Europe Economics Report for the Commission for Energy Regulation (CER)

Cost of Capital for Transmission Asset Owner (TAO), Transmission System Operator (TSO), Distribution System Operator (DSO)

– Appendices

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APPENDIX 1: SMALL COMPANY PREMIUM

Small Company Premium

A1.1 We now explore the issue of whether there should be a higher cost of capital for Eirgrid than for ESB on the grounds of Eirgrid's smaller size. Such a premium is known as "a small company premium". Proponents of a small company premium have argued for a premium on both the cost of equity and the cost of debt.

A1.2 Clearly, the inclusion of a small company premium represents a departure from the CAPM, in which expected returns depend only on the systematic risk exposure of investors and not on the size of the company raising finance.

A1.3 CAPM has been subject to many critiques, and many alleged "anomalies" have been identified. One such is the "small firm effect". This was first documented by Rolf Banz in 1981.[1]

A1.4 Since 1926, the (arithmetic) average annual difference between returns on the shares with the smallest market capitalisations and those with the largest such capitalisations has been 3.54 per cent (the geometric average difference was 2.6 per cent). The "small-to-big" factor appeared in the Fama-French three-factor model (along with the Fama-French version of beta and a book-value-to-market-value factor). The popularity of the Fama-French model and the apparent significance of this small company premium led to a wide-spread sense that this was an important anomaly in respect of CAPM that might necessitate some adjustment in a number of settings – perhaps even in regulatory determinations.

A1.5 For the period since 1981, however, there appears to be no small companies premium — it seems to have disappeared as soon as it was discovered (for the period 1981-2007, the geometric average annual small company effect was 0.08 per cent); indeed, during the 1990s there was a "small companies discount" (geometric average: -2.1 per cent).[2] The current state of play is that there is very widespread doubt as to whether such an effect exists at all.[3]

Explanations of a Small Companies Effect

A1.6 If there is indeed a small companies effect, there are several candidate explanations, including:

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1 Banz, R. (1981), "The Relationship between Return and Market Values of Common Stock", *Journal of Financial Economics*, **9**, pp3-18.

2 Source: Europe Economics calculations on Kenneth French's dataset http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

3 See for example Fama and French, 2004, "The Value Premium and the CAPM", Chicago Graduate Business School.

(a) that this is a deviation from the CAPM — that small firms are in some way more risky than large firms in a way not captured within the CAPM;

(b) that the effect is driven by a greater survivorship bias for small firms;

(c) that this is an instance of collective data mining — that, having noticed a purely statistical anomaly in one dataset, researchers keen to achieve publication then sought to find similar relationships in other datasets;

(d) that this was a temporary deviation from the Efficient Markets Hypothesis, in that there was a tendency for small firms to be under-priced, but that once the deviation was pointed out through publication, it corrected itself as expected, as agents tried to make use of it. This would then be an instance of the principle that no known deviation from the efficient markets hypothesis could be used to make money. (The clear consequence would be that no such anomaly should ever be used in regulatory determination.)

(e) that this was a permanent deviation from the assumptions of the Efficient Markets Hypothesis in that there are non-trivial transactions costs in financial markets — e.g. semi-fixed costs of flotation and bond issuance — that fall more heavily upon small firms than large;

(f) that investors require a premium for holding shares in companies whose shares have a low trading frequency, to compensate them for the fact that they can less easily sell the shares when they wish to do so. In other words, there may be a liquidity premium for equity in small companies.

If it existed, why has it disappeared?

A1.7 If one of these explanations were accepted, there would then be a number of candidate explanations for why it has now disappeared:

(a) Small companies are indeed inherently more risky in some way not reflected in CAPM — so necessitating the small company premium — but the 1990s onwards has been one of those periods of relatively worse returns for smaller companies. This is supported by empirical evidence in the UK where the dividend performance of small companies was superior to that of larger companies until the end of 1980s and inferior thereafter.

(b) Small companies are subject to greater governance risks. The idea here is that governance differences between small and large companies may have become more marked during the 1990s than in previous decades. This meant that small company returns suffered in this period.

(c) The expansion in the number of available assets has created a number of alternative “competitors” (such as derivatives) to small companies as a means to achieve portfolio diversification.

(d) The significant adjustments in large listed firms during 2001 and 2002 (e.g. Enron) make updating the increased risk of larger firms necessary. Hence the small company premium would be re-confirmed by an analysis based on a larger horizon.

(e) Considering that small companies have limited access to bond markets, direct comparative analysis with larger quoted firms may be flawed.

(f) A small number of out-performers significantly biased the small company premium. Separating in the sample the rapidly rising firm from the other more static small firms might confirm CAPM predictions.

Our view

A1.8 Few, if any, of these explanations seems particularly compelling. As matters stand, there is scant evidence that there is any small companies premium to explain. The most theoretically defensible position is that relating to semi-fixed flotation and bond-issuance costs, and the deviation from the efficient markets hypothesis that this implies. But this raises the question as to how small companies have to be for such semi-fixed costs to become significant. Companies of tens of millions of pounds in value are not obviously small for the purposes of flotation and bonds issuance costs.

A1.9 Otherwise, to defend the use of small companies effects for firms on this scale, one must appeal to results such as that of Fama and French, or to the use of a liquidity premium.[4] However, the principal approach taken in this review is CAPM; and in any event, as noted, the Fama-French small companies' effect is now nugatory and perhaps even negative.

A1.10 We believe that adding a liquidity premium to a cost of equity estimated using CAPM introduces double-counting, since if a liquidity variable had been included in the original beta estimation then the beta estimate (and hence the base cost of equity) would have been lower.

A1.11 To summarise, our view is that the use of a small companies premium is incompatible with the broad thrust of modern corporate finance theory (going much broader than simply the CAPM model), and doubly so in the context of a review based on CAPM (in which issues such as liquidity premia do not arise), and that it does not have any good statistical support either. Thus we would strongly recommend against the use of a small companies premium.

Cost of debt and default risk

A1.12 It has been suggested that, in some circumstances, small companies may have a higher cost of debt than larger companies carrying out similar activities due to higher specific risks (due to less scope for diversification within the company).

A1.13 In corporate finance theory, only systematic risks should affect the cost of capital, and hence arguments based on higher specific risks should not be given any weight.

A1.14 This remains true even if the interest rate charged to small companies is higher than that charged to large companies due to these differences in specific risks. In considering this question it is important to distinguish between *promised* returns (e.g. the observed yield on bonds or the rate of interest charged by banks) and *expected* returns to providers of debt (once the possibility of default has been taken into account). If the risk of bankruptcy is higher for smaller firms due to higher specific risks, then *expected* returns after adjusting for default risk may be identical for small and large firms even though *promised* returns are different. It is quite plausible that some small firms do in fact have a higher probability of default due to higher specific risks.

A1.15 Under CAPM, it is the expected return which needs to be equal to or greater than the cost of capital in order to persuade investors to finance a project. Hence, if the CER were to set the regulatory WACC at the true underlying cost of capital then it would set the cost of debt on the basis of evidence on expected returns to debt providers (i.e. adjusting promised returns downwards to take account of default risk). This would reduce the cost of debt assumption in the WACC calculation, as well as removing the rationale for setting a different cost of debt for ESB and Eirgrid based on any differences in specific risk.

A1.16 However, removing the default risk premium from observed yields on bonds would potentially be controversial because regulators have not typically made such an adjustment in the past. We explore the effects of such an adjustment in the cost of debt section and in Appendix 2, and show that the adjustment does not in fact have a material effect on our WACC estimate.

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[4] In the Fama-French dataset for 2007, the smallest five per cent of "small" firms have market capitalisation below $184m.

APPENDIX 2: COST OF DEBT: IS A DEFAULT PREMIUM ADJUSTMENT REQUIRED?

A2.1 This appendix sets out the theoretical arguments as to why the cost of debt should be based on expected returns to bondholders, estimated by subtracting the default premium from observed bond yields.

Default premium

A2.2 In CAPM, the cost of debt is the expected return to bondholders. However, given the possibility of default, firms have to promise a higher return than this, and hence observed bond yields exceed the expected return to bondholders. This difference is referred to as the default premium.

A2.3 Bearing this in mind, the debt premium can be decomposed into two elements:

- default premium – the difference between promised and expected returns;
- default risk premium – the additional expected return over and above the risk-free rate required to compensate bondholders for their exposure to systematic risk. The default risk premium can be calculated by multiplying the debt beta by the market risk premium.

A2.4 Sometimes a liquidity premium is also included in the decomposition. However, we do not think this is appropriate since liquidity premia go outside the CAPM and are thus inconsistent with the theoretical framework which is being used to estimate the cost of capital.

A2.5 The default premium and promised return reflect both specific and systematic risks (since either may lead to default), whereas the default risk premium and the expected return to bondholders depends only on systematic risk.

Implications for estimation of cost of debt

A2.6 When estimating the cost of debt, regulators in the past have typically based their assumed cost of debt on observed bond yields, without removing the default premium. However, this has a number of uncomfortable implications in terms of theory:

- First, it means that specific risks are now reflected in the cost of capital estimate, since they affect the size of the default premium. This has the uncomfortable implication that, for example, a WACC estimated in this (incorrect) way might be higher for a small, non-diversified company than for a larger, diversified company, simply because specific risks are higher for the smaller company. This contravenes the insights of CAPM that only systematic risk differences affect the cost of capital.

- Second, it means the overall WACC estimate is biased upwards to an increasing extent for more highly geared companies, since the default premium is larger at higher levels of leverage. Consequently, a WACC estimated on this basis no longer follows the Modigliani Miller (MM) theorem (see section 8), purely as a result of the way in which the cost of debt has been estimated, even though none of the assumptions on which MM is based has been relaxed.

A2.7 The question therefore arises as to whether, instead of basing the cost of debt on observed bond yields, it should be based on expected returns to bondholders, i.e. stripping the default premium out of observed bond spreads.

A2.8 Under CAPM, it is the expected return which needs to be equal to or greater than the cost of capital in order to persuade investors to finance a project. Hence, if the CER were to set the regulatory WACC at the true underlying cost of capital then it would set the cost of debt on the basis of evidence on expected returns to debt providers (i.e. adjusting promised returns downwards to take account of default risk).

A2.9 However, removing the default risk premium from observed yields on bonds would be controversial because regulators have not typically made such an adjustment in the past.

Effect of adjustment on returns to equity providers

A2.10 An objection that could be raised to such an approach is that in a central case where all costs (e.g. for opex, capex) are in line with regulatory assumptions, the allowed cost of debt would not be sufficient to cover coupon interest bond payments. Since the company would have to pay these coupon interest payments ahead of giving dividends, the effect would be that in the central case shareholders would get less than the cost of equity.

A2.11 However, in our view this objection misses the point that what matters to shareholders is their expected return (and its variance) over all states of the world, not the return in the central regulatory case.

A2.12 Across all states of the world shareholders would still earn the cost of equity, even if they did not earn their cost of equity in the central scenario. This is because in upside scenarios they would get to keep 100 per cent of the upside gain, whereas in downside scenarios there would be the possibility that the downside pain might be shared with bondholders (since shareholders have limited liability, and if the negative shock is large enough bondholders might suffer a default). Given this asymmetry, and assuming upside and downside scenarios occur with equal probability, the expected return to shareholders would be above their return in the central case.

A2.13 We more formally demonstrate that shareholders would still receive an expected return equal to the cost of equity below.

A2.14 Consider two options for setting the cost of debt:

Option 1: The cost of debt is set on the basis of promised returns to bondholders (while the cost of equity is set on the basis of expected returns required by shareholders). In this case, it follows that the overall allowed WACC will exceed the cost of capital (i.e. the expected return required by investors), since promised returns to bondholders are greater than expected returns.

Option 2: The cost of debt is set on the basis of expected returns to bondholders. In this case, it follows that the overall allowed WACC will exactly equal the cost of capital (i.e. the expected return required by investors). This follows from the fact that the allowed WACC is in this instance based on the expected return required by debt and equity providers, so by construction equals the expected return that investors require overall.

A2.15 Since the WACC formula is used to calculated the allowed WACC, we know that (under either option):

allowed WACC = allowed cost of equity x (1 – g) + allowed cost of debt x g [1]

where g is gearing.

A2.16 Using the basic structure of the WACC equation but focusing on actual expected returns, it is also true that (under either option):

overall expected return = expected return to equity x (1 – g) + return to debt x g [2]

A2.17 Providing opex, capex and other assumptions have been set at their expected values, the total expected return for all investors will equal the allowed WACC. Again, this is true under either Option 1 or Option 2.

A2.18 Let us now consider Option 2 in more detail. In many states of the world, bondholders would earn more than the allowed cost of debt under this option, since promised returns (which would be paid out in the absence of default) exceed the expected returns on which the allowed cost of debt is set. However, by definition across all states of the world bondholders would only receive the expected return, which is equal to the allowed cost of debt under Option 2.

A2.19 Hence, using the equation in 2 above but taking account of the above two paragraphs, the following equation holds true **under Option 2 only**:

allowed WACC = expected return to equity x (1 – g) + allowed cost of debt x g [3]

A2.20 Comparison of equations [1] and [3] shows that, **under Option 2 only**:

expected return to equity = allowed cost of equity

A2.21 In other words, as long as we have correctly estimated the cost of equity, shareholders get the required expected return across all states of the world precisely when the cost of debt is based on expected returns (as in Option 2).

A2.22 The same sequence of logic applied to option 1 would show that, under this option, the expected return to shareholders are greater than the allowed cost of equity when the cost of debt is set on the basis of promised returns.

Regulatory risk

A2.23 If there is regulatory risk then it could be argued that the regulator needs to set the allowed WACC above the true cost of capital in order to compensate investors for the possibility that the regulator will "renege" by not adequately compensating investors in the future (e.g. by setting an excessively harsh price cap at the next review). While this is worth noting, there are two problems with it as a justification for the traditional approach to the cost of debt:

- Regulatory risk may be symmetric, i.e. regulators may err on the side of giving too much as well as too little, in which case the allowed WACC does not need to be higher than the cost of capital to compensate for asymmetry.

- If the regulatory risk argument were true, it would apply equally to debt and equity and hence would not justify setting the allowed cost of debt above expected returns to bondholders when a similar adjustment is not made for the allowed cost of equity.

Conclusion

A2.24 In the light of this analysis, we have calculated the cost of debt (and hence the overall WACC) both with and without the deduction of a default risk premium. Although it is more theoretically robust to deduct the default premium, we note that such an adjustment lacks regulatory precedent, is potentially controversial and may not be understood by stakeholders. Our sensitivity analysis in appendix 3 shows that, in practice, the adjustment may not make much difference when the WACC calculation is based on A category credit rating.

APPENDIX 3: WACC RANGE SENSITIVITY ANALYSIS – COST OF DEBT DEFAULT PREMIUM ADJUSTMENT

A3.1 As explained in section 9, we carried out sensitivity analysis to calculate the WACC range using a debt premium based on expected returns. This involved deduction of the default premium from observed bond spreads. The theoretical rationale for such an adjustment is explained in appendix 2.

A3.2 In implementing this adjustment, we have also calculated the asset beta and re-levered the equity beta assuming a non-zero debt beta. This is necessary for consistency since the default risk premium left when the default premium is deducted can only be positive if the debt beta is positive.[5]

A3.3 However, as shown in Table A3. 1 below, employing this methodology in this case results in a WACC range and point estimate which are very similar to that calculated using the more traditional methodology.

A3.4 Using this method we estimate that the real, pre-tax cost of capital for the TAO, TSO and DSO lies within the range **3.1 to 5.6 per cent** with an indicative point estimate of **4.5 per cent**. This is based on a pre-tax cost of equity of 3.8 to 8.7 per cent and a pre-tax cost of debt of 2.5 to 3.5 per cent. The parameter estimates on which the range is based are shown in the table below.

A3.5 This range is very similar to the range given in section 9 (3.2 to 5.6 per cent with an indicative point estimate of 4.6 per cent).

[5] As explained in appendix 2, the default risk premium equals the debt beta multiplied by the market risk premium.

Table A3. 1: WACC range, incorporating a default premium and non-zero debt betas

	Low	High	Point estimate
Cost of equity			
Risk-free rate	1.6	2.2	2
Equity risk premium	4.5	5.4	5.2
Debt beta	0.32	0.25	0.28
Asset beta	0.35	0.55	0.45
Equity beta	0.38	1.00	0.66
Post-tax cost of equity	3.3	7.6	5.4
Pre-tax cost of equity	3.8	8.7	6.2
Cost of debt			
Debt premium	0.9	1.3	1.1
Pre-tax cost of debt	2.5	3.5	3.1
Post-tax cost of debt	2.2	3.1	2.7
WACC			
Notional gearing (%)	50	60	55
Corporation tax rate (%)	12.5	12.5	12.5
Post-tax WACC	2.7	4.9	3.9
Vanilla WACC	2.9	5.1	4.1
Pre-tax WACC	3.1	5.6	4.5

Source: Europe Economics

APPENDIX 4: REVIEW OF REGULATORY PRECEDENTS ON COST OF CAPITAL IN IRELAND AND THE UK

A4.1 The review provides an overview of the following regulatory precedents on cost of capital:

(a) Ofwat:

- Price review 2004;
- Price review 2009.

(b) Competition Commission: Stansted Airport 2009 Decision ;

(a) Office of Rail Regulation 2008 Periodic Review;

(b) Ofgem:

- Transmission price control review 2004;
- Distribution price control review 2006;
- Transmission price control review 2007;
- Distribution price control review 2009.

(c) Ofcom;

(d) CER:

- Transmission and Distribution allowed revenue 2001 determination;
- Transmission and Distribution allowed revenue 2005 determination.

(e) Commission for Aviation Regulation:

- Price control 2001 determination;
- Price control 2005 determination;
- Price control 2009 determination.

(f) Northern Ireland Authority for Utility Regulation (NIAUR) SONI Price control 2009 determination;

(g) Commission for Communication Regulation 2008 decision;

(h) Postcomm 2006 decision.

A4.2 We summarise each of these below.

Ofwat

Price review 2004 final determination

Context

A4.3 This section covers Ofwat's last review of price limits for the 23 water companies in England and Wales for the period April 2005 to March 2010.[6] Ofwat concluded on a WACC of 5.1 per cent in real terms on a post-tax basis (or 7.3 per cent pre-tax). This was a weighted average of a real pre-tax cost of debt of 4.3 per cent and a real post-tax cost of equity of 7.7 per cent.

A4.4 Ofwat had initially come up with a range for the cost of capital of 4.2 per cent to 5.3 per cent, but believed a number near the top of the range – in their view 5.1 per cent – should allow companies to "maintain access to the capital markets at reasonable rates and enable the water industry to remain attractive to a diverse range of finance, including equity."

A4.5 In this instance, water only companies were allowed a premium on both the cost of debt and the cost of equity, with the total small company premium skewed towards the cost of equity. The full range for the premium was 0.3 per cent to 0.9 per cent on a post-tax basis, with the actual premium dependent on the size of the company which could fall under any of four different size bands using RCV as a proxy for size.

A4.6 In addition to the CAPM, Ofwat assessed a wide range of evidence, including evidence from the Dividend Growth Model, Market to Asset Ratios and transaction-based evidence.

Gearing

A4.7 In setting the cost of capital, Ofwat assumed a consistent level of gearing for all companies. Ofwat proposed a range of 55 per cent to 65 per cent gearing to be consistent with a credit rating that lies comfortably within the investment grade category. Ofwat adjusted companies' opening balance sheets to bring them to the bottom of this range at March 2005. Industry average gearing for 2003-04 was 59 per cent; however, excluding the very highly geared companies lowered this average to 51 per cent.

Cost of debt

A4.8 Ofwat used a range of 80 to 140 basis points for the debt spread on publicly traded debt. They believed that the low debt spreads would be unlikely to be sustained throughout the five-year period and there was a much greater risk that spreads would rise over the period than remain unchanged or fall.

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[6] Ofwat, Future water and sewerage charges 2005-10: Final determinations.

A4.9 In respect of the cost of debt, Ofwat placed greater emphasis on longer-term historic averages for the risk-free rate and the debt premium, identifying a range of 3.3 per cent to 4.4 per cent for the cost of debt with the view that higher end of the range was more appropriate. Consequently, the arguments for an embedded debt premium were much weaker, and Ofwat concluded that no additional premium would be required.

Cost of equity

Risk-free rate

A4.10 Ofwat used a range for the risk-free rate of between 2.5 per cent to 3.0 per cent. This was based on historical average level of yields on medium-term index-linked gilts. Ofwat noted that recent yields appeared suppressed – an average of yields over the six-month period preceding Ofwat's analysis came to just under 2.0 per cent. But Ofwat believed simply taking account of the current market spot rates would not lead to a sustainable WACC over the medium term, and thus did not lower its range for the risk-free rate.

Equity risk premium

A4.11 On this issue, Ofwat's advisors concluded that the data supported a range of 3.5 per cent to 5 per cent with the view that the top of the range was more appropriate.

A4.12 The Smithers report touched on the difficulties in estimating separately the risk-free rate from the equity risk premium, and suggested that this may be best overcome by examining historic overall equity returns (rather than the individual components). The Smithers study summarised a range of evidence which suggested that equity returns had, over reasonably large samples, been fairly stable over time and across different markets.

A4.13 Ofwat chose to use a range of 6.5 per cent to 8.0 per cent for the cost of equity (the Smithers study reported a range of 6.5 per cent to 7.5 per cent based on arithmetic averaging).

Equity beta

A4.14 Ofwat points out that since July 2004 equity betas had averaged just under 0.4. Taken at face value this may imply that equity markets regard investment in water stocks as considerably less risky relative to the time when estimated betas were higher. However, Ofwat point out that the low beta factors are more likely to be a statistical product of the increase in market volatility. Work undertaken by Smithers & Co Ltd (2004) for Ofgem recommended that, when betas are stable, regulators may want to give more weight to an expectation of a beta of 1. Bearing this in mind, Ofwat used a value of 1 for the geared equity beta.

Overall WACC

Table A4. 1: Cost of capital estimates during PR04 by Ofwat

	Low	High
Gearing (debt: RCV) (%)	55	55
Cost of equity		
Risk-free rate (%)	2.5	2.5
Equity beta	1.0	1.0
Equity risk premium (%)	4.0	5.0
Cost of equity (post-tax) (%)	6.5	8.0
Cost of debt		
Risk-free rate (%)	2.5	3.0
Debt premium (including transaction costs) (%)	0.8	1.4
Cost of debt (gross of tax shield) (%)	3.3	4.4
WACC (gross of tax shield) (%)	4.7	6.0
WACC (post-tax) (%)	**4.2**	**5.3**

Source: Ofwat

Table A4. 2: Small company premiums

RCV	Companies	Premiums				
		Total		Equity	Debt	
		Gross of tax shield (%)	Post-tax (%)	Post-tax (%)	Pre-tax (%)	Post-tax (%)
< £70m	Cambridge, Dee Valley, Folkestone & Dover, Tendring Hundred	0.9	0.9	1.5	0.5	0.4
£70m - £140m	Bournemouth & W Hampshire, Portsmouth, Sutton & East Surrey	0.8	0.7	1.3	0.4	0.3
£140m - £280m	Bristol, Mid Kent, South Staffordshire	0.7	0.6	1.2	0.3	0.2
£280m - £700m	South East and Three Valleys	0.3	0.3	0.5	0.1	0.1

Source: Ofwat

Price review 2009 final determination

A4.15 In November 2009, Ofwat published its final decisions on price limits (its fourth since the privatisation of the industry 20 years ago) for the regulated water companies in England and Wales for the period 2010-2015.

A4.16 Ofwat concluded in its final determination a weighted average post-tax cost of capital of 4.5 per cent (estimated in the context of the CAPM). While noting that is below the level set during the 2004 price review (in which they concluded a 5.1 per cent post-tax WACC), Ofwat highlighted that this figure is towards the high end of the pre marked-up range (i.e. the range before taking into account the asymmetric consequences associated with the risk to consumers of setting the cost of capital too low) that we, Europe Economics, advised to Ofwat. The range for the cost of capital that we provided Ofwat was between 2.5 and 4.7 per cent (on a post-tax basis).

Gearing

A4.17 In setting the cost of capital, Ofwat continued to assume (as it did in 2004) that it would be inappropriate to have the notional level of gearing led by the most highly geared companies. Ofwat proposed, therefore, to maintain a gearing ratio of between 55 and 65 per cent, a range which it believes is a sustainable level of gearing to ensure that the regulated water companies remain comfortably within the investment grade category.

A4.18 As it did in the previous price review, Ofwat adjusted the opening balance sheets of companies to bring them towards the lower end of the gearing range (i.e. to 57.5 per cent). The key reasons underlying this proposal were as follows:

- the level assumed is broadly in line with that estimated at the previous price review; and
- the level assumed takes into account the "opposing effects of deflation and financing efficiencies achieved by companies between 2001 and 2010".

Cost of debt

A4.19 In its final decision, Ofwat assumed a real cost of debt of 3.6 per cent. This estimate was a weighted average of the cost of companies' existing debt (which was estimated at 3.4 per cent) and forward-looking projections of the cost of debt.

A4.20 Ofwat estimated that the forward-looking cost of debt lay in the range of 4.1 to 4.3 per cent. Included in this estimation was an assessment not only of the mix of existing debt that is expected to remain in place over the period 2010-2015, but also of new financing and refinancing requirements.

Cost of equity

A4.21 The post-tax WACC proposed by Ofwat includes a 7.1 per cent post-tax cost of equity which it calculated using estimates of the risk-free rate, the equity risk premium and the equity beta. The estimates for each of these and the assumptions underlying them are summarised below.

Risk-free rate

A4.22 Ofwat proposed a risk-free rate of 2 per cent. This is below the 2.8 per cent they assumed at the previous price review. Ofwat argued that, while the 2 per cent measure was above the current spot prices for ILGs, this estimate is consistent with the view that the risk-free rate is expected to increase over the medium term. Ofwat also highlighted that this estimate is also consistent with the following two factors:

- ten year long-run historic UK ILGs of a 5- and 10-year maturity; and
- recent regulatory precedents

Equity risk premium

A4.23 Ofwat proposed an equity risk premium of 5.4 per cent. Not only is this higher than that estimated in the previous price review, it sits at the higher end of the range that was estimated by Europe Economics. Our range estimate was based on Dimson, Marsh and Staunton series data for the long-term equity risk premium. According to Ofwat, its preferred estimate for the equity risk premium reflects the economic conditions under which price decisions have been made.

Equity beta

A4.24 Ofwat proposed an equity beta of 0.9 (lower than the equity beta of 1 estimated in 2004) at a notional gearing level of 57.5 per cent. This estimate was derived using an estimate of the asset beta of 0.4. Ofwat noted again, however, that these estimates are reflective of the fact that price limits are being set in a period of economic uncertainty.

Overall WACC

Table A4. 3: Draft determination cost of capital of the water industry

	Draft determination
Gearing (debt: RCV) (%)	57.5
Cost of equity	
Risk-free rate (%)	2
Equity beta	0.9
Equity risk premium (%)	5.4
Cost of equity (post-tax) (%)	7.1
Cost of debt	
Cost of debt (gross of tax shield) (%)	3.6
WACC (gross of tax shield) (Vanilla) (%)	5.1
WACC (post-tax) (%)	**4.5**

Source: Ofwat

A4.25 In its draft determination, Ofwat included a small company cost of debt of 0.1 per cent for the two largest water companies and 0.4 per cent for all other companies. The main rationale underlying this decision was that smaller firms face different challenges to larger water firms in accessing debt. In particular, not only may access to finance be relatively limited for smaller companies, the sources available to them may also be less competitive than those available to larger firms.

A4.26 Table A4. 4 below sets out Ofwat's calculation of the WACC for water-only companies.

Table A4. 4: Small companies' cost of capital

Companies	WACC		Equity	Debt	
	Gross tax shield (Vanilla)	Post-tax	Post-tax	Pre-tax	Post-tax
South East Water, Three Valleys Water	5.3	4.8	7.1	3.7	2.7
All other water-only companies	5.5	4.9	7.1	4.0	2.9

Source: Ofwat

Competition Commission

Stansted Airport 2009 decision

A4.27 The Airports Act of 1986 requires the Civil Aviation Authority (CAA) to set maximum limits on airport charges for BAA's London airports (Heathrow, Gatwick and Stansted) and

Manchester airport. The CAA is required, by statute, to refer its proposed price controls for each airport to the Competition Commission (CC) for review, although the CAA remains the final decision-making body. The CC presented its recommendations on the maximum level of airport charges that Stansted Airport would be able to levy during the five-year period beginning on 1 April 2009 (Q5) on 23 October 2008 (well into the current financial crisis).

Gearing

A4.28 Based on analysis of current debt market conditions, meetings with the three main ratings agencies, and the CC's own modelling approach, they settled on a notional 50 per cent gearing level. In the previous price control period, the CC had chosen to base their cost of capital calculations in line with BAA's actual gearing, while in its earlier Q5 recommendations on Heathrow and Gatwick (discussed later), the CC recommended using a notional gearing assumption consistent with maintaining a solid investment-grade credit rating.

A4.29 In reaching this particular decision, the CC also believed that their notional gearing level should enable the airport to maintain a solid or comfortable investment grade rating. While a solid investment grade rating was interpreted as BBB+/Baa1 for Heathrow and Gatwick during Q5, the CC were advised that in current market conditions companies with these ratings would be able to raise new debt finance only as long as they were prepared to meet lenders' demand on price. The timing of new issues also had to be planned more carefully and companies typically had to access both bond and bank debt markets. In contrast, companies with ratings in the A category had been less affected by the market turmoil. With ongoing uncertainty around current and future debt markets, the CC decided to adopt a notional gearing level of 50 per cent, which was believed to be consistent with ratings of A3/A- (as opposed to 60 per cent with Heathrow and Gatwick).

Cost of debt

A4.30 The CC decided on a range between 3.4 per cent and 3.7 per cent for the cost of debt for Stansted in Q5, which breaks down as shown in the following table.

Table A4. 5: Summary of cost of debt calculation for Stansted by CC

Component	Weight	Annual cost (%)
New and floating-rate debt	0.5	3.6 to 3.9
Embedded fixed-rate debt	0.5	3.1 increasing to 3.3
Fees	-	0.1
Total		**3.4 to 3.7**

Source: Competition Commission

A4.31 In exploring the relationship between gearing, credit ratings and the cost of debt the CC took into account the following aspects:

(a) the cost of debt for new issuance and floating rate debt; and

(b) the cost of embedded debt.

A4.32 The CC employed a benchmarking approach with regard to the cost of debt for new issuance and floating rate debt; whereby benchmarks were obtained from the secondary market for debt with A and BBB credit ratings, and from rates observed in recent issuance by comparable regulated entities. On this basis, they concluded that a regulated company with an A3/A rating would, in present market conditions, be expected to pay between 6.5 and 6.8 per cent interest a year on floating-rate debt, which equates to a real cost of debt between 3.6 and 3.9 per cent, with an assumed average RPI of 2.8 per cent a year for the five-year period.[7]

A4.33 In considering the cost of embedded debt, the CC decided to focus on the financing that BAA raised prior to its acquisition by ADI Ltd in 2006, and reported that BAA had secured a cost of debt in nominal terms between 6.0 and 6.2 per cent (3.1 to 3.3 per cent in real terms) on £4.5 billion of financing. The CC assigned a 50:50 weighting to new and floating rate debt against embedded fixed-rate debt.

A4.34 Finally, the CC made an adjustment to allow for ongoing commitment, agency and arrangement fees paid respectively to lenders, rating agencies and arrangers of finance – a total allowance of 10 basis points.

A4.35 The combination of these three elements gave rise to a 3.4 to 3.7 per cent range.

Cost of equity

A4.36 The risk-free rate and equity risk premium (ERP) are economy-wide parameters, and hence recent decisions by other regulators are of direct relevance to Ofwat.

Risk-free rate

A4.37 The CC decided to retain the traditional approach of using Index Linked Gilts (ILGs) to infer the risk-free rate, and chose an assumed risk-free rate of 2.0 per cent for the rest of Q5, based on up-to-date observed yields on shorter maturity ILGs.

A4.38 They noted that, at the time, the yield curve for ILGs was inverted, and believed that yields on longer-dated ILGs were not a good estimator for the RFR for a typical investor.[8] Thus the CC relied on data from 3-, 5- and 10-year ILGs.

A4.39 Further, the CC refuted NERA's assertion that evidence from the ILG market should be ignored altogether, and the risk-free rate should be derived from interest rate swaps. The CC identified a number of concerns with NERA's methodology: NERA took a 10-year

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[7] This stems from an assumption of an annual average 4.0 per cent RPI inflation in 2009/10 with 2.5 per cent RPI inflation thereafter.

[8] The reasons put forward to explain the current inversion include: segmented market hypothesis; and regulatory and accounting requirements of pension funds such that only pension fund investors are buying long dated gilts at current prices.

historical average rather than making a more forward-looking estimate; NERA's risk-free rate included an inflation risk premium; and research shows that only a proportion of the differential between the return on gilts and the return on other financial assets can be attributed to credit risk, the rest being a liquidity premium or convenience yield.

A4.40 In the Heathrow and Gatwick review, the CC had recommended a risk-free rate of 2.5 per cent but they recommended a lower value of 2.0 per cent during this review to reflect latest market data. This revision was believed to recognise the re-pricing of risk and increase in investor risk aversion, which has increased their willingness to accept lower returns on risk-free assets.

Equity risk premium

A4.41 The CC focused on overall market return (derived by adding an equity risk premium to the risk-free rate). The CC believed that the expected return on the market portfolio remained in the range of 5.0 to 7.0 per cent, as proposed in the 2007 review for Heathrow and Gatwick. At the time, the range for the equity risk premium (ERP) was 2.5 per cent to 4.5 per cent, and the risk-free rate was estimated at 2.5 per cent.

A4.42 Thus, the fact that the CC assumed a lower risk-free rate this time must mean an increase in their ERP assumption. In its concluding remarks the CC notes that:

> "…the expected return on the market has, if anything, increased slightly during the last 12 months at a time when the expected return on risk-free assets has fallen. It would be illogical for us to have retained our previous range for the equity-risk premium in the absence of any reason to believe that a lower risk-free rate had translated into a lower cost of equity."[9]

A4.43 Although recent market data, forward-looking models and/or geometric averages may suggest a return at the lower end of the range, this has to be weighed against support for the top end of the range from studies using historical data, especially when arithmetic averages are used. The CC concludes that although there may be reasons to prefer one over another, a range for the market return between 5.0 and 7.0 per cent was a fair reflection of current academic and company estimates.

Equity beta

A4.44 Here the CC faced a problem in that Stansted is not a listed company, and therefore its equity beta could not be estimated directly from market data. Thus they relied on disaggregation of overall BAA beta estimated prior to its de-listing and comparisons with similar businesses, reaching the conclusion that the equity beta for Stansted was in the range 1.00 to 1.24.

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[9] Stansted Airport Ltd: Q5 price control review, Appendix L, pp L19, October 2008

A4.45 The analysis drew on the following two types of evidence:

- the CC's 2007 assessment of asset betas for Heathrow, Gatwick and the remainder of BAA;
- direct estimates of asset betas for regulated utilities, international airports and the UK stock market.

A4.46 The CC was faced with the view from BAA that its historical beta was no longer an appropriate reflection of shareholders' current perception of its risk, in light of evidence of a slowdown in demand for air travel and rising oil prices since 2007.[10] However, upon examining the updated betas of non-BAA comparators, the CC concluded that these betas had stayed broadly the same as compared with their historical value, and therefore they could continue to have confidence in the historical estimate of BAA's beta.

A4.47 The next step was to consider Stansted's beta relative to that of Heathrow and Gatwick and the rest of BAA. The CC agreed with previous assessments by the CAA and BAA which suggested that Stansted was riskier than Heathrow and Gatwick, and therefore its asset beta *could not be lower* than those of Heathrow and Gatwick. With regard to BAA's other non-regulated activities (including other airports, property interests and World Duty Free), the CC felt that the risk facing Stansted was *no greater than* the risk facing these other businesses.

A4.48 With this view, the CC was able to infer that the upper limit for their range of beta estimate should be equal to the beta of these other businesses, which was 0.61. Attaching a point estimate to the lower end of the range proved difficult, since although the consensus was that Stansted was more risky than Gatwick, it was unclear how much more risky it was. Thus the CC decided to choose 0.61 as their final point estimate for the asset beta of Stansted, with a range of 0.06 above and below to allow for estimation error. Re-levering of the asset beta into an equity beta using the 50 per cent notional gearing assumption resulted in a range for the equity beta of 1.00 to 1.24.

Overall WACC

A4.49 Having determined the range for the allowed WACC, and undertaken further comparisons with the 2007 recommendations on Heathrow and Gatwick, as well as considerations of risk of under-investment versus over-compensation, the CC believed 7.1 per cent to be the appropriate cost of capital for Stansted.

[10] BAA was de-listed in 2006 following its acquisition by ADI in 2006, and therefore more current market data is not available.

Table A4. 6: Summary table of cost of capital estimates for Stansted at Q5

Component	BAA base case		BAA alternative case		CC	
	Low	High	Low	High	Low	High
Gearing (%)	50	50	50	50	50	50
Pre-tax cost of debt (%)	3.39	4.30	3.39	4.30	3.40	3.70
Risk-free rate (%)	1.75	2.25	1.75	2.25	2.0	2.0
Return on market (%)	5.25	7.75	5.25	7.75	5.0	7.0
Equity risk premium (%)	3.50	5.50	3.50	5.50	3.0	5.0
Equity beta	1.26	1.33	1.50	1.79	1.00	1.24
Post-tax cost of equity (%)	6.16	9.57	7.00	12.10	5.00	8.20
Taxation	28	28	28	28	28	28
Pre-tax cost of equity (%)	8.56	13.28	9.72	16.80	6.94	11.39
Pre-tax real WACC (%)	5.97	8.79	6.56	10.55	5.20	7.54
Point estimate of WACC (%)	**7.38**		**8.55**		**7.10**	

Source: CC

A4.50 Finally, the CC recognised the current volatility of financial markets and recommended that the CAA continue to monitor the markets and take into account any new information, particularly concerning any significant re-pricing of long-term risk, before passing its final judgements.

A4.51 Following the CC's report, the CAA released a consultation document with its proposals for setting new price controls on 9 December 2008. In this, the CAA expressed satisfaction with the CC's approach and result:

> The CAA therefore considers that the Commission's cost of capital estimate is a reasonable and appropriate basis for constructing a RAB-based price cap.[11]

A4.52 Although the CAA reviewed more recent market data, it concluded that the CC's estimate of the risk-free rate or its overall estimate of the cost of capital did not warrant changing.

[11] Stansted airport: CAA price control proposals; CAA, 9 December 2008, pp. 58

Office of Rail Regulation

Periodic Review 2008

A4.53 On 30 October 2008, the Office of Rail Regulation (ORR) released a report which formed the culmination of the periodic review it conducted during the year to set Network Rail's outputs, revenue requirement and access charges for the five years from 1 April 2009 to 31 March 2014. Their decision forms the first periodic review for Network Rail and is one of the two most recent regulatory decisions on the cost of capital in the UK, undertaken in the context of present market turmoil.

A4.54 The ORR has stated its intention to provide Network Rail with an allowed return that reflects its risk-adjusted cost of capital.[12] The original estimates for the cost of capital were derived in June 2007 and updated in April 2008 to reflect market conditions at the time – an exercise which increased the preferred range for the cost of capital from 4.30 - 4.70 per cent to 4.70 - 4.90 per cent. The draft determinations, released in June 2008, set the allowed return at 4.70 per cent on a real vanilla basis.

A4.55 The final decision taken by the ORR in October 2008 was to revise the cost of capital set out in its draft determinations slightly upwards: from 4.70 per cent to **4.75 per cent**. Below we outline the analysis undertaken by the ORR's advisors – CEPA – in April 2008 and highlight any subsequent updates. Since the company is not listed, the cost of capital is calculated on the basis of that cost of capital which would be faced by an efficient, conventionally financed business with assets comparable to those of Network Rail's.

Gearing

A4.56 After reviewing market evidence and regulatory precedents, CEPA took the view that a 60 to 65 per cent range for gearing would be defensible. However, it advised the ORR to employ a 60 per cent gearing assumption for the higher end of the WACC range, keeping 62.5 per cent as the upper end of the range. In reaching this conclusion, CEPA recognised that Network Rail needs to maintain an A- credit rating rather than BBB+ to finance itself in current market conditions.

A4.57 In the end, a "conservative" notional gearing of 62.5 per cent was used in calculating the WACC range.

Cost of debt

A4.58 There were two types of debt considered here: cost of raising unsupported debt; and cost of embedded debt.

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[12] Determination of Network Rail's outputs & funding for 2009-14, pp 227

A4.59 The April 2008 analysis reported a range of 2.70 – 3.00 per cent real for the cost of embedded debt. This compares with a range of 3.00 per cent to 3.75 per cent for the real cost of unsupported debt. Following the post-April updating, CEPA concluded that the real cost of unsupported debt at the beginning of CP4 should be 4.00 per cent.

A4.60 Having said that, CEPA advised that it was likely that there would be a reduction in the cost of real unsupported debt over CP4 as a result of: a reduction in the new issuer premium; greater familiarity with Network Rail's business risks and credit quality; and possibly increased demand for regulated utility debt. In the end, taking into account recent market developments, Network Rail's proposed capital programme (recent analysis was based on lower capital expenditure), and low cost of embedded debt, CEPA concluded that the weighted average cost of debt should remain in the range consistent with its earlier April findings – **3.25 to 3.50 per cent**.

A4.61 The risk-free rate and debt premium (defined as the spread over gilts on corporate bonds) were estimated as part of the methodology. CEPA found a substantial increase in the debt premium since June 2007 (at the time they had indicated the debt premium for A-rated bonds was around 100 basis points). The table below provides spot and 5-year averages for the debt premium.

Table A4. 7: Spreads on A- 10-, 20- and 30-year corporate bonds

Time series	10-year maturity	20-year maturity	30-year maturity	Weighted average
Spot	1.9	1.9	2.0	1.9
5-year average	0.9	0.9	1.0	0.9

Source: CEPA

Cost of equity

A4.62 An appropriate range for this component of the WACC was thought to lie between 6.5 – 7.0 per cent in the April report, with the belief that the point estimate should be set towards the top end of the range. The calculations of the cost of equity were designed to reflect the financial framework proposed by the ORR, in which the cost of capital should be set in line with the WACC of a notional conventionally financed Network Rail.

Risk-free rate

A4.63 In determining the appropriate risk-free rate, CEPA looked to both UK nominal gilts and UK index-linked gilts, calculating weighted average real yields for 10-, 20- and 30-year maturities of index-linked gilts, and the implied real yield on zero coupon nominal gilts. The table below summarises their findings, showing weighted average real yields for 10-, 20- and 30-year maturities of index-linked gilts and the implied real yield on zero coupon nominal gilts.

Table A4. 8: Estimates of real risk-free rates

Time series	Index-linked gilts	Deflated nominal gilts
Spot	1.0	1.1
5-year average	1.6	1.8
10-year average	n/a	2.2

Source: CEPA

Equity risk premium

A4.64 CEPA conduct a brief overview of the impact of the financial crisis on the ERP, as well as a review of longer-term studies on the appropriate range for the ERP. Evidence to support a higher ERP is observed such as higher volatility in equity markets and comments from a city institution saying that the headline rate of ERP could be as high as 7 per cent.

A4.65 However, CEPA remain of the view that a reasonable long-term range for the ERP is 3.0 – 5.0 per cent, consistent with Smithers (2003).

Equity beta

A4.66 Here CEPA assumed a value of 1 for the equity beta. They pointed out that this estimate was conservative given recent observations of ”flight to quality” effect; however, they did not adjust their estimate of beta downwards because doing so can often lead to implausibly low estimates for the cost of capital.

A4.67 Finally, CEPA had used MARs as a cross-check in its June 2007 analysis, and a recap of this analysis and current market evidence implied that the actual cost of equity was not higher than the allowed cost.

Table A4. 9: The range for WACC as of April 2008

Component	Lower estimate	Upper estimate
Post-tax cost of equity (%)	6.50	7.00
Pre-tax cost of debt (%)	3.25	3.50
Gearing (%)	62.50	60.00
Post-tax vanilla WACC (%)	**4.50**	**4.90**

Source: CEPA

A4.68 As discussed earlier CEPA’s preferred range was 4.7 – 4.9 per cent, and the WACC was eventually settled at 4.75 per cent.

CAA

Heathrow and Gatwick

A4.69 The discussion that follows relates to the CAA's final decision, as published in March 2008, on the appropriate cost of capital for Heathrow and Gatwick for the five-year period commencing 1 April 2008 (Q5). In November 2007, the CAA adopted the CC's recommendations on the WACC, setting it at 6.2 per cent for Heathrow and 6.5 per cent for Gatwick on a pre-tax real basis.

Gearing

A4.70 A notional gearing assumption of 60 per cent was used, where gearing was defined as net debt to RAB. This was believed to be consistent with companies achieving a solid investment grade rating which at the time was interpreted as BBB+/Baa1. The CAA believed that this struck an appropriate balance between efficiency and robustness, despite calls from stakeholders to revise this assumption in different directions.

Cost of debt

A4.71 The CAA focused its analysis of the cost of debt on the aggregate yield, looking at the funding costs faced by utilities in the past five years at a range of maturities, rather than estimating the individual components.

A4.72 Subsequent to its November 2007 release of a real cost of debt of 3.55 per cent (inclusive of ongoing commitment, agency and arrangement fees), the CAA received numerous analyses of the market data since the onset of greater financial unrest, with different parties vying for adjustments to the original estimate. In the end, the CAA believed there was no "compelling evidence" to indicate that there had been a fundamental shift in the cost of debt and therefore chose to maintain it at 3.55 per cent.

Cost of equity

A4.73 The CAA also reviewed the evidence it received in relation to the cost of equity, following its November proposals, in light of the view that there may have been "contagion" to equity markets in the months leading up to the final decision.

Risk-free rate

A4.74 The CC, in its recommendations to the CAA, proposed a point estimate for the risk-free rate of 2.5 per cent, based on analysis of both historic data on 5- and 10-year index-linked gilts, and forward rates up to the middle of Q5.

A4.75 While the CAA acknowledged the more recent market evidence on the decline in gilt yields, it felt it was "prudent and internally consistent" to retain the CC's recommendation of a 2.5 per cent risk-free rate.

ERP

A4.76 Combined with an ERP assumption of 4.5 per cent, the implied post-tax real market return on equity was 7.0 per cent. The CAA notes that this was right in the middle of the range produced by Smithers and Co (2003).

Equity beta

A4.77 In arriving at an estimate for the asset beta of BAA, which was delisted in 2006, the CAA gave regard to the analysis of group asset beta for BAA prior to its takeover and delisting, as well as asset betas of broadly comparable companies. The stand-alone estimates of individual airport betas derived from this analysis were re-levered to the notional gearing level to produce equity beta estimates.

A4.78 With regard to the debt beta the Commission's assessment was based on the decomposition of the debt premium, which gave rise to a range of 0.10 to 0.19. The CAA settled on a cautious assumption of 0.10 for the debt beta in its final assessments.

Table A4. 10: Summary of CAA determination of WACC for Heathrow and Gatwick for Q5

Parameter	Heathrow		Gatwick	
	Low	High	Low	High
Gearing (%)	60		60	
Pre-tax real cost of debt (%)	3.55		3.55	
Risk-free rate (%)	2.50		2.50	
Equity risk premium (%)	2.50	4.50	2.50	4.50
Equity beta	0.90	1.15	1.00	1.30
Post-tax real cost of equity (%)	7.3		7.9	
Taxation (%)	28		28	
Pre-tax real cost of equity (%)	10.2		10.9	
Pre-tax real WACC (%)	6.2		6.5	

Source: CAA

Ofgem

Transmission price control review 2006

A4.79 This review concluded with Ofgem's final proposals released in December 2006 for the maximum revenue that the four electricity and gas transmission licensees could extract from consumers and other network users over the five-year period commencing on 1 April 2007. Ofgem concluded on a point estimate for the vanilla WACC of 5.05 per cent.

A4.80 Ofgem commissioned Smithers & Co. to provide advice on various components of cost of capital during this review. Ofgem conducted an assessment of differential risk – considering the relative risks faced by transmission and distribution companies. For the

purposes of this price review, however, Ofgem did not believe there was sufficient robust evidence to suggest that transmission was a lower-risk activity as compared with distribution. Further, Ofgem took the view that the same cost of capital should be set for each of the transmission companies.

Gearing

A4.81 Ofgem concluded that a notional gearing level of 60 per cent would be appropriate, having reviewed the available evidence and anticipated financing needs of the companies. This level was broadly consistent with actual gearing levels and the approach adopted in the previous price review.

Cost of debt

A4.82 One of Ofgem's main stated objective for this price review was to "facilitate the necessary capital formation (debt and/or equity) to enable the expected investment in the networks".[13] Ofgem believed that the appropriate range for the pre-tax real cost of debt was between 3.5 per cent and 4.0 per cent.

A4.83 The risk-free rate was based on the recommendation in the Smithers & Co. report that the best long-term estimate of the risk-free rate was 2.5 per cent. This was also broadly consistent with previous regulatory decisions.

A4.84 With regard to the debt premium, Ofgem noted that the observable premium on utility debt was at historically low levels at the time (in the range of 98 to 130 basis points). Because Ofgem wished to take a longer-term view on appropriate returns, it decided to use a cost of debt figure above that implied by market conditions of the time. Analysis of long-term average of the debt premium supported the range 1.0 per cent to 1.5 per cent.

Cost of equity

A4.85 In setting a cost of equity Ofgem gave regard to the CAPM framework as well as wider market evidence, including the aggregate return on equity over time.

Risk-free rate

A4.86 As mentioned earlier, the Smithers report recommends a risk-free rate of 2.5 per cent.

A4.87 Two important questions were raised in the analysis of the risk-free rate: (a) the recent past had shown that differences between yields at different maturities (the term premia) had virtually disappeared, but was this a temporary phenomenon? and (b) should regulators look to yields on nominal or indexed bonds?

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[13] Ofgem; Transmission price control review: final proposals, December 2006

A4.88 The report drew on the recent path of inflation forecasts which lent support to the view that indexed yields were providing an unduly depressed picture of forward-looking real returns. The report observes that although the Bank of England's official inflation forecast was lowered from 2.5 per cent to 2.0 per cent, implicit inflation forecasts within the period actually rose closer to 3 per cent. They believe that the most likely explanation for this is that the gap between nominal and real yields is not purely a forecast of inflation, but also contains a risk premium element (i.e. that indexed bonds have traded at an increasing risk *discount*).

A4.89 They note that:

> "Since regulated companies issue barely any indexed debt this suggests that using indexed yields as a benchmark in setting the cost of capital may tend to bias the cost of debt downwards, and that it would be more appropriate to focus on nominal yields, and their associated term premia."[14]

A4.90 Their conclusions on the risk-free rate are as follows:

> In the absence of any evidence of a significant term premium, probably the best current market-based estimate of the forward-looking real interest rate is the nominal yield on medium-dated bonds, less the Bank of England's inflation target of 2%: thus a figure of around 2 to 2 ½%. This is remarkably close to that in the benchmark "Taylor Rule", and to the estimate in Mason, Miles and Wright (2003).

Equity risk premium

A4.91 The market return on equity was evaluated during DPCR4 (discussed above), and reviewed by Smithers & Co. in its assessments. The Smithers study found no compelling evidence to deviate from the range for the real arithmetic market return on equity of between 6.5 and 7.5 per cent considered during DPCR4. They note that the real equity return appears remarkably stable over time and across the country.

A4.92 Combined with a real risk-free rate of 2.5 per cent, this implies an arithmetic equity risk premium of 4 to 5 per cent.

Equity beta

A4.93 The Smithers study found evidence that beta estimates of the time were lower than 1, although they had varied considerably since privatisation. In view of the scale of capital expenditure requirements, Ofgem believed it was important that the assumed cost of equity was sufficient to enable companies to withstand unanticipated risks and to attract and retain equity funding. Although Ofgem wanted to err on the side of

[14] Smithers & Co; Report on the cost of capital provided to Ofgem, September 2006

caution with its beta estimate, it gave weight to the Smithers finding and chose to adopt a somewhat lower estimate for beta than the one chosen at DPCR4.

Overall WACC

Table A4. 11: Overall WACC estimates by Ofgem at TPCR4

	Updated proposals	Final proposals
Risk-free rate (%)	2.30	2.50
Debt premium (%)	1.10	1.25
Cost of debt (%)	3.40	3.75
Cost of equity (%)	7.00	7.00
Gearing (%)	60	60
Tax (%)	30	30
WACC (real pre-tax) (%)	6.00	6.25
WACC (after tax at 30%) (%)	4.20	4.40
WACC (vanilla) (%)	**4.84**	**5.05**

Source: Ofgem

A4.94 The pre-tax return outlined above is calculated on the basis of a traditional tax wedge assumption. Ofgem's Final Proposals provided an allowance for the expected tax payments becoming due in respect of each year of the new price control, reflecting the view of capital allowances and interest payments based on assumptions about gearing.

Gas distribution price control 2007

A4.95 The final proposals, published on 3 December 2007, reset the price control, which specifies the maximum revenue that a network can recover from its customers for the five-year period commencing on 1 April 2008.[15] This was the first review, following the sale of four of the gas distribution networks (GDNs) by NGG in 2005, when Ofgem has been able to make meaningful comparisons between the GDNs.[16]

A4.96 Ofgem intended the allowed return on the Regulatory Asset Value (RAV) to be at least equal to the licensee's cost of capital, and set the overall WACC at 4.94 per cent real.

Gearing

A4.97 Ofgem considered a gearing level of 62.5 per cent would be consistent with a credit rating comfortably within investment grade. This approach was consistent with the last price review, and compares with a 60 per cent gearing assumption adopted for the

[15] Ofgem; Gas distribution price control review: final proposals, December 2007
[16] The total number of GDNs during the course of this review was eight.

transmission review. This reflects the lower financing requirements, and therefore the lower financial risk facing transmission companies, as well as observed gearing levels.

Cost of debt

A4.98 By the time the final proposals were released in December 2007, difficulties had already started to become apparent in debt markets. In its initial and updated proposals Ofgem maintained that an appropriate value for the cost of debt was 3.55 per cent, which appropriately balanced the spot rates for the cost of debt, the 10-year trailing average, and long-term averages.

A4.99 Ofgem recognised that it had become more difficult to raise substantial levels of finance in markets towards the latter half of 2007, as compared with the benign market conditions in the preceding years. Ofgem believed that the risk of such difficulties was already accounted for through the approach of setting revenue allowances which are consistent with a credit rating comfortably within investment grade - pointing out that where utilities were raising new debt, it was at rates which were often considerably below their assumed cost of debt.

A4.100 Thus they chose to maintain the cost of debt at 3.55 per cent, concluding that it properly balanced the cost of debt over different time periods.

Cost of equity

A4.101 Ofgem assumed a real post-tax return on equity of 7.25 per cent in its final proposals. This compares with the 7.00 per cent assumed in TPCR4.

A4.102 Ofgem based the allowed rate of return on equity on the estimated equilibrium level of total market returns, as in TPCR4 and DPCR4. In a review of relative risk, Ofgem concluded that GDNs were overall no less risky, and may be somewhat more risky, than the transmission companies under the current price controls. This lent support to the view that the allowed rate of return on equity for GDNs should be no lower, and could be somewhat higher, than the 7.0 per cent rate assumed in TPCR4.

A4.103 Ofgem recognised that, all other things being equal, the use of a higher gearing assumption should lead to a commensurately higher expected rate of return on equity, reflecting the greater financial risk borne by shareholders. But it was also apparent that the empirical data relating to UK utilities did not fully support the view that the relationship between gearing and expected rate of return on equity was a continuous linear function.

A4.104 Although there may have been other factors affecting the market data and therefore distorting the predicted positive correlation between gearing and equity betas, Ofgem did not believe it would be appropriate to disregard the market evidence entirely.

Overall WACC

A4.105 Taking the above considerations together, Ofgem concluded that an appropriate allowed vanilla return on capital in this instance was 4.94 per cent real.

Table A4. 12: Overall WACC estimates by Ofgem at GDPCR4

	Updated proposals	Final proposals
Cost of debt (%)	3.55	3.55
Cost of equity (%)	7.00	7.25
Gearing (%)	62.50	62.50
Vanilla WACC (%)	**4.84**	**4.94**

Source: Ofgem

Distribution price control review 2004

A4.106 This review summarises Ofgem's decision during DPCR4, which applies to electricity Distribution Network Operators (DNOs) and covers the period from 1 April 2005 to 31 March 2010.[17]

A4.107 Ofgem used a post-tax approach to the cost of capital, and consulted on the range 4.2 per cent to 5.0 per cent before its final proposals. Ofgem's initial proposals from June 2004 saw a modelling assumption of 4.6 per cent for the cost of capital, which was subsequently set at 4.8 per cent post-consultation.

Gearing

A4.108 Ofgem's final proposals, released in November 2004, adopted a notional gearing level of 57.5 per cent. Earlier in June, the initial proposals had indicated a gearing level of 60 per cent, which was subsequently revised following a consultation process. Ofgem quoted evidence of the time which indicated that Moody's considered a debt to RAV gearing level in the range of 60 per cent to 65 per cent to be consistent with target A3 (A-) ratings for comparable regulated network businesses.

Cost of debt

A4.109 Ofgem's initial and final proposals put forward a pre-tax cost of debt figure of 4.1 per cent.

A4.110 Ofgem examined the evidence on debt premiums in recent years. Although the premium had been volatile in the year 2000, it displayed a more stable trend thereafter. Because of considerable uncertainty regarding the cost of debt, Ofgem adopted a wide range for the debt premium of 1.0 per cent to 1.8 per cent in its cost of capital calculations. Combining

[17] Ofgem, Electricity distribution price control review: final proposals, November 2004

with the range for the risk-free rate gave rise to a range for the real cost of debt of 3.25 per cent to 4.80 per cent.

Cost of equity

A4.111 For the final proposals, Ofgem adopted a post-tax real cost of equity figure of 7.5 per cent – the top end of the range published in earlier proposals.

Risk-free rate

A4.112 Ofgem reviewed the most recent decisions on the risk-free rate by the CC, who had at the time concluded on a range of 2.5 per cent to 2.75 per cent. The CC had looked at yields on 5-, 10-, and 20-year index-linked gilts in arriving at its decision. Ofgem acknowledged that, since the CC rulings, yields have dropped even further. Given the sensitivity of both the cost of equity and the cost of debt to the risk-free rate, Ofgem went for a wide range in its March 2004 proposals, widening the CC range by 0.25 per cent on either side which gave a range for the risk-free rate of 2.25 per cent to 3.00 per cent.

Equity risk premium

A4.113 Ofgem conducted a thorough review of empirical evidence on the return on equity, including Dimson, Marsh, and Staunton (2001), and Wright, Mason and Miles (2003), as well as survey evidence. In the end, Ofgem referred to the CC's most recent decision on the matter, in which the ERP was believed to lie between 2.5 per cent to 4.5 per cent (implied return on equity was in the range of 5.00 per cent to 7.25 per cent). Ofgem did not believe there to be any strong evidence to deviate from this range; they did, however, believe that it was more likely that the higher end of this range was more relevant.

Equity beta

A4.114 Ofgem had adopted an equity beta of 1 in the previous price review and, in examining the evolution of equity betas since then, they found that they had fallen from approximately 1 between 1993 and 1999 to 0.3 in 2004. Ofgem went on to consider whether this was due to the changing risk profile of the companies or other factors.

A4.115 Ofgem commissioned Smithers and Co. to produce a report estimating betas for a range of companies in the water and electricity sector. The report produced beta estimates on a daily, weekly and monthly basis within the CAPM framework, using the FTSE All-Share Index and a broader market index as a proxy for the market portfolio. The report also accounts for the impact of the TMT (Technology, Media and Telecommunications) bubble around the turn of the millennium.

A4.116 In light of the Smithers and Co. report and Ofgem's own analysis of the evidence, Ofgem proposed a range for equity beta of 0.6 to 1 in its March proposals.

Table A4. 13: Cost of capital assumptions for DPCR4

	Mid point from initial proposals and September update	Final proposals
Cost of debt (%)	4.10	4.10
Cost of equity (%)	7.25	7.50
Gearing (%)	60.00	57.50
Vanilla WACC (%)	5.40	5.50
Pre-tax WACC (%)	6.60	6.90
Post-tax WACC (%)	**4.60**	**4.80**

Source: Ofgem

Distribution price control review – 2009 (DPCR5)

A4.117 On 7 December 2009, Ofgem published its final decisions on the cost of capital for the price control review period 2010-2015. Ofgem decided that a pre-tax weighted cost of capital of 4.7 per cent was appropriate.

Gearing

A4.118 In deciding upon the gearing level, Ofgem considered advice provided by its Consultants (i.e. PwC) as well as decisions made in previous reviews. In its Initial Proposals paper, Ofgem stated that it believed that a notional gearing level of between 55 and 65 per cent was consistent with maintaining an investment grade credit rating. In its Final proposals, however, Ofgem decided that the appropriate range for the notional gearing level was between 62.5 and 65 per cent, and opted for a notional gearing at the top of this range (i.e. 65 per cent) to calculate the cost of capital for DPRC5. This decision was made on the basis that evidence suggested that the DNOs could ”comfortably support relatively high levels of gearing to their RAV” over the forthcoming review period; and that this was in part, it was argued, due to greater certainty over allowed revenues and the high levels of depreciation within allowed revenues.

Cost of debt

A4.119 In estimating the cost of debt, Ofgem continued to rely largely on long-term averages to inform its decision (particularly so given the long life-span of the assets the debt would be financing). Ofgem stated that it did not believe there was sufficient evidence to suggest that the recent financial crisis has resulted in a ”fundamental shift in the cost of debt”.

A4.120 In estimating the range and the spot rate for the cost of debt, Ofgem considered 10-year trailing averages for the cost of debt for issuers of a similar credit rating to the DNOs and found that this average was 3.6 per cent.

A4.121 Ofgem decided on a range of 3.3 to 3.7 per cent for the cost of debt and a spot rate of 3.6 per cent in estimating the cost of capital.

Cost of Equity

Risk-free rate

A4.122 In calculating the risk-free rate, Ofgem relied mainly on evidence from movements in indexed-linked gilt yields. Ofgem concluded that a risk-free rate of "around 2 per cent was appropriate. This was based on the fact that, at the time of writing, 10-year index-linked gilts were less than 1 per cent and that the 10-year trailing average is less than 2 per cent. Ofgem opted for "around" 2 per cent on the basis that it believed that the yields on index-linked gilts at the time of writing were depressed as a result of the Bank of England's Quantitative Easing programme, as well as demand from pension funds.

Equity risk premium

A4.123 In its final decision paper, Ofgem noted that the equity risk premium had been the area in which there has been the most disagreement between the various consultants. Ofgem rejected the argument put forward by the DNOs that the recent financial crisis has resulted in a "fundamental re-pricing of equity risk". Rather, Ofgem believed there was sufficient evidence to suggest that the recovery in equity prices has been strong since the low point in April 2009 and in recent months has returned to "normal" levels. Ofgem therefore decided that there was "no reason to believe that there has been a fundamental departure from the long-term trend in the equity risk premium which is generally estimated by academics to be in the 3 to 5 per cent range".

Equity beta

A4.124 As none of the DNOs is directly listed on the UK stock market, Ofgem based its decision on the appropriate equity beta largely on evidence provided by PwC. Ofgem also analysed the performance of share prices of listed utilities both before and after the financial market turmoil, and concluded that there was sufficient evidence that utility companies, particularly regulated ones, are less risky than the market. Ofgem concluded on an asset beta in the range 0.24 and 0.34. This implies an equity beta of between 0.68 and 0.91.[18]

Overall WACC

A4.125 Table A4. 14 overleaf, summarises Ofgem WACC calculations for DPRC5.

[18] Equity beta=asset beta/(1-the notional gearing level); =0.24/(1-65.)=0.68
[18] Equity beta=asset beta/(1-the notional gearing level); =0.34(1-.625)=0.91

Table A4. 14: Ofgem WACC calculations for DRPC5

	Estimates		
	High (%)	**Low (%)**	**Final proposals (%)**
Cost of debt	3.3	3.7	3.6
Cost of equity	6.3	7.0	6.7
Gearing	65.0	62.5	65.0
WACC (vanilla)	4.3	4.9	4.7
WACC (post-tax)	3.7	4.3	4.0

Source: Ofgem

Ofcom

BT – 2005

A4.126 In August 2005, Ofcom released a statement setting out its approach to estimating companies' weighted average cost of capital and discussing Ofcom's regulatory approach to real options. The statement focused on BT's cost of capital given its importance in the context of the telecoms review and in relation to a number of imminent Ofcom decisions, e.g. valuing BT's copper access network, and the network charge controls.

Gearing

A4.127 The market average gearing ratio of the time was around 30 per cent, as supplied by BT. BT's gearing ratio of the time was around 35 per cent. Ofcom used a low gearing assumption of 30 per cent and a high gearing assumption of 35 per cent in its WACC calculations.

Cost of debt

A4.128 In relation to BT's debt premium, Ofcom noted that the yield on some corporate bonds had declined in recent years.

A4.129 In Ofcom's view it would not have been appropriate for Ofcom to exclusively base its estimates of each parameter on current market values, and therefore Ofcom concluded that a debt premium of 1.0 per cent, as used in the PPC statement, represented a reasonable value for BT's debt premium.

Cost of equity

Risk-free rate

A4.130 Ofcom considered arguments in favour of both short and long-term gilts as estimates of the risk-free rate. The principal argument favouring shorter-term gilts is that a duration equivalent to the price-control period may be more appropriate, whereas the principal argument favouring longer-term gilts is that BT is required to make investments with an economic lifetime beyond the duration of a typical price control period.

A4.131 In Ofcom's view, the use of 5-year gilts strike a reasonable balance between the above two arguments. Ofcom's preferred approach is to base estimates on current market yields of bonds of an appropriate maturity, but also to analyse yields over a sufficiently long period of time to avoid allowing short-run fluctuations to have an impact on its regulatory estimates.

Equity risk premium

A4.132 Ofcom believed that values in the range 4.0 per cent to 5.0 per cent for the ERP were reasonable. Within this range Ofcom took the view that 4.5 per cent was the appropriate value for it to use in estimating a company's cost of capital. This was half a percent lower than Ofcom's previously applied value of 5.0 per cent.

A4.133 Ofcom believed that the downside risk associated with taking too low a value for the ERP (which would discourage discretionary investment) would be more detrimental to the interests of consumers than taking too high a value (which would lead to higher prices to customers) and has tended to the higher end of the possible range.

Equity beta

A4.134 Ofcom took the view that the appropriate value for BT's group equity beta was 1.1, having initially estimated an equity beta of 1.3.

A4.135 Ofcom did not find any statistical data or qualitative reasoning to support the previous estimate of 1.3. Furthermore, statistical evidence offers some (limited) evidence that there is some tendency for equity betas to revert towards 1 over time. In conclusion, Ofcom said:

> "Since analytical reasoning suggests that BT's group equity beta should be around 1; statistical evidence suggests that it is difficult to find a basis for a BT group equity beta far from 1; and arguments from regulatory precedent and practice suggest that it would be undesirable to reduce BT's group equity beta too far, Ofcom concludes that the appropriate approach is a BT group equity beta of 1.1."[19]

Overall WACC

A4.136 Ofcom considered two gearing scenarios for BT to be appropriate (35 per cent and 30 per cent), with the final estimate of the WACC in each case being the simple average of the two gearing scenarios.

A4.137 In summary Ofcom has calculated the following pre-tax nominal WACC estimates for BT's different activities:

- copper access - 10.0%; and

– the rest of BT - 11.4%.

Table A4. 15: Estimates of pre-tax nominal WACC for BT's copper access business

	High gearing (35%)	Low gearing (30%)
Risk-free rate (%)	4.6	4.6
ERP (%)	4.5	4.5
Equity beta (%)	0.9	0.8
Cost of equity (post-tax) (%)	8.7	8.4
Debt premium (%)	1.0	1.0
Cost of debt (pre-tax) (%)	5.6	5.6
Corporate tax rate (%)	30	30
Cost of debt (post-tax) (%)	3.9	3.9
Gearing (%)	35	30
WACC (post-tax) (%)	7.0	7.0
WACC (pre-tax) (%)	9.99	10.04
Average WACC (pre-tax) (%)	**10.0**	

Source: Ofcom

Table A4. 16: Estimates of pre-tax nominal WACC for rest of BT

	High gearing 35%	Low gearing 30%
Risk-free rate	4.6	4.6
ERP	4.5	4.5
Equity beta	1.23	1.14
Cost of equity (post-tax)	10.1	9.7
Debt premium	1.0	1.0
Cost of debt (pre-tax)	5.6	5.6
Corporate tax rate	30	30
Cost of debt (post-tax)	3.9	3.9
Gearing	35	30
WACC (post-tax)	8.0	8.0
WACC (pre-tax)	11.37	11.42
Average WACC (pre-tax)	**11.4**	

Source: Ofcom

[19] Ofcom's approach to risk in the assessment of the cost of capital: final statement, Ofcom, August 2005, pp 66

New pricing framework for Openreach – 2009

A4.138 On 22nd May 2009, Ofcom published its final decision on the weighted cost of capital: one for Openreach and one for the rest of BT's activities. Ofcom decided on a WACC of 10.1 per cent for Openreach and 11 per cent for the rest of BT's activities. Ofcom's statement made significant reference to the uncertainty governing financial markets and the move towards recession at the time of the review.

Gearing

A4.139 Ofcom assumed an optimal level of gearing of 30 per cent. While Frontier Economics, on behalf of Talk Talk, argued that a more appropriate level of gearing level for Openreach would be between 50 and 60 per cent, Ofcom believed that there was no convincing reason to alter their gearing assumption, particularly given the fact that financial conditions were making investors more wary of companies with higher levels of debt. At the time of its most recent debt issue, BT's gearing was 38 per cent.

Cost of debt

A4.140 Ofcom opted for a debt premium for BT of 3 per cent which was at the top end of the earlier range put forward by Ofcom in its previous consultations.

A4.141 At the time of the review, BT's credit rating was Baa2 (Moody's) and BBB (S&P), after having been downgraded from BBA1 and BBB+ in March 2009. At the time of Ofcom's review, BT's debt was trading at 400-450 basis points above equivalent government bonds, up from 155 basis points at the time of its most recent bond issuance in June 2008.

A4.142 Ofcom opted for a spot value at the top of its 2-3 per cent range, to reflect the deterioration in capital markets which had exacerbated the spreads on corporate debt irrespective of gearing levels.

Cost of equity

Risk-free rate

A4.143 Ofcom proposed a forward-looking risk-free rate of 2 per cent. In estimating the risk-free rate, Ofcom considered a range of evidence including nominal and real yields (both historic and spot) on 5-year UK gilts. In their earlier consultation, Ofcom did not set out a specific forecast range for inflation They argued that this was appropriate approach given inflation expectations are implicitly accounted for in nominal yields and given the stability of inflation assumptions at the time. However, given the recent volatility of the UK inflation rate (e.g. turning negative for the first time since 1960), Ofcom believed a more prudent approach was necessary and thus felt it needed to be explicit about their inflation assumptions.

A4.144 Ofcom assumed a rate of inflation of 0 per cent in the first year of the price control, and then 2.5 per cent in each subsequent year of the control period. This implied a nominal risk-free rate of 2 per cent in year one and a nominal risk-free rate of 4.5 per cent in all of the subsequent years.

Equity risk premium

A4.145 Ofcom's approach to estimating the equity risk premium was consistent with that set out in its 2005 Final Statement. In estimating the equity risk premium, Ofcom considered previous decisions taken by itself, other economic regulators and the CC.

A4.146 Ofcom believed the range of 4 to 5 per cent for the ERP, with a point estimate of 5 per cent, was reasonable. It argued that this reflected a balanced view of the broad evidence available. Ofcom noted, however, that this range was biased towards placing greater weight on *ex post* historic estimates of the ERP.

A4.147 Ofcom opted for a spot rate at the higher end of the range in order to reflect increased levels of volatility and turbulence in the market. In deciding on this spot rate, Ofcom also took account of longer-term outlooks as well as the views of various market participants including the Bank of England.

Equity beta

A4.148 Ofcom assumed that an equity beta of 0.86 for the BT Group as a whole was reasonable at a gearing ratio of 35 per cent. Ofcom also noted that taking the estimated equity beta for BT into account, 0.76 would be a reasonable estimate of Openreach's equity beta.

Overall WACC

A4.149 Table A14.1 overleaf, presents Ofcom's final decisions on the individual WACC components.

Table A14.1: Estimates of pre-tax nominal WACC for Openreach and other BT activities

WACC Component	Openreach	Rest of BT
Risk-free rate (%)	4.5	4.5
Equity risk premium	5	5
Equity beta	0.76	0.96
Cost of equity (post-tax)	8.3	9.3
Debt premium (%)	3	3
Corporate tax rate (%)	28	28
Cost of debt (post-tax)	5.4	5.4
Gearing (%)	35	35
WACC (post-tax)	7.3	7.9
WACC (pre-tax)	**10.1**	**11**

Source: Ofcom

CER

Transmission and distribution allowed revenue 2001 determination

A4.150 In September 2001, the CER published its decision paper on the transmission and distribution price control for the period January 2001 to December 2005.

A4.151 The CER concluded that the appropriate pre-tax weighted cost of capital for both transmission and distribution was 6.5 per cent.

Gearing

A4.152 The CER concluded that the optimal level of gearing for ESB should be approximately 50 per cent. This conclusion was based on the following:

- the characteristics of the industry and regulatory precedents which, according to the CER, indicated a relatively high gearing ratio; and
- the evidence of ESB's gearing value and Ireland's lower tax environment.

Cost of debt

A4.153 The CER's estimation of the debt premium relied on medium- to longer-term bond yields, and was based on the cost of debt for comparator companies that were regarded as having a similar gearing level as that envisaged for ESB. It was also based on the assumption that ESB would maintain a single A credit rating over the period. The average cost of debt for these comparators was found to fall in the range of 137 to 167 bps. Given this evidence, the CER decided that a figure of 1.5 bps above the risk-free rate would be an appropriate estimate for the rate at which ESB would feasibly be able to raise debt.

Cost of equity

Risk-free rate

A4.154 The CER estimate of the risk-free rate was based on yields on a 10-year German government bond adjusted for inflation in the Eurozone.

Equity premium

A4.155 While the CER considered a wide array of evidence with regard to the ERP, including historic, semi-*ex-ante* survey and market evidence, its approach to estimating the equity risk premium relied heavily on US survey evidence, which suggested that the ERP would be likely to lie within the 5-7 per cent range. The CER selected a figure of 5.4 from within this range.

Equity beta

A4.156 In the absence of share price data, the CER's estimate of the asset beta was based on the long-term betas of comparators. The set of comparators which were used comprised two network operator comparators in addition to a wider set of integrated electricity companies. On the basis of the evidence gathered from this approach, the CER decided that ESB's asset beta was around 0.4 per cent, from which an equity beta of 0.80 (based on the assumption of 50 per cent gearing) was estimated.

Overall WACC

A4.157 Table A4. 17 below sets out the breakdown estimates of the cost of capital elements.

Table A4. 17: Proposed cost of capital for transmission and distribution business

Component	CER's view
Cost of equity	
Nominal risk-free rate	4.75
Expected inflation	1.7
Risk-free rate	3.05
ERP	5.4
Asset beta	0.41
Gearing	50
Equity beta	0.8
Post-tax return on equity	7.37
Effective tax rate	12.50
Pre-tax return on equity	8.42
Cost of debt	
Debt premium	150
Cost of debt	4.55
WACC	
Real post-tax WACC	6.0
Real pre-tax WACC	6.5

Source: CER

A4.158 Although ESB included a proposal for an additional "small company premium" of 0.6 per cent, this was rejected by the CER (and therefore omitted from the CER's calculation of the WACC). The CER's rejection was based on what it regarded as "unconvincing arguments". First, the CER noted that recent academic literature in this area suggests that smaller companies have, in fact, under-performed the market over the last 20 years, which suggests a small company discount. Second, it noted that even if one were to accept the existence of a size variable, it is:

> "irrelevant for a company the size of ESB. Articles examining the size premium tend to define small stocks as the lowest tenth percentile of the market-by-market capitalisation. This equates to US$60 million. ESB has a book value in excess of this."

Transmission and distribution allowed revenue 2005 determination

A4.159 In September 2005, the CER published decision papers on the transmission and distribution price control reviews for the period 2006-2010. Like the previous review period, the CER's cost of capital analysis was identical for transmission and distribution.

A4.160 The CER decided that the appropriate weighted cost of capital was 5.63 per cent (pre-tax), selected from within a range of 3.26 to 6.85.

Gearing

A4.161 The CER assumed a notional gearing level of between 50 and 60 per cent on the basis that they believed this gearing level to be consistent with the approach taken by regulators internationally, and was reflective of the debt-grading of comparable companies.

Cost of debt

A4.162 To inform its decision on the debt premium, the CER looked at the debt premium for companies with a comparable debt rating to ESB (BBB or A) for bonds with a maturity of 5-10 years. Based on averaging figures over different time-periods, it arrived at an estimated debt premium of 1 per cent for A rated bonds and 1.6 per cent for BBB rated bonds. The CER also considered the debt premium used in a number of regulatory precedents, which demonstrated that a wide range of values had been used. Based on this analysis, it chose a point figure of 1.35 per cent for the debt premium.

Cost of equity

Risk-free rate

A4.163 The CER proposed a risk-free rate of 2.38 per cent. The CER's view on the risk-free rate was informed by spot and forward gilt rates which prevailed at the time of its decision, rather than by longer-term historical averages. It looked at yields on nominal and index-linked gilts with maturities of 5 and 10 years. Its analysis of index-linked gilts was based on French gilts on the grounds that these were the only substantively traded government index-linked bonds within the Eurozone. Its analysis of nominal gilts was based on yields on German and Irish gilts, with both inflation expectations and an inflation risk premium deducted in order to provide an estimate of the risk-free rate. Averaging across these different sources of data yielded a figure of 2.13 for 5-year gilts and a figure of 2.49 for 10-year gilts, which formed the basis of the CER's range.

Equity premium

A4.164 In its estimation of the cost of capital, the CER proposed an equity premium of 5.25 per cent. The CER's estimate of the equity risk premium was based on:

- international estimates of the equity risk premium produced by Dimson, Marsh and Staunton (DMS) using historic returns;
- forward-looking ERP estimates from various studies; and
- regulatory precedents from a number of countries.

Equity beta

A4.165 Given that ESB is not publicly listed, the CER's analysis for the equity and asset beta was based on comparator analysis. The CER looked at equity betas for a range of European

utilities estimated using monthly returns data over a period of 50 months. Adjusting these equity betas for actual gearing gave a range of 0.2 to 0.4 for the asset betas of the comparator companies, which in turn yielded a range of 0.3 to 0.6 for the equity beta once re-levered for an assumed gearing level of 50 per cent.

A4.166 Alongside comparator analysis, the CER also looked at the equity betas used in various regulatory precedents. These were typically higher than the above comparator betas, and hence the CER adopted a final range for the equity beta of 0.6 to 1.0 with a point figure of 0.8.

Overall WACC

A4.167 Table A4. 18 below sets out the ranges of the elements of the cost of capital.

Table A4. 18: Proposed cost of capital for transmission and distribution business

Component	Low %	High %	CER's view
Cost of debt			
Risk-free rate	2.13	2.49	2.38
Debt premium	1.00	1.50	1.35
Cost of debt (pre-tax)	3.13	3.99	3.73
Cost of equity			
Real risk-free rate	2.13	2.50	2.38
ERP	3.75	6.00	5.25
Asset beta	0.20	0.40	0.40
Equity beta	0.60	1.00	0.80
Cost of equity	4.38	8.50	6.58
WACC			
Effective tax rate	0.13	0.13	0.13
Gearing	0.60	0.50	0.50
Pre-tax WACC	3.26	6.85	5.63
Post-tax WACC	2.85	6.00	4.92

Source: CER

Commission for Aviation Regulation

2001 Determination

A4.168 In August 2001, the Commission published its determination of the maximum levels of airport charges over the regulatory year 2001-2006. The Commission set Aer Rianta's real post-tax weighted cost of capital equal to 6 per cent. The Commission based its decision on advice provided to them by Colm Kearney (Professor of Finance at Dublin University).

Gearing

A4.169 A notional level of gearing of 50 per cent was used in the calculation of the weighted cost of capital. This estimation was based both on the current level of gearing employed by Aer Rianta and the projections by Standard & Poor (2000). The level of gearing at the time was 54 per cent, and Standard & Poor (2000) projected that this gearing ratio would not exceed this level over the next 5 years.

Cost of debt

A4.170 Based on the analysis undertaken by Kearney, the Commission estimated that the cost of debt for Aer Rianta was 113 basis points above the risk-free estimate, with the resulting cost of debt estimated at 3.7 per cent. In early 2001, Aer Rianta engaged in its first public issuing in the Euro-dominated bond market. Financial market data on Aer Rianta's debt premiums was used, therefore, to estimate the cost of debt. This was because the quoted yield spread over the benchmark rate was deemed as the most up-to-date assessment of the costs associated with debt issues by Aer Rianta. The spread between the yield of its Euro-denominated bonds and the benchmark rate as of 30 July 2001 was equivalent to 113 basis points.

Cost of equity

Risk-free rate

A4.171 The risk-free rate was estimated at 2.6 per cent. This estimation was based on 16 years (1984 to 2001) of data on historical and nominal interest rates, inflation and real interest rates in Germany, the UK and the US. Kearney noted that this estimate lay in the range of estimates reviewed by the CAA in 2001 that had been applied in its recent regulatory determination in the UK. Kearney also noted that this estimate falls below the lower end of the 2.75 to 3.25 pr cent range suggested by the CAA in 2001. According to the Commission, the main rationale underlying its choice of the lower estimate is that its estimate includes an adjustment for the inflation risk premium.

Equity premium

A4.172 Kearney estimated the equity risk premium to be 6 per cent and based this estimation on a mixture of historical data (e.g. on the levels, percentage returns and standard deviation for the stock markets in Germany, the UK, and the US between 1984 and 2001).

Equity beta

A4.173 As Aer Rianta is an unlisted company, the approach to estimating the equity beta was to use BAA as the appropriate comparator company. The estimation was carried out in the following three steps:

- "de-gearing" the equity beta of BAAA to produce an asset beta which is equivalent for a company that has no debt in its capital structure;

- adjusting the asset beta for any differences in business risk between BAA and Aer Rianta which produces an asset beta for Aer Rianta;

- the asset beta is then re-geared to reflect Aer Rianta's capital structure.

A4.174 On the assumption of a notional gearing level of 50 per cent, Kearney recommended an equity beta of 0.93.

Overall WACC

A4.175 Table A4. 19 below sets out the estimated values of the components of the cost of capital.

Table A4. 19: The Commission's determination of the weighted cost of capital

Component	
Cost of equity	
Expected inflation	
Risk-free rate	2.6
ERP	6.0
Asset beta	0.5
Gearing	50
Equity beta	0.93
Cost of debt	
Debt premium	1.1
WACC	
Post-tax WACC	5.7
Pre-tax WACC	6.6
Real post-tax WACC	6.0

Source: CAR

2005 Determination

A4.176 In September 2005, the Commission published its determination on maximum airport charges for 2006 to 2010. The Commission concluded, on the basis of the consultancy advice provided to it, that the real, post-tax weighted cost of capital for the Dublin Airport Authority (DAA) – which was established after the de-merging of Aer Rianta[20] – be set at 7.4 per cent.

[20] As set out in the States Airport Act (2004).

Gearing

A4.177 Kearny and Hutson used a gearing assumption of 46 per cent which was based on the actual gearing of the DAA in December 2004. While the impacts on the pre-tax WACC value of using this assumed gearing level were noted as having the potential to reach appreciably 14 basis points, the Commission adopted the position that "this is well within the margin of error for the 7.4 per cent cost of capital recommended by Kearny and Hutson".

Cost of debt

A4.178 The debt premium was estimated at 1.1 per cent. As in the 2001 price review, this measurement was based on the quoted spread between the yield of DAA's euro-denominated debt and the benchmark rate (i.e. a 10-year German government bond).

Cost of equity

Risk-free rate

A4.179 In calculating the cost of capital, on the basis of its external advice, the Commission used the same risk-free rate that was determined in the 2001 price review (i.e. 2.6 per cent). The procedure for estimating the risk-free rate was the same as that used in the previous price review, i.e. using German government bonds as a proxy for the risk-free rate. The main reasons underlying this choice of proxy were as follows:

- Ireland's membership in the Eurozone and the UK's absence from it;
- many Irish companies and utilities source their financing in the euro-denominated debt markets.

A4.180 The authors also noted that not only did their suggested risk-free rate lie within the 2.5 to 2.75 per cent range estimated by the CC in 2001 in estimating the cost of capital for BAA, the figure was also the average of previous Irish determinations.

Equity premium

A4.181 The equity risk premium used in the Commission's estimation of the cost of capital was the same as that used in the 2001 price control review (i.e. 6 per cent). The evidence used to estimate the equity risk premium was the same as that used in the 2001 price review: namely, financial market data on percentage returns and standard deviations for the stock markets in Germany, the UK, and the US between 1986 and 2004; and estimates from academic and practitioner studies including Dimson and Staunton's (2002) estimates of the risk premium.

Equity beta

A4.182 As in the 2001 price review, BAA was used as the appropriate comparator company for estimating DAA's equity beta. Again, the three same steps were followed: i.e. de-gearing BAA's equity beta to arrive at an estimation of the asset beta, adjusting this for differences in risks and then re-levering according to DAA's capital structure.

A4.183 The equity beta for DAA was estimated at 1.1 per cent, which represents an 18 per cent increase in the 0.93 value estimated for Aer Rianta in 2001.

2009 Determination

A4.184 On 4 December 2009, the Commission published its final determination of maximum airport charges for the DAA in which it proposed a pre-tax weighted average cost of capital of 7.1 per cent.

A4.185 The Commission estimated the cost of capital using the same approach it used in its previous determinations. In contrast to previous determinations, however, the Commission undertook its own analysis in estimating the cost of capital (although it remained relatively consistent with the approach taken by Kearney and Huston in 2001 and 2005).

Gearing

A4.186 The Commission decided on a notional gearing level of 50 per cent. Although the Commission noted in its draft determination that the DAA's gearing level in 2009 was 37 per cent, the 50 per cent gearing figure was said to reflect the uncertainty surrounding the "DAA's funding plans over the next regulatory period".

Cost of debt

A4.187 The Commission's draft decision paper noted that, although the DAA's long-term corporate credit rating was downgraded by S&P in March 2009 from A to A-, its credit rating still lies in the "investment grade" category.

A4.188 To estimate the cost of debt for DAA, the Commission considered financial market data on the yields for bonds of 7-10 years' maturity for AA, A and BBB rated bonds, and on the spread between yields on BBB rated and higher-rated bonds. The Commission found that there had been significant narrowing of the spread between BBB and higher-rate bonds since the publication of its draft determination in June 2009, falling from approximately 245 basis points to 91 basis points. The Commission also considered financial market data on the spread of bond yields against the benchmark rate, which it observed had halved over the same period for BBB rated bonds (which represented a fall of 2 per cent). On the basis of this evidence, the Commission concluded that the real cost of debt had fallen since it had published its draft determination and decided on a real post-tax cost of debt of 4.1 per cent.

Cost of equity

Risk-free rate

A4.189 The Commission estimated that the risk-free rate lies in the range 1.5 to 2.5 per cent. For the draft decision, the Commission used a real risk-free rate of 2.5 per cent which it noted is consistent with the most recent price-cap decisions taken by UK and Irish regulators.

A4.190 The Commission relied on a variety of evidence to arrive at this estimate, including the yield on 10-year German government bonds between 1997 and 2009; and data on annualised real investment returns estimated by the Credit Suisse Investment Global Survey 2009.

A4.191 In estimating the real risk-free rate from nominal bond data, the Commission believed, as it did in 2001 and 2005, that an inflation risk premium of 40 per cent was an appropriate assumption.

Equity premium

A4.192 In deciding on the equity premium to use in its cost of capital estimate, the Commission used a range of evidence from a variety of sources, including The Credit Suisse Global Investment Returns Sourcebook 2009 and evidence from other regulatory decisions both in Ireland and the UK. This approach is consistent with that taken in 2005 and in 2001.

A4.193 With regard to historical equity mean returns relative to bonds, The Credit Suisse Global Investment Returns Sourcebook 2009 estimated these as 4.6 per cent for the world, 5 per cent for Europe and 4.4 per cent for Ireland. These estimates were based on data ranging from 1900 to 2008. The Commission believed that looking over such a time span has the advantage of covering not only periods of boom, but also of decline. It argued that this would mitigate the scope for either over- or under-estimating the equity risk premium. Further, Dimson, Marsh and Staunton argued that countries like Ireland and Belgium may be subject to higher risks than others as a result of their banking systems; which, if true, might suggest that the equity risk premium for Ireland should be higher than the world average to reflect country-specific risks.

A4.194 With regard to evidence from past regulatory decisions, the Commission noted that estimates ranged from 3 to 6 per cent.

A4.195 On the basis of the evidence, therefore, the Commission decided in its draft determination that the equity risk premium was in the range 4 to 5 per cent; and in its final determination opted for a spot rate of 5 per cent to calculate the cost of capital.

Equity beta

A4.196 In contrast to both 2005 and 2001, BAA shares were no longer listed at the time of this price cap determination. The Commission did, however, continue to use evidence relating to BAA in determining the appropriate equity beta for DAA. In particular, the

Commission referred to the recent work carried out by the Competition Commission in the UK in 2008 and 2009 in estimating the beta for BAA in price cap reviews for Heathrow, Gatwick and Stansted.

A4.197 In deciding what weight to attach to beta estimation for BAA airports, the Commission considered two things: whether the systematic risks faced by the DAA are different from those risks that BAA airports are exposed to, and whether the airport sector in general had become more risky.

A4.198 On the basis of these considerations, the Commission decided that an asset beta for the DAA in the range of 0.5 to 0.7 was appropriate and decided on a 0.61 point estimate of the asset beta in estimating the cost of capital. With a 50 per cent notional gearing level and an assumed debt beta of zero, this implies an equity beta in the range of 1[21] to 1.4[22] and a point estimate of 1.22.[23]

Overall WACC

Table A4. 20: The Commission's final determination of the WACC

Component	The Commission's view
Risk-free rate	2.5
ERP	0.5
Equity beta	1.22
Tax	12.50
Real cost of equity (pre-tax)	9.9
Real cost of debt (post-tax)	4.1
Gearing	50
Real pre-tax WACC	7.0

Source: CAR

NIAUR

SONI price control determination 2008

A4.199 On 4 April 2008, NIAUR published its decision paper on SONI price controls covering the regulatory period 2007-2010. The Utility Regulator proposed a pre-tax weighted average cost of capital for SONI of 4.98 per cent, including a small company premium of 0.26 per

[21] Equity beta=asset beta/(1-the notional gearing level); =0.5/(1-0.5)=1
[22] Equity beta=asset beta/(1-the notional gearing level); =0.7(1-0.5)=1.4
[23] Equity beta=asset beta/(1-the notional gearing level): =0.61/(1-0.5)=1.22

cent. The Utility Regulator's decision on the WACC was significantly lower than the WACC of 8.59 per cent proposed by SONI for the same period.

Gearing

A4.200 The Utility Regulator rejected SONI's suggestion that a 50 per cent gearing assumption would be appropriate on the basis of it being a small company. This is mainly because the Utility Regulator was:

A4.201 "…unconvinced that SONI's size translated to a debt to equity ratio of 1:1, particularly where, as SONI has stated, the cost of equity (11-12.5 per cent) is higher than the cost of debt (5.365 per cent) which makes it more prudent to raise finance by issuing debt as opposed to equity".

A4.202 The Utility Regulator therefore decided on a notional gearing level of 57.5 per cent.

Cost of debt

A4.203 The Utility Regulator based its estimate of the debt premium on that estimated by the CC in its report on price controls for BAA airports. The Utility Regulator decided that a debt premium of 1.05 per cent was a fair premium for the SONI business.

Cost of equity

Risk-free rate

A4.204 In estimating the WACC the Utility Regulator decided that a risk-free rate of 2.5 per cent, as recommended in the CC's report on BAA airports, was appropriate. The CC's estimate at the time was based on analysis of 5- and 10-year index-linked bonds. Although the Utility Regulator considered subsequent market events, it decided that the CC's figure (which was the latest regulatory estimate at the time) was "robust and relevant" and therefore used it in its cost of capital calculations.

Equity risk premium

A4.205 The Utility Regulator was unconvinced by SONI's 10.8 per cent estimate of the equity risk premium and therefore based its estimate on the CC's range estimate of 2.5 to 4.5 per cent (taken from its report on BAA airports). On the basis of the market uncertainty that prevailed at the time of the decision, the Utility Regulator opted for an estimate of 4.5 per cent, at the upper end of the CC's range.

Equity beta

A4.206 The Utility Regulator rejected SONI's claims that it hadan equity beta of 1.7. They rejected this claim on the basis of the view that SONI's role in the Northern Ireland electricity market and in the SEM implied certainty of revenues. Combined with its revenue correction facility (i.e. the k factor), its natural monopoly position, and its age and

experience, this makes it a less than average investment risk. The Utility Regulator therefore decided on an equity beta for SONI of 0.71. Again, this estimate was also based on the CC's estimated range of 0.30 to 0.6 for BAA airports.

Overall WACC

A4.207 Table A4. 21 below sets out the final proposals on cost of capital elements.

Table A4. 21: Summary of NIAUR determination of WACC

	Utility regulator proposal	***SONI proposal***
Risk-free rate (%)	*2.5*	
Debt premium	*1.05*	
Cost of debt (%)	*3.55*	*5.37*
Gearing	*0.575*	*0.5*
Equity risk premium (%)	*4.5*	
Equity beta	*0.58*	
Tax	*0.28*	*0.28*
Cost of equity (post-tax)	*4.53*	*8.5*
Cost of capital pre-tax	*4.72*	*8.59*
Small company premium	*0.265*	
Final cost of capital pre-tax	*4.98*	*8.59*

Source: NIAUR

Commission for Communication Regulation

eircom 2008

A4.208 On 22 May 2008, ComReg published its response to consultation and decision notice on eircom's cost of capital. ComReg estimated a nominal cost of capital in the range 7.77 to 11.08 per cent for eircom's fixed-line business. ComReg decided that 10.21 would be the most appropriate spot estimate of the nominal weighted average cost of capital for eircom.

Gearing

A4.209 In assessing the WACC, ComReg used a notional gearing level of between 30 and 50 per cent, which it believed was consistent with maintaining an investment grade credit rating. This approach was consistent with that taken in the previous review, and would therefore provide "a degree of regulatory consistency and certainty to Eircom's investors".

Cost of debt

A4.210 ComReg concluded that adopting a cost of debt estimate at the upper end of the range estimated by Oxera (eircom's advisors) would be most appropriate given Oxera's assessment of the recent financial crisis on the cost of debt.

Cost of equity

Risk-free rate

A4.211 Oxera proposed a range of 4.5 to 5 per cent for the nominal risk-free rate which was based on regulatory precedent and market data (at the time), and which reflected uncertainty regarding the future path of interest rates. With regard to market data, Oxera considered historical and nominal yields on Irish and German government bonds across a number of different maturities, taking the spot yield on 10-year Irish government bonds as the lower end of the range.

A4.212 Given the uncertainty over the future path of interest rates, and therefore bond yields, ComReg decided that a prudent approach to the spot yield would be appropriate to account for the possibility that yields may continue to rise. ComReg decided, therefore, that a lower and upper limit of 4.5 and 5 per cent, respectively, would be appropriate.

Equity risk premium

A4.213 Oxera advised ComReg that the equity risk premium lay in the range of 4.8 to 6 per cent. This estimate was based on a range of sources, including Dimson, Marsh and Staunton for 2006, Irish regulatory precedent and ComReg's previous determinations.

A4.214 ComReg decided that there was no robust evidence to conclude that the equity risk premium lay above the range proposed by Oxera. Further, having considered additional market evidence (at the time of the decision), ComReg opted for an equity risk premium value at the top of the range (i.e. 6 per cent) in order to accommodate "potential variation in the ERP as a result of the financial turmoil".

Asset beta

A4.215 ComReg based its estimate of Eircom's asset beta on the assessment carried out by Oxera. Oxera had estimated the asset beta using a combination of approaches and data sources. The first approach involved using Eircom's group beta as a proxy for the beta of its fixed-line business. The second approach involved estimating Eircom's beta directly by using two proxies: beta estimates for comparator companies; and regulatory precedents for the asset beta of regulated telecoms incumbents in, for example, the UK and New Zealand. Table A4. 22 below summarises the beta estimates considered by ComReg.

Table A4. 22: Summary of beta estimates

	Low	Midpoint	High
Direct statistical estimation	0.28	0.49	0.69
Third-party estimates	0.31	0.41	0.51
Peer comparison	0.56	0.64	0.71
Implied fixed-line comparator	0.44	0.56	0.67
Regulatory precedent	0.50	0.65	0.80
Previous WACC determination	0.60	0.70	0.80
Average beta estimates	0.45	0.57	0.70

Source: ComReg

A4.216 On the basis of the evidence, ComReg concluded that the range of 0.47 to 0.7 recommended by Oxera was appropriate and selected a mid-point estimate of 0.57.

Overall WACC

A4.217 Table A4. 23 below summarises the WACC calculation for eircom.

Table A4. 23: WACC calculation including point estimate

	Low	***Midpoint***	***High***	***Point estimate***
Cost of debt				
Nominal risk-free rate (%)	4.5	4.75	5.0	
Debt premium (bps)	120	155	190	
Nominal cost of debt (%)	5.7	6.3	6.9	6.9
Cost of equity				
Nominal risk-free rate (%)	4.5	4.75	5.0	4.75
Asset beta	0.45	0.57	0.7	0.57
Notional gearing (%)	30	40	50	40
Equity beta	0.64	1.02	1.39	1.02
Equity risk premium (%)	4.8	5.4	6.0	6.0
Statutory tax rate (%)	12.5	12.5	12.5	12.5
Post-tax cost of equity (%)	7.57	10.47	13.36	10.87
Nominal pre-tax WACC (%)	7.77	9.43	11.08	10.21

Source: ComReg

Postcomm

Royal Mail price and service review – 2005 decision

A4.218 In December 2005, Postcomm published its final proposals for the price and service quality controls on Royal Mail for the period 2006-2010.

A4.219 Postcomm proposed a pre-tax weighted average cost of capital of 8 per cent for Royal Mail.

Gearing

A4.220 Postcomm accepted Royal Mail's gearing estimate of 20 per cent for the purposes of calculating the cost of capital. According to Postcomm, this estimate was accepted mainly for pragmatic reasons. Not only did Postcomm note that the WACC was not sensitive to the gearing ratio selected (within reasonable bounds at least), it also noted that "it did no wish to express opinions on capital structure issues".

Cost of debt

A4.221 Postcomm accepted Royal Mail's 3 per cent estimate of its cost of debt at 20 per cent gearing, on the basis that they found no evidence to suggest that this estimate was too high. Postcomm decided, therefore, that a 0.5 per cent debt premium should be used in calculating the cost of capital.

Cost of equity

Risk-free rate

A4.222 In estimating the cost of capital, Postcomm considered regulatory precedents. Postcomm highlighted that all of the estimates in previous regulatory determinations considered were above the returns available at the time on index-linked government bonds. This, it was noted, reflected the concerns on the part of these regulators that bond yields at the time were "unsustainably low". Postcomm proceeded to highlight that it shared these same concerns and thus decided that a 2.5 per cent estimate of the risk-free rate was appropriate.

Equity risk premium

A4.223 While both the Department for Trade and Industry and Royal Mail proposed a range of 4 to 5 per cent for the equity risk premium, using regulatory precedent as the main rationale, Postcomm decided that regulatory precedent supported a range with a lower limit of 3.5 per cent. An equity risk premium range of 3.5 to 4 per cent was therefore deemed appropriate.

Equity beta

A4.224 In estimating the equity beta for Royal Mail, Postcomm considered the following:

- regulatory precedents; and
- data on beta estimation calculated from share trading data for a number of companies that are comparable with Royal Mail in some respects.

A4.225 With regard to regulatory precedents, Postcomm used this as a starting point, highlighting that none of the precedents they considered involved an asset beta greater than 0.75 per cent. In terms of considering the betas of other regulated companies, Postcomm selected those which share some of the same features as Royal Mail. For example, regulated companies with a large, diverse and largely captive customer base and those facing little or no competition, were included in the sample. Examples included National Grid, BT, Centrica and Scottish Power.

A4.226 Postcomm concluded that the appropriate asset beta for Royal Mail was in the range 0.65 to 0.75. Further, Postcomm decided that in calculating the cost of capital an estimate at the upper end of this range would be most appropriate, and noted that this decision mainly reflected "the sensitivity of Royal Mail's profits to cost shocks". Using Royal Mail's proposed gearing of 20 per cent, Postcomm used an equity beta in the range 0.75 to 0.94 for its WACC calculations.

Overall WACC

A4.227 Table A4. 24 below provides a summary of Postcomm's estimate of the WACC.

Table A4. 24: Postcomm's estimate of Royal Mail's WACC (pre-tax)

	Low case	***High case***
Risk-free rate	2.50	2.50
Debt premium	0.50	0.50
Cost of debt	3.00	3.00
Gearing	0.20	0.20
Equity risk premium (%)	3.50	5.00
Asset beta	0.65	0.75
Equity beta	0.75	0.94
Corporation tax	0.30	0.30
Cost of equity	7.63	10.27
WACC	6.71	8.81

Source: Postcom

APPENDIX 5: HOW OTHER REGULATORS HAVE DEALT WITH FINANCEABILITY IN IRELAND AND THE UK

Ofwat

Periodic Review 2004 (PR04)

A5.1 Ofwat has a duty to secure that companies are able to finance the proper carrying out of their activities as licensed undertakers. It saw this as having two strands, firstly to see that if a company was efficiently managed and financed it could earn a return at least equal to its cost of capital and, secondly, that its revenues, profits and cash flows must be such as to allow it to raise finance on reasonable terms in the capital markets. It referred to the second strand as financeability. Ofwat noted that a consequence of requiring companies, even efficient ones, to undertake large capital programmes was persistent negative cash flow which could worsen a company's credit rating, increasing their cost of finance and jeopardising their ability to deliver services and improvements.

A5.2 An important aspect of Ofwat's approach to calculating financeability adjustments was the use of a notional level of gearing instead of the actual gearing of water companies. Ofwat took the view that,

> "The actual capital structure that companies choose is a matter for their management and the market. This should not be at the expense of customers, however".

A5.3 Thus Ofwat chose to use the same package of financial indicators for all companies, regardless of their capital structure.

A5.4 Ofwat set its price limits with the view that companies needed to maintain credit ratings comfortably in the investment grade range, so that they could continue to raise the finance necessary to undertake their investment programmes.

A5.5 The financial indicators Ofwat looked at, along with their critical values, are summarised in Table A5. 1

Table A5. 1: Ranges for financial indicators used by Ofwat at PR04

Ratio	Value
Cash interest cover (FFO/gross interest)	Around 3 times
Adjusted cash interest cover i (FFO less capital charges/gross interest)	Around 1.6 times
Adjusted cash interest cover ii (FFO less capital maintenance expenditure/gross interest)	Around 2 times
FFO/debt	Greater than 13%
Retained cash flow (RCF)/debt	Greater than 7%
Gearing (net debt/regulatory capital value)	Below 65%

Source: Ofwat, Future water and sewerage charges 2005-10: Final determinations, p233

A5.6 Revenue uplifts were granted to certain companies in selected years to ensure their projected financial ratios under Ofwat's proposals were compliant with the critical values set out above. Ofwat found that, generally, the ratios for the water-only companies (WoCs) implied by the price limits were better than those for water and sewerage companies (WaSCs). This was to be expected in the light of allowing a small company premium to the cost of capital and the smaller capital programmes required for WoCs relative to their size.[24] The bulk of the £430 million additional revenues accrued to WaSCs who all received adjustments, while the WoCs received £10 million in adjustments.

A5.7 Another key point that underpins Ofwat's calculations of financeability adjustment is the assumed level of distributed dividends. It is Ofwat's view that if companies adopt dividend policies which seem too generous, the argument that financeability adjustments are needed would be undermined. This raises the possibility that companies paying too much in dividends will jeopardise the possibility they might make financeability adjustments at the next review.

A5.8 So, in summary, during the PR04 price review Ofwat made upward adjustments to revenue allowances for certain companies to ensure that the financing of large investment programmes would not be jeopardised. Unlike its price review prior to this (i.e. PR99), these adjustments were of a higher value and were applied more widely.

Periodic Review 2009 (PR09)

A5.9 In ensuring that water companies are able to raise finance on reasonable terms, it is important that investors continue to see water companies maintaining a good quality credit rating. This is important given the need of the industry to finance significant investment programmes and to re-finance existing debt. According to Ofwat in its draft determination paper, this is a particularly pertinent issue in the context of volatile finance markets.

A5.10 In assessing financeability, Ofwat considered a range of financial ratios used by both ratings agencies and the wider financial community. The financial indicators against which Ofwat considered the price limit package, along with their critical values, are summarised in Table A5. 2 below.

[24] Note that Ofwat decided not to include a specific uplift to ratios for small companies at this review, although it allowed a small company premium to the cost of capital.

Table A5. 2: Ranges for financial indicators used by Ofwat at PR09

Ratio	WaSCs	WoCs
Cash interest cover (funds from operations: gross interest)	Around 3 times	Around 3.5 times
Adjusted cash interest cover (funds from operations less capital charges: net interest)	Around 1.6 times	Around 1.8 times
Funds from operations: debt	Around 13%	Around17%
Retained cash flow: debt	Around 8%	Around 10%
Gearing (net debt: regulatory capital value)	Below 65%	Below 60%

Source: Ofwat, Future water and sewerage charges 2010-15: Draft determinations, p113

A5.11 Currently, most water companies are able to demonstrate that they are pre-financed "into the early part of the 2010-15 period." According to Ofwat, this is largely due to the fact that many of the water companies were able to take advantage of issuance windows in order to finance liquidity.

A5.12 In its last price control review (PR04), Ofwat set price limits with the view that companies needed to maintain credit ratings comfortably in the investment grade range, so that they could continue to raise the finance necessary to undertake their investment programmes. In its draft determination, however, Ofwat stated that the current financial environment meant it had to be more explicit with the level of the package of financial ratios.

A5.13 In assessing financeability, therefore, Ofwat based its financial ratios on a minimum credit target rating of strong BBB+/Baa1, noting also that the majority of water companies had a higher credit rating than this.

A5.14 Ofwat assumed uplifts in the ratios for WoCs on the basis that:

> "credit ratings agencies require greater headroom in cash flows for water only companies to account for the impact on cash flow of specific or asymmetric risks."

A5.15 In modelling financial projections, Ofwat made assumptions regarding interest costs and dividend yields. With regard to interest costs, Ofwat assumed a nominal interest rate of 6.2 per cent. According to Ofwat, 3.6 per cent of this represents the real interest rate with the remaining 2.5 per cent reflecting Ofwat's assumption of investors' long-term view of the inflation rate. Ofwat further assumed that 30 per cent of gross debt in opening balancing sheets is index-linked.

A5.16 With regard to equity investment, Ofwat assumed a dividend yield of 5 per cent (which is consistent with the dividend yield on existing equity) which implies a dividend growth rate of 2.1 per cent. While Ofwat acknowledges that this is a lower yield than that assumed in the previous price control (PR04), it stresses that the lower yield is necessary on the basis that it considers equity retention as an "important part of the way forward to ease a financing constraint".

Ofgem

Distribution Price Control Review 4 (DPCR4)

A5.17 This particular price control applies to electricity Distribution Network Operators (DNOs) and covers the period from 1 April 2005 to 31 March 2010.[25]

A5.18 Ofgem endorsed the same approach as in its previous price review and proposed an adjustment to smooth the depreciation allowance over time. For most electricity distribution companies, the lifespan of post-Vesting assets was shortened from 33 years to 20 years once Vesting assets were fully depreciated.[26] In order to maintain neutrality in Net Present Value (NPV) terms, the difference between asset values obtained using 33 years and 20 years was calculated and added in equal instalments to the depreciation spread over 15 years. The motivation for this adjustment was to avoid a "cliff-face" reduction in depreciation allowances once Vesting assets became fully depreciated.

A5.19 When it came to financeability, Ofgem indicated that it intended to propose price controls that were consistent with the regulated companies being able to maintain credit ratings that were "comfortably within investment grade." Ofgem employed a financial model to examine a range of financial indicators to assess whether the proposals were in line with this requirement.

A5.20 For three indicators, test values consistent with credit ratings comfortably within investment grade were set out, as shown in the table below.

Table A5. 3: Financial indicators used by Ofgem at DPCR4

Ratio	Range
Funds flow from operation (FFO)/Interest	Not less than 3x
Retained cash flow/Debt	Not less than 9%
Debt/ egulatory asset value (RAV)	Not higher than 65%

Source: Ofgem

A5.21 Following discussions with ratings agencies, Ofcom concluded that, for standalone distribution companies, weaker test ratios than those shown above could still be consistent with ratings comfortably within investment grade.

A5.22 On the basis of Ofgem's modelling, all the distribution companies - with the exception of EDF-SPN - were able to satisfy the conditions laid out in Table A2.1. The problem with EDF-SPN was that, without further adjustments, the financial indicators would have

[25] Ofgem, Electricity distribution price control review: final proposals, November 2004

[26] Vesting assets refer to those assets held by the company during privatisation of the regional electricity companies in 1990, while post-Vesting assets relates to operational assets acquired after privatisation.

deteriorated towards the end of the control period. This was largely due to a low starting RAV combined with relatively higher projections of capital expenditure. Ofgem acknowledged that some adjustments were required for EDF-SPN to reflect its particular circumstances, and proposed two adjustments to the price control proposals applicable to EDF-SPN only, in order to:[27]

> "adjust the balance between the P0 and X factors, to provide additional revenues in the latter years of the price control period when cash flow would otherwise be weakest, by setting X so that prices increase by RPI+2 in 2006/07 and thereafter, with a corresponding reduction in the P0 value to ensure that the present value of revenues continues to equal the present value of costs and other allowances; and
>
> provide an additional revenue allowance of £1.6m per year to provide a small cushion against downside risks and improve the projected financial ratios."

A5.23 Taken together, Ofgem believed that these adjustments would be sufficient to move the company to comfortable investment grade range. They also reiterated that these adjustments were designed to reflect EDF-SPN's particular circumstances and should not be considered a standard adjustment procedure for other companies (or indeed SPN at a different review) faced with similar financial ratios.

A5.24 Hence, Ofgem used a mixture of price sculpting within the price control period alongside additional revenue allowances, to ensure financeability was maintained for the company whose financial ratios were inadequate the latter element appearing to be similar to the approach taken by Ofwat at PR04).

Transmission Price Control Review (TPCR4)[28]

A5.25 This review concluded with Ofgem's final proposals for the maximum revenue that the four electricity and gas transmission licensees could extract from consumers and other network users over the 5-year period commencing on 1 April 2007.

A5.26 As with DPCR4, Ofgem intended to propose price controls that were consistent with the regulated companies being able to maintain credit ratings that were comfortably within investment grade. In analysing the impact of its final proposal, Ofgem considered a range of capital expenditure scenarios. They indicated that if their proposals did not allow licensees to maintain appropriate credit ratings, they would assume that this meant companies would require additional equity and, as such, an appropriate allowance for the direct costs of equity issuance would be made.

A5.27 Ofgem employed the financial ratios set out in the table below in its assessment.

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[27] Ofgem, Electricity distribution price control review: final proposals, pp 114, November 2004
[28] Ofgem Transmission price control review: final proposals, December 2006

Table A5. 4: Financial indicators used by Ofgem at TPCR4

Ratio
Debt to RAV
Funds flow from operation to RAV
Funds flow from operation plus interest to interest

Source: Ofgem

A5.28 Where the above mentioned financial ratios for a licensee showed a deteriorating trend, such that in the final year of the forthcoming price control this would result in a credit rating of BBB/Baa2 or lower, Ofgem assumed that new equity would be raised earlier in the period to stabilise the ratios at a level which would be consistent with a rating comfortably within the investment grade.

A5.29 Consultation with the ratings agencies helped determine the hurdle level necessary to trigger this. If financial ratios that were problematic in earlier years became acceptable by the final year, Ofgem would use a different approach (e.g. by re-profiling X) to address this, since new equity would not be acceptable.

A5.30 Ofgem's analysis found that financeability issues were only likely to arise for the two Scottish transmission operators, Scottish Power Transmission Limited (SPTL) and Scottish Hydro-Electric Transmission Limited (SHETL), under the higher capital expenditure scenario. It was anticipated that SPTL would require an addition £43 million of new equity if it was to invest up to the maximum forecast level, including all expenditure already allowed for under the Transmission Investment for Renewable Generation (TIRG) scheme. For SHETL, it was anticipated that financeability issues would arise at much lower levels of capital expenditure, and that an additional £39 million of new equity would be required to finance baseline capital expenditure allowances and expenditure under the TIRG scheme. There is a possibility of this rising to £165 million, should SHETL be required to undertake an additional £250 million of capital expenditure to connect new generation.

A5.31 In determining the cost allowances for the issuance of new equity, Ofgem believed it was important to consider the following three factors:

- The appropriate cost to allow per unit of equity raised;
- The mechanism for determining the appropriate amount of new equity required; and
- Whether the allowance should be provided *ex-ante* or ex-post.

A5.32 So, in conclusion, Ofgem proposed a "use it or lose it" approach in dealing with the financeability problem, whereby an appropriate allowance for the cost of equity issuance

would be made, under the assumption that if Ofgem's proposals did not allow the licensee to maintain appropriate credit ratings, it would require additional equity.

Gas Distribution Price Control Review (GDPCR 2007-13)

A5.33 The final proposals, published on 3 December 2007, reset the price control, which specifies the maximum revenue that a network can recover from its customers for the five-year period commencing on 1 April 2008.[29] This was the first review, following the sale of four of the gas distribution networks (GDNs) by NGG in 2005, when Ofgem has been able to make meaningful comparisons between the GDNs.[30] The importance of benchmarking is expected to increase further in the next price review.

A5.34 Ofgem used a notional capital structure assumption and tested their financial model for each of the GDNs against four key financial ratios indicated in the table below.

Table A5. 5: Financial indicators used by Ofgem at GDPCR 2007-13

Ratio
Funds flow from operation (FFO)/interest
Retained cash flow (RCF)/debt
Debt/regulatory asset value (RAV)
Post maintenance interest cover ratio (PMICR)

Source: Ofgem

A5.35 The assessment was based on a consideration of whether a given GDN funded with nominal debt was likely to achieve financial ratios consistent with a "comfortably investment grade credit rating".[31] The first three ratios were used by Ofgem in DPCR4 and their target value remains consistent with those used in previous reviews. Post maintenance interest cover ratio (PMICR) was introduced to represent adjusted interest cover ratio, which is already used by the major credit rating agencies to rate independent GDNs.

A5.36 Ofgem's assessment of financeability was carried out for the round and therefore it is not a requirement for the notional financial model to meet the target values for all ratios in every year.

A5.37 Some reservations were expressed by Ofgem[32] about the usefulness of PMICR in testing the financeability of an Ofgem financial model since it reduced to a function of the cost of capital. Ofgem also noted that, in sectors where PMIRC was a key ratio, most companies

[29] Ofgem; Gas distribution price control review: final proposals, December 2007
[30] The total number of GDNs during the course of this review was eight.
[31] Ofgem; Gas distribution price control review: final proposals, December 2007 pp 108
[32] Ofgem; GDPCR fourth consultation, March 2007

had adopted a certain proportion of index-linked debt which reduced their annual cash interest payment, in turn improving this ratio. Where PMIRC was at a level consistent with a weaker credit rating, consideration was given as to whether a modest change in the level of index-linked debt would improve the ratio such that it was in line with comfortable investment grade ratings. Ofgem acknowledges that the market for index-linked debt may not always be available to the companies, especially in light of recent problems in debt markets.

A5.38 An increase in the assumed cost of equity at the final proposals had a positive impact on financial ratios, as did the increase in capex and oepex assumptions relative to the GDN's views. In conclusion, Ofgem stated that "Our review of financeability indicates that the package of ratios arising from our notional assumptions for each GDN appears consistent with a comfortable investment grade credit rating".[33]

A5.39 There was variation in the performance of the GDNs. Scotland, in particular, performed relatively poorly, although its ratios were consistent with comfortableinvest grade ratings in the next round. Southern and Wales & West also stood out as having relatively weak levels of PMICR.

Civil Aviation Authority (CAA)

Q5 Heathrow and Gatwick price review

A5.40 The Airports Act of 1986 requires the Civil Aviation Authority (CAA) to set maximum limits on airport charges for BAA's London airports (Heathrow, Gatwick and Stansted) and Manchester airport. The CAA is required, by statute, to refer its proposed price controls for each airport to the Competition Commission (CC) for review, although the CAA remains the final decision-making body. The discussion that follows relates to the CAA's price control decisions in respect of Heathrow and Gatwick airports for the five-year period commencing 1 April 2008 (the fifth quinquennium, or Q5).[34]

A5.41 The CAA conducted its own analysis of financeability for each airport to ascertain the extent to which the combination of assets, liabilities, costs and revenues implied by the CAA's proposed price caps, cost of capital and notional capital structure would allow the proposed investments at each airport to be financed.

A5.42 During the consultation process, the CAA received submissions from BAA and BA on the issue of financeability as well as the CC's advice.[35] A number of concerns in relation to CAA's methodology were expressed by BAA, including: the inappropriateness of CAA's revenue projections; the implicit assumption that there would be an index-linked debt

[33] Ofgem; Gas distribution price control review: final proposals, December 2007 pp 108
[34] CAA; Economic regulation of Heathrow and Gatwick airports 2008-2013: CAA decision, March 2008

market for unsecured corporate borrowers rated at BBB or below; and the assumption that airports would be able to raise sufficient capital in the debt markets with a BBB+/Baa1 credit rating to finance the envisaged capital programmes. BAA also suggested that a more probable credit rating for Heathrow was Baa2 rather than Baa1.

A5.43 After a careful evaluation of the available evidence, the CAA took the view that, for Heathrow, its proposed price caps were likely to be consistent with the maintenance of a solid investment grade credit rating from at least two ratings agencies.

A5.44 For Gatwick, most of the evidence pointed towards the same conclusion. However, one particular ratio – the Adjusted Interest Cover Ratio (AICR) – raised concerns as it exhibited a declining profile suggestive of a Baa2, rather than the desired Baa1 credit rating. The CAA considered changing its proposed price control profile, such that revenues were differed to later years of Q5. Howeverit was eventually decided that the original proposed price controls should not be changed since they were broadly cost-reflective, and it made little sense to defer revenues (which would otherwise be due to the business) to later years just to improve notional financeability in particular years. Thus, a consideration of financeability did not lead to adjustments to proposed controls in this case.

A5.45 The CAA did make two adjustments to the initial base case used in its assessment. The first of these was an acknowledgement that while both Heathrow and Gatwick would be able to access debt markets for nominal debt at a BBB+/Baa1 rating, index-linked debt was not available at the time. Thus they made the conservative assumption that no new debt issued in Q5 would be index-linked. The other change relates to assuming that the cost of the existing debt reflects the costs that a reasonably efficient, notionally financed airport operator might have incurred up to that point.

Office of Rail Regulation (ORR)

Periodic Review 2008 (PR08)

A5.46 The currently ongoing 2008 periodic review (PR08) will set Network Rail's outputs, revenue requirement and access charges for the five years from 1 April 2009 to 31 March 2014.[36] It is the first periodic review to take place since the passing of the Railways Act 2005. What follows is a brief discussion of how the ORR has proposed to deal with financeability in its *draft* determinations, which therefore may be subject to change. [37]

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[35] The CC evaluated 6 financial ratios (interest cover, FFO interest cover, PMICR, adjusted ICR, FFO/debt and gearing) and reached the conclusion that the ratios resulting from their price control recommendations would be consistent with an investment grade credit rating taking Q5 as a whole, although the ratios would not be met in each year.

[36] ORR; Periodic review 2008: Draft determinations, June 2008

[37] Although, ORR has indicated that their approach to assessing financeability has been confirmed by consultation. Refer to ORR; Periodic Review 2008: Financial issues update and further consultation, September 2007.

A5.47 The ORR states that it has "a duty to act in a manner that will not render it unduly difficult for Network Rail to finance its activities". Network Rail is required to use all reasonable endeavours to ensure that it maintains an investment grade credit rating, which the ORR must bear in mind in making its proposals. The ORR said they will consider financeability in the round, i.e. taking into account a range of financial indicators (consistent with those used by rating agencies), and the business risks and regulatory protections to inform their assessment.

A5.48 The ORR required the companies to achieve a "solid" investment grade under their proposals of BBB+/Baa1 or above. The financial indicators being used by the ORR in this periodic review is set out in the table below.

Table A5. 6: Financial indicators used by ORR in PR08

Ratio
Adjusted interest cover ratio (AICR)
Debt/Regulatory asset base (RAB)
Funds from operations (FFO)/Interest
Adjusted retained cash flow (RCF)/Debt

Source: ORR

A5.49 Consultation with credit ratings agencies is being used to determine the target level of these ratios. The ORR believes that the above set of indicators adequately covers both long-term solvency and shorter-term cash flow for the relevant control period (CP4). As with the other regulators, they consider the overall set of indicators across the control period as a whole, rather than relying on a particular indicator or year which would be misleading.

A5.50 Financeability was modelled using Network Rail's proposed financial strategy, which contained their proposed debt structure rather than relying on a notional level of gearing, as is the usual precedent. This was considered an appropriate approach for Network Rail's particular circumstances, given constraints on its capital structure and the importance of providing them with a hard budget constraint.

A5.51 The ORR calculated the values for each of the financial ratios for every year of the control period. Based on these modelled values, the ORR was able to conclude that

> "We consider that these ratios, considered in the round and combined with our assessment of the risks facing Network Rail compared to those facing other regulated network industries and the protections provided to the company as part of the overall package for CP4, are consistent with a solid investment grade credit rating, in current and prospective market conditions."

A5.52 In addition the ORR conducted sensitivity analysis, running Monte Carlo simulations to test the robustness of Network Rail's financial position in the face of cost and revenue uncertainty. The conclusion of this exercise was that Network Rail would be able to

maintain a solid investment grade credit rating in the face of a range of fluctuations in cash flow.

Commission for Aviation Regulation

Determination of maximum levels of airport charges – 2005

A5.53 One of the three statutory objectives of the Commission as set out in Section 33(1) of the 2001 Act is:

> " to enable Dublin Airport Authority to operate and develop Dublin Airport in a sustainable and financial viable manner"

A5.54 In assessing financial viability, the CAR considered a range of financial ratios used by credit ratings agencies and by the wider financial community. These financial ratios and their corresponding thresholds are listed in Table A5. 7 below.

Table A5. 7: Financial ratios and threshold values used by CAR

Ratio	Threshold value
FFO: Debt	20%
FFO: Interest	2.5x
EBITDA: Interest	2x
EBIT: Interest	1.5x
AICR	1.5x

Source: CAR

A5.55 Of these ratios, CAR focused particularly on FFO debt and FFO interest. This focus was justified on the basis that these were the two ratios to which Standard and Poor's paid particular attention. Table A5. 8 below sets out the financial ratios for the various financial ratios listed above.

Table A5. 8: Financial scenarios used by CAR

Group financial indicator	Indicative threshold	2006	2007	2008	2009	2010	Average
Debt: RAB at year end (%)	70 (max)	49.0	52.4	54.3	54.1	53.0	52.6
FFO: average debt (%)	20	17.5	16.2	14.3	14.2	14.8	15.4
EBITDA cover	2	3.9	3.9	3.1	3.3	3.5	3.5
FFO cover	2.5	3.9	3.9	3.2	3.4	3.6	3.6
AICR cover	1.5	2.5	2.4	2.0	2.1	2.2	2.2
EBIT cover	1.5	2.4	2.3	1.9	2.0	2.1	2.2

Source: CAR

A5.56 According to these figures, the projected FFO interest ratio exceeded the threshold value across the period considered. The FFO debt ratio, on the other hand, fell below its threshold value. The Commission concluded, therefore, that the FFO debt ratio might pose a problem for the DAA in the future.

A5.57 The Commission rejected the DAA's argument that the determination should be set in a manner consistent with maintaining their single A credit rating. The DAA argued that maintaining this credit rating was essential not only because a lower credit rating might have the effect of restricting its borrowing capacity (and thereby hampering their ability to invest) but also because a lower rating might increase the DAA's real cost of debt.

A5.58 The Commission rejected the case put forward by the DAA for a number of reasons. Firstly, according to the Commission, the DAA underestimated "the liquidity and depth of international bond markets for financing investment grade below A". According to the CAR, while the pool of potential investors reducess the credit rating approaches BBB, the level of investment grade debt below A is not insignificant in volume.

A5.59 Secondly, the Commission highlighted that the DAA neglected to consider that fact that there are several airports which are financially viable despite having an investment grading of below A grade, and that some of these have successfully managed to access bond markets.

A5.60 Thirdly, studies carried out by NERA and Europe Economics both found that the cost of BBB rated debt over "A" rated debt would be in the order of 20-35 bps. According to the Commission, however, this increase in the cost of debt would have a negligible impact on the company's WACC. At a notional gearing of 46 per cent, for example, the CAR found that the pre-tax WACC would be expected to increase by around 14bps which the CAR regarded as well within the margin of error for the 7.4 per cent cost of capital it set in their determination paper. In light of this, therefore, the CAR concluded that:

> "the modest impact of a BBB rating rather than an A rating on the WACC lends further support to the proposition that the Commission should interpret its sustainable and financial viability objective as enabling the DAA to maintain and investment grade rating as opposed to an "A" credit rating."

Draft determination of maximum levels of airport charges at Dublin airport – 2009

A5.61 When assessing the sustainability and the financial viability of the DAA in its decision paper, the Commission noted that while the medium- to long-term prospects for the DAA Group finances were good, its short-term ratios were poor. In particular, the Commission noted that the forecast FFO:debt ratio was lower than that estimated in its draft decision paper, and that there were plausible reasons for investors to "expect the DAA's current financial ratios to look weaker than they might in other periods". According to the Commission, this is largely on account of the following factors which have had a negative impact on the DAA's balance sheets:

- The capital investment programme relating to the building of terminal two is being completed which the DAA did not fund using an equity injection from shareholders.

- The coinciding of the completing of the investment programme with the economic downturn has had material effects on the DAA's profits.

A5.62 Despite the Commission forecasting in its draft determination that the DAA would have a FFO:debt ratio of well below 15 per cent in the near future, S&P gave the DAA an A credit rating in August 2009. In its final decision, however, the Commission noted that since its draft decision there have been a number of developments that may have an impact on the way investors assess the DAA's business. In particular, the Commission noted that continued falls in passenger demand may result in an investment grading downgrade. Thus, after its draft decision, the Commission revised up the level of airport charges it will allow the DAA in 2010 which, it argues, should "result in a more favourable credit rating all else being equal".

A5.63 Although the Commission stated that it was confident that the Determination would enable the DAA "to improve various financial rations to levels consistent with investment grade in the medium-term", it accepted that in the current environment the DAA's investment grade may be at risk. Thus, in considering how the situation might be improved in the short term, the Commission considered the following two options:

- an equity injection that would yield an FFO:debt ratio of 15 per cent in 2010, which would rise rapidly in later years; and

- requesting current users at Dublin airport pay higher charges than those estimated in earlier sections of the Determination.

A5.64 The first option was ruled out on the basis that, in one of the government's policies referred to in the 2009 Direction, there will be no possibility of an equity injection from the government. With regard to the second option, the Commission stated that there was a case for further price rises in 2010 and thus decided to decrease the depreciation charge which corresponded to rise in the price cap of €0.68. For later years, however, the Commission decided that no other increase in the level of airport charges be allowed in the Determination as it was satisfied that such changes would not be necessary to enable the DAA to operate the airport in a "financially viable and sustainable manner".

Postcomm

Royal Mail Price and Service Review – final proposals 2005

A5.65 One of Postcomm's statutory obligations under the Postal Services Act 2008 is to carry out its functions in a manner that is consistent with ensuring the provisions of a universal service, and to have regard to the need to ensure that:

> "licence holders such as Royal Mail are able to finance the activities authorised or required by their licenses."

A5.66 In assessing financeability, the approach taken by Postcomm was similar to that taken by other UK regulators: namely, setting price limits that allow regulated entities to maintain an investment grade credit rating. Postcomm highlighted, however, two key factors that meant that it could not entirely replicate the approach taken by other regulators. First, Royal Mail is not a quoted company and does not have a credit rating. Second, at the time of the review, Royal Mail's balance sheet was not healthy and this was largely due to the scale of its pension deficits.

A5.67 Postcomm's assessment of financial viability, therefore, was intended not only to ensure that Royal Mail's regulated entities have sufficient cash to fund their operation and capital costs, but also to ensure that Royal Mail's pension and balance sheet deficits "can be addressed in a reasonable period of time".

A5.68 In addition to the above issues, Postcomm also considered uncertainty and risk which it identified as key issues affecting the financing of Royal Mail. The risks that Postcomm made specific provisions for in the price control included the following:

- volume risks; and
- increases in the pension deficit.

A5.69 In light of the state of Royal Mail's balance sheet, Postcomm focused on looking at the "glide path" of Royal Mail's balance sheet over the price control period as well as beyond it. In particular, Postcomm conducted a cash flow and balance sheet analysis in order to determine the extent to which, under reasonable assumptions, Royal Mail:

> "could be expected to return to a position of balance sheet surplus and make significant progress towards financial strength (e.g. to justify an investment grade credit)."

A5.70 In assessing financeability, in addition to considering the extent to which consumers should be asked to fund the pension and budget deficit, Postcomm also noted that there are many actions that Royal Mail could take to help improve its financial situation. Indeed, Postcomm highlighted that it believed that it would be appropriate to treat Royal Mail in a manner consistent with "any other commercial business finding itself in a similar situation".

A5.71 While Postcomm noted that there are a number of actions that Royal Mail could take to improve its financial position other than by raising prices (e.g. outperforming the price control in terms of efficiency, asset disposals and/or refinancing arrangements), it also noted that it was not its intention to be "prescriptive" in this regard.

A5.72 In assessing whether or not Royal Mail could reasonably be expected to achieve an investment grade rating over the price control period, Postcomm made a number of assumptions, including, for example, that:

- Royal Mail Group (RMG) would be considered as an ”industrial” company (for which the financial ratios are more demanding) by credit rating agencies as opposed to a utility; and

- a limited share of the total fund deficit would be attributed to Post Office Ltd.

A5.73 In summary, having observed that Royal Mail's balance sheet would be in a state of deficit at the beginning of the price control period, Postcomm concluded that it would be unlikely to achieve an investment grade credit rating from a ratings agency. However, the projections made in Postcomm's financial model for Royal Mail's regulated activities balance sheet, suggested that:

> “assuming its management achieves the profits projected by Postcomm and acts in a prudent way, by the end of the price control period Royal Mail's balance sheet for its regulated activities will have returned to surplus and RMG will be in a better position to achieve an investment credit grading”