

Estimating the cost of capital: a technical appendix
for the economic regulation of Heathrow and Gatwick
from April 2014: Notices of the proposed licences

CAP 1140

A large, abstract graphic composed of overlapping, semi-transparent geometric shapes in various shades of blue and grey, covering the bottom two-thirds of the page.

CAP 1140

Estimating the cost of capital: a technical appendix for the economic regulation of Heathrow and Gatwick from April 2014: Notices of the proposed licences

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CHAPTER 1

Summary

- 1.1 The CAA has decided to use a pre-tax real¹ weighted average cost of capital (WACC) of 5.35% for Heathrow Airport Limited (HAL) and 5.7% for Gatwick Airport Limited (GAL) for Q6.
- 1.2 The CAA's final views are lower than the CAA's October 2013 final proposals of 5.60% and 5.95% respectively because of a lower cost of equity resulting from a lower total market return (TMR) assumption. In coming to these final views the CAA has considered further stakeholder responses and new evidence in the form of the Competition Commission's (CC) provisional determination on Northern Ireland Electricity (NIE).
- 1.3 The WACCs for both airport operators have reduced compared to the Q5 settlement² of 6.2% for HAL and 6.5% for GAL. The reductions mainly reflect reductions in corporate tax, the cost of debt and TMR since the previous settlement (2008/9 to 2013/14).

Approach

- 1.4 The CAA's approach to the WACC continues to assume notionally financed airport operators. The financing structure should remain the responsibility of the regulated company. The regulated companies and their shareholders should bear the risk of highly leveraged structures (or gearing above the notional gearing assumptions).
- 1.5 The CAA assumes gearing (debt to regulatory asset base (RAB)) of 60% for HAL (Q5: 60%) and 55% for GAL (Q5: 60%).
- 1.6 Throughout the review, the CAA's approach was a combination of a careful assessment of the individual components of the WACC and a

¹ All figures in this document are expressed in pre-tax real (i.e. inflation adjusted) terms unless otherwise stated.

² The Q5 headline WACC was 6.2% (HAL) and 6.5% (GAL), but the figures applied to the RAB to derive the actual capital charge were reduced to 6.01% and 6.3% respectively owing to the airport operators' ability to reinvest returns within the year. A similar automatic adjustment has not been made for Q6; instead the concept has been taken into account as one of the factors when deciding the point estimates within the range.

top-down assessment of the WACC. Evidence was taken in the round by the CAA to reach its proposals for the point estimates for the WACC.

Cost of equity

- 1.7 The cost of equity is estimated using the Capital Asset Pricing Model (CAPM). The post-tax cost of equity estimate for HAL and GAL has been reduced compared to the final proposals to reflect the lower TMR assumption. The beta assumptions are unchanged. As a consequence the post-tax cost of equity is 6.8% for HAL and 7.0% for GAL. The lower TMR assumption reflects the new evidence presented by the CC and the greater emphasis placed by the CC on forward-looking estimates (which tend to be lower than the very long-run historical estimates).
- 1.8 The CAA continues to consider that it is not appropriate to include a specific uplift for skewed equity returns, something for which HAL had argued.³

Cost of debt

- 1.9 The CAA's cost of debt assumption, 3.2% for both HAL and GAL, is unchanged from the final proposals. Several stakeholders considered that the CAA had made errors in its calculation. The CAA has assessed the responses and notes that although there is some evidence to suggest that the appropriate assumption might be lower or higher than 3.2%, on balance the evidence available suggests an estimate of 3.2% is appropriate.

³ HAL considered that similar to other investments it suffers in recessions but, relative to other investments, it cannot benefit when the economy is doing well owing to capacity constraints.

CHAPTER 2

Introduction

- 2.1 This document sets out the CAA's reasoning for its assessments of the WACCs to apply to the Q6 price settlements for HAL and GAL. Unless otherwise stated this document refers to the pre-tax real WACC.
- 2.2 This document should be read in conjunction with the Economic regulation at Heathrow from April 2014: notice of the proposed licence (CAP 1138) and Economic regulation at Gatwick from April 2014: notice of the proposed licence (CAP 1139), both published at the same time and available from the CAA's website.
- 2.3 The remainder of this document is structured as follows.
- Chapter 3 considers **methodological issues** including whether adjustments need to be made for **skewed equity returns** and whether it is appropriate to introduce **debt indexation**.
 - Chapter 4 sets out the **overarching comments** received.
 - Chapter 5 assesses **gearing** and the appropriate value for the **cost of debt**.
 - Chapter 6 assesses **risk** and the appropriate value for the **cost of equity**.
 - Chapter 7 draws together the preceding chapters and assesses the appropriate **WACC** value.

CHAPTER 3

Methodological issues

- 3.1 This chapter considers the basic framework, skewed equity returns and debt indexation.

Basic framework

WACC and CAPM

- 3.2 The final proposals concluded that, consistent with previous reviews and other regulated sectors, the WACC was the appropriate basis for estimating the cost of capital and that the two elements were the cost of equity (using the CAPM framework) and the cost of debt. The final proposals noted that:

- HAL thought that the 'standard' CAPM should be modified or extended to take into account 'skewed' equity returns.⁴ This specific issue is discussed in more detail below.
- GAL thought that its evidence suggested that its returns were more negatively skewed than those of HAL and that this implied a greater uplift to the CAPM-based cost of capital for GAL.

- 3.3 Other than in respect of skewness, the responses to the final proposals did not suggest a departure from the WACC and CAPM approach, and hence the CAA concludes that the WACC continues to be the most appropriate way to assess the cost of capital and the CAPM framework is the most appropriate way to assess the cost of equity.

Split cost of capital

- 3.4 The final proposals concluded that it was not appropriate to adopt the split cost of capital for Q6.⁵ The CAA did not receive any subsequent

⁴ Equity returns are the returns earned by shareholders in the form of dividends (income) and share price appreciation (capital growth).

⁵ The split cost of capital assumes that the RAB is a long-term relatively risk-free asset, in contrast to the development of new capital investment and the operation of the airport, which are inherently riskier. The split cost of capital proposes that the RAB can be fully debt-funded and should, therefore, attract a relatively low cost. The capital base required to support capital

responses in favour of adopting the split cost of capital. The CAA has decided not to adopt the split cost of capital for Q6.

Accounting rate of return

- 3.5 The accounting rate of return (ARR) is a concept that recognises that within a year returns can be reinvested, and therefore to earn the WACC by the end of the year, a lower cost of capital, the ARR, should be applied to the RAB. The ARR was used in previous quinquennia and is used in other, but not all, regulated sectors.
- 3.6 In the initial and final proposals, the CAA noted that since the WACC was ultimately a judgement within a plausible range of outcomes, formulaically applying the adjustment might result in spurious accuracy. However, the CAA continued to consider that there was an argument for the use of the concept of the ARR because returns that are earned throughout the year can be reinvested. The CAA noted that it was, therefore, something the CAA expected to take into account when judging where in the range to adopt its proposals for the WACC.
- 3.7 The CAA did not receive any responses in respect of its proposed approach to the concept of the ARR. However, some airline responses considered that contrary to what the final proposals stated, the CAA had not taken account of the ARR in deciding the appropriate point estimate in the range. The point estimate for the WACC taking account of the ARR concept is discussed in chapter 7.

Skewed equity returns

- 3.8 Negatively skewed equity returns would mean that compared to other investments, an airport operator has more downside risk than upside potential. For example, the airport operator could suffer in recessions, but not be able to benefit when the economy is doing well.⁶ If

expenditure and operating expenditure is riskier and should attract the cost of equity. A fuller explanation can be found in the initial proposals.

⁶ The CAPM assumes that share returns have a normal distribution. This distribution is symmetric, with equal chances of the same upside gain and downside loss. Because of this symmetry, risk can be fully described by the standard deviation (or equivalently by the variance). Professor Ian Cooper, on behalf of HAL, argued that when returns are not normally distributed, the CAPM is an incomplete model. Skewness means that the upside potential of a company's shares is different to their downside risk. Positive skewness means that upside potential is greater than downside risk, and negative skewness means that downside risk is greater than upside potential. In particular, Cooper argued when there is significant skewness of returns the standard deviation (and consequently the CAPM beta) is no longer

skewness exists and is material, investors with well diversified portfolios are concerned about the coskewness of the investment relative to the market generally.

Final proposals

- 3.9 The final proposals set out the representations made by HAL, GAL and British Airways (BA), along with the advice from the CAA's own independent study by PricewaterhouseCoopers (PwC)⁷, on whether or not the CAA should make a specific adjustment to uplift HAL's and GAL's cost of equity to reflect negatively skewed equity returns. Building on the initial proposals, the final proposals concluded that beta and coskewness were likely to be driven by the same factor (excess demand over fixed capacity). The final proposals noted that as a consequence, if capacity tightens one would expect the beta to fall and negative coskewness to increase, other things being equal. The final proposals noted that PwC estimated the risk premium for HAL taking into account beta only (second moment CAPM) and beta and coskewness (third moment CAPM), and concluded that this analysis showed that the post-tax cost of equity was in a range of 4.7% to 7.3%. Because of the commonality of factors driving beta and coskewness, there appeared, in fact, no difference in the end result. The CAA's final proposals used a post-tax cost of equity of 7.3%, which was at the top of this range.
- 3.10 The final proposals noted that PwC did not find negative coskewness associated with the BAA asset beta above 0.45, therefore the beta estimate proposed by the CAA of 0.5 for HAL was too high to be associated with negative coskewness.
- 3.11 The CAA concluded that an adjustment for coskewness would not be appropriate with the beta estimate. The CAA considered that there was insufficient merit in including an allowance for skewness and reducing the beta because PwC's estimates of the third moment CAPM suggested that on average over the long-run it was within the

an adequate description of risk. Furthermore, Cooper argued that skewness matters because it affects the desirability of an investment to investors and, hence, the cost of equity. Published at <http://www.caa.co.uk/default.aspx?catid=78&pagetype=90&pageid=67>

⁷ PwC provided three reports for the CAA. These can be found at: <http://www.caa.co.uk/default.aspx?catid=78&pagetype=90&pageid=14279>

margin of accuracy of the second moment CAPM and that there was benefit in a consistent approach with previous control periods.

Responses

3.12 HAL considered that the CAA had failed to address the evidence on the systematic asymmetry of HAL's returns, resulting in an under estimation of HAL's cost of equity. HAL made reference to the papers it had previously submitted. HAL also focused on a short period just before de-listing in 2006 to show that an asset beta of 0.43 was consistent with negative coskewness coefficient of -0.46 and that this would increase the pre-tax WACC by 44 basis points (bps).

Discussion of the issues

3.13 In response to the final proposals HAL noted that for the period very shortly before de-listing an asset beta of 0.43 (the CAA used 0.50 in its final proposals) was consistent with negative coskewness. In the final proposals the CAA noted this, but also noted that over a longer period, negative coskewness was not consistent with the beta estimate above 0.45. PwC presented 14 years' worth of monthly data, and HAL arguments focused on a small number of data points. Furthermore, using HAL's suggestion of an asset beta of 0.43 a negative coskewness coefficient of -0.46 and a coskewness premium of -1.9% the cost of equity is broadly the same as using an asset beta of 0.5 as shown in Figure 3.1.

Figure 3.1 Post-tax cost of equity using HAL's coskewness assumptions

Component	CAA's final view	HAL's suggested asset beta, coskewness coefficient and coskewness premium
Risk-free rate	0.5%	0.5%
Asset beta	0.50	0.43
Equity beta	1.10	0.93
Equity risk premium*	5.75%	5.75%
Coskewness coefficient	-	-0.46
Coskewness premium	-	-1.9%
Post-tax cost of equity	6.83%	6.69%

* the equity risk premium (ERP) is likely to be lower where a coskewness premium is also used. For simplicity the table uses the same ERP in both calculations.

Source: CAA calculations and page 31 of HAL's response

Decision

- 3.14 The CAA's view is unchanged from its final proposals. The CAA does not consider it appropriate to include an allowance for coskewness in the cost of equity for Q6.

Indexation of the cost of debt

- 3.15 The CAA's cost of capital calculation includes a cost of debt assumption. In Q5 and previous quinquennia, the cost of capital and its components were fixed, ex-ante, for the quinquennia. An alternative approach (called indexation) is for the cost of debt and therefore the cost of capital to be updated in line with market movements during the control period.⁸

Final proposals

- 3.16 The CAA proposed that, on the balance of evidence, it would not be in passengers' interests to introduce debt indexation for the airport operators for Q6.

Responses

- 3.17 No new or material comments were received.

Final view

- 3.18 The CAA's final view is unchanged from its final proposals.

⁸ The cost of equity is often considered to be a long-run estimate and relatively unmoved by markets in the shorter run (i.e. during the control period). In contrast the cost of debt is considered to be more dependent on short-run market conditions which can change during the quinquennium.

CHAPTER 4

Estimating the WACC: summary

Final proposals

4.1 The final proposals set out the representations made by stakeholders along with the advice from PwC from its own independent study on the appropriate estimate of the cost of capital.

Figure 4.1: Summary of the CAA's final proposals for the WACC

	HAL	GAL
Gearing	60%	55%
Pre-tax cost of debt	2.78 - 3.45%	2.95 - 3.58%
Total market return	6.25 - 6.75%	6.25 - 6.75%
Risk-free rate	0.5 - 1.0%	0.5 - 1.0%
Equity risk premium	5.75%	5.75%
Asset beta (number)	0.42 - 0.52	0.46 - 0.58
Equity beta (number)	0.9 - 1.15	0.9 - 1.17
Post-tax cost of equity	5.68 - 7.61%	5.68 - 7.71%
Tax rate	20.2%	20.2%
Pre-tax cost of equity	7.11 - 9.54%	7.11 - 9.66%
Pre-tax WACC	4.51 - 5.89%	4.82 - 6.31%
CAA point estimate pre-tax WACC	5.60%	5.95%
CAA point estimate vanilla ⁹ WACC	4.85%	5.10%

Source: CAA's final proposals

Responses

4.2 This section sets out overarching responses to issues including the CC's NIE provisional determination. In the chapters which follow this

⁹ The vanilla WACC is calculated from the pre-tax cost of debt and the post tax cost of equity. It therefore excludes any adjustment for taxation. This facilitates comparisons across sectors (regulators take different approach to tax) and over time (when tax rates change).

one, these points are explored further and the CAA's final views are set out.

HAL

- 4.3 HAL commented that 'the CAA's final proposals make a 0.25% upward revision to HAL's WACC to 5.6%, with the effect of providing for a WACC that is a little closer to a rate of return that might incentivise investment, but still falls significantly short of such a rate. The shortfall is the result of a combination of errors and misjudgements that fall outside of the discretion afforded to the CAA under the [Civil Aviation] Act 2012.'
- 4.4 HAL considered that the CAA failed to consider the fact that there was a global, competitive market for finance and, given such a market, whether the return offered for investment in HAL at least meets the opportunity cost of other options. HAL considered that investors will manage investments relative to those alternatives and relative to the risks, which in this instance included the regulated return. HAL considered that in light of the regulatory risk, revenue risk and the proposed reductions in the level of allowable return, the CAA's assumption that HAL should be in a position to 'guarantee' c£3bn of investment during Q6 is economically irrational.
- 4.5 HAL also considered that the CAA's claim that it had done a 'top-down' analysis to check the overall reasonableness of its final proposals on WACC was not borne out by a close examination of the CAA's technical analysis. HAL considered that in 93 pages, the extent of top-down analysis was minimal and appeared to come down to a very brief comparison of levels of WACC for other UK regulated industries.
- 4.6 HAL considered it hard to understand the CAA's claim that a comparison between the allowed returns of UK regulated companies showed that the WACC it proposes for HAL was fair taking into account relative risks. HAL asserted that the CAA had provided no analysis that would allow this conclusion to be checked. By way of example, HAL noted that the CAA proposed a WACC 25bps below that set in 2009 by Ofwat for water and sewerage companies. It was unclear to HAL why such companies might be said to have significantly higher risk, not least in the light of their certain customer base and demand.

- 4.7 HAL considered that the CAA took a significant risk when it dismissed the need to take coskewness into account. HAL thought that the CAA's two primary reasons for doing so were that PwC found 'no conclusive proof of asymmetric risk' and that 'it was not clear' that taking coskewness into account would ultimately change the WACC. HAL noted that leaving aside the appropriateness of dismissing an adjustment for asymmetric risk because of an absence of clear proof that it is necessary, the approach taken by the CAA was inappropriately risky as it failed to take into account whether investors believe there to be asymmetric risk.
- 4.8 HAL considered that the CAA appeared to draw some comfort for its decision on WACC for Q6 from the fact that HAL continued to invest in Q5 with the implication that HAL regarded the CAA's proposed WACC for Q5 as acceptable. HAL refuted the CAA's assertion that the WACC during Q5 was correct or acceptable and HAL considered that it made this clear to the CAA on a number of occasions.
- 4.9 HAL considered that operating under a previous price control cannot be taken as evidence that the regulated company accepted all elements, or as evidence that those elements could be carried forward to the next price control without challenge. HAL believed that its ability to raise funds to invest in the proposed capital expenditure (capex) programme could be at risk and did not believe that the programme and the benefits for passengers should be put at risk by a WACC that cannot be viewed by objective investors as 'pro-investment'.

GAL

- 4.10 Oxera, on behalf of GAL, noted that while there was an upwards revision in the WACC, there were a number of important reasons why the WACC was still too low. The most significant point was the failure to recognise that greater competition faced by GAL should be compensated for in a higher asset beta and a higher rate of return. Oxera considered that it could not be reasonable for the CAA and its advisers to accept that GAL has faced greater risk and greater volatility of revenues, but not to allow it a higher rate of return through a higher asset beta. Similarly, while the CAA had agreed to raise the cost of debt allowed for in the price control there was insufficient recognition that GAL's cost of debt was higher than HAL's. Oxera considered that it was important that greater recognition be given to

the higher risks faced by GAL compared with HAL and that this difference was reflected in the asset beta and the cost of debt, and consequently in a WACC which adequately reflected the difference in the risk profile of the two airports. Oxera did not consider that the proposed WACC differential between HAL and GAL of 35bps was sufficient.

Airlines

- 4.11 easyJet considered that the CAA should not have increased its estimate of GAL's cost of capital from 5.65% to 5.95%. easyjet considered that there were three main weaknesses in the changes made by PwC to GAL's estimated WACC.
- easyJet considered that PwC's assessment of the cost of capital was originally based on a top-down assessment of the overall cost of debt and cost of equity rather than the component parts of each of these. However, easyJet considered that the final proposals focused on a detailed assessment of the individual component parts.
 - easyJet considered that PwC's cost of debt estimates were based on short-term measures of debt, which risk distorting the WACC estimates by using short-term estimates rather than longer-term estimates.
 - easyJet considered that PwC had artificially increased GAL's cost of debt to ensure that it was higher than HAL's, despite market evidence that GAL has a lower cost of debt than HAL.
- 4.12 Airport Consultative Committee – Gatwick Airport (ACC) believed that the CAA's estimate of the GAL WACC of 5.95% (compared with an effective rate of 6.3% in Q5) was inaccurate in three key respects and failed to reflect the WACC of a notionally efficient airport operator:
- the cost of debt was excessive and the ACC understood the CAA had made errors in its calculations;
 - the reduction of gearing to 55% and increasing beta was not based on evidence; and

- the CAA was wrong to take a point at the top of the range, implying illogically that all uncertainty was in one direction. The decision on the range also failed to account for the CAA change of policy on reinvestment of returns.

4.13 BA considered that the CAA had made significant errors in its calculation of WACC and that the proposed cost of capital, at 5.6% and 5.95% were excessive, not based on the evidence, and contrary to passengers' interests. It was BA's view that:

- the cost of debt was wrong because of methodological and technical errors;
- the CAA had selected a figure for the overall WACC that was at or above the top end of the range proposed by PwC (rather than at the 75th percentile as stated) because of errors in the treatment of inflation; and
- the evidence on equity beta did not support the beta assessment, especially given the (unjustified) reduction in GAL gearing relative to Q5.

4.14 The Heathrow Airline Community, (which comprises the London (Heathrow) Airport Consultative Committee (LACC) and Heathrow AOC Limited (AOC)) noted that the adjustments made to the WACC bore little resemblance to current trends in market rates for debt and equity. Consequently the Heathrow Airline Community could not accept the rationale behind the proposed increase in the WACC. The Heathrow Airline Community considered that:

- Airport infrastructure and regulated assets with index-linked revenues and regulatory asset values were attractive assets to a broad range of investors. It considered that this was further supported by the acquisition by USS of shares in HAL's ultimate parent company in October 2013, after the announcement of the final proposals, at a premium of 14% to 15% to regulatory asset value (broker estimates).

- The CAA had not taken a step back to examine what the developments in capital markets meant and what an appropriate return for an asset provider like HAL should be. The impact of lower bond yields and other capital market developments was having a far larger impact on decisions made by Ofgem and Ofwat without any detrimental impact on the supply of capital.

4.15 Virgin supported the responses of the Heathrow Airline Community and the ACC.

CC's NIE provisional determination

4.16 In November 2013 the CC published its provisional determination of the NIE's new price control arrangements. The CC estimated that the vanilla WACC is 4.1% for the period from April 2012 to September 2017.

HAL

4.17 HAL commissioned NERA to review the relevance of the CC's provisional determination for NIE for the CAA's estimate of the cost of capital for Q6. In summary, NERA found the CC's decision to hold little relevance, particularly for estimates of:

- TMR - because of differences in time period to which the review relates and concerns with the evidence base;
- the cost of debt - because of the reliance on current low yields (for new debt), the lack of allowance for fees (for embedded debt);
- HAL is much riskier than NIE; and
- the point estimate from the range. The CC's selection of the mid-point (after adjusting some of its ranges) did not allow for the asymmetric effect of incorrectly estimating the WACC or asymmetric beta risks.

GAL

4.18 GAL raised concerns should the CAA adopt the CC's provisional NIE determination. GAL noted that:

- these were merely provisional, the CAA would need to explain what was wrong with its own final proposals;

- the CAA should not be fettered by a CC decision particularly as the Competition and Markets Authority (CMA) rather than the CC will be the appeal body and that the provisional decision was for NIE and does not take into account GAL specific factors; and
- differences in the treatment of embedded debt as well as the cost of equity.

Airlines

4.19 Responses from the airlines all considered that the CC's provisional determination showed that the HAL and GAL WACCs included in the CAA's final proposals were too high.

- The airlines noted the CC used a lower TMR and ERP compared to the CAA's final proposals.
- The airlines noted that the CC's selection of a point estimate for the WACC which represented the mid-point in the range. Some respondents noted that this supported their previous submissions which criticised the CAA's choice of a point estimate which was high in the range.

Discussion of the issues and final views

4.20 The overarching responses to the issues set out in this chapter are discussed in detail and the CAA's final views set out in the following chapters.

CHAPTER 5**Estimating the WACC: gearing and the cost of debt**

Gearing**Final proposals**

- 5.1 In the initial and final proposals the CAA proposed that the appropriate gearing should be 60% and 55% for HAL and GAL respectively. For HAL the gearing assumption was unchanged from Q5. For GAL the final proposal was 5% lower than Q5.
- 5.2 The final proposals noted that ultimately, the choice of gearing was a matter of judgement. The CAA placed some weight on the status quo to avoid unnecessary uncertainty. However, GAL's relative risk exposure was higher compared to HAL, specifically with respect to exposure to demand risk, implying a relatively smaller capacity for debt financing. The CAA considered that the difference in risk between HAL and GAL warranted a lower gearing assumption for GAL.

Responses

- 5.3 The ACC did not consider there was a rational basis for reducing the gearing assumption to 55% for a notionally efficient company of GAL's size, while also increasing the beta. The ACC considered that this was below GAL's current gearing and the stated intention to GAL's investors. The ACC also noted that the CAA/PwC analysis also found that GAL had issued bonds in Q5 at rates lower than HAL on average (2.9% for GAL compared to 3.3% for HAL).

Discussion of the issues

- 5.4 The CAA continues to consider, for the reasons set out in PwC's work and the initial and final proposals, that GAL's risk profile is such that the appropriate gearing assumption for GAL should be slightly lower than HAL. The cost of GAL's actual debt is lower than that of HAL and, as noted in the final proposals, this is explained by the differences in timing of the issuances.

- 5.5 The CAA considers that the level of gearing in the notional capital structure is an important assumption and input into the assessment of financeability and ultimately whether the price cap meets the CAA's requirements to have regard to:
- the need to secure that each holder of a licence is able to finance its provision of airport operation services; and
 - the need to promote economy and efficiency on the part of each holder of a licence.
- 5.6 If notional gearing is too low, then the notional financial structure may not be economic or efficient. The CAA notes that it is generally considered that the WACC increases as gearing falls because of the tax shield on debt.
- 5.7 If the notional gearing assumption is too high then the notional airport operator might find it difficult to finance its operations. The CAA's financeability testing in the main documents¹⁰ supports the view that the notional airport operator will be able to finance its operations at the assumed gearing of 60% and 55% for HAL and GAL respectively. Furthermore, the ratios suggest that there is scope to absorb downside shocks and maintain an investment grade rating, but that the level of that buffer is not so large as to suggest significant inefficiency in the assumed gearing levels.
- 5.8 The CAA notes that the CC's NIE provisional determination assumed a gearing level of 50% and this suggests that the CAA's assumptions are broadly correct.

Final views

- 5.9 The CAA proposes to use gearing of 60% and 55% for HAL and GAL respectively.

Cost of debt

Final proposals

- 5.10 The cost of debt in the final proposals was 3.2% for HAL and GAL. This was lower than the Q5 determination (3.55%).

¹⁰ 'Economic regulation at Heathrow from April 2014: notice of the proposed licence' and 'Economic regulation at Gatwick from April 2014: notice of the proposed licence'.

Figure 5.1: Cost of debt range including fees in the final proposals

	HAL	GAL
Historical fixed rate debt (70%)	3.30%	3.10%
New debt and floating rate debt (30%)	2.50%	2.75%
Cost of debt excluding fees	3.05%	3.00%
Fees	0.15%	0.20%
Cost of debt including fees	3.20%	3.20%

Source: Final Proposals

- 5.11 The CAA used a range of data and evidence to arrive at its final proposals. The final proposals noted that while there might be a risk differential between HAL and GAL and that theoretically this might be reflected in the cost of debt, this was offset because GAL's actual cost of debt is lower than HAL's. The CAA concluded that for Q6 the gearing and beta differentials sufficiently take into account the difference in risk.

Reponses

HAL

- 5.12 HAL considered that the CAA's final proposals included a combination of errors and misjudgements which HAL estimated meant that the CAA had understated the cost of debt by 70bps and the WACC by 42bps.

Figure 5.2 'Errors and misjudgements' on the cost of debt identified by HAL

	Impact on HAL's WACC bps
Flawed model of forward market corporate debt cost	4
Omission of new issue premium from cost of new debt	4
Partial omission of revolving credit facility	13
Erroneous change to 'mid-point' of Q6	1
Omission of the impact of non-sterling debt	3
Arbitrary overlay to cost of debt range	4
Update to latest market yields	1
Flawed analysis of the cost of new debt	12
Total	42

Source: HAL's responses to final proposals

FLAWED MODEL OF FORWARD MARKET CORPORATE DEBT COST

- 5.13 HAL considered that the CAA's estimate of the cost of new debt relies critically on PwC's regression analysis of the relationship between yields on government and corporate bonds.
- 5.14 HAL considered that PwC's numerical assumption for the relationship between government gilt and corporate bond yields was unsound, unstable and fell short of a value of 1.0 that was supported by available analysis and evidence (ie corporate debt yields tend, on average, to move in a one-to-one relationship with government debt).

OMISSION OF NEW ISSUE PREMIUM FROM COST OF NEW DEBT

- 5.15 HAL noted that the CAA had not included an explicit allowance for the new issue premium (NIP) in the cost of debt, relying on advice from PwC. HAL considered that PwC's analysis of the NIP for new debt contained an error in interpreting bond yield data and failed to take into account actual data on NIPs provided by HAL as well as PwC's own information that NIPs were currently around 40bps to 50bps.

PARTIAL OMISSION OF REVOLVING CREDIT FACILITY

- 5.16 HAL noted that the CAA included only 5bps in the cost of debt for the revolving credit facility, compared to HAL's estimate of 17bps to 20bps. HAL considered that this left a short-fall of 12bps to 15bps, even without the proposed move to a 24 month adequacy of

resources licence condition.

ERRONEOUS CHANGE TO 'MID-POINT' OF Q6

5.17 HAL noted that PwC's methodology for determining the forward adjustment to the cost of new debt required it to assume a 'mid-point' of Q6 against which to measure the forward adjustment to interest rates. HAL noted that for the initial proposals PwC took this mid-point to be September 2016, which approximated to the mid-point of Q6 running from April 2014 to March 2019. For the final proposals, however, PwC moved this 'mid-point' to June 2016. HAL calculated that this change reduced the forward curve by 6bps, depressing the WACC by 1bp.

OMISSION OF THE IMPACT OF NON-STERLING DEBT

5.18 HAL considered that the CAA took the theoretical position that if sterling debt costs were lower than non-sterling (plus hedging costs), then HAL would raise slightly more debt in sterling markets until the costs equalised. HAL considered that this ignored the fact that diversification across sterling and non-sterling markets not only sought to minimise costs but also provide financial resilience. HAL considered that borrowing in non-sterling markets, at the margin, would be more expensive than borrowing in sterling markets, but was nevertheless an optimal business decision. HAL estimated that taking account of non-sterling debt hedging costs would add 3bps to the WACC.

ARBITRARY OVERLAY TO COST OF DEBT RANGE

5.19 HAL considered that the CAA's range for the cost of debt incorporated a downward adjustment of 25bps to the top end of the range for the cost of new debt. HAL considered that this overlay was intended solely to allow variation between the cost of new debt for GAL relative to that of HAL. This approach was not sustainable. In its view the downward adjustment to HAL's cost of debt was totally arbitrary and without foundation. It thought that an equally plausible approach would be to increase GAL's overall cost of new debt.

UPDATE TO LATEST MARKET YIELDS

5.20 HAL considered that PwC continued to base its analysis of the cost of new debt on a single cut-off date/point in time, now 27th June 2013. In HAL's view using a single reference date lacked the reliability of

looking at an average of rates but if PwC persisted in a less reliable single cut-off point, it should at least reflect the latest numbers available. HAL quoted PwC that 'yields have markedly increased since March 2013' and that 'Gilt yields may, in time, increase to even higher levels, but we suggest regulators follow this trend'. HAL calculated that if rates were updated to 7 October 2013, or if an average of rates over the last 3 months was taken, the cost of new debt would be higher by around 7bps, adding 1bps to the WACC.

FLAWED ANALYSIS OF THE COST OF NEW DEBT

5.21 HAL noted that PwC did not explicitly take account of the risk-free rate (RFR) in estimating the cost of new debt. HAL noted that in its response to the initial proposals it showed that a better approach is to:

- start with a robust estimate of the RFR; then
- add a debt premium.

5.22 Using this approach, HAL estimated the cost of new debt would be 3.86%.

GAL

5.23 Oxera, on behalf of GAL noted that although the CAA's estimate of GAL's cost of debt (3.2%) was the same as GAL's submissions, GAL should have a higher cost of debt than HAL. The reasons were that HAL's risk was lower than GAL's and this enabled it to achieve a higher credit rating at the assumed gearing level than GAL. Furthermore GAL already had sufficient debt in place for Q6 (the CAA estimated that the cost of new debt was below the cost of GAL's existing debt).

Airlines

5.24 BA's response stated that 'it is the CAA's proposals with respect to the cost of debt that are most troubling, as in this regard British Airways believes that the CAA has made a number of technical errors.... We also believe that the CAA, by choosing to use HAL's actual debt (which includes acquisition debt and subordinate debt) rather than a benchmark index, has inadvertently made an error of principle by departing from its previous policy statement not to allow HAL to pass through costs related to the airport's change in ownership.'

5.25 Cambridge Economic Policy Associates (CEPA), on behalf of BA

considered that the appropriate inflation forecast was in the range 3.0% to 3.4% and significantly above PwC's estimate of 2.8%. CEPA also estimated that if PwC's recommended WACC was adjusted for what it considered was the CAA's view of inflation (3.0% to 3.1%) then in effect the CAA's point estimates for the HAL and GAL WACCs were greater than the top of PwC's range.

- 5.26 BA was critical of the CAA's use of Bank of America Merrill Lynch (BoAML) bond indices. BA considered that the BoAML indices were skewed for this purpose because of the inclusion of financial institutions. BA considered that more appropriate indices showed that the actual yields over Q5 would have been lower.
- 5.27 BA estimated that the cost of existing debt was overstated by 110bps (the CAA estimates that this equates to 46bps on the WACC). BA considered that the sample of HAL's bonds used by PwC and the CAA was not appropriate in the calculation of the cost of existing debt because:
- it included debt rated below A- (which was not consistent with a 60% gearing assumption in circumstances where HAL had issued debt 67% gearing all with A- rating);
 - it included bonds which were the subject of basis point incentives established in order to achieve the re-financing associated with the change in control of HAL and/or in order to allow gearing well over 60% and/or to allow easier payment of dividends;
 - by wholly excluding non-sterling bonds, PwC increased the average tenor and thus increased the debt costs.
- 5.28 BA estimated that the cost of new debt was overstated by 150bps. The CAA estimates this equates to 27bps on the WACC. BA considered that CAA's estimate of new debt was flawed because:
- it appeared that PwC had made a mathematical error in its averaging of traded bond yields for HAL and GAL, inflating its range by 10bps;
 - the CAA had made serious errors in how it made use of evidence from benchmark indices;
 - for HAL, the CAA should have only looked at the cost of A- rated debt as this rating was consistent with gearing of 60%.

- 5.29 BA was also critical of the CAA for the final proposal's apparent departure from the notional debt approach. BA considered that it was an error of principle to allow HAL's actual costs of debt and that this also led it to make a further error of principle in departing from its previous policy statement not to allow HAL to pass through costs relating to the airport operator's change in ownership. BA considered that the CAA should have used benchmark indices only.
- 5.30 The Heathrow Airline Community¹¹ provided work carried out by Jonathan Mirlees-Black from RARE Infrastructure which argued that the cost of debt had been overstated in three ways:
- it used actual HAL actual cost of debt and notional gearing level;
 - it had not used the a forward-looking inflation estimate with the benchmark bond indices; and
 - it used an estimate of inflation for new debt which is too low compared to current expected inflation.
- 5.31 Based on BA and CEPA's work, the ACC concluded that the increase in the cost of debt to 3.2% in the final proposals compared to the initial proposals was unjustified. Further, the ACC considered that there was no justification for the CAA simply to 'aim up' to deal with any uncertainties. This was inefficient and not in the interests of passengers because it locks in a high cost of debt and therefore higher prices.

CC's NIE Provisional Determination

- 5.32 The CC estimated the cost of debt for NIE by taking a blend of historical fixed rate debt (80%) and new debt (20%). The CC estimated that the real cost of existing debt was 3.6% and the real cost of new debt was approximately 2.4%. The CC included an additional allowance to cover issue fees (10bps) and for holding cash ahead of use (20bps) and added these to new debt only. The calculation of the cost of debt in the CC's NIE provisional determination is summarised in the table below.

¹¹ Virgin's response explicitly supported this work.

Figure 5.3 CC's cost of debt for NIE

	Nominal	Real
Historical fixed rate debt (80%)	6.50%	3.60%
New debt (20%)	5.40%	2.40%
Issue fees and cash holding costs (added to new debt only)	0.30%	0.30%
Cost of debt including fees	6.34%	3.40%

Source: CC's NIE Provisional Findings

Discussion of the issues

Review of Q5

5.33 BA was critical of the CAA's use of BoAML bond indices. The CAA notes that the purpose of the comparison of the Q5 cost of debt assumption to actual yields during Q5 (using BoAML indices) was to provide background to the Q6 review and to refute the claim that airports had been under rewarded during Q5.

Approach to the notional debt

5.34 The CAA has previously stated that it sets the cost of capital for a notional financed airport operator and does not take into account the actual ownership or actual finance structure. BA considered that, by taking into account yields on HAL and GAL's actual bonds the CAA has departed from that policy.

5.35 The CAA continues to consider that the cost of capital should reflect that of a notionally financed airport operator.¹² The CAA also tries to ground its analysis in market data and in particular data which provides evidence as to how investors view the risks and therefore the required returns for investing in HAL and GAL. The CAA notes that at the time of the Q5 decision, there were only a few BAA traded bonds.

5.36 The CAA is aware that, by taking into account evidence on HAL and GAL's actual bonds, the CAA might appear to have discarded the

¹² Placing to one side the use of HAL and GAL's actual bonds as a source of evidence, the CAA's final proposals' cost of debt estimate used the following notional assumptions: gearing; proportion of new debt required in Q6 (based on RAB assumptions in the price control); cost of new debt and floating rate debt; proportion of debt which is index-linked (for the purposes of financeability testing); fees; credit rating; structure (e.g. senior and junior); and credit enhancements (such as security over assets).

notional debt approach, therefore giving stakeholders (including investors) the expectation that the cost of actual debt is a 'pass through' for Q6 and future control periods. This is not the case. The CAA has used evidence on the cost of HAL and GAL's bonds because it considers that the yields on these bonds are not out-of-line with benchmark indices for the same ratings at the time of issuance and therefore can be considered efficiently incurred. If there had been no such alignment, the CAA would not have used the evidence. Accordingly the CAA is not departing from the notionally financed company nor is the actual cost of debt a pass through.

- 5.37 In the final proposals the CAA used a range of evidence in order to inform its estimate of the cost of debt including benchmark bond indices and did not solely use yields on HAL and GAL bonds.

Overall cost of debt

- 5.38 As set out above, HAL raised numerous points all of which it considered showed that the CAA's final proposals understated the cost of debt. Oxera considered that although the final proposals' cost of debt allowance for GAL was the same Oxera had proposed, the CAA should allow GAL a higher cost of debt than it allowed HAL. BA and CEPA raised points all of which they considered showed that the CAA's final proposals overstated the cost of debt.
- 5.39 The CAA has used the CC's approach to NIE's cost of debt to double check the final proposals and see if any material differences exist. The CAA has substituted its estimate of nominal historical cost of debt for HAL and GAL into the CC's model, but left all other assumptions made by the CC unchanged. The CAA calculates that using the CC's methodology and assumptions the cost of debt:
- for HAL would have been 3.26% (that is 6bps higher than the CAA's final proposals); and
 - for GAL would have been 3.11% (that is 9bps lower than the CAA's final proposals).

Figure 5.4 Comparison of CC's NIE provisional determination and the CAA's final proposals

	CC NIE	HAL	GAL
Historical fixed rate debt (80%)	3.60%	*3.40%	*3.21%
New debt and floating rate debt (20%)	2.40%	2.40%	2.40%
Fees (added to new debt only)	0.30%	0.30%	0.30%
Cost of debt including fees	3.40%	3.26%	3.11%
<i>Difference to CAA final proposals (3.2%)</i>	<i>0.20%</i>	<i>0.06%</i>	<i>-0.09%</i>

* The CAA has used its estimate of the nominal cost of historical fixed rate debt of 6.3% (HAL) and 6.1% (GAL) and deducted inflation in the same manner as the CC. In the CAA's final proposals these figures, after deducting inflation, were 3.3% and 3.1%.

Source: CAA analysis

5.40 The CAA considers that the CC's provisional determination does not suggest the CAA should revise its final proposals for the cost of debt.

Inflation

5.41 Based on work by CEPA and RARE Infrastructure, airlines considered that in the final proposals the CAA had been inconsistent with its inflation assumptions, had applied them incorrectly and had understated the inflation rate.

5.42 Inflation assumptions in the cost of debt calculation are required because corporate debt yields are expressed in nominal terms (ie include an allowance for inflation) and the CAA (and most other regulators) set a real cost of capital (ie excluding an allowance for inflation). When adjusting market data for inflation, two issues need to be considered:

- whether the adjustment is for expected inflation or actual inflation; and
- how the inflation assumption is estimated.

5.43 The price an investor is willing to pay for a bond (and therefore the yield that they require) reflects the investor's expectations of the future, including its expectations of future inflation (until the expected redemption date) at the time it purchased the bond.¹³

¹³ An alternative approach is to assume that the nominal cost of debt is constant and therefore the forecast inflation for the control period is the appropriate estimate (i.e. the

- 5.44 Estimating investors' expectations of inflation is not straight-forward and a number of possible sources of evidence exist.
- Recent actual inflation (on the assumption that the recent past is a good guide to the future). RPI inflation for the year to November 2013 was 2.6%.
 - Forecasts by independent forecasters and government. Forecasts vary by forecaster and by year, and are in the range of 2.8% to 3.5% for the period up to 2018.
 - breakeven inflation (the implied inflation rate calculated by comparing government index-linked bonds with government conventional bonds). For example at 30 November 2013 the implied inflation spot curve suggested inflation was 2.7 (derived from gilts with 2.5 years to maturity) to 3.7% (from gilts with 25 years maturity)
- 5.45 Ideally the choice of inflation assumption needs to reflect the future inflation expectations at the same point in time as the market data on the bond and cover the period of time to that bond's maturity. On their own none of the sources of inflation estimates provides this information in the required detailed and reliable form. Therefore, in the final proposals the CAA used a range of estimates, and attempted to be as transparent as possible in these assumptions.
- 5.46 The CC's NIE work assumed inflation of 2.8% in respect of embedded debt and the mid-point of the range 2.7% to 3.2% for new debt.
- 5.47 PwC's advice was based on an assumption of 2.8%. In the final proposals the CAA also undertook some analysis using an inflation rate of 3%.¹⁴ Ultimately the choice of inflation estimate is a matter of judgement. While other inflation rates are also plausible, the CAA considers that its assumptions as an estimate of the expected future inflation rate contemporaneous with the market data are appropriate and within the range of plausible estimates.

expected rate of inflation to be applied to the RAB).

¹⁴ CEPA considered that the CAA had made an error in not using the Fisher Equation in some of its analysis. The CAA agrees that the Fisher Equation is theoretically preferred, but notes that the simple deduction method used by the CAA in some of its analysis is within the margin of accuracy of the underlying inflation estimate.

Cost of existing debt

Non-sterling bonds

- 5.48 HAL considered that by omitting the cost of non-sterling bonds PwC and the CAA had understated the cost of new debt. The CAA has not omitted non-sterling bonds in the calculation of the cost of debt, but instead concluded that the cost of sterling debt was an appropriate proxy for the cost of non-sterling debt (including any associated foreign exchange instruments).
- 5.49 HAL considered that the cost of non-sterling debt would be slightly more than the cost of sterling debt.
- 5.50 BA and RARE Infrastructure (on behalf of the Heathrow Airline Community) considered that non-sterling bonds may be cheaper than sterling bonds because of the shorter tenor.
- 5.51 On the balance of the evidence the CAA continues to consider that the cost of sterling bonds remain a good proxy for the cost of non-sterling bonds.

Credit rating assumption

- 5.52 BA considered that for HAL the CAA should assume a rating of A- at gearing of 60%. The CAA's assumption, consistent with Q5 is for a solid investment grade (BBB/BBB+) at 60% gearing, which is slightly lower than HAL's actual rating of A- at 68% gearing. The CAA considers that while HAL might be able to achieve a higher rating than the CAA has assumed, the CAA's gearing and credit assumption gives it comfort that HAL will be able to finance its activities over Q6. The CAA also notes that HAL's actual financing includes credit enhancements including security over assets and cross guarantees. Consistent with the policy to move to a full financial ring-fence over time, the CAA has assumed a simple debt structure which does not include such credit enhancements.

Use of HAL bonds

- 5.53 BA considered that the CAA had overestimated the cost of debt because it included HAL's bonds which were the subject of basis point incentives established in order to achieve the re-financing associated with the change in control of HAL and/or in order to allow gearing well over 60% and/or to allow easier payment of dividends. BA considered

that the CAA should have used benchmark indices only. The CAA notes that PwC compared HAL and GAL bonds to benchmark indices and concluded that the airports' bonds were issued at yields to maturity that were less than the benchmark indices.

- 5.54 BA considered that PwC had made a mathematical error in its averaging of traded bond yields for HAL and GAL, inflating its range by 10bps. The CAA also calculated weighted averages of the bond yields which confirmed PwC's work.
- 5.55 In the round, the CAA considers that its estimate of the cost of existing debt in the final proposals remains appropriate.

Cost of new debt

- 5.56 The CAA does not consider that PwC's forward-looking adjustment is flawed. PwC clearly sets out the broader concept behind the adjustment - that Quantitative Easing (QE) affected the yields on government gilts the most and corporate bonds slightly less. PwC noted that as QE unwinds the forward curve suggests that gilt yields will rise by c90bps. PwC considers that the unwinding will affect corporate bonds slightly less and PwC had estimated this to be c70bps. Had the PwC not used any forward-looking adjustment the pre-tax WACC would have been c12bps lower. If the CAA used HAL's preferred 'one-to-one' relationship the CAA calculated that the pre-tax WACC would have been 3bps higher.
- 5.57 HAL considered that the change in mid-point in PwC's estimate of the forward-looking adjustment was inexplicable and meant that the WACC was understated by 1bp. PwC's change in mid-point arose because of the availability of data, is consistent with the reduction in length of the control period by three months and the impact, as calculated by HAL, is trivial.
- 5.58 HAL considered that the CAA's range for the cost of debt incorporated a downward adjustment of 25bps to the top end of the range for the cost of new debt and that this was arbitrary. The CAA considers that because of a lower risk profile HAL is clearly towards the bottom of this range. In fact the CAA took the mid-point in the cost of new debt range estimated by PwC (2.6%) and reduced it slightly for a higher inflation forecast than assumed by PwC.
- 5.59 HAL considered that PwC's estimate of the cost of new debt was over

reliant on a single data point and that PwC had acknowledged that yields were increasing. HAL considered that this meant that the final proposals understated the cost of debt. In contrast, CEPA considered that the reliance on a single cut-off date meant that the final proposals overstated the cost of debt. The CAA notes that:

- PwC combined spot rates with the forward-looking adjustment and hence had allowed for an increase in yields going forward. Movements in the market since PwC's cut-off date are consistent with PwC's recommendations.
- PwC tested its assumption on the cost of new debt to recent period averages. Furthermore, in the final proposals, the CAA also set out the 12 month average for A and BBB rated bonds of 1.1% and 1.8% respectively. These averages are less sensitive to the cut-off date and once PwC's forward-looking adjustment (70bps) is included, they suggest that the cost of new debt is in the region of 1.8% to 2.5%.

- 5.60 The CC's estimate of the cost of new debt for NIE (2.4%) was slightly below the CAA's assumption in the final proposals for HAL (2.5%) and significantly below the CAA's assumption for GAL (2.75%). The CAA's cost of new debt for HAL was based on the mid-point of PwC's recommended range, and its cost of new debt for GAL was higher to reflect the lower credit rating achieved by GAL.¹⁵
- 5.61 In October 2013, HAL raised £750 million by issuing a 35 year bond at a yield of 4.6% (rating A-). After deducting inflation this equates to a real cost of debt in the region of 1.6 to 1.8%. The final proposals assumed that the cost of new debt for HAL over Q6 would be 2.5%, which was based on current rates of 1.8% plus PwC's forward-looking adjustment (0.7%) to reflect the unwinding of QE over Q6.
- 5.62 HAL's debt issuance in October is consistent with and therefore supports the CAA's final proposals.

¹⁵ With actual gearing of 62% GAL achieved a credit rating of BBB+, while with actual gearing of 67% HAL achieved a credit rating of A- (and with an actual gearing level of 78% HAL achieved a rating of BBB).

Fees and new issue premium

- 5.63 One difference between the CC's NIE provisional determination and the CAA is the allowances for fees - the CC allowed for significantly lower fees than the CAA. The CC included an allowance for issue costs of 10bps on the cost of new debt. In addition, unlike the CAA, the CC allowed holding costs (ie the cost of drawing down funds and holding them before they are needed) on new debt of 20bps. Combining these figures, they equate to 6bps on the overall cost of debt. In comparison the CAA allowance for fees was 15bps for HAL and 20bps for GAL. Consistent with its previous price controls, the CAA did not include an allowance for holding costs.
- 5.64 HAL reiterated its previously expressed views and stated that the CAA should include a NIP on the new debt. The CAA notes that its approach to estimating the cost of existing fixed rate debt means that if the NIP exists it is already included in the cost of existing debt. The CAA notes HAL's views that the cost of new debt should include an additional, specific allowance for NIP. Given the CC did not provide for a specific additional allowance to cover any NIP, the CAA continues to consider that consistent with PwC's advice, it is not appropriate to include an additional allowance for Q6.
- 5.65 HAL considered that the CAA had not fully allowed for the costs of its revolving credit facility. The CAA notes that the fees allowance for HAL included in the final proposals is the same as that allowed in Q5 and greater than that allowed by the CC in its NIE provisional determination. Furthermore, as previously noted, other regulators such as Ofgem, provide no allowance for such fees. The CAA considers that on balance the allowance for fees included in the final proposals remains appropriate.
- 5.66 RARE Infrastructure noted that short maturity debt is significantly cheaper than longer maturity debt. This means that to fund short-term liquidity the airports can borrow short-term (at rates less than the CAA's cost of debt assumption on new debt) rather than issue long-term debt and suffer the cost of carry. The CAA considers that the treasury policy is a matter for the companies and is not advocating any specific treasury approach, but highlights this issue to show that there are alternative approaches. Furthermore this demonstrates that the cost of debt should be viewed in-the-round rather than giving focus on individual components in isolation.

Final view on the cost of debt

- 5.67 HAL considered that the CAA should update its estimates for the latest market evidence and calculated that this would increase the WACC by 1bp.
- 5.68 The CAA has not updated its cost of debt assumption for the latest market evidence. By taking an approach which places limited reliance on the choice of data cut-off, the CAA considers that its cost of debt assumption is robust to the usual market movements. Furthermore, purpose of the uplift applied to the cost of new debt is to reflect PwC's view that debt yields will slowly rise over Q6. Furthermore the effect, as calculated by HAL, is trivial.
- 5.69 The CAA has considered the issues raised in responses to the final proposals in-the-round. The CAA considers that the range identified by PwC remains the appropriate range. The appropriate point estimate is a matter of judgement and therefore it is not surprising that some responses to the consultation present argument and evidence to suggest that the cost of debt allowance is too high, while some responses suggest that it is too low.
- 5.70 Taking all the evidence in-the-round the CAA considers that the cost of debt of 3.2% in the final proposals remains appropriate for Q6. Furthermore, the CAA's estimate is consistent with the CC's NIE provisional determination and the debt issued by HAL since the final proposals.

CHAPTER 6**Estimating the WACC: cost of equity**

Total market returns, risk-free rate and the equity risk premium

Final proposals

- 6.1 In the final proposals the CAA used a TMR assumption of 6.75%, a RFR assumption of 1.0% and therefore an ERP assumption of 5.75%. The CAA also noted that these were current rates but that the PwC's current TMR was not significantly different to longer-run rates.
- 6.2 The analysis included in the final proposals showed that, while there was significant debate around the RFR, all submissions were consistent with TMR in the range 6.25 to 7.25%. The final proposals noted that focusing on the TMR and taking a longer run view of equity returns provided stability in this key element of the CAPM.
- 6.3 The analysis in the final proposals showed that if the CAA were to have used HAL's preferred TMR, RFR and ERP assumptions (rather than the CAA's proposals) the pre-tax WACC would be higher by only 9bps. A similar analysis using BA's preferred assumptions would have led to a pre-tax WACC that was only 4 to 5bps lower than CAA. If the CAA had used the Q5 assumptions, then the WACC would have been only 6bps higher than the CAA final proposals. The CAA considered that all these differences were within the margin of accuracy of estimating the cost of equity.
- 6.4 Only GAL's estimate which used the highest TMR of 7.25% would have led to a materially different WACC (c25bps) than the CAA's assumptions. The CAA noted that GAL's assumption was consistent with Ofgem's 2012 determination¹⁶, but it would not have been correct to say that there is regulatory consensus on this issue - for example ORR's June 2013 draft determination used a range of 6.25 to 6.75%¹⁷ and Ofcom was using a TMR assumption of 6.3% (comprising RFR of

¹⁶ Since the publication of the final proposals, Ofgem has used a TMR of 6.85% in its assessments of business plans.

¹⁷ These figures were confirmed in its Final Determination.

1.3% and ERP of 5%). The CAA noted that PwC examined a range of evidence including its own dividend growth model estimates, which supported a TMR assumption of less than 7.25%.

Responses

HAL

6.5 HAL considered its estimate of TMR of 7% remained appropriate and that:

- PwC appeared to misinterpret the evidence on regulatory precedent, which led to the unjustified conclusion that there was a downward TMR trend relative to Q5;
- the single period dividend growth model (DGM) PwC used to estimate the forward-looking TMR was too simplistic, resulting in a potentially inaccurate estimate of true forward-looking TMR; and
- PwC ignored current market evidence based on more sophisticated DGM models provided by the Bank of England and Bloomberg which supported a figure of at least 7% for the forward-looking TMR and thus also could not support a downward trend relative to when the CAA last set prices.

GAL

6.6 Oxera on behalf of GAL noted that the assumed TMR was broadly appropriate, given capital market uncertainty. Oxera noted:

- The CAA's upward revision of the TMR was supported by the volatility observed in capital markets since the CAA's initial proposals, as well as by the regulatory determination by the ORR.
- However, the CAA omitted any reference to Ofgem's March 2013 strategy decision for Electricity Distribution, which proposed an upper bound of 7.5% for the TMR range (mid-point of 7.0%).
- Heightened uncertainty in capital markets persists, following the US Federal Reserve's announcement to withdraw QE and the ongoing US government budget crisis, combined with uncertainty regarding economic growth.

- Furthermore, UK government yields had risen since April 2013, as recognised by the CAA. In light of this, a 6.75% estimate of the TMR appeared reasonable, although higher estimates would also be consistent with ongoing capital market uncertainty and regulatory precedent.

Airlines

- 6.7 Although BA did not raise any specific points on the TMR, other than to support the CC's estimate, which it calculated was 100bps¹⁸ below the CAA's estimate, it considered that there was no rationale for choosing a point estimate above the mid-point of the WACC. CEPA, for BA, suggested that the CC's provisional determination justified further scrutiny of the CAA's assessment.
- 6.8 The Heathrow Airline Community¹⁹ provided work from RARE Infrastructure which argued that the cost of equity had been overstated because the CAA used an ERP of 5.75%, which was higher than other UK regulators and above a level typically used in financial markets.

CC's provisional finding on NIE

Figure 6.1 TMR extract from the CC's Provisional Determination on NIE

13.144 The interpretation of the evidence on market returns remains subject to considerable uncertainty. The CC has said in recent regulatory inquiries that 7 per cent is an upper limit for the expected market return, based on the approximate historical average realized return for short holding periods. We think that it may be appropriate to move away from this upper limit based on historical realized returns and place greater reliance on forward-looking estimates which tend to support an upper limit of 6.5 per cent. We note the following points in support of setting an upper limit for the market return of 6.5 per cent:

- (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.⁴⁵
- (d) A forward-looking expectation of a return on the market of 7 per cent does not appear credible to

¹⁸ The CAA estimates the difference is in the region of 75bps to 85bps.

¹⁹ Virgin's response explicitly supported this work.

us, given economic conditions observed since the credit crunch and lowered expectations of returns.

13.145 Further, the implied range for the ERP of 4 to 5 per cent⁴⁶ appears consistent with the following evidence:

- (a) the lower end of the 5 to 6 per cent range suggested by the pure historical analysis conducted by DMS (see paragraph 13.133);
- (b) DMS's decomposition approach (see paragraph 13.136) suggesting an ERP of 4.5 to 5 per cent; and
- (c) Fama & French's forward-looking projections based on the DGM suggesting an ERP of 4.4 per cent (see paragraph 13.134).

13.146 Based on the above, we consider that the appropriate upper limit for the market return is 6.5 per cent. In the context of setting a cost of capital for NIE, we are less concerned with a lower limit to the expected market return (since we would wish to avoid NIE's cost of capital being too low), but in this context we consider 5 per cent an appropriate lower bound figure.⁴⁷

13.147 We therefore provisionally estimate a range of 5 to 6.5 per cent for the market return, and implied range of 4 to 5 per cent for the ERP.

Footnotes

⁴⁵ Credit Suisse Global Investment Returns Yearbook 2013, Figure 5.

⁴⁶ We associate the lower market return (5 per cent) with the lower RFR (1 per cent) and the higher market return (6.5 per cent) with the higher RFR (1.5 per cent).

⁴⁷ Figures lower than 5 per cent may well be appropriate in other contexts, for example providing advice to equity investors on the lower end of the range of expected returns before costs. In this context, we note that the Financial Services Authority (FSA) requires UK financial advisers to project nominal returns on a notional product two-thirds invested in equities and one-third in fixed income (before costs and personal tax) using rates of 5, 7 and 9 per cent. From 2014 onwards the FSA has reduced the assumed returns to 2, 5 and 7 per cent. Assuming RPI of 2.9 per cent, this implies real returns of -0.9, 2.1 and 4.1 per cent.

Source: http://www.competition-commission.org.uk/assets/competitioncommission/docs/2013/northern-ireland-electricity-price-determination/131112_main_report.pdf.

Discussion of the issues

Total market returns

- 6.9 Contrary to HAL's response, PwC used both a single period DGM and a two period DGM.
- 6.10 HAL considered the Bank of England analysis suggested a TMR of 7%, however, the CAA notes that the CC's analysis of the Bank of England data suggests the TMR fluctuates around 6.5%.
- 6.11 The CC and the CAA took a similar approach to considering the TMR

and ERP. First, that the TMR is a key component in the estimation of the ERP and second, that both historical evidence and forward-looking evidence should be considered.

- 6.12 Compared to the final proposals and PwC's advice to the CAA, the CC's provisional determination on NIE appears to present two broad differences:
- additional evidence on the estimate of the TMR; and
 - a different weight placed on historical estimates compared to forward-looking estimates.
- 6.13 The additional evidence included in the CC's report all points to a lower estimate of the TMR than the CAA assumed in its final proposals (6.75%).
- Fama and French approach to estimating historical TMR suggested the long-run TMR was in the region of 5.5% and possibly around 4.5% more recently.
 - A forward-looking estimate which, although similar in approach to PwC, assumed that dividend growth would be lower than Gross Domestic Product (GDP) growth. (PwC assumed that long-run dividend growth would be the same as GDP growth). The CC's method suggested 6.5% was the upper limit of the TMR.
- 6.14 The CC appeared to place greater emphasis on forward-looking rates and is clearly concerned only with the return required for that period. In NIE's case this is the period 1 April 2012 to 30 September 2017. In contrast, the CAA's final proposals placed greater emphasis on longer run averages, and used a point estimate of 6.75% (the top of PwC's recommended range of 6.25% to 6.75%).
- 6.15 The CAA notes that its RAB-based control period runs from 1 April 2014 to 31 March 2019 (or 31 December 2018 for HAL), while the CC's review covers the period 1 April 2012 to 30 September 2017. Therefore while there is a large degree of overlap, the two periods are not identical.
- 6.16 The CAA also notes that forward-looking estimates require more judgements to be made and are inherently more unstable - for example the reliance on forward-looking assumption of dividend yields.

- 6.17 The CC's provisional determination was unambiguous: 6.5% was the upper limit. Therefore the CAA's view set out in the final proposals that the appropriate TMR was 6.75% is not consistent with the CC. In the final proposals, the CAA noted that PwC recommended a range for the TMR of 6.25% to 6.75%. The CAA also noted that the range was probably 6.5% to 7%, the upper end reflected some of the higher historical evidence and regulatory decisions in other sectors. The CC's NIE work suggests that the appropriate range is 5.0% to 6.5%, although the CC also suggests that there is less support for the lower end of its range. In light of the CC's provisional determination, the CAA considers that it is appropriate to place more weight than it did in its final proposals on the forward-looking estimates and take into account the new evidence which suggest the historical estimates might be lower than the CAA had previously considered. However, the CC's point estimate of approximately 5.9/6.0% appears below all other evidence that the CAA has received and below PwC's recommended lower estimate of 6.25%.
- 6.18 The CAA is also aware that in 2010 the Office of National Statistics (ONS) changed the way in which RPI inflation was calculated, which led an increase in measured RPI inflation of approximately 50bps²⁰(the formula effect). This means that any estimate of the real (RPI-stripped) TMR before 2010 is likely to be c50bps higher than estimates after 2010. PwC estimated the difference to be 32bps. Ofgem recognised this in its recent assessment of Electricity Distribution business plans when it estimated that the formula effect was 40bps and reduced its TMR from 7.25% to 6.85%.
- 6.19 The CAA therefore concludes that the low end of the plausible range for the TMR in the final proposals was too high and that there is evidence, as put forward by the CC and the impact of the RPI formula effect, to suggest that the TMR could be as low as 5.5% or 6%.
- 6.20 In light of the additional evidence arising from the CC's NIE provisional determination the CAA has revised its point estimate for the TMR to 6.25% which is 50bps lower than its final proposals.
- 6.21 The CC's views on TMR (and all components of the WACC) are

²⁰ <http://www.ons.gov.uk/ons/about-ons/get-involved/consultations/archived-consultations/2012/national-statistician-s-consultation-on-options-for-improving-the-retail-prices-index/options-for-improving-rpi-consultation-document.pdf>.

provisional, and the final determination is expected in 2014. It is possible that the CC revises its views for the final determination and uses a TMR which is greater or less than the 6%. In reaching its final views the CAA is cognisant the CC final determination may differ to its provisional determination. The CAA has linked its revision in the TMR to the new evidence presented by the CC rather than specifically to the CC's choice of a point estimate for the TMR of 6%.

- 6.22 The CAA considers that its view that the appropriate TMR assumption of 6.25% is consistent with the CC's estimate of 6% because of the slightly different time periods covered by price controls. There may be some reversion to the longer run historical rates towards the end of Q6 (and after the end of the NIE control period on which the CC has opined). The CAA also notes that this is consistent with Q5 when the ARR and the ONS change to inflation are taken into account.

Risk-free rate and the equity risk premium

- 6.23 Once a view on the TMR is reached, the purpose of the RFR is to split the TMR into the RFR and the ERP. The final proposals included a RFR of 1%. PwC's recommended range for the RFR was 0.5% to 1%. In effect, the choice of RFR makes little difference to the cost of equity once the TMR is fixed.
- 6.24 Having decided to reduce the TMR compared to the final proposals, the CAA has assessed options - reduce the RFR, reduce the ERP or a mixture of the two.
- 6.25 PwC's advice was that the appropriate ERP was 5.75%, and that the range for the RFR was 0.5% to 1.0%.²¹ In order to remain consistent with PwC's advice the CAA's view is that the ERP should be 5.75% (unchanged from the final proposals) and the RFR should be 0.5% (reduced from 1.0% in the final proposals). For the avoidance of doubt, the reduction in the RFR is to ensure consistency and is a consequence of the reduction in the TMR, and should not be viewed in isolation from the TMR and ERP. Furthermore, the CAA's approach to estimate the total cost of debt (rather than the RFR and the debt premium separately) means that the RFR estimate does not affect the cost of debt.

²¹ PwC's advice was that the RFR was in the range 0.5% to 1.0% and was consistent with the TMR range of 6.25% to 6.75%.

- 6.26 The CC estimated that the appropriate range for the RFR was 1.0 to 1.5% and the ERP was 4 to 5%. The CC narrowed this range slightly by increasing the lower end of the range by 50bps. In effect the CC used a RFR of approximately 1.25% and an ERP of approximately 4.75%.
- 6.27 If the CAA used the CC's RFR estimate (1.25%) and the CAA's TMR and equity beta estimate of HAL²² (6.25% and 1.10 respectively) the post-tax cost of equity would be 6.77%. Alternatively, if the CAA used the CC's ERP estimate (4.75%) and the CAA's TMR and equity beta estimate for HAL, the post-tax cost of equity would be 6.74%. The proximity of these estimates (6.77% and 6.74%) and CAA's estimate of the post-tax cost of equity for HAL of 6.84% leads the CAA to conclude that, consistent with its view in the final proposals, once the TMR is set, the cost of equity is not significantly affected by the choice of RFR (within a reasonable range).

Beta and equity risk

Final proposals

- 6.28 The CAA considered demand risk (also called traffic risk or volume risk) is a systematic risk and that airport operators are exposed to demand risk in a way that water and energy are not. All other risks being equal, the CAA considers that airport operator betas should be higher than those of revenue capped regulated companies, which face little or no volume risk. The CAA also considered that HAL and GAL's resilient performance in economic downturn during Q5 demonstrated the limited effect of downside risks.
- 6.29 The final proposals also noted that there was no double-counting of risk in the cost of capital and the shocked traffic forecasts.
- 6.30 The final proposals included asset betas of 0.50 for HAL and 0.56 for GAL, which at gearing of 60% and 55% equated to equity betas of 1.10 and 1.13 respectively.²³ This was based on a range of evidence, which examined both the level and the movement of betas, including:
- the average beta estimate of listed airports and airport groups; and

²² The same conclusion is reached if GAL's beta is used.

²³ A debt beta of 0.1 was also assumed and consistent with Q5 and the CC's NIE Provisional Determination.

- the AdP and Fraport betas as an indicator of Charles de Gaulle and Frankfurt airports respectively and therefore as an indicator of HAL and, to a lesser extent, GAL.
- 6.31 The CAA reviewed other sectoral regulators' publications. The CAA calculated from the National Grid Electricity Transmission (NGET) price control that Ofgem used an asset beta of 0.44,²⁴ and ORR's draft determination for Network Rail (assuming no government support) used an asset beta of c0.43²⁵. The CAA's asset beta for HAL (0.50) was 14% higher than NGET and Network Rail and its asset beta for GAL (0.56) was 27% higher than NGET and Network Rail.
- 6.32 The final proposals noted that other evidence on market-to-asset ratios, actual gearing levels, credit rating reports and the CAA's assessment of BA's five investor tests were consistent with its conclusion on the risk of HAL and GAL.
- 6.33 The CAA's initial and final proposals used a tax rate of 20.2% tax for Q6. This represented a simple average of the rates signalled by the Chancellor (21% for 2014/15 followed by 20% in subsequent years). The CAA rejected Oxera's suggestion (on behalf of GAL) that a higher rate should be used to reflect the concept that actual tax is paid on nominal not real equity returns. The CAA considered that 20.2% was consistent with its previous approach and it was not clear, because of trading losses, whether GAL would be paying Corporation Tax in the near future.
- 6.34 Applying the tax rate (20.2%) to the CAA's post-tax cost of equity, the point estimates for the pre-tax cost of equity were 9.2% for HAL and 9.31% for GAL.

Responses

HAL

- 6.35 HAL considered that the CAA had understated the equity beta and the correct beta was 1.35 (final proposals: 1.10) and therefore the cost of equity should be 51bps higher. HAL considered that:

²⁴ To ensure consistency with the CAA proposals, a debt beta of 0.1 was used by the CAA in this calculation.

²⁵ To ensure consistency with the CAA proposals, a debt beta of 0.1 was used by the CAA in this calculation.

- the CAA had failed to take into account HAL's risk relative to other UK utilities;
- PwC and the CAA's comparisons to other European hubs such as AdP and Frankfurt was misleading;
- the CAA had not fully explained its judgement on the appropriate debt assumption and beta of comparator airports; and
- pension risk had a strong systematic element and the CAA had not taken sufficient account of the risks.

6.36 HAL also considered that the CAA should take into account the tax plans of the Her Majesty's Official Opposition Party in setting the appropriate tax rate for Q6.

GAL

6.37 Oxera, on behalf of GAL considered that the proposed asset beta for GAL did not reflect the significant increase in Gatwick's risk. Oxera thought that:

- the CAA had not sufficiently considered the impact of competition on risk;
- the CAA had not sufficiently taken into account its analysis which showed that Q6 systematic risk was 15% to 25% greater than Q5; and that the increase in risk has been greater for GAL than either HAL or Stansted Airport Limited.

6.38 Oxera also reiterated its previous point that the tax rate should be applied to the nominal cost of equity not the real cost of equity and that this increased the WACC.

Airlines

6.39 BA reiterated its view that it considered that HAL's equity beta was less than one (the final proposals assumed 1.10) and that it had seen no evidence to change its view.

6.40 The Heathrow Airline Community²⁶ provided work from RARE Infrastructure which argued that the cost of equity had been overstated because the CAA had increased its estimate of the asset beta since the initial proposals. RARE Infrastructure considered that

²⁶ Virgin's response explicitly supported this work.

airport infrastructure and regulated assets with index-linked revenues and regulatory asset values were attractive assets to a broad range of investors.

- 6.41 In respect of GAL, the ACC considered that neither the CAA nor PwC had taken account of the evidence provided that traffic risks in Q5 were not representative of future risks, because of the one-off effects of the abolition of the Bermuda II agreement.

Discussion of the issues

- 6.42 The CAA has seen no evidence or argument to change its views on the appropriate beta contained in the final proposals. The CAA remains of the view that there has been no material change in risk of HAL and GAL relative to the economy and thus there is no change in the asset beta.
- 6.43 In the final proposals the CAA set out a comparison of its beta assumptions for HAL and GAL with National Grid and Network Rail, and compared its vanilla WACC with those set by other regulators.
- 6.44 The CAA set out various beta estimates for comparative airports. HAL compared volatility of traffic at HAL with Fraport group of airports and AdP group of airports, and found it impossible to see how the CAA could conclude that HAL had a lower asset beta than Fraport and AdP. The CAA notes that its final proposals set out the reasons why it was appropriate to conclude that HAL was lower risk than Fraport and AdP - HAL had strong demand and was operating closer to capacity.
- 6.45 In respect of pensions risk, the final view allows the recovery of pension deficit costs in the operating expenditure (opex) allowance.
- 6.46 HAL considered that the CAA had not been clear as to the appropriate measurement of debt in the gearing assumption used to re-gear betas from comparator airport groups. The WACC annex to the final proposals (paragraph 7.64 et seq) clearly noted the options and expressed the CAA's view on this issue.
- 6.47 Oxera considered that increasing competition had increased the risk of GAL. The CAA has recently undertaken a market power determination and has concluded that GAL has substantial market power and is likely to maintain substantial market power. The CAA considers that it would therefore be inappropriate and inconsistent

with its market power determination to conclude that the beta should be increased because of competition.

- 6.48 GAL also noted that its analysis showed that GAL was riskier than Q5, because its increase in absolute volatility had been greater than the increase in absolute volatility at HAL and STAL. Unfortunately, Oxera did not provide an analysis about how GAL's volatility compares to the economy more widely. The CAA remains unconvinced that Oxera's analysis shows that GAL is more risky compared to the market. The airlines provided evidence showing that some of this absolute volatility was due to one-off events.
- 6.49 BA and CEPA consider that the evidence previously submitted suggested that HAL's equity beta was less than 1. The CAA considers that it is slightly above 1 and its final proposals set out the range of evidence on betas which supported this view.
- 6.50 The CAA notes that it and the CC's Q5 recommendations applied the statutory tax rate to the real cost of equity. The CAA considers that it is not appropriate to take account of the opposition party's tax plans.
- 6.51 On taxation, the CAA considers that a consistent approach is preferred and therefore considers that the statutory tax rate, with no adjustment other than to take into account the policy set out by the government (as far as is known) is appropriate.

Final views

- 6.52 The CAA has considered the issues raised in responses to the final proposals in the round. The CAA considers that the range identified by PwC remains the appropriate range. The appropriate point estimate is a matter of judgement and therefore it is not surprising that some responses to the consultation present argument and evidence to suggest that the cost of equity allowance is too high, while some responses suggest that it is too low.
- 6.53 The CAA's final views are that the appropriate asset beta for HAL is 0.50 and for GAL is 0.56, and these translate into equity betas of 1.10 and 1.13 at 60% and 55% gearing respectively.
- 6.54 The appropriate tax uplift is 20.2% and that this is applied to the real cost of equity.
- 6.55 Combining various assumptions, the CAA concludes that the

appropriate pre-tax cost of equity is 8.58% for HAL and 8.76% for GAL.

CHAPTER 7**Estimating the WACC: conclusions**

Point in the range**Final proposals**

- 7.1 The CAA considered that the appropriate point estimate for the WACC from the overall range was ultimately a matter of judgement. The CAA set out the multi-step process that it followed. The CAA also noted that the concepts that guide that judgement are often qualitative in nature.
- Whether the best estimate was the mid-point or that there was a reason why it might differ to the mid-point.
 - Asymmetry of cost of getting the estimate 'wrong'.
 - The concept that returns earned during the year can be reinvested in order that the WACC is earned for the year. (In effect, a lower return can be given that the WACC in order for the airport operator to earn the required return).
 - The consistency of the CAA's WACC proposals with the credit rating metrics as set out in the final proposals document.
 - The greater flexibility that the licence-based regime introduces.
- 7.2 Considering these concepts, the CAA final proposals concluded that the appropriate point estimates for the cost of capital were:
- 5.6% for HAL. This was 29bps (Q5: 38bps) from the top of the range and represented the 79th percentile (Q5: 77th); and
 - 5.95% for GAL. This was 36bps (Q5: 47bps) from the top of the range and represented the 76th percentile (Q5: 75th).
- 7.3 The CAA considered that the WACC differential between HAL and GAL (35bps) was appropriate because it reflected a better understanding of the relative risks of the two airport operators now that they are under separate ownership. Evidence included market data on:

- the MARs²⁷ (GAL MARs were noticeably lower than HAL);
- a significantly lower level of actual gearing at GAL than HAL; and
- the credit rating assessment of business risks and therefore the credit rating differential of the actual finance.

- 7.4 The final proposals included a comparison to Q5 and noted that the reduction was explained by lower tax rates (c40bps) and lower cost of debt (20bps) and for GAL this was slightly offset by the effect of lower gearing (8bps).
- 7.5 To facilitate comparison to other sectors the final proposals translated the pre-tax WACC into vanilla WACCs of 4.85% (HAL) and 5.10% (GAL). The CAA also had to make slight adjustments to some of the other regulator's WACC to bring them onto a comparable basis. On this basis, the final proposals noted that the differences in the WACCs were consistent with the CAA's understanding of the differences in the risks between the regulated industries. For example HAL's vanilla WACC was 40bps greater than NGET and GAL was 88bps greater than NGET.

Stakeholder views

HAL

- 7.6 HAL focused its comments on the components of the WACC calculation. NERA on behalf of HAL noted that selecting the mid-point ignored the asymmetric effects of getting the WACC estimate wrong and ignores the asymmetric beta risks.

GAL

- 7.7 GAL focused its comments on the components of the WACC calculation.
- 7.8 Oxera, on behalf of GAL noted that the CAA used a point estimate for the total equity market return (6.75%) that was broadly consistent with the CC's Q5 final determination for GAL, where the point estimate was at the 85th percentile, and the CC's final determination for Bristol Water, where the point estimate was at the top of the range. Oxera noted that in these determinations, the CC justified point estimates above the mid-point by a combination of capital market volatility and

²⁷ Market-to-asset ratios. These show the ratio of market value to the value of the RAB.

the costs of under investment in airports—both factors that Oxera thought still apply to GAL today. Oxera also noted that in the provisional determination for NIE, the CC had not explained why it had departed from its own precedent of selecting a point estimate at or near the top of the range. Oxera noted that it may be because NIE was considered a low risk utility compared with a higher risk airport, as Oxera considered was suggested by the following quotation from the CC report: 'Our cost of equity for NIE is towards the lower end of the range of the CC's recommended cost of equity for the airports, reflecting the lower risk that utility companies face compared with airports.'²⁸ Given the higher risk of airports relative to traditional utilities, Oxera saw no reason for the CAA to depart from the precedent of choosing a WACC point estimate towards the top end of the CAA's range.

Airlines

- 7.9 BA was critical of the CAA's choice of point estimate from the range. BA consider that the CAA had:
- not given proper consideration to the evidence placed before it;
 - not presented rationale backed by evidence for its point estimate; and
 - inadvertently and erroneously chosen a point outside of PwC's range (because of the different inflation assumptions).
- 7.10 The Heathrow Airline Community²⁹ provided work carried out by RARE Infrastructure which argued that the CAA had not taken time to examine what the developments in capital markets meant for what an appropriate return was for an asset like HAL. The impact of lower bond yields and other capital market developments was having a far larger impact on decisions by Ofgem and Ofwat without any detrimental impact on the supply of capital.
- 7.11 Virgin also noted the announcements³⁰ by both HAL and Ferrovial,

²⁸ Competition Commission (2013), 'Northern Ireland Electricity Limited Price Determination—provisional determination', 8 November, para. 13.179

²⁹ Virgin's response explicitly supported this work.

³⁰ <http://www.telegraph.co.uk/finance/newsbysector/transport/10397806/Ferrovial-sells-Heathrow-stake-to-UK-pension-fund-for-392m.html>
<http://www.telegraph.co.uk/finance/newsbysector/transport/10410323/Heathrow-boosts-profits->

which it considered provided clear empirical evidence that equity investors see value in HAL at the return set in the initial price proposal, let alone the more benign final proposal, and will continue to invest through Q6.

- 7.12 The ACC did not support the CAA's proposal to select a point 76% along the range for GAL. The ACC considered that selecting a point high in a range compounds uncertainties and possible errors within each constituent range and also illogically assumes that many of the numbers could be wrong in the same direction at the same time, without considering whether some of these would be likely to balance.
- 7.13 The ACC also considered that the CAA was inconsistent with approaches taken by other regulators and ignored the CAA's stated intention to make no reduction for the reinvestment of returns by GAL, but to take this into account when selecting the point in the range. ACC noted that the CAA asserted that the cost of underestimating WACC was very much greater than the costs to passengers of over estimating WACC and implied that the best estimate might be above the mid-points of constituent range, but no further detail is given to explain this.
- 7.14 The ACC disagreed strongly with the CAA statement that the decision on the WACC is 'ultimately a matter of judgement' and considered that the CAA had not justified its proposal, which appeared arbitrary.
- 7.15 The ACC considered that the CAA's Q6 approach was also inconsistent with the specific circumstances of the Q5 review where the future growth in the size of the RAB was larger (33% growth over Q5 compared to 3% for Q6): investment in Q5 was clearly more important and strategic and the consequences of getting it wrong were now much less significant. In Q5, the CAA had already made what was then a relatively large change in WACC.

CC's NIE Provisional Determination

- 7.16 The CC's NIE provisional determination concluded that the possible range for the vanilla WACC was 3.6% to 4.5%. The CC concluded that the value was unlikely to lie at the very top or the very bottom of

[at-Ferrovial.html](#)

<http://mediacentre.heathrowairport.com/Press-releases/Heathrow-SP-Limited-Results-for-the-nine-months-ended-30-September-2013-6ce.aspx>

this range. Furthermore the CC considered that the lower bound for its TMR was less well supported by evidence as the upper end of its TMR. The CC narrowed its range to give a plausible range for the vanilla WACC was 3.9 to 4.3%. The CC then chose the mid-point of the plausible range as its point estimate for the vanilla WACC (4.1%). When the point estimate is compared to the initial range (3.6% to 4.5%) the CC's point estimate reflects the 55th percentile.

- 7.17 The CC's approach of taking the mid-point of the plausible range for NIE is in contrast to previous CC reports on HAL, GAL, StAL and Bristol Water which used point estimates in the top quartile including the very top of the range.

Discussion of the issues

Summary of range

- 7.18 The estimate of the cost of capital is ultimately a matter of judgement. Some responses described differences in judgements between the consultee and the CAA to be errors. The CAA has considered a range of evidence and therefore made judgements about both individual components and the overall WACC. Those judgements have been set out in this document and previous consultations in this review.
- 7.19 The discussion in the previous chapters supports the CAA's view that, other than the top of the TMR range, the range for the WACC that was presented in the final proposals remains the appropriate range.

Figure 7.1: Summary of CAA's range

%	HAL		GAL	
	final proposals range	Final view point estimate	final proposals range	Final view point estimate
Gearing	60	60	55	55
Pre-tax cost of debt	2.78 - 3.45	3.20	2.95 - 3.58	3.20
Total market return ³¹	6.25 - 6.75	6.25	6.25 - 6.75	6.25
Risk-free rate	0.50 - 1.00	0.50	0.50 - 1.00	0.50
Equity risk premium	5.75	5.75	5.75	5.75
Asset beta (number)	0.42 - 0.52	0.50	0.46 - 0.58	0.56
Equity beta (number)	0.90 - 1.15	1.10	0.90 - 1.17	1.13
Post-tax cost of equity	5.68 - 7.61	6.84	5.68 - 7.71	6.99
Tax rate	20.2	20.2	20.2	20.2
Pre-tax cost of equity	7.11 - 9.54	8.58	7.11 - 9.66	8.76
Pre-tax WACC	4.51 - 5.89	5.35	4.82 - 6.31	5.70
Vanilla WACC	3.94 - 5.12	4.66	4.18 - 5.44	4.90

Source CAA analysis

- 7.20 Combining all the point estimates of the components set out in the preceding chapters, the pre-tax WACC is 5.35% for HAL and 5.7% for GAL.
- 7.21 Compared to the final proposals, the CAA has made one adjustment to reduce the TMR by 50bps. This adjustment reduces the pre-tax WACC for both HAL and GAL by 25bps.
- 7.22 The CAA's point estimate for HAL represents the 61st percentile in the range. The CAA's point estimate for GAL represents the 59th percentile in the range.

³¹ The TMR range stated is that based on PwC's advice. As noted in chapter 6, the CC suggests that the TMR is not above 6.5%. For consistency the range in the table is the same as set out in the final proposals.

- The equivalent percentiles in the final proposals were 79th percentile (HAL) and 76th percentile (GAL).
- The equivalent percentiles for Q5 were 77th percentile (HAL) and 75th percentile (GAL).³²
- The CAA notes that the CC point estimate for its NIE vanilla WACC represented the 55th percentile of its initial range.

7.23 The CAA considers that the point estimates from the range better reflect the ARR and place the appropriate emphasis on the asymmetric consequences of getting the WACC wrong without undue weight. The CAA considers that its conclusions address the airlines concerns in this respect.

Figure 7.2: Comparison of final views to Q5 decision

%	HAL	HAL	GAL	GAL
Q5 decision - headline WACC	6.20		6.50	
Q5 decision - ARR (effective WACC)		6.01		6.30
Reduction in Corporation Tax	(0.40)	(0.40)	(0.43)	(0.43)
Reduction in cost of debt	*(0.20)	(0.17)	*(0.20)	(0.17)
Reduction in GAL gearing	n/a	n/a	0.08	0.08
Reduction in cost of equity	*(0.25)	(0.09)	*(0.25)	(0.09)
Q6 final views	5.35	5.35	5.70	5.70

The effect of the ARR is included in the estimates of the changes in these components

Source: CAA analysis

7.24 The comparison to Q5 is complicated because the headline WACC of 6.2% (HAL) and 6.5% (GAL) was not applied to the RAB to calculate the price cap. Instead a lower rate, also called the ARR, of 6.01% (HAL) and 6.3% (GAL) was applied. Compared to the Q5 ARR, the Q6 final views are 66bps lower for HAL and 60bps lower for GAL.

7.25 Figure 7.2 shows how the CAA's final view relates to Q5. Focussing on the comparison of the effective Q5 WACC with the Q6 final views, the reduction in WACC is due to:

- reduction in corporate tax rates (c40bps);

³² The Q5 comparative percentiles are calculated on the basis of the ARR's of 6.01% (HAL) and 6.3% (GAL).

- reduction in the cost of debt due to lower market yields (17bps);
- a reduction in the cost of equity and specifically the TMR assumption (9bps); and
- for GAL the reduction in gearing (8bps increase in the WACC).

Comparison to other sectors

7.26 The CAA's final views for a pre-tax WACC of HAL and GAL are 5.35% and 5.70% respectively. These translate into vanilla WACCs of 4.66% and 4.90% respectively. The CAA has calculated the appropriate values for the comparators to its final views.

7.27 In the following table, WACCs from other sectors are presented. To facilitate the comparison

- the WACCs are on a 'vanilla' basis (ie excluding taxation); and
- where the regulator uses the ARR (NERL and CC in respect of NIE), or equivalent adjustments (Ofgem and ORR) the values shown in the table have been adjusted to reflect the effective rate applied to a simple average of opening and closing RAB. Therefore the values in the table may differ to the 'headline' WACCs quoted in other sectors.

Figure 7.3: Comparison of CAA's final views to other regulated sectors' vanilla, adjusted WACCs

Regulator	Sector	Status	Date of decision	Appropriate comparative
Ofwat	Wholesale water	Business plans	2013	4.00-4.50%
Ofgem	WDP - Elect Dist	Fast-track business plan	2013	4.02%
CC	Northern Ireland Elect.	Prov. Determination	2013	4.02%
Ofgem	Gas Distribution	Determination	2012	4.11%
ORR	Network Rail	Determination	2013	4.22%
Ofgem	Gas Transmission	Determination	2012	4.30%
Ofgem	Elect. Trans., National Grid	Determination	2012	4.45%
Ofgem	Electricity Distribution	Determination	2009	4.59%
Ofcom	MCT	Determination	2011	4.60%
CAA	HAL	Final View	2014	4.66%
Ofgem	Elect. Trans., Scottish	Determination	2012	4.68%
Ofcom	Openreach	View	2013	4.90%
CAA	GAL	Final View	2014	4.90%
Ofwat	WASC	Determination	2010	5.10%
CAA	NERL	Determination	2010	5.54%
Ofcom	Rest of BT (not price controlled)	View	2013	5.70%

Note Ofgem: This is the lower figure after an adjustment is made by Ofgem equivalent to the ARR. In the excel models used by Ofgem to calculate the price controls, the closing RAB each year is discounted by the WACC, before applying the WACC to the simple average of the opening and adjusted closing RAB. Ofgem describe this as the NPV-neutral RAB base. For example see rows 13 to 32 of the RAV&Return sheet found at the following link http://www.ofgem.gov.uk/Networks/Trans/PriceControls/RIIO-T1/ConRes/Documents1/RIIO_ET1_FP_FinancialModel_dec12.xlsm.

Note CC: Although not explicitly stated in the CC's Provisional Determination, it appears that the CC did use the ARR as noted in one of the responses to the Provisional findings. <http://www.competition-commission.org.uk/assets/competitioncommission/docs/2013/northern-ireland-electricity-price-determination/hastings.pdf>

Note: ORR: The value shown is the semi annual WACC used by ORR which is the same as the ARR

Note CAA NERL: This is the vanilla ARR.

Source: CAA Analysis

- 7.28 In addition to the CC's NIE provisional determination, the general direction of regulatory decisions and/or views continues to support the view that the WACC has reduced over recent years.
- 7.29 In November 2013, Ofgem assessed the Electricity Distribution plans against a cost of equity (6.3%), rather than a WACC because the cost of debt calculated by its indexation model is exogenous to the plans and assessment. The latest value calculated by Ofgem's indexation model for the cost of debt is 2.72% and combining this with the cost of equity of 6.3% and gearing of 65% equates to a headline WACC of 4.0% (equivalent to an ARR of 3.9%). The fast-tracked business plan of Western Power Distribution (WPD) used a vanilla WACC of 4.1% (equivalent to an ARR: 4.02%).³³ The previous electricity distribution control period Ofgem used an effective vanilla WACC of 4.59%.
- 7.30 The values quoted for the 2012 Ofgem decisions include the cost of debt as calculated by its indexation model at the time of the decision (2.92%). As noted above, Ofgem's indexation model now calculates the cost of debt of 2.72%, and if this value was used in the 2012 WACCs they would have been c13bps lower than those quoted in the table.
- 7.31 Water and sewerage companies' business plans for PR14 use vanilla WACCs in the range of 4 - 4.5% and are significantly below Ofwat's previous decision for PR09 of 5.10%. Although Ofwat has not yet published a WACC number, comments from Ofwat suggest that the vanilla WACC is likely to be at the lower end or below the rates used in the business plans. For example:
- In a speech on 13 November 2013 to 'Water 2013' Sonia Brown, Chief Regulation Officer of Ofwat noted that the 'Cost of capital will fall [for the next control period compared to the current control period] - when companies put forward their proposals for the cost of capital in their business; there is a real opportunity for this number to start with a 3.'³⁴

33 <https://www.ofgem.gov.uk/ofgem-publications/84945/assessmentoftherio-ed1businessplans.pdf>

34 http://www.ofwat.gov.uk/mediacentre/speeches/prs_spe20131113water2013sbrown.pdf

- In an announcement on 19 December 2013 Ofwat stated that 'Ofwat's initial testing of companies' views on risk and reward has shown that they are not in alignment with market evidence for the water sector'.³⁵

- 7.32 The ORR's final determination confirmed its draft determination in respect of the WACC. In its determination the ORR assumed a headline vanilla WACC of 4.31%. However, it used a lower 'semi-annual' vanilla WACC of 4.22% to reflect the concept that returns can be reinvested. (The previous control period vanilla WACC was 4.75%).
- 7.33 The CAA's work on NERL's price control is on-going and the CAA has not yet expressed a view on the appropriate WACC for the next control period (2015 to 2019).
- 7.34 These examples of regulatory vanilla WACCs suggest that regulators have or are expect to reduce the vanilla WACC by around 40bps and 100bps (possibly more). While it would be incorrect simply to apply the reductions seen in other sectors to the Q5 WACC in order to estimate the Q6 WACC, the CAA's reduction in the vanilla WACC of 25bps for HAL and 21bps³⁶ for GAL is less than that seen in other sectors.
- 7.35 The CAA's final view on the WACCs for HAL and GAL is consistent with all recent evidence from other UK regulated utilities and the CAA's understanding of the risk and price control design of these industries.

Acquisition by USS of shareholding in Heathrow

- 7.36 On 24 October 2013 Universities Superannuation Scheme (USS) acquired from Ferrovial equity shares which equated to 8.65% of the share capital of FGP Topco Limited, the holding company which owns Heathrow Airport Holdings Limited and the ultimate parent company of HAL.

HAL

- 7.37 HAL noted that its shareholders have repeatedly stated that the CAA's

³⁵ http://www.ofwat.gov.uk/mediacentre/ibulletins/prs_ib2813pr14changes

³⁶ For a consistent comparison, the Q5 vanilla WACCs were reduced to the ARR before being compared to the Q6 vanilla WACCs.

proposals on WACC were inadequate. HAL also stated that while the acquisition by USS was a signal of confidence in the long-term future of the airport, it could not be read as an indication that the CAA's final proposals for Q6 were appropriate.

- 7.38 HAL also quoted USS that said 'while the CAA's proposals are very challenging, USS is investing for the long term. We have confidence that the right incentives will be set in place to encourage the investment that Heathrow and the UK need'. HAL noted that as well as a buyer of shares there was also a seller in that transaction which crystallised inadequate Q5 returns and that the transaction brought no new equity to the group.
- 7.39 HAL considered that it was generally accepted that the cost of capital of large pension funds like USS was lower than the cost of capital of other types of investors. On that basis, HAL considered that the recent transaction could not be regarded as a confirmation that the WACC proposed by the CAA provides an adequate return to all types of equity investors.

Heathrow Airline Community

- 7.40 The Heathrow Airline Community response quoted broker estimates that the acquisition equated to a premium of 14% to 15% to regulatory asset value.
- 7.41 The response also noted that there had been a substantial growth in demand for regulated inflation-protected assets like HAL, and this had been the driver for the growth of infrastructure funds and infrastructure as an asset class. The Heathrow Airline Community noted that:
- Preqin (2013) showed that infrastructure assets under management in unlisted funds doubled from €26bn in 2009 to €54bn in December 2012 and that these funds currently had €24bn of committed funds yet to be invested.
 - European focused unlisted funds have raised €9bn so far in 2013.
 - There were many and increasing numbers of investors with similar investment requirements to USS.
 - The ultimate investors in these assets have similar risk-return requirements, and would look at HAL as a long-term investment as USS had.

Discussion of the issues

- 7.42 PwC has estimated that USS's acquisition equated to a premium of 10% to the HAL RAB. Other estimates have been in the range 13 to 15%.
- 7.43 Consistent with the final proposals the CAA sees value in examining market evidence such as this in the absence of publicly listed and traded equities. However, as previously noted the CAA is cautious when placing weight on this evidence.
- 7.44 The CAA considers that the premium paid by USS suggests that there are investors who are willing to invest in airport operators such as HAL at the proposed price cap (including the WACC assumption) set out in the initial and final proposals (regardless of whether or not USS is investing in HAL for the long term). The USS acquisition and HAL's ability to issue long-dated debt at market rates shortly after the CAA's final proposals supports the CAA's views that the price cap proposals are financeable for HAL.
- 7.45 The CAA notes HAL's views that the cost of capital for pension funds such as USS is lower than other types of investors. However, the CAA has assessed the risk and, therefore, the appropriate return for HAL independently of its ownership.³⁷ Different investors may have different risk/return preferences, but this does not alter the risk of the underlying asset (HAL). In fact, USS's investment confirms HAL is a low risk asset because it is attractive to those investors seeking such assets (and, by definition, requiring lower returns).

Overall conclusion

- 7.46 While the CAA has built up its estimates of the WACC by assessing individual components it has also assessed the overall WACC by comparing it to other sectors, understanding where in the range of the WACC the point estimate is and understanding recent corporate finance transactions involving HAL and GAL.
- 7.47 There is no single correct answer for the value of the WACC. The CAA considers that its point estimate for the WACC is within a plausible and reasonable range. The CAA acknowledges that there are arguments to suggest that the appropriate value for individual components may be higher or lower than the point estimates for

³⁷ This approach is common across regulators.

individual components chosen by the CAA, but that in the round the WACC estimates of 5.35% for HAL and 5.7% for GAL appropriately balance these arguments.