



# **RISK ADJUSTED COST OF CAPITAL FOR NETWORK RAIL UPDATE**

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April 2008

**Report**

Prepared by:

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 CAMBRIDGE ECONOMIC  
POLICY ASSOCIATES

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## **IMPORTANT NOTICE**

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## EXECUTIVE SUMMARY

### 1. Introduction

This paper provides an update of CEPA's June 2007 paper for ORR on an appropriate cost of capital for a risk-adjusted Network Rail (without the financial indemnity mechanism (FIM) support). We continue to interpret this as the cost of capital that would be faced by an efficient, conventionally financed (debt and equity) business with comparable assets as Network Rail, referred to as the 'notional network rail'.

The conclusion in the June 2007 report was that:

- the range for the cost of capital assuming that ORR introduced indexation on the post-tax vanilla WACC could be as low as 4.1% to 4.5%; and
- in the absence of indexation, a range of 4.3% to 4.7% was reasonable.

We did not comment on an appropriate point estimate. The analysis of market data in this report is up to 31<sup>st</sup> March 2008.

### 2. Assessment of notional gearing

In June 2007 we indicated our view that the evidence suggested that it was possible to maintain a solid investment grade rating at gearing levels as high as 70%. We therefore suggested a conservative gearing range (net debt:RAB) of 60% - 65% and used 62.5% as the spot estimate for our WACC ranges.

However, our judgement in the light of regulatory precedent and the need for the notional network rail to maintain an A- rating (as opposed to BBB+) to finance itself in current market conditions, suggests that it would be appropriate for ORR to use a 60% gearing assumption for the higher end of the WACC range whilst retaining 62.5% as the upper end of the gearing range.

### 3. Assessment of pre-tax cost of debt

Our approach to determining an appropriate range for the allowed cost of debt remains as in June 2007. We have considered the cost of existing debt that an efficiently financed notional network rail might have been expected to incur over the past 5 years and the expected cost of new debt to be raised throughout the CP4 control period.

Our judgement is that an appropriate **cost of debt range in the absence of cost of debt indexation (or 'triggers') is in the range 3.25% - 3.5%**, which is 0.25% higher than the same range suggested in June 2007. This change takes account of current market conditions. However, our judgement is that the top end of the range should be regarded as comfortable given: (i) the low cost of existing debt that a notional network rail would be expected to have locked in for CP4 during the recent period of historically low costs of debt issuance; (ii) the

fact that recent increases in debt premia have been offset by corresponding reductions in risk free rates; and (iii) the expectation that the current market conditions may not continue indefinitely, with gradual reversion to the mean, even if rates are unlikely to return to those prevailing prior to the credit crunch.

#### 4. Assessment of post tax cost of equity

Our judgement remains that an appropriate range for the **cost of equity for a notional network rail in CP4 is 6.5% - 7.0%**. However, in the light of the recent regulatory settlements, we no longer argue against ORR setting the point estimate at the top end of this range.

#### 5. Post-tax vanilla WACC

Table 1 provides a summary of the post-tax vanilla WACC that results from the above assumptions (in the absence of cost of debt indexation). **It shows that our judgement is that an appropriate post-tax vanilla WACC should be in the range 4.5% – 4.9%. We have not been asked to provide a point estimate of the range. However, taking account of all of the factors discussed in this paper, we believe that an appropriate point estimate is unlikely to be in the bottom half of this range.**

*Table 1 – WACC (without cost of debt ‘triggers’)*

Sample	Lower	Upper
Post-tax Cost of Equity	6.5%	7.0%
Pre-tax Cost of Debt	3.25%	3.5%
Gearing	62.5%	60%
Post-tax vanilla WACC	<b>4.5%</b>	<b>4.9%</b>

## **1. INTRODUCTION**

In June 2007 CEPA completed a report for the Office of Rail Regulation (ORR) on the appropriate cost of capital for a risk-adjusted Network Rail (without the benefit of the financial indemnity mechanism (FIM) support). The conclusion of the June 2007 analysis was that a reasonable range for the post-tax vanilla WACC for Network Rail in CP4 is between 4.1% and 4.7% real. This paper provides an update of the analysis.

### **1.1. Terms of reference**

The terms of reference for this work are attached at Annex C of this report. The requirements for the work are to update our June 2007 report taking into consideration the following factors:

- Recent changes in financial markets;
- Network Rail's detailed financing strategy; and
- ORR's further decisions on the appropriate financial framework for Network Rail in CP4.

The terms of reference do not envisage that the underlying methodology used in the June paper would need to be amended. It indicates that the study would need to cover:

- An analysis of how the issues set out above affect the risk-adjusted cost of capital in CP4.
- An updated range for Network Rail's risk-adjusted cost of capital, in real vanilla terms.
- Updated assessments of the appropriate level of gearing, the cost of debt and the cost of equity that underpin the cost of capital range.

### **1.2. Background**

As set out in the June 2007 report, the context for this study is ORR's approach to the financial framework for CP4. Their latest position is set out in the February 2008 Paper<sup>1</sup> and reflects the analysis in earlier consultation papers<sup>2</sup>.

We do not propose to summarise the main points of relevance again here. However, we note in particular that it is agreed between ORR and Network Rail that the appropriate approach to setting the cost of capital is to seek to identify the weighted average cost of capital that would be faced by an efficient, conventionally financed (debt and equity)

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<sup>1</sup> February 2008, *Periodic Review 2008: Advice to Ministers and framework for setting access charges*

<sup>2</sup> Office of Rail Regulation, *Periodic Review 2008: Enhancing Incentives for Continuous Improvements in Performance: A Consultation Paper*, July 2006. This paper draws particularly on CEPA 2006, *Incentives in the GB Rail Industry* – on options to increase corporate finance incentives acting on Network Rail.

business with comparable assets and business risks as Network Rail. In addition our analysis of the cost of debt assumes that there is no financial indemnity in place. In what follows, this is how we have interpreted the ‘risk adjusted cost of capital’ referred to by ORR. For the avoidance of doubt, reference to the ‘notional network rail’ with both debt and equity should not be taken to suggest any change in the financial or corporate structure of Network Rail.

### **1.3. Structure of report**

The analysis in this report broadly follows the structure of the June 2007 paper as follows:

- Section 2 revisits the appropriate gearing of a ‘notional’ conventionally financed Network Rail. It takes account of views submitted to ORR by Network Rail in relation to their relative risk and the First Economics report commissioned by ORR (which is summarised in Annex A).
- Section 3 reviews the evidence on the cost of debt in the light of current market conditions and recent regulatory precedent. In addition to reviewing evidence on risk-free rates, debt premia and all-in costs of debt we reconsider our earlier assumptions about how an efficiently financed notional network rail might finance itself. Particular changes to be aware of (compared with the June 2007 report) are as follows:
  - We no longer consider the appropriate range in the context of the possibility of either the introduction of ‘indexation of the cost of debt’ or hedging in the forward markets – given that these are no longer considerations for ORR.
  - In considering Network Rail’s actual cost of debt as a cross check, we take account of additional information provided to us on Network Rail’s financing strategy for CP4 – including the rating that is expected to be required to support the level of Network Rail’s planned borrowing.
- Section 4 provides a very brief review of the cost of equity. As in the original report, ORR has indicated that they do not require CEPA to carry out in-depth primary analysis of the cost of equity. Our approach is therefore to focus on the available market evidence on the overall required return on equity in addition to consideration of the components of the Capital Asset Pricing Model (CAPM).

Our summary assessment of the appropriate range for the post-tax vanilla WACC for CP4 is set out in the Executive Summary.



## 2. NOTIONAL GEARING

### 2.1. Introduction and approach

In this section we revisit our assumption for the level of gearing to be used in the allowed WACC.

As noted in the June 2007 report, the theoretical optimal level of gearing is that level of gearing at which the marginal interest tax shield benefit (arising from tax allowances) equates to the marginal default risk cost. However, in practice, regulators have not sought to estimate this optimal level directly. Rather they have tended to use a ‘notional’ level of gearing as a proxy for the optimal rate. The notional gearing is typically defined as the gearing ratio that would be consistent with an efficiently managed company achieving a solid investment grade rating (i.e. A, A-, or BBB+)<sup>3</sup>.

Key points to note about our interpretation of this approach are as follows:

- Gearing is calculated using the ratio of net debt to RAB. The principal reason for this is that regulators are concerned with companies’ required return on their regulated assets.
- It is the issuer rating at the level of the consolidated regulated businesses that should be considered when estimating the cost of debt for regulated companies.

As in our June 2007 report we emphasise that the decision about the level of gearing to use in the WACC needs to be taken in the round as part of the other judgements (e.g. on efficiency savings) in the price settlement.

In the rest of this short section we re-present the evidence from the June 2007 report before drawing our conclusion. Our conclusions take account of the analysis in the paper commissioned by ORR on relative risk and Network Rail’s arguments (see Annex A for a summary).

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<sup>3</sup> Standard & Poor’s ratings. The use of a ‘solid’ investment grade rating in setting allowed revenues allows some headroom compared with the licence requirements (in water and energy particularly) to maintain an investment grade rating.

## 2.2. Regulatory precedent

Table 2.1 updates the June 2007 table with the recent determinations by Ofgem and CAA.

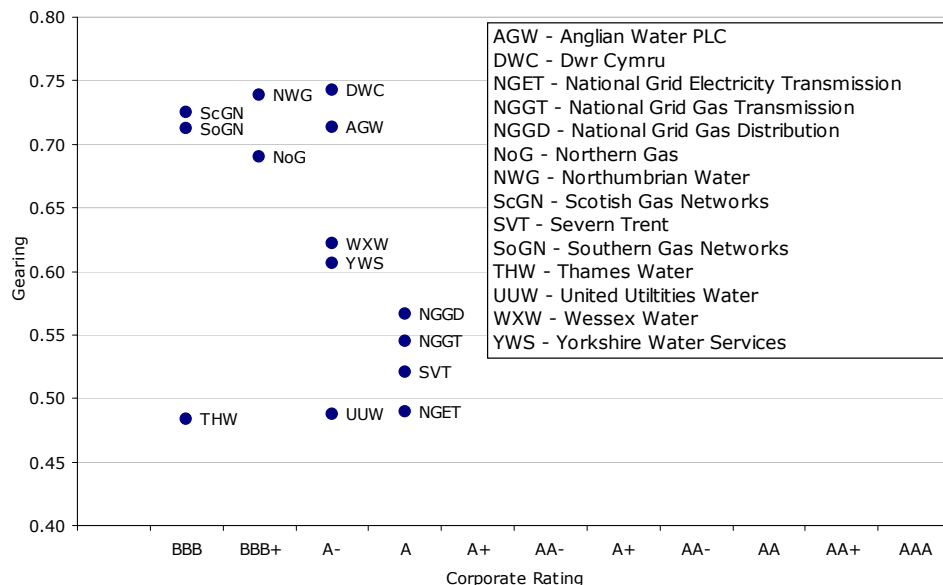
Table 2.1: Notional gearing regulatory precedent

Regulator	Notional Gearing Assumption
CAA (CC) (2008) (Airports)	60% <sup>4</sup>
Ofgem GDPCR (2007)	62.5%
Ofgem TPCR (2006)	60%
Ofgem DPCR (2004)	57.5%
Ofwat (2004)	55%

## 2.3. Market evidence

Figure 2.1 updates the gearing / credit rating chart produced in the June 2007 paper<sup>5</sup>. In our view it confirms the conclusion that for most regulated businesses gearing as high as 70% (or higher) is consistent with a solid investment grade rating<sup>6</sup>.

Figure 2.1: Gearing and issuer credit rating of utilities



<sup>4</sup> CC / CAA explicitly refer to BBB+ as their measure of solid investment grade rating. This is relevant since, in current market conditions a notional Network Rail may struggle to finance itself with a BBB+ credit rating in CP4 – given the quantum of debt issuance required.

<sup>5</sup> Note that the approach to identifying these data points varies according to the particular company. Greatest weight should be placed on the evidence of the listed companies where the majority of the business is subject to price regulation. Annex D provides further background on the approach and data sources.

<sup>6</sup> Subject of course to a wider assessment of the business risks and the net cash flow profile of the particular business.

## 2.4. Conclusion

Taking account of the available evidence, we remain of the view that a range 60% – 65% gearing<sup>7</sup> remains an entirely defensible range for ORR to use in its WACC determination.

However, our judgement in the light of regulatory precedent and the need for the notional Network Rail to maintain an A- rating (as opposed to BBB+) to finance itself in current market conditions, suggests that it would be appropriate for ORR to use a 60% gearing assumption for the higher end of the WACC range whilst retaining 62.5% as the upper end of the range.

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<sup>7</sup> Net debt to RAB

### 3. COST OF DEBT

#### 3.1. Introduction and background

In this section we consider what an appropriate cost of debt would be for an efficiently financed and operated network utility with comparable assets and business risks to those of Network Rail. This comprises an estimate of the risk free rate and the debt premium (taken to be the spread over gilts on corporate bonds).

#### 3.2. Regulatory precedent and CEPA methodology

##### 3.2.1. Recent cost of debt regulatory determinations

Our June 2007 report provided a brief review of regulatory precedent in setting the cost of debt. Since then there have been two further regulatory decisions, namely Gas Distribution (Ofgem) and Heathrow and Gatwick airports (CAA / CC). Table 3.1 provides a revised version of the same table in the June report including these recent decisions.

*Table 3.1: Recent regulatory decisions on the cost of debt*

Regulator	Decision	R <sub>f</sub>	Debt premium	CoD Used
CAA / CC	BAA (Mar 2008)			3.55% <sup>8</sup>
Ofgem	GDPCR (Dec 2007)	2.50%	1.3%	3.55%
Ofgem	TPCR (2006)	2.50%	1.25%	3.75%
Ofwat	Water & sewerage (2004)	2.50-3.00%	0.80-1.40	4.30%
Ofgem	DPCR4 (2004)	2.25-3.00%	1.00-1.80%	4.10%
CAA	Heathrow (2002)	2.50-2.75%	0.90-1.20%	3.675%*

*\*Midpoint,*

Key points to note about the most recent decisions are as follows:

- Ofgem continues to set the cost of debt with reference to a judgement about the spot and ‘trailing average’ cost of 10-year risk free bonds and spreads on A- rated corporate debt. The determination was in December during the earlier stages of the recent financial turbulence. Ofgem note in particular that:

“..the real cost of funding has remained below Ofgem's assumption, and the discount [of the actual rate] to the trailing average has widened since updated proposals. In addition, Ofgem's proposed allowance is still higher than the trailing average, and this gap is likely to grow over the forthcoming period, unless rates rise sharply”

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<sup>8</sup> Comprising 3.4% cost of debt based the 6.3% estimate for the nominal cost of 10 year corporate debt; and 15 bp for ongoing commitment, agency and arrangement fees.

- The CAA’s determination is consistent with the advice provided by the CC in October 2008 on the cost of debt<sup>9</sup>. However, as part of their analysis, CAA give careful consideration to whether the cost of debt proposed by the CC is appropriate in the light of market turbulence as in early March 2008. In making their judgement they note:
  - That the 15bp allowance for ongoing commitment, agency and arrangement fees is allowed “...on all debt, i.e. existing and new debt, in each year of Q5. This is likely to provide significant headroom above the annual fees that would be payable on all debt and the new issue costs...”<sup>10</sup>.
  - That [it is not appropriate] to ‘aim-up’ further on the cost of debt in ‘bad markets’ would be a mistake; and particularly given that its approach to setting the cost of capital had in any event been conservative.
  - That “there can be no escaping from the fact that an efficiently financed notional airport might now be expected to hold a material stock of debt issued under more benign market conditions. This would tend to suggest that a forward looking cost of debt assumption set in line with observable recent market prices would, in practice, lie above the most likely average cost of debt (of all vintages) which an efficiently financed notional airport would expect to bear during Q5”.

In terms of methodology we believe that these recent determinations are consistent with the observations about regulatory precedent in our earlier paper. In particular, the judgement that regulators are seeking to make in setting the cost of debt (in the absence of any indexation mechanism) is to ensure that the regulated entity is able to meet the cost of:

- Existing fixed and variable rate debt that an efficiently financed company would have incurred in financing capital expenditure in the past.
- New debt required to efficiently re-finance existing debt and to deliver an agreed capital expenditure programme.

The particular approach that regulators use to inform these judgements and the way that they describe what they are doing varies. However, in general, regulators:

- Look at short and long-term historical averages of fixed and floating rate debt to establish what the embedded or ‘actual’ cost of debt might be for at for an efficiently financed utility at the outset of the control period. (The use of historic averages of

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<sup>9</sup> The CC’s analysis appears to us to be relatively cursory, relying only on the current yields of benchmark A and BBB corporate debt. See the comments in section 2.2.2 of CEPA’s recent submission to CAA the Airports price control [http://www.caa.co.uk/docs/5/ergdocs/heatgatnov07/ba\\_annex4.pdf](http://www.caa.co.uk/docs/5/ergdocs/heatgatnov07/ba_annex4.pdf)

<sup>10</sup> CEPA shares this view and therefore, as in the June 2007 report, does not seek to allow for these costs in addition to making conservative assumptions about the actual cost of debt faced by the company.

fixed debt recognises that an efficiently financed utility would have financed itself with a proportion of fixed-interest debt in previous control periods).

- Then make a judgement about whether this cost of debt is likely to be sufficient to cover the costs not only of raising new debt but also of existing debt. In recent regulatory periods, at a time when the cost of debt has been lower than the long-term average, regulators have typically set the allowed cost of debt significantly higher than the short-term averages - therefore creating a degree of headroom between the actual cost of debt faced by the regulated entity at the outset of the control period and the allowed cost of debt funded in the allowed revenue<sup>11</sup>.

### **3.2.2. CEPA methodology**

Our methodology for assessing the appropriate cost of debt remains as set out in the June 2007 report (Section 3.2.2. also). Particular points to note in the light of recent regulatory and market developments are as follows:

- We remain of the view that it is appropriate for ORR to consider how an efficiently operated and financed company might seek to arrange its funding requirements<sup>12</sup>. We recognise however that there is likely to be a difference between the portfolio of debt that might have been achievable over the last five years compared with that which is achievable in current market conditions. (For example, on the ability of the company to continue to access the very low rates on long-dated, index-linked debt that have been available over the last five years)
- Given the decision by ORR not to introduce any form of indexation of the cost of capital, we do not think that it is appropriate to consider the lower ranges for the cost of debt as discussed in our June 2007 report.

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<sup>11</sup> As we have argued in our paper: Indexing the Allowed Rate of Return (September 2007) we believe that because of regulators' views about the asymmetry of risks in setting the allowed cost of capital, the headroom will always be positive. The paper goes on to argue that introducing indexation on the cost of debt would allow regulators to reduce this headroom to the benefit of customers without putting at risk the ability of the regulated entity to finance itself in the forthcoming control period. We do not accept the arguments put forward by the Competition Commission about the impact of such a mechanism eroding the requirement for shareholders to manage the risks associated with their financing.

<sup>12</sup> For example, taking account of an appropriate maturity profile and mix of index-linked and nominal fixed-rate debt.

### 3.2.3. Outline of section

The rest of the section is structured as follows:

- Section 3.3 reviews our June 2007 analysis of how an efficiently financed company would seek to arrange its funding requirements.
- Section 3.4 updates our analysis of the separate components of the cost of debt.
- Section 3.5 considers recent evidence of the all-in cost of debt for comparable businesses – placing greater emphasis on the all-in cost of nominal fixed-rate corporate debt.
- Section 3.6 provides our assessment of the appropriate range for the cost of debt in current circumstances.
- Section 3.7 concludes by considering information provided to us by Network Rail as to its actual cost of debt – as a cross check on the proposed range in Section 3.6.

### 3.3. Factors affecting how an efficient company might finance itself

In the June 2007 report we indicated that an efficiently financed business would look to adopt an optimal debt structure that minimises its actual debt financing whilst also seeking to mitigate various risks (e.g. interest rate, regulatory, inflation, and refinancing risk).

The optimal debt structure is not static or independent of market conditions. For example, whilst a company would generally expect to spread its fixed rate debt over a mix of maturities<sup>13</sup> it is reasonable to expect a treasurer to increase the weight in the portfolio of particular maturities and debt instruments to take advantage of market conditions. The historically low all-in costs of long-dated index-linked debt are a good example of this.

The June 2007 report concluded the following:

- **Floating and fixed rate debt:** That a notional Network Rail would use a high proportion of fixed rate debt; and therefore not be “significantly” exposed to interest rate movements.
- **Maturity:** An appropriate average debt maturity profile for a ‘notional network rail’ would be 20 years with a broadly even distribution of maturities.
- **Index-linked debt:** That it was reasonable to assume that a notional network rail would finance itself with a significant proportion of index-linked debt – and that a 30% proportion was likely to be a defensible assumption for the purposes of the analysis of the WACC.

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<sup>13</sup> Taking account of the useful life of assets and refinancing risk.

- **Hedging:** That whilst it is clearly reasonable to assume that an efficiently financed business would use derivatives in order to hedge risk, it was not appropriate for CEPA or ORR to seek to second guess the situations in which this was likely to be appropriate when determining the appropriate WACC<sup>14</sup> for a notional network rail.

In reviewing these assumptions for the purposes of this updated assessment of the WACC, we have taken account of two main market developments. The first is the reduced market appetite for index-linked corporate debt. The second is greater clarity about the expected size of the financing requirements in CP4 – which suggest an efficiently financed network rail would need to access the international debt markets and borrow in a range of currencies (including GBP; USD and Euro).

### 3.3.1. Index-linked debt

One of the impacts of the recent turbulence in financial markets has been the reduced potential for regulated utilities to issue index-linked debt. We understand that this reflects a reassessment of the risks associated with the repayment of the inflation-adjusted principal on maturity. This has always been a factor constraining the ability of companies with lower credit ratings (e.g. BBB+, S&P)<sup>15</sup> to issue index-linked debt (unless they were able to get a monoline credit wrap).

In current market conditions:

- We understand that there are now similar difficulties for more highly rated companies. For example, it is interesting to note that National Grid’s most recent bond issue was a fixed rate nominal debt (after a sustained period of index-linked issuances).
- It is difficult for companies with lower investment grade ratings to get credit enhancement.

Given the current uncertainty associated with the ability of solid investment grade rated regulated utilities to issue as much index-linked debt over the next price control period; we think that it is reasonable for ORR to discount the potential for a notional network rail to issue index-linked debt in the forthcoming period. This should not impact (materially) on the judgement that ORR takes on the actual cost of debt faced by the notional network rail at the beginning of the next control period. However a factor that should be taken into account in considering the cost of new debt to be faced by an efficiently financed Network Rail in CP4.

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<sup>14</sup> Although we noted that, if it was clear that if Network Rail did have significant hedging (e.g. in the forward swap markets) in place during CP4, this might impact on the extent to which ORR need to ‘aim off’ the actual cost of debt at the outset of the control period to allow for mean reversion / possible market movements.

<sup>15</sup> At lower credit ratings (and higher levels of gearing) investors may require the borrower to fund a ring-fenced sinking fund to cover the inflation risk, which erodes the savings on the low observed rates on long-dated index-linked debt.



We note that, given the presence of the FIM, it may be possible in practice for Network Rail to continue to issue index-linked debt (since it is issued with a sovereign AAA rating). While this is relevant for ORR's understanding of Network Rail's financeability and as a cross-check on the assumed WACC for the notional network rail, it is not directly relevant to this analysis<sup>16</sup>.

#### *Foreign currency borrowing*

The June 2007 paper did not explicitly consider how to deal with the possibility that an efficiently financed company may need or wish to access the non-sterling denominated debt markets. We recognise that this is likely in circumstances where the quantum of debt required is large (as is the case for the notional network rail in CP4). In principle the real interest rate in other currencies may be different from that on sterling-denominated debt. However, given that the cost of putting in place appropriate exchange rate hedging (e.g. through currency swaps / forward contracts) is likely to reflect underlying differences in the cost of debt denominated in different currencies the reasonable assumption for ORR<sup>17</sup> is that the expected cost will be the same as the sterling equivalent. We do not therefore consider the cost of non-sterling denominated debt.

An important exception to this general rule relates to index-linked debt. The cost of index-linked gilts in sterling is materially lower than the cost in dollars. This consideration is of less importance given that we de-emphasise the weighting of index-linked debt in our assessment of the WACC.

#### **3.3.2. Conclusion**

In this updated analysis of the WACC we therefore judge that an efficiently financed regulated utility:

- would have issued a significant proportion of its debt as fixed rate debt over the past 5 years<sup>18</sup>;
- would have financed itself with about 30% index-linked debt over the past five years;
- over the next price control period would continue to issue a significant proportion of its debt as fixed rate debt;
- but may not have comparable access to the sterling index-linked debt markets over the period; and

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<sup>16</sup> It is relevant however to the separate question of the appropriate level of the FIM fee.

<sup>17</sup> Assuming covered interest parity.

<sup>18</sup> In the June 2007 report we defined this as a minimum of 80% of debt in fixed interest instruments. However, in practice our analysis of the WACC assumed a negligible level of floating rate exposure.

- would maintain a weighted average debt maturity of about 20 years with a broad spread of maturities about the average

### 3.4. Components of the cost of debt

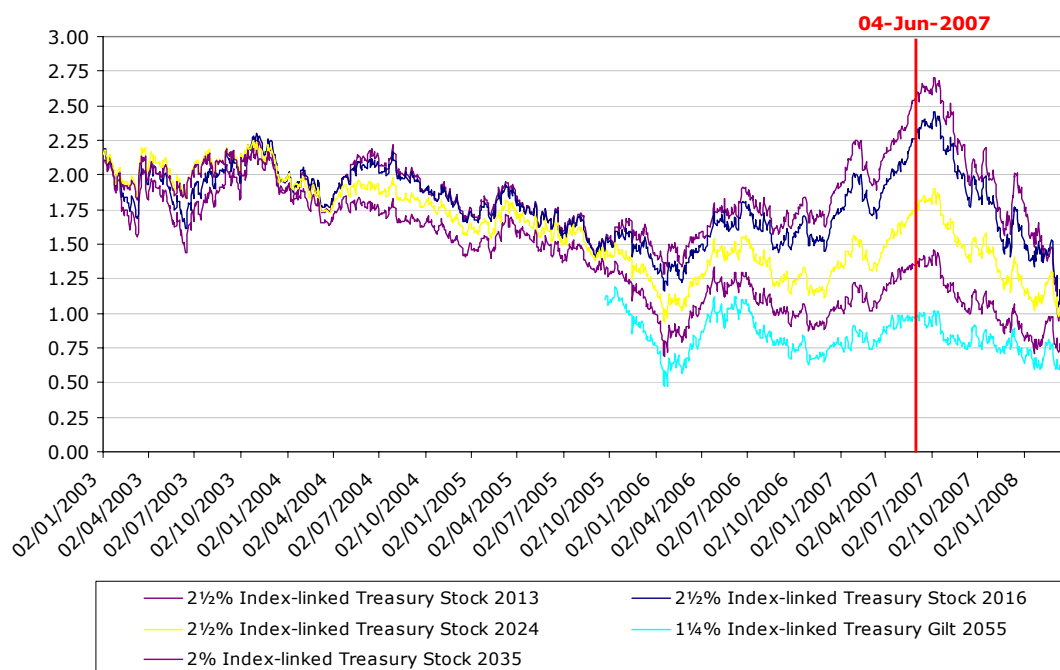
As in the June 2007 report we consider here the evidence on the risk free rate (looking at both index-linked and nominal gilts) and the debt premium.

#### 3.4.1. Risk free rate

##### *Index-linked debt*

Figure 3.1 below shows recent movements in the yields on a selection of index-linked gilts. Last summer we noted that yields had risen (at the short-end particularly) compared with historic lows. Since then the impact of increased market turbulence and a flight to quality has lead to quite dramatic reductions across all maturities. In addition the yield curve has flattened (compared with a more downward sloping yield curve in recent years).

Figure 3.1: Yields on UK index-linked gilts



Source: DMO

Table 3.2 provides summary information on the spot rates and average yields over the last 5 years for index-linked gilts of 10, 20 and 30 year maturities<sup>19</sup>. The figures in brackets (*and italics*) are the figures reported in June 2007<sup>20</sup>. The final column shows a weighted average

<sup>19</sup> The gilts used are the same as those used in Table 3.2 in the June 2007 report.

<sup>20</sup> We present the analysis here to 1 decimal place only.

assuming that the company has equal proportions of each maturity. The key point to note is that over the last year the risk-free rate has fallen dramatically, opening up a significant difference between the 5 year average and spot rates.

The new range for the weighted average (depending on whether you focus on the spot or 5-year averages) is 1.0% - 1.6%. The reduction of the low end of the range reflects the reduction in spot rates.

As we noted in the June 2007 report, the rates shown would be lower still (and particularly for the 5 year average) if the 50 year maturity was included. We had excluded these rates in June 2007 because there is limited appetite for corporate index-linked bonds of this maturity. Recent market developments suggest that this continues to be appropriate. The figures in brackets (*and italics*) are the numbers reported in June 2007

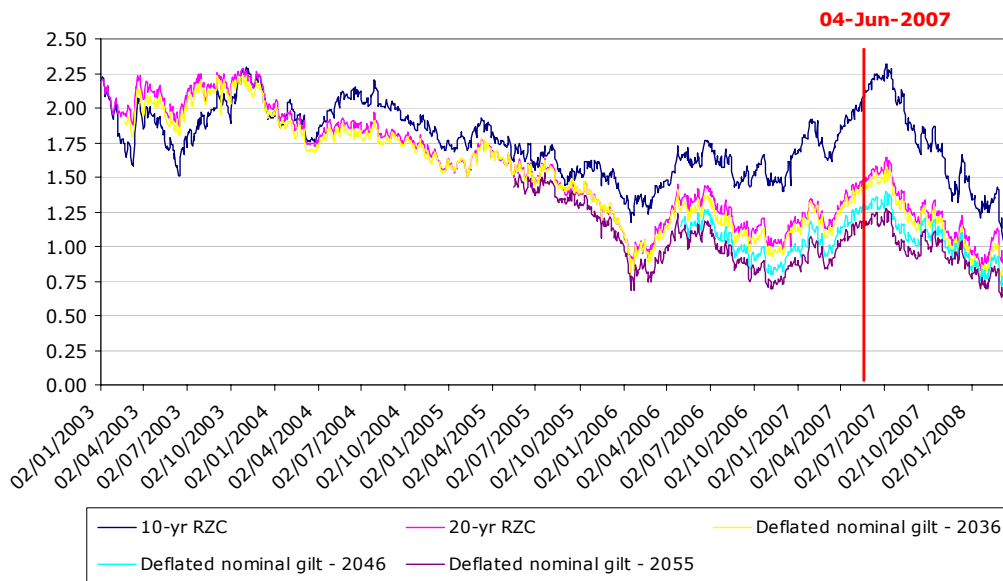
*Table 3.2: Real yields on 10, 20 and 30 year to maturity index-linked gilts*

<b>Time series</b>	<b>10 year maturity</b>	<b>20 year maturity</b>	<b>30 year maturity</b>	<b>Weighted average</b>
<b>Spot</b>	1.1 ( <i>2.1</i> )	1.1 ( <i>1.5</i> )	0.8 ( <i>1.3</i> )	1.0 ( <i>1.6</i> )
<b>5 yr average</b>	1.8 ( <i>1.8</i> )	1.6 ( <i>1.7</i> )	1.5 ( <i>1.5</i> )	1.6 ( <i>1.7</i> )

*Conventional nominal debt*

Figure 3.2 below shows the movements in the real yields on zero coupon bonds as implied by the difference between nominal and index-linked gilts. The dataset for maturities 5, 10 and 20 years is from the Bank of England. Real yields on longer-dated nominal debt are calculated by deflating the yields on a number of benchmark bonds. Not surprisingly the movements in yields since June 2007 mirror those on index-linked securities. In particular we have seen reductions in yields and flattening of the yield curve.

Figure 3.2: Real yields implied by nominal UK gilts



Source: BoE and: DMO

Table 3.3 provides summary spot, and 5 and 10-year averages for the same maturities as reported for index-linked gilts in Table 3.2. As with movements in index-linked gilts there has been a marked reduction in the spot rates since June 2007 - which opens up a significant difference between the 5 and 10 year average and the risk free rates prevailing in the market at the moment. The figures in brackets (*and italics*) are the numbers reported in June 2007.

As discussed in the June 2007 report, the yields at each maturity in Table 3.3 do not take account of the likelihood that the Bank of England's inflation expectations estimate also includes an inflation risk premium. If we continue to assume the inflation risk premium might be of the order of 25bp, then the ranges for the weighted averages (depending on whether you focus on spot, 5 or 10 year averages) are between 1.2% and 2.25%. (Note: the reduction in the lower end of the range reflects the lower spot rates).

Table 3.3: Real yields on 10, 20 and 30 year to maturity conventional gilts<sup>21</sup>

Time series	10 year maturity	20 year maturity	30 year maturity	Inflation risk premium	Weighted average
Spot	1.0 (2.1)	0.9 (1.5)	0.7 (1.4)	0.25	1.1 (1.95)
5 yr average	1.7 (1.8)	1.5 (1.7)	1.5 (1.6)	0.25	1.8 (1.95)
10 yr average	2.0 (2.2)	1.8 (2.0)	n/a	0.25	2.2 (2.25)

<sup>21</sup> Numbers may not add due to rounding.

The methodology used to derive the real yield on nominal bonds assumes perfect sustainability of nominal and index-linked bonds. The implications of less than perfect sustainability for our analysis are considered below and later in Section 3.5.

### *Summary*

Table 3.4 below summarises the above evidence on the risk free rate from the Tables 3.2 and 3.3 above. The columns show the weighted average real yield for 10, 20 and 30 year maturities of index-linked and the implied real yield on zero coupon nominal gilts.

*Table 3.4: Real risk-free rates from 10, 20 and 30 year maturities*

<b>Time series</b>	<b>Index-linked Gilts</b>	<b>Deflated Nominal Gilts</b>
Spot	1.0	1.1
5 yr average	1.6	1.8
10 yr average	n/a	2.2

### **3.4.2. Debt premiums**

Figure 3.3 shows the evolution of spreads (against gilts) for corporate debt with an A- rating and for different debt maturities<sup>22</sup>. It shows a dramatic increase in the risk premium since June 2007. At that time we indicated that an appropriate assumption for the debt premium for A-rated debt was around 100 basis points.

Table 3.5 provides spot and 5-year averages for the debt premium for different maturities.

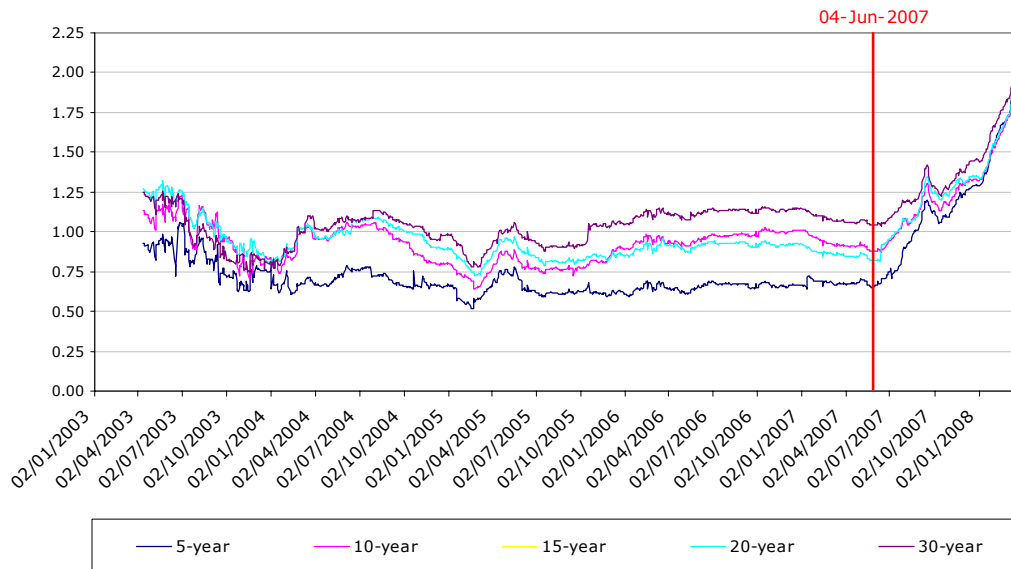
*Table 3.5: Spreads on A- 10, 20 and 30 year corporate bonds*

<b>Time series</b>	<b>10 year maturity</b>	<b>20 year maturity</b>	<b>30 year maturity</b>	<b>Weighted average</b>
Spot	1.9	1.9	2.0	1.9
5 yr average	0.9	0.9	1.0	0.9

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<sup>22</sup> In this paper, we restrict our analysis to a solid investment grade rating, taken to be an A- rating (i.e. the middle rating of our normal interpretation of ‘solid’ – BBB+ to A). We think this is particularly appropriate given the financing requirements of the notional Network Rail in CP4.

Figure 3.3: Spreads on A- rated corporate debt



Source: Bloomberg

A key issue when forming a judgement about the debt premium over the next price control period is the extent to which the widening of spreads associated with the current market turbulence will be sustained. Further there is the question of whether, if there is mean reversion as markets normalise, at what future level debt premia will average and how quickly mean reversion will occur.

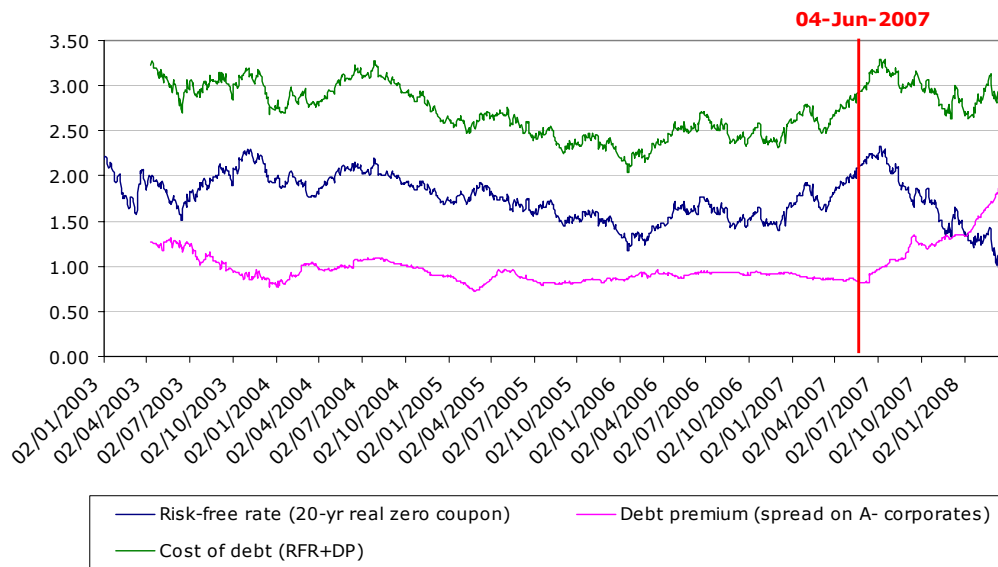
### 3.4.3. Conclusions of ‘components analysis’

#### Summary

Figure 3.4 brings together the movements in the risk-free rate and the debt premium for A-rated 20 year maturity debt. It shows that broadly speaking the overall real cost of debt is little changed compared with June 2007 and remains about 3%. That is, the reductions in the risk-free rate have more than offset the increase in the risk premium. It is important to recognise that these two movements are linked – since it is the flight to quality that is pushing down risk free rates and opening up spreads on corporate risk. Our expectation is that as the market settles down we will observe reductions in the spreads on A-rated bonds and commensurate increase in the risk free rate<sup>23</sup> (although there is clearly some uncertainty here).

<sup>23</sup> We note that using a 2.5% risk free rate together with the existing spreads to estimate of the cost of debt is inappropriate.

Figure 3.4: Summary movements in the cost of debt



Source: Bloomberg, BoE and CEPA

Table 3.5 below summarises the evidence on the components, using the weighted average maturity from Tables 3.2, 3.3 and 3.4.

Table 3.5: Cost of debt summary (analysis of components)

Time series	Index-linked Gilts	Deflated Nominal Gilts	Debt premium	Total <sup>24</sup>
Spot	1.0	1.1	1.9	2.9% – 3.0%
5 yr average	1.6	1.8	0.9	2.5% - 2.7%
10 yr average	n/a	2.2	n/a	

Given the above analysis:

- We believe that a reasonable estimate of the cost of debt that an efficiently financed Network Rail would have ‘locked in’ on existing debt<sup>25</sup> is given by the actual average cost of debt over the last 5 years. This range is 2.5% - 2.7%.
- The current cost of debt for an A- rated utility is around 3.0%. However, before assessing the expected cost of debt over the next control period we need to consider the all-in cost of debt faced by corporate utilities. This is discussed in Section 3.5.

<sup>24</sup> Ranges are based on the alternative risk free rate estimates presented in the table.

<sup>25</sup> The 10 year average is arguably less relevant to a notional Network Rail than other utilities given its recent history.

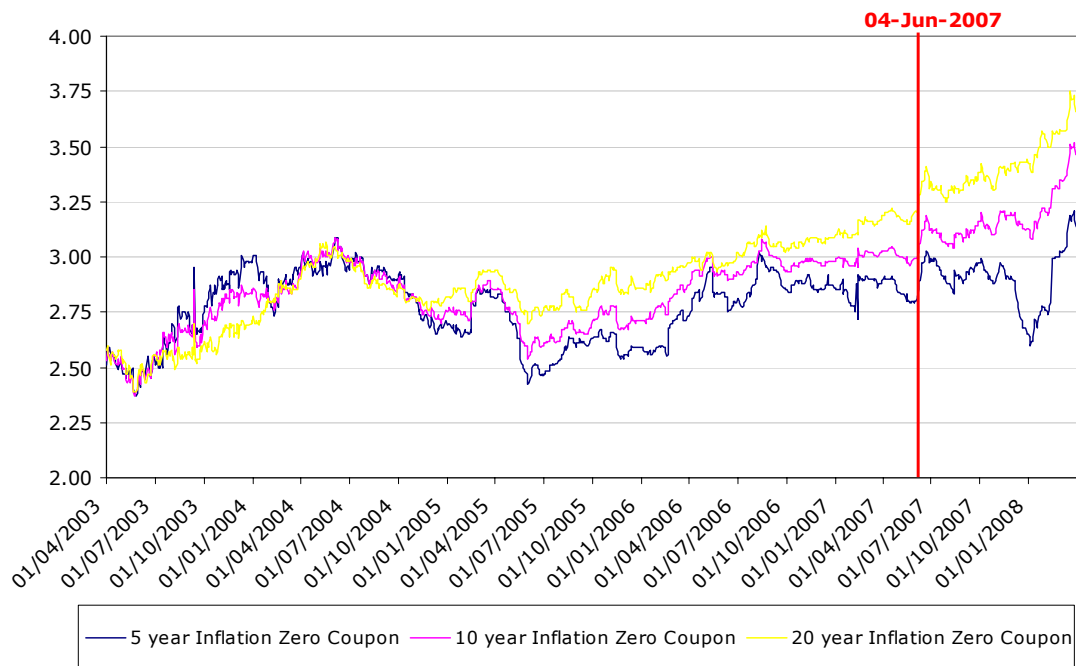
We therefore conclude that an appropriate range for the cost of existing debt is broadly the same as we concluded in the June 2007 paper; namely 2.7% - 3.0%<sup>26</sup>.

*Real yields on zero coupon bonds and inflation expectations*

As we noted in our June 2007 report, real risk-free rates published by the Bank of England (i.e. the zero-coupon yield curves) are constructed using the difference between yields on index-linked and nominal gilts. This difference is a reasonable market measure of inflation expectations (together with an inflation risk premium) if there is close substitutability in those markets.

Figure 3.5 shows that implied inflation expectations based on this spread have increased over the last year because there has been an increased difference between yields on index-linked and nominal gilts of the same maturity.

*Figure 3.5: Inflation expectations from Bank of England zero coupon yield curves*



*Source: Bank of England*

However, if there is less than perfect substitutability between index-linked and nominal gilts the implied inflation rate and real yield on nominal gilts may be mis-estimated. There is some reason to believe that there is segmentation in the bond market causing real yields on index-linked debt to remain lower than real yields on nominal gilts. One possible cause is structural, caused by strong demand by pension funds for long dated, index-linked Sterling

<sup>26</sup> The top end of the spot and 5-year average ranges.



assets that best match their long-term liabilities. The sustained ‘gap’ between yields in Sterling and Dollar – denominated index-linked gilts suggests that this might be the case. If it is correct then the implied real yields on nominal gilts would be higher than the rates derived using the spread between index-linked and nominal Sterling gilts. It is possible that as a result of a flight to quality there has been a further increase in the relative demand for index-linked gilts given that they are the least risky UK sovereign financial instrument.

As the Bank of England notes<sup>27</sup> it is also possible that inflation estimates based on the index-linked nominal gilt spread might reflect:

- Changes in the inflation risk premium (in the above analysis we continue to assume that it is 25 basis points as a reasonable estimate – but without any particular evidence-base). It is possible that this inflation risk premium might increase in uncertain economic conditions.
- Changes in the expected difference between CPI inflation (which is Bank of England’s targeted measure) and RPI inflation (which is the measure used in most financial instruments).

### **3.5. All-in costs of debt**

Given the fact that we are assuming that notional network rail may not have access to index-linked debt market for new debt over the price control period, here we place greater emphasis on the ‘all-in’ cost of conventional bond finance than we did in June 2007. In deriving the real ‘all-in’ cost of nominal debt we therefore take account of the possible lack of substitutability of index-linked and nominal bonds.

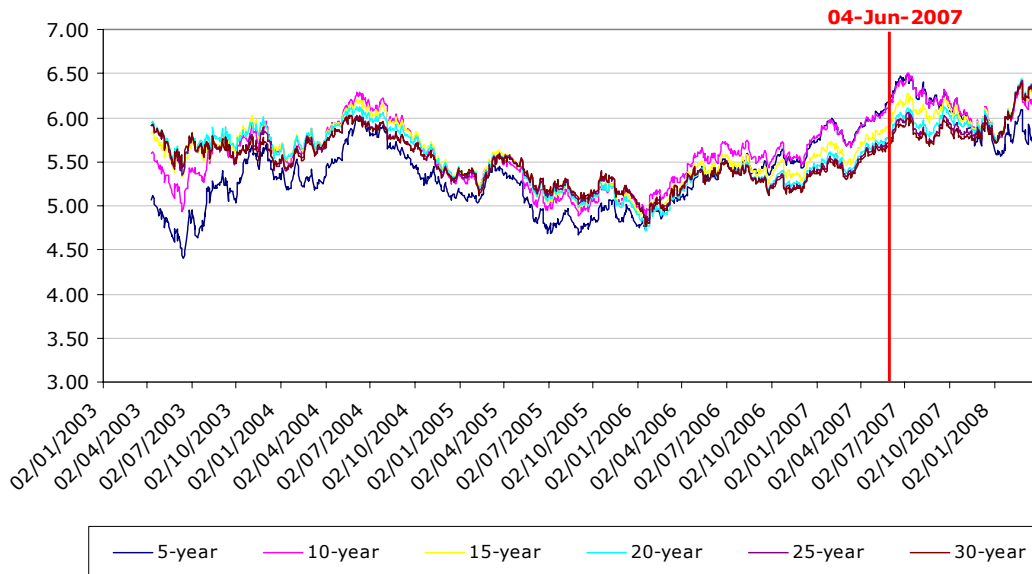
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<sup>27</sup> Inflation Report, February 2008, Page 36-37.

### 3.5.1. All-in cost of corporate debt

Figure 3.6 shows the movements in nominal yields on conventional A- rated debt of different maturities over the last five years. It shows that yields have risen over the past year and fluctuated broadly in the range 6.25% - 6.5%.

Figure 3.6: Yields on A- corporate bonds

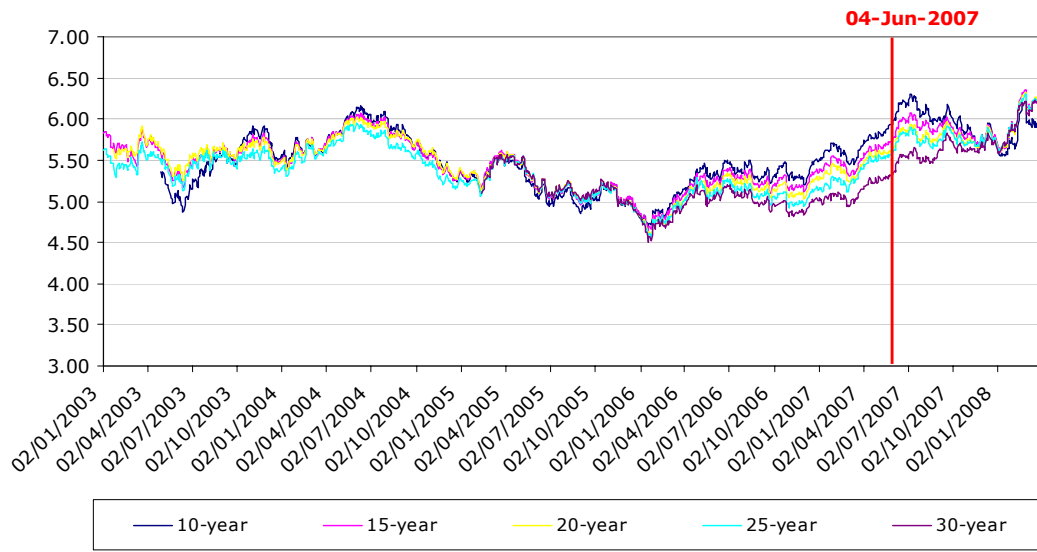


Source: Bloomberg

We have also considered the yields on corporate debt issued by utilities. Figure 3.7 shows the yields on A- rated utility debt of different maturities. The data indicates that the cost of debt issued by utilities benefits from a yield discount compared with other A- corporate debt of around 25 basis points currently. This suggests that the current cost of debt for A- debt for notional Network Rail is in the range 6.0 – 6.25% (excluding any new issue premium – see section 3.5.2)<sup>28</sup>. Figure 3.8 shows the yields on BBB+ rated debt issued by utilities – and confirms the view that regulated utilities are benefiting from yield discount (since the yields are broadly consistent with those for A- rated corporates).

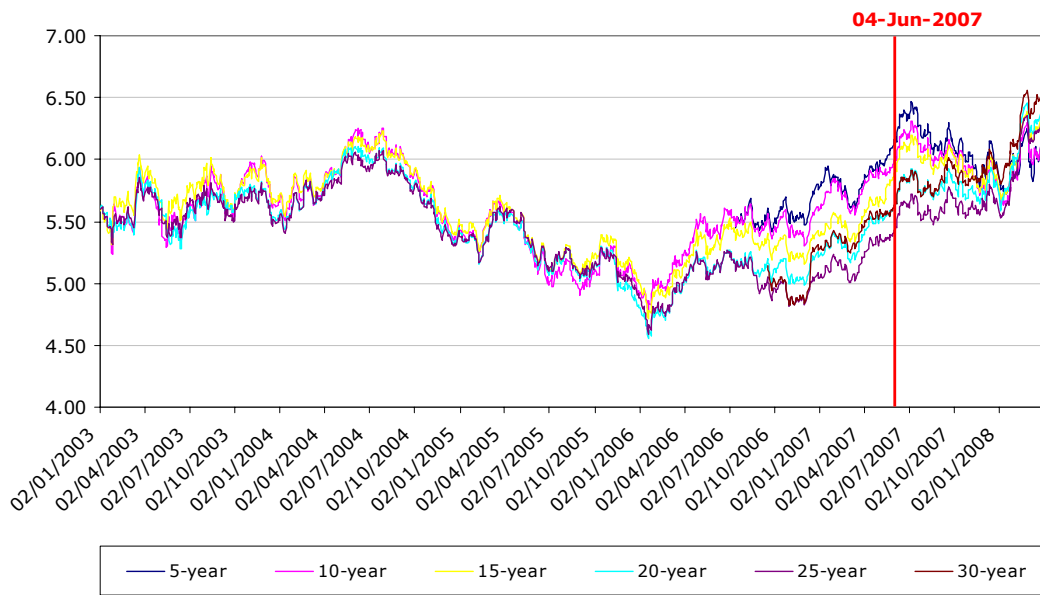
<sup>28</sup> We have grouped together bonds of different maturities to give rough averages.

Figure 3.7: Yields on A- rated bonds issued by utilities



Source: Bloomberg

Figure 3.8: Yields on BBB+ rated bonds issued by utilities



Source: Bloomberg

### **3.5.2. New issue premium**

One of the effects of the current dislocation in financial markets is the existence of a new issue premium – i.e. yields at issue for new corporate debt are at a premium to the yields on existing corporate debt trading in the secondary market. This can also be observed by looking at the Credit Default Spread (CDS).

We have considered the market evidence on the two utility issues in February (National Grid Gas) and March 2008 (Severn Trent). We have simply considered the differences between the yield at issue of the new debt, compared with existing issues of the same rating and maturity (where possible). This analysis suggests that it is reasonable to conclude that a notional network rail would face an additional 25 basis point spread at issue in current market conditions above the 6.0% - 6.25% range reported in Section 3.5.1 above. The judgement to be made is whether this new issue premium related to current market conditions is likely to be sustained over the price control period.

### **3.5.3. Conclusion on all-in cost of debt and ‘forward looking judgement’**

#### *Range*

Given the above analysis our judgement is that the current actual nominal cost of debt is in the range 6.25% - 6.5%.

In setting the appropriate cost of debt, ORR needs to make a forward looking judgement about the cost of new debt issued across CP4. Our view is that the range based on current costs is a reasonable basis. The top end of the range is conservative since it presumes the continued dislocation of the markets throughout CP4. In practice it would seem reasonable for ORR to assume that the financial markets revert to the long run mean at some point during CP4. This expectation would be consistent with following assumptions:

- The steady erosion of any new issue premium (i.e. currently assumed to be 25 basis points).
- Some reduction in nominal spreads on A- rated corporate bonds (although not to the levels seen in the market over the last five years).
- A recovery of the index-linked market for A- rated companies. The emphasis on the all-in yields on nominal corporate bonds (as opposed to index-linked) means that we assume that a notional network rail would not benefit from the current very low required cost of index-linked securities. Whilst the market may not return to the volumes and / or pricing observed recently for index-linked issuance by A- rated companies our judgement is that it is reasonable to expect that the market will re-open over the course of CP4 and that the causes of the low cost of index-linked debt will persist.

### *Deflating the nominal range*

The key issue is which expected inflation rate to use to derive the real cost of nominal debt from the nominal cost. The earlier analysis used the spread between index-linked and nominal gilts to derive a current expected inflation rate of significantly more than 3% (See Figure 3.5). Our judgement is that a reasonable range for the expected rate of inflation is between:

- 3.25% (which is consistent with BoE long dated zero coupon inflation expectations and inflation premium of around 25bp); and
- 2.75%. This value is consistent with the Bank of England's current CPI inflation target<sup>29</sup> and similar to the expected inflation rate cited by market analysts.

Using this expected inflation range to deflate the nominal cost of debt gives a real cost of new debt for notional Network Rail in CP4 in the range 3.0% - 3.75%.

*Figure 3.9: Ranges for the real cost of debt*

		Nominal Cost of debt		
		6.00%	6.25%	6.50%
Deflation factor	3.50%	2.50%	2.75%	3.00%
	3.25%	2.75%	3.00%	3.25%
	3.00%	3.00%	3.25%	3.50%
	2.75%	3.25%	3.50%	3.75%

*Source: CEPA Analysis*

### **3.6. Conclusion on cost of debt**

#### *Allowed cost of debt*

Given the analysis set out in this section:

- We remain of the view that the notional network rail might have been expected to face cost of debt in the range 2.7 – 3.0% real on existing or embedded debt.
- Analysis of the likely all-in cost of debt for Network Rail in CP4 suggests a range 3.0% - 3.75% real (depending on expected inflation rate).

In June 2007, in the absence of indexation, we indicated that the appropriate narrow range taking account of significant mean reversion was 3.0% - 3.25%. At the time we noted that

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<sup>29</sup> The Bank of England report that the historic difference between RPI and CPI is 0.75% (Inflation Report, November 2005)

depending on various market factors (e.g. mean reversion and the continued existence of a 'term discount') there was a case for ORR to extend the top end of the range to 3.5%.

**In the light of current market conditions our assessment today<sup>30</sup> is that it would be appropriate to increase the narrow range for the cost of debt to be applied to the whole RAB to 3.25% - 3.5%.** We note that, in doing so, significant 'headroom' is created because of the 'gap' between the cost of existing debt and the allowed cost of debt. Particularly in the early years before existing debt is refinanced.

### **3.7. Cross-check with Network Rail's actual cost of debt**

In order to cross-check the above range with Network Rail's current actual cost of debt (adjusted to take account of the absence of the FIM in the case of the notional network rail), we have considered evidence provided to us by Network Rail on its embedded cost of debt and its current costs of debt. In our view this analysis confirms that the top end of the range is comfortable for Network Rail - since it allows for a continued (and potential worsening) of the current dislocation of the market throughout the entirety of CP4. As already noted, we think that it is reasonable for ORR to assume that conditions in debt and capital markets will improve at some point in or before CP4.

Details of this analysis are set out in Annex B, which is commercial in confidence.

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<sup>30</sup> Assuming the continued absence of any cost of debt indexation or 'triggers'.

## **4. COST OF EQUITY**

### **4.1. Introduction**

#### **4.1.1. Approach**

CEPA's approach to assessing the cost of equity has typically been to focus on the aggregate return on equity within a broad CAPM framework.

The June 2007 report provided a summary of recent regulatory precedent and discussed historical estimates of the returns required on equity<sup>31</sup>. Particular weight was given to recent market evidence on the cost of equity for regulated companies, including transactions in the UK water and gas sectors, implied required returns on equity contained in current share prices of UK regulated companies, and returns on equity sought by private equity/infrastructure funds.

In the light of this evidence CEPA's judgement was that an appropriate point estimate for the cost of equity for Network Rail was likely to be in the range 6.5 – 7.0%. Given market conditions at the time and the nature of the relative riskiness of Network Rail (compared with other regulated utilities), we deemed it reasonable to conclude that the correct point estimate was not at the top end of the 6.5 – 7.0% range.

#### **4.1.2. Structure of section**

In this section we briefly consider the most recent evidence on what an appropriate cost of equity would be for an efficiently financed and operated network utility with comparable assets and business risks to those of Network Rail. Our discussion of the cost of equity continues to reflect the nature of the financial framework proposed by ORR, in which the cost of capital will be set with regard to the WACC of a 'notional' conventionally financed Network Rail.

In what follows we:

- Summarise recent regulatory precedent on the approach to and recent estimates of the cost of equity.
- Discuss market evidence on the cost of equity for regulated companies, including on the impact of the financial crisis on the ERP and equity betas, stock market evidence and market asset ratios.
- Provide a concluding assessment of the appropriate range for Network Rail's cost of equity, taking account of a range of factors and setting it in the context of the CAPM.

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<sup>31</sup> As agreed with ORR we did not then (or now) carry out detailed primary analysis of CAPM parameters (e.g. of betas).

## 4.2. Recent regulatory precedent

Since our June 2007 report, there have been two further regulatory decisions in respect of gas distribution (Ofgem) and Heathrow and Gatwick Airports (CAA/CC). Table 4.1 below is a revised version of the same table from the June report.

Table 4.1: Recent regulatory decisions on the cost of equity

Regulator	Decision	R <sub>f</sub>	ERP	Beta	CoE Range	CoE Used	Gearing Assumption
Ofgem (Dec 07)	GDPCR	Individual CAPM components not discussed explicitly			7.0 – 7.5%	7.25%	62.5%
CAA (Mar 08)	Heathrow	2.5	2.5 - 4.5	0.9 – 1.15		7.3%	60%
CAA (Mar 08)	Gatwick	2.5	2.5 – 4.5	1.0 – 1.3		7.9%	60%

In Section 4.3 we discuss certain aspects of these decisions in the light of recent market evidence. However, we note here that in considering the appropriate range for the cost of equity for a notional Network Rail, it is appropriate for ORR to take account of these regulatory judgements. It is in this context that the work that it commissioned on relative risk (See Annex A) is particularly relevant.

This analysis of relative risks suggests that the appropriate comparator for Rail is most likely to be in the power sector. This would indicate that, other things being equal, the recent Ofgem GDPCR determination<sup>32</sup> on the cost of equity is likely to be the most appropriate comparator for the notional network rail. **Once the Ofgem cost of equity is re-levered to 60% gearing (to be comparable with the CAA decision) the GDPCR cost of equity is 6.95%**

## 4.3. Recent market evidence

We discuss here how equity markets have been affected by the current financial crisis. It is important to note this is not intended as a comprehensive survey. Rather it is a brief overview to inform our judgements.

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<sup>32</sup> Adjusted for the notional gearing assumption. For a gearing of 60%, the levered cost of equity comparable with 7.25% (at 62.5%) gearing is 6.95%



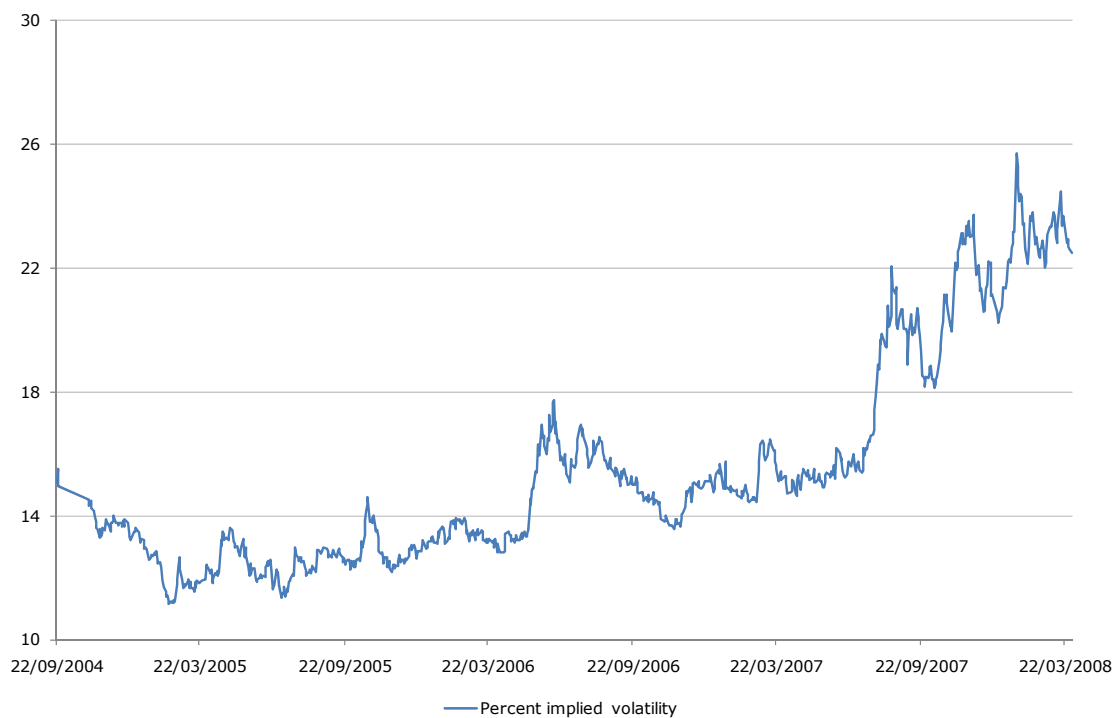
### 4.3.1. Impact of financial crisis on ERP

#### *Implied volatility*

A number of commentators, including Oxera (providing evidence for BAA as part of CAA's Q5 price review) point to an increase in the implied volatility in equity markets.

Figure 4.1 shows that the implied volatility on (18 month) FTSE 100 index put options. Other things being equal an increase in volatility would imply that, in general, investors are exposed to greater risks and therefore that there has been an increase in equity risk premia (ERP).

*Figure 4.1: Implied volatility in UK equity markets*



*Source: Bloomberg*

#### *DGM Analysis*

The dividend growth model (DGM) is based on the premise that the value of any share is the NPV of the future stream of dividends per share. DGM states that the nominal cost of equity equals the dividend yield per share plus the nominal expected growth rate of dividends per share. For listed companies the dividend yield can be observed. If the sustainable dividend growth rate can be estimated then the cost of equity can be determined. We note that there is considerable uncertainty about this analysis, but that current estimates imply that the ERP may be relatively high.

We have seen evidence from one City institution suggesting that the headline estimate of the ERP may be as high as 7% currently. However, taking account of the average over a reasonable time series suggests an estimate of 4.64%. The same institution also argues that this number is consistent with market analysts' estimates of the equity risk premium on infrastructure assets.

*Longer-term studies on ERP (BAA evidence)*

In addition to arguments about equity market volatility, BAA (in its evidence to the CAA) referred to two longer-term studies which argue for a higher top-end of the range for the ERP:

- Myers (2008)<sup>34</sup> argues for an ERP range of 4-6% and points to an increased Bank of England forecast to almost 5%.
- Schaefer (2007)<sup>35</sup> estimated a much wider ERP range of 2.5 – 6.5% with an even higher maximum.

Whilst the CAA acknowledged the appearance, since the Competition Commission's (CC) report<sup>36</sup>, of some aspects of 'contagion' from the credit crisis to equity markets, it also noted the conflicting views offered by BAA's advisers. In particular:

- Oxera's view that the CC's range should be widened to reflect the positive relationship between ERP and volatility of the market portfolio; and
- Schaefer's view that the analysis of historic returns suggests no adjustments for market turbulence while, at the same time, supporting the historical record of equity returns as the only source of reliable information on the ERP.

The CAA concluded that there was no compelling case to depart from the 2.5 – 4.5% ERP range, which it based on a presumption that long run historical evidence is more likely to provide a robust basis for taking regulatory decisions over the long term than an assessment based on short term market fluctuations. It added that this was consistent with the long-term view of the CC, both at this and previous reviews.

*CEPA's assessment*

Whilst recognising that estimation of the ERP is difficult – not least because it cannot be observed directly – we remain of the view that an appropriate, conservative range for the

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<sup>34</sup> Myers, S.C. (2008), 'CAA Price Control Proposals Heathrow and Gatwick Airports', January.

<sup>35</sup> Schaefer, S. (2007), 'The Cost of Capital for Heathrow and Gatwick', December.

<sup>36</sup> Competition Commission (2007), 'BAA Ltd – A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd)', September.

ERP in the long term is 3% - 5%<sup>37</sup>. In our June report, our estimate for the cost of equity was consistent with the top end of the ERP range, i.e. 4-5%.

We have consistently advised that in setting the cost of equity it is appropriate to 'aim off' from the lower-end of the cost of equity ranges derived from CAPM whilst having reference to wider market evidence (particularly on the all-in required return on equity). In recent years this has also meant aiming off from analysts' estimates which in the bull market have been as low as 2%.

Our range for the cost of equity of 6.5% - 7.0% is consistent with conservative estimates of the ERP, which already allow sufficient headroom for short-term fluctuations in market conditions.

#### **4.3.2. Impact of financial crisis on equity betas – relative risk**

##### *Background and approach*

In the June 2007 report, we noted that Ofwat and Ofgem's decisions tend to discount the evidence of low and steadily declining equity betas because they gave implausibly low estimates of the cost of equity. We also noted that both regulators chose a value of 1 to generate costs of equity that were consistent with other evidence on the actual cost of equity<sup>38</sup>.

Our approach, which tends to emphasise the all-in cost of equity, is broadly consistent with this approach. In particular we note that beta evidence is most appropriate in supporting judgements about the relative riskiness of regulated utilities in different sectors. Like most regulators, we have tended to make the same simplifying, conservative assumption in our CAPM analysis that the equity beta is 1 even though market evidence clearly indicates that equity investors view regulated utilities as lower risk than the market portfolio.

We note that the CAA (and CC) have taken an approach that places greater emphasis on the CAPM approach – including estimating values for beta (based on the assumption of a broadly constant asset beta; and the possibility of a non-zero debt beta). Their analysis (assuming a constant 60% gearing assumption and 0.10 point estimate of the debt beta) resulted in range for the equity beta of 0.9 – 1.15 for Heathrow's re-levered equity beta (or 1.0 – 1.3 for Gatwick's). We would note that most observers would regard an equity beta of greater than 1.0 as implausible.

##### *Recent evidence*

In the light of recent market volatility Oxera have argued (in its evidence to CAA on behalf of BAA) that forward-looking estimates of equity betas (using volatility indices) suggested a

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<sup>37</sup> This is consistent with the work by Smithers in 2003.

<sup>38</sup> In the more recent Ofgem determination, there was even less emphasis on the components of CAPM.

23% increase during 2007 over the previous year.<sup>39</sup> They argue that, if BAA stock were traded, it might have experienced similar mark-downs, reflecting an increase in the non-diversifiable risk to which BAA investors were exposed.

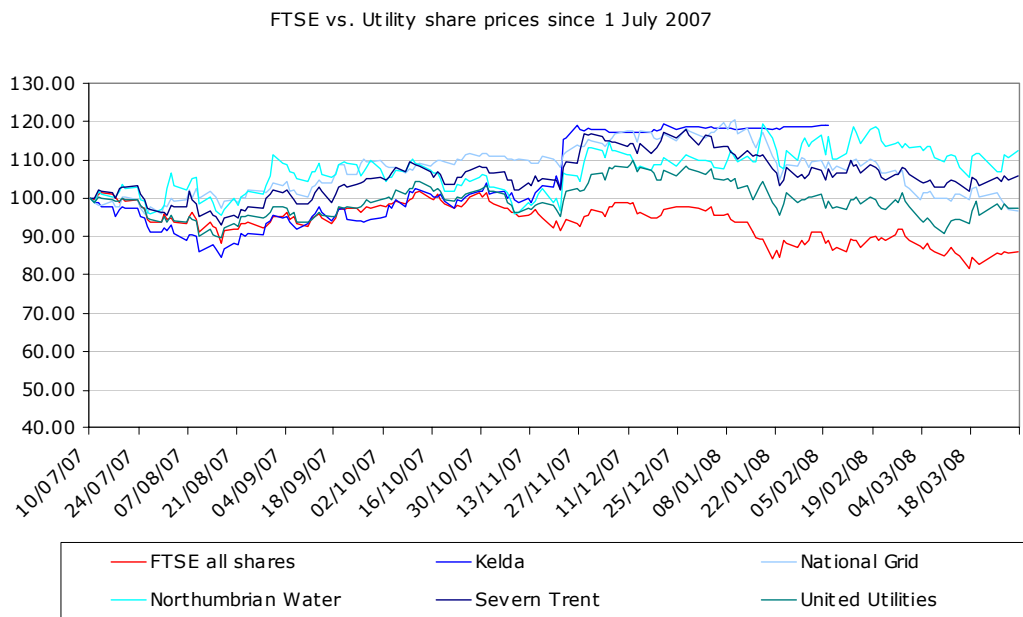
The CAA have, in our view, rightly discounted these arguments on the grounds that market volatility would not have any impact on its assessment of the long-term underlying risk of the assets of the individual airports.

#### *Share price evidence*

Contrary to the arguments presented by Oxera, there is evidence to suggest that equity prices for listed utilities have moved significantly less than the market as a whole. In other words, that utilities may be benefiting from a ‘flight to quality’ by equity investors (e.g. flying from finance sector to utilities). Figure 4.1 below compares an index of the share price of a number of ‘clean’ regulated businesses<sup>40</sup> compared with the FTSE All Share Index.

This evidence adds weights to the view that the assumption that an equity beta of regulated utilities of 1 is conservative - since these companies do appear to be less volatile than the equity market as a whole.

*Figure 4.1: Movement of equity prices for utilities relative to the market*



<sup>39</sup> Oxera (2008), ‘Impact of the financial crisis on BAA’s cost of capital’, January. Oxera’s sample of BAA’s peers included Flughafen Wien, Macquarie Airports, National Grid, United Utilities and Southern & Scottish Energy.

<sup>40</sup> Where the regulated business accounts for the large majority of the enterprise value. The movement in the Kelda’s share price reflects the takeover by Saltaire Water (Directed by a CitiGroup lead consortium) and subsequent de-listing.

### 4.3.3. Market asset ratios

We have not carried out any further analysis of market asset ratios since June 2007. However, we understand that the available evidence from analysts and from share prices (see Figure 4.1) suggest that regulated assets continue to trade at a significant premium to their RAB. This is despite the fact that the cost of debt has risen significantly in the short term whilst market/RAB premia are lower than during the boom (prior to 2007), they remain (based on anecdotal evidence) above 10%. This suggests that the actual cost of equity is not higher than the allowed cost of equity for those companies.

### 4.4. Conclusions

Given the above analysis, our judgement is that there is no strong case to change the range identified in our June 2007 report for the cost of equity, i.e. 6.5 – 7.0%. In drawing this conclusion we note in particular that our estimates in June 2007 already aimed off substantially from the very low rates implied by CAPM analysis and reflecting the particular point in the cycle.

However, we no longer regard it as appropriate to argue that the point estimate should be much below the top end of the range – since we regard it as reasonable for ORR to take account of recent regulatory precedents.

As in June 2007, for completeness, we illustrate what plausible estimates of the CAPM parameters might suggest for the cost of equity. Table 4.2 reproduces this range – and includes an illustration of the parameters that would be consistent with a 7% cost of equity which is the top of our range (and is broadly consistent with the Ofgem decision at a 60% gearing). In particular, the 7% cost of equity value is consistent with a real risk free rate of 2.0%, an ERP of 5% and an equity beta of 1.

Table 4.2: CAPM calculations

	Low	Mid	Upper	Alternative (Upper)
RfR	1.70%	2.025%	2.35%	2.0%
ERP	4.0%	4.25%	4.5%	5.0%
$\beta$	1	1	1	1
CoE	5.70%	6.28%	6.85%	7%

## **ANNEX A: RELATIVE RISK**

### **1. Introduction**

The analysis of relative risk, specifically the riskiness of Network Rail (NR) relative to companies in other regulated sectors, is relevant to judgements about the appropriate assumptions for:

- NR's notional gearing, defined in the regulatory sphere as the gearing ratio that would be consistent with an efficiently managed company achieving a solid investment grade credit rating.
- NR's equity beta which measures the level of risk for NR equity shareholders relative to overall financial market risk.

For the purposes of our June 2007 paper<sup>41</sup>, CEPA's overall judgement (based solely on general knowledge of other sectors and regulatory regimes) was that rail might be towards the lower end of the riskiness range. This was taken into account in assuming a reasonable point estimate of 62.5% for NR's notional gearing and a point estimate for the overall cost of equity that lies in the range 6.5% to 7.0% range.<sup>42</sup>

Primary analysis of the relative risk of different regulated sectors was and remains beyond the scope of CEPA's work on NR's WACC. However, since the June 2007 paper, there have been a number of developments and some new analysis. The remainder of this paper provides a summary of First Economics' February 2008 report for ORR on the riskiness of Network Rail relative to other regulated industries.

The annex is structured to follow the analysis in the First Economics paper. Section 2 summarises recent developments, including Ofgem's price control determination for gas distribution, Water UK's investor surveys and a recent report by Moody's rating agency. Section 3 summarises First Economics' analysis of the magnitude of NR's RAB-to-expenditure ratio and, consequently, the company's ability to absorb demand and cost shocks. Section 4 summarises First Economics' analysis business risks facing NR and whether there is evidence to suggest that the company's exposure to unforeseen shocks is greater than elsewhere. Section 5 concludes with some observations on First Economics' conclusions.

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<sup>41</sup> CEPA, "Risk Adjusted Cost of Capital for Network Rail", Report for the Office of Rail Regulation, June 2007.

<sup>42</sup> The conclusion on the cost of equity was based on Smithers' (2004 and 2006) analysis of long run average returns on equity for the market as a whole and recent evidence of the required rates of return by equity investors in the market. Recent regulatory evidence, evidence relating to market-to-asset ratios and indicative ranges suggested by the CAPM framework were also used.

## 2. Recent developments

### *Ofgem GDPCR*

In last year's gas distribution price control review, Ofgem deliberately positioned the cost of equity with reference to the 2006 electricity and gas transmission review. In comparing the risk profiles of gas distribution and transmission businesses, the regulator concluded that gas distributors have higher annual expenditure-to-RAB ratios (see separate section below), higher cost risk in their capex programmes and face 'higher-powered' incentives. However, because the differentials represented only a small proportion of total risk taken and because of limited statistical significance in the differences, Ofgem concluded that gas distributors were 'no less risky' than the transmission networks. It allowed a 7.25% cost of equity (alongside a gearing assumption of 62.5%) versus a cost of equity of 7.0% (and a gearing of 60%) for transmission.<sup>43</sup>

Ofgem did not carry out detailed analysis of the relative risk profile for airports compared with other sectors, but did take into account the Competition Commission's (CC) summer 2007 inquiry into the Heathrow and Gatwick price controls. The CC assumed a 7.33% cost of equity for Heathrow Airport (based on a gearing of 60%) and Ofgem recognised that gas distribution networks face lower business risks than regulated airports. In addition, the CC remarked that it was 'logical' that Heathrow and Gatwick airports should have higher betas than other utility businesses.

### *Water UK Survey*

A recent survey by Water UK (the trade association for the water and sewerage companies), asked 40 representatives of the investor community to rank different types of company in order of risk. This revealed a ranking that is consistent with the work of Ofgem and the CC last year. Energy transmission was perceived as least risky due to the essential nature of the infrastructure and revenue cap regulation. Energy distribution and water and sewerage were perceived as more risky due to a sense of greater volatility in revenues. Respondents ranked airports as more risky, generally highlighting their exposure to demand risk.

### *Moody's report*

In a report published in November 2007, Moody's perceived risk to be lowest in water, electricity distribution and electricity and gas transmission and stated that it applies broadly the same credit metrics when rating debt issued by companies in these industries. The rating agency applies slightly tighter credit metrics for gas distribution companies due to a modestly higher business risk (at least in the early stages of the sector's evolution), largely arising from their need to build new IT systems from scratch when they separated from National Grid.

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<sup>43</sup> The difference is negligible once allowance is made for the effect that increased gearing has on the equity beta.

Telecoms and aviation were identified as the two regulated sectors in which permanently higher risk exists.

None of these reports or surveys provided any insights into the rail industry's risk profile.

### **3. RAB-to-expenditure ratios**

First Economics also discuss the role of the size of the RAB relative to total expenditure as a measure of risk in regulated companies.

Companies that face broadly similar 'component' risk can see different volatility in profits. This is because a company's profits become much less sensitive to cost and demand risks as the proportional share of profit in total allowed revenues (the relative magnitude of profits) grows. In the current context, differences in the relative magnitude of profits arise from differences in the size of RABs.

The higher a company's RAB relative to current expenditure, the greater the relative magnitude of profit in allowed revenues and the less likely it is that a demand or cost shock would raise difficulties in serving debts or force a requirement to cut dividends to shareholders. Note that the notion of a cost shock incorporates the potential for interest rate fluctuations. For example, an increase in interest rates after the regulator has determined allowed rates of return, has detrimental effect on the company's cash flows in the same way as, for example, an unexpected increase in opex.

First Economics note that in 2000 Railtrack's relatively small RAB was deemed to result in a thin layer of profit relative to ongoing levels of opex and capex.<sup>44</sup> This was, in turn, deemed to result in investors bearing relatively higher levels of risk – and resulting in higher allowed rates of return than those being offered in other sectors. In 2003, ORR found that NR's RAB-to-expenditure ratio had increased to a point where it was not obviously different to that of companies in the energy and water sectors. This was due to the trebling in size of the company's RAB. This gave ORR some comfort in equalising NR's rate of return with that in the other sectors.

NR's average RAB-to-expenditure ratio over the 5 years of CP4 is projected to be close to 7<sup>45</sup>, which is significantly lower than for National Grid's gas transmission business (whose RAB stands well in excess of 10 times ongoing opex and capex), slightly lower than that for the gas distribution companies, but greater than the ratios for electricity distribution, water and sewerage, Heathrow airport and electricity transmission. However, the scale of NR's CP4 investment programme combined with ORR's expectations that NR will make significant efficiency improvements results in a ratio of 8.74 by 2013/14. This suggests that the 2003 conclusion in relation to Network Rail (in this regard) remain appropriate.

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<sup>44</sup> This was also the case for NATS and Royal Mail.

<sup>45</sup> First Economics' estimate of NR's ratio includes network enhancement expenditure. These were not included in the previous analyses. However, NR's enhancement programme is to increase substantially in CP4 and, so, to ignore it would be to overlook a major source of potential cost overrun and loss of profit.



#### 4. Analysis of business risks

The last section of First Economics' report established how much investors in NR should worry about business risk compared to investors in other sectors. This section considers whether there is any evidence that the company's exposure to unforeseen shocks is greater than elsewhere.

NR's risk profile is influenced by a number of distinct variables, some of which point in the direction of higher risk and others the opposite way. Table 1 below presents a summary of the analysis by First Economics. It distinguishes between underlying variability in the different components of the total cash flows that ORR is modelling as part of its periodic review and the regulatory treatment of such variability (namely efforts by the regulator to match variations in costs with variations in income).

*Table 1: Network Rail's business risks*

Type of risk	Underlying	Regulatory treatment
Demand	Unimportant.	Hybrid revenue/price cap leads to a good match with NR's cost structure (operational gearing).
Operating costs	Energy price volatility; Potentially offset by low activity-level risk for signalmen. In other words, the number of people required and what they will be doing can be predicted with reasonable certainty.	Largely neutral; Pass through for traction electricity purchase costs.
Maintenance/ Renewals	Common exposure to macro risk. Differences likely to arise from non-systematic project-specific (diversifiable even within the company for equity holders); But may be skewed towards overspends so potentially greater exposure to downside risk.	Maintenance under- and overspend borne by NR. Renewals under- and efficient overspend included in the RAB after 5 years on a rolling basis. Implies efficiency testing and high-powered incentives.
Enhancement	Non-systematic project-specific risks might, ceteris paribus, lead to lower credit ratings and a higher cost of debt. Systematic differences in capex risk might lead to an effect on beta.	NR is compensated via the inclusion of P80 (rather than P50) cost estimates in the RAB. Allowance of contingencies for unforeseeable risk. This would imply no effect on the cost of capital. Note ORR intention to establish a bespoke risk allocation for the Thameslink project.

Type of risk	Underlying	Regulatory treatment
Reopeners	Not applicable.	Price control reopeners if NR is expected to lose its investment grade credit rating (although we understand that this is under review). Already provision for changes in material circumstances.
Service quality	Not applicable.	Uncapped Schedule 8 performance regime; Partial prospective cushion provided by capped upside-only volume term.
Regulatory/ political	Regulators are largely seen as reducing risk and there is no reason to distinguish rail from other sectors. Political risks appears to be a balance between NR's reliance on DfT support and general closeness to Government (upside) and Government's behaviour in the run-up to Railtrack's collapse and, more recently, Metronet.	Not applicable.

Table 2 below provides an analysis of relative business risk by identifying, for each of the cash flow components, comparators that are likely to be perceived as equally risky and comparators against which NR is likely to be perceived as either more or less risky.

*Table 2: Relative business risk analysis*

Type of risk	Closest comparator	More risky than...	Less risky than...
Demand	Electricity transmission Gas transmission Gas distribution	None	Airports Water & sewerage Electricity distribution
Opex	Electricity transmission and distribution Gas transmission and distribution	None	Airports * Water & sewerage **
Maintenance/ renewals	Water & sewerage	Airports Energy distribution Energy transmission	None
Enhancement	Water & sewerage	Airports Energy distribution Energy transmission	None
Reopeners	Water & sewerage †	None	Airports Energy distribution Energy transmission

Type of risk	Closest comparator	More risky than...	Less risky than...
Service quality	Energy distribution	Water & sewerage Energy transmission	Airports ‡
Regulatory/ political.	If any difference, small and gradually diminishing.		

\* 75:25 sharing rule for security cost variability.

\*\* Potential cost variability associated with water generation.

‡ Provision for substantial effects.

‡ Up to 7% revenue loss in the event of failure to meet standards. Only 3% potential bonus.

Based on this analysis, First Economics concluded that:

- investors are unlikely to perceive NR to be as risky as airports because the greater downside risk in its capex programme is likely to be offset by a combination of lower demand and opex risk, lower-powered service quality incentives and more explicit provisions for reopeners; and
- it would be difficult to mount a convincing argument that NR's risk profile is materially different from other regulated companies because there is potential for perceptions of both less and greater riskiness.

This is contrary to NR's belief that rail is perceived to be riskier than most UK regulated industries (like water, electricity and gas) and on a par with airports in terms of capex and O&M.

## 5. Conclusion

We have not identified any reason that would lead us to challenge First Economics' conclusions and to deviate from First Economics' recommendations to ORR in the relation to CP4. In particular that:

- ORR treats the CC's conclusions on the cost of equity for Heathrow airport (7.33%) as an absolute ceiling on the cost of equity for NR;
- that companies in the energy distribution and water and sewerage sectors provide better comparators for a shareholder-owned NR, in which case it would not be unreasonable to use share price data from the energy and water sectors or Ofgem/Ofwat determinations as benchmarks; and
- ORR should encourage credit rating agencies to compare the risk profiles of companies in the energy, rail and water sectors, while pushing back on any perception that NR is a more risky borrower.

However, in coming to our judgements we also note:

- NR's point that the 60% notional gearing assumption used by the CC/CAA in respect of BAA related to an assumed credit rating of BBB+. (As far as we are aware, Ofgem did not make a precise link between a 60% notional gearing assumption and a particular credit rating. Rather they note that it is consistent with a credit rating which is comfortably within investment grade.) This is relevant since, in current market conditions an notional network rail may struggle to finance itself with a BBB+ credit rating in CP4 – given the quantum of issuance required.
- Ofgem's explanation that of its use of the slightly higher 62.5% notional gearing assumption for gas distribution companies. This related to the latter's lower financing requirements (as a result of less significant capex). We note that NR's expected level of capital investment for CP4 will be at least on a par with BAA's and significantly higher than the transmission companies'.
- NR's comment that – regardless of the actual risk of the business – the failure of Railtrack and recently Metronet, mean that investors tend to regard rail businesses differently from other regulated utilities<sup>46</sup>.

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<sup>46</sup> We have not sort to verify this point. But we note that it is not unreasonable – although it is of course not clear whether such a view relates to the precedent of poor management in the sector as opposed to underlying riskiness.

## ANNEX B: CROSS CHECK ON NR'S ACTUAL COST OF DEBT

An allowed cost of debt at the top end of the range (3.5%) is in our view comfortable. It is consistent with:

- 3.00% cost of debt on existing debt / embedded debt. Network Rail has indicated that as at 31<sup>st</sup> March 2008 the nominal cost of its embedded debt was 5.02%. We believe that this would have been equivalent to 5.5% - 5.75% for an A- rated company over the last five years. In real terms this is 2.7% - 3.0% (assuming an RPI deflation rate of 2.75%) and 2.5- 2.75% (assuming an RPI deflation rate of 3.00%)
- 3.75% cost of new debt issued in 2008/09 and throughout CP4. This assumes 6.5% nominal cost of debt and 2.75% inflation.

Figure 3.10 shows the weighted average cost of debt for a notional network rail assuming:

- Different combinations of cost of debt on new debt (raised from March 31<sup>st</sup> 2008 onwards) and existing debt (raised before March 31<sup>st</sup> 2008).
- The stock of actual debt – based on Network Rail's current expected financing requirements. This shows that the mix of 'existing or embedded debt' falls from £15.4bn to £9.4bn over the period; whilst 'new debt' increases from £7bn to £25.2bn by the end of the period.

Note that if the actual cost of existing debt is taken to be 2.75% (which is closer to our understanding on equivalent actual cost faced by a notional network rail) and the cost of new debt over the entire of CP4 averages 3.5%, the notional network rail's cost of debt is just less than 3.25%.

Figure 3.10: Weighted average cost of debt check

(As at March 31st 2008)		2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
<b>Existing (£bn)</b>		15.4	14.0	11.8	10.8	10.5	9.4
% of total debt		69%	56%	42%	35%	32%	27%
<b>New debt (£bn)</b>		7.0	11.1	16.3	20.0	22.3	25.2
% of total debt		31%	44%	58%	65%	68%	73%

		CoD on new debt			
		3.25%	3.50%	3.75%	4.00%
CoD existing debt	2.75%	3.06%	3.21%	3.37%	3.52%
	3.00%	3.15%	3.31%	3.46%	3.62%
	3.25%	3.25%	3.40%	3.56%	3.71%

## ANNEX C: TERMS OF REFERENCE (EXTRACT)

### Update of June 2007 advice on estimating Network Rail's risk-adjusted cost of capital

ORR, March 2008

#### Background

1. The 2008 Periodic Review (PR2008) will establish Network Rail's required outputs, allowed revenues and access charges for the control period 2009-14 (CP4). A key part of determining allowed revenues will be establishing the appropriate allowed rate of return.
2. We have said<sup>47</sup> that we will provide Network Rail with an allowed rate of return that reflects its risk-adjusted cost of capital.
3. In order to ensure that Network Rail faces a hard budget constraint and is not able to make easy windfall gains by easily beating the regulatory financial assumptions, we intend to take the following approach to determining the cost of debt within the overall cost of capital. We will take into consideration the type of financing strategy that an efficiently financed regulated utility could be expected to have in place based on historic, present and forward looking market conditions.
4. In particular, we said in February 2007 that we will consider evidence on the extent to which other regulated utilities had taken advantage of the bond market conditions that prevailed at the time.
5. By setting out this approach to establishing the allowed cost of capital, our intention was to send a strong message to Network Rail that we expect it to finance itself efficiently and consider carefully whether it is appropriate to alter its financing strategy given current market conditions.

#### June 2007 study

6. In June 2007, CEPA provided us with an initial study on the appropriate risk-adjusted cost of capital for Network Rail in CP4<sup>48</sup>. This set out a likely range for the allowed return of 4.1-4.7% (real, vanilla).
7. Since that study was completed there have been significant changes in financial market conditions, particularly in terms of credit spreads and the availability of credit to low investment grade entities.

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<sup>47</sup> ORR, February 2007, *Periodic Review 2008: Advice to Ministers and framework for setting access charges*.

<sup>48</sup> Available at <http://www.rail-reg.gov.uk/upload/pdf/pr08-cepa-risk-jun07.pdf>

8. We have also developed our thinking of the appropriate financial framework for Network Rail in CP4, and many of the detailed policy issues have now been pinned down<sup>49</sup>.

9. Network Rail has also developed further its financing strategy for CP4 and the remainder of CP3. We expect to receive its detailed strategy on 3 April 2008. We will provide a copy of it to the successful consultant.

**Required consultancy services**

10. We would like to appoint consultants to update CEPA's June 2007 study on the appropriate risk-adjusted cost of capital for Network Rail.

11. In particular, the consultants will need to take into consideration:

- (a) Recent changes in financial markets;
- (b) Network Rail's detailed financing strategy; and
- (c) Our further decisions on the appropriate financial framework for Network Rail in CP4.

12. We do not envisage that the underlying methodology set out in CEPA's June paper will need to be amended.

13. The study will need to set out:

- (a) An analysis of how the issues set out in paragraph 11 above affect the risk-adjusted cost of capital in CP4;
- (b) An updated range for Network Rail's risk-adjusted cost of capital, in real vanilla terms;
- (c) Updated assessments of the level of gearing, cost of debt and cost of equity that underpin the cost of capital range;

14. Preliminary work, commissioned by ourselves and DfT, on the financial structures of the ten largest regulated UK utilities (excluding Network Rail) and on potential efficient financing strategies based on current market conditions was provided to CEPA to inform their June 2007 study. We have since commissioned two further pieces of work:

- (a) A market sounding on the extent to which Network Rail might achieve lower financing costs by structuring its unsupported debt; and
- (b) A study on the risk facing Network Rail relative to that for other regulated network industries in the UK.

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<sup>49</sup> Our decisions to date on the CP4 financial framework are set out in chapter 4 of our February 2008 *Update on the Framework for Setting Outputs and Access Charges and Strategic Business Plan Assessment*. This is available at <http://www.rail-reg.gov.uk/upload/pdf/351.pdf>.

15. We will make all of this analysis available to the successful consultant.



## ANNEX D: DATA SOURCES FOR GEARING / CREDIT RATING ANALYSIS

In this Annex we set out the basis and source for the data points in Figure D1 below.

Figure D1

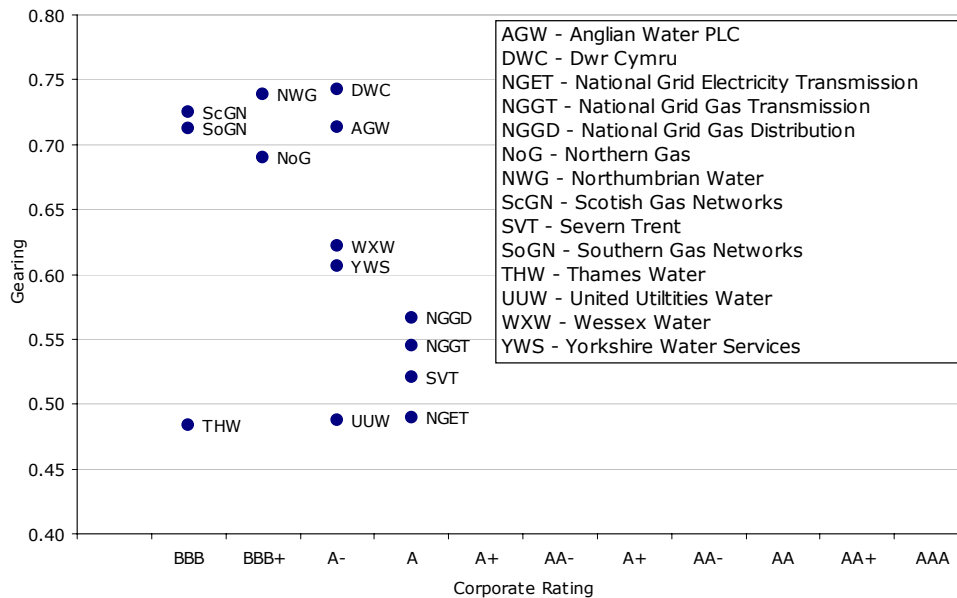


Table D1 indicates whether the gearing and / rating are for the regulated company (OpCo) or the Parent Company (HoldCo). It also shows that for some companies where it is not possible to get an issuer rating we have used the rating of the lowest-rated corporate issuance.

Table D1: Entities compared for the notional gearing

Gearing Corporate rating	1. Regulated company	2. Parent company
1. Regulated company	DWC, NGET, NGGT, NGGD, NoG, ScGN, SoGN, THW, U UW, WXW, YWS	n/a
2. Parent company	n/a	SVT
3. Debt rating <sup>^</sup> for (1)	NWG,	n/a
4. Debt rating for (2)	n/a	AGW

<sup>^</sup> rating on the lowest rated corporate debt issued

# parent company used insofar as the regulated company accounts for a significant

SoGN and ScGN are both part of Scotia, who do not issue debt themselves but only through the subsidiaries.

In terms of sources:

- Bloomberg is the source for both gearing and corporate rating for AWG, SVT and THW.
- Bloomberg is the source for the corporate rating, with the regulated accounts the source for the gearing, for NGET, NGGT, NGGD, NWG, NoG, ScGN, SoGN, UUW, WXW and YWS.
- The regulated accounts are the source for both corporate rating and gearing for DWC.