RIIO cost of equity consultation

A REPORT PREPARED FOR NOTHERN POWERGRID

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1 Introduction

Frontier has been asked by Northern Powergrid (NPg) to provide an opinion on Ofgem's consultation on the methodology for assessing the equity market return for the purpose of setting RIIO price controls ('the consultation').

The Competition Commission (CC) has recently published its Provisional Determination (PD) of the price control for Northern Ireland Electricity (NIE). The PD incorporated an approach to assessing allowed equity returns for NIE. Ofgem is considering whether to apply the CC's provisional approach for assessing equity returns to the RIIO-ED1 review, and at subsequent RIIO reviews.

We set out first an overall summary of our view on the case for applying the CC's provisional approach to the RIIO controls. We then respond directly to the specific questions Ofgem has posed in the consultation, as well as commenting on other issues raised in Ofgem's consultation document.

2 Overview of the issues

We consider that Ofgem should not adopt the CC's provisional approach to estimating NIE's allowed cost of equity for RIIO-ED1 or in subsequent RIIO reviews. There are four primary reasons for this.

- First, adopting the CC's approach would result in an unexpected and material change to Ofgem's methodology in regards the allowed rate of return. This change in itself would result in an increase in regulatory uncertainty, which would increase the cost of capital and could risk the delivery of investment valued by customers.

- Second, Ofgem's existing methodology has been developed through extensive consultation with stakeholders; is consistent with established regulatory precedent; and is appropriate in the context of the RIIO framework. In contrast, the CC's provisional approach has not been tested with GB stakeholders, and it is not clear the CC's approach is suitable within the RIIO context. Ofgem should not consider the cost of equity methodology in isolation of other components of the price control, in particular the duration of the price control and the methodology for setting the cost of debt.

- Third, the CC's provisional cost of equity methodology would lead to cost of equity determinations that are more volatile, pro-cyclical and unpredictable. This would raise systematic risk as well as regulatory risk.

- Finally, the CC's methodology has a number of major weaknesses and is not supported by the evidence available. As a result of these methodological shortcomings, the CC's provisionally determined cost of equity for NIE is too low. Application of the CC's approach would result in a similarly low cost of equity for GB DNOs. This would jeopardise the DNOs' ability to deliver the investments that customers value, thus undermining the principal objectives of the RIIO framework.

We discuss each of these concerns further below.

2.1 Adopting the CC's approach would be a substantial and unexpected change to Ofgem's existing methodology

As Ofgem has recognised,[1] the CC's approach to the allowed rate of return represents a significant departure from the approach established by Ofgem under the RIIO framework and at previous price control reviews. It is therefore necessary for Ofgem to consider whether adopting the CC's approach is appropriate, given that a material and unanticipated shift in regulatory practice is, in itself, likely to detrimentally affect the cost of capital.

Ofgem's RIIO approach was developed through a detailed process of consultation with stakeholders that took more than two years to complete. This has been followed by two price control reviews (RIIO-T1 and RIIO-GD1) through which the practical application of the RIIO model has been further fleshed out. Through this extensive period of review and consultation, Ofgem has developed a clear and predictable methodology.

In particular, the RIIO-T1 and RIIO-GD1 cost of equity decisions both established that, under RIIO, an approach based on long-run data was preferable to an approach weighted towards contemporaneous evidence. In both price control reviews Ofgem preferred to base its allowance on long-term evidence despite the observed divergence of short-term and long-term estimates. For example, Ofgem stated that:

"*We considered it appropriate to focus on longer-term estimates, particularly as we are setting controls for an eight-year period. Our experience from previous price controls shows that looking beyond short-term volatility is a prudent approach to take when setting the cost of equity assumption for network companies.*"[2]

It is clear, therefore, that Ofgem considers a long-term approach to be the most applicable and consistent with the RIIO framework. This methodology is also consistent with best practice regulatory approaches that had been established and applied at previous price controls by Ofgem and other regulators. By contrast, the CC's determination, even once finalised, would not have followed the same extensive consultation and engagement with stakeholders.

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1 In Appendix 1 of 'the consultation' paragraph 1.2, Ofgem states "…we have identified a material underlying difference in approach between the CC's estimate and the estimates adopted historically by Ofgem and other regulators for the return that investors require for investing in the equity market."

2 Ofgem, RIIO-GD1 Initial Proposals – Finance Annex, paragraph 3.34 and RIIO-T1 Initial Proposals – Finance Annex, paragraph 3.39.

Moreover, the framework developed with Ofgem, in partnership with the industry and customers, was designed to support the overarching objectives of RIIO: namely, the successful delivery of investments valued by customers through appropriate incentives and management of risk.

A cornerstone of the RIIO framework is the development of a stable regulatory environment within which the business can deliver the required outputs efficiently. Were Ofgem to alter radically its approach to the allowed return on equity now, it would **add** significant regulatory uncertainty. Investors have planned and committed capital to finance regulated energy networks in GB on the basis of the RIIO methodology developed by Ofgem. The GB DNOs have developed business plans in consultation with stakeholders on the basis of the RIIO methodology, and stakeholder expectations have been established on this basis.

The importance of minimising regulatory risk is well accepted by regulators and the Government. There is strong evidence that investors in regulated assets consider the extent of regulatory risk is one of the strongest drivers of required returns. For example, the 2013 Water UK investor survey identified that regulatory risk was, by a significant margin, the most important risk factor identified by investors.[3]

Given the importance of minimising regulatory risk, the Government's principles for economic regulation, published in April 2011, state that the framework for economic regulation should provide a stable and objective environment, enabling all those affected to anticipate the context for future decisions and to make long term investment decisions with confidence[4].

Ofgem's RIIO framework also clearly recognises the need to minimise regulatory risk and uncertainty. Although the RIIO model can evolve over time to remain fit for purpose, Ofgem recognised explicitly that along with the benefits that come with an adaptable system:

> *"…there are potential downsides in terms of the impact on regulatory commitment and certainty. We will therefore be transparent about how adaptation could take place. We will seek to ensure consistency with the principles of better regulation when making any modifications to the RIIO model."*[5]

The principles of better regulation referred to by Ofgem are summarised **Figure 1** below. These principles are all designed to minimise regulatory uncertainty.

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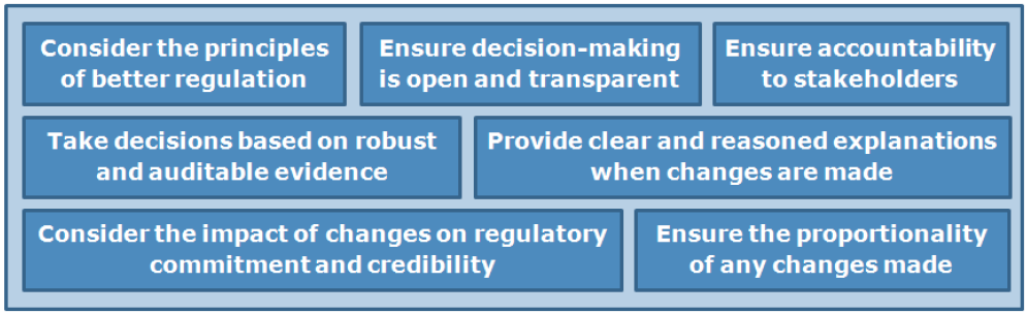
3 "2013 Survey of Investors in the water sector", A report by Indepen for Water UK, June 2013.

4 Department for Business Innovation & Skills (2011), Principles for Economic Regulation.

5 Ofgem (2010), Handbook for implementing the RIIO model.

Figure 1. Principles to adopt in adapting the RIIO model



Source: Ofgem (2010), *Handbook for implementing the RIIO model*, 4 October, p.12

Similarly, in its recent Phoenix Natural Gas (PNG) price determination the CC identified that an increase in regulatory uncertainty could increase the cost of capital through:

- an increase in the cost of debt, through a possible downgrade to the credit rating;
- an increase in the cost of equity; and/or
- reducing the willingness to invest, particularly in greenfield investments[6].

In the PNG case the CC clearly recognised that material, unanticipated changes to the regulatory framework can increase the cost of capital and are not necessarily in the public interest (even if the proposed change might result in a short term fall in prices).

It is appropriate that the allowed market equity returns should be capable of evolving over time as new evidence of long-term investor expectations emerges. However, we consider that the RIIO framework sets out a transparent and reasonably predictable methodology for reflecting such changes. Adopting the CC's approach would undermine the common understanding Ofgem has built up so far with investors, the DNOs, and other stakeholders on this issue, increasing the cost of capital as a consequence.

It is important to note that this would be true not only for electricity distribution networks, which are the subjects of the current review. The increase in regulatory uncertainty would also raise the cost of capital of electricity transmission networks and gas transmission networks, whose price controls have already been settled. This is because equity investors considering the prospect of committing capital now to **any** of the networks regulated by Ofgem would rationally 'price in'

6 The Competition Commission (2012), Phoenix Natural Gas Limited – price determination.

the greater regulatory uncertainty associated with Ofgem replacing its established approach under RIIO with the CC's approach.

Overall, we consider that adopting the CC's approach is likely to result in unnecessary increases in the cost of attracting capital, while at the same time resulting in a reduction in the allowed cost of equity. Clearly, this risks jeopardising the DNOs' ability to attract capital and deliver investments that are in the interests of customers. If Ofgem were to implement this change it would therefore need to consider any benefits of doing so in light of the potential detrimental impact on customers of introducing increased regulatory uncertainty.

2.2 The CC's cost of equity approach is inconsistent with the RIIO framework

As Ofgem notes in the consultation, the CC is the appeals body for the RIIO controls and it is therefore relevant to consider the CC's views when determining the RIIO controls. However, the CC has determined its provisional cost of equity allowance for NIE in the context of a significantly different regulatory framework.

Irrespective of the merits of the CC's case in respect of the cost of equity, two elements of the RIIO framework in particular would suggest the CC's cost of equity methodology for NIE should not be directly transferred across to the GB context.

- **Duration of the price control.** The NIE WACC applies to a price control which finishes in 2017. Although we do not agree with it, one interpretation of the CC's determination might be that it has considered an approach that places greater emphasis on more recent evidence is suitable for NIE, given that the CC is determining a relatively short-term price control (effectively forecasting over a three year period from today). In contrast, the RIIO-ED1 WACC must be forecast to 2023, which means Ofgem's forecast has to be applicable for nine years from the point the forecast is made. It would be inappropriate to apply the CC's approach at ED1, given the longer term forecast that is required and the significant scope for the expected equity return to change over this period.

- **Consistency with approach to cost of debt.** The NIE WACC incorporates a cost of debt allowance based largely on NIE's embedded debt cost. In contrast, Ofgem's cost of debt approach is independent of the DNOs embedded debt cost. NPg highlighted in its business plan that it expects its (efficiently incurred) actual debt costs to exceed the allowed debt costs for RIIO-ED1. This shortfall must be funded by NPg's equity shareholder. NPg calculated that the estimated shortfall on the cost of debt

converted to 90-140 basis points on the return on regulatory equity, with an average gap of around 110 basis points.[7] We consider that the CC's approach to the cost of equity would need to be modified if it were to be used in conjunction with Ofgem's existing cost of debt approach.

Adopting the CC's methodology would therefore result in a cost of equity allowance which is inconsistent with the other aspects of the RIIO-ED1 determination.

2.3 The CC's approach would increase the cost of capital

The CC's over-emphasis on short-term evidence will lead to cost of equity determinations that will raise systematic risk as well as regulatory risk. The overall effect is likely to be an increase in the cost of capital of regulated networks in GB, thus making the raising of capital required more expensive. This, in turn, would undermine the ability of businesses to deliver the investment outputs that the RIIO framework was designed to bring forward.

The CC's methodology implies an increase in the cost of capital through four channels.

- First, basing the cost of equity on short-term data would make regulatory settlements more pro-cyclical, increasing systematic risk.
- Second, basing the allowed return on contemporaneous evidence, and giving greater discretion to the regulator, would increase the volatility of returns, which would increase the cost of equity.
- Third, greater regulatory discretion will be accompanied by the (real and/or perceived) risk of asymmetric regulatory treatments where the regulator depresses allowed returns during economic downturns but does not allow returns to go high enough in boom times. This would require the allowed return on equity to be higher than the cost of equity, if investors are expected to earn the cost of the equity.
- Finally, there would also be higher probability of measurement error and misjudgement, as the regulator will have to re-estimate and re-interpret market evidence at every price control.

In practice, as Ofgem has noted, in the face of increased volatility it is likely that utilities would need to carry a lower debt burden in order to avoid financial

7 See NPG's RIIO-ED1 business plan, Section 3 pages 5 and 6.

distress during periods when regulators may set a low WACC. Lower gearing is likely to increase overall financing costs.

Adopting the CC's methodology would therefore unnecessarily raise the systematic and regulatory risk that the GB DNOs are exposed to, and increase the cost of capital, to the long-term detriment of customers. We expand on the effects described above in response to Question 2.

2.4 The CC's cost of equity allowance is not supported by the evidence

The CC's estimate is based on a narrow selection of academic studies and an apparent selective use of data. The CC has not considered other sources of evidence to cross-check its results. A fuller consideration of the available evidence would lead to a cost of equity allowance that is higher than the CC has provisionally determined. We expand on this in our response to Question 1.

Prior to the CC's Provisional Determination on NIE, the return on market equity used by regulators and the CC has been in a tight range around 7% (see **Table 1** in response to Question 1). There is no clear evidence that previous regulatory decisions were systematically biased in over-estimating the cost of equity. For example, any evidence from market-asset ratios and transaction premiums can be explained by expected outperformance in other factors. Ofgem should therefore set a very high evidence threshold for moving away from its established approach.

The narrow and selective use of data and available evidence also highlights a further concern with the CC's methodology as described above, namely that the approach is likely to raise investor concern about the use of regulatory discretion at future reviews given the lack of transparency.

2.5 Conclusions on applying the CC's approach

We consider that Ofgem's existing approach to determining the cost of equity in the RIIO controls, based on long-term historical data on equity returns, remains the most appropriate method of calculating the allowed equity return. Ofgem, the CC itself, and other UK utility regulators have all tended to take a longer term approach towards estimating the market return in order to shield utility companies from the normal cyclical nature of the equity market.[8]

[8] For example, Ofwat's RP4 determination in 2009 of the market cost of equity of 7.4% was based on the top of the range produced by the long-term equity risk premium data, in order to reflect the volatile equity market created by the global economic crisis.

We note that this approach does not imply that the overall market return or the underlying components should remain fixed. We consider that any approach to assessing the cost of equity in the public interest would meet the following criteria.

- **The determined cost of equity must be sufficient to attract investment.** Ofgem has highlighted the ongoing need to attract substantial financial investment in Britain's energy networks. This investment is needed to meet the challenge of decarbonisation; adapt to climate change; and deliver outputs valued by customers, including a high quality of supply. While the CC's approach would result in a short term reduction in prices, Ofgem's duties require it to ensure that the cost of equity allowance is sufficiently attractive to investors. The CC itself has previously noted the considerable risks of setting a cost of capital allowance which is too low[9].

- **The methodology for setting the cost of equity must be predictable and transparent.** Subject to ensuring that the cost of equity is sufficient to attract necessary investment, customers and networks will benefit if the methodology for determining the cost of equity is predictable and transparent. Investors are being asked to commit funds across multiple price control periods. Therefore they need confidence about the future basis for assessing returns. A lack of predictability would result in an increase in regulatory risk and required returns. Conversely, a predictable and transparent methodology will ensure the cost of attracting capital is minimised. Any unanticipated departure from established practice should therefore be sufficiently well justified in light of the associated potential costs.

- **The methodology for setting the cost of equity should not introduce undue volatility or pro-cyclicality in the determined WACC.** A methodology for determining the cost of equity could satisfy the first two criteria, but still result in inefficient and unnecessary increases to the cost of capital if it inherently introduces volatility and pro-cyclicality. An approach which is weighted towards contemporaneous market evidence will imply that the allowed cost of equity moves in line with short term market fluctuations. This would introduce pro-cyclicality and increase beta unnecessarily, as well as potentially introducing a degree of regulatory discretion which could increase the perception of regulatory risk and volatility. In contrast, a

9 For example, in the Bristol Water 2010 determination, the CC states, in paragraph 2, "A return below the cost of capital would not be consistent with our WIA91 section 2(2A)(c) duty to secure that the company is able to finance the proper carrying out of its functions.

methodology that takes a long-term approach will produce cost of equity allowances that are relatively stable and less pro-cyclical. This would reduce the cost of capital; promote relative stability of pricing to end users; and ensure the regulatory framework is consistent with long-term financing models and the objective to achieve efficient investment over the long-term.

- **The methodology should result in an allowed cost of capital that can evolve over time, based on robust evidence.** Requiring a methodology that is predictable, transparent, and avoids pro-cyclicality (subject to ensuring the cost of equity allowance is sufficient to attract investment) does not mean that the cost of equity (or the underlying parameters of the CAPM model) should never change over time. A well-defined methodology would imply that the determined cost of equity can evolve so long as this is consistent with the available evidence and long-run data.

We believe that Ofgem's existing approach meets these criteria and is therefore in the public interest. Any departure from this established regulatory practice must therefore be clearly explained and justified. We do not consider that the CC has provided such justification, or that a shift in approach would be merited in the RIIO context.

It is also important to recognise that the CC's approach is provisional, and will not be finalised until 30 April 2014. In light of responses to the PD it is possible that the CC will amend its approach. It would therefore be premature for Ofgem to replace its current approach to the cost of equity with the methodology followed by the CC in its PD.

Overall, we consider that the CC's provisional methodology is not appropriate or applicable in the GB context. We consider that adopting this approach would undermine a key objective of the RIIO framework to minimise regulatory uncertainty. Further, the resulting cost of equity (and overall cost of capital) that would be applied in RIIO-ED1 if this methodology is adopted would be too low.

3 Responses to consultation questions

3.1 Question 1

Do you agree with our direct translation of the CC's equity market return estimate to DNO cost of equity allowances?

We do not agree with a direct translation of the CC's equity market return estimate to DNO cost of equity allowances. This is because we do not agree with the approach the CC has taken to reach its estimate.

Below we provide a brief summary of the CC's approach and evidence base before expanding on our concerns.

3.1.1 Summary of CC's approach and evidence base

The CC's approach places heavy reliance on short-run evidence of market returns, and makes selective use of academic studies that aim to interpret the historical evidence and forward-looking evidence.

The CC estimates an Equity Risk Premium (ERP) of 4% to 5%. Two of the key pieces of short-term/forward-looking evidence the CC relies on to reach this estimate are:

- the Dimson, Marsh and Staunton (DMS) decomposition approach which estimates a forward-looking ERP by "adjusting for non-repeatable factors", which the CC finds to suggest an ERP of 4.5% to 5% (and therefore a market return of 5.5% to 6.5%); and

- Fama and French's (and other) forward-looking projections which estimate the underlying return from the sum of average dividend yields and the average rate of dividend growth. The CC finds these to suggest an ERP of 4.4% (and a market return on 5.4% to 5.9%).

The CC also considers long term historical evidence on equity returns gathered by DMS. The CC concludes this long-run historical evidence suggests a range of 5% to 6% for the ERP, although as we explain further below we believe the CC has mis-characterised the historical evidence.

In respect of the risk-free rate (RFR) the CC observes that index-linked gilts have declined significantly in recent times. They are currently negative for short-term maturities and close to zero for longer-term maturities. The CC argues that some of the decline in yields is permanent in nature and therefore justifies a lower RFR of 1% to 1.5%.

The CC concludes that its estimates of ERP and RFR are consistent with its view of the total market return of 5% to 6.5%. The CC points out that the total

market return cannot be regarded as fixed over time at its previous view of 7%, and it argues that more recent evidence supports its lower view of total returns. Specifically, the CC argues that:[10]

- a long-term decline in RFRs should logically result in increased demand for equities, and therefore increased share prices and lower equity returns;
- DMS research suggests a relationship between real interest rates and real returns on equities and bonds in the subsequent five-year period; and
- a forward-looking expected return on the market of 7% is not credible given economic conditions observed since the credit crunch and lowered expectations of returns.

We do not believe the CC's approach is appropriate for the following reasons:

- First, the approach is too focussed on analysis of short-term data.
- Second, the CC has made selective use of data and sources which bias the estimate of the cost of equity downwards, without providing sufficient justification for these selections.
- Finally, adopting the CC's approach would represent a major shift away from established regulatory precedent, and would therefore itself have implications for the cost of capital.

It is worth noting that the evidence base that the CC has relied upon in the NIE case is essentially the same as that it relied upon in the Bristol Water case – to the extent that main evidential paragraphs are identical. Nevertheless, the CC has arrived at an estimate of market returns that is 1% lower in the NIE case than the Bristol Water case. This reinforces our view that the CC's approach is clearly flawed.

3.1.2 The approach is too short-term focussed

In arguing that an expected return on the market of 7% is not credible given economic conditions observed since the credit crunch, the CC has confused recent short-term *realised* equity market returns with the underlying *cost* of equity capital. In the long run, the two can be reasonably similar. But in the short run, the cost of equity can be very different from current realised equity returns.

When market uncertainty increases, investors become more risk-averse and move their investments away from risky equities to safer assets like gilts, thereby pushing down the equity market prices and pushing up the cost (required return)

10 See paragraph 13.144

of equity, all else being equal. In so doing, these investors sustain losses (or lower returns) on their equity investment than they would have earned had the market condition not worsened. The realised return of equity capital in these periods will be low due to the low current equity prices compared with the historic prices. However, this is precisely consistent with the higher forward looking cost of equity, as current investments into equity need to be sufficiently compensated through the current low prices.

In NIE's response to the CC's Provisional Determination, we have shown considerable evidence that the returns that investors require in order to commit capital to risky investments have increased, not fallen, because market uncertainty and investor risk aversion have risen since the 2008 financial crisis.[11] For example, implied market volatility measured by FTSE 100 index has been approximately 44% higher on average in the five-year period following the financial crisis than in the five-year period leading up to the crisis. The ECB Global Risk Aversion Indicator suggests that the market is significantly more risk-averse after the crisis than before. As Dimson, Marsh and Staunton (DMS) note, the equity premium should be higher at times when the equity market is riskier and/or when investors are more risk averse.[12] Therefore, the CC's apparent focus on the recent realised returns is an inappropriate approach to estimate the cost of equity and has consequently biased its allowance downwards.

Furthermore, the CC's choice of RFR reflects current low gilt rates that are unlikely to remain at present levels. The CC has identified (see paragraphs 13.114 and 13.120) that index linked gilt (ILG) rates have declined significantly in recent times and are currently negative for short-term maturities, and close to zero for longer-term maturities. This appears to have guided the CC's thinking in respect of its proposals on the RFR.

However, the extremely low interest rates have resulted, in large measure, from the investors substituting from risky assets to low-risk assets in the face of greater market uncertainty (the so-called 'flight to safety phenomenon') and quantitative easing (QE) policies employed by the Bank of England. Both these causes are very likely to be temporary. As market uncertainty declines, investors will seek out risk again by substituting away from gilts in favour of risky assets. QE cannot be sustained indefinitely because of the strong inflationary pressures that would eventually arise. An unwinding of the flight to safety and QE would result in ILG yields rising again as capital flows out of safe haven assets and as the supply of gilts increases. Clearly there is a greater likelihood that this will happen in the 2015-2023 period for which Ofgem is determining cost of equity in RIIO

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11 Frontier's submission to the CC, appended to NIE's "Response to the Competition Commission's Provisional Determination", Annexe 2, 29 November 2013.

12 Dimson, Marsh and Staunton, 2013, Credit Suisse Global Investment Returns Sourcebook 2013.

than the period to 2017 for which the CC has determined a cost of equity for NIE.

Finally, irrespective of whether appropriate estimates are being used, a short-term approach to the estimation of equity return would inevitably introduce systematic risk to the regulated business, as the allowed returns would be more in-line with the market returns. This would increase beta, and therefore imply a higher cost of capital. We expand on this point in our response to Question 2.

3.1.3 Selective use of data and sources

The CC has used the data selectively, without appropriate justification, and has adopted too narrow a review of the relevant empirical evidence and academic literature to reach a fair or representative assessment. We summarise a number of these shortcomings below[13].

- The CC uses the historical data (1990 to 2012) in Table 13.7 of the PD to support its ERP of 4% to 5%. The CC states that the historical evidence suggests a range for the ERP of 5% to 6%, and its ERP estimate is therefore consistent with the lower end of this range. However, only four of the 40 estimates of ERP presented by the CC have a value of 5% or less, while 27 of the estimates cited take on a value of 5.5% or higher. This evidence provides no sound basis for finding an ERP of less than 5.0%, still less 4.0%.

- The CC's assessment of the historical data was based on a range of investor holding periods, from 1 year to 20 years. The estimate of market return and ERP varies considerably depending on the holding period. The CC has not considered which holding period is most appropriate, and therefore effectively treats all holding periods as equally relevant.

  We do not consider this approach to be valid. As the ERP is not a firm-specific parameter (i.e. it represents the risk premium associated with holding the market portfolio), a more appropriate approach would be to place more emphasis on the average equity holding period. Annualised share turnover data for the London Stock Exchange suggests an average investor holding period of approximately 2 years.[14] According to the DMS data presented by the CC, the market return range for a two-year holding period is 6.7% to 7.5%. This is clearly inconsistent with the CC's 5% to 6% view of the historical data, let alone its final estimate of 4% to 5%.

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13 An expansion on these points can be found in Frontier's submission to the CC, which is appended to NIE's "Response to the Competition Commission's Provisional Determination", 29 November 2013.

14 Data taken from the World Federation of Exchanges.

- To estimate the ERP, the CC has relied on the forecasts of Dimson, Marsh and Staunton, without considering whether the assumptions made by these academics in generating their forecasts are appropriate. For example:
  - DMS's forecast assumes that the future long-term real rate of dividend growth should be lower than the long-term historic average of 0.5% p.a. This is simply an assumption on DMS's part, and is not tested or cross-checked by the CC. The CC therefore ascribes significant weight to this assumption without any justification. The long-term GDP growth rate forecast that is conventionally used in dividend growth models is 2%.
  - DMS derive their prospective world risk premium by assuming that the historic real growth rate of dividends was at least half attributable to past good fortune which is "non-repeatable". Such assumptions are speculative.
  - DMS assert that "the historical expansion in the price/dividend ratio cannot be extrapolated and might be assumed to be zero" because the supposed cause of the historic growth in the price/dividend ratio, the expansion in diversification opportunities, is unlikely to recur. However, it is not obvious that the expansion of diversification opportunities has been exhausted. Furthermore, changes in the price/dividend ratio might have been due to reasons other than falling risk premiums.[15]
- In focussing solely on the DMS forecast, the CC has ignored the views of a large number of other academics who suggest the ERP could be much higher than DMS. A recent survey of 49 UK finance academics found that the average required market rate of return expected is 7.7%[16].
- The CC's choice of the Fama and French method as a central part of its evidence base is unexpected, given the CC acknowledges that this approach *"remains controversial"*. The Fama and French approach has been shown to be a poor predictor of realised returns. The CC itself cites a study by Welch and Goyal (PD page 13-40 footnote 34), who do not find robust evidence that forecasts of the ERP based on dividend yields were any better at predicting

15 The price/dividend ratio could grow over time if the economy were to produce more companies (a) with high (increasing) valuations; and/or (b) that tend to reinvest profits rather than paying these as dividends. A well-known example of such a firm is Apple Inc., which has grown in value substantially over time, whilst maintaining a low dividend yield on the grounds that it needed to reinvest profits in R&D.

16 Fernandez, P., Aguirreamalloa, J., Linares,P., 2013, Market risk premium and risk free rate used for 51 countries in 2013: a survey with 6,237 answers, IESE Business School working paper

future returns than simply assuming a constant ERP.[17] The study shows the forecasting performance to be particularly poor in the period since 1995. Mehra and Prescott (2003) state that *"…over the long horizon the equity premium is likely to be similar to what it has been in the past and the returns to investment in equity will continue to dominate that in T-bills for investors with a long planning horizon."*[18] There is very little discussion of the merits and performance of the Fama and French approach in the PD relative to the weight that the CC appears to have placed on this evidence.

3.1.4 The CC's approach causes a material shift in regulatory precedent

The CC's new approach to allowed cost of equity is a significant departure from recent precedent (see **Table 1**). To justify such a significant departure requires robust evidence which the CC does not provide. Even if the approach and resulting estimates had been well evidenced and justified, considerable caution would have been called for in putting this into the regulatory decision. In other words, the CC should have considered the ramification of its decision more carefully and made much smaller step changes to the relevant parameters, so as for the market to accommodate its position much more confidently and rationally.

By shifting the regulatory precedent by such a considerable amount, the CC is effectively implying that recent sector regulators' decisions do not constitute a valid evidence base for its decision. This is creating significant unease across the entire UK network utility, and the fact that Ofgem is already consulting on this issue suggests that considerable regulatory uncertain may have been already introduced into the sector, and this will likely increase the cost of capital of the sector in the long run.

17 Welch, I. and Goyal, A., 2008, A comprehensive look at the empirical performance of equity premium prediction, Review of Financial Studies 21(4), 1455-1509

18 Mehra, R. and Prescott, E., 2003, The equity premium in retrospect, Handbook of the Economics of Finance 1(B), 889–938.

Table 1. UK regulatory determinations on RFR, ERP and total market return prior to the CC's Preliminary Determination

Sector	Subsector / company	Regulator	Year	RFR	ERP	Market return
Energy	Gas distribution	Ofgem	2007	2.5%	4.75%	7.25%
Aviation	Airport – Stansted	CAA [1]	2009	2.0%	3%-5%	5.0%-7.0%
Water	General	Ofwat	2009	2.0%	5.4%	7.4%
Energy	Electricity distribution	Ofgem	2009	2.0%	5.25%	7.25%
Water	Bristol Water	CC	2010	1.0% - 2.0%	5%	7.0%
Aviation	NATS	CAA	2010	1.8%	5.25%	7.05%
Energy	Electricity & Gas transmission	Ofgem	2012	2.0%	5.25%	7.25%
Energy	Gas distribution	Ofgem	2012	2.0%	5.25%	7.25%
Aviation	Airport - Heathrow & Gatwick (Initial Proposals)	CAA	2013	1.0%	5.75%	6.75%
CC PD				*1.0% - 1.5%*	*4% - 5%*	*5% - 6.5%*

[1] Note that the ERP and Market return figures are from the Competition Commission report on Stansted Airport Ltd, Q5 price control review. In this case a point estimate for the WACC was chosen near the top of the range and therefore the implicit market return on equity chosen was towards the top end of the 5% to 7% range.

Source: Regulatory publications

3.2 Question 2

Can you provide evidence on the impact of giving greater weight to contemporary market evidence on perceived systematic and regulatory risk?

In estimating the equity market return, the CC has departed from the conventional approach of basing the estimate on long-term historic data, which typically suggests a range of around 7%. Instead the CC has placed greater emphasis on more recent data and market evidence, and has placed greater reliance on forward-looking estimates which make use of this more recent evidence[19]. As a result the CC estimates the total equity market return to be 5% to 6.5%, comprising of an ERP estimate of 4% to 5% and a RFR estimate of 1% to 1.5%.

There are a number of channels through which placing greater weight on more short-term and contemporary evidence as well as forward-looking models could lead to greater (perceived and actual) systematic and regulatory risk.

- First, basing the cost of equity on short-term data would make regulatory settlements more pro-cyclical, increasing systematic risk.

- Second, basing the allowed return on contemporaneous evidence, and giving greater discretion to the regulator, would increase the volatility of returns, which would increase the cost of equity.

- Third, greater regulatory discretion will be accompanied by the (real and/or perceived) risk of asymmetric regulatory treatments where the regulator depresses allowed returns during economic downturns but does not allow returns to go high enough in boom times. This would require the allowed return on equity to be higher than the cost of equity, if investors are expected to earn the cost of the equity.

- Finally, there would also be higher probability of measurement error and misjudgement, as the regulator will have to re-estimate and re-interpret market evidence at every price control.

We discuss evidence for each of these effects in turn below. We also highlight how, in practice, adopting such an approach in GB would result in outcomes which are detrimental for customers over the long term.

19 See paragraphs 13.144 – 13.147.

3.2.1 A methodology based on contemporary evidence would make regulatory settlements pro-cyclical and introduce increased systematic risk

In broad terms, there are three potential approaches that can be adopted for estimating the total market return and ERP.

- **The survey approach**, where investors, business managers, academics and/or financial analysts provide their view of the ERP for the future.
- **The historical approach**, where the estimate of the ERP is based on an average of past returns on equities (which implicitly assumes there is mean reversion in equity returns).
- **The implied forward-looking approach**[20], where future cash flows and recently observed data are used to back out an estimated ERP.

A methodology which places greater weight on contemporary evidence will be based on either the survey approach or an implied forward-looking approach (or both)[21].

The CC has rejected a survey approach on the grounds that surveys are subject to bias depending on the identity of the respondents. The CC also notes that it can conduct its own analysis on the basis of the same underlying data that would be available to survey respondents[22].

The contemporary evidence on the ERP and total market return used by the CC has therefore been based on estimates of the implied forward-looking premium. The most commonly used by practitioners for this purpose is the Dividend Growth Model (DGM). In this model, the value of equity is the present value of expected dividends from investment. If dividends are assumed to grow at a constant rate in perpetuity, the value of equity can be written as the present value of that dividend stream as follows:

$$Value\ of\ Equity = \frac{Expected\ Dividends\ Next\ Period}{(Required\ Return\ on\ Equity - Expected\ Growth\ Rate)}$$

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20 This terminology is adopted from Damodaran (2012), "Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2012 Edition." The CC refers to this as the "forward-looking" approach.

21 If a historical averaging approach is used it would not make sense to base this on contemporary data (e.g. 10 or 20 years), since the shorter the time-period the greater noise in the data. Damodaran (March 2012) shows that the standard error of from ten-year or twenty-year estimates are likely to be almost as large or larger than the risk premium estimated, concluding that the cost of using shorter time periods overwhelms any advantage associated with using a more updated premium (see pp. 22-23, and Table 2).

22 Paragraph 13.141

Three of these parameters can be obtained or estimated, i.e.:

- the value of equity is the current level of the market;
- the expected dividends in the next period and the expected dividend growth rate can be estimated based on forecasts from analysts, market participants or academics.

In the DGM we can therefore solve for the required return on equity:

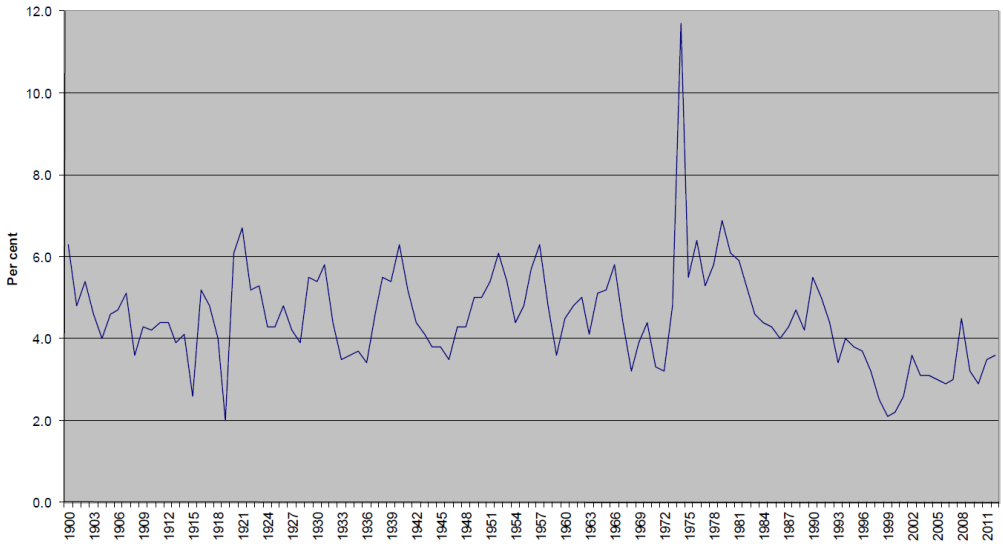
$$Required\ Return\ on\ Equity = Dividend\ Yield + Expected\ Growth\ Rate$$

where Dividend Yield is the ratio of Expected Dividends to the Value of Equity. The ERP can be calculated by subtracting the RFR from the required return on equity.

DGM estimations are sensitive to assumptions on dividend forecasts and the long-run expected growth rate of dividends. In itself this can create problems as it leaves scope for the regulator to apply discretion, as we discuss in the next section.

However, notwithstanding these problems, it is clear that a formulaic application of the DGM would result in cyclical estimates of the market return, given the cyclicality in the dividend yield. The CC presents data on the dividend yield for the UK market, which is reproduced in **Figure 2** below.

Figure 2. Dividend yield for UK market (Barclays data)

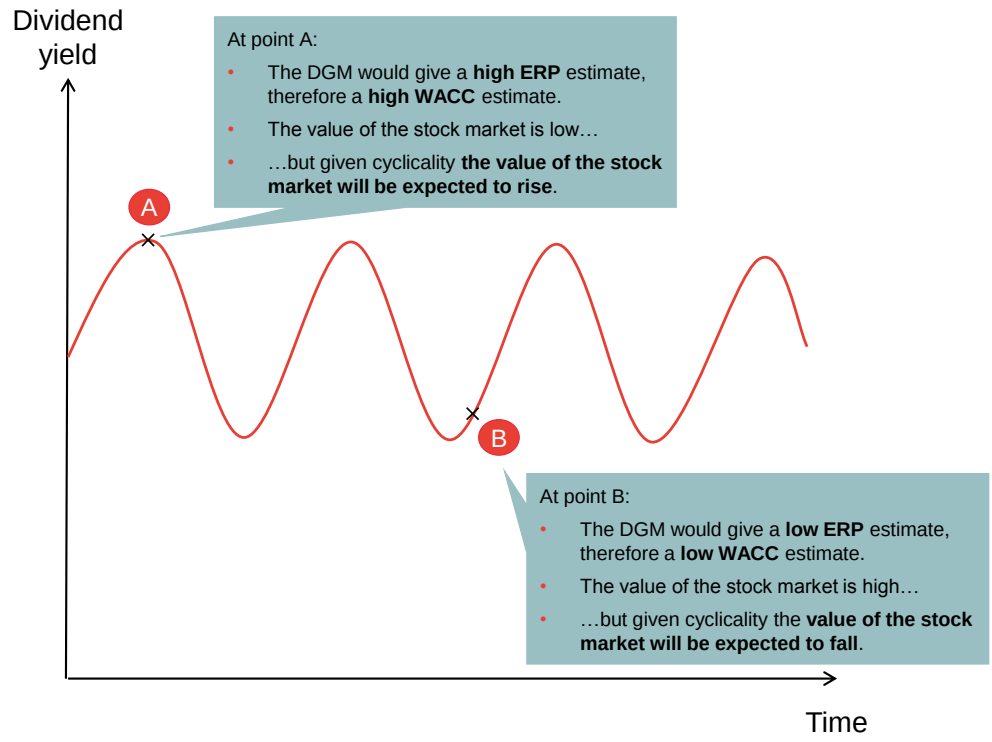


Source: CC, NIE PD, Figure 13.5 p 13-41. (Original source: Barclays Equity Gilt Study 2013)

The data clearly shows that, although subject to shocks, there is a strong cyclical element to dividend yields over time. Over most of the period this cycle has

fluctuated around 5%, although there are periods during which the yield is higher than the long-term average (e.g. from around 1974 – 1980 in the wake of the oil crisis) and periods where the yield is below average (e.g. 1907-1918, and from 1990 – 2012). This cyclicality in the dividend yield is likely to lead to **pro-cyclicality in returns to network companies** if their allowed WACC is set using the DGM. See **Figure 3** for a stylised illustration.

Figure 3. Illustration of pro-cyclicality of WACC estimate in DGM



Source: Frontier Economics

At point A where the dividend yield is high, the stock market price level is relatively low possibly due to adverse market conditions. If the allowed cost of equity is set according to this higher-than-average level, the regulated company would be making a higher-than-average return, mirroring the market. This increases the correlation between the firm's return and the market return, increasing the systematic risk of the regulated business and pushing up its beta. As a direct result of that, the cost of financing would increase. Similarly, at point B where the stock market level is relatively high and dividend yield low, a lower-than-average allowed return on equity would increase the correlation between the company's return and market return, increasing systemic risk and beta. Once again, this would increase the cost of capital.

Whether or not the dividend yield can be used to predict stock market movement and indeed whether or not it can be used to forecast the ERP accurately still remains an un unsettled academic debate. For detailed discussions, see Campbell and Schiller (1988, 1998 and 2001), Rozef (1984), Fama and French (1988), and Goyal and Welch (2008).[23] However, what is less controversial is the fact that ERP follows the cyclical pattern of the economy as a whole. In a study, Lettau, Ludwigson and Wachter (2007)[24] show the link between the ERP (measured by dividend yield) and the volatility in real economic variables including employment, consumption and GDP growth. **Figure 4** is taken from this study, and it shows the relationship between the volatility of dividend yield and GDP growth.

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23 Campbell and Shiller, (1988), Stock Prices, Earning, and Expected Dividends;

Campbell and Shiller, (1998), Valuation Ratios and the Long-Run Stock Market Outlook;

Campbell and Shiller, (2001), Valuation Ratios and the Long-Run Stock Market Outlook: An Update;

Rozef, M. S., (1984), Dividend Yields are Equity Risk Premiums, *Journal of Portfolio Management*, 11(1), 68—75;

Fama, E. F., and K. R. French, (1988), Dividend Yields and Expected Stock Returns, *Journal of Financial Economics*, 22, 3—25; and

Welch, I. and Goyal, A., (2008), A comprehensive look at the empirical performance of the equity premium predicting, *Review of Financial Studies* 21(4), 1455-1508.

24 Lettau, M., S.C. Ludvigson and J.A. Wachter, 2008. "The Declining Equity Risk Premium: What role does macroeconomic risk play?" Review of Financial Studies, v21, 1653-1687.

Figure 4. GDP volatility and the ERP

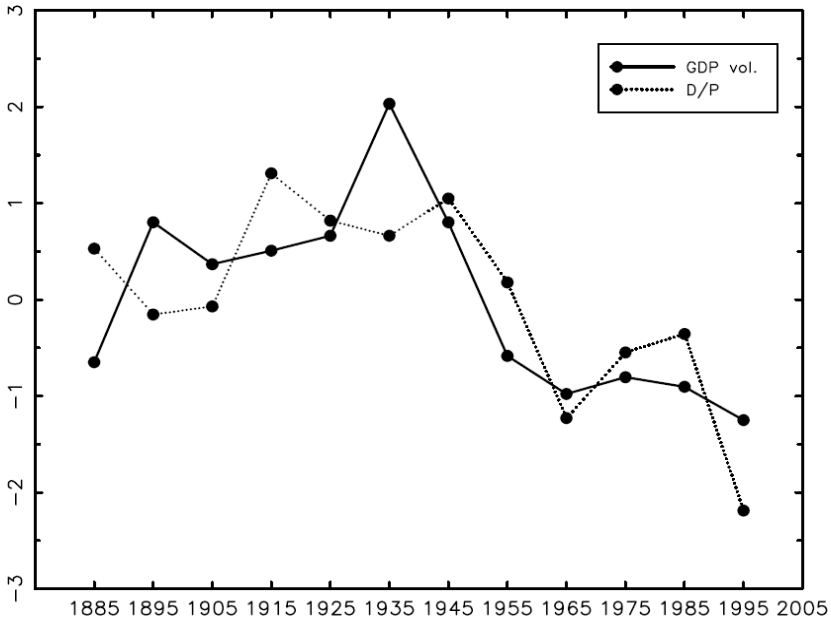


Figure 3
GDP volatility and the D/P ratio—Prewar evidence
This figure plots the standard deviations of GDP growth and the mean D/P ratio by decade starting in 1880 until 2000. Both series are demeaned and divided by their standard deviation. The GDP data are from Ray Fair's website (http://fairmodel.econ.yale.edu/RAYFAIR/PDF/2002DTBL.HTM) based on Balke and Gordon (1989). The dividend yield data is from Robert Shiller's website (http://aida.econ.yale.edu/~shiller/data/ie_data.htm).

Source: Lettau, Ludwigson and Wachter (2007)

Dividend yield has clearly tracked volatility in the real economy over a long time-frame. This implies that the ERP follows market trends, i.e. it is cyclical and exhibits a certain degree of mean reversion. This supports the view, shared by many regulators to date, that a long-run historical approach to estimating the risk premium is the most appropriate in the context of estimating the cost of equity for regulated utilities.

3.2.2 A methodology based on contemporary evidence will imply greater regulatory discretion, which would further increase volatility and risk

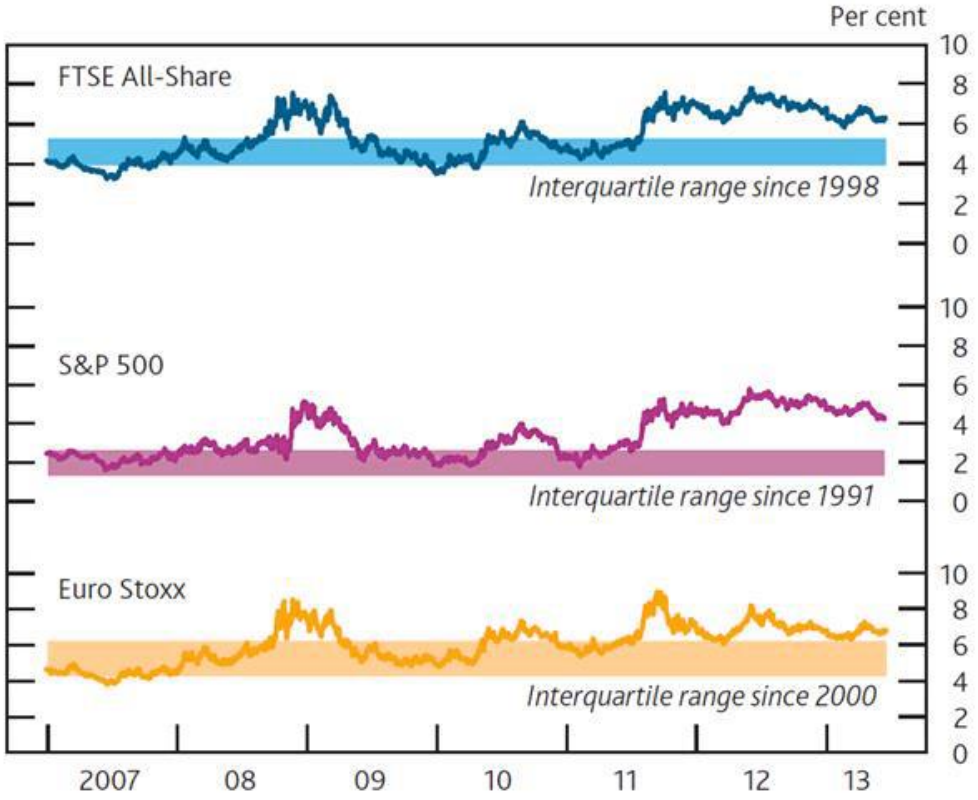
Adopting the CC's methodology will result in estimates of the cost of equity which fluctuate over time, and depend to a large extent on regulatory discretion. Both of these features imply that investors can expect more volatility in returns.

For example, the following two points show how the CC's approach can easily lead to hugely fluctuating results, due to the volatile nature of short-term data.

- In estimating the forward looking estimates of the ERP, the CC included analysis produced by the Bank of England (paragraphs 13.138 to 13.139).

This analysis was published in 2010 and suggests that the ERP has fluctuated at around 4.5%. The Bank's analysis was updated in July 2013, and these DGM-based estimates of the ERP for the UK suggest that the ERP is slightly higher than 6% at present (see **Figure 5**).[25] The CC has failed to take this new evidence into account (presumably unintentionally).

Figure 5. Bank of England estimates of the equity risk premium



Source: Bank of England, 2013, Financial Stability Report, June, p.14

- Similarly, the CC has stated that estimates of 7% for the market return do not appear credible given the conditions observed since the credit crunch (paragraph 13.144). However, in 2013 the FTSE 100 and European indices recorded the best annual rise since 2009, with the FTSE 100 up 14.4%. If the CC included this latest market evidence in realised market return, the conclusion could be very different than the one it has come to, although we obviously do not argue that one should focus on this high realised return in 2013 for the estimation of the cost of equity.

25 Bank of England, 2013, Financial Stability Report, June p.14.

This demonstrates how volatile short-term evidence can be and how easily regulators can be misled if they were to rely on short-term evidence for regulatory decisions.

This type of volatility is clearly important to investors. A 2013 Water UK Investor Survey[26] gathered information from 79 financial market participants, covering the various groups of stakeholders, asks investors to identify the top three risks facing the water sector. Investors identified five main risks: regulatory, political, inflation, operational and climate. By far the most important of these was regulatory risk. **Table 2** shows the proportion of investors from each category that identified regulatory risk as the most important risk. Overall, roughly 93% of the investors stated that regulatory risk was the top risk in the sector.

Table 2. Importance of regulatory risk to water sector investors

	% Identifying Regulatory Risk as a Top 3 risk		
	1st	2nd	3rd
List equity investors	100%	-	-
Unlisted equity investors	97%	3%	-
Banks	86%	14%	-
Bondholders	83%	11%	-

Source: Water UK Investor Survey 2013

The survey also asked investors about their perception of the licence modification process that took place in 2011 and 2012. Ofwat had consulted on changes to water company licences that would have introduced greater discretion regarding the future regulation of the sector (specifically the proportion of revenue covered by price cap regulation and the future basis for indexing the asset base). The proposals caused concern for investors and companies and were subsequently revised. The investor survey asked whether the proposals had made the industry more or less attractive to investors. The results, shown in **Table 3**, show that a large majority of investors considered that the process had made the sector less attractive.

26 "2013 Survey of Investors in the water sector", A report by Indepen for Water UK, June 2013.

Table 3. Impact of licence modification proposals

	Made the sector less attractive	No difference	Made the sector more attractive
List equity investors	90%	10%	-
Unlisted equity investors	97%	3%	-
Banks	67%	33%	-
Bondholders	69%	31%	-

Source: Water UK Investor Survey 2013

These results from the investor survey highlight that changes to regulation are seen as a highly significant risk factor for investors (and equity investors especially) in regulated utilities.

Even though the volatility captured in the survey is not necessarily systematic risk, i.e. it is not specified as diversifiable or undiversifiable, there is evidence that investors would on a whole prefer a more stable cashflow profile than a more volatile one. This is not at odds with the CAPM theory, but rather a real-world qualification of it. Further detail is explained in Annexe 2.

Ofgem has also previously noted that an increase in volatility caused by increased regulatory risk could lead to increases in the cost of debt through a change in the ratings' agencies view of the regulatory framework. Moody's rating methodology is shown in **Figure 6** below.

Figure 6. Moody's methodology for regulated electric and gas networks

Rating Factor/Sub-Factor Weighting

Broad Rating Factors	Broad Rating Factor Weighting	Rating Sub-Factor	Sub-Factor Weighting
Regulatory Environment and Asset Ownership Model	40%	Stability and Predictability of Regulatory Regime	15.00%
		Asset Ownership Model	10.00%
		Cost and Investment Recovery	10.00%
		Revenue Risk	5.00%
Efficiency and Execution Risk	10%	Cost Efficiency	6.00%
		Scale and Complexity of Capital Programme	4.00%
Stability of Business Model and Financial Structure	10%	Ability and Willingness to Pursue Opportunistic Corporate Activity	3.33%
		Ability and Willingness to Increase Leverage	3.33%
		Targeted Proportion of Operating Profit Outside Core Regulated Activities	3.33%
Key Credit Metrics	40%	Adjusted ICR (or FFO Interest Cover)	15.00%
		Net Debt/RAV (or Fixed Assets)	15.00%
		FFO/Net Debt	5.00%
		RCF/Capex	5.00%
Total	100%		100.0%

Source: Moody's Global Infrastructure Finance, 'Global Regulated Water Utilities – Rating Methodology', December 2009.

It is clear that the "Regulatory Environment and Asset Ownership Model" is a key element in the assessment as it makes up 40% of the overall assessment of the credit rating. Therefore a lower score in this area (i.e. through increased regulatory risk) results in a worsening of the overall credit rating. Since applying the CC's cost of equity methodology is also likely to result in substantially worse credit metrics, the result is very likely to be a reduction in the rating of the GB DNOs.

This illustrates that allowing the regulator greater discretion (which would be the case if adopting a short-term cost of equity approach) can have a substantial impact on the cost of capital. Ofgem itself has recognised the benefits of limiting regulatory discretion under the RIIO framework, for example by prescribing a standard approach to setting the cost of debt; substantially limiting the scope of the mid-period outputs review; and generally specifying the components of the framework at length and following extensive consultation.

The Commission's own implementation of its own methodology makes this risk of greater discretion particularly clear. The Commission has relied on virtually identical evidence in the NIE case as it did in the Bristol Water case and yet has arrived at an estimate of the market return that is 1% lower with no additional evidence or reasoning to support such a significant shift in its position. The only difference in evidence is that the table of historic market returns in the NIE report has been updated with 3 more years of data relative to the Bristol Water

report. The key evidential paragraphs in the NIE report (paragraphs 13.129-13.140) are identical to paragraphs 80-89 of Annex N of the Bristol Water decision. To use the same evidence base to arrive at a quite different answer is a clear example of regulatory decision and completely undermines the benefits of stable and consistent regulatory decision-making as the cornerstone of incentive based regulation.

3.2.3 A methodology based on contemporary evidence could result in asymmetric treatment and increase the company's systematic risk

Greater regulatory discretion could create a further increase in risk because the regulator is (or is perceived to be) prone to apply discretion asymmetrically, by depressing allowed returns to below the average expected level during economic downturns without providing higher than average returns during booms. Since the risk associated with greater regulatory discretion is asymmetric, a larger adjustment must be made to the allowed cost of equity. This point has been supported by Professor Ian Cooper (London Business School) in his paper on Heathrow's cost of capital.[27]

Furthermore, the asymmetric treatment is likely to be motivated by wider macro-economic conditions. Although this needs not to perfectly correspond to the equity market, it is highly likely to be correlated to it. As a result, the asymmetric treatment is prone to be pro-cyclical, further increasing the systematic risk of the regulated company and its cost of capital.

Indicative evidence for this effect on systematic risk of the application of regulatory discretion can be found by assessing the impact on beta of events or regulatory decisions where such discretion has been applied. Annexe 1 presents a number of event studies that examine how regulatory changes have affected the betas of companies (i.e. within the CAPM structure) or the volatility of equity returns. These event studies provide strong support to the view that applying regulatory discretion can have an impact on beta or required returns, and this impact can be quite material.

3.2.4 Placing greater weight on contemporary market evidence also increases risk resulting from the possibility of measurement error

Disregarding the long-term average and relying on short-term estimations could also lead to a higher probability of measurement error and misjudgement, as the regulator is likely to have to re-estimate and re-interpret market evidence at every price control.

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27 Copper, I. (2011) Adjusting Heathrow's cost of capital for skewness: Methodological and qualitative issues, Prepared for BAA for the purpose of a regulatory submission, London Business School.

Estimating the cost of equity that is based on contemporary market evidence will most likely involve the DGM or some variant on this model. The DGM model involves a number of aspects over which the regulator must apply discretion or choice in the approach. These include in particular:

- the assumption around the long-run expected growth in dividends (e.g. which analyst forecast or metric should be used as the basis for the long run growth estimate? Should this forecast be divided into near-term periods where there is more certainty about dividend growth vs. a longer-run assumption?);
- whether to use the dividend yield or some other measure of earnings (e.g. using the payout ratio of dividends/earning; a measure of 'potential dividends' which incorporates stock buybacks as well as dividends (see Damodaran (2012); or making use of accounting data such as book value numbers[28]); and
- whether to take an average of DGM estimates over time or to use point estimates.

Compared to relying on long run estimates, the estimation and methodological choices associated with obtaining a robust estimate of market returns based on short run data is far more problematic and prone to error.

Again, the Commission's own use of data and evidence and its interpretation of that evidence serve to illustrate the errors that can result from applying this methodology. As we detailed in our answer to question 1, the Commission made only selective use of data, without apparent justification, and has adopted too narrow a review of the relevant empirical evidence and academic literature to reach a fair or representative assessment. These errors are likely to further introduce volatility.

3.2.5 In practice, the unintended consequences of adopting the CC's approach will be detrimental to customers.

Through all of the above channels, it is likely that putting more weight on contemporary evidence will increase systematic risk and the cost of equity. However, quantifying this is difficult as it depends on the extent to which the cost of equity methodology is allowed to become pro-cyclical; how transparent this methodology is; and the extent to which the regulator is able to exercise discretion.

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[28] Easton (2007) summarises the limitations of models which use the latter to estimate the cost of equity. See Easton, P., 2007, Estimating the cost of equity using market prices and accounting data, Foundations and Trends in Accounting, v2, 241-364.

The impacts of this additional systematic and regulatory risk on investor and firm behaviour could be profound. We believe there could be the following unintended consequences if Ofgem adopted an approach similar to the CC's.

- **Less attractive to long-term investors**. The current long-term approach to estimating the cost of equity promotes stability in returns. In turn this means DNOs can attract long-term equity investors. This brings a number of benefits. First, the firm can focus on the fundamentals of improving operational efficiency rather than attracting investment. At the same time, the long-term investor is able to develop a better understanding of the firm and therefore is better able to identify efficiency improvements. The investor is also able to take a long-term perspective in their financing decisions (e.g. not taking dividends out of the firm to improve the financial stability of the firm and support). Determining allowed equity return based on short-term market data would wipe away such benefits.

- **Distortion of the financing mix**. Introducing more volatility and downside risk into the allowed equity return may mean firms need to lower gearing to maintain credit ratios and access debt markets. Thus, the ability to use cheap debt would be reduced and the overall cost of capital would rise.

- **Reduced maturity of debt**. If the cost of equity is fluctuating in each price control, DNOs may need to start issuing much shorter maturity debt, possibly matched to the price control period. This is unlikely to be efficient as most assets being financed typically have long asset lives. A disconnect between asset lives and finance lives would create unnecessary transaction costs.

- **Distortion of planned investment in business plans**. Using short-term market evidence to determine allowed equity return could introduce pro-cyclicality to the planned investments. It would be better for the long-term sustainability of the sector if stable investment were made with little impact from the short-term economic cycles.

3.3 Question 3

Do you think changing our methodology for equity market return would impact on interest costs for DNOs?

If so, how would this need to be accommodated in our approach to the financial package or regulatory package more widely?

If Ofgem were to change to the CC's methodology for equity market return, there would be an undesirable impact on the interest costs for DNOs, both for the short run given the current condition in the debt market and for the long run. We discuss these two in turns.

3.3.1 Short-term impact on the cost of debt

- **Cost of downgrading**. The lower allowed equity return according to the CC's approach would impose financeability difficulties on companies. The CC has noted this is the case for NIE, and Ofgem has indicated that a deterioration in credit metrics is also possible for the GB DNOs. As the ratings agencies place substantial weight on credit metrics in their assessments (e.g. see Moody's methodology, **Figure 6**, which places 40% weight on key credit metrics), this could lead to downgrade of the DNO's credit ratings.

  This would translate directly into an increase in the cost of debt. NPg's financial model indicates that if Ofgem were to apply directly the CC's approach on allowed return on equity, the company would face a material risk of downgrading of at least one notch. NPg's current rating is A-/A3, a one-notch down grade to BBB+/Baa1 would translate to 15 bps of debt premium, according to Reuters Corporate Bonds Spread for Utilities. A one-notch downgrade from BBB+/Baa1 to BBB/Baa2, however, would translate to 25 bps of debt premium. As most DNOs are currently rated at BBB+/Baa1 or A-/A3, the prospect of such considerable extra debt costs is very real.

- **Cost of de-gearing.** Ofgem has suggested in its consultation that to offset the downgrade pressure DNOs may have to de-gear by 10% to around 60% gearing, which would translate to an increase in the cost of debt by about 0.2%. Without having seen Ofgem's calculation we cannot comment on its result directly. However, our own analysis suggest that NPg would have to de-gear to about 50% in order to restore the financeability metrics back to the original levels as proposed in the business plan.[29] This would represent

[29] We note that in our calculation we have taken care to ensure consistency between the lower gearing and the allowed cost of equity which depends on gearing. While identifying the gearing needed to

over 15% decrease in net debt. If Ofgem were to make an adjustment to account for de-gearing achieved by foregoing the benefit of current cheap debt, the additional cost of debt would be over 0.4%. Further, it is questionable whether a substantial increase in the equity share is realistic or feasible, particularly as the allowed return of equity would be more unattractive.

- NPg appears to have the highest embedded debt cost compared with other DNOs. Our sector-wide analysis of embedded debt reveals that NPg's nominal cost of embedded debt is 6.7%, while the industry average excluding NPg is 5.83% nominal[30]. This means that applying a sector-wide change of methodology on equity market return would cause adverse effects to different degrees across DNOs, with NPg at the worst end of the spectrum.

To accommodate a change in allowance for the cost of equity, the allowance for the cost of debt would need to be adapted to ensure consistency of the shorter-term approach to the cost of financing. In the case of NPg, this means that the allowance for the cost of debt may have to be based on the embedded debt cost. Ofgem's current approach for setting the allowed cost of debt using a ten-year trailing average of the iBoxx indices would not be consistent with a short-term estimate of the cost of equity.

3.3.2 Long-term impact on the cost of debt

There are longer-term concerns of adopting the CC's methodology even if the equity market return happened to be at a higher than average level (in which case the above short-term difficulties would not emerge).

- Volatility of the equity market return would introduce higher uncertainty to the cash position of the companies, and could result in a higher probability of default in certain periods than others, thereby increasing the cost of debt.

- Utilities currently tend to issue debt across a time-span over several price control periods to reflect the long lifetime of their assets. If the allowed cost of equity were to fluctuate significantly at each price control (as would occur under the CC's provisional approach), DNOs may need to start issuing

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preserve the financeability metrics, an iterative process was used to allow the equity beta to go down with the gearing level.

30 Our analysis is based on electricity company bonds issued on nominal terms (i.e. excluding index linked debt) identified using the Bloomberg service. It will not cover all debt issued by the sector, for example debt which is not traded. It also does not account for any instruments which may have modified the cost of debt from the coupon rate (e.g. we understand NPg has issued 'wrapped' debt in the past, which qualified for a lower interest rate than could have been achieved if it was not wrapped).

much shorter maturity debt, possibly matched to the price control period. Refinancing debts would incur inefficient additional issuance costs and carrying costs, which would ultimately translate to higher customer bills.

- One of the central components of the rating agencies rating methodology (as shown in **Figure 6**) is their assessment of the stability and predictability of the regulatory environment. That assessment is likely to deteriorate for the GB utilities if Ofgem were to adopt the CC's methodology, both as a result of increased uncertainty associated with an unanticipated change in methodology, and because the methodology itself is inherently unstable (as explained in response to question 2 above).

3.4 Question 4

How do you consider that the choice of methodology for determining the appropriate equity market return impacts on investment incentives?

Is there any evidence you can provide?

As we noted in the summary to this submission, the first criteria for selecting a cost of equity methodology which is in the public interest is to ensure that the resulting allowed return on equity is sufficient to attract the required investment. As Ofgem has stated in relation to choosing an allowed return within an estimated range:

"The RIIO framework is about providing incentives to encourage companies to deliver their outputs at minimum cost. This requires a level of opportunity and risk that does not align with a low cost of equity."[31]

We consider that there is a clear risk associated with adopting the CC's cost of equity methodology that the allowed return is set too low. In particular, the impact of adopting this methodology on the cost of equity and cost of debt (which have been highlighted in response to the previous three questions) would not be accounted for under the CC's approach. While we have not assessed whether this would result in allowed returns which are insufficient to attract investment, this is a distinct possibility which should be considered carefully by Ofgem.

A further potential consequence for investment is that a short-term methodology for setting the cost of equity encourages more short-term thinking and planning on the part of the DNOs. It is possible that the CC's methodology will encourage the networks to re-focus on managing risks over the short term which are driven by the cost of equity methodology (i.e. incentivising less investment when the allowed return on equity is low, and more investment when it is high).

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31 Ofgem, RIIO-T1 and RIIO-GD1 Strategy Decision – Finance Annex. Paragraph 3.65.

More volatile regulatory settlements could therefore undermine an important objective of the RIIO model to encourage longer-term planning and to deliver long-term efficient outcomes. In contrast, as Ofgem has noted, a consistent, long-term approach (as Ofgem currently adopts) provides stable investment incentives to long-term investors, which should deliver benefits to customers over the long term.

In addition, we note that the consultation (paragraphs 1.25 and 1.26) suggests that the current stable measure of cost of capital allowances could lead to overinvestment (underinvestment) when the market anticipates low (high) returns. We believe this effect would be limited or non-existent for the following reasons.

- **The incentive to change investment patterns would be extremely limited given long asset lifetimes**. Investments made in the sector tend to have asset lives well over 40 years, which stretch over many regulatory price control periods. Investment decisions of such long-term horizon are unlikely to be heavily dependent on the outcome of one particular price control. The overall level and stability of long-run returns are more relevant concerns for investors than potential short-term higher-than-market level of returns.

- **Safeguards and incentives in the RIIO framework help ensure investment is efficient regardless of current equity market conditions**. There is very limited scope to change investment levels depending on market conditions. Benchmarking and the requirement to justify capex spend in the business plans, as well as the incentivisation of primary outputs and monitoring of secondary deliverables, ensure that spend is efficient. Moreover, incentive mechanisms to reduce capex are likely to far outweigh any incentive to increase capex expenditure resulting from a difference in the allowed cost of equity compared to the market return on equity.

- DNOs have some discretion over the timing of investments during the price control, but again the incentives to move investment are very limited and any impacts on consumers are highly limited.

3.5 Question 5

To what extent do you think the merits of the alternative approaches to the assessment of equity market returns are affected by the eight-year RIIO control period?

The NIE WACC applies to a price control which finishes in 2017. One interpretation of the CC's determination might be that it has considered a short-run approach is suitable for NIE given that the CC is determining a relatively short-term price control (the NIE price control is already two years in, so

effectively the "forecast" only lasts 3 years). Even in the context of NIE investigation this approach is highly suspect given the significant uncertainties surrounding growth, asset prices and returns for the next three years.

In the case of the DNOs the approach has even less relevance. Ofgem is determining an 8 year price control which begins in 2015 – meaning its forecast has to be applicable for 9 years. Therefore, it would be even more inappropriate to apply this approach at ED1, given the longer term forecast that is required and the significant scope for the expected equity return to change over this period.

4 Other issues

In Appendix 2 of its consultation document Ofgem has set out an explanation of its central reference point for testing the DNO business plans. While the consultation does not invite specific responses to this section, we consider it worth noting our view in relation to two issues, namely:

- Ofgem's considerations in relation to changes in the RPI formula; and
- Ofgem's statements in relation to transaction values and RAB premia.

4.1 Change to the RPI formula

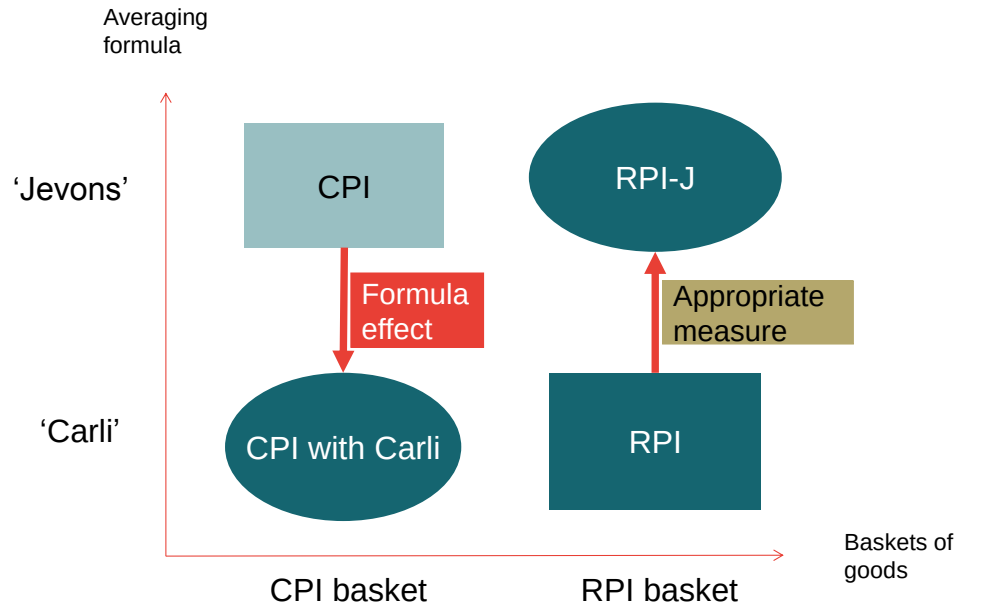
In the consultation, Ofgem suggests it will recalibrate its estimate of the long-run real risk-free rate from 2.0% used in its RIIO-GD1 decision to 1.6%, as a result of potential overstatement of inflation of RPI due to the change in the ONS's data collection method relating to clothing items. Ofgem cites the following reasons why this 0.4% adjustment should be made:

- On 10 January 2013, the ONS announced that it will not change the methodology for computing RPI. That day saw a 0.4% reduction in yields on ten-year index-linked gilts.
- The ONS publishes the so-called "formula effect" as a component of the difference between RPI and CPI inflation. Ofgem calculates the averages of this "formula effect" for two periods, Jan 1998 - Dec 2009 and Jan 2011 - Oct 2013. The difference between these two averages happens to be 0.42%.
- ONS is unlikely to make further changes that could offset the formula effect.
- There is no need to adjust for other components of the CPI-RPI wedge, such as housing costs.

Although we recognise the need to take account of the potential overstating effect of RPI on inflation, we do not agree with the method used by Ofgem nor its result. In our view, Ofgem has used the wrong counterfactual to calculate the quantum of the potential overstatement of inflation by RPI. Consequently, the 0.4% is an over-estimation of the appropriate adjustment required. We propose an alternative, and in our view, more appropriate counterfactual for the estimation and explain it in detail below.

The difference between RPI and CPI is two-fold, as shown in **Figure 7** below in a stylised illustration.

Figure 7. Adjusting for changes in RPI



- Firstly, they use different averaging formulas. The RPI formula (Carli) is more prone to overstating inflation than the CPI formula (Jevons), particularly after the new method of clothing data collection was introduced by the ONS in 2010.

- Secondly, the basket of goods and services, their weights and the population covered in these two indices are all different.

The 'formula effect' calculated by ONS is the difference between CPI and CPI basket of goods measured with the Carli formula. For the purpose of quantifying the RPI's overstatement of inflation due the change in clothing data collection method, Ofgem proposes to use the difference between the average formula effects before and after the transitional period of 2010.

However, we do not consider this as an appropriate estimate because CPI has never been a relevant parameter in Ofgem's previous price control determinations. Using CPI as a counterfactual would implicitly require that past allowed equity returns to be based on CPI, which was clearly not the case.

We propose to use a different method to estimate RPI's overstatement of inflation, to be consistent with the fact that all past determinations have been based on RPI. We propose to use a different counterfactual, the so-called RPI-J, also calculated by ONS. The only difference between RPI-J and RPI is the fact that RPI-J is calculated using the Jevons formula. This captures precisely what needs adjusting – the fact that the Carli formula overstates inflation.

Other issues

We calculate the average difference between RPI and RPI-J before the change of clothing data collection method in 2010, and compare that with that after the change. We look at the same 'before' and 'after' periods as suggested by Ofgem, in which case the change is 29 bps.

However, it may be more appropriate to compare a balanced time period of 34 months starting from January 2011 (the maximum time series we have available after allowing 2010 for transition) versus the 34 months up to December 2009. This results in an estimated change of 25 bps.

Based on the evidence above, we consider that the appropriate range of the change in potential overstatement of inflation by RPI is within the range of 25 – 29 bps.

Finally, regarding Ofgem's observation that the bond market moved on the date of the ONS's announcement by 40 bps as a support for its proposed 40 bps adjustment, we note that this approach is opportunistic for the following reasons.

- Firstly, 40 bps was the total market movement in ten-year IL gilt yields on the day, not controlled for any other factors. In other words, for the 40 bps to be entirely attributable to the ONS announcement, one has to assume that all other factors in the bond market that day aggregated to exactly zero, which is unlikely to be true.

- Secondly, this was a one-day market movement which is likely to involve typical financial market noises such as market over-reactions to news. To properly measure the market's reaction, appropriate statistic method must be used to estimate the difference before and after the announcement. It would be extremely imprudent to use this one data point as a basis for a fundamentally critical regulatory decision such as the allowance for the cost of capital.

- Finally, a market reaction on the ONS announcement in IL gilt yield (even when measured accurately) would not be the best estimate of the RPI's overstatement of inflation in any case. This is because one can directly calculate it using the method we suggested involving RPI-J.

4.2 Transaction/traded values versus RABs

Ofgem's consultation states that new evidence of transaction values since the RIIO-GD1 determination in December 2012 has influenced its view that the 6.7% cost of equity allowed at GD1 may no longer be appropriate for ED1.

"We stated in our 'Assessment of the RIIO-ED1 business plans' document that we had considered a wide range of market evidence that has emerged since our RIIO-GD1 decision, including transaction values for regulated network businesses."[32]

"The evidence from transaction values and traded shares shows that the market has valued regulated networks at more than their regulatory asset values, and a valuation premium has persisted for a number of years. Some of the valuation premium can be explained by anticipated operating outperformance (and perhaps bidders' optimism bias in some cases). However, we can infer that some of the premium reflects a difference between the returns the market requires at present, in a low interest rate environment, and the longer term."[33]

Ofgem does not appear to acknowledge that regulated assets can, and have, been sold for less than their regulatory asset valuation. Moreover, Ofgem has not recognised the full range of factors that can explain transaction premia. Specifically these factors include:

- **Measurement error due to lack of accurate public information**. Public reporting of the value of private transactions relies on information leaked or provided by the parties involved. There is no guarantee that this information is accurate to the actual terms of the deal, and indeed there are potentially strong incentives on the part of the seller to distort these numbers. It is not clear that this represents a reliable source of information on which regulators should base decision-making.

- **Non-regulated earnings**. Many networks firms have non-regulated elements to their business. There is a large amount of uncertainty around the correct value of these which can lead to error when assessing the traded value of the regulated part of the business relative to the RAB. Non-regulated earnings are also likely to increase the measurement error highlighted above, since it is likely to be difficult to separate the non-regulated value of a transaction with very limited publically available information.

- **Valuation of potential outperformance**. A large part of the premium reflects *expectations* of outperformance in other areas not related to the cost of capital, in particular in operational efficiency. This is particularly true for transactions of network firms where the new owner will have expectations of finding greater efficiency savings, many of which are realised in practice. For example, Ofgem has noted that WPD has achieved significant

32 Appendix 2, paragraph 2.3

33 Appendix 1, paragraph 1.6

efficiencies since acquiring the West Midlands and East Midlands licensees[34]. It is also notable that it is not uncommon for the weaker performing assets to be the ones available on the market and subject to transactions – this indicates that the potential for outperformance is a strong driver of value. Investors may also value outperformance differently, for example depending on their expectations as to the timing of when outperformance can be achieved.

- **Optimism bias**. This is a common issue when there is uncertainty about the value of the firm in a transaction. The successful bidder is likely to be the one who makes the most optimistic assumptions, which lead to a high valuation. Given a range of valuations this may be a value above the fair market value.

- **Synergies.** Some transactions may result in additional returns being realised on other assets that the investor owns in their portfolio (e.g. through learning around processes and techniques across multi-national organisation).

- **Valuation of future potential opportunities**. Investors may perceive value greater than the RAB if the transaction offers opportunities to expand in future. For example, in the case of an electricity network this might include opportunities in the area of smart metering or renewable technologies, or a transmission company might see benefits from potential future new interconnectors.

- **Specific features of the buyer**. A number of features of the buying party can strongly influence their valuation of a network. For example, large state-owned European utilities with large cash reserves were particularly active acquirers in the late 1990s and 2000s, and factors other than the underlying economic value of the assets, were likely to be driving their valuation of businesses. Similarly, tax arrangements may make a network more attractive to particular (e.g. multi-national) investors. These and other factors can have a significant impact on valuation.

- **Volatility in market returns**. In response to question 2 above we highlighted that market returns fluctuate around a long run average. If investors expect that the regulator will determine price control allowances based on a long-run average, then the timing of the transaction will affect

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34 Ofgem fast-track decision document, Appendix 5 paragraph 1.18, page 55. In its business plan WPD also noted that synergy and efficiency savings have been delivered following WPD's acquisition of the West and East Midlands DNOs (e.g. see SA-05 Supplementary Annex – Expenditure, page 179 paragraph 58.3).

their valuation of the network. For example, an investor considering a transaction at Point B in **Figure 3** might consider that there will be a period where the cost of equity is below the long-run average, thereby inflating the valuation. Similarly, in periods where the cost of debt is low, investors might value network assets higher than the RAB for that period of time. The converse is in periods where the cost of equity and debt is above the long-run average, during which time we might expect to see networks valued at a discount to RAB. While this is more unusual, in the late 90s and early 2000s, water companies were trading at a discount to RAB.

- **Flight to safety**. Related to the above point is that, in periods of uncertainty in the markets, investors are likely to be more attracted to assets that are considered more "safe". Regulated networks assets are perceived to provide relatively stable long-term cashflows, and as such their value is likely to be inflated when investors are seeking to de-risk their portfolios.

- **Error on the part of buyers**. While transactions of the scale of regulated network assets are subject to extensive levels of due diligence and scrutiny, it is not infeasible that buyers base decisions on information that has been misunderstood or mis-interpreted. For example, if incentive frameworks are particularly complex, it is possible that buyers could inaccurately estimate the level of returns that can be achieved from an investment.

With such a large range of factors that can explain transaction values, and variation in transaction values between different buyers, it is our view that transaction premia are a very unreliable source of evidence on which to base regulatory decisions about the allowed cost of equity. It is likely that the factors identified above explain a significant part of any observed or supposed transaction premium.

Other issues

Annexe 1: The effect of regulatory discretion on systematic risk

There are a number of published event studies that have examined how regulatory changes have affected the betas of companies (i.e. within the CAPM structure) or the volatility of equity returns. A summary of the most relevant event studies on the cost of equity is provided in **Table 4**.

Table 4. Event studies of regulatory uncertainty on the cost of equity

Study	Description	Range of estimated impacts[35]
Antoniou and Pescetto (1997)	The study considered the impact of around 30 regulatory and policy announcements affecting BT	Average absolute change in cost of equity = 1.1% Range of impacts: 1.6% to 1.4% (based on 10th and 90th centiles)
Pescetto (2008)	The study considered the impact of 116 regulatory announcements affecting the water industry in England & Wales	Range of impacts: 0.31% to 0.56%
Paleari and Redondi (2005)	The study considered the impact of 30 regulatory and policy announcements on the betas of Regional Electricity Companies (RECs)	Average absolute change in cost of equity = 0.3% Range of impacts: -0.44% to 0.3% (10th and 90th centiles)
Buckland and Fraser (2001)	The study estimated the impact on REC betas of events during the 1992 General Election	Average absolute change in cost of equity = 1.0% Range of impacts: 0.05% to 4.25%
Robinson and Taylor (1998a)	The study examines the impact of 30 significant regulatory events on the expected volatility of RECs' share returns before and after the regulatory events. The authors find that regulatory actions marking the start of a consultation on regulatory policy had a negative effect on RECs' returns.	39 out of 58 regulatory events showed a significant and persistent increase in equity volatility
Robinson and Taylor (1998b)	The study considered impact on volatility of regulator's announcement of reopening the REC price control in March 1995.	Share price volatility increased significantly for 8 out of 12 of the RECs and that this higher volatility persisted afterwards.

Source: Frontier analysis

Notably these are mostly not events directly relating to a change in the estimation methodology for the cost of capital, as is being considered by Ofgem in the

35 We have converted the estimated changes in beta into impact on the cost of equity using standard assumptions for the equity risk premium. These are set out in Annexe 1.

current consultation[36]. However, these event studies lend strong support to the view that applying regulatory discretion can have an impact on beta or required returns, and this impact can be quite material[37].

Figure 8 below shows the distribution of the impacts from three of the studies combined: Antoniou & Pescetto (1997), Buckland & Fraser (2001) and Paleari & Redondi (2005). These studies cover a range of regulatory announcements and political events. The Figure shows that a significant proportion of the events had an impact on the cost of equity of more than 1%[38].

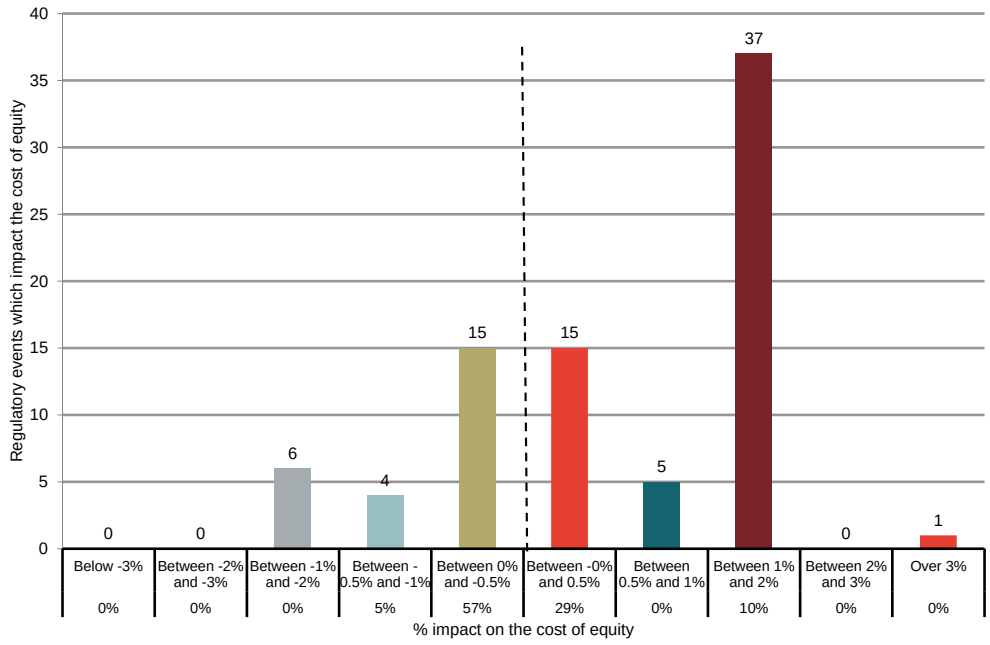
36 The studies have focussed on the following types of events: regulatory price control decisions; announcements relating to changes in future regulatory policy; announcements relating to possible regulatory actions or behaviour; government decisions or consultations relating to the regulated sector (i.e. introduction of competition); and political events (i.e. general elections) that relate to possible changes in government policy.

37 The detail of the methodology used to estimate the impact varies from paper to paper. The general approach is to estimate a time-varying model for the beta of the utilities and then to include dummy variables to capture the impact of specific evidence. The estimation can be done individually for each specific event or estimated in a more general form. A similar econometric approach is adopted by the models that consider the impact on equity volatility rather than the CAPM beta. The two studies by Robinson and Taylor looked at the impact on equity volatility rather than CAPM betas. However, there is strong conceptual and empirical support that any increase in volatility will translate into an increase in required returns.

38 These have been calculated using general assumptions of a 5% equity risk premium.

Annexe 1: The effect of regulatory discretion on systematic risk

Figure 8. Impact on cost of equity – summary of event studies



Source: Frontier analysis

In **Table 5** we summarise the evidence from these studies on the absolute change in the cost of equity arising from the events (i.e. treating equally the decreases and increases in the cost of equity). The average impact was 0.87% and the interquartile range is 0.41% to 1.19%.

Table 5. Impact on cost of equity – summary of event studies

	Change in the cost of equity
Mean of absolute changes	0.87%
Lower quartile	0.41%
Upper quartile	1.19%

Source: Frontier analysis

The evidence from these event studies, then, suggests that the application of regulatory discretion could result in substantial increases to the cost of equity, of the order of 87 bps.

Annexe 2: Evidence on the link between risk and return

This section examines the empirical relationship between risk and return based on a review of recently published studies. We show that several recent empirical academic studies identify a positive relationship between risk and return, which supports the theoretical risk-return trade-off that underpins all asset pricing models. More specifically, the studies generally find a positive relationship between diversifiable risk and returns. The implication of this finding is that, in practice, even risks that should be diversifiable according to a strict application of CAPM theory actually do have an impact on the actual realised returns.

This does not mean that the CAPM should be rejected altogether. The studies do find a strong relationship between non-diversifiable risk, which is central to the CAPM, and stock returns. However, the empirical literature finds that there appear to be factors other than those captured within the CAPM that explain the variation in stock returns. The implication is that the risks faced by businesses are often not fully diversifiable.

Statistical analyses of the risk-return relationship

Although there is no complete consensus on the issue, several academic studies have identified a positive relationship between risk and investor returns. For example:

- Using returns data from the AMEX/NYSE, Duffee (1994) finds a positive relationship between stock returns and firm stock return volatility (especially for small firms and firms with little financial leverage).[39]

- Using portfolio returns data from the AMEX/NYSE, NYSE and NASDAQ, Jiang and Lee (2006) find a positive relationship between diversifiable (idiosyncratic) risk and stock market returns, once the statistical problem of serial correlation is corrected.[40]

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39 Duffee, G. R. (1995), 'Stock returns and volatility: a firm-level analysis', *Journal of Financial Economics* 37, 399-420.

40 Jiang, X, Lee, B-S. (2006), 'The Dynamic Relation Between Returns and Idiosyncratic Volatility', *Financial Management* 35(2), 43-65.

- Malkiel and Xu (2006) employ Japanese stock returns data and find a positive relationship between idiosyncratic risk and individual (cross-sectional) stock returns.[41]

- Bollerslev et al (2009) find that the risk premium paid by investors for hedging stock market volatility (measured using volatility index and S&P500 data) is related positively to realised stock returns.[42]

- Using Australian industry portfolio returns, Darrat et al (2011) confirm the standard risk-return relationship by exploring if portfolios' 'conditional beta' can explain the time variation in expected portfolio returns.[43]

Evidence on real investments

The studies cited above all use data from stock markets to assess empirically whether the relationship between risk and return holds in financial markets. The relationships found in these papers are supported by evidence from studies that examine on how companies make investment decisions about projects (i.e. 'real' investments):

- Using a survey of US Fortune 1,000 firms, Poterba and Summers (1995) find that use hurdle rates significantly in excess of the standard cost of capital.[44]

- Chirinko and Schaller (2009) employ data on investment expenditure and actual project outcomes for over 16,000 quoted US companies. They find expected returns on these projects to be significantly greater than estimated costs of capital.[45]

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41 Malkiel, B. G, Xu, Y. (2006), 'Idiosyncratic Risk and Security Returns', *working paper*.

42 Bollerslev, T., Tauchen, G., Zhou, H. (2009), 'Expected Stock Returns and Variance Risk Premia', *Review of Financial Studies* 22(11), 4463-4492.

43 We term to the 'portfolio's conditional covariance with the market returns', referred to by the authors, as the 'conditional beta' of the portfolio. See: Darrat, A. F., Li, B., Benkato, O., (2011), 'The Relationship between Volatility and Expected Returns: Some Evidence for Australia', *International Journal of Business and Economics* 10(1), 27-43.

44 Poterba, J. M., Summers, L. H. (1995), 'A CEO Survey of US Companies' Time Horizons and Hurdle Rates', *Sloan Management Review* 37(1), 43-53.

45 Chirinko, R. S., Schaller, H. (2009), 'The irreversibility premium', *Journal of Monetary Economics* 56, 390-408.

Annexe 2: Evidence on the link between risk and return

- Jagannathan et al (2011) survey 127 CFOs in the US and find that companies systematically use hurdle rates significantly greater than the CAPM-based cost of capital.[46]

One interpretation for the findings of these studies is that, when making investment decisions, executives take into account risks that are firm-specific, and therefore predicted to by diversifiable within a CAPM framework.[47]

The evidence considered in this chapter shows that, both in theory and practice, any increase in risk is highly likely to feed through into an increase in the returns expected by equity investors.

46 In fact, the authors find the 'markup' on the CAPM-based cost of capital "makes up about one half of the average hurdle rate used in practice". See Jagannathan, R., Meir, I., Tarhan, V. (2011), 'The cross-section of hurdle rates for capital budgeting: an empirical analysis of survey data', *NBER working paper* 16770.

47 Of course, these observations could have alternative explanations. For example, executives may set hurdle rates higher than the cost of capital in order to account for managers sponsoring those projects being overly optimistic about their expected success.

Annexe 2: Evidence on the link between risk and return

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