



Cost of Debt Indexation
A Report for Heathrow Airport Ltd
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Executive Summary

In a recent paper submitted to the CAA prepared by CEPA, BA proposes that CAA adopts a cost of debt indexation to compensate HAL for its debt costs over the next regulatory period (Q6). According to the CEPA paper, a cost of debt indexation is preferable to setting a fixed ex ante cost of debt allowance (the current approach) since indexation can ensure that the debt allowance tracks efficient costs, and thereby reduces the risk that HAL over-recovers efficient debt costs, and consumers pay too much.

In this paper, we show that CEPA's approach to indexation is flawed and will not track efficiently incurred debt costs. We have set out our preferred approach to indexation which corrects for the identified flaws. However, it is not clear that even a well-designed indexation approach is preferable to the current ex ante approach to setting debt cost allowances for HAL, given that HAL's debt costs do not clearly track an index due to airport specific risks. In addition an indexation approach may blunt incentives to minimise debt costs (economic efficiency), and will increase regulatory costs.

CEPA's Index Will Not Track Efficient Debt Costs

CEPA's proposed indexation mechanism for HAL largely draws on the indexation mechanism introduced by Ofgem at RIIO-T1/GD1, which set allowed revenues for transmission and gas distribution companies for the period 2013-2021. Our review of CEPA's proposals show that its proposed indexation method, if implemented, would not result in allowed debt costs tracking efficiently incurred debt costs, with greater risk to HAL of under-recovery of debt costs. In particular, we have identified the following shortcomings with the CEPA index:

- *CEPA's proposed benchmark index does not compensate HAL's for its historical debt issuance costs.* Our analysis shows that between 2008 and 2012, HAL issued sterling bonds at an average premium of 80 basis points relative to CEPA's proposed iBoxx benchmark index. There are a number of factors that explain this premium: (I) CEPA's index comprises debt with a shorter maturity on average than HAL's average maturity; (II) the greater financing costs for HAL during the financial crisis relative to safe-haven debt; and more generally, (III) the greater (beta) risk associated with airport debt relative to the other industries in the index, e.g. lower risk utility debt.¹ In short, CEPA's proposed index would result in HAL under-recovering its historic debt costs.
- *CEPA's proposed use of a simple (i.e. unweighted) 10-year trailing average of the benchmark index fails to reflect HAL's actual debt issuance profile.* HAL's debt issuance is largely driven by mandatory capex, and refinancing requirements. HAL's debt issuance is also necessarily lumpy to meet the minimum size for efficient bond issuance. By contrast, CEPA's proposed index based on a 10 year trailing average assumes that HAL issues debt in equal annual increments with a ten-year maturity. CEPA's simplified

¹ We note that Europe Economics argues that shocks affecting HAL have been more frequent and substantial in recent years, HAL has become capacity constrained implying greater skewness in its returns, and that it is becoming more dependent on one large customer. Europe Economics assumes a debt beta of 0 or 0.1, indicating the possibility for a non-zero debt beta for airports. Source: Europe Economics (February 2012): "Heathrow Airport's Cost of Capital – A report on behalf of Heathrow", p10, p80.

approach risks penalising (or rewarding) HAL for debt issuance timing that lies largely outside management control.²

- CEPA’s use of 10 year breakeven inflation to calculate the real benchmark cost of debt from the observed nominal cost of debt exposes HAL to outturn inflation risk (actual inflation being different than inflation expectations at time of issue).
- The debt index does not compensate HAL for transaction or liquidity costs.

For these reasons, we do not consider that CEPA’s proposed index will track HAL’s efficiently incurred debt costs, and does not meet its stated objective.

Our Well Designed Index Should Ensure Allowances Track Costs

In Chapter 3 of this report, we have set out our proposals for an indexation mechanism which would more closely track HAL’s efficiently incurred debt costs. Specifically, we propose that the use of iBoxx index based on 10-15 year maturity to more closely match the maturity of HAL’s historical debt issuance. We also propose that the index is a weighted average of all years where HAL has outstanding debt issuance, where the weights are based on actual outstanding debt issuance in year over total debt issuance. Our approach will ensure that HAL is not penalised (or rewarded) for the timing of its debt issuance.

In addition, we also propose an additional uplift of at least 60 bps to our proposed benchmark index to reflect the historical debt issuance premium associated with HAL debt relative to the lower (beta) risk debt incorporated within the index, as well as an allowance to allow HAL to recover transaction and liquidity costs associated with debt finance. HAL estimate total transaction costs to be 32-38 bps, and liquidity around 17-20 bps.³

We also propose that the nominal index value is deflated by outturn RPI (from the previous regulatory year) to derive the real allowance, using the same RPI value used to index the regulated asset base. The use of outturn RPI will ensure that HAL’s investors recover their efficient nominal debt costs, and will not face the risk that breakeven inflation (nominal minus real yields on government debt) deviates from actual inflation for prolonged periods.

Overall, our proposed approach to indexation will result in the debt allowance more closely tracking HAL’s efficiently incurred debt costs relative to CEPA’s approach.

Table 1 contrasts our proposed indexation method with CEPA’s proposals.

² The CC has stated that debt timing issuance lies outside of companies’ control. The CC states: “*one of the main factors affecting the cost of fixed-rate debt is the time it was taken out, and interest rates fluctuate over time. As debt issuance may be affected by company-specific factors (for instance, the timing of capex) and the cost of fixed-rate debt is affected by unpredictable changes in interest rates, there may be a danger [that failure to take into account timing of debt issuance] penalising companies that need to borrow at times of high interest rates.*” Competition Commission (2010) Bristol Water, Appendix, p10. http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep_pub/reports/2010/fulltext/558_appendices.pdf

³ Heathrow Airport Limited (25th June 2013): “Response to CAA Initial Proposals”, Appendix 2, p124.

Table 1
CEPA vs. NERA Proposed Debt Indexation Method

Issue	CEPA Proposal	NERA
Debt index	iBoxx 3-5Y/7-10Y/15+Y (Average of three series)	iBoxx 10-15 year
Credit rating	Broad A/Broad BBB (Average of two series)	Broad A/Broad BBB (Average of two series) – assuming consistent with regulatory WACC assumption
Uplift to series to reflect higher (beta) risk	None	At least 60 bps
Averaging period	10 year simple trailing average	Weighted average of all years where there is outstanding debt issuance, where weighted based on outstanding debt in year over total debt
Deflation	10yr breakeven inflation	Outturn RPI (as used to inflate RCV)
Debt transaction and liquidity costs	None	HAL estimates: Transaction 32-38 bps Liquidity 17-20 bps.

Source: CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6, Heathrow Airport Ltd (June 2013): Response to CAA Initial Proposals, Appendix 2, p124.

An Indexation Method Is Not Clearly Preferable to an Ex Ante Approach

The current approach to compensating for HAL’s debt costs – based on an ex ante allowance – provides powerful incentives for HAL to minimise its debt costs, as HAL retains any out or under performance for the period of the review. The current approach also has positive sharing properties as out or under-performance against the ex ante allowance is passed through to customers at the subsequent review period, in line with the treatment of other regulatory costs, e.g. operating costs. The current approach also involves minimal regulatory costs. We note that in recent methodology statement for setting prices in 2014, Ofwat rejected a move to debt indexation, based on PwC’s advice who stated:

“Consistent with the core principles of incentive based regulation, our view is that regulated companies are best placed to manage finance related risks (including changes in the market cost of debt) and any shift to allocate more risks to customers is counter to the current direction of Ofwat’s regulatory policy where companies take more ownership for delivering outcomes and managing risks.”⁴

⁴ PwC “Cost of capital for PR14: Methodological considerations”, July 1013.

In summary, an ex ante approach to setting debt cost allowances scores well on efficiency, equity (or sharing) and regulatory cost criteria. For these reasons, it is not surprising that an ex ante approach is the common approach to compensating for debt cost in incentive based regulatory regimes.

By contrast, as set out above, CEPA's proposed indexation approach will not necessarily result in HAL's allowed debt costs tracking actual debt costs, and therefore does not score well on equity or sharing criteria relative to an ex ante approach. In particular, CEPA's approach to weighting will penalise (or reward) HAL for its historical and future debt timing, and also fails to compensate HAL for its higher debt risk relative to the debt included in the index.

We have set out a proposed indexation approach which corrects for the flaws we have identified with CEPA's approach, and should provide a reasonable expectation that HAL will recover its efficient debt costs but no more.

However, even our preferred indexation mechanism is not clearly preferable to an ex ante approach. As noted in this paper, an indexation approach may result in companies issuing debt to track the index to minimise the variance in allowed relative to actual debt costs, as opposed to minimising debt costs. Thus, indexation could result in higher debt costs overall relative to an ex ante approach to setting debt allowances, a point noted strongly by energy networks in their submissions to the RIIO-T1/GD1 processes.

In addition, the introduction of a well-designed debt indexation mechanism involves higher regulatory costs relative to the current approach. In the context of RIIO-T1/GD1, the introduction of debt indexation necessitated the development of a financial model (incorporated within the licence) to recalculate allowed revenues on annual basis. As a measure of the regulatory cost, the RIIO-GD1 financial model handbook runs to 54 pages, and the associated special licence conditions 40 pages.⁵

Overall, a well designed mechanism could result in earlier/fuller sharing of debt out or under performance with customers, but this benefit could come at the cost of blunted incentives to minimise debt costs, and higher regulatory costs.

⁵ Ofgem (2013): "GD1 Price Control Financial Handbook", Ofgem (2013): "Standard Special Conditions Applicable To All DN Licensees – Part D".

Table 2
Cost of Debt Indexation Is Not Clearly Preferable to Ex Ante Approach

Approach	Evaluation criteria:		
	Incentive to minimise debt costs (economic efficiency)	Out/underperformance shared with customers (equity)	Regulatory costs
Ex-ante approach	High-powered incentive to minimise debt costs	HAL actual debt costs passed-through at review	Simplest approach
CEPA indexation	Risk companies issue debt to track index rather than minimise debt costs	Index will not track efficient debt costs. Risk of under or over recovery, although greater risk to HAL investors	More complex process for annual update of annual revenues
NERA well-designed index	As above.	Efficient debt costs passed through to customers within year	As above

Source: NERA analysis

Final Comment

Although it has not been the purpose of this report to review the CAA’s analysis of WACC proposals for Q6, our analysis has shown that there is a clear difference between average debt costs for HAL and average debt costs for the A/BBB iBoxx index over the period since 2008. This appears to be based on evidence that shows HAL debt is more risky in periods of high market volatility / financial crisis due the impact of such events on air traffic. This is reflected in our proposal for an uplift of at least 60 bps to the series to reflect higher HAL risk.

This evidence does therefore further undermine the PwC cost of debt assumption for HAL in its report for the CAA, which is based on A/BBB debt.⁶

⁶ PwC (April 2013): “Estimating the cost of capital in Q6 for Heathrow, Gatwick and Stansted – A report prepared for the Civil Aviation Authority (CAA)”, p31.

1. Introduction

Heathrow Airport Ltd (HAL) has asked NERA to explore a number of issues in relation to the design of a cost of debt indexation mechanism for airports.

The standard approach to setting allowed cost of debt as part of the allowed rate of return for UK regulated companies has long been determining an ex-ante fixed allowance for the duration of the regulatory price control period. This approach incentivises companies to minimise debt costs and optimise financial structure (gearing). However some UK regulators have recently expressed concern about companies' outperformance of financial assumptions, and promoted new arrangements which ensure the sharing of both gains and losses resulting from external factors with customers. For example, Ofgem introduced a cost of debt indexation mechanism as part of its recent gas and electricity transmission (RIIO-T1) and gas distribution network (RIIO-GD1) price controls.⁷

The adoption of an annual cost of debt indexation mechanism leads to an annual pass-through of changes in market debt costs (which are largely outside the companies' control) to customers as opposed to the cost of debt allowance being reset at each review only. However, the indexation method needs to be carefully designed to ensure that allowed debt costs do in fact track actual (efficient) company debt costs.

This report discusses the pitfalls and possible advantages of introducing debt indexation in the UK airport sector. It is structured as follows:

- Section 2 provides a review of the CEPA paper on cost of debt indexation for HAL. We highlight the shortcomings of CEPA's proposals which, if implemented, create a risk that HAL would not fully recover its efficiently incurred debt costs in the future;
- Section 3 discusses more general design issues associated with developing cost of debt indexation mechanisms for airports and develop an alternative methodology which addresses the shortcomings identified in CEPA's paper; and
- Section 4 sets out the practical challenges with implementing a cost of debt indexation mechanism for airports.

⁷ Ofgem (March 2011): Decision on the strategy for the next transmission and distribution price controls – RIIO-T1 and GD-1 Financial issues.

2. Review of CEPA Proposals

2.1. CEPA Proposals

In its recent paper “*Note on a Cost of Debt Indexation approach for Q6*”⁸ prepared for BA, CEPA proposes that the CAA should adopt debt indexation to set the cost of debt component of the allowed rate or return (ARoR) for airports in Q6. CEPA considers that debt indexation is preferable to setting an ex-ante fixed allowance, since indexation can reduce the risks faced by both airports and consumers.

CEPA proposes a cost of debt indexation mechanism inspired largely by Ofgem, who introduced cost of debt indexation in its recent gas and electricity transmission (RIIO-T1) and gas distribution (RIIO-GD1) price controls (2013-2021).⁹ For every company Ofgem sets the cost of debt in each year equal to the same 10-year trailing average of the yields on the benchmark index.¹⁰ The benchmark is defined as a simple average of the iBoxx index for GBP Non-Financials of 10+ year maturity with broad A and BBB ratings. Ofgem deflates the daily yields using 10-year breakeven inflation data from the Bank of England on the corresponding day; thereby rolling a 10Y average of inflation expectations into the 10Y trailing average. No adjustments are allowed for issuance costs, new issuance and inflation risk premiums. The indexed cost of debt allowance is updated annually and allowed tariffs are adjusted accordingly every year.

In its paper, CEPA notes that Ofgem’s debt indexation mechanism needs to be adjusted to reflect the specific case of airports. CEPA’s proposals for HAL are summarised in Table 2.1.

Table 2.1
CEPA Proposals for Debt Indexation for Airports

Issue	CEPA Proposal
Tenure of debt	3-5Y/7-10Y/15+Y (Average of three series)
Data source	iBoxx
Credit rating	Broad A/Broad BBB (Average of two series)
Averaging period	10 year
Deflation	10yr breakeven inflation
Uplifts (transaction costs)	None
Update Methodology	Annual

Source: CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6.

⁸ CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6.

⁹ Ofgem (March 2011): Decision on the strategy for the next transmission and distribution price controls – RIIO-T1 and GD-1 Financial issues.

¹⁰ The one exemption is Scottish Hydro, a company with a very large capex programme in the next few years for which Ofgem allows a weighted index.

Due to the shorter average maturity of HAL's debt (12.5 years on average) relative to GB energy networks, CEPA proposes to use a shorter maturity benchmark index than Ofgem. Specifically, CEPA proposes to use an average of the iBoxx GBP Non-Financial indices with 3-5Y, 7-10Y and 15Y+ maturity with broad A and broad BBB rating.¹¹ Following Ofgem's approach, CEPA proposes adopting a simple 10-year trailing average of the yields on the benchmark index and deflating the nominal allowance with 10-year breakeven inflation data from the Bank of England. CEPA further proposes not to include any additional allowance for transaction costs and also to update the price caps annually to take account of the changes in the 10-year trailing average of the index.

In the following sub-sections we discuss the shortcomings of CEPA's proposals which, if implemented, would create a significant risk that HAL will not recover its (efficiently) incurred debt costs. This newly created risk lies largely outside of management control. The three key shortcomings of CEPA's approach are:

- CEPA's benchmark index does not accurately reflect HAL's actual debt costs;
- CEPA's index weightings do not reflect HAL's capex and actual issuance profile and;
- CEPA's inflation assumption exposes HAL to outturn inflation risk.

In Section 3, we discuss how these shortcomings can potentially be addressed when designing a suitable debt indexation mechanism for airports.

2.2. CEPA Fails to Assess the Appropriateness of its Benchmark Index

The key shortcoming of CEPA's proposal is that it does not provide any analysis of whether the proposed benchmark index appropriately reflects HAL's actual debt costs. Choosing a benchmark index which is representative of the regulated companies' actual debt costs is the key issue when designing a debt indexation mechanism. Selecting an index which does not appropriately reflect the regulated company's debt costs will result in consistent "under/outperformance" relative to regulatory allowances. However, if the reason for the difference is that the chosen benchmark index does not reflect the characteristics of the company in question the risk of out/underperformance is largely outside of management control.

CEPA does not undertake any detailed comparability analysis but merely makes a high level comment on HAL's debt costs compared to benchmark indices, based on the analysis carried out by PwC in their report on cost of capital¹² commissioned by the CAA:

¹¹ CEPA proposes an average of the three different bond indices as opposed to a single series with maturity matching HAL's average debt costs (the 10-15Y iBoxx series). The 10-15Y iBoxx series shows higher yields than an average of the three iBoxx series, due to the concavity of the yield curve. See details in CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6, p. 6-7. Average maturity of the CEPA three-way average and the 10-15Y iBoxx series are roughly equivalent as the CEPA index gives 2/3 weight to shorter maturities but 1/3 weight to a very long maturity index (15Y+).

¹² PwC (2013): Estimating the cost of capital in Q6 for Heathrow, Gatwick and Stansted.

“PwC’s analysis considers financing for Heathrow against a benchmark with 10-15 years maturity, finding that the airport has been financed at or better than the benchmark yields. Since 2008, bonds have been issued at 5.8% nominal (blended average for Heathrow and Gatwick) compared to the yield on benchmark A and BBB indices with an average of 6.8%.”¹³

This observation does not provide any robust evidence on the comparability of HAL’s debt costs relative to the proposed index.

First, we note that comparing yields at issue (which occur at discrete points in time) with the 5 year average of an index does not reveal whether HAL’s actual issuance costs were above or below the benchmark index *at the time of the issue*. This is especially true when the benchmark index has a strong downward/upward trend.¹⁴ Secondly, the benchmark index PwC uses is not the same index that CEPA proposes for cost of debt indexation for airports in Q6. The pricing of HAL’s debt relative to a *different* index is not relevant for assessing the appropriateness of CEPA’s proposals.¹⁵

We calculate the yields at issue for HAL’s issuances of investment grade sterling denominated bonds and compare it to CEPA’s proposed index, which is different from the index that PwC uses.¹⁶ In practice, we note that a borrower of Heathrow’s size (even under its notional 60% gearing assumption) would likely need to resort to non-sterling markets in order to attract sufficient and liquid demand for its debt issuance.

The results are shown in Figure 2.1.

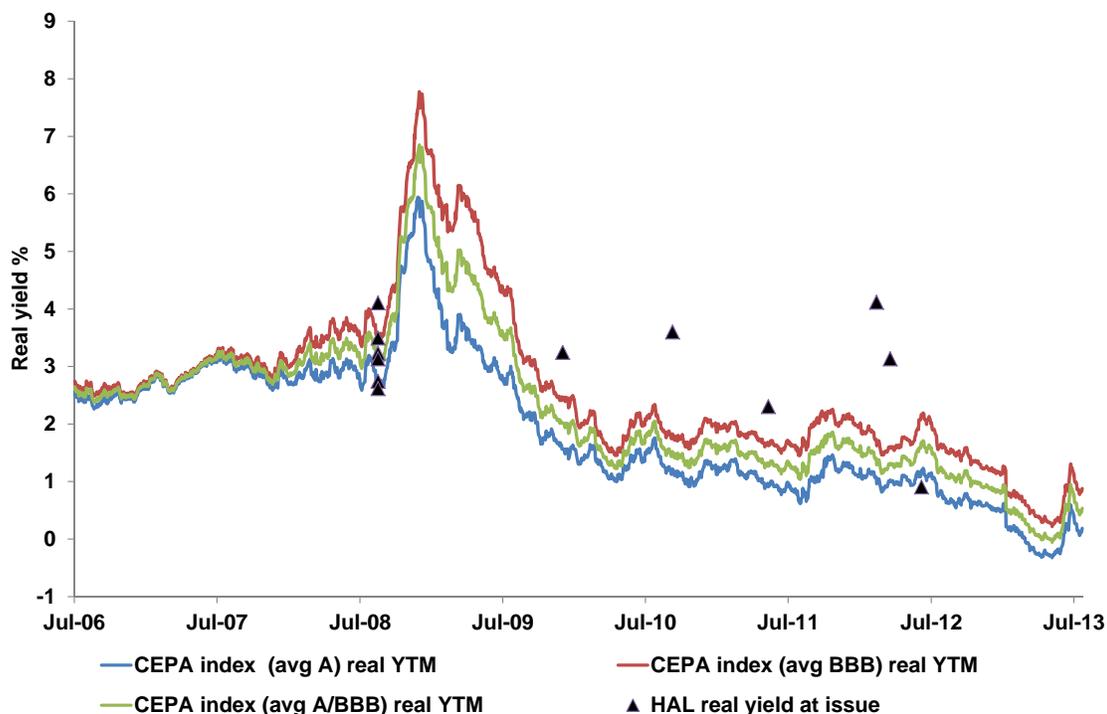
¹³ CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6, p.5.

¹⁴ HAL could consistently issue bonds at yields above the index and its average yield at issue could still be lower than the average value of the index over the last five years, as long as the issuances occurred at a time when the index values were below average and the yields at issue themselves were below the average value of the index at the time of issue.

¹⁵ PwC uses the broad A and broad BBB Bank of America GBP NON-GILTS indices with 10-15Y maturity. The PwC index is a broader index than the CEPA proposed iBoxx one (since it includes all non-gilt bonds, whereas the iBoxx also excludes bonds issued by financial institutions).

¹⁶ We calculate the yield at issue as the coupon for all bonds, except those issued in 2008. For the bonds issued in 2008, we use the traded yield on the first traded day. These bonds were originally issued by BAA plc, and migrated to the ring-fenced entity during the 2008 refinancing. They were legally issued at par by Heathrow Funding in August 2008, but the actual traded yield was determined by the market. We therefore consider the traded yield to be a more accurate reflection of HAL’s debt cost on the date of the transfer to the regulated entity. We note that using the coupons instead of traded yields has no material impact on the size of the issuance spread (49 bps under coupons and 50 bps under traded yields for 2008 bonds).

Figure 2.1
HAL's Historical GBP Yields at Issue relative to CEPA Index



Source: NERA analysis of Bloomberg and Datastream data. Note: Real yields are calculated using the Fisher formula. We use estimates of breakeven inflation from the Bank of England, which approximately match the maturity of the index/bond (we interpolate between BoE’s 5Y, 10Y and 20Y breakeven inflation indices).

Figure 2.1 above shows that most of HAL’s bonds have been issued at higher yields than the CEPA index.¹⁷ The spreads relative to CEPA’s index for each of the bonds as well as additional information on the individual issuances are shown in Table 2.2.

¹⁷ As part of the 2008 re-financing, HAL issued three long dated bonds (with 15 year maturity and larger) at lower yields than the proposed CEPA index. In addition, the 5Y bond issued in 2008 and the 3Y bond issued in 2012 were also issued at yields marginally below the CEPA index, although we note that the maturity of the index is around 10 years longer than these issuances.

Table 2.2
HAL's GBP Yields at Issue relative to CEPA Index

Issue Date	Tenor and Rating	HAL Real Yield at Issue (Traded YTM for 2008 Bonds)	CEPA A Index	CEPA BBB Index	CEPA A/BBB Index	Spread to CEPA index (A/BBB)
18-Aug-2008	5Y A-	4.1%	2.7%	3.5%	3.1%	1.0%
18-Aug-2008	8Y A-	3.5%	2.7%	3.5%	3.1%	0.4%
18-Aug-2008	13Y A-	3.2%	2.7%	3.5%	3.1%	0.1%
18-Aug-2008	15Y A-	3.1%	2.7%	3.5%	3.1%	0.0%
18-Aug-2008	20Y A-	2.7%	2.7%	3.5%	3.1%	-0.4%
18-Aug-2008	23Y A-	2.6%	2.7%	3.5%	3.1%	-0.5%
3-Dec-2009	17Y A-	3.2%	1.6%	2.5%	2.0%	1.2%
10-Sep-2010	8Y BBB	3.6%	1.2%	1.8%	1.5%	2.1%
13-May-2011	30Y A-	2.3%	0.9%	1.6%	1.3%	1.0%
14-Feb-2012	12Y BBB	4.1%	1.0%	1.6%	1.3%	2.8%
20-Mar-2012	8Y BBB	3.1%	1.0%	1.6%	1.3%	1.8%
8-Jun-2012	3Y A-	0.9%	1.2%	2.2%	1.7%	-0.8%
Weighted Average		3.1%			2.3%	0.8%

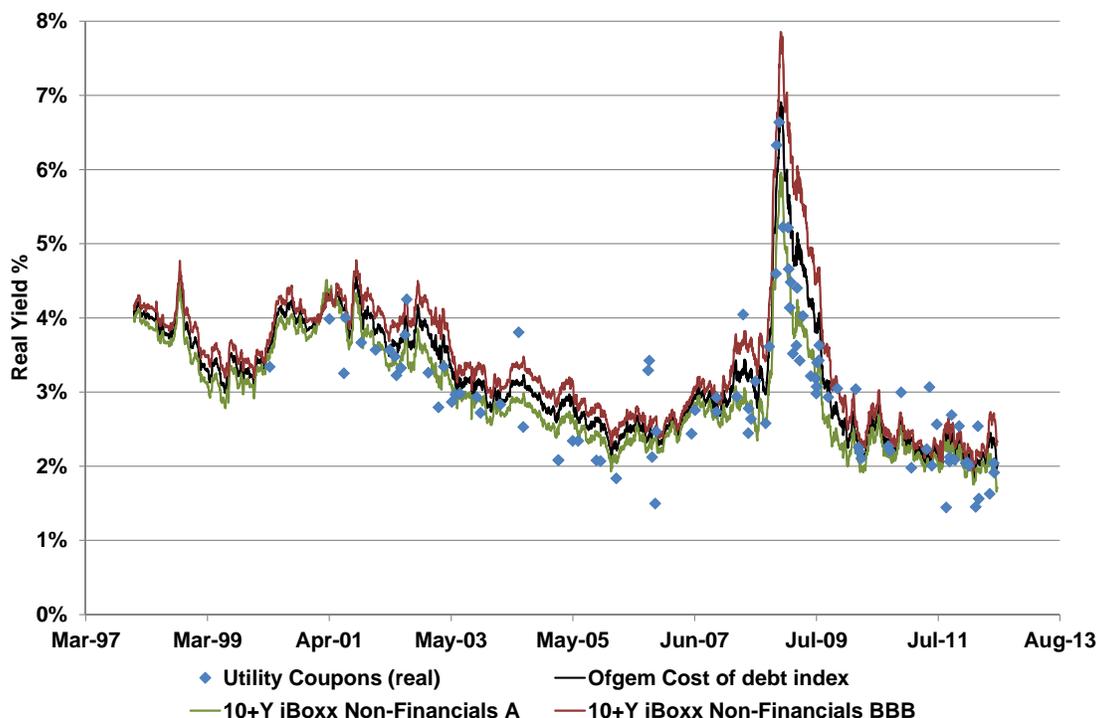
Source: NERA analysis of Bloomberg and Datastream data. The CEPA index columns show the yield of CEPA's proposed index on the day of the issue of HAL's bond. We compare yields at issue to the prevailing yield of CEPA's index to assess whether CEPA's proposed index is representative of HAL's debt costs. This does not correspond to an allowance granted to HAL for the cost of debt under CEPA's proposed debt indexation mechanism.

The results show that between 2008 and 2012, HAL issued bonds on average 80 basis points above CEPA's index (at time of issue and weighted by size of issuance). Moreover, the issuance spread varies between 80 basis points below CEPA's index and 280 basis points above. The variability of this index highlights the difficulty in calculating a consistent and stable estimate of the spread over time.

HAL's performance relative to CEPA's index contrasts with utilities' issuances, who have issued bonds at yields in line with or below Ofgem's debt index.¹⁸ Figure 2.2 shows utilities' issuance relative to the iBoxx index.

¹⁸ See Ofgem (March 2011) : Decision on the strategy for the next transmission and distribution price controls – RIIO-T1 and GD-1 Financial issues, p. 28-29 for discussion.

Figure 2.2
Utilities' Current Yields vs. iBoxx Cost of Debt Index



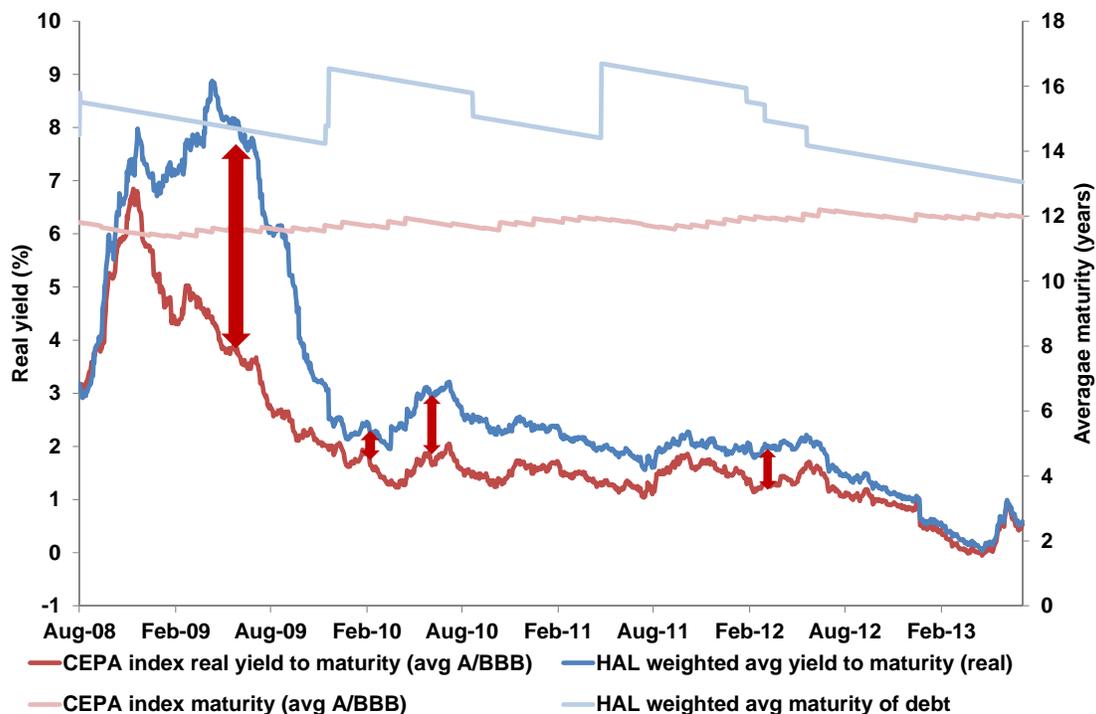
Source: NERA analysis based on Datastream, Bloomberg and Ofgem data

Figure 2.2 shows that utility coupons have been broadly in line with the iBoxx indices, and since 2010 have been 10 basis points under the Ofgem cost of debt index. This contrasts with HAL who have issued significantly above the index, as previously seen in Figure 2.1.

The calculation of yields at issue suggests that HAL’s sterling denominated bonds have historically attracted a premium relative to the bonds in CEPA’s index. To investigate the premium in more detail, we calculate the weighted average yield on HAL’s GBP issuances.¹⁹ The weighted average yield does not represent HAL’s actual debt costs (which are given by yield at issue), however it represents an indicator of relative pricing of HAL’s debt relative to the benchmark index. The results are shown in Figure 2.3.

¹⁹ We calculate HAL’s weighted average yield as: prevailing yield to maturity on all HAL’s bonds traded between 2008 and 2013, weighted by the size of issuance. We include only sterling denominated investment grade bonds in our analysis. Weighted average yield to maturity for nominal bonds is deflated using the Bank of England’s 10 year breakeven inflation, in line with CEPA’s assumption. The results are combined with yield to maturity on I/L debt to calculate HAL’s weighted average yield to maturity for all sterling denominated investment grade debt.

Figure 2.3
HAL's Weighted Average GBP Bond Yield relative to CEPA Index



Source: NERA analysis of Bloomberg and Datastream data. Note: (1) Real yields for HAL weighted average are calculated using the Fisher formula. We use breakeven inflation from the Bank of England which matches the average maturity of HAL’s nominal bonds (we interpolate between BoE’s 10Y and 20Y breakeven inflation indices). (2) Real yields for the CEPA index are calculated using 10-year breakeven inflation, in line with CEPA’s proposals.

Figure 2.3 shows that HAL’s bonds have (almost) continually attracted a premium relative to CEPA’s index. The observed premium varied considerably between August 2008 and July 2013, ranging from -30 basis points in September 2008 to + 450 basis points in May 2009, with an average of around +100 basis points relative to CEPA’s index. Thus, HAL’s bonds attract a large and *volatile* premium over the CEPA index. The volatility of the premium suggests it may be difficult to estimate a reliable and consistent estimate of the premium as part of the indexation process. We note that the size of the spread in 2009 may be partly linked to concerns about the disposal of Gatwick as well as proposals by the Department of Transport.²⁰ We discuss the volatility of the premium further in Section 3.

Figure 2.3 also compares the average maturity of HAL’s bonds included in our analysis (light blue line) relative to the average maturity of bonds in CEPA’s index (light red line). The average maturity of HAL’s bonds is above CEPA’s index throughout the observation period. It seems unlikely that the difference in maturity would explain (all of) the observed premium,

²⁰ These factors may have made it difficult for BAA to service its debt and also impacted the creditor’s access to assets in the case of bankruptcy. Source: Fitch (August 2009): “Fitch Affirms BAA Funding Bonds; Outlook Negative”.

as step changes in maturity of HAL's debt have not resulted in equivalent changes in the observed premium.²¹

Our analysis shows that CEPA's proposed index does not appear representative of HAL's actual debt costs. If the CAA adopted debt indexation on the basis of CEPA's proposals, there would be a significant risk that HAL would not be able to recover its (efficiently) incurred debt costs. Since HAL can be viewed as a price taker in the financial markets, relative pricing of HAL's debt to the CEPA index is a risk which lies largely outside of management's control.

We discuss the suitability of alternative benchmark indices for debt indexation for airports in more detail in Section 3.

2.3. Equal Weighting Fails to Reflect HAL's Issuance Profile

CEPA proposes to use a simple 10-year trailing average of yields on its benchmark index to set annual cost of debt allowances. CEPA favours the simple 10-year trailing average since the "*investment profile does not appear to be lumpy*" and this approach "*has benefits from simplicity and transparency perspectives*".²²

CEPA's proposals fail to reflect HAL's issuance profile and can lead to over-/or under-recovery of actual debt costs at the expense of customers or shareholders. This constitutes a new risk which lies largely outside of management's control, since issuances are largely driven by mandatory capital expenditure programmes and debt tenure decisions from many years ago.

The introduction of a debt indexation mechanism represents a long-run regulatory commitment and consequently its design should be flexible enough to be able to accommodate potential future capex growth. While for Q6, HAL is not expecting significant RAB growth, it has incurred large capex outlays in relation to T5 and the new T2 construction in previous price controls. The future investment profile for HAL is unlikely to be stable and predictable, unlike for mature energy network companies for which Ofgem uses a simple 10-year trailing average of the benchmark index.²³ There is a reasonable chance that capex will increase again in the future (Q7 and beyond) in relation to capacity expansion in the South East.

Apart from capex, companies' issuance is driven by re-financing needs. Figure 2.4 shows that HAL's re-financing programme over the next price control is not stable (with most debt

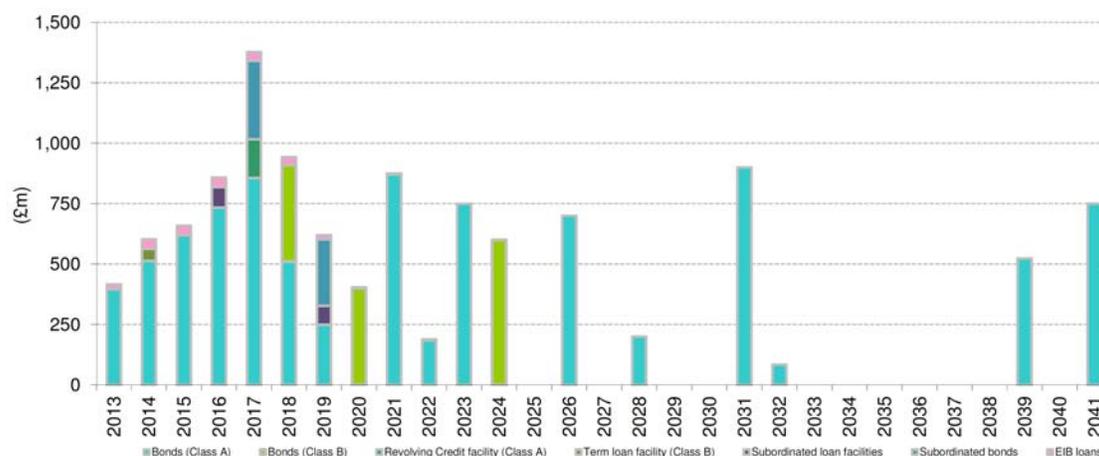
²¹ For example, the step *increase* in HAL's weighted average maturity debt in December 2009 was accompanied by a *tightening* of the spread relative to the CEPA index. If the difference in yields was explained by the term premium (i.e. difference in maturity of HAL's debt relative to the index), an *increase* in maturity of HAL's debt would result in an *increase* in the observed premium.

²² CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6, p.7.

²³ The one exception is Scottish Hydro Transmission, which is undertaking a very large investment programme during RIIO-T1 (increasing the asset base by a multiple of significantly more than 2x in real terms). Ofgem granted Scottish Hydro the application of a tailored index. Given the significant growth in the asset base Scottish Hydro cannot realistically be considered a mature network at this stage.

to be re-financed in the middle and end of Q6 (2016-2018) and least debt at the beginning (2014-2015).

**Figure 2.4
HAL's Debt Maturity Profile**



Source: HAL's website <http://www.heathrowairport.com/static/HeathrowAboutUs/Downloads/Debt%20maturity%20profile%20-%20June%202013.pdf>

Based on the above, we consider it important that the weightings of any potential debt index should reflect HAL's actual issuances, to ensure that the cost of debt allowances do in fact track HAL's (efficiently) incurred debt costs. New debt issuances are largely driven by mandatory capital expenditure programmes and re-financing needs and therefore lie largely outside of management's control.

In Section 3 we discuss how index weights should be calculated in detail.

2.4. No Allowance for Transaction Costs

CEPA does not propose to include a specific uplift to its proposed debt index for transaction costs. With respect to transaction costs, CEPA notes:

“Further points have been noted around the relative transaction costs and additions to the index that should be included. In Ofgem’s 2010 paper, they set out that networks issued debt at 30bps below the index, so there is implicit headroom built in for such costs (in addition to the implicit headroom which we note is included within the calculation methodology for the index).”²⁴

CEPA implicitly acknowledges that regulated companies' should be allowed to recover transaction costs on top of the coupon costs companies have to pay on their debt. CEPA's observation that Ofgem found that its index for energy networks includes implicit headroom to accommodate these transaction costs is not relevant in the context of airports. The

²⁴ CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6, p.13.

performance of energy networks relative to Ofgem’s proposed index is not relevant for the decision whether HAL should be allowed to recover transaction costs associated with servicing its debt over and above the allowance generated by CEPA’s index, which is different from Ofgem’s index. As we show in Section 2.2, HAL has consistently issued bonds at yields *above* CEPA’s proposed index, unlike utilities who have issued in line with or slightly below the index (see Figure 2.2). Hence for airports there is no headroom in the index that could accommodate transaction costs which will need to be allowed for separately via an explicit uplift.

We note that the CAA recently increased its allowance for transaction costs as included in initial proposals for Heathrow, Gatwick and Stansted (to 15bps (LHR) and 20bps (GTW, STN)) relative to the allowances it gave in 2007/08, which ranged from 10-15bps.²⁵ This is consistent with Ofwat’s allowance of 20 basis points in PR09 to cover “*transaction costs, commitment fees and costs associated with the maintenance of an appropriate level of liquidity*”.²⁶ In addition, the CC allowed for non-coupon costs of 30bps in its determination on Bristol Water’s cost of capital.²⁷ HAL estimate total transaction costs to be 32-38 bps, and liquidity around 17-20 bps suggesting recent regulatory estimates of transaction costs may be insufficient to cover HAL’s actual issuance cost.²⁸

2.5. CEPA’s Inflation Assumption Exposes Airports to Outturn Inflation Risk

CEPA proposes to use 10-year breakeven inflation from the Bank of England to calculate the real cost of debt allowances from the benchmark index.

By using two different measures of inflation for inflating the asset base and calculating real yields respectively CEPA fails to remove one of the central risks associated with the current approach that sets a fixed ex ante allowance based on expected inflation. Instead the use of a common value for both purposes maintains simplicity, removes outturn inflation risk (risk of outturn inflation differing from the market expectations at the time of issue) and provides a reasonable expectation that investors will recover their financing costs.

Moreover, we note that breakeven inflation is a potentially distorted measure of inflation expectations as we set out in more detail in section 3.3 where we also discuss the issue of deflating the nominal debt index in more detail.

2.6. Other Issues

CEPA states that the Ofgem cost of debt indexation methodology has been “*accepted by companies*”.²⁹

²⁵ CAA (2013): Initial Proposals for Heathrow, Gatwick and Stansted.

²⁶ Ofwat (2009): “Future water and sewerage charges 2010-15: Final determinations”, p131.

²⁷ Competition Commission (2009): Bristol Water Determination (Appendix N).

²⁸ Heathrow Airport Limited (25th June 2013): “Response to CAA Initial Proposals”, Appendix 2, p124.

²⁹ CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6, p.4.

While none of the GB energy network companies chose to appeal the Ofgem RIIO-T1/GD1 decisions, the companies raised a number of concerns with Ofgem's proposed debt indexation approach which need to be considered for airports as well. The principal concerns raised by the companies were as follows:³⁰

- companies may seek to minimise the variation in their actual debt costs relative to the index by issuing bonds which track the index. Such bond issuances may not be least cost, which may become a secondary objective relative to minimising the variation in actual versus allowed debt costs;
- the lack of ability to hedge against movements in the index which could increase companies' risk;
- the index is unrepresentative of the networks' debt portfolios;
- the proposed index does not account for a number of costs, including: debt issuance and liquidity management costs, and new issue premia on bond coupons;
- Ofgem's calculation of expected inflation required to calculate the real debt cost allowance from the nominal index is flawed as it fails to take into account the inflation risk premium on non index-linked bonds;
- the indexation of debt costs complicates price-setting.³¹

All of the issues above are also relevant for airports.

CEPA further states:

*“Annual indexation of certain components of the cost of capital is a well-established practice among European regulators.”*³²

We disagree that cost of debt indexation represents an established regulatory practice. In the UK, cost of debt indexation was introduced by Ofgem at its latest RIIO-GD1/T1 price control review (covering years 2013-2021). Ofgem justifies cost of debt indexation principally on the basis of uncertainty over future debt costs, and thus the high risk of windfall gains or losses to companies if Ofgem were to set a fixed allowance over the new and longer 8-year price control period.³³

Despite Ofgem's precedent, other UK regulators have not chosen to adopt cost of debt indexation to set cost of debt allowances. In its recent methodology paper for PR14 (2015 to

³⁰ Ofgem (March 2011): Decision on the strategy for the next transmission and distribution price controls – RIIO-T1 and GD-1 Financial issues.

³¹ For example, a change in the cost of debt index complicates mechanisms which rely on calculating net present values (NPVs). Partly as a consequence of the debt indexation, Ofgem has introduced a process whereby it recalculates revenue allowances on an annual basis using a financial model incorporated in the licence to solve for the complex interactions between debt costs and other allowed revenues lines.

³² CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6, p.4.

³³ Ofgem (March 2011): Decision on the strategy for the next transmission and distribution price controls – RIIO-T1 and GD-1 Financial issues.

2019), Ofwat stated that it intends to retain its existing approach to setting fixed cost of debt.³⁴ Ofwat further stated:

*“We consider that it would be inappropriate for us to change from our existing approach when prevailing debt costs are very low.”*³⁵

In summary, cost of debt indexation has been introduced only recently in the UK and has so far been adopted by only a single regulator while others (ORR, Ofwat) have not followed suit in recent draft decisions / methodology papers, instead rejecting indexation. In fact, CEPA itself in its advice to the ORR did propose a fixed cost of debt estimate for the rail sector.³⁶ The mechanism has not been tested in practice yet and therefore cannot be referred to as established regulatory practice. In addition, while some European regulators do index the risk-free rate estimate in the cost of equity allowance, to our knowledge, no other European regulator undertakes explicit indexation of the cost of debt.

In the next section, we discuss how these shortcomings can be addressed when designing a suitable debt indexation mechanism for airports.

³⁴ Ofwat (July, 2013): Setting price controls for 2015-20 – final methodology and expectations for companies’ business plans, p. 122.

³⁵ Ofwat (July, 2013): Setting price controls for 2015-20 – final methodology and expectations for companies’ business plans, p. 122.

³⁶ CEPA et al. (Jun 2013): ADVICE ON ESTIMATING NETWORK RAIL’S COST OF CAPITAL, p.27.

3. Key Issues in Debt Indexation Mechanism Design

In this section, we consider in more detail how to address the shortcomings of CEPA's proposals when designing a cost of debt indexation mechanism for airports. We look at the following issues:

- Section 3.1 presents the analysis of other potential benchmark indices;
- Section 3.2 discusses how the benchmark index should be weighted;
- Section 3.3 discusses how to convert the nominal index to real values and;
- Section 3.4 discusses the suitable range for the debt premium above the iBoxx index;
- Section 3.5 concludes on the NERA alternative index.

We find that the iBoxx GBP Non-Financials index with 10-15 years maturity matches HAL's actual debt costs better than CEPA's index. However, we find there remains a premium at which HAL issues its debt relative to the benchmark index, which would require an explicit uplift to the index to allow HAL to recover its efficiently incurred debt costs. We further recommend that the benchmark index is weighted by actual company issuances each year and RPI is used to deflate the index, consistent with the indexation of RAV. However, given the remaining conceptual and practical problems it is unclear whether the "best available" index represents an improvement over the previous fixed allowance approach as we discuss in more detail in chapter 4.

3.1. Choice of Benchmark Index

The choice of benchmark index is a central question of debt indexation mechanism design. Primarily, the corporate bond benchmark index used for debt indexation purposes needs to be representative of airports' (efficiently incurred) actual debt costs. In addition, to preserve the incentive properties of the index, it is necessary to identify an index which is sufficiently broad to be independent of airports' individual debt issuances. We have identified four potential corporate bond indices to assess against our criteria. These are summarised in Table 3.1.

Table 3.1
List of Candidate Indices and Tenures

Indices	Available Tenures (Years)
iBoxx GBP Non-Financials A	1-3, 3-5, 5-7, 7-10, 10-15, 10+, 15+
iBoxx GBP Non-Financials BBB	
Bloomberg GBP European Corporate Investment Grade	1-3, 1-5, 1-10, 5-10, 10+
FTSE Sterling Corporates A Price	Only available by either rating or tenure
FTSE Sterling Corporates BBB Price	
Reuters UK Corporates A	2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 30
Reuters UK Corporates BBB	

Source: NERA

Of the four indices, FTSE Sterling Corporates and Reuters UK Corporates are least suitable for the following reasons:

- FTSE Sterling Corporates are not available at a sufficient level of disaggregation to adequately reflect airports debt costs, i.e. they comprise an index of bonds from the same rating group but across all maturities, or an index of bonds from similar maturities but across all rating groups; and
- Reuters UK Corporates indices comprise benchmark yields for specific maturities (e.g. 10, 15, 30), not for ranges of maturities (e.g. 10+, 15+), and thus do not contain a sufficiently large number of constituent bonds per series to provide robust results. Moreover, the Reuters Corporates indices appear to contain bonds issued by financial institutions, which are not representative of regulated UK industrial issuers.

We further observe that out of the remaining two indices the iBoxx GBP Non-Financials may be considered preferable over Bloomberg GBP Corporates because:

- The Bloomberg index includes sterling bonds that are issued by European (non-UK) companies and includes financial institutions, which are not representative of a typical corporate bond, whereas iBoxx contains UK companies' issuances and excludes financial institutions; and
- The Bloomberg index for "A" rated debt has an insufficiently long time-series for determining meaningful trailing averages, whereas the iBoxx time-series has a longer time-series dating back to 1998.

At RIIO-T1/GD1, Ofgem preferred the use of an iBoxx index over the Bloomberg one for the following reasons:³⁷

- iBoxx has a more transparent methodology so it is more predictable;

³⁷ Ofgem (March 2011): RIIO-1 and GD1 Financial Issues, p. 24

- iBoxx uses more bonds issued by regulated UK energy networks, so it is more representative of the industry's cost of debt ; and
- iBoxx has a longer maturity so it more accurately reflects the long-term tenure of energy companies' bonds.

We also note that PwC use the Bank of America Merrill Lynch £ NON-GILTS index in their report for the CAA.³⁸ Similar to a “corporates index” a “non-gilts” index also includes financial institutions whose issuance profile differs from a regulated non-financial issuer. Consequently, we consider both the BoA-ML non-gilts and the iBoxx non-gilts index as less suitable comparator groups than pure non-financials indices.

On the basis of the above we consider the iBoxx GBP Non-Financials indices to be the most suitable candidates for cost of debt indexation of airports.

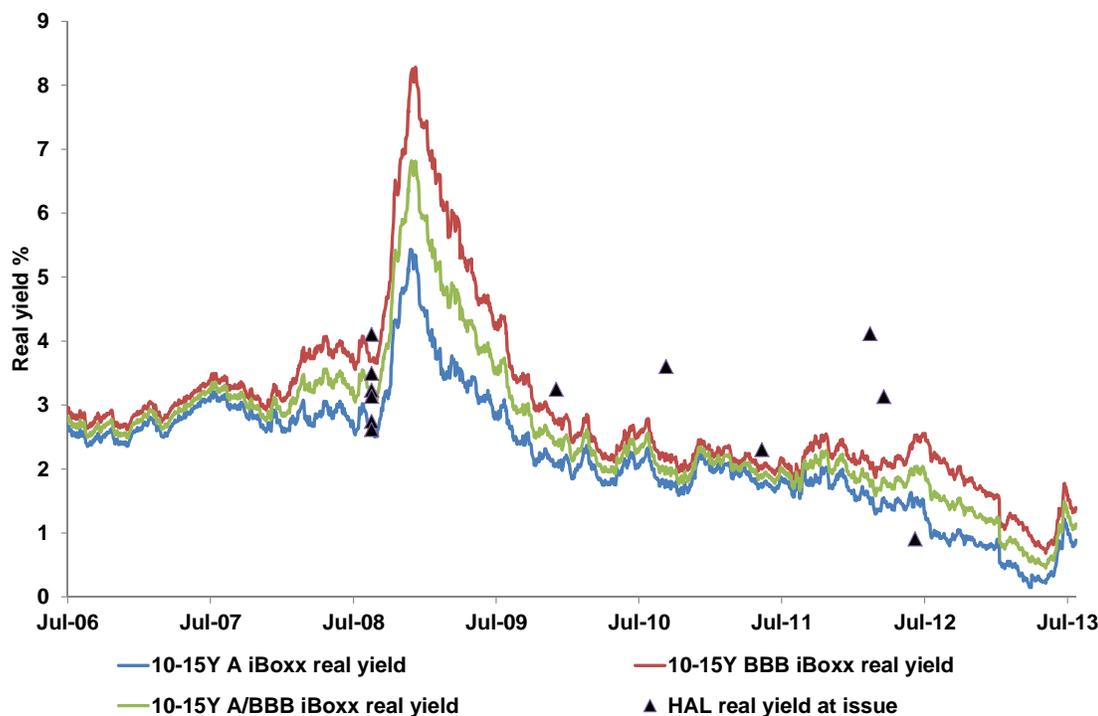
As we discuss in Section 2.2, HAL issued debt at a premium to the index CEPA proposes (average of the three iBoxx series with 3-5, 7-10 and 15+ maturity respectively). Adopting this index for debt indexation would not enable HAL to recover its efficiently incurred debt costs. We note that the difference between HAL's actual debt costs and yields on CEPA's index is not due to differences in maturity. CEPA's proposed index has an average maturity of around 12 years, which is broadly in line with the average maturity of HAL's debt.

As an alternative to CEPA's proposals, we consider the iBoxx GBP Non-Financials index with 10-15 years maturity. The average maturity of the index is 12.3 years, close to the average maturity of CEPA's index and HAL's actual debt. However, the yield on the index with 10-15 years maturity is higher than CEPA's index because of the concavity of the yield curve.³⁹ We investigate whether the 10-15Y iBoxx series can account for the premium at which HAL issued debt in the past relative to CEPA's index. Figure 3.1 shows HAL's actual debt issuance costs versus the iBoxx index with 10-15 years maturity.

³⁸ See PwC (2013): Estimating the cost of capital in Q6 for Heathrow, Gatwick and Stansted.

³⁹ CEPA proposes an average of the three different bond indices as opposed to a single series with maturity matching HAL's average debt costs (the 10-15Y iBoxx series). The 10-15Y iBoxx series shows higher yields than an average of the three iBoxx series, due to the concavity of the yield curve. If the yield curve is concave, any average of yields with two different maturities (which can be represented by a straight line connecting the two yields) will always lie below the curve (which represents the actual yield for the single maturity). See details in CEPA (June, 2013): Note on a Cost of Debt Indexation approach for Q6, p. 6-7.

Figure 3.1
HAL's Historical Yields at Issue relative to iBoxx 10-15 Years Index



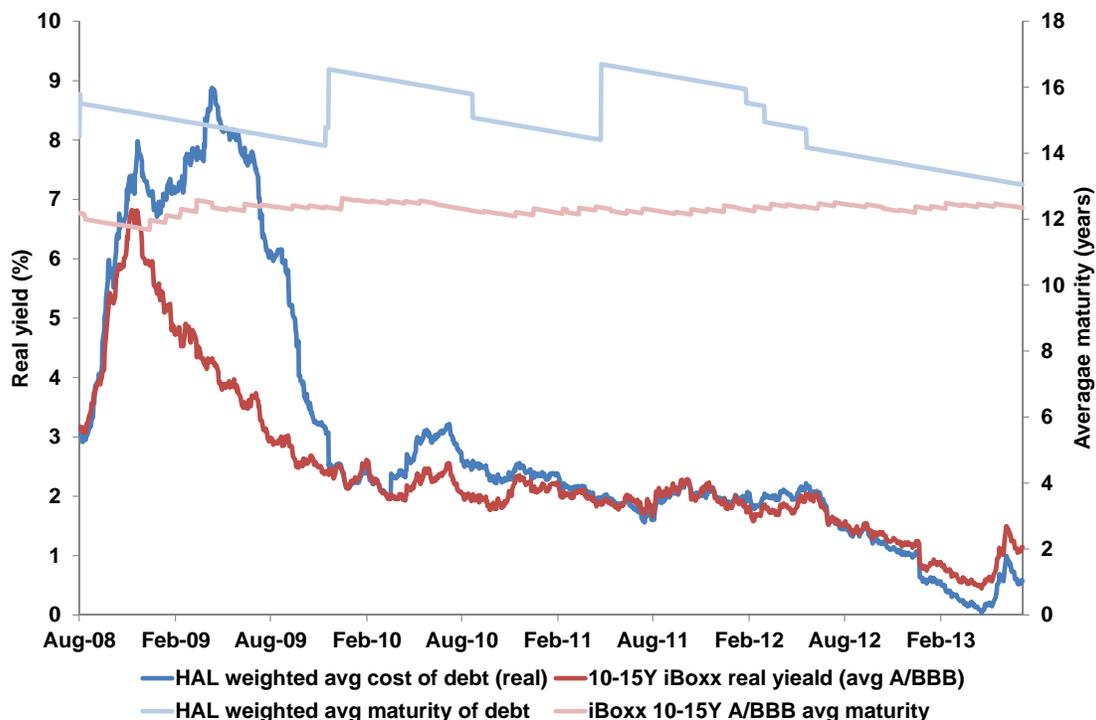
Source: NERA analysis of Bloomberg and Datastream data. Note: real yields are calculated using the Fisher formula. We use breakeven inflation from the Bank of England which matches the maturity of the index/bond (we interpolate between BoE's 5Y, 10Y and 20Y breakeven inflation indices)

HAL's debt costs track the 10-15 year iBoxx index more closely than the CEPA index, but there still appears to be a premium. Between 2008 and 2012, HAL issued bonds at an average premium of 50 basis points relative to the average yield of A/BBB iBoxx series with 10-15 years maturity (at time of issue and weighted by size of issuance). This compares to a premium of 80 basis points relative to the CEPA index.

To investigate the evolution of the premium over time, we compare HAL's weighted average yield to the 10-15Y iBoxx series.⁴⁰ The results are shown in Figure 3.2.

⁴⁰ The weighted average yield does not represent HAL's actual debt costs (which are given by yield at issue), however it represents an indicator of relative pricing of HAL's debt relative to the benchmark index.

Figure 3.2
HAL's Weighted Average GBP Bond Yield relative to iBoxx 10-15 Years Index



Source: NERA analysis of Bloomberg and Datastream data. Note: Real yields are calculated using the Fisher formula. We use breakeven inflation from the Bank of England which matches the average maturity of HAL’s nominal bonds (we interpolate between BoE’s 10Y and 20Y breakeven inflation indices).

HAL’s weighted average yield tracks the 10-15 year iBoxx index more closely than the CEPA index. The observed premium to the 10-15 year iBoxx is lower relative to the premium to CEPA’s index, with an average of around +61 basis points between August 2008 and July 2013. However, the premium varies considerably over the period, and ranges from 55 basis points below the index and 460 basis points above.

The spread was at its highest after the onset of the financial crisis. HAL faced additional risk from the potential drop in passenger numbers following the start of the recession. The increase in spread is also partially explained by concerns over the sale of Gatwick as well as proposals by the Department of Transport.⁴¹ We discuss the airport-specific risks that HAL faces in relation to the debt spread in 3.4.

We note that there is essentially no difference between the two series since 2010 (the spread to the 10-15 year iBoxx index is 6 basis points). However, for two reasons this finding does not mean that the iBoxx index now provides an appropriate approximation of the actual cost of debt for HAL:

⁴¹ These factors may have made it difficult for BAA to service its debt and also impacted the creditor’s access to assets in the case of bankruptcy. Source: Fitch (October 2009): “Fitch Affirms BAA Funding’s Bonds On Gatwick Airport Sale”.

- As shown in Figure 3.1 HAL's recent bond issues have all (bar one) been issued at a premium to the iBoxx 10-15Y index; and
- Figure 3.2 compares the yield on HAL's bonds to the index. However, while the yield for existing bonds may have fallen in an environment of falling yields (as prices have risen) the same is not true for the actual cost of debt incurred by HAL, which depends only on the coupon costs and not market yields in the secondary market.

Conclusion

We conclude that the iBoxx series with 10-15 year maturity tracks HAL's actual GBP bond debt costs more closely than CEPA's index. However, we still find evidence of an issuance premium relative to the alternative index. If the CAA were to adopt debt indexation using the 10-15 years iBoxx series, it would need to include an uplift to the index to ensure that HAL can recover its efficiently incurred debt costs.

However, it is not clear how to objectively determine the size of the uplift, since spreads on HAL's debt relative to the index have been volatile over time. However, introducing subjective elements into debt indexation undermines the objectivity and transparency of this approach. Any decision on the potential uplift would need to be reviewed at subsequent price controls to ensure its accuracy going forward.

3.2. Index Weighting and Averaging Period

CEPA proposes to attach uniform weights to each year in the trailing average. As shown in Figure 2.4 HAL's financing profile is far from uniform, at least in part driven by HAL's "lumpy" capex profile. Hence equal weightings do not reflect HAL's issuance profile leaving interest rate risk still largely outside management's control with simple indexation not necessarily providing a risk reduction relative to a fixed allowance.

We have identified two potential options for calculating company specific weights in order to reduce interest rate risk:

1. Weightings based on companies' outstanding debt issuance

One option is to weight the index based on the actual company debt issuance profile. The weights are set according to the debt issued in each year as a percentage of total debt held in that year. The length of the index would be determined by the earliest date of outstanding debt issuance. For all years where the company issued debt which is still outstanding, the weighting is set equal to the value of the debt issued in that year divided by total debt issuance. For all past years where no outstanding debt was issued in that year, the weight is zero. One feature of such an approach is that the length of the averaging period and weighting vary from year to year.

We also need to consider the definition of debt issuance included within the weightings. For example, the weighting could be based on:

- **bond market issuance only:** This would be the least data intensive approach. However, regulated companies also utilise bank loans, EIB loans, credit facilities and derivative

instruments so using bond market data only might not accurately reflect their debt profile; or,

- **all debt issuance:** Drawing on data set out in companies' statutory and regulatory accounts. The use of all debt instruments may ensure that the index better approximates to the companies' costs. However, the use of all debt instruments may be complicated by quasi-debt and quasi-equity instruments.

2. Weightings based on a proxy for debt issuance – incremental capex

Weightings based on companies' debt issuance may undermine incentives to optimise the timing of debt issuance, i.e. in considering whether to issue debt now or to delay issuance to take account of expected changes in debt issuance costs. To preserve incentives around issuance timing, the indexation weights could be calculated based on capex additions in a given year, as a proportion of total capex over the period covered by the index. Such an approach would help preserve incentives to optimise the timing of debt issuance. Ofgem's approach to setting the weights for SHETL used a similar proxy for debt issuance (as opposed to debt issuance itself), potentially for similar reasons. (See Appendix A for details.)

However, the obvious downside with this approach is that incremental capex may provide a poor proxy for debt issuance, particularly due to the timing of refinancing which depends on historical issuance decisions as opposed to future capex needs. As we show in Figure 2.4, HAL will need to re-finance a significant proportion of its debt portfolio in the next price control period and the re-financing is expected to occur in a non-linear manner, with most debt maturing in the middle of the price control and least debt to be refinanced at the beginning of Q6.

In this case it is also less clear how to set the first year of the trailing average period. In this case, one solution would be to set the first year by the earliest date of outstanding debt issuance (as with the case where the weights are based on outstanding debt issuance). An alternative approximation would be to use a cut-off point consistent with average debt maturity.

Conclusion

We conclude that using a uniformly weighted index is unlikely to approximate actual debt issuance by companies over time. Consequently, a uniform index is unlikely to be best suited to mitigating interest rate risk. Instead, an alternative indexation approach is to weight the chosen index by airports' actual debt issuances in each year. This approach is likely to be superior to using new capex for weighting because we expect that capex provides a poor proxy for debt issuance, particularly due to the timing of refinancing which depends on historical issuance decisions as opposed to future capex needs.

We note that using company-specific actual debt issuance weights could mute incentives to optimise debt issuance timing. However, debt issuance timing is not always within companies' control but rather driven by mandatory capital expenditure programmes and debt tenure decisions from many years ago. Thus, in practice companies may have limited control over the timing of debt issuance.

3.3. Conversion of a Nominal Index to a Real Debt Cost Measure

We observe nominal yields on corporate bonds, and indices denominated in nominal terms. Inflation needs to be subtracted from the selected nominal index to derive a real measure consistent with the CAA's regulatory approach to setting a real allowed rate of return, and indexing the RAB by RPI inflation. We have considered three different ways to measure inflation and to convert nominal yield observations to real terms:

- subtracting the difference between nominal and real government debt (referred to as breakeven inflation) over the period of the debt issuance, and as used by Ofgem at RIIO-T1/GD1;
- subtracting HMT consensus forecasts for inflation over the period of the price control; or,
- subtracting the RPI used to index allowed revenues and RAB.

We recommend that the RPI series used to index the RAB is also used to convert nominal to real debt costs. The use of a common value for both purposes maintains simplicity, minimises outturn inflation risk and provides a reasonable expectation that investors will recover financing costs. It might help rebut claims of double-counting too – the whole revenue requirement is updated by the RPI price cap adjustment, but RPI is deducted before the debt cost adjustment is formed. Below we discuss the relative merits of the three approaches.

3.3.1. Breakeven Inflation

Breakeven inflation is the difference between the nominal and index-linked yields on gilts of the same maturity. In theory, breakeven inflation reflects the market's expectation of average inflation over the period. However, in practice the break-even inflation potentially overstates market expectations of inflation as a result of:

- the presence of positive inflation risk premia⁴² required by holders of nominal debt for bearing inflation risk;
- the strong demand from the life insurance and pensions industry for indexed instruments relative to supply,⁴³ which will tend to suppress index-linked gilt yields and thus the resulting breakeven inflation will overstate the market's inflation expectations when ILG yields are subtracted from a nominal gilt yield.

The potential bias caused by the latter issues is likely to have been amplified by recent money market interventions by the Bank of England, which have strongly affected / distorted the demand for both nominal and index-linked gilts and thus potentially distorted the measure of inflation derived from these instruments.

⁴² See for example Andreasen (2011): An Estimated DSGE Model : Explaining Variation in Term Premia.

⁴³ See for example discussion in Russell Investments (February 2012): Help! We're Running out of Gilts.

Additionally, using breakeven inflation potentially exposes companies to outturn inflation risk when outturn inflation (by which the RAB is indexed) differs from the market expectation at time of issuance (which has been subtracted from the cost of debt allowance).⁴⁴

3.3.2. HMT Consensus

HM Treasury publishes “*Forecasts for the UK Economy*”, which contains a range of inflation forecasts (RPI & CPI) for the UK for the next four years, every February, May, August and November. It is a summary of the views from independent forecasters so it reflects the markets’ expectations of inflation.

The HMT inflation consensus for the next charging year could be used to adjust nominal yield for the next charging year but the HMT forecasts do not contain a forecast of inflation more than four years into the future. Moreover, as with using the breakeven rate of inflation, the use of HMT consensus exposes companies to inflation risk when outturn inflation differs sufficiently from the consensus used to adjust the nominal yield.

3.3.3. Inflation Used to Index RAB

As discussed above, using inflation expectations (either break-even or HMT) to adjust nominal yield to real yield exposes companies to outturn inflation risk. An alternative approach is to use observed outturns, such as the RPI inflation series that the CAA uses to adjust airports’ price caps and closing RAB at each review, to derive the real debt allowance.

The use of a common index to rebase price caps and RAB and to derive real from nominal debt ensures that investors have a reasonable expectation of recovering their nominal cost of finance. It might help rebut claims of double-counting too – the whole revenue requirement is updated by the RPI price cap adjustment, but RPI is deducted before the debt cost adjustment is formed thereby ensuring that indexation and deduction are based on the same inflation estimate.

3.4. Estimation of Debt Premium to Weighted iBoxx Index

The evidence on HAL’s issuances and traded yields shows HAL has incurred a significant and variable debt premium to the 10-15 year iBoxx index since 2008. Any debt indexation methodology must allow HAL to recover its efficiently incurred debt costs, and the 10-15 year iBoxx index is incapable of achieving this by itself. The methodology must incorporate an additional premium.

The debt premium to the iBoxx index was at its greatest immediately after the onset of the financial crisis (January 2009 to October 2009), as can be seen in Figure 3.2. This suggests there is an airport-specific risk that the market viewed as being much higher following the

⁴⁴ For example, assume a company issues a 10-year bond at a fixed nominal yield of 8%. The 10-year breakeven inflation is 4% at issuance so the calculated real yield for the cost of debt index for that year is 4%. Let’s assume in year 5 out of 10 the outturn RPI inflation is 1%. The company still incurs an 8% nominal yield, and thus the company’s actual real cost of debt for year 5 is 7%, but the index based on breakeven inflation at issuance will only provide a 4% real allowance for the bond. Thus, as this example illustrates, an index adjustment based on breakeven inflation exposes companies to inflation risk.

start of the financial crisis. Credit agency reports highlight that HAL’s financing risks in 2009 were at least part correlated with the global economy:

*“The key issues for BAA remain the economic downturn and its impact on passenger numbers (pax), refinance risk including the ability to issue bonds”*⁴⁵

On this basis, Fitch changed BAA’s outlook to negative on the basis that *“the Negative Outlook reflects uncertainties regarding the depth and duration of the downturn”*.⁴⁶

Thus, HAL’s risks are likely to be more correlated with that of the global economy, in contrast to the utilities that make up the iBoxx index. This again supports the view that the indexation methodology must make a premium allowance to reflect the additional risks that HAL faces when issuing debt at times of global economic uncertainty.

The difficulty in estimating a debt premium lies in its historic variability. Table 3.2 shows the historic variability of the issuance spread to the iBoxx index, and the weighted average yield spread to the iBoxx index.

**Table 3.2
Historic Variability of Debt Spread**

Debt Spread		Min Spread (bps)	Max Spread (bps)	Average Spread (bps)
HAL Issuance Spread relative to 10-15Y iBoxx	Figure 3.1	-110	240	30
HAL Weighted Average Yield Spread relative to 10-15Y iBoxx	Figure 3.2	-55	460	61

Source: NERA analysis of Bloomberg, Datastream data and Heathrow annual accounts

Table 3.2 highlights the variability in the debt spread on both measures. Thus, the debt indexation methodology must ensure the premium accounts for the underlying risk of the spread increasing at certain points in time.

We consider a debt premium of 30 basis points to be the minimum that HAL should receive above the weighted 10-15 year iBoxx index, based on the average spread of HAL’s issuance relative to the iBoxx index. However, there is considerable support for setting a premium higher than 60 basis points, the spread of HAL’s weighted average yield relative to the 10-15Y iBoxx index.

In particular, HAL faces asymmetric risks relative to the other utilities that comprise the 10-15 year iBoxx index. HAL’s debt costs increase significantly relative to the index when global economic conditions worsen, but remain in line with the index at other times. In contrast, utilities’ debt costs follow the index fairly closely and even lie below the index at certain points in time.

⁴⁵ Fitch (August 2009): “Fitch Affirms BAA Funding Bonds; Outlook Negative”.

⁴⁶ Fitch (August 2009): “Fitch Affirms BAA Funding Bonds; Outlook Negative”.

Given the possibility that economic conditions may worsen in future, a mechanistic indexation methodology must allow a debt premium significantly higher than the 60 basis points average spread of HAL's actual debt cost to the weighted 10-15Y iBoxx index. We consider a debt premium of at least 60 basis points relative to the weighted 10-15Y iBoxx index to be appropriate for HAL's debt costs.

3.5. Conclusion on NERA Alternative Index

We consider the allowance should be based on the iBoxx Non-Financials indices with 10-15 years maturity and broad A and broad BBB rating, weighted by HAL's issuances in each year and deflated by outturn RPI. This index has tracked HAL's actual cost of debt more closely than the unweighted index that CEPA proposes.

HAL estimates total transaction costs to be 32-38 bps, and liquidity around 17-20 bps, significantly higher than recent regulatory allowances for transactions costs, neither of which CEPA considers.⁴⁷ In addition, we make an additional allowance of at least 60 basis points debt premium above the weighted iBoxx index. This uplift accounts for the fact that our weighted index remains slightly below HAL's actual debt costs and HAL faces asymmetric risks which could lead to spreads widening at certain points in time.

Our proposed index is more likely to track HAL's actual cost of debt, allowing HAL to recover its efficiently incurred debt costs.

⁴⁷ Heathrow Airport Limited (25th June 2013): "Response to CAA Initial Proposals", Appendix 2, p124.

4. Practical Issues

The previous section focused on the theoretical issues of designing a debt indexation mechanism for airports. This section discusses the practical issues of implementing a robust debt indexation mechanism within the price control process. The section is structured as follows:

- Section 4.1 discusses how a debt indexation mechanism can be implemented within price controls;
- Section 4.2 discusses the associated increase in regulatory burden and regulatory costs;
- Section 4.3 discusses the likely future appropriateness of a selected benchmark index; and
- Section 4.4 compares debt indexation to alternative approaches to setting debt costs allowances.

4.1. Implementing Debt Indexation within Price Controls

Under a debt indexation mechanism, the cost of debt component of the allowed rate or return is re-calculated every year to reflect the changes in the benchmark index. There are two main options for when to update the price-cap calculations for changes in the debt index value:

- The first option is to true-up the accumulated NPV difference between the ex-ante allowed cost of debt used to set airport charges and the outturn benchmark yield at the end of the regulatory period. The adjustment to the price-cap can be upfront in the first year of the next price control, or smoothed out over the 5-year period.
- The second option is to implement an annual automatic adjustment mechanism to the price-cap mirroring the annual change in the benchmark yield every year. This option ensures that allowed debt costs track actual debt costs more closely, and should minimise financeability issues compared to the first option where there is a lag of up to five years before the true-up.

Ofgem implemented its cost of debt indexation mechanism through an annual adjustment to the revenue-cap as part of its recent RIIO-T1 and RIIO-GD1 price control reviews.

An annual adjustment to the price-cap seems preferable for airports, as this option reduces the scope for financeability problems arising in periods of high debt cost volatility. Also, as CEPA note, the customer base for an airport changes over time and it is the customer who will ultimately be paying for airport charges. Annual updates ensure that different customer groups do not cross-subsidise each other over time.

Annual updates of the price-cap could result in volatility of airport charges. Concerns with charging volatility could be addressed through airports providing forecasts of changes in expected airport charges based on expected debt costs. (For example, airports can provide an indication of expected changes in debt costs based on forward curves.) Thus, airports should be able to provide information to customers which would improve the predictability of airport charges (if not address volatility per se).

4.2. Increase in Regulatory Burden and Costs

Introducing annual updates of the price-cap would increase the regulatory burden on the airports as well as the CAA and likely result in an increase in regulatory costs.

The annual adjustment would require airports to submit, on a yearly basis, relevant information to the CAA, e.g. new debt issuance to allow the re-calculation of annual weights. Ex-ante procedures need to be defined between the airports and the regulator in order to ensure that information is provided in a timely manner in the required quality. Auditing procedures for verifying the truthfulness of provided information may also need to be agreed.

Annual indexation might also necessitate the development of a financial model to calculate the impact of the change in the allowed cost of debt on airports' price-caps.⁴⁸ The financial model needs to address how to update regulatory allowances which depend on the allowed rate of return (such as the allowed return allowance or mechanisms, which rely on NPV calculations using the allowed rate of return as the discount rate). The financial model would have to be accepted by both the regulator and the airports.

4.3. Future Appropriateness of Benchmark Index

As we discuss in Section 3, the closest benchmark index appears to be the iBoxx GBP Non-Financials series with 10-15 years maturity, which matches the current average maturity of HAL's debt. Due to the existence of a premium on HAL's sterling debt relative to the index, the CAA would need to include an uplift to the benchmark to ensure that HAL will be allowed to recover its efficiently incurred debt costs.

However, there is no guarantee that any specific index chosen now will remain appropriate for HAL in the future. In fact our analysis has shown that the premium HAL paid relative to the index has varied significantly over time. With further investment expected into the airports during Q7 and beyond (in relation to capacity expansion in the South-East), possible revisions in rating and/or maturity of debt issued in order to finance the airports' operations are to be expected in the future.

A fundamental change in how HAL finances its operations would require a revision of the appropriateness of the benchmark index. An ex-post change to the benchmark index will expose HAL to new types of risks in relation to any hedging mechanisms it put in place relative to the "old" index. Moreover, revisions to the benchmark reduce transparency and predictability for investors thus partly defeating the point of introducing indexation.

4.4. Comparison of Debt Indexation to Alternative Approaches

The main advantage of a debt indexation mechanism is introducing a transparent and objective mechanism of setting and updating cost of debt allowances. Such a mechanism protects regulated companies from interest rate risk (which lies largely outside of companies' control), while creating a reasonable expectation that investors will recover their financing

⁴⁸ Ofgem developed a detailed financial model for its recent RIIO-T1 and GD-1 price controls which enables the annual update of allowed revenues. The model was incorporated within the energy companies' licenses.

costs. To be successful, the process has to be carefully designed in order to ensure that allowances track regulated companies' efficiently incurred debt costs.

As we discuss in detail in Section 3, a debt indexation mechanism for airports would inevitably include some degree of subjectivity.⁴⁹ Any debt indexation mechanism based on subjective components undermines its original purpose, which is introducing objectivity and transparency into the process of setting cost of debt allowances.

It is not clear that a debt index, which has to include an uplift based on a subjective assessment of its inputs, which are potentially subject to revisions represents an improvement in objectivity or transparency, relative to the current regime of setting fixed ex-ante cost of debt allowances. In addition, under a debt indexation approach, companies may be incentivised to minimise the variation in debt costs relative to the index, which may not represent a least cost approach to financing.

Since debt costs are largely outside of companies' control, an alternative approach to remunerating debt cost is treating debt as a pass-through item. This approach is widely used to allow for the interest cost component of the allowed return in the US and in Germany. However, treating debt as a pass-through reduces incentives for companies to minimise debt costs. In addition, UK regulators have been reluctant to be involved with companies' financing decisions and preferred to use notional financial structures when setting regulatory allowances for the rate of return. Introducing companies' actual financial structure in the regulatory rate of return allowances would have necessary implications for the other WACC components, such as the cost of equity.

Nonetheless we note the difficulty of coming up with a reliable forecast of the future cost of debt at the current time where the future path of government and corporate bond markets is highly uncertain. A further alternative to indexation may be the use of a trigger mechanism that automatically requires the CAA to review the cost of debt assumption if the cost of company's actual issuance and / or the benchmark index moves outside certain bounds for a period of time.

⁴⁹ Our review of benchmark indices suggests that HAL's debt has been historically issued at yields above benchmark indices and if the CAA were to adopt debt indexation, it would need to include an uplift to the index to ensure that HAL will be allowed to recover its efficiently incurred debt costs. However, it is far from clear how large this uplift should be since spreads on HAL's debt relative to benchmark indices have been volatile over time. Any decision on the potential uplift would need to be reviewed at subsequent price controls to ensure its accuracy going forward.

Appendix A. Ofgem Approach to SHETL

At RIIO-T1 (applicable from 2013-2021), Ofgem accepted Scottish Hydro Electric Transmission's (SHETL) proposal to use a bespoke cost of debt index with a weighting based on the company's investment profile. The key features of SHETL's bespoke index are as follows:

- In the first year, the allowed cost of debt equals the 10-year trailing average at end-October of the previous year;
- In subsequent years, the average index cost of debt (from the previous financial year) enters the cost of debt allowance according to the weight defined by the previous year's ratio of total allowed nominal RAB additions to the closing RAB;
- Because the average index cost of debt from the previous financial year is not known until well past into the new charging year, the average index up until last October is used for the new charging year. The average index is then replaced with the full financial year average in the subsequent charging year.

The advantage of using RAB-additions-based weight is that RAB is readily available and well-understood. It mirrors companies' capex profiles, and takes account of asset lives via regulatory depreciation. It still preserves the incentive to optimise debt timing. It might not work if RAB is not growing.

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