



A Response to the CC's NIE Provisional Determination on WACC

A Report for London Heathrow

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Executive Summary

In this report, we consider whether the Competition Commission's (CC) recent provisional determination for NIE has any relevance for the CAA's estimate of the cost of capital for Q6. In summary, we find the CC's decision to hold little relevance, particularly for estimates of total market returns (TMR) and the cost of debt.

Total Market Returns

For the TMR, the CC uses a range of 5.5% -6.5% to estimate its vanilla WACC range. The CC focuses on short-run market evidence for NIE, which results in a reduction from its range of 5.0%-7.0% in the 2010 Bristol Water decision, where it selected the top end of its range.

We consider the CC's focus on short-run evidence to be less relevant for HAL because HAL's Q6 regulatory period begins in April 2014 compared to NIE's regulatory period, which has already been running for 11 months. HAL's price review period starts 15 months later than NIE's, by which time the market expects the economy to return close to long-run normal conditions. We have found strong evidence from forward gilt yields and economic growth forecasts, that the market expects the economy to return to its long-run level in Q6.

We disagree with the CC's provisional conclusion that the current TMR is lower than the long-run level and believe there is strong evidence to show that lower risk-free rates are offset by higher ERPs due to "flight-to-quality". We also feel that the CC incorrectly ignores evidence from the Bank of England and Bloomberg showing the ERP increased following the crisis, offsetting the fall in the risk-free rate. Therefore, the empirical evidence does not support the CC's assertion that the TMR will remain low, and the CC's range results in an underestimate of the true cost of equity.

Overall, there are no strong reasons for the CAA to adjust its estimate of TMR, since it is consistent with the economy returning to its long-run level in Q6.

Cost of Debt

The CC estimates the cost of new debt for NIE by adding a debt spread to **current** nominal gilt yields with different maturities. Again, we consider current nominal gilt yields to be less relevant for Heathrow because the market expects yields to return to long-run levels in Q6. In addition, the CC does not allow for any increase in yields over the price control period, because it argues the yield curve is broadly flat.

In addition, we believe the CC has ignored important evidence from forward curves in coming to its conclusion that current yields are a good proxy for future costs of debt. Forward rates are expected to rise during Q6, and this supports a higher cost of new debt than what the CC has estimated. We estimate that the CC's methodology has underestimated NIE's future cost of debt and would underestimate the cost of new debt for HAL by around 95bps.

We also note that the CC does not make any allowance for transaction costs in its cost of embedded debt estimate. This would prevent an efficiently financed company recovering its

debt costs. Thus, the CAA should not place any weight on the CC's allowance of transaction costs in the cost of embedded debt.

Finally, we note that the CC make no reference to the dampened relationship between government gilt and corporate debt yields claimed by PwC in its report to the CAA (and adopted by the CAA in its Final Proposals).

Asset Beta

The CC estimates an asset beta range of 0.4-0.45 for NIE and notes that airports face more risk compared to regulated utilities.

The CC's use of an asset beta of 0.4-0.45 supports HAL's argument that the CAA's asset beta range of 0.42-0.52 is too low. Although the CAA selects a WACC estimate that implies a beta point estimate of 0.50, this still does not account for the significant difference between the systematic risk faced by Heathrow and NIE. A beta of 0.50 relative to 0.4-0.45 results in the vanilla WACC increasing by only 20bps, which does not compensate for the additional risk that an airport faces over a regulated utility. Heathrow faces a much more risky regulatory framework with exposure to airport traffic volume risk under its price cap. Furthermore, it is more exposed to asymmetric risks from competition, quality of services and capex incentive mechanisms than NIE. The CC's NIE decision represents an important benchmark that would support a beta in a much higher range than what the CAA has allowed.

WACC Point Estimate

Finally, we consider the CC's WACC point estimate relative to its range is of little relevance for setting the Q6 cost of capital. The CC selects an overall vanilla WACC point estimate of 4.1%, which is the mid-point of the range of 3.9%-4.3%. We note that the CC's point estimate is slightly misleading since it adjusts its range for several CAPM parameters prior to estimating the overall WACC range. For example, the CC regards the bottom end of its original TMR range of 5%-6.5% to be unrealistic, and narrows it to 5.5%-6.5%. Therefore, by selecting the mid-point of its final range, the CC effectively chooses the top end of its original CAPM parameter ranges.

The CC's approach is inconsistent with its previous approach for Heathrow and Gatwick in its 2007 price determination. In that decision, the CC argued that the negative effect of setting an allowed WACC too low is much greater than the effect of setting a WACC too high. Setting a WACC too low leads to underinvestment and could potentially cause financial distress. Accordingly, the CC selected a point estimate at the top end of its range for Heathrow and Gatwick in 2007. We see no reasons why these factors may have changed, and the CC provides no justification of this change. So the CC's methodology fails to incorporate the asymmetric risk of estimating the WACC incorrectly.

Furthermore, by selecting the mid-point of its WACC range, the CC does not make any allowance for asymmetric risks. As noted, HAL faces substantially greater asymmetric risks from capacity constraint, competition, quality of services and capex incentive mechanisms relative to NIE, and this justifies setting a WACC at the top end of the range.

Overall, we consider the CC's approach is not relevant for HAL. Selecting the mid-point does not allow for the asymmetric effect of incorrectly estimating the WACC or asymmetric

beta risks. The CAA should adopt the top end of its range, particularly to account for HAL facing greater asymmetric risks.

1. Introduction

Heathrow Airport Ltd (HAL) has asked NERA to provide a review of the Competition Commission's provisional determination on the cost of capital for Northern Ireland Electricity's (NIE) price control (January 2013 to September 2017).¹

The CC uses the CAPM as its methodology for determining the cost of capital. In this report, we consider how the CC has estimated each of the CAPM parameters. We find that the underlying background for HAL's cost of capital is substantially different from NIE, since its regulatory period begins 15 months later than the NIE price control. The macroeconomic conditions support a return to long-run levels for CAPM parameters during Q6, and therefore the CAA should not place weight on the CC's use of current market evidence. We also identify some important areas where we believe the CC has estimated a parameter incorrectly, notably in its calculation of total market returns (TMR) and cost of debt. We therefore consider the CC's approach for these parameters to be of little significance to the estimation of the corresponding parameters for HAL.

We also consider the CC's approach to estimating NIE's beta, which serves as an important benchmark against which HAL's beta may be considered.

Overall, we do not believe the CAA's cost of capital range requires any adjustments following the CC's provisional determination. Our report is structured as follows:

- Section 2 considers the CC's approach to the TMR;
- Section 3 discusses the CC's estimate of NIE's beta;
- Section 4 considers the CC's estimate of the gearing assumption;
- Section 5 discusses the CC's estimate of the cost of debt; and
- Section 6 discusses the CC's WACC point estimate within its range.

¹ CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination.

2. CC Total Market Return Estimate

In this section we consider the CC's approach to setting the risk-free rate (RFR) and equity risk premium (ERP). Estimating the TMR for Q6 is inherently different from NIE's regulatory period, because Q6 begins 15 months after the start of the NIE price control. There is substantial market evidence to show that forward rates will return to long-run normal levels in Q6, which justifies a TMR exceeding the CC's range for NIE. Therefore, the CC's TMR estimate is not directly relevant for the CAA's TMR estimate for Q6.

In addition, we find the CC's methodology contains a number of internal inconsistencies and is not relevant for the CAA's estimate for Q6. The CC places too much weight on current market evidence, because it considers the long-run market returns have decreased since the financial crisis. This contradicts its view that equity investors have an indefinite time horizon, which implies the long-run market return will be unaffected following a relatively short period of market volatility. We find significant empirical evidence from forward rates, that the RFR is likely to return to long-run levels in Q6, directly contradicting the CC's estimate.

2.1. CC Methodology for Estimating TMR

The CC estimates the ERP by subtracting its estimate of the RFR from the TMR. An important reason for this is that equity market returns have tended to be inversely correlated to government bond yields. If the CC estimates the RFR using government bond yields, then any reduction in the RFR requires a corresponding increase in the ERP, to ensure the TMR is constant. The CC notes this inverse relationship does hold, and therefore estimates the ERP as the residual of TMR after subtracting the RFR:²

"[We] prefer to derive the ERP by subtracting the RFR from the expected market return. A further reason for using this approach with historical data is that, historically, the market return has tended to be less volatile than the ERP (as measured, for example, by the ratio of standard deviation to mean) and there is some evidence of the ERP being negatively correlated with Treasury Bill rates."

Despite recognising this inverse relationship exists, the CC does not set an ERP higher than the long-run level alongside its low RFR estimate of 1.0%-1.5%. The CC's ERP range of 4%-5% is below the UK equity risk premium from 1900-2012, as estimated in the widely used Dimson, Marsh and Staunton database.³ Thus, the CC's TMR estimate of 5.0%-6.5% is significantly lower than long-run historical level.

The CC finds some evidence of a TMR of 5.0% based on the TMR implied by the forward-looking risk premium calculated by DMS and Fama & French's forward-looking projections based on the DGM. The CC then notes that the lower bound is less relevant for setting the

² CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination, p13-44.

³ Dimson, E, Marsh, P, Staunton, M (February 2013): "Credit Suisse Global Investment Returns Sourcebook 2013", p28, Table 10.

final cost of capital to avoid the danger of setting the cost of capital too low. It narrows the range that it actually uses for WACC estimation to 5.5%-6.5%.

More critically, the CC's lowered upper bound of 6.5%, relative to 7% in the Bristol Water decision, does not reflect the plausible upper bound as determined by long-run evidence. The 6.5% estimate is based on the implied TMR from the Bank of England's long-term (15-year) ERP estimate of 4.5%. The CC sets out four reasons for the reduction in the top end estimate of the TMR:⁴

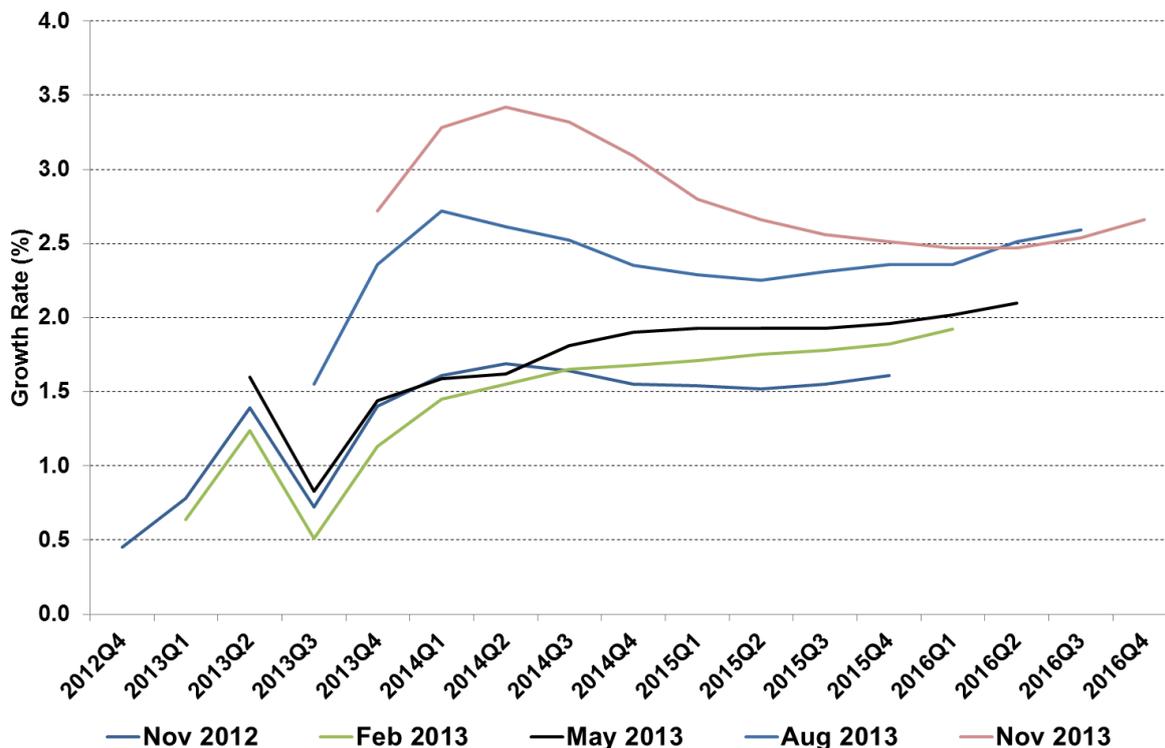
- *“(a) We consider that the return on the market is a more stable parameter than the ERP. However, it remains the case that it exhibits considerable volatility and cannot therefore be regarded as fixed over time.*
- *“(b) We consider that there is logic to the proposition that a long-term decline in RFRs, as we discuss above, should correspond with an increased demand for equities and thus increased prices and lower returns.*
- *“(c) We note research conducted by DMS suggesting a clear relationship between real interest rates and real returns on equities and bonds in the subsequent five-year period.*
- *“(d) A forward-looking expectation of a return on the market of 7 per cent does not appear credible to us, given economic conditions observed since the credit crunch and lowered expectations of returns.”*

With respect to (d), this is the major reason why the CC's estimate of TMR for HAL is not directly relevant for HAL. The NIE price review started in January 2013 whereas the HAL price review starts in April 2014, 15 months after the NIE price control. Since the start of 2013, the UK economy has returned to consistent growth, volatility is lower and the trajectory is that growth and interest rates are forecast to return to more normal levels.

Figure 2.1 shows the Bank of England's forecasts growth rates as of each quarter from November 2012 to November 2013. The figure clearly shows that the Bank of England has revised its expectations of the economy recovery from between the start of the NIE price control (represented by the green line) and now (blue line). The economy is now expected to recover much faster than was expected a year ago, and therefore we expect a return to long-run economic conditions in Q6.

⁴ CC (November 2013): “Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992”, Provisional determination, p13-144.

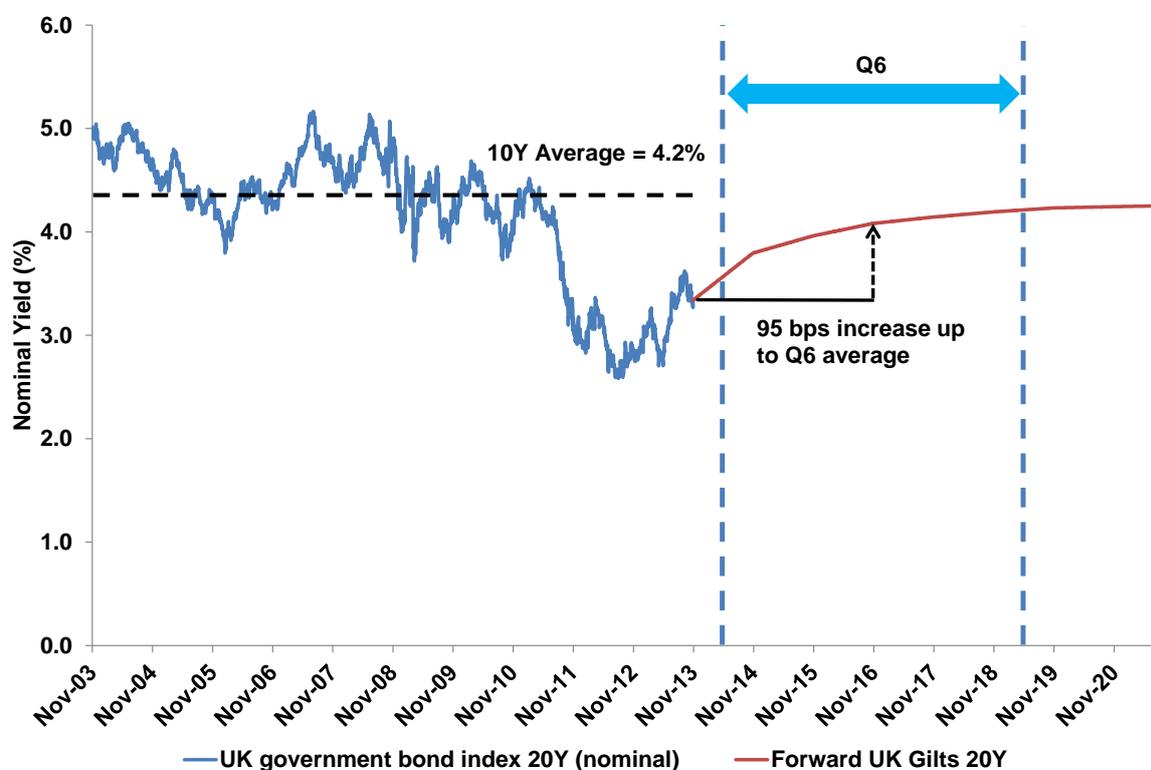
Figure 2.1
Economic Growth Forecasts Are Now More Optimistic Than at the Beginning of the NIE Price Control



Source: Bank of England (November 2013) MPC Forecasts of Annual GDP Growth Based on estimates of past Growth

Figure 2.2 shows the forward curve for 20Y UK gilts.

Figure 2.2
Forward Curve for UK 20Y Nominal Gilts



Source: Bloomberg; data up to 31 October 2013

Figure 2.2 shows that the average forward rate for gilts over Q6 is 95bps higher than the 1-year historical average. Thus, using current market evidence would not be a valid approach for Q6, since it would not capture the expected increase in the risk-free rate. The evidence in Figure 2.2 clearly shows that the market expects the risk-free rate to return to its long-run level. We note that DMS's long-run risk-free rate estimate is 2.1%,⁵ and in this context, the CC's estimate of 1.0%-1.5%, would underestimate the true RFR over Q6 by 0.6%-1.1%. The CAA should place greater weight on the evidence for Q6 because the regulatory period is 15 months after the NIE price control begins.

In addition, the CC's other arguments do not withstand scrutiny, especially in light of the fact that the CC recognises elsewhere in the decision that (equity) investor horizons are indefinite,⁶ which by corollary must mean that required equity returns are unaffected by short-run factors. We rebut the individual statements below:

- (a) If equity investments indeed have indefinite maturity as postulated by the CC, it is internally inconsistent to argue that volatility in current returns could significantly affect expected long-run returns for an asset with indefinite maturity;

⁵ Dimson, E, Marsh, P, Staunton, M (February 2013): "Credit Suisse Global Investment Returns Handbook".

⁶ CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination, p13-32, paragraph 13.114.

- (b) The CC's phrasing is unclear in this case. However, under both plausible meanings of the CC's argument, it does not stand up to scrutiny.
 - Either the CC is referring to the current situation: In that case the long-term decline in RFRs merely shows that there is increased demand for government bonds (which pay the RFR). Lower RFRs do not allow us to make a statement about demand for equities. In fact the “flight to quality” theory suggests that the reduction in RFRs is the consequence of reduced demand for riskier assets (such as equities) and increased demand for safe assets. There is a substantial academic literature documenting the “flight-to-quality” effect, and this supports the view that the crisis led to reduced demand for equities.⁷
 - If instead the CC is arguing that the current low returns are going to lead to a reversal of this trend going forward (with investors moving back into riskier assets because of poor returns on safe assets), it is unclear why the CC does not explicitly consider the offsetting effect that reduced demand for safe assets would have on the RFR, i.e. increasing it.
- (c) If equity investments indeed have indefinite maturity as postulated by the CC, lower expected returns over the subsequent five-year period are unlikely to have a significant effect on long-run expected returns.

With regard to the comparability of the CC and CAA decisions, it is worth noting that the CC takes a mixture of a long-run and short-run approach while the CAA uses a pure short-run approach. In interpreting the short-run data the CC takes an approach to the long-run growth rate assumption that is less favourable to the company, i.e. arguing that GDP growth is likely to overstate DPS growth.

The implication of the CC's errors identified above is that the CC's TMR estimate of 5.5%-6.5% is too low for the HAL price review, particularly at the bottom end. The CC recognises that equity investor horizons are indefinite, so current market volatility should have little impact on the long-run expected returns. Thus, there is no theoretical justification for a decrease in long-run market returns under the CC's methodological framework.

2.2. Current Market Evidence on ERP

The CC's range risk-free rate would be acceptable if it made a corresponding upward adjustment to the ERP. The CC notes in its final determination “*there is some evidence of the ERP being negatively correlated with Treasury Bill rates*”,⁸ in line with the CAA's thinking.⁹ Thus, the CC suggests that it should increase the ERP to above long-run levels if the risk-free rate is set under long-run levels.

⁷ For an academic example documenting the “flight-to-quality” effect, see Rosch, C, Kaserer, C “Market liquidity in the financial crisis: The role of liquidity commonality and flight-to-quality”, Journal of Banking and Finance, Volume 37, Issue 7, July 2013, p2284-2302.

⁸ CC (November 2013): “Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992”, Provisional determination, p13-44, paragraph 13.142.

⁹ “The CAA considers that the benefit of focusing on the TMR and taking a long run view of equity returns provides stability in this key element of the CAPM.” Source: CAA (October 2013): “Estimating the cost of capital: a technical

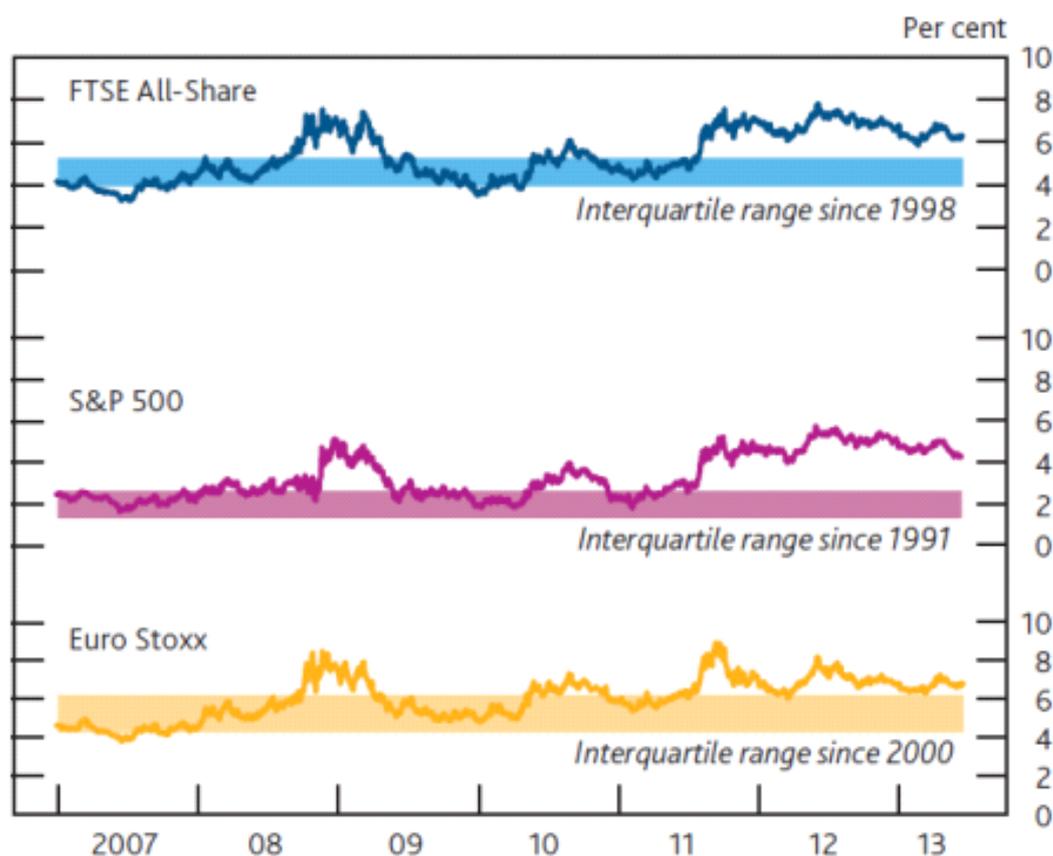
However, the CC estimates a range of 4%-5% for the ERP. As noted earlier, this is derived from the TMR range of 5.5%-6.5%, which is below the long-run historical level. There is significant evidence that current market evidence supports an ERP higher than the long-run level for HAL's price review.

We review evidence from different dividend growth models that estimate total market returns and the ERP. Such models are published by a number of institutions including Bloomberg and the Bank of England, each using slightly different approaches to estimating the ERP for the UK market.

Figure 2.3 and Figure 2.4 show that while the results generated by the different models differ somewhat they all show a significant increase since 2009 when CAA set prices for Q5. Figure 2.3, which is taken from a 2013 Bank of England financial stability report, shows the expected ERP for the FTSE All Share as well as other major markets to have been on the rise since 2009 with a latest estimate for the UK ERP around 6%.

appendix to the CAA's Final Proposal for economic regulation of Heathrow and Gatwick after April 2014", p61, paragraph 7.23.

Figure 2.3
CC Has Ignored Important Evidence on the ERP



Source: Bank of England Financial Stability Report, June 2013, which is drawing on Bloomberg, Thomson Reuters and own calculations according to source. Note: As implied by a multi-stage dividend discount model.

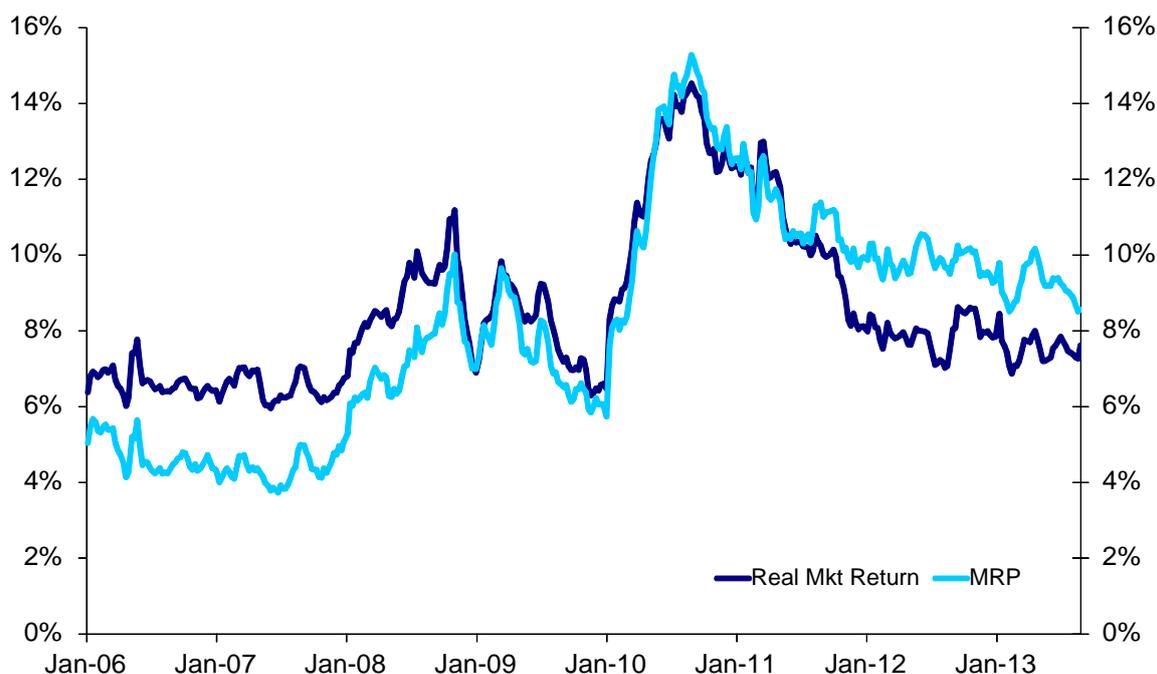
Any estimate of the ERP using dividend growth models depends on the assumption of future growth of dividends, which determine the current estimate of the ERP to a large degree. The Bank of England DGM assumes that the rate of expected dividend growth “jumps” from rates forecast by stock market analysts to the potential growth rate of the economy the moment after which analyst forecasts are no longer available (usually five years ahead).

The CC also considers the Bank of England’s evidence on the ERP, but considers it to hold little weight because of the “arbitrary” assumption on the future long-run growth in dividends.¹⁰ However, even if the long-run growth assumption is different, this would not change the conclusion that the ERP has increased since the start of the crisis. The Bank of England evidence shows the ERP has increased, and this is independent of the long-run growth assumption. Thus, the CC’s ERP estimate is too low since it does not use the Bank of England’s evidence.

¹⁰ CC (November 2013): “Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992”, Provisional determination, p13-43, paragraph 13.139.

We also note Bloomberg uses a “multi-stage” DGM that takes into account short-run growth rates (as provided by equity analysts) as well as long-term sustainable growth rates while including a transition glide path between the two rates.¹¹ Bloomberg reports significantly higher ERPs than the Bank of England as can be seen from Figure 2.4.

Figure 2.4
UK ERP Estimates by Bloomberg



Source: NERA analysis of Bloomberg data and HMT RPI forecasts. TMR as reported by Bloomberg, real market returns obtained by subtracting average HMT Consensus inflation over PR14 using Fisher formula.

Thus, given the increase in ERP since the beginning of the financial crisis, we do not believe there is justification for the CC estimating a TMR below the long-run level.

We also note that the CAA’s consultants found evidence that the ERP has increased since the crisis to offset the fall in gilt yields.¹² Thus, it supported setting a TMR in line with long-run evidence.

¹¹ According to Bloomberg Helpdesk, the Bloomberg MRP is calculated as follows: i) Short run dividend growth is based on analyst forecasts (in line with the 1-stage DGM). Long run expected dividend growth is based on the current required market return (as per the 1-step DGM) times the payout ratio (this is a proxy adjustment with the idea being that companies with very low current payout ratios are in a fast growth phase and will find it harder to maintain the same levels of growth). Medium run dividend growth is a linear extrapolation between the short- and long run growth rates. The length of the “medium run” varies depending on the availability of analyst forecasts and ends between years 5 and 10.

¹² PwC (April 2013): “Estimating the cost of capital in Q6 for Heathrow, Gatwick and Stansted – A report prepared for the Civil Aviation Authority (CAA), p41-42

2.3. Conclusion on CC TMR Estimate

We consider the CC's estimate of the TMR to be flawed, and thus the CAA should place little weight in the CC's estimates.

We note that NIE's regulatory period (January 2013 to September 2017) does not align with Q6 (April 2014 to April 2019). Thus, the CC's use of current market evidence cannot be applied for HAL, as it would underestimate the TMR for Q6. Forward rates support an increase in TMR over Q6 and thus the CAA should place more weight on long-run evidence over current market evidence.

We also note some flaws in the CC's methodology. Despite noting that equity investors have an indefinite time horizon (which would imply market returns will return to their long-run level in Q6), the CC relies on short-term estimates of market returns. Thus, by estimating a TMR below the long-run level, the CC contradicts itself. The CC's justification for why it considers there to be a long-term decline in the TMR is also flawed. Current low risk-free rates do not imply low equity returns, as the "flight to quality" theory suggests the reductions in gilt yields is due to reduced demand for riskier equities.

Overall, the NIE price control does not align with Q6 and CC does not have a credible argument for stating that the TMR will remain low in future, and therefore it places too little weight on the long-run historical evidence. Therefore, the CAA should place little significance on the CC's determination for NIE in setting the cost of capital for Q6.

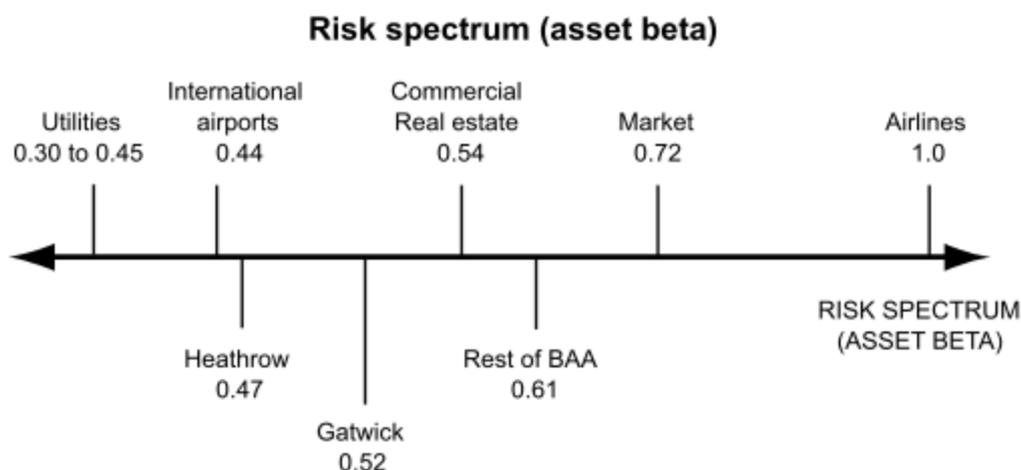
3. CC Beta Estimate

The CC estimates a beta in the range of 0.40-0.45, assuming a debt beta of 0.1. The CC estimates betas for regulated GB utilities, but considers NIE to face greater systematic risk than GB comparators because the Northern Irish regulatory regime is likely to be less well understood by investors.¹³ The CC also notes regulatory precedent for other industries, but considers the beta for NIE to be lower than for GB airports, but higher than for GB utilities:¹⁴

“Airports are likely to have different risk characteristics from water companies. However, the Heathrow and Gatwick airports inquiry included a comparison of asset beta. Utilities are positioned at the lower end of the spectrum at between 0.3 and 0.45.”

The CC considers regulated utilities as ‘defensive’ investments, and thus they face less risk relative to airports. The CC’s view of the relative risk and corresponding asset beta for various industries is set out in Figure 3.1.

Figure 3.1
CC Estimates of Asset Beta for Different Industries



Source: CC (November 2012) NIE Provisional Determination, p13-49, Figure 13.7

The CC’s determination is a benchmark against which we can consider the risks of other sectors. Given the CC argues airports face greater systematic risks than regulated utilities, the beta for airports must be significantly higher than the CC’s upper bound of 0.45.

The CC’s use of an asset beta of 0.4-0.45 supports HAL’s argument that the CAA’s asset beta range of 0.42-0.52 is too low. Although the CAA selects a WACC estimate that implies a beta point estimate of 0.50, this still does not account for the significant difference between

¹³ CC (November 2013): “Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992”, Provisional determination, p13-52, paragraph 13.168.

¹⁴ CC (November 2013): “Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992”, Provisional determination, p13-49, paragraph 13.160.

the systematic risk faced by Heathrow and NIE. A beta of 0.50 relative to 0.4-0.45 results in the vanilla WACC increasing by only 20bps, which does not compensate for the additional risk that an airport faces over a regulate utility. Heathrow faces a much more risky regulatory framework with exposure to airport traffic volume risk under its price cap. Furthermore, it is more exposed to asymmetric risks from capacity constraints, competition, quality of services and capex incentive mechanisms than NIE. Therefore, the CC's NIE decision represents an important benchmark that would support a beta in a much higher range than what the CAA has allowed.

We also note that the CC's beta estimate is based on the upper end of its 95% confidence interval using empirical comparator estimates.¹⁵ The CC recognises that current empirical estimates of the beta do not reflect true investor expectations of systematic risk, and thus selects the upper end of empirical estimates. This again supports setting a beta higher than the CAA's own estimate, which is lower than the empirical estimates of the beta for comparators.

The CC does not apply the Blume adjustment because it does not believe that betas converge to 1 over time. However, the Blume adjustment is widely used, for example by Bloomberg, Merrill Lynch and ValueLine (see Patterson, 1995). The Blume adjustment formula accounts for the tendency of estimated betas to converge towards the market value of 1 over time.¹⁶ Therefore, we believe the CAA should not deviate from its estimate of the asset beta, which is based on its consultant's use of a similar adjustment.¹⁷

In addition, the CC applies a debt beta of 0.1. This confirms the CAA and its consultant's use of a debt beta of 0.1 for estimating the beta.

The CC uses net debt rather than total debt in calculating asset betas.¹⁸ This is likely to work in the companies' favour where the beta estimate is derived from empirical evidence as the use of net debt will make the observed gearing level appear lower and thus lead to higher calculated asset betas for a given equity beta.¹⁹

Overall, we consider the CC's beta estimate to be of little direct relevance to the CAA's decision. The CC's estimate for CC NIE is consistent with the CAA's decision for airports in

¹⁵ CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination, p13-50, paragraph 13.162.

¹⁶ Blume (1971) tested to see if forecasting errors based on historical estimates were biased. Blume demonstrated a tendency for estimated betas to regress towards their mean value of one. The adjustment formula above captures this tendency.

¹⁷ The CAA's consultant, PwC, applies a Bayesian adjustment to raw equity betas. This is in line with using a Blume adjustment. Source: PwC (April 2013): "Estimating the cost of capital in Q6 for Heathrow, Gatwick and Stansted – A report prepared for the Civil Aviation Authority (CAA)", p57.

¹⁸ CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination, p13-52, paragraph 13.165.

¹⁹ We note that the CAA considers the true beta "*probably lies somewhere between the net debt and the gross debt calculations*" in its final proposals for Heathrow. Thus, the CC's approach is consistent with the CAA's view. Source: CAA (October 2013): "Estimating the cost of capital: a technical appendix to the CAA's Final Proposal for economic regulation of Heathrow and Gatwick after April 2014", p71, paragraph 7.64.

that regulated utilities are less risky than airports. The only methodological point of contention lies in the use of the Blume adjustment, and we consider the CAA should apply its own Bayesian adjustment given its widespread use.

4. CC Gearing Estimate

The CC adopts a gearing assumption of 50% (close to NIE's actual gearing) in order to be consistent with the gearing used in financial ratios and to calculate tax. The CC argues the assumed level of gearing should result in financial ratios consistent with an investment-grade credit rating. Thus, the CC assumes NIE's existing level of gearing consistent with its financial projections that would allow it to maintain an investment-grade credit rating of Baa1/BBB+. By contrast, the CAA targets a credit rating of BBB/BBB+ under S&P methodology and Baa2/Baa1 under Moody's methodology reducing HAL's actual gearing down to levels the CAA considers to be more sustainable. The CC decision considers NIE's current gearing to be sustainable and therefore provides limited read-across on how the CC would treat a highly leveraged entity like HAL.

Although the CC's decision provides limited read-across for the CAA, we note the CC's financeability assessment to ensure the gearing assumption allows NIE to maintain investment-grade rating. The financeability test is even more important for airports because of their greater capex and financing needs over Q6: we note that only 20% of NIE's debt will need to be newly issued over the regulatory period,²⁰ compared with 30% for Heathrow over Q6.²¹ Thus, the CC is likely to employ a similar approach to ensuring company financeability for airports, and estimate a consistent level of gearing.

5. CC Cost of Debt Estimate

The CC calculates the cost of debt as a weighted average of the cost of embedded debt and cost of new debt. The overall cost of debt is a weighted average of the two parameters, based on a weighting of 80% embedded to 20% new debt. The overall estimate for the cost of debt is 3.4%. This approach is in line with the CAA approach, although the actual estimates differ with actual company cost of debt payments. In addition the CC does not propose a debt indexation approach because it considers that such a policy would require pre-notification.²²

5.1. CC Methodology for Cost of Embedded Debt

For the cost of embedded debt, the CC uses an estimate based on NIE's actual debt. The CC accepts the case for a Northern Irish risk premium and incorporates this by calculating NIE's actual cost of embedded debt using NIE's two existing bonds. It is worth noting that the CC does not make an allowance for transaction costs for the cost of embedded debt. This approach results in a real cost of existing debt of 3.7%, based on inflation of 2.8%.²³ This approach suggests that the CC might look at HAL's existing debt as well if it were to review

²⁰ CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination, p13-22, paragraph 13.74.

²¹ Source: CAA (October 2013): "Estimating the cost of capital: a technical appendix to the CAA's Final Proposal for economic regulation of Heathrow and Gatwick after April 2014", p53, paragraph 6.78.

²² CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination, p13-16, paragraph 13.56.

²³ The CC's inflation estimate for the cost of embedded debt is based on the Bank of England's 2% target for the CPI, adjusted for the historic difference between CPI and RPI of 0.8%.

HAL's debt although the NIE decision does not provide any guidance on the CC's possible approach if it were to use a lower level of gearing than HAL's actual level.²⁴

The CC's decision assumes an inflation rate of 2.8%, which is lower than most projections of RPI inflation over the regulatory period.²⁵ The CC's estimate is based on the Bank of England's CPI target of 2.0%, and the historical average difference between CPI and RPI of 3.0%. The CAA's inflation assumption is 3%, and we note that if it adopts the CC's assumption, this would increase the real vanilla WACC by 0.2%.²⁶

We find a fault with the CC's methodology on transaction costs. The CC does not allow for any transaction costs for the cost of embedded debt, even though it includes an issuance cost allowance of 10bps for the cost of new debt. The CC's cost of embedded debt is based on the actual yield on NIE's debt, but this does not include any on-going transaction costs such as ratings agency fees. The CC's methodology fails to allow all the costs that an efficiently financed company would incur.

5.2. CC Methodology for Cost of New Debt

While the CC's estimate of the cost of embedded debt is relatively uncontroversial the CC's estimate of the cost of new debt raises a number of very significant issues. For the cost of new debt, the CC adds a debt spread to current nominal gilt yields with different maturities.²⁷ The debt spread is based on range made up by the spot and one-year average debt spreads of NIE's largest bond above the benchmark UK government yield. The CC also adds 10bps for issuance costs and fees. The CC uses a central estimate for the cost of new debt estimate of 2.7%.²⁸ The CC considers that "*the current yield curves for longer-dated gilts (both nominal and index linked) do not suggest an expectation of an increase in yields during the price control period.*"²⁹ For this reason it does not explicitly allow for an increase in financing costs as part of its cost of new debt allowance. In doing so the CC makes two explicit errors:

Firstly, the CC claims the yield curve is broadly flat from 15Y onwards while in fact the curve continues to rise steadily for nominal gilts and marginally for ILGs over the full length of the observation horizon. Figure 5.1 shows current spot yields on ILGs with 20Y maturity

²⁴ For the Bristol decision the CC used Bristol's actual cost of debt despite using a lower level of gearing but there is no guarantee the CC would do so again given that it has taken a tougher approach on a number of other aspects as well.

²⁵ CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination, p13-7, paragraph 13.23.

²⁶ Source: CAA (October 2013): "Estimating the cost of capital: a technical appendix to the CAA's Final Proposal for economic regulation of Heathrow and Gatwick after April 2014", p50, Figure 6.6.

²⁷ It is not totally clear from para 13.73, which averaging period is used as none of the four lines shown in Figure 13.4 is between 3.0 and 3.7% for yields with a maturity of 15 years and over. It does appear that the CC is referring to spot yields and is actually looking at maturities of 11Y and over.

²⁸ The CC's inflation assumption for the cost of new debt is 2.7%-3.2%, which is different from the assumption for the cost of embedded debt. The inflation assumption for the cost of new debt combines evidence from HMT forecasts, OBR forecasts, the Bank of England's implied inflation based on the difference between index-linked gilts and nominal gilts, and the Bank of England's inflation target.

²⁹ CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination, p13-21, paragraph 13.73.

are significantly higher than those with 15Y maturity, implying the yield curve is upward sloping even at longer maturities.

Secondly and more importantly, the CC does not consider forward curves in coming to its conclusion. A yield curve shows the yield for bonds with different maturities *at any given point in time*. For these bonds, the yield curve plots the relationship between the yield and maturity of the bonds. In contrast, a forward curve plots the yield for bonds with a specific maturity *at different points in the future*. Thus, a yield curve is based on actual current market information, whereas the forward curve shows the market's expectation of what yields will be going forward.

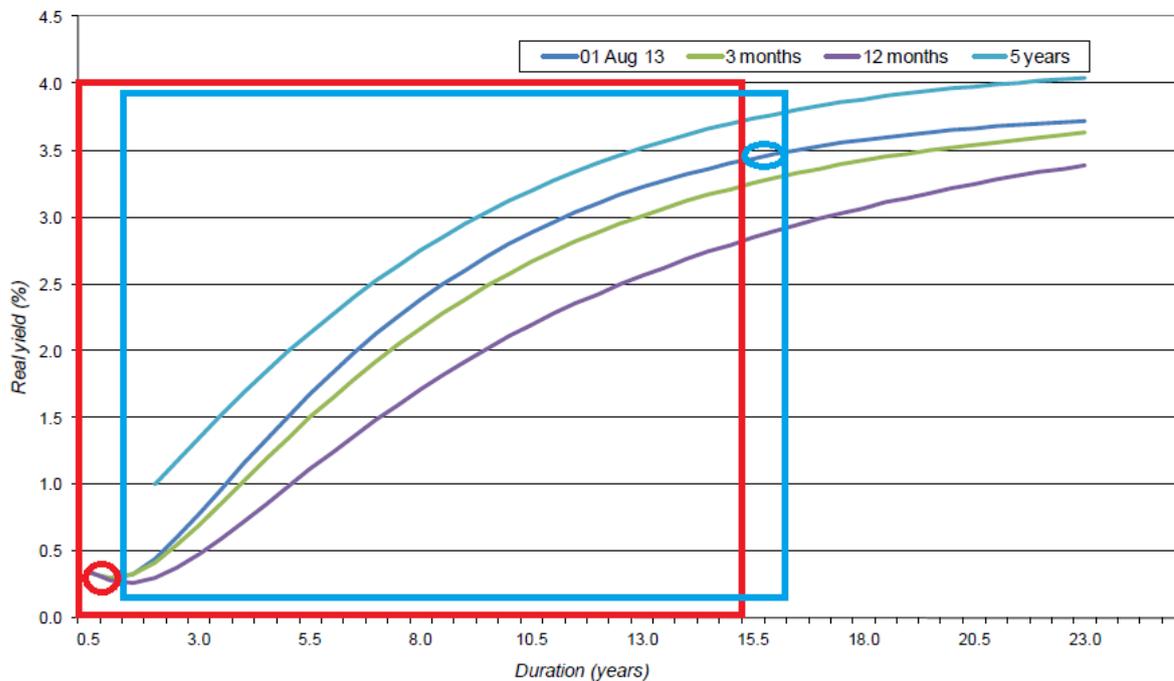
The CC should focus on the forward curve for the purposes of estimating the cost of new debt. The cost of new debt should reflect NIE's project cost of new financing in its regulatory period, which is best captured by looking at forward curves. By only considering the yield curve, the CC fails to accurately incorporate any evidence on NIE's projected financing cost.

In addition, the yield curve flattening after a certain point (at longer maturities) does not imply a flat forward curve because the 15Y yield calculated in 1 years' time would no longer incorporate the current low 1Y rate. Therefore the 15Y rate one year from now would be significantly higher than the current 15Y yield.

The CC shows that current yields on short maturities are very low (<0.5%) relative to the long-run levels (1.0%), hence these are likely to have a significant effect on the forward curve throughout the regulatory period even if the yield is flatter at the longer maturities.

Figure 5.1 illustrates how the forward curve can change significantly even when the yield curve is broadly flat at the long end of the curve. The red (left) box shows the CC's averaging period for NIE, and it concludes that the yield curve is flat during this basis. However, for the purposes of Q6, which is 15 months ahead of the NIE price control, the relevant time horizon is the right (blue) box. This shows that the very low current interest rates (red circle) are not relevant for the Q6 cost of debt. Instead, the high interest rates (blue circle) over Q6 imply the forward rate will increase. We conclude that the yield curve and its associated forward rates imply an increase in the cost of new debt relative to current market rates.

Figure 5.1
Illustration of Impact of one year's difference on Forward Curve

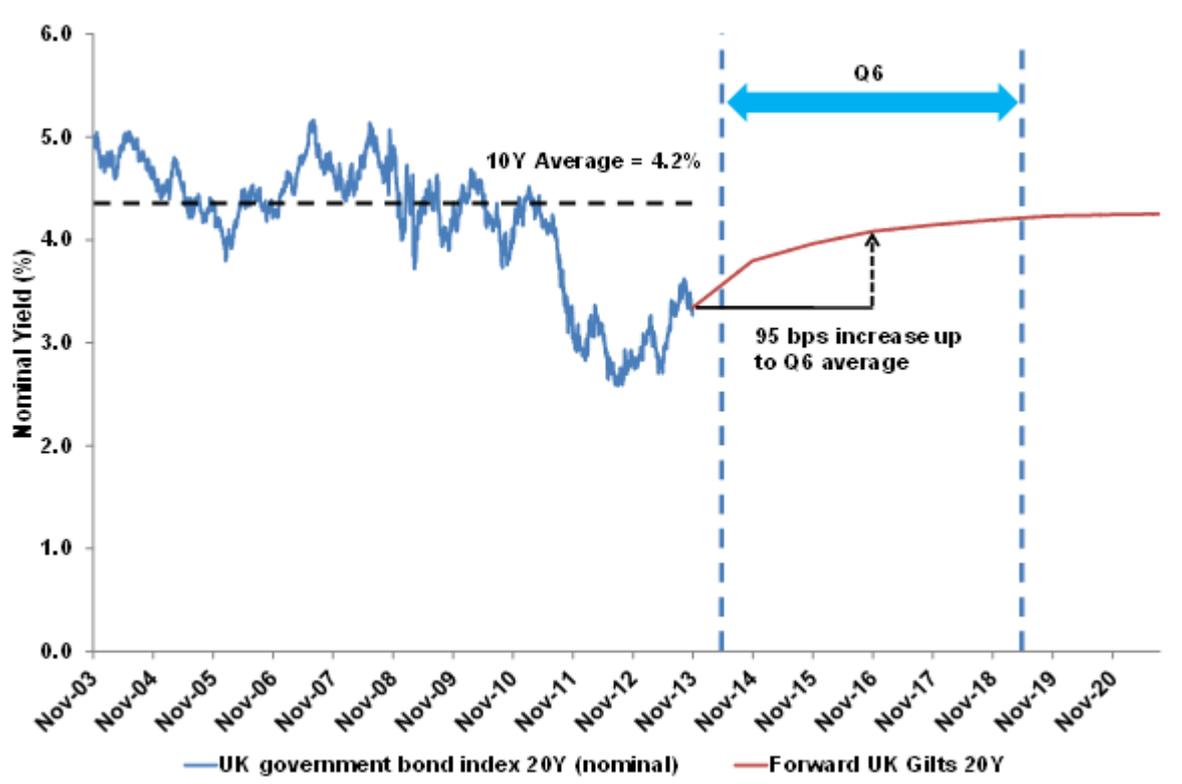


Source: NERA analysis of CC Decision, Figure 13-4. Note: Incorrect labelling of the y-axis as per CC Decision.

This failure to address forward curves in estimating the cost of new debt leads to a significant underestimation of the cost of new debt. We may estimate the exact magnitude of the error based on actual forward curves for UK Gilts.

Figure 5.2 shows the UK 20Y Nominal Gilt Forward Curve through Q6.

Figure 5.2
Forward Curve for UK 20Y Nominal Gilts



Source: Bloomberg; data up to 31 October 2013

Under the CC's methodology, the cost of new debt would be equal to the short-term (1Y) average of gilt yields plus a short-term debt spread. This does not account for any increase in the projected cost of financing debt in Q6 (as represented by the red line between April 2014 and April 2019).

The correct method would be to use the average forward rate over the Q6 period and add the same short-term debt spread.^{30,31} We estimate the average 20Y gilt forward rate over Q6 to be 95bps higher than the 1Y average. Thus, applying the CC's methodology would underestimate the cost of new debt for airports by 95bps. This is summarised in Table 5.1.

³⁰ We note that using the average forward rate over Q6 assumes the company's likelihood of issuing new debt in each time period in Q6 is equal. In practice, if the company is likely to issue more debt at the end of Q6, the (higher) forward rate from the end of Q6 should be used.

³¹ By using the short term debt spread, the CC assumes that the debt spread will not change over time. There is no evidence to suggest that the CC's assumption is incorrect for NIE, but if forward curves for Northern Irish utilities shows the debt spread is changing, this should be incorporated into the debt spread. Unfortunately, such a forward curve for such an index is not available.

Table 5.1
CC Methodology Impact on Cost of New Debt

	Yield (%)
Correct Method: Average 20Y Gilt Forward Rate over Q6	4.07
CC Method: 1Y Average Gilt Rate	3.12
Difference	0.95

Source: Bloomberg; data up to 31 October 2013

The CC's focus on yield curves instead of forward curves is surprising given that the CC shows awareness of forward curves when discussing the uplift to the risk-free rate used in the cost of equity, which is derived referencing *"levels implied by current forward rates."*³²

5.3. Gilt and corporate debt yields

Finally, we note that the CC makes no reference to the dampened relationship between government gilt and corporate debt yields claimed by PwC in its report to the CAA (and adopted by the CAA in its Final Proposals).³³ PwC estimated the cost of new debt by adding a spread above benchmark government bonds, but assumed that a 1% increase in government bond yields would result in only a 0.8% increase in corporate yields. PwC effectively assumes that as gilt forward rates increase, the spread between gilts and corporate bonds will fall.

In contrast, the CC adds a fixed spread above benchmark gilt yields based on the current spread of one of NIE's existing bonds of short-term government yields. Although it estimates a range of 165-250bps in the spread, it does not consider this spread will change as the government bond yield changes. Thus, the CC's methodology would result in a one-for-one relationship between government bond yields and corporate yields.

We consider the CC's decision is inconsistent with the PwC approach used by CAA for setting HAL's cost of future debt. However, both approaches contain errors: (1) PwC and the CAA have erroneously assumed that there is an inverse relationship between gilt yields and debt spreads; and (2) the CC have assumed a constant debt spread over the regulatory period but have erroneously assumed that gilt yields will stay constant.

5.4. Conclusion on Cost of Debt

Overall, we consider the CC's methodology for the cost of debt to contain serious flaws. Most seriously, the CC underestimates the cost of new debt because it does not consider the forward curve, and does not allow for any projected increase in yields. An efficiently

³² CC (November 2013): "Northern Ireland Electricity Limited Price Determination – A reference under Article 15 of the Electricity (Northern Ireland) Order 1992", Provisional determination, p13-36, paragraph 13.122.

³³ Source: CAA (October 2013): "Estimating the cost of capital: a technical appendix to the CAA's Final Proposal for economic regulation of Heathrow and Gatwick after April 2014", p39, paragraph 6.22.

financed company would not be able to recover all its debt costs. Even if a company is able to lock in all its debt costs using current rates, an airport is likely to face uncertain capex and financing needs. Thus, the best estimate of the cost of new debt is based on the projected cost of debt over the regulatory period, and not the cost based on current rates.

In addition, we find fault with the CC's lack of allowance for transaction costs for the cost of embedded debt.

We conclude that there is little read-across on the cost of debt from the CC's determination for NIE, other than exclusion of PwC's adjustment for the claimed relationship between gilt and corporate debt yields.

6. CC WACC Point Estimate

In its NIE provisional determination, the CC selects an overall point estimate for the vanilla WACC of 4.1%, which is the mid-point of its range of 3.9%-4.3%. The choice of the mid-point represents a departure from the CC's previous approach of selecting a WACC towards the top end of the range.

Table 6.1
CC WACC Range and Point Estimate for Previous Determinations

	NIE	Heathrow Oct 07	Gatwick Oct 07	Stansted Oct 08	Bristol June 10
WACC Range (%)	3.9 - 4.3	4.0 – 5.2	4.1 – 5.5	4.2 – 6.0	3.8 – 5.0
WACC Estimate (%)	4.1	5.1	5.3	5.6	5.0
Percentile (%)	50	92	86	78	100

Source: CC (November 2013) NIE Provisional Determination, p13-57, Table 13.12

Table 6.1 shows that the NIE WACC point estimate is by far the lowest relative to the range. In its most recent previous determination for Bristol Water, the CC justified using the top end of its range because of the market uncertainty at the time of making the decision and to ensure consistency with cross-check methodologies.³⁴

We believe that setting the cost of capital at the mid-point of the range does not account for asymmetric risks, particularly if the CC's methodology is applied to airports. The CAPM methodology assumes that risks are symmetrically distributed. In reality, airports are likely to face asymmetric returns, as due to the capacity constraint the fall in passenger volumes during a macroeconomic downturn is likely to be greater than the increase in returns during an upturn.³⁵ To remunerate investors for the risk of asymmetric returns, the CC methodology should be adjusted to select a WACC point estimate at the top end of its range.

The CC's approach is also inconsistent with its previous approach for Heathrow and Gatwick in its 2007 price determination.³⁶ In that decision, the CC argued that the negative effect of setting an allowed WACC too low is much greater than the effect of setting a WACC too

³⁴ CC (February 2010): "Bristol Water Plc Determination", Appendix N, N45, paragraph 156.

³⁵ For a more detailed discussion of asymmetric returns, see NERA (June 2013): "A Review of the Risk Assessment in the CAA's Initial Proposals for Q6 – A Report for London Heathrow".

³⁶ CC (September 2007): "BAA Ltd – A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F, F36, paragraph 150.

high.³⁷ Setting a WACC too low leads to underinvestment and could potentially cause financial distress. Accordingly, the CC selected a point estimate at the top end of its range for Heathrow and Gatwick in 2007. Thus, the CC's methodology fails to incorporate the asymmetric risk of estimating the WACC incorrectly.

³⁷ Source: CAA (October 2013): "Estimating the cost of capital: a technical appendix to the CAA's Final Proposal for economic regulation of Heathrow and Gatwick after April 2014", p87, paragraph 8.18.

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