even if there were no FIM the mechanics of the RAB/WACC approach to allowing revenues to fund the cost of capital can induce inefficient investment decisions.

NR has limited incentive to enter into commercial partnerships, for example, to accelerated major rail station developments because it can only earn the return on investment provided for in allowed revenues. (In option (ii) it would have no incentive at all to undertake these investments). The government may be reluctant to include such major investments in the output specification when the result will be an increase in its FIM exposure or an increase in user charges and/or public subsidy. A straightforward solution offers itself if options (iii) or (iv) were adopted, namely, to exclude the costs and revenues relating to those investments from price regulation. Profit ‘upside’ from these non-price regulated businesses would be retained by NR and used to invest in the business. ‘Downside risks’ would be absorbed by the providers of capital to the non-regulated business and therefore the cost of capital would be appropriate to the risks involved. Of course the FIM would not apply to finance raised to fund the non-regulated business. There would need to be secure ring-fencing of non-regulated business cash flows to ensure that network users did not bear the costs of failure in the non-regulated business. There are precedents in other regulated industries for this approach e.g. airports.

Efficient disposal/closure decisions

Within the price regulated network business there is the question of how to incentivise NR to take efficient disposal and closure decisions even if option (iii) or (iv) were adopted. If, after a subsequent review of transport policy and /or accumulating evidence that a particular service is no longer socially profitable, it is decided to close a section of the network, how should the related assets be dealt with in the price control? Similarly, if other assets increase in value above their book value, should there be an adjustment to the RAB?

Efficient disposal/closure decisions

The RAB is intended to reflect the “value of the network”, but in practice is the original sales value (reflecting the likely income that shareholders would receive), plus the net increment in capital asset value (gross investment less depreciation). This would be reasonable if on average new investment were socially profitable (and that in turn requires that we specify the test discount rate (TDR) at which profitability is assessed, which should be the WACC). Clearly it is important that this is the case, i.e. that investments are only undertaken in the expectation of being socially profitable.

What then should happen if, after a subsequent review of transport policy and/or the accumulating evidence of a low WTP for particular services, it is decided to close some lines with their related assets (stations, bridges, signals, etc) as they are no longer covering a return

on their realisable value? In normal accounting the asset value would be written down by the loss of value (value on the books of these assets, i.e. the relevant part of the RAB, less any scrap value, which is their realisable value). Other investments that are more profitable (on average) than the TDR could in theory be sold for a higher value than their book value, and if they were sold the asset value of the company would be increased by the realised value. If on average investments earn the TDR then the losses of the former would be balanced by the gains on the latter, and the underlying asset position of the company would be as though there had been no adjustments to the RAB as a result of closures.

What would happen if the RAB were adjusted downward for closures or abandonment of assets but not upwards for profitable investments? The cash flow to NR would fall by the decrement in the RAB times the WACC, but might increase above the forecast used to set the price control on the more profitable investment, if they were commercially and not purely socially more profitable. In that case if the cost of finance (the WACC) were equal to the average rate of return required, NR would remain on its expected financial track. If the socially more profitable investments only yielded a financial return to NR equal to the WACC, and the unprofitable investments failed to recover their WACC, then NR's cash flow would reduce and it would be making a loss.

Would this encourage NR to retain assets in the RAB that failed to cover a return on their realisable value? Unfortunately this is quite likely and would underwrite continuing socially unprofitable activities.

Suppose the book (RAB) value of the line is B , and the realisable or scrap value is R , then closing the line and writing off the asset reduces NR's income by $r(B - R)$ where r is the WACC. If the net revenue from the line is $y < rR$ (so the line should be shut), it is still possible (indeed likely) that $r(B - R) + y > 0$, making it in NR's interest to retain the line in use. If, on the other hand, the RAB is not adjusted because of closure, income with the line is $rB + y$ and income after closure is $rB + rR$, where the extra rR is the reduction in debt interest as a result of realising value R . In this case closure is attractive if $rB + rR > rB + y$, or if $y < rR$, which is the efficient rule for closing the line. Thus for efficient closure decisions, the RAB should not be adjusted for the liquidation of any assets (and indeed the revenue from such asset sales should be allowed as windfall income or capital that does not affect the RAB).

This approach would have implications for cash flow and future price controls that would need careful attention so as to retain appropriate incentives to close unprofitable services. The price control review would probably need to forecast the extent to which services would be shown to be unprofitable and no longer deserving of subsidy.