

August 2009

**Ofwat's PR09 Draft
Determinations: A Review of
the Financial Assumptions
A Final Report for Water UK**

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Executive Summary

This report sets out NERA’s comments on Ofwat’s Weighted Average Cost of Capital (WACC) for PR09, as set out in the Draft Determinations (DD).¹

We first discuss Ofwat’s conclusions at a high level, comparing Ofwat’s overall WACC assumption of 4.5% post-tax real against NERA’s recommended range of 4.6-5.1%² which formed the basis for the majority of company Final Business Plan (FBP) WACC assumptions. We then comment on the individual WACC parameters assumed by Ofwat within the Capital Asset Pricing Model (CAPM) WACC framework

Ofwat’s DD WACC Assumptions

Table 1 shows Ofwat’s DD WACC decision of 4.5%, against: (i) NERA’s range of 4.6-5.1%; and (ii) Ofwat’s advisers’ (Europe Economics (EE)) recommendations.

Table 1
Cost of Capital Estimates: Ofwat’s DD, Europe Economics and NERA

	EE Range (July)	Ofwat DD (July)	NERA (January)
Gearing (debt/RCV)	55-65	57.5	60
Risk Free Rate	1.5-2.2	2.0	2.5
Equity Risk Premium	4.1-5.4	5.4	5.4
Asset Beta	0.22-0.32	0.4	0.35-0.45
Equity Beta	0.48-0.92	0.9	0.88-1.13
Post-tax Cost of Equity	3.5-7.2	7.1	7.4-8.2
Pre-tax Cost of Debt	2.5-4.7	3.6	3.8-4.2
Post-tax (vanilla) WACC	2.9-5.6	5.1	5.3-5.8
Post-tax WACC	2.5-4.7	4.5	4.6-5.1
“Marked-Up” Post-tax WACC	2.9-5.4	N/A	N/A

The DD states that the adopted WACC parameters are at the “high end” of the EE range. However, it is not clear that this is the case. EE’s range is 2.5-4.7% before uplifts (“mark up”) and 2.9-5.4% after uplifts. Hence it is more accurate to say that the DD WACC is in the upper half of the EE range.

More fundamentally, EE’s range is so wide that it allows Ofwat to exercise discretion to choose any number between 2.5% and 5.4%. The DD does not provide a thorough explanation of how the assumptions underlying the WACC of 4.5% have been derived. This is not consistent with good regulatory practice.

¹ Ofwat (2009) “Future water and sewerage charges 2010-15: Draft determinations”, 23 July.

² NERA (2009) “Cost of capital for PR09”, A Report for Water UK, January.

This approach undermines the transparency of the regulatory process, since it removes any objective basis for setting an allowed rate of return. Adopting a much firmer basis for the WACC in the Final Determinations would be consistent with good regulatory practice.

We also note that the lower parts of EE's ranges (before and after uplifts) are implausible, and reflect inconsistencies in the use of short term and long run evidence (such as a 1.5% risk free rate and 1% debt premium). The lower end of EE's cost of equity range of 3.5% is especially implausible and is below the rates at which water companies are currently raising debt.

Ofwat's Cost of Equity

The DD "point" estimate of the cost of equity of 7.1% is below NERA's January 2009 range for AMP5 of 7.4-8.2%, based on long run historic evidence, and below the cost of equity of 7.7% that was used to set the cost of capital at PR04.

NERA believe that the DD cost of equity conclusion of 7.1% is not only lower than long run historic evidence but also fails to reflect the impact of the recession and increased market volatility on the increased returns that equity investors require to compensate for increased risk over AMP5.

Since our January report the UK economy has moved firmly into recession and, although there are currently some signs of macro-economic recovery, equity markets are still significantly more volatile and higher risk than at previous price reviews. Reflecting these instabilities in global capital markets NERA's updated DGM analysis suggests water companies' costs of equity currently lies in the range of 7.9-10.6%, with an average of 9.4%, substantially above the DD. As a result, we believe that the DD cost of equity of 7.1% is insufficient for the *average* water company to attract equity finance into long-term irreversible investments. This conclusion is of particular importance for companies that need new equity investment to finance their capital investment programme. While the cost of equity has particular importance for those companies needing to raise new equity, it matters to all companies, as an incentive to retaining equity participation, which reduces risk to customers.

Importance of Cross Checks

Because the CAPM allows a wide range of answers, any regulator's selection of input parameters is constrained by the need to produce an overall estimate of the cost of equity which is consistent with other market evidence.

The DD states that the CAPM cost of equity conclusions have been cross checked with evidence from the dividend growth model (DGM). The DD refers to the EE conclusions that the DGM cost of equity is in a range of 5.6-7.7%. However, the EE DGM analysis is flawed since it uses an incorrect formulation of the DGM and arbitrary input assumptions. Notwithstanding these errors, the DD interpretation of the EE results is also incorrect since EE's DGM analysis is based on a lower gearing than is assumed in the DD.

Updated NERA analysis presented in this paper shows that a correct formulation of the DGM produces a cost of equity for listed WaSCs in the range of 7.9-10.5% since the credit crisis

started, and 7.4-8.2% over a longer historic period. The DD conclusion that the cost of equity for the water sector is 7.1% is therefore not consistent with DGM market data.

Consultation with equity investors on required returns to attract and retain new equity investment in the water sector also provides an important cross check on the overall cost of equity, especially in current market conditions. Initial results from an Investor Survey conducted by Indepen following the DD also suggest that the conclusions on the cost of equity and the WACC are lower than the market requires.

Risk Free Rate

The key reason why the DD CAPM estimate is too low is because the risk free rate estimate is too low. The DD has used a risk free rate of 2.0% as a long run assumption. However, by choosing a ten year historical average of UK ILG (Index Linked Gilt) yields, the DD has relied on data that is biased due to the introduction of the Minimum Funding Requirement for pensions schemes from 1997 and the more recent introduction of the Pension Protection Fund and FRS17 (which have further encouraged funds to hold gilts). For these reasons UK ILGs no longer serve as a robust measure for estimating the risk free rate applicable to decisions by investors in the wider stock market. NERA has identified an interest rate swap approach as an unbiased alternative to ILGs which suggests a risk free rate in the region of 2.5% over the long run.

Equity Risk Premium and Beta

The DD's estimates for the ERP of 5.4% and asset beta of 0.4 are broadly consistent with NERA's assumptions in our January Report, and reflect long run levels for these parameters consistent with a long run risk free rate of 2.5%. However, if the DD uses a lower risk free rate than 2.5% the ERP must be increased to ensure that its estimate of total market returns (sum of risk free rate and ERP) is plausible.

As with other aspects of the DD WACC assessment, we are concerned that both the beta and ERP assumptions are described as being at the "high end" of the EE recommendations, giving the impression that the estimates could be revised downward in the FD.

EE's report does not show that an ERP of 5.4% is at the top end of a plausible range. In fact it shows that the current ERP is likely to be higher than 5.4%: EE refer to academic papers that show the ERP rises by around 20% in periods of crisis, coming back to its previous "normal level" *after three years after the end of the recession*. Given that EE recommend that the normal ERP is 5% an increase in the ERP of 20% in periods of crisis suggests an ERP of around 6% could be justified for the whole of the AMP5 period.

Cost of Debt

Overall, we largely agree with the approach to estimating the cost of debt in the DD, namely to estimate the cost of debt over AMP5 as a weighted average of existing and forward-looking debt costs.

The DD does not explicitly link the cost of debt to a credit rating assumption. Our analysis shows that the cost of debt in the DD is consistent with A or A- ratings, rather than the BBB+

rating used in the financeability tests (discussed below). This is internally inconsistent and may affect companies' ability to finance their functions.

More generally, the DD is not transparent about how the cost of debt is derived and how the estimate reconciles with the latest market evidence, which makes it difficult to scrutinise the underlying assumptions. Nevertheless, we note:

- § The DD range for the cost of new debt, 4.1-4.3%, is slightly below our assessment of the cost of new debt at an A- rating of 4.3-4.4%, and;
- § Our estimate of the real cost of companies' existing debt is 3.6% at an A- rating, slightly above the DD estimate of 3.4%.

Our latest estimates reflect the fact that the sizeable decrease in the nominal cost of new debt since the time of our January report has been offset to some degree by decreases in expected inflation over AMP5. As a result, our latest analysis suggests that the overall cost of debt including transaction and pre-funding costs for PR09 is in the region of 3.8% rather than the DD allowance of 3.6%. Importantly, however, this estimate is stated before considering the significant risks around forward-looking debt costs such as the economic outlook, likely volume of government gilt issuance and the unwinding of quantitative easing. Downside risks must also be taken into account in financeability modelling to ensure that companies can finance their functions under a range of plausible macro-economic conditions.

Financeability and Testing Downside Risks

The DD states that the financeability tests have been conducted to ensure financial ratios are consistent with a minimum of a strong BBB+ rating. This rating assumption is justified on the basis that investors in utility debt are "less sensitive to the difference between a high BBB and low A range ratings" (DD, p.114). However, this statement is contradicted by a recent report by S&P on the UK Water sector in which S&P observes that investors have a clear preference for 'A' rated bonds:

*"Recent bond issuance suggests [...] investors' preference for debt rated in the 'A' category."*³

In other parts of the report, S&P refers to Ofwat as being "relatively relaxed" for not making a distinction between A- and BBB+ rated debt.⁴

Ofwat's duty to ensure companies can finance their functions also requires Ofwat to ensure that companies have sufficient headroom in their projected financial ratios to be able to raise finance in both central case and plausible downside case scenarios. Evidence of investors' current clear preference for 'A' rated bonds suggests the assumption of a BBB+ rating in the DD might not be adequate to enable companies to maintain efficient access to financial markets over AMP5 in the event of a plausible downside scenario materialising.

³ Standard and Poors (3 August 2009), "U.K. Regulator's Proposals For The Water Sector In 2010-2015 Are Likely To Squeeze Rating Headroom", p. 18.

⁴ Standard and Poors (3 August 2009), "U.K. Regulator's Proposals For The Water Sector In 2010-2015 Are Likely To Squeeze Rating Headroom", p. 18.

Skewed Expected Returns

Our wider assessment of the DD is that it includes a number of mechanisms and adjustments (such as the CIS, OPA, opex efficiency), which either prevent companies from recovering costs or expose companies' returns asymmetrically to more downside than upside risk.

The effect of these design flaws is likely to skew expected returns towards lower outturns such that the DD post-tax cost of capital of 4.5% is likely to lie above the expected rate of return investors actually anticipate. This has implications for companies' ability to retain and attract finance and, therefore, could be inconsistent with Ofwat's statutory duty to enable companies to finance themselves. Two obvious remedies present themselves:

- § An increase in the allowed rate of return above the cost of capital, to compensate for the skewed downside risks, so that expected returns equal the central estimate of the cost of capital in the DD, or;
- § For financeability tests to be based on expected costs rather than allowed costs, thereby not systematically denying companies a reasonable prospect of cost recovery.

In the FD, we recommend that financeability tests should give full consideration to the link between the other regulatory allowances and the expected returns. If the best estimate of the WACC is 4.5% then an averagely efficient company must expect to earn at least 4.5% over the price control period, in order to finance its functions.

Implications for Ofwat's WACC Approach at Final Determinations

This report has shown that the available evidence suggests that a higher rate of return should be allowed in the FD for the following reasons:

- § The cost of equity conclusion of 7.1% in the DD cannot be reconciled with wider market evidence on the cost of equity from the DGM, especially in recent periods when equity volatility has been high;
- § The DD has used a downwardly biased estimate of the long run risk free rate of 2.0% which is based on ILG yields that are known to be distorted by the effects of accounting and actuarial regulations. We show that an unbiased estimate of the risk free rate based on swaps, and consistent with long run historic international evidence, leads to a central risk free rate around 0.5% higher than Ofwat's assumption;
- § On the cost of debt, our latest analysis suggests that the overall pre-tax cost of debt including transaction and pre-funding costs for AMP5 is around 3.8% rather than the DD estimate of 3.6%.
- § EE recommend that Ofwat should "mark up" the WACC to take account of the asymmetric consequences of regulatory errors. This approach was also followed by the Competition Commission in the 2007 and 2008 airports price reviews and suggests that a WACC towards the upper end of a plausible range should be adopted. There is no evidence that a WACC of 4.5% is at the upper end of a plausible range.

Overall, we regard our January WACC range of 4.6-5.1% for the AMP5 period as broadly robust given recent evidence. Although debt costs have fallen somewhat since our January

report, equity market volatility remains high and there is evidence that the cost of equity is expected to remain above the long run historic range of 7.4-8.2% presented in the January report.

1. Introduction

Water UK has commissioned NERA to review the cost of capital assumptions incorporated in Ofwat's Draft Determination (DD) on the prices English and Welsh water companies will be able to charge over the period 2010-15.⁵

This review of the DD follows on from a January 2009 report NERA prepared on the water industry's cost of capital (hereafter referred to as "the January 2009 report").⁶

This report does not update NERA's overall estimate of the cost of capital for the sector. However, we do comment on the consistency of the DD with updated market data up to August 2009. We also review the internal consistency of the DD, such as between testing the cost of debt estimated within the cost of capital and the credit ratings assumed in the approach to financeability.

This report is structured as follows:

- § Section 1 makes a high-level comparison between the DD cost of equity proposals and NERA's;
- § Section 2 analyses the DD risk-free rate;
- § Section 3 reviews the DD beta and ERP estimates;
- § Section 4 reviews the DD cost of debt;
- § Section 5 evaluates the approach to financeability tests in the DD.

The Appendices provide various supplementary materials.

⁵ See Ofwat (2009) "Future water and sewerage charges 2010-15: Draft determinations", July 23.

⁶ See NERA (2009) "Cost of capital for PR09: A Final Report for Water UK", January.

2. High Level Review of the Draft Determination Cost of Equity

The DD has adopted a cost of equity of 7.1% (at 57.5% gearing). This is below NERA's proposed (January 2009) range of 7.4-8.2%, based on long run historic evidence, and below the cost of equity of 7.7% used to set the cost of capital at PR04.

Table 2.1 compares the differences between NERA's and the DD's estimate of cost of equity for AMP5.

Table 2.1
Comparison of the Draft Determination with NERA (January 2009) WACC (%)

	NERA (January 2009)		Draft Determination (July 2009)	
	CAPM	DGM	CAPM	DGM ¹
Real Risk-free Rate	2.5		2.0	
Equity Risk Premium	5.4		5.4	
Gearing	60	60	57.5	54
Asset Beta	0.35 – 0.45		0.40	
Equity Beta	0.88 – 1.13		0.94	
Cost of Equity (real, post-tax)	7.2 – 8.6	7.4 – 8.2	7.1	5.6 – 7.7
Conclusion	7.4 – 8.2		7.1	
Conclusion (60% gearing)	7.4 – 8.2		7.4	

Source: Ofwat DD PR09; NERA (January 2009). ¹Ofwat refer to EE's analysis on the DGM.

Since the DD has used a lower gearing than NERA in their WACC conclusions, Table 2.1 also presents the DD cost of equity at 60% gearing.

We note the following comparison between the DD and NERA's cost of equity assumptions:

- § At a comparable level of gearing, the DD cost of equity of 7.4% (at 60% gearing) is at the *low end* of the NERA (January 2009) range of 7.4-8.2%.
- § The key difference between the DD and NERA on the CAPM is the risk free rate. The DD uses a risk free rate of 2.0%, whereas NERA's central long run assumption is 2.5%. This is due to reliance on ILG data in the DD, which is widely recognized to be downwardly biased. By comparison NERA estimate the risk free rate based on swap rates, an approach that is supported by the recent finance literature.
- § There is a significant difference between NERA's DGM range of 7.4-8.2% and the DD reference to EE's DGM range of 5.6-7.7%. We show in Section 2.1.1 that this is partly due to an incorrect formulation of the DGM by EE and partly due to a failure to adjust EE's DGM results for a higher notional gearing assumption in the DD.

The DD is not generally transparent about how individual CAPM parameters are derived. Especially, it is not clear how the evidence presented by EE is interpreted and how much weight is attached to current market evidence.

In the interests of regulatory transparency, consistent with sound regulatory principles, the DD should explain the assumptions made using objective and empirically verifiable data. The DD does not, however, transparently explain the basis for the estimate of the cost of capital, nor clearly cite the evidence upon which the estimate is based. A fuller justification for its estimate of the cost of capital, linked to objective and empirically verifiable data, should be provided within the FD.

Another general comment on the cost of equity conclusions in the DD is that they are overly precise. The cost of equity and CAPM parameters are stated as single point estimates, but the range of plausible estimates is not considered. We believe that the cost of equity is best estimated within a range (and a point estimate determined using the financeability test as discussed in more detail below) since there are at least two sources of underlying uncertainty:

- i. uncertainty around the true value of the parameter being estimated; and
- ii. uncertainty about the evolution of the true parameter value over the regulatory period.

We note that at present both types of uncertainty are amplified by the ongoing financial crisis. We also note that the decision not to state the plausible range for the cost of equity within the DD is in contrast to other regulatory decisions, such as those by the Competition Commission for BAA.

Once a plausible range for the cost of equity has been estimated, the purpose of the financeability tests is then to make sure the “point” cost of equity that is used in setting prices allows the company to achieve projected financial ratios that are consistent with the credit rating assumed in the cost of debt, and provides the company with sufficient headroom to cope with company specific risks. This framework should be adopted for the FD.

2.1. The use of DGM Evidence in the Draft Determination is Flawed

Because the CAPM allows a wide range of answers, any regulator’s selection of input parameters is constrained by the need to produce an overall estimate of the cost of equity which is consistent with other market evidence.

The DD states that the CAPM cost of equity conclusions have been cross-checked with evidence from the dividend growth model (DGM). The DD refers to EE’s conclusions that the DGM cost of equity is in a range of 5.6-7.7%, and then states:

“Our draft determinations cost of equity is at the high end of the range under the dividend growth model [...]” (Ofwat DD PR09, p.107).

However, we show that the EE DGM analysis is flawed and the interpretation of the EE results in the DD is incorrect since EE’s DGM is based on a lower gearing than has been assumed in the DD.

2.1.1. Errors in Ofwat’s and EE’s DGM Analysis

EE’s DGM analysis is set out in Section 9 of their report. However, EE’s analysis of the cost of equity using the DGM and the interpretation of EE’s results in the DD contains at least four major errors.

First Error: Model Specification

EE's first error concerns their formulation of the model. EE (p.120) set out the DGM as the sum of the prospective dividend yield plus a constant long term growth rate:

$$r = (D_1/P_0) + g$$

EE note that this is a simple version of the model and "*multi-stage variations of the model allow for differentiation of growth between periods*". However, EE say that "*owing to our reliance on the DGM primarily as a cross check for cost of equity estimates, we focus on the simpler high-level version of the model*".

Given the importance of undertaking proper and robust cross checks on cost of equity, we disagree with EE's "constant growth" formulation of the DGM that appears to be justified on the basis of its simplicity.

The use of a simple "constant growth" DGM model ignores the fact that investors **can** and **do** forecast earnings for individual years. This is especially important for regulated companies since investors know that dividends over the period generally reflect such factors as expected RCV growth, expected inflation and the impact of price reviews.⁷ It is therefore a major error by EE to use a formulation of the DGM that assumes constant dividend growth, especially when the only reason given to justify this is its simplicity.

EE's estimate of the dividend growth rate biases downwards their overall conclusions on the cost of equity since analysts' forecasts of dividend growth (which we use as proxies for investors' forecasts of dividend growth) are generally higher than EE's assumptions over the period of their modeling. In particular, our analysis shows that over the period from January 2007 to April 2009 analyst's forecasts of medium term dividend growth averaged 2.6% in real terms, which is greater than EE's central estimate of 2.2 %.⁸

Second Error: Long-term Dividend Growth Rate

The second error made by EE in their formulation of the model is the assumption used for the long term dividend growth rate. EE state that they consider the following sources for the long-term dividend growth rate:

1. Analyst projections of dividend growth into the next few years;
2. Long-run trend growth in the UK economy; and
3. Ofwat's projected real growth in water companies' regulatory capital values.

⁷ By contrast to the UK, the use of DGM is standard practice in US rate case hearings for estimating the allowed cost of equity. The "multi period dividend growth model" is the standard formulation of the DGM model that is used in US courts.

⁸ We note that EE dismiss data on analysts' forecasts of dividend growth available from I/B/E/S on the basis that these forecasts would be upwardly biased. EE justify their decision by reference to an unrefereed article by McClure (2008). We note that the article does not provide evidence that this would be the case for UK water stocks. As a result, evidence from I/B/E/S should not be dismissed.

From these data sources, it is not clear how EE can justify a “Low” growth rate of 2.0% and a “High” growth rate of 2.5%. As noted above, analyst projections of dividend growth over the period from 2007 to 2009 show an average growth rate of 2.6%, above EE’s “High” estimate. Further, according to Consensus Economics, the projected long-run trend growth for the UK economy is 2.4% and real growth in water companies’ regulatory capital values averaged 2.2% (covering 2005-10). This means all of EE’s data sources provide estimates above 2.0% which is used by EE as the “Low” long-term dividend growth rate. This means EE’s “Low” and “High” estimates of the long-term growth rates cannot be reconciled with EE’s data sources and produce estimates which are downwardly biased. Consequently, EE’s DGM cost of equity range is downwardly biased.

Third Error: Internal Consistency

The third flaw in EE’s application of the DGM is that EE give no regard to internal consistency of parameter values. For instance, for the “Low” cost of equity, EE combine their estimate of *low* dividend yield of 3.6% (25th percentile) with their estimate of the *low* long-term dividend growth rate of 2.0%, to derive a cost of equity of 5.6% (=3.6%+2.0%). However, a water company with a *below* average dividend yield is likely to be expected to have an *above* average long-term dividend growth rate (since the company sacrifices current dividends for future dividend growth). This internal consistency further biases EE’s “Low” cost of equity estimate downward.

Fourth Error: Re-levering for Consistent Capital Structure

EE’s fourth error in the application of the DGM is that EE did not re-lever the cost of equity to reflect EE’s notional capital structure. EE’s DGM-derived cost of equity estimates are based on a 54% actual gearing assumption. EE argue that the actual gearing of 54% underlying their DGM results would be sufficiently similar to EE’s overall gearing assumption of 55% at the low end. However, notional gearing of 57.5% is assumed in the DD which increases the implied DGM results by around 0.3%.

2.1.2. Errors by Ofwat in Application of EE’s DGM Results

As noted above, the DD refers to EE’s DGM cost of equity range of 5.6-7.7% and states that “[o]ur draft determinations cost of equity is at the high end of the range under the dividend growth model [...]” (Ofwat DD PR09, p.107).

However, as shown above EE’s DGM analysis is flawed and EE’s results have largely been misinterpreted in the DD. EE’s DGM cost of equity is based on an average gearing assumption of 54%, which is below the DD notional gearing assumption of 57.5%. The DD, however, does not adjust EE’s DGM range for the difference in gearing. Since the cost of equity increases with level of gearing, EE’s estimates unambiguously understate the actual cost of equity at 57.5% gearing level.

Table 2.2 presents EE’s DGM-derived cost of equity on a notional 57.5% gearing assumption (which is consistent with the DD) and a notional 60% gearing assumption (which is consistent with NERA).

Table 2.2
Europe Economics' DGM-derived Cost of Equity for Water Companies
(Adjusted for Notional Gearing)

		Low	Central	High	Calculation	
a	Risk free Rate	Ofwat	2.0%	2.0%	2.0%	
b	ERP	Ofwat	5.4%	5.4%	5.4%	
c	Cost of Equity at 54% gearing	EE	5.6%	6.9%	7.7%	
d	Implicit Equity Beta (at 54% gearing)	calc	0.67	0.91	1.06	$= (c-a)/b$
e	Implicit Asset Beta	calc	0.31	0.42	0.49	$= d/(1+54%/(1-54%))$
f	Implicit Equity Beta (at 57.5% gearing)	calc	0.72	0.98	1.14	$= e/(1+57.5%/(1-57.5%))$
g	Implicit Equity Beta (at 60% gearing)	calc	0.77	1.04	1.21	$= f/(1+60%/(1-60%))$
h	Cost of Equity at 57.5% gearing	EE adj.	5.9%	7.3%	8.2%	$= f*b+a$
i	Cost of Equity at 60% gearing	EE adj.	6.1%	7.6%	8.6%	$= g*b+a$

Source: Ofwat DD PR09, Europe Economics (July 2009), "Cost of Capital and Financeability at PR09" and NERA analysis.

Table 2.2 shows the following:

- § On a notional 57.5% gearing level, EE's adjusted estimates are in the range of 5.9-8.2%, with an adjusted central estimate of 7.3%. The DD cost of equity of 7.1% is clearly below EE's central estimate.
- § On a notional 60% gearing level, EE's adjusted estimates are in the range of 6.1-8.6%, with an adjusted central estimate of 7.6%. This is similar to the NERA range of 7.4-8.2%, in particular with regard to the high end of the range.

The DD clearly misinterprets the evidence presented by EE. Based on EE's own evidence, the appropriate cost of equity "towards the high end of the assessed range under the dividend growth model", would be towards 8.2%.

Moreover, as we have shown above this understates the true upper end of the DGM range due to the fact that EE have erroneously not taken into account individual company dividend forecasts over the first five years.

Leaving aside all errors in EE's DGM analysis, adjusting EE's results for a consistent level of gearing shows that the DD is clearly wrong in stating that "[o]ur draft determinations cost of equity is at the high end of the range under the dividend growth model [...]." The DD cost of equity of 7.1% is below EE's central estimate of 7.3% on a consistent gearing level.

2.1.3. NERA's DGM Analysis

Figure 2.1 shows a time series of the DGM-derived cost of equity for the water sector⁹ over the period from January 2007 to April 2009.¹⁰

⁹ Based on the four listed WaSCs: United Utilities, Penmon, Severn Trent and Northumbrian.

¹⁰ For details on our DGM methodology, see NERA (January 2009), Section 7.1.

Figure 2.1
DGM-Derived Cost of Equity for Water Companies (60% Gearing)

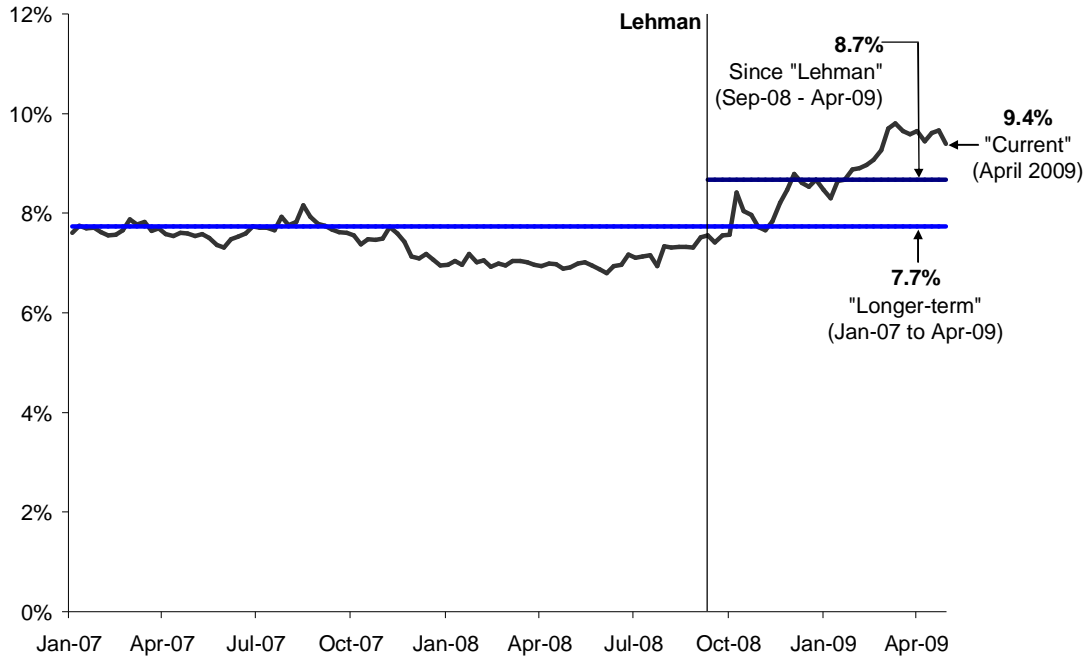


Figure 2.1 demonstrates that the average cost of equity for the listed water stocks since the beginning of 2007 lies above the DD decision of 7.4% on a comparable gearing level. The average DGM cost of equity for the four listed water companies is 7.7% over the period from January 2007 to April 2009. Therefore, the DD cost of equity decision is below the average cost of equity of the listed water companies.¹¹

Furthermore, Figure 2.1 shows that water companies' cost of equity has increased significantly since the collapse of Lehman Brothers in mid-September 2008 by around 2-3%. Since "Lehman" the DGM cost of equity across the listed WaSCs averaged 8.7%.

The current estimates of water companies' costs of equity lie in the range of 7.9-10.6%, with an average of 9.4%, substantially above the DD. This means, the DD is even *below the low end* of the current range. Put differently, in the current market environment, the DD cost of equity of 7.1% is insufficient for the *average* water company to attract equity finance into long-term irreversible investments. This conclusion is of particular importance for companies that need new equity investment to finance their capital investment programme. While the cost of equity has particular importance for those companies needing to raise new equity, it matters to all companies, as an incentive to retaining equity participation, which reduces risk to customers.

¹¹ Note our range derived in the January Report based on 2008 data of 7.4-8.2% continuous to lie within the center of this range.

2.2. Summary

The DD estimate of the CAPM cost of equity is not transparent with respect to the input data used and the assumptions made. To be consistent with good regulatory principles the FD should provide more justification, linked to verifiable and objective data, for the estimate of the cost of equity.

The DD CAPM estimate has been cross-checked against EE's DGM evidence. Our analysis shows the cross-check is misleading since:

- § EE's dividend growth rate assumption does not take account of analysts' forecasts which are a valuable source of information about investors' expectations and which show a dividend growth rate (2.6%) in excess of the range used by EE (2.0-2.5%).
- § EE's results are based on a lower notional gearing assumption than the DD cost of equity (54% versus 57.5%). Correcting the EE results for the difference in gearing leads to an increase of 0.3% in the cost of equity range.

We also note that updated NERA analysis shows that the average DGM cost of equity for the four listed water companies has been 7.7% over the period from January 2007 to April 2009 at the gearing of 57.5% assumed in the DD. Therefore, the DD cost of equity is significantly below the average cost of equity of the listed water companies over the past two and a half year period. Further, our analysis shows that water companies' costs of equity have increased by around 2-3% since the collapse of Lehman Brothers in mid-September 2008. Since "Lehman" the DGM cost of equity across the listed WaSCs has averaged 8.7%.

In summary, the DD cost of equity is lower than market evidence indicates. As a result the DD increases the risk that the average water company will be unable to attract efficient levels of equity finance into long-term irreversible investments over AMP5.

3. Risk-Free Rate

A real risk-free rate of 2.0% is proposed in the DD. This is 0.5% lower than NERA's estimate of 2.5%.

In this section we review the methodology used in the DD and by EE to derive their estimates of the risk free rate and compare the strengths and weaknesses of their methodologies against the NERA methodology, set out in our January Report.

3.1. Ofwat's estimate of the Risk-Free Rate

The estimate of the risk free rate in the DD is based on long run time series yield data of UK ILGs (ILGs):

“a risk free rate of 2.0% ... is above the current spot rates for index-linked gilts, but is consistent with the view that the risk free rate is expected to increase in the medium term. It is also consistent with the ten-year long-run historic UK index-linked gilts of five- and ten-year maturity and consistent with recent regulatory determinations” (p.107, DD).

Table 3.1 presents various historic averages of the average yield based on three-, five- and ten-year maturity ILGs, up to 30 June 2009. Table 3.1 shows the following:

- § Ten-year trailing averages of five- and ten-year maturity ILGs are, as the DD suggests, around 2.0%;
- § Current yields are considerably below 2.0%, as the DD claims.

We do not, therefore, disagree with the interpretation of the data in the DD. We do, however, disagree with the reliance upon ILGs as the only input data to estimating the real risk-free rate.

**Table 3.1
Historic Averages of Index-Linked Gilt Yields**

	3-year	5-year	10-year
30-Jun-09	1.07	1.12	0.99
Last 20 days	1.14	1.17	1.05
Last 3 months	1.02	1.06	1.09
Last 6 months	1.33	1.25	1.22
Last year	1.98	1.79	1.48
Last 3 years	1.99	1.88	1.58
Last 5 years	1.91	1.83	1.62
Last 10 years	2.16	2.05	1.91

Source: NERA analysis of Bank of England data until 30th June 2009.

Our comments on the approach in the DD focus on whether ILGs are an appropriate basis for the risk-free rate and whether alternative methods might provide better estimates.

3.2. Reliance on Index-Linked Gilts as Basis for Risk-Free Rate

The DD relies on ILGs as the sole basis for the estimate of the risk free rate in the CAPM. This is despite the fact that EE state that there is “*no precise method for determining the risk free rate and a certain amount of judgment is necessary*” (DD, p31).

NERA have previously presented substantial evidence that the ILG market is distorted as a true measure of the risk free rate. In the Appendix to their report, EE comment on the NERA arguments that ILGs are distorted by excess demand. They start by noting that the NERA view is also widely held in the City (EE, p166):

“The case offered above would seem to suggest that index-linked gilt returns are distorted by excess demand. It is a view widely held in the City, and repeated in our interview discussions”

EE then proceed to set out two theoretical paradoxes that, in their view, weaken the argument that the gilt market is affected by a distortion. EE state:

- § *“First, if index-linked gilt returns fall, why does this not create an arbitrage opportunity versus non-index-linked gilts, given that the latter can be combined with other financial instruments (e.g. inflation swaps) to achieve a similar effect? And if it does not, where is the alleged volume limitation effect arising from undersupply of index-linked gilts? Surely a small under-pricing of index-linked gilts versus non-index-linked gilts would make it more attractive to use non-index linked gilts in combination with other instruments to achieve the same benefits of matching cash inflows and outflows?”*
- § *“Second, if index-linked securities are so much more efficient for this matching purpose, and yet index-linked gilts have distortedly low returns, why would firms not switch, instead, to the use of index-linked bonds — either in high ratings or (if such were insufficiently available) in diversified packages of lower-rated index linked bonds?”*

These comments by EE are focused on the contention that distortions should not exist in efficient markets. Their response overlooks a number of important facts.

First, Cooper and Scholtes (2001), two economists of the Bank of England, address exactly EE’s “first paradox.” According to Cooper and Scholtes, there are two requirements that result in ILG yields ceasing to be an unbiased measure of the risk-free rate: (i) there must be a subset of investors with price-inelastic demand for ILGs, and; (ii) this sub-set of investors must be the marginal and hence the dominant investors that dictate the bond price.

Cooper and Scholtes explain that one reason for an investor to exhibit a price-inelastic demand for ILG is that the *investor “is constrained (or strongly encouraged) by some form of regulation to hold a government bond even when its yield falls below the theoretical fair value.”* Cooper and Scholtes explain that as net supply (issue less redemption) falls, bond prices rise above fair value and the marginal price-inelastic investors bid up prices which leads to bond prices becoming overvalued in the sense that their yields are no longer reflective of a default risk-free interest rate. Cooper and Scholtes state that this can be observed in the UK market: *“the observed yields [on ILGs] do appear to be surprisingly low and the bonds are held almost exclusively by investors with strong incentives to hold them, notably pension funds and life assurance companies.”*

Second, EE argue that inflation swaps in combination with nominal bonds would provide a viable arbitrage strategy for institutional investors. However, inflation swaps are expensive (in terms of banking credit lines), difficult to obtain and do not provide institutional investors with the same advantages as ILGs in determining companies' capital adequacy (e.g. under Solvency II regulation or Basel II).

Finally, EE question whether there is a "volume limitation effect arising from undersupply of index-linked gilts". But capital market participants have for long expressed their concern of the undersupply of ILGs. For example, the Financial Times, (19 January 2009) writes that a

*"feature of the UK gilts market is that the demand for long-dated and index-linked gilts far outweighs supply. [...] Pension insurers, for example, are keen to ensure their liabilities are sufficiently hedged against inflation and interest rates. However, at the very long end of the gilt market, supply is limited [...]. A direct consequence of this is that, unlike the US and the eurozone countries, the UK has an inverted real yield curve [...]. Real yields are significantly below 1 per cent at the 30-year mark in the UK compared with above 2 per cent elsewhere."*¹²

With regard to EE's "second paradox", we reiterate that institutional investors are strongly encouraged or gain substantial benefits from investing in ILGs (e.g. through calculating their solvency capital requirement), as opposed to other types of corporate index linked bonds. For instance, the Bank of England stated recently that the effects of accounting and regulatory changes continue to push yields down:¹³

"... strong pension fund demand for inflation-protected bonds has pushed down their yields ...this demand may reflect several regulatory and accounting changes [FRS17, IAS19] over the past few years that have encouraged pension funds to seek to match their liabilities more closely with inflation-linked assets".

Because these regulations are unrelated to investors' attitudes to risk their impact has caused yields on index-linked bonds to be biased below the true risk-free rate. As a result, evidence from the ILG market must be regarded as understating the true risk-free rate. EE have not altered the fact that, even by their own admission, there is both significant evidence and a widely held view in the City that yields on ILGs are distorted.

3.3. Shorter Term Yields

In the Stansted case, the CC focused on the 3, 5 and 10 year maturity ILG benchmarks and forward rates, stating that they had "less reason to question pricing at the short end of the market" after concluding that long dated yields were distorted and were not an accurate measure of the risk-free rate. This means the CC believes that the distortion only exists in long-dated ILG yields and does not exist at the shorter-end of the ILG yield curve. The DD appears to agree with the CC since it also relies more heavily on shorter dated maturities.

¹² Financial Times, 19 January 2009 "More long-dated gilts needed, please".

¹³ See Bank of England (2008) *Quarterly Bulletin*, May.

However, it seems implausible that ILGs with shorter term maturity are not also affected by these distortions caused by regulatory requirements and inelastic demand by institutional investors. For example, an investor wishing to purchase a 15 year ILG would instead buy a 10 year ILG if the price (yield) was sufficiently lower (higher). Mechanically, via the same process, these distortions – albeit of decreasing magnitude - must spill-over to the short-end of the curve. As will be explained in greater detail in the next section, longer-dated index-linked bonds are under-supplied relative to demand. In the absence of comparable duration matching opportunities in the corporate bond market¹⁴, institutional investors may have to satisfy their ILG appetite by buying shorter maturities which are in higher supply. Therefore, yields at the shorter end of the curve are also likely to be distorted, although possibly to a smaller extent.

Since there is no widely accepted correction for this distortion, the market for ILGs provides no guidance as to the true risk-free rate.

3.4. Quantitative Easing has Suppressed ILG Yields

Market data and commentary illustrate that QE is suppressing yields. The Bank of England themselves has noted the impact of QE on government yields¹⁵ and corporate yields¹⁶, as have other market commentators.¹⁷ For example, a recent IMF working paper stated that “a tentative assessment of [the] direct impact on longer-term gilt yields on the order of 40-100 basis points” (p28) and that “real gilt yields also eased by about 15-20 basis points on March 5” (p30) and by 30 basis points by the end of June (p31).¹⁸

Overall, QE has clearly reduced yields across both the gilt and ILG curves. Since this reduction in yields is generated by government demand rather than reflective of investors’ attitude to risk these reductions in gilt and ILG yields are not indicative of a reduction in the risk-free rate. That is, the impact of QE on yields should be viewed as distorting gilt and ILG yields as a measure of the ‘true’ risk free rate.

3.5. Europe Economics’ Analysis of Swap Market Data

NERA has outlined a number of institutional features that distort ILG and gilt yields as measures of the real risk-free rate. A preferable method for estimating the real risk-free rate involves swap rates, which has several advantages including:

§ Swap rates are very liquid even for long maturities;

¹⁴ The Financial Times (19 January 2009): “More longer-dated gilts needed, please”

¹⁵ The Bank of England stated: “*The announcements and subsequent purchases of assets by the Facility during the first quarter of 2009 were followed by falls in yields on medium to long-term UK government bonds*”, Bank of England “Asset Purchase Facility Quarterly Report 2009 Q1”.

¹⁶ See Bank of England (2009) “Inflation Report”, p16 (Box), August.

¹⁷ The decrease in gilt yields was noted by the Financial Times: “*A week after the announcement, benchmark 10-year gilt yields touched a record low of 2.91 per cent - nearly a percentage point lower than just before the QE announcement*” Financial Times (27 March 2009): “Banks must step up its commitment to bond buy backs”.

¹⁸ See Meier (2009) “Panacea, Curse, or Nonevent? Unconventional Monetary Policy in the United Kingdom”, IMF Working Paper 09/163, August.

- § Swap rates are not affected by supply constraints;
- § Swap rates are not affected by pension and accounting regulations that bias ILGs, and;
- § Swap rates have liquidity more similar to equities, which is consistent with the desirable properties of a CAPM risk-free rate.

Several academics including Fleming (2000), Hull, Predescu, and White (2004), Choudhry (2005), Feldhutter and Lando (2007) and Schaefer (2008), among others, use interest-rate swaps as the foundation for their estimates of the risk-free rate. Swap rates can, as a result, be properly classed as an academically supported, if not preferred, method for estimating the risk-free rate.

EE make a number of comments on NERA’s swap-based estimates of the real risk-free rate including that:¹⁹

- § **There is a high correlation between the swap-based real risk-free rate and ILG yields such that “the swap-based approach estimate shows downward dips at precisely those points the ILG series is alleged by NERA to be downward-distorted”;**
- § **There is no formal proof (as opposed to anecdotal evidence) that regulatory changes have decreased ILG yields, and;**
- § **An inverted yield curve is not proof that ILG yields are biased.**

We address these comments below.

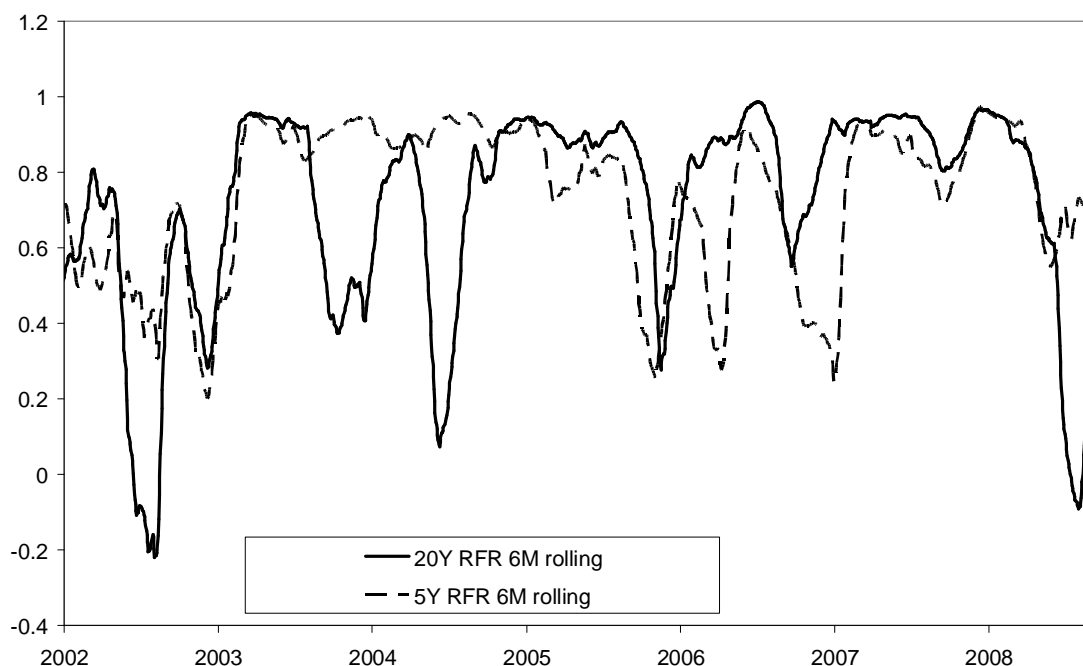
High correlation between swap-based risk-free rate and ILG yields

To address the first point Figure 3.1 presents the rolling six-month correlation between ILG yields and NERA’s swaps-based real risk-free rate estimates for a five-year maturity. It is clear that the correlations between the two measures are not strong, especially between long-term ILGs and swap rates when there is a negative correlation in some periods.

Therefore, EE’s central contention that “*either the swap markets share the same distortion as ILG markets ... or the alleged distortion does not exist*” (p162) is not supported by the available evidence. By contrast, the data shows very low correlations in the years 2005 onwards, for 5 year gilts as well as long term gilts, precisely the period when yields on ILGs were falling substantially.

¹⁹ See Europe Economics (2009) “Cost of capital and financeability at PR09”, pp162-163, 21 July.

Figure 3.1
Six-month rolling correlation between ILG Yields and NERA's Swaps-Based Real Risk-Free Rate



Source: NERA analysis of Bloomberg, Bank of England, iTraxx and HM Treasury data until 12th September 2008, the day before Lehman's collapse.

Absence of formal proof

With respect to the second point we note that EE argue our reliance on a Bank of England statement from 1999 is out of date and that “it might have been more convincing to bring a more recent statement” (p163). Further, the advisors contend that this statement by the Bank of England may have only been “speculation about a temporary distortion” (p163) and that it may “have revised its interpretation over time” (p163).

However, there are abundant recent statements by capital market participants, including the Bank of England, which demonstrate this effect continues to be of critical importance:

For instance, the Bank of England notes in 2006 that pension funds are the dominant purchasers (directly and indirectly) of ILGs. The Bank of England also notes that pension funds have significantly increased their demand for ILGs in recent years and that institutional investors are price-inelastic, leading to falls in yields as the demand to supply ratio increases.²⁰

²⁰ “D(d) for long-maturity gilts from institutional investors can at times become relatively price inelastic... the combination of price-inelastic demand and the relative scarcity of long maturity bonds may result in investors paying a high price for long-dated gilts. This premium would tend to reduce the yield on such instruments, pushing long-maturity forward rates below the rate that would hold in the absence of these factors.” Bank of England (2006) “Quarterly Bulletin Spring 2006.”

In 2008, the Bank of England indicates that the effect of inelastic demand from institutional investors is still prevalent and exerts significant downward distortions on government bond yields:

“... strong pension fund demand for inflation-protected bonds has pushed down their yields ...this demand may reflect several regulatory and accounting changes [FRS17, IAS19] over the past few years that have encouraged pension funds to seek to match their liabilities more closely with inflation-linked assets (Bank of England, 2008, pp 164, 232)

Recently, the financial press stated that inelastic demand from pension funds still exert significant downward pressure on government bond yields:

“[...] regulatory and accounting pressures push pension schemes towards high government bond allocations even where the yield is inadequate.”²¹

Also, the Bank of International Settlements recently stated that government bonds were biased due to institutional factors:

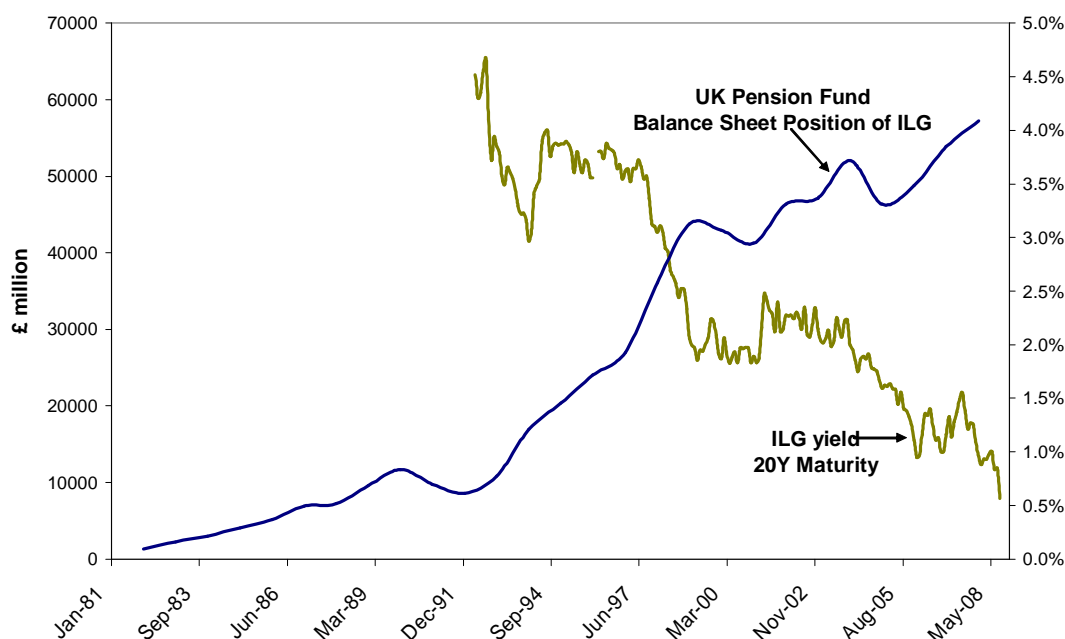
“...strong and relatively price-inelastic demand from pension funds and life assurance companies is widely thought to have put downward pressure on conventional and index-linked gilt yields in recent years.”²²

Figure 3.2 shows the holdings of index-linked gilts by UK pension funds over time and the yields on long-dated ILGs over the same period. Figure 3.2 shows a clear negative correlation between pension funds' holding of ILGs and yields on ILGs, i.e. as the holding position increases, yields decrease. For instance, following the introduction of MFR in 1997, pension funds increased their holdings in ILG by around £16 billion over the two years following the introduction. During this period, yields on long-dated ILGs sharply decreased by around 1.5%. Further, pension funds increased their holding by another £7.5 billion following the introduction of FRS17 and IAS19 in 2005. During this period, yields dropped by another 0.6% to around 1% at the end of 2006.

²¹ Financial Adviser: Gilt distribution overhaul gets nod from NAPF. 26 February 2009

²² See International Actuarial Association (IAA): “Measurement of Liabilities for Insurance Contracts: Current Estimate and Risk Margins” (Re-Exposure Draft, 24 March 2008), Chapter 5: Discounting Cash Flows.

Figure 3.2
ILG yields versus UK Pension Fund ILG Balance Sheet Position



Source: NERA analysis of Bank of England and ONS data.

Inverted yield curve

EE contend that “an inverted yield curve merely implies a different expected path for future interest rates from a [upwards]-sloping curve” (p163).

However, conventional economic reasoning suggests long-term yields should normally be above medium-term yields due to the presence of a term-premium. As a result, the fact that long-term ILG yields are and have been below medium-term ILG yields is strongly indicative of a bias in ILG markets.

The fact that the inversion of the UK yield curve is a direct consequence of the supply demand imbalances in the UK ILG market has been noted in the financial press: For example, the Financial Times, (19 January 2009) writes that:

“Pension insurers, for example, are keen to ensure their liabilities are sufficiently hedged against inflation and interest rates. [...]. A direct consequence of this is that, unlike the US and the eurozone countries, the UK has an inverted real yield curve [...]. Real yields are significantly below 1 per cent at the 30-year mark in the UK compared with above 2 per cent elsewhere.”²³

²³ Financial Times, 19 January 2009 “More long-dated gilts needed, please”.

EE should have noted this issue themselves since their own data shows US yield curves to be substantially upward sloping (p.25) by comparison to UK yield curves (p.30) substantially downward sloping.

3.6. Summary

A real risk-free rate of 2.0% is proposed in the DD based on trailing averages of index-linked gilt yields.

In this section we provide evidence that shows that index-linked gilt yields understate the true risk-free rate because of supply and demand imbalances caused by price-inelastic investors and insufficient supply of ILGs. As a result, using ILG data to estimate the risk free rate produces a downwardly biased estimate for the true risk free rate from an equity investor's point of view. This fact has been recognized in the financial and academic literature.

The DD does not, however, attempt to correct for the bias in setting the risk free rate at 2.0%. Our analysis shows that an unbiased estimate of the risk free rate, based on swap rates, is roughly 0.5% higher than the estimate in the DD based on ILG data. This means since the DD relies on (unadjusted) ILG yields as the basis for the risk free rate, the risk free rate and hence overall WACC in the DD is biased downwards.

In this section, we have also addressed all of EE's concerns of using swap rates as the basis for the risk-free rate and have rebut EE's arguments against the swap-based approach. Further, we showed that the approach of using swap rates as the basis for estimating a CAPM risk free rate has strong support in the academic and financial literature.

4. Equity Risk Premium and Beta

An Equity Risk Premium (ERP) of 5.4% and an asset beta of 0.4, which is consistent with an equity beta of around 0.9 at 57.5% gearing, are proposed in the DD. The DD states that the proposals on each of these CAPM parameters are at the “high end” of EE’s recommendations.

In this section we review the DD and EE’s conclusions on each of these parameters and compare the analysis undertaken by EE with evidence from NERA’s January 2009 report.

4.1. Equity Risk Premium

An ERP of 5.4% is proposed in the DD. This is consistent with NERA’s ERP assumption as set out in our January Report. The DD is not explicit about how this estimate is derived, but states that it is:

“at the high end of the range proposed by Europe Economics which is based on Dimson, Marsh and Staunton series data for the long-term equity risk premium. It reflects our view that we should assume a high equity risk premium given the economic conditions within which the cost of capital is set” (DD, p107).

Whilst we do not disagree with the proposed ERP assumption of 5.4%, the claim that an ERP of 5.4% is at the top end of EE’s proposed range seems unjustified.

In their report, EE set out a wide range of evidence on historic and forward looking ERP data. In their conclusions, EE state that

“we recommend an ERP of 6.0% in the current crisis scenario and 5% after the end of the turmoil” (EE, p63).

In considering what period a “crisis ERP” should apply to, EE refer to a paper by Cochrane and Piazzesi (2005) which argues

“the ERP increases by almost 20 per cent in periods of crisis, coming back to its previous “normal level” after three years after the end of the recession” (EE, p62).

Cochrane and Piazzesi’s paper therefore appears to imply that an ERP of 6.0% should be used for three years after the end of a recessionary period.

Given that the UK is currently in recession, and central projections by independent forecasters such as the Bank of England, OECD and IMF show economic growth is expected to be negative in 2009 and close to zero in 2010, the EE analysis suggests that a “crisis” ERP of 6.0% should be applied until 2013/2014 at least.

Cochrane and Piazzesi’s assessment is also “on average”, which given that the current recession is much deeper than an average recession might suggest that the ERP will not return to its previous “normal level” for more than three years.

In summary, statements in the DD convey the impression that the ERP assumption is generous relative to EE’s recommendations. However, a detailed analysis of the EE evidence,

and the supporting academic papers, shows that a plausible “high end” ERP assumption of 6.0% is more consistent with EE’s evidence.

4.2. Beta

4.2.1. Ofwat’s Beta Conclusions

An asset beta of 0.4 is proposed in the DD. This lies at the centre of NERA’s January 2009 range of 0.35-0.45. The DD states:

“our equity beta of 0.9 at our 57.5% notional level of gearing is derived from an asset beta of 0.4. These assumptions are at the high end of Europe Economics’ beta observations, but reflect the fact that we are setting price limits at a time of market uncertainty” (DD, p107).

As with the ERP, the estimate of the asset beta in the DD is presented as at the upper end of EE’s recommendations.

Although the DD attributes the estimate of the asset beta to the high end of EE’s recommendations, it is not clear that this is in fact an accurate description. Table 39 of the DD shows EE’s range for the equity beta range as 0.5-0.9. However:

- § The EE report appears to conclude on a point estimate of the equity beta of 0.65 before adjustments for gearing, and “marked-up” uplifts;
- § EE present re-levered equity betas in a range of 0.51-0.97 (excluding Dee Valley) for target notional gearing of 55-65% (EE, p46).

Based on this evidence, the EE analysis seems to support an equity beta in the range of 0.5-1.0 before “mark-ups”. Applying a 14.4% mark-up to take account of the “asymmetry of consequences” (EE, page 112), this suggests that EE’s equity beta range is actually in the range of 0.6-1.1.

The proposed equity beta assumption of 0.9 in the DD is not necessarily unreasonable against a range of 0.6-1.1, but it does not lie at the upper end of a plausible range as suggested. Therefore, the DD does not justify why an assumption of 0.9 should be used in setting prices.

More generally, more transparency about how the DD proposals have been reached is required. In particular, to enable proper scrutiny of the DD some explanation of how the DD reconciles with EE’s recommendations or the analysis Ofwat have themselves undertaken is necessary.

4.2.2. Differences between NERA and EE

NERA’s estimate of the asset beta for UK water companies is a range of 0.35 to 0.45, which leads to an equity beta range of 0.88-1.13 at our recommended 60% gearing. Using EE’s gearing range of 55-65% this equates to a range of 0.8-1.3.

NERA's beta range of 0.8-1.3 is therefore higher than EE's range of 0.5-1.0 when expressed on the same gearing assumption of 55-65%. This difference can be explained by a number of technical flaws in the beta estimation procedure and data used by EE:

- § First, EE do not make a Blume or Vasicek adjustment to their raw equity betas even though these adjustments are common place in the financial community;²⁴
- § Second, EE include several small and/or illiquid traded water companies in their assessment of beta e.g. Dee Valley Water. These companies should have been excluded from the sample, or at the least, some adjustment made for the relative infrequency of trading in these stocks which causes underestimates of beta;
- § Third, EE place considerable weight on short-term estimates that cover the recent period of market turmoil and the ongoing price review, which may have reduced water companies' betas below the level that is likely to prevail over AMP5. A short run beta assumption is also not consistent with the long run data used in the derivation of the risk free rate and other WACC parameters in the DD.

Overall, the beta estimates presented by EE are biased downwards by these omissions and errors. NERA has examined the 10 year average asset beta for water companies and shown that this lies in a range of 0.35 to 0.45, based on conventional estimation techniques.

4.3. Summary

It is unsatisfactory that the DD does not set out the method underpinning the estimates of either the ERP or the beta. This explanation needs to be provided in the FD so that the regulatory process is transparent and based on objective and verifiable data sources.

The ERP and beta are presented in the DD as lying at the upper end of the ranges proposed by EE. However, in this chapter we have shown that the EE analysis actually points to higher upper limits for both of these parameters.

The EE analysis also contains a number of technical flaws that mean the equity beta range is downwardly biased as a true estimate of long run water sector betas.

Overall, the DD ERP and beta lie in the middle of the ranges set out by EE. Given that price limits are being set at a time of considerable market uncertainty it seems more appropriate to choose values for these parameters in the FD toward the top of plausible ranges.

²⁴ In his textbook on regulatory finance, Morin (p.67, 1994) states very clearly why a Blume adjustment should be used: *"The regression tendency of betas to converge to 1.0 over time is very well known and widely discussed in the financial literature. Because of this regressive tendency, a company's raw adjusted beta is not the appropriate measure of market risk to use. Current stock prices reflect expected risk, that is, expected beta, rather than historical risk or historical beta. Historical betas, whether raw or adjusted, are only surrogates for expected beta. The best of the two surrogates is adjusted beta."*

5. Cost of Debt

This section analyses Ofwat’s assessment of the cost of debt in the Draft Determinations. Ofwat state (DD, p108):

“we have concluded on a real cost of debt of 3.6%. In doing so, we have drawn on direct observations from companies’ existing debt portfolios and projections. The cost we have assumed for existing debt is 3.4%. Our forward-looking cost of debt is 4.1% to 4.3%. We have factored into this assessment the mix of existing debt that will remain in place over 2010-15, together with the new financing and refinancing requirement. At an industry level, for the draft determinations, we have assumed that the ratio of existing debt to new debt is 75:25.

We have set the cost of debt at a level so that transaction costs, commitment fees and costs associated with the maintenance of an appropriate level of liquidity can be met.”

Table 5.1 summarises the key components of the DD cost of debt and compares them to NERA’s January report. The DD allows a pre-tax real cost of debt of 3.6%, below NERA’s recommendation of 4.1%. Although there are differences in the values assigned to different parameters the overall approach adopted in the DD is similar to NERA’s proposed approach.

**Table 5.1
Cost of Debt**

	Ofwat DD July 2009	NERA January 2009
Current Cost of Debt	4.1 – 4.3%	5.8%
Historic Cost of Debt	3.4%	3.4%
Historic / Current Weight	75 / 25	70 / 30
Overall Cost of Debt	3.6%	4.1%

Note: In our January report NERA presented historic / current weights as a range by company across the WaSCs. The range of estimates was 80/20 – 63/37, which implied an overall cost of debt range of 3.8-4.3%. We focus on the industry-level estimate here to be comparable to Ofwat.

We largely agree with the approach taken to estimating the cost of debt in the DD. In particular we largely agree with the decision to:

- § differentiate between the costs of existing debt and the cost of new debt;
- § explicitly consider the weight to attach to the two costs of debt;
- § take account of transaction and pre-funding costs, in the cost of debt allowance and;
- § assume “no new issuance of index-linked debt” (see DD, p108).

We do, however, have some concerns about the following aspects of the cost of debt estimate:

- § The DD does not explicitly link the cost of debt to a credit rating assumption. NERA’s own analysis suggests that the proposed cost of debt in the DD is consistent with a single A/A- rating not a BBB+ rating.

- § Since the financeability tests are based on a BBB+ rating, for some companies at least, this leads to an internal inconsistency since the overall price control package is therefore not sufficient to allow companies to raise debt at the costs that are assumed in the cost of capital calculation.
- § More generally, it is not transparent how the historic cost of debt assumption of 3.4% and the forward looking cost of debt assumption of 4.1-4.3% are arrived at. This lack of transparency means it is not clear how, if at all, the cost of debt assumption will be updated for new evidence in the FD;
- § The allowance for transaction, pre-funding and liquidity costs is not explicitly stated and therefore cannot be scrutinized.

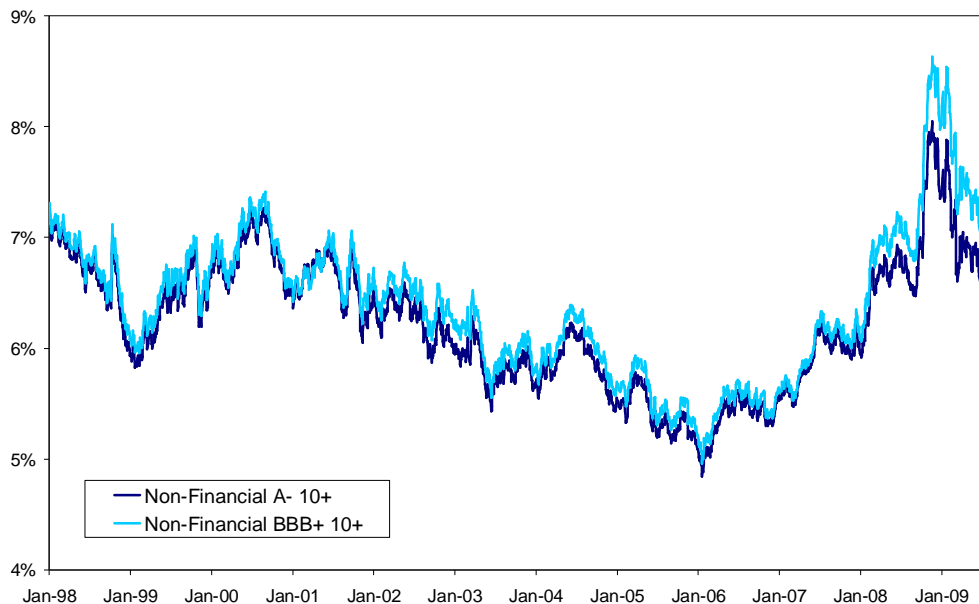
We consider these issues in more detail below.

5.1. The Cost of Debt Assumption and Financeability Tests are Inconsistent

The estimated WACC needs to be checked for consistency with the range of future financial positions implied by its application. To take an extreme example, it cannot be valid to estimate a low WACC which, when used as the allowed rate of return, implies a high risk of bankruptcy.

It is not clear what credit rating the estimate of the cost of debt is based upon. However, as Figure 5.1 shows there has recently been a significant widening between the costs of A- and BBB+ debt.

Figure 5.1
Secondary market bond yields



Source: NERA analysis of IBOXX data until 31st July 2009. A- and BBB+ series derived from A and BBB series using linear interpolation.

In particular, we note:

- § Over the past ten-years yields on A- rated bonds have been about 20 bps less than yields on BBB+ rated bonds;
- § More recently the differential has increased to about 50 bps.

The significant widening between the costs of A- and BBB+ debt means that it is vital that regulators make clear what credit rating assumption is implicit in the cost of debt allowance.

In Table 5.2 and Appendix A we examine the costs of recent water and other utility company debt issues in more detail. We look at both mid to low single A ratings (i.e. A and A-) and mid to high BBB ratings (i.e. BBB and BBB+) ratings of both short (five to fifteen years) and long tenor (20-30 years) in the period May-July 2009.²⁵ The data shows that:

- § Coupons offered on new short-to-medium tenor bond issues with an A or A- credit rating range from 5.1% to 6.0%;
- § Coupons offered on new short-to-medium tenor bond issues with a BBB+ (or equivalent) credit rating range from 5.9% to 6.8%, and;
- § Coupons offered on new long-tenor bonds with an A or A- credit rating range from 6.2 - 6.4%.

²⁵ To be consistent with our approach to the January report we should consider evidence on other types of debt as well. However, bonds are the dominant source of funding. Further, our purpose here is not to update our assessment of the real cost of new debt, but to gauge the rough appropriateness of the DD.

We convert these nominal costs into real terms using City and independent institutions' forecasts of RPI inflation over the term of the bonds.²⁶ These estimates, presented in Table 5.2 below, suggest the current real cost of new A/A- bond debt is around 3.5-4.4% incorporating transaction and pre-funding costs. The corresponding figures for a BBB+ rating are 4.2-4.9%.

Table 5.2
Real Cost of Recent A/A- Bond Issues

	Short to Medium Tenor		Long Tenor	
	5Y	15Y	20Y	30Y
Nominal Cost	5.1	6.0	6.2	6.4
Inflation Expectations	2.2	2.4	2.4	2.5
Real Cost	2.9	3.5	3.7	3.8
Transaction & Pre-funding costs	0.6	0.6	0.6	0.6
Total Real Cost	3.5	4.1	4.3	4.4
Range	3.5 – 4.4			

Source: NERA analysis. Inflation expectations are an average over the period stated from the date of the publication of the inflation forecasts i.e. from May-July 2009.

Based on this analysis, the assessment of the real cost of new debt of 4.1-4.3% in the DD is broadly consistent with single A/A- debt costs of medium to long term maturities.

As Table 5.2 and Appendix A show, the debt costs for BBB+ ratings are around 50 basis points higher than single A debt costs. Hence, the DD allowance of 4.1-4.3% is inconsistent with a BBB+ financeability assumption.

Since water companies typically aim to raise longer tenor debt in order to match the lives of their assets, we conclude from this analysis of recent debt costs that a forward looking cost of debt assumption of 4.3% to 4.4% would be the most reasonable assumption based on the data in Table 4.2 above. However, if this range is adopted then the financeability tests must also ensure that projected financial ratios for all companies are based on a single A/A- credit rating not a BBB+ credit rating.

Relationship to the economic outlook

As Table 5.2 shows, the assessment of the cost of new debt in the DD is broadly consistent with recent A/A- debt costs on new issues. There is no obvious headroom in this cost of debt allowance for the risk that debt costs may increase in the future.

We note that the balance of risks to the economic outlook is highly uncertain at this time. In particular, there is considerable uncertainty about how deep the recession will be and how long it will last. Current forecasts of GDP growth and inflation are marked by wider confidence intervals than is usual, often placing greater weight on downside risk. For example, the Bank of England stated in their most recent Inflation Report that “the timing and

²⁶ We construct estimates of inflation expectations corresponding to the tenor of the bond issues from HM Treasury's publication of City and independent forecasts published in May-July 2009.

strength of that recovery remains highly uncertain” and that “there are a number of uncertainties surrounding the outlook for inflation further out”.²⁷

The impact of quantitative easing

As noted in Section 3.4 QE has depressed government bond yields. QE has also reduced corporate bond yields. For example, a recent IMF working paper states that:²⁸

“developments in non-government bond markets reflected a significant spill-over from lower gilt yields: longer term corporate bond yields dropped by nearly 30 basis points on March 5 and by another 30 basis points the following day”.

The Bank of England themselves has also noted the impact of QE on corporate yields.²⁹

Although there has been no explicit statement from the Bank of England about the likely duration of the QE programme it seems likely that it will be wound-down during AMP5, if not before. It seems likely, therefore, that the currently observed cost of debt *understates* the likely cost of debt over AMP5.

A substantial increase in government indebtedness also raises the prospect of substantial gilt issuance in the next few years (if not beyond).³⁰ The increase in gilt issuance could ‘crowd out’ corporate borrowers leading to higher corporate debt costs.

If the FD does not allow for headroom in the cost of debt, downside risks must be taken into account in the financeability modelling to ensure that companies can finance their functions under a range of plausible macro-economic conditions.

5.2. The Allowance for Existing Debt Costs

A real cost of existing debt of 3.4% is proposed in the DD. This assessment is identical to NERA’s (January 2009) assessment of the real cost of historic debt, measured using a benchmark index of A- bonds over a ten year period. However, whereas NERA’s estimates of historic debt are based on an objective and verifiable data source, the DD is not transparent about the basis for this assessment. We note that EE did not estimate the cost of existing debt.

²⁷ See Bank of England (2009) Inflation Report, p39, August.

²⁸ See Meier (2009) “Panacea, Curse, or Nonevent? Unconventional Monetary Policy in the United Kingdom”, IMF Working Paper 09/163, August, p29.

²⁹ See Bank of England (2009) “Inflation Report”, p16 (Box), August.

³⁰ HM Treasury’s Budget forecasts public sector net debt to rise to £76.2b by 2013-14 from £43.0b in 2008-09: see HMT Budget 2009, Table 2.2.

Adjustments to Historic Debt Costs for Changes in Expected Inflation over AMP5

In the lead up to the FD, an important issue in relation to the overall cost of debt is expected inflation. In particular, on the assumption that the nominal cost of existing debt is fixed (or mostly fixed) over AMP5 then recent decreases in expected inflation over AMP5 may have increased the real cost of existing debt.

It is not clear what inflation rate is assumed in the DD in the derivation of historic real debt costs of 3.4%. We note that several variants of expected inflation appear in the DD, such as those presented in Table 44 and a long-term view of inflation of 2.5% (p114).

Table 5.3 below shows updated historic bond debt costs, comparing real cost up to July 2009 with the real cost presented in our January report (based on data until November 2008). We show that the real costs of historic debt, measured using a benchmark index of A- bonds over a ten year period have increased from 3.4% to 3.6% since our January report. This increase is largely due to a reduction in AMP5 expected inflation.

Table 5.3
Updated Real Cost of Existing Debt

	Nominal bond costs ^(a)	Expected inflation ^(b)	Real bond costs ^(c)
November 2008 ¹	6.1	2.6	3.4
July 2009 ²	6.2	2.5	3.6

Source: NERA analysis of IBOXX and HM Treasury data. Notes: (a) Ten-year trailing average; (b) Expected inflation for July 2009 derived as explained in Appendix B; (c) Calculated using the Fisher formula; (1) January 2009 report; (2) Data until the end of July 2009.

It is critical that expected inflation over AMP5 is monitored up until the FD so that the real cost of existing debt is set appropriately.

5.3. Inconsistency between the Draft Determinations and Europe Economics' Recommendations

The DD states that EE recommended a range of 2.5-4.7% for the pre-tax real cost of debt (DD, p106). This range is based on EE's recommendation that the risk-free rate is 1.5-2.2% and the debt premium is 1.0-2.5%.³¹

We note that EE present this range for the cost of debt in Table 8.2 (p.112) of their report. However, a cost of debt range of 2.5-4.7% is unsatisfactory for a number of reasons

§ The range is based on implausible combinations of parameters with no regard to the internal consistency of the component assumptions. For example, the lower part of this range is based on a debt premium of 1% and a risk free rate of 1.5%. This is not a plausible combination of assumptions, especially in the context of the current credit crisis and likely post recovery conditions.

³¹ See Europe Economics (2009) Table 8.2, p112.

§ EE's range of 2.5% to 4.7% does not reconcile with the cost of debt analysis undertaken in Section 6 of their report. In this section, EE recommend that the overall cost of debt should be based on an assessment of 'crisis' and 'post-crisis' debt costs. Based on an A-rating EE's assessment of post-crisis debt costs are 3.25% real and crisis debt costs are 4.25% real. Based on EE's own recommendation that the crisis WACC should be given a 45% weight in the overall WACC, this would lead to an overall cost of debt allowance of 3.7% before transaction costs.

§ EE also recommend applying a 14.4% uplift to the WACC for the asymmetric consequences of errors. This would lead to an overall cost of debt allowance of 4.2%.

Our interpretation of the EE report is therefore that it recommends a central cost of debt allowance of 4.2% (excluding transaction costs). This is significantly above the cost of debt allowance of 3.7% (including transaction costs) in the DD. The DD is not, therefore, consistent with EE's recommendations.

5.4. Summary

Overall, we largely agree with the approach taken to estimating the cost of debt in the DD, namely to estimate the cost of debt as a weighted average of existing and forward-looking debt costs.

The real pre-tax cost of debt of 3.6% in the DD is somewhat below NERA's recommendation of 3.8-4.3% in our January Report. However, the DD is not transparent about how the debt allowance is derived or how the estimate reconciles with the latest market evidence.

As set out in this section, the cost of new debt has fallen since the time of our January report; however, inflation forecasts over AMP5 have also decreased in the first half of 2009. These effects have offsetting impacts on our recommendation for the overall cost of debt at PR09.

We have updated our debt cost assumptions based on the latest debt data. The results are shown in Table 5.4 below:

Table 5.4
Updated Cost of Debt

	Ofwat DD July 2009	NERA August 2009
Credit Rating Assumption		A-
Current Cost of Debt	4.1 – 4.3%	4.3 – 4.4%
Historic Cost of Debt	3.4%	3.6%
Historic / Current Weight	75 / 25	75 / 25
Overall Cost of Debt	3.6%	3.8%

Our latest analysis suggests that the overall cost of debt including transaction and pre-funding costs for PR09 is in the region of 3.8% rather than the DD allowance of 3.6%. Importantly, however, this estimate is stated before considering the significant risks around forward-looking debt costs such as the economic outlook, likely volume of government gilt issuance and the unwinding of quantitative easing.

In addition to the overall cost of debt calculations, we note three specific points of internal consistency in the cost of debt calculations in the DD:

- § First, the cost of debt allowance is not explicitly linked to a credit rating assumption. NERA's analysis suggests that the cost of debt allowances in the DD are consistent with a single A/A- rating, not a BBB+ rating. If the cost of debt is based on a single A/A- rating the financeability tests must also ensure that the projected financial ratios for all companies are based on a single A/A- debt rating not a BBB+ debt rating.
- § Second, the assumptions underlying the existing and forward looking costs of debt should be made transparent so that they can be scrutinised and updated for the FD. In particular, it is not transparent how the historic cost of debt assumption of 3.4% has been estimated, and whether this allowance is based on actual debt costs or on a benchmark index.
- § Third, the real cost of historic debt must take account of updated inflation forecasts over the AMP5 period. NERA analysis of the latest HM Treasury publications of City and independent institutions' inflation forecasts suggests that expected inflation is approximately 0.1% lower now than in January 2009. All else equal this has increased the real post-tax WACC by around 0.05%. This data must be updated at the time of the FD.

6. Financeability

This section comments on the approach to financeability testing in the DD. The DD states (DD, p114) that it has:

“ensured financial ratios are consistent with, as a minimum a strong BBB+/Baa1 rating” and conduct their financeability tests using the ratios and thresholds shown in Table 6.1.

The DD argues that a BBB+/Baa1 rating is sufficient since “investors appear to be less sensitive to the difference between high BBB and low A range ratings where utilities are concerned” (DD, p114).

Table 6.1 below shows the ranges for the financial indicators that have been considered in the financeability testing in the DD.

**Table 6.1
Draft Determination Financial Ratios and Thresholds**

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

Source: Ofwat PR09 DD, Table 42 (for WaSCs only).

The DD does not provide any guidance as to how it is determined if a company satisfies the financeability test, such as whether a company must satisfy all ratios in all years, or whether some ratios are given more weight than others.

In this section we discuss the following two issues:

- § First, we consider whether the financeability tests that are focused on a strong BBB+ credit rating are appropriate in the current market environment, and;
- § Second, we comment on the need to take account of downside risks in financeability testing.

6.1. The Financeability Tests should have Targeted a Minimum A-Rating not BBB+.

The DD justifies the choice of a BBB+/Baa1 credit rating on the basis that:

“investors appear to be less sensitive to the difference between high BBB and low A range ratings where utilities are concerned” (DD, p114).

This statement appears to suggest that a BBB+/Baa1 rated water company would be able to access capital markets as readily as an A-/A3 rated one. There are several reasons why this is not correct:

Internal Inconsistency – Ofwat’s WACC is based on A- Debt Costs NOT BBB+ Debt Costs

The financeability test is a primarily an internal consistency test: the projected financial ratios for the company need to be at least equal to the financial ratios associated with the credit rating that underpins the cost of debt and overall WACC calculation. If not, the price controls are not internally consistent. In such a case the original WACC estimate needs to be revised upwards until the outcome financial ratios are consistent with the ratios underpinning the WACC.

In the DD the cost of debt is calculated on the basis of debt costs that are largely consistent with A- credit ratings. Although the DD does not explicitly state this, it does say that the historic cost of debt is calculated based on companies’ existing debt portfolios and most companies lie within the credit rating range A to BBB+ with an average across the industry of A-.

On forward looking debt, the DD assumes a cost of debt of 4.1-4.3% and our analysis in Section 5 showed that this was broadly consistent (a little lower) than the recent costs of A- debt over medium to long tenors in the range of 4.3-4.4%.

It is internally inconsistent to base a WACC on an assumption of an A- credit rating and to then undertake financeability tests that show projected ratios consistent with a lower credit rating. If the financial modelling in the DD is targeting BBB+ ratings, then the WACC that is assumed needs to be increased to be consistent with BBB+ ratings.

As we have already shown in Section 5, BBB+ debt costs have been around 20bp higher than A- debt costs over the long run and are around 50bp higher than A- debt costs since the credit crisis started. Attaching a 75% weighting to historic debt costs and 25% weight to future debt costs, this translates into a premium of 0.20% on the post-tax cost of debt and 0.12% on the WACC.

Table 6.2 shows the difference between A- and BBB+ debt costs more clearly:

Table 6.2
Impact on WACC: A- Versus BBB+ Rated Debt

Credit Rating Assumption	A-	BBB+
Current Cost of Debt	4.3 – 4.4	4.8 – 4.9 ¹
Historic Cost of Debt	3.6	3.8 ²
Historic / Current Weight	75 / 25	75 / 25
Overall Pre-Tax Cost of Debt	3.80%	4.05%
<i>Impact on Post Tax Cost of Debt</i>		0.20%
Impact on WACC		0.12%

Source: NERA analysis. Notes: (1) Equals cost of new debt at A- rating plus 50 bps; (2) Equals cost of existing debt at A- rating plus 20 bps.

There are Strong Arguments why an Efficient Capital Structure is A- not BBB+

We believe there are strong arguments for assuming a A- credit rating rather than a BBB+ credit rating:

- § First, as our January Report makes clear, the WACC is minimised at an A- Credit Rating (see NERA (January 2009), Section 11)
- § Second, rating agencies themselves have noted that investors' preference is for debt in the single A category. S&P state that "recent bond issuance suggests, in our view, investors' preference for debt rated in the 'A' category. Issuance in the 'BBB' category has been limited so far in 2009".³²
- § Third, although access to debt is generally possible at BBB+ ratings, this rating does not allow companies sufficient headroom to deal with downside risks. A downgrade to BBB could materially impair the ability of a company to raise capital under market turbulences. The current credit crisis has disproportionately increased investors' demand for compensation of risk at credit classes below BBB+.
 - Recent experience demonstrates the potential for access to debt markets to be curtailed at BBB ratings, e.g. during the height of the financial crisis in late 2008 bond issuance was dominated by A rated (or better) companies, while BBB rated companies – including those with BBB+ ratings – were effectively unable to access bond markets.
- § Finally, we also note that Ofwat's advisers recommend that notional gearing be set on a "cautious basis so as to allow companies to maintain a rating of at least A-".³³

Overall, there appears to be a clear distinction between A-/A3 and BBB+/Baa1 ratings. The approach to financeability should reflect this distinction by focusing upon A-/A3 ratings instead of BBB+/Baa1.

We also note that the approach in the DD is inconsistent with the Competition Commission's approach in the Stansted case. In that case the CC recognised the need for a stronger credit rating when it adopted an A-/A3 rating for Stansted instead of BBB+/Baa1 for Heathrow and Gatwick because "companies with A category ratings appeared to have been less affected by the credit crunch and are better placed to raise new capital at a reasonable cost".³⁴

6.2. Risk Modelling

Ofwat's duty to enable companies to finance their functions extends not only to the cost assumptions in Ofwat's notional regulatory model but also to expected outcomes from risks

³² See S&P (2009) "UK Regulator's Proposals for the Water Sector in 2010-2015 are likely to squeeze rating headroom", p18, August 3.

³³ See Europe Economics (2009) "Cost of capital and financeability at PR09", p149, 21 July. See also p72. Note also that EE state "some people we spoke to thought that water companies needed a rating of at least A- in order to access sufficient debt finance, whereas others thought that debt finance would be available at a rating of BBB+, albeit at a higher cost": see Europe Economics (2009) "Cost of capital and financeability at PR09", p149, 21 July..

³⁴ See Competition Commission (2008) "Stansted Airport Ltd: Q5 price control review", Appendix L, para 23, 23 October.

(including regulatory risks) that companies are exposed to, and also to plausible downside scenarios.

This means that it is critical that companies have sufficient headroom in their projected financial ratios to be able to raise finance at minimum A- ratings in both central case and plausible downside case scenarios.

Rather than focusing solely on the K in the central case, financeability analysis should also aim to establish the range and likelihood of possible outcomes – by financial modelling of scenarios, sensitivity and stress testing, and risk analysis designed to derive key financial measure statistics (best, worst, expected outcome, probability that the outcome is outside investment grade positions, risk of bankruptcy, etc.). This is so that the full implications of particular K factors can be seen.

In the current economic circumstances it is critical that this stress testing consider the potential impact of deflation upon companies' financial ratios and the implications for credit ratings. Although the DD states (DD, p103) that the impact of a prolonged period of deflation has been considered the DD provides no indication that other downside scenarios have been considered within the financeability tests or that any kind of risk modelling has been undertaken. By contrast, we note that Ofgem is explicit about the risk modelling that it is conducting at DPCR5.³⁵

We also note that the DD indicates the substantial effects clause provides insurance to companies against deflation. However, the most recent interpretation of this clause by the Competition Commission has created significant doubt about how this clause would be applied. A full elaboration on this issue is outside the scope of this paper.

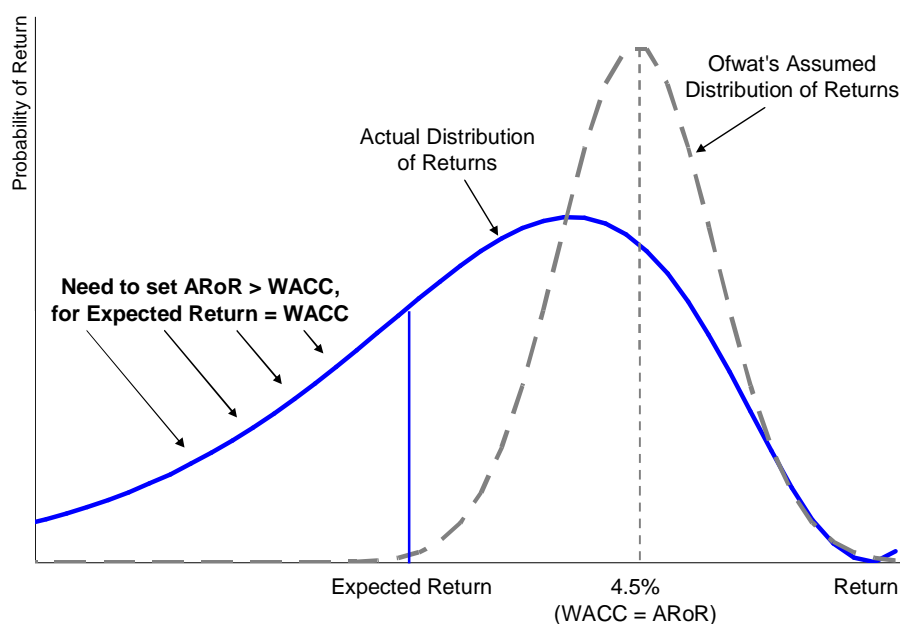
6.3. Skewed Returns

A real post-tax cost of capital of 4.5% is proposed in the DD. However, this headline figure does not reflect the range of adjustments and penalties that have been imposed elsewhere in the DD. Several mechanisms such as the CIS, OPA, opex efficiency targets and bad debt allowance may have the effect of reducing and skewing expected returns below the proposed cost of capital, as Appendix C illustrates. For example, we note that OPA and CIS penalties lead to an industry-wide reduction in the prospective return of 0.09 percentage points (see Appendix C).³⁶

³⁵ For example, Ofgem state: "In addition to this baseline financial model, we have developed a dynamic model that uses Monte Carlo simulation to test a range of price control outcomes depending on some key macroeconomic indicators and DNOs' performance against discretionary incentives. We are using this model to estimate the plausible range of allowed revenues and returns on regulatory equity (RORE), and these results will inform our calibration of the different incentives and risk protection mechanisms in setting Final Proposals": see Ofgem (2009) "Electricity Distribution Price Control Review Initial Proposals – Allowed Revenues and Financial Issues", p46, 3 August.

³⁶ Source: NERA analysis of DD, Appendices 2 and 3. NERA understands that more detailed company specific information provided to companies by Ofwat on revenue penalties for CIS and OPA would in many cases alter the assessment of revenue adjustments to be taken into account in the calculations. In some cases the effect is that the assessment of CIS/OPA on allowed returns is significantly understated. Many companies have also noted that, in their detailed reports, Ofwat has applied a range of company specific revenue adjustments in addition to those for the CIS/OPA, so that the estimates for the impact of the CIS/OPA further understate the ability of those companies to earn the allowed return. It should also be noted that our analysis does not account for working capital adjustments.

Figure 6.1
Illustrative Impact of Penalties and Adjustments on Expected Rate of Return



The effect of these design elements is to skew expected returns towards lower outturns such that the allowed post-tax cost of capital of 4.5% lies above the rate of return investors actually anticipate. This has implications for companies' ability to retain and attract finance and, therefore, could be inconsistent with Ofwat's statutory duty to enable companies to finance themselves. Two obvious remedies present themselves:

- § An increase in the allowed rate of return above the cost of capital to compensate for the skewed downside risks, so that expected returns equal the central estimate of the cost of capital, or;
- § For financeability tests to be based on expected costs rather than allowed costs, thereby not systematically denying companies a reasonable prospect of cost recovery.

In the FD, we recommend that the financeability tests should give full consideration to the link between the other regulatory allowances and the expected returns. If Ofwat believe that the WACC is 4.5% then an averagely efficient company must expect to earn at least 4.5% over the price control period, in order to finance its functions.

We note that EE include a 'mark-up' in their recommended cost of capital because the implications of setting the allowed rate of return to low are more serious than the implications of setting the allowed rate of return too high. This adjustment focuses on what is the appropriate point estimate of the allowed rate of return over AMP5 given the risk that the actual cost of capital will outturn differently. It is not, therefore, relevant to a discussion about the impact of penalties and adjustments on the expected rate of return vis-à-vis the allowed rate of return.

6.4. Summary

This section makes the following key points:

- § The financeability test is primarily an internal consistency test: the projected financial ratios for each company need to be at least equal to the financial ratios associated with the credit rating that underpins the cost of debt and overall WACC calculation. Since the cost of debt in the DD is based on A- credit ratings then the financeability tests also need to be based on A- credit ratings. If not, the price controls are not internally consistent.
- § Ofwat's duty to enable companies to finance their functions extends not only to the cost assumptions in Ofwat's notional regulatory model but also to expected outcomes from risks (including regulatory risks) that companies are exposed to, and to plausible downside macro-economic scenarios. Company risks must be explicitly modelled to ensure sufficient headroom in company projected financial ratios under downside scenarios.

Our wider assessment of the DD is it includes a number of mechanisms and adjustments (such as the CIS, OPA, opex efficiency), which either prevent companies from recovering costs or expose companies' returns asymmetrically to more downside than upside risk.

The effect of these design flaws is likely to skew expected returns towards lower outturns such that the allowed post-tax cost of capital of 4.5% may lie above the expected rate of return investors actually anticipate. This has implications for companies' ability to retain and attract finance and, therefore, could be inconsistent with Ofwat's statutory duty to enable companies to finance themselves. Two obvious remedies present themselves:

- § An increase in the allowed rate of return above the cost of capital to compensate for these downside risks, so that expected returns equal to the central estimate of the cost of capital, or;
- § For financeability tests to be based on expected costs rather than allowed costs, thereby not systematically denying companies a reasonable prospect of cost recovery.

In the FD, we recommend that the financeability tests should give full consideration to the link between the other regulatory allowances and the expected returns. If Ofwat believe that the WACC is 4.5% then an averagely efficient company must expect to earn at least 4.5% over the price control period, in order to finance its functions.

Appendix A. Recent Bond Issues

Table A.1
Utilities' sterling A/A- bond issues in May-July 2009

Issuer	S&P Rating	Amount £m	Issue Date	Tenor (years)	Coupon Yield (%)
Short Tenor					
YORKSHIRE WATER SRV BRAD	A-e	275	24/07/09	10	6.000
RWE FINANCE BV	A	500	06/07/09	13	5.547
IBERDROLA FINANZAS SAU	A-	200	01/07/09	13	6.000
BG ENERGY CAPITAL PLC	A	500	02/06/09	8	5.125
Range		200 - 500		8 - 13	5.1 - 6.0
Long Tenor					
YORKSHIRE WATER SRV BRAD	A-e	200	24/07/09	30	6.375
RWE FINANCE BV	A	1000	06/07/09	30	6.196
Range		200 - 1000		30	6.2 - 6.4

Source: NERA analysis of Bloomberg data from 1st May 2009 to 31st July 2009. Bonds are A or A-rated by S&P at the time of issue, GBP only, utilities only, fixed coupon only, non-callable, not private placement, bullet repayment only, non-subordinated, not index-linked.

Table A.2
Utilities' sterling BBB+/BBB bond issues in May-July 2009

Issuer	S&P Rating	Amount £m	Issue Date	Tenor (years)	Coupon Yield (%)
Short Tenor					
ENW CAPITAL FINANCE	BBB	300	21/07/2009	6	6.750%
WALES & WEST UTL FIN PLC	BBB+	250	10/07/2009	12	6.250%
NORTHERN GAS NETWORKS	BBB+	200	08/07/2009	10	5.875%
Range		200 - 300		6 - 12	5.9 - 6.8

Source: NERA analysis of Bloomberg data from 1st May 2009 to 31st July 2009. Bonds are BBB+ or BBB rated (or equivalent) at the time of issue, GBP only, utilities only, fixed coupon only, non-callable, not private placement, bullet repayment only, non-subordinated, not index-linked.

Appendix B. Inflation Expectations

Since the price control period covers 2010 Q2 to 2015 Q1 the relevant measure of inflation expectations for estimating the real cost of existing debt is 2010 Q2 to 2015 Q1.

To estimate inflation expectations we rely on HM Treasury's publication of forecasts of RPI inflation made by City and independent institutions. These forecasts comprise:

- § Year-ended (i.e. Q4 on Q4) inflation for the year the forecast is made in (e.g. 2009 for a forecast made in 2009) and the next year, and;
- § Year-average inflation for the year the forecast is made in (e.g. 2009 for a forecast made in 2009) and the subsequent four years.

The second category of forecasts are only made on a quarterly basis (February, May, August and November), whereas the first category of forecasts are made on a monthly basis.

In this report we rely on the August 2009 publication (which comprises forecasts made over the previous few months) to derive expected inflation for the 2010 Q2 to 2015 Q1 period. The relevant data is presented in Table B.1.

Table B.1
HM Treasury Data: August 2009

	Year-ended forecasts		Year-average forecasts				
	2009	2010	2009	2010	2011	2012	2013
Aug-09	-1.1	2.8	-1.1	1.8	2.2	2.8	2.7

Source: NERA analysis of HM Treasury data.

Based on this data, we think it is clear that the HMT year average inflation forecasts should be used for 2011-2013 and the 2013 figure should be extrapolated forwards for 2014 and 2015 Q1. To estimate expected inflation for the 2010 Q2 to 2010 Q4 period we interpolate between year-ended 2009 (-1.1%) and 2010 (2.8%) inflation forecasts. Table B.2 summarises the quarterly data underpinning our forecast of inflation expectations for August 2009.

Table B.2
Quarterly forecasts: 2010 Q2 - 2015 Q1

	2010			2011				2012				2013				2014				2015	
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	
Aug-09	0.9	1.8	2.8	2.2	2.2	2.2	2.2	2.8	2.8	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7

Source: NERA analysis of HM Treasury data.

Our estimate of expected inflation over 2010 Q2 to 2015 Q1 is obtained by averaging the quarterly forecasts, which gives expected inflation for AMP5 of 2.5%.

Appendix C. Impact of CIS and OPA on Rate of Return

Table C.1 below sets out the impact of CIS and OPA penalties on the expected achievable rate of return.³⁷

Table C.1
Impact of CIS and OPA on the cost of capital

	Allowed Returns (£m) ¹	Average RCV (£m)	Allowed Vanilla WACC (%)	Revenue Adjustment (£m)	Post Adjustment Returns (£m)	Post Adjustment Vanilla WACC (%)	Impact on Vanilla WACC (ppts)
Anglian	1401	5545	5.05	0.7	1402	5.06	0.00
Dwr Cymru	939	3728	5.04	-6.5	933	5.00	-0.03
Northumbrian	781	3103	5.03	-30.2	751	4.84	-0.19
Severn Trent	1562	6190	5.05	-30.2	1532	4.95	-0.10
South West	617	2473	4.99	-2.2	615	4.97	-0.02
Southern	882	3490	5.06	-20.9	861	4.94	-0.12
Thames	2174	8802	4.94	-18.7	2155	4.90	-0.04
UU	1918	7720	4.97	-99.4	1819	4.71	-0.26
Wessex	576	2278	5.06	17.3	593	5.21	0.15
Yorkshire	1162	4634	5.02	0.0	1162	5.02	0.00
WaSCs	12011	47964	5.01	-189.4	11822	4.93	-0.08
BWH	35	126	5.49	-0.4	34	5.42	-0.07
Bristol	81	300	5.42	-5.9	75	5.03	-0.39
Cambridge	16	59	5.50	0.0	16	5.50	0.00
Dee Valley	16	59	5.46	-0.1	16	5.41	-0.05
Folkestone	19	70	5.29	-0.6	18	5.13	-0.16
Portsmouth	27	101	5.27	0.0	27	5.27	0.00
South East	220	852	5.16	-11.4	208	4.89	-0.27
South Staffs	58	218	5.31	1.6	59	5.45	0.15
Sutton & ES	44	164	5.33	-3.0	41	4.97	-0.36
Tend' Hd	16	56	5.53	-0.1	15	5.48	-0.05
Three Valleys	184	713	5.17	-11.6	173	4.84	-0.32
WoCs	714	2718	5.26	-31.6	683	5.02	-0.23
Industry	12726	50682	5.02	-221	12505	4.93	-0.09

Source: NERA analysis of Ofwat DD, Appendices 2 and 3. Note: (1) Allowed returns includes income allowance / reduction for working capital.

³⁷ Source: NERA analysis of DD, Appendices 2 and 3. NERA understands that more detailed company specific information provided to companies by Ofwat on revenue penalties for CIS and OPA would in many cases alter the assessment of revenue adjustments to be taken into account in the calculations. In some cases the effect is that the assessment of CIS/OPA on allowed returns in Table C.1 is significantly understated. Many companies have also noted that, in their detailed reports, Ofwat has applied a range of company specific revenue adjustments in addition to those for the CIS/OPA, so that the estimates for the impact of the CIS/OPA further understate the ability of those companies to earn the allowed return.

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