NERA
ECONOMIC CONSULTING

Response to Ofwat's Cost of Debt Consultation for PR19

For Portsmouth Water

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Executive Summary

Portsmouth Water (PW) commissioned NERA Economic Consulting (NERA) to review Ofwat's recent consultation on setting the cost of debt allowance for the 2019 price review (PR19).[1] In particular, PW asked us to review Ofwat's proposed approach to compensating for embedded debt costs which – based on the industry average embedded debt costs –may not compensate PW for its atypical and efficiently incurred embedded debt.

In this report, we conclude that PW's embedded cost of debt allowance should be set with reference to a market benchmark value at the time of issuance, in common with the approach of UK regulators for companies with atypical debt profiles.

Ofwat proposes to use a benchmark index for new debt only, and a continuation of its approach at PR14 for embedded debt

Ofwat's recent consultation paper sets out three options for setting the cost of debt allowance at PR19:

- Option 1: a fixed allowance for embedded debt and an ex ante allowance for new debt, as per PR14
- Option 2: full indexation of the cost of debt, e.g. as per the approach in GB energy sector
- Option 3: fixed allowance for embedded debt costs and indexation of new debt costs

Ofwat's preferred approach is option 3. According to Ofwat, by drawing on a benchmark index, option 3 addresses the difficulty of accurately forecasting new debt relative to an ex ante approach as per option 1 (the approach adopted by PR14). For the embedded debt allowance, Ofwat proposes to determine a fixed allowance consistent with recent price control reviews, drawing on evidence from both *"benchmarks"* and *"efficient sector costs"*.[2]

Ofwat's approach fails to recognise PW's efficiently incurred embedded debt

In general, Ofwat's proposed approach to setting the embedded cost of debt allowance based on the industry average and benchmark costs over the past ten years will lead to under-recovery of debt costs for companies that issued debt when market costs were high relative to current levels (in effect, any company with a concentration of debt issuance prior to the financial crisis), and over-recovery of costs for companies that issued debt when market costs were relatively low. Ofwat adopts a "benefit-of-hindsight" approach to compensating companies for the cost of debt, penalising those who issued debt when credit markets were higher in the period prior to the financial crisis.

PW is a relatively small company, and cannot efficiently hold a diversified portfolio of debt given the minimum efficient scale associated with debt issuance. As a result PW has a single debt issuance issued at a time when the market cost of debt was high relative to current low market rates. At PR14, Ofwat's cost of embedded debt allowance of 2.6 per cent was

[1] Ofwat (September 2016), Water 2020: consultation on the approach to the cost of debt

[2] Ibid, p.29

substantively below PW's embedded debt cost of 3.6 per cent (in relation to its public bond). The use of a 75:25 embedded: new debt weighting based on a uniform debt issuance profile also failed to reflect PW's near 100 per cent embedded debt proportion, exacerbating its under-recovery.

However, our analysis shows that PW's historical debt issuance is efficient: the yield at issuance of 3.6 per cent in real terms was marginally below the benchmark cost of debt at the time of issuance of 3.7 per cent, and it has a tenor in line with other issues at the time. Indeed, PW's (and other water only companies') use of the Artesian vehicle to access public bond markets was cited by Ofwat as a reason for reducing small company premium to the direct benefit of water consumers.

Ofwat should recognise efficiently incurred embedded debt for atypical debt structures, as per standard practice

Our review of regulatory precedent shows that UK regulators, including Ofgem, Ofwat and UREGNI have introduced approaches to the cost of debt that reflect actual debt issuance profiles where a company has an atypical profile, e.g. because of the small size of the networks in the case of SHETL and NI gas distribution, or the relative scale of the investment programme, in the case of TTT.

Recognising the embedded debt costs associated with PW's atypical debt structure would meet Ofwat's objectives for setting the cost of debt allowance. For example, if PW's cost of embedded debt allowance were based on the benchmark value in the year of issuance, and retaining a notional capital structure, customers would not face the costs of *financing inefficient financing structures* (Ofwat's first reason for retaining its PR14 approach) and *customers will only face the efficient cost of debt for a notionally structured company* (Ofwat's second reason).

Such an approach would also provide strong incentives for PW to optimise capital structure and minimise yield at issuance, as the cost allowance is based on an efficient market benchmark (e.g. iBoxx 10Y+ corporate non-financials) and assumed notional gearing (e.g. 62.5 per cent) and therefore independent of PW's actual costs and leverage. That is, the approach *provides incentives for companies to outperform* (Ofwat's third reason for retaining its PR14 approach).

The iBoxx index is a reasonable measure of efficient costs

In its consultation document, Ofwat raises concerns around the outperformance of companies of the benchmark iBoxx index. We show that the apparent sector outperformance is mainly explained by stronger credit ratings for water companies and therefore lower yields at issuance relative to the average of A and BBB rated iBoxx 10Y+corporate bonds, Ofwat's benchmark. This does not represent outperformance per se: stronger credit rating reflects companies' decisions around capital structure, and the implied rating and the lower debt costs relative to the benchmark should be a risk borne by companies.

We also show that there is no evidence for the so-called halo-effect – the supposed ability for companies to issue below market costs owing to the benefits of the regulatory regime – where

the comparison of network companies and benchmark yields is undertaken on a like-for-like basis, namely controlling for any differences in rating, timing and tenor.

Ofgem (at recent energy reviews) and Ofwat (for TTT) also considered the iBoxx benchmark was representative of networks' financing costs.

Ofwat's proposed approach to the cost of embedded debt at PR19 exacerbates the negative impact on financial metrics from the anticipated change to CPI indexation

As set out in an earlier NERA report,[3] PW's financial structure exposes it to unique risks from the anticipated change from RPI to CPI indexation as its share of RPI index-linked debt (ILD) as a percentage of total debt is almost 100 per cent, and around 70 per cent of RCV, one of the highest in the industry. A switch to an alternative index based on CPI exposes PW to greater risk, and weakens its credit metrics.

If Ofwat continues with its current approach to compensating for embedded debt costs at PR19, the failure to recognise PW's efficiently incurred debt costs will exacerbate the weakness in PW's financial credit metrics over PR19 from the proposed change to indexation. This can be addressed by setting a cost of embedded debt allowance based on the efficient benchmark index value at the time of issuance, in line with common practice for networks with atypical debt profiles. This could be dealt with via a company specific adjustment.

[3] See NERA (May 2016), Financeability Impact of Ofwat's Indexation Proposals

1. Introduction

Portsmouth Water (PW) commissioned NERA to review Ofwat's consultation paper on setting the cost of debt allowance for the 2019 price review (PR19).[4] In particular, PW asked us to review Ofwat's proposed approach to setting the cost of embedded debt allowance which, based on a benchmark and industry average costs, is unlikely to fully compensate PW for its own embedded debt costs.

This report is structured as follows:

- Section 2 explains why Ofwat should recognise efficiently incurred embedded debt for companies with atypical debt profiles, and provides examples of best practice from UK regulators;
- Section 3 explains why the iBoxx index provides an efficient benchmark for recognising PW's debt costs; and
- Section 4 draws conclusions.

Appendix A provides evidence on the efficiency of PW's historical debt issuance.

Appendix B reviews evidence on the so-called halo-effect, and shows that network companies do not systematically outperform the iBoxx market benchmark if the comparison of network companies' debt costs and the benchmark index is undertaken on a like-for-like basis.

[4] Ofwat (September 2016), Water 2020: consultation on the approach to the cost of debt

2. Other Regulators Recognise Embedded Debt Costs under Notional Approach

In this section, we summarise Ofwat's proposed approach to setting the embedded cost of debt, and its reasons for proposing an approach in line with its approach at PR14. We explain why Ofwat's PR14 approach does not allow PW to recover its (efficiently) incurred cost of debt given the atypical debt profile, and provide examples of how other regulators recognise atypical debt profiles in determining embedded debt costs.

2.1. Summary of Ofwat's Proposals

Ofwat's recent consultation paper set out three options for setting the cost of debt allowance:

- Option 1: a fixed allowance for embedded debt and an ex ante allowance for new debt, as per PR14;
- Option 2: full indexation of the cost of debt where both embedded and new debt are based on a market index, e.g. as per the GB energy network sector; and,
- Option 3: fixed allowance for embedded debt costs (e.g. as per PR14) and indexation of new debt costs.

Ofwat's preferred approach is option 3. According to Ofwat, by drawing on a benchmark index, option 3 addresses the difficulty of accurately forecasting new debt relative to an ex ante approach as per option 1 (the approach adopted by PR14). For the embedded debt allowance, Ofwat proposes to determine a fixed allowance consistent with recent price control reviews, drawing on evidence from both *"benchmarks"* and *"efficient sector costs"*.[5]

Ofwat does not support option 2, where both the embedded debt and forecast debt are based on a benchmark index, citing concerns that the sector as a whole outperforms the index, and the risk that companies may over-recover embedded debt costs.[6]

Under all its proposed options, it appears that Ofwat proposes to use a notional (i.e. industry average) cost of debt.[7] Ofwat states that:

> "*the notional efficient cost of debt is a common allowance for the cost of debt based on evidence from benchmark and sector average costs. An alternative approach to using a notional efficient cost of debt would be to use the actual cost of debt for each company*."[8]

It goes on to cite three reasons to support its approach for using the notional cost of debt. These are:[9]

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5 Ibid, p.29

6 Ibid, p.26

7 Ibid, p. 16

8 Ibid, p. 16

9 Ibid, p. 16

- *"Customers should not be responsible for funding inefficient financing structures of debt costs"*
- *"Companies are free to choose their actual capital structure and the debt instruments raised, but customers will only face the efficient cost of debt for a notionally structured company."*
- *"Using a notional approach rather than basing the cost of debt allowance on actual costs provides incentives for companies to outperform."*

2.2. Ofwat's Approach to Cost of Embedded Debt Does Not Compensate PW for its Efficiently Incurred Debt Costs

At PR14, Ofwat set the cost of debt allowance on average industry nominal company debt costs, and iBoxx benchmark cost of debt, less 15 bps to reflect Ofwat's view of the average sector outperformance of the benchmark.[10] Ofwat weighted the cost of embedded and new debt "*according to their mix in the notional capital structure*" based on an assumed weighting of 75:25 embedded to new debt.[11]

Given PW has a single (non-bank) debt issuance, issued at a time when the market cost of debt was high relative to current low market rates, the approach does not compensate PW fully for its (efficiently incurred) embedded debt. For example, Ofwat determined an embedded cost of debt allowance of 2.9 per cent at PR14 (including a 25 bps company specific uplift) [12] compared to PW's yield at issuance for its 2002 bond issue of 3.6 per cent, i.e. PW under-recovers historical debt costs by around 80 bps.[13] In addition, Ofwat assumed weighting of 75:25 for embedded:new debt based on an assumed uniform debt profile further penalises PW, as it understates PW's weighting on its embedded debt which is closer to 100 per cent. Ofwat's new cost of debt allowance was 2.25 per cent for PW, far below PW's embedded debt costs.[14]

In general, Ofwat's approach to embedded debt imposes windfall loses on those companies that issued debt when market costs were high relative to current low market rates (e.g., any debt issuance prior to the financial crisis), and provides windfall gains to companies that issued debt when market costs were relatively low. Ofwat adopts a "benefit-of-hindsight" approach to compensating companies for the cost of debt, penalising those who issued debt when credit markets were tighter.

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[10] Ibid, p.9

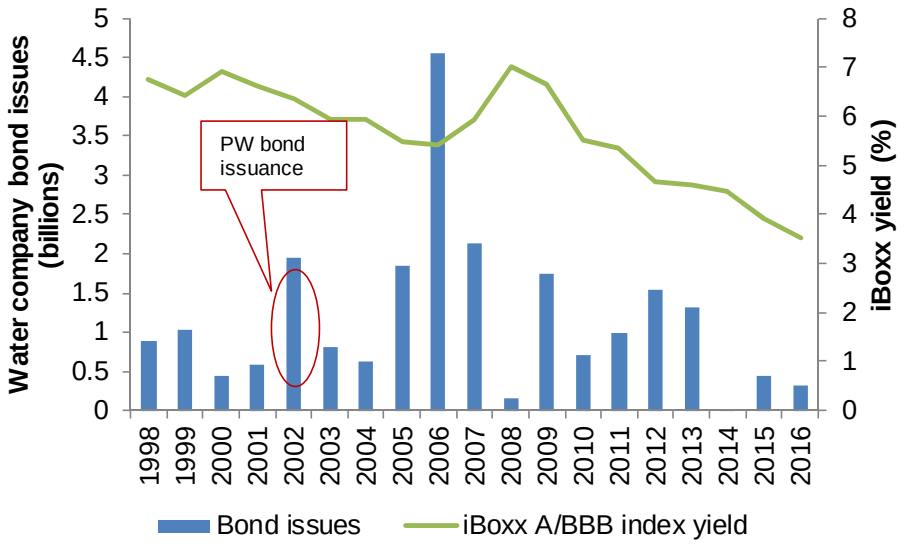
[11] Ibid, p.9

[12] Ofwat (December 2014), PR14 Final Determination, Chapter A7 – risk and reward, p.41, p.47

[13] See Table A.1

[14] The 2.25 per cent allowance includes a 25 bps company specific uplift. See Ofwat (December 2014), PR14 Final Determination, Chapter A7 – risk and reward, p.41, p.47

Figure 2.1
Ofwat's Approach to Embedded Debt Penalises PW that Has a Concentrated Debt Issue Prior to the Financial Crisis



Source: NERA analysis of Bloomberg data; includes water companies' public GBP bond issuances including index-linked and non-bullet bonds.

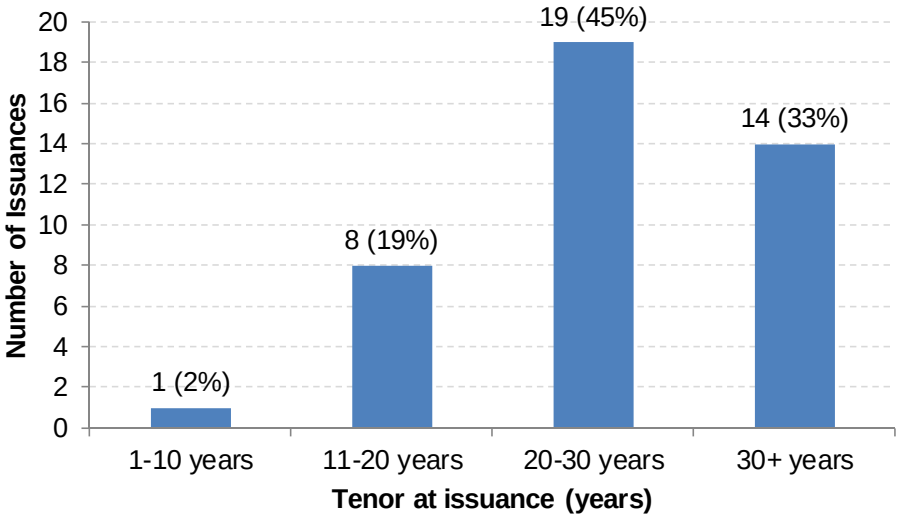
2.2.1. PW's 2002 debt issue was efficient

Although PW's 2002 debt cost is relatively high compared to the industry average, our analysis shows that the debt issue was efficient in terms of both its yield at issuance relative to the benchmark index value at the time of issuance, and its tenor (see Appendix A). For example, we calculate the benchmark value at the time of issuance in June 2002 at 3.7 per cent real compared to a yield at issuance of 3.6 per cent, i.e. PW marginally outperformed the index value.[15]

In relation to the 30 year tenor of PW's debt, based on a survey of 42 utility bonds issued at a similar time, we find that around half of utility companies issued debt of between 20 and 30 years, and a third issued longer-term debt instruments at the time. (See Figure 2.2.) Therefore, we consider that the tenor was in line with the wider sector at the time, and efficient.

[15] See Table A.1

Figure 2.2
Distribution of Tenor at Issuance for Utility Bonds 2000-2004



Source: NERA calculations based on Bloomberg data

Indeed, Ofwat has stated that the use of Artesian finance – the vehicle used by PW to issue its 2002 debt instrument – has contributed to a reduction in small company financing costs, and the small company premium, with direct benefits to consumers. For example, in the 2004 Final Determination Ofwat stated:

> *"There is evidence that the small company debt premium (both on interest rates and transaction costs) has decreased since the last review. This is in part due to developments in the sector, enabling the smaller companies to gain greater access to a variety of debt sources."*[16]

2.3. Other Regulators Recognise the Timing of Debt Issuance

In this section, we set out examples of regulators that set the cost of embedded debt based on a notional capital structure and efficient market index, but where the framework recognises the timing or debt profile of the network company (notably, where the debt profile is atypical because of the size of the company or the size of the investment programme).

The examples we cite correspond to Ofwat's approach to TTT (which broadly corresponds to Ofwat's option 2), Ofgem's approach for Scottish Hydro Electric Transmission (SHETL), which corresponds to Ofwat's option 3, as well as UREGNI's cost of debt indexation for NI gas distribution.

[16] Ofwat (2 December 2004), Future water and sewerage charges 2005-10 Final determinations, p.227

2.3.1. Ofwat's cost of debt for TTT reflects its atypical debt structure

For the Thames Tideway Tunnel (TTT), Ofwat developed a cost of debt mechanism where the ex-ante allowed cost of debt is adjusted over time in line with changes in market cost of debt. The adjustment provides TTT with a cost of debt allowance based on the efficient market cost of debt (measured by the BBB iBoxx index) at the time of *actual* debt issuance.[17] That is, the mechanism recognises the actual debt issuance profile over the construction and initial operational phase of the project.

In addition, in the post construction phase, Ofwat has acknowledged that it would need to consider TTT specific factors in determining the cost of debt allowance. Notably, Ofwat has proposed an alternative assumption for the embedded debt: new debt ratio (90:10) for the TTT relative to the industry average (75:25), in recognition of TTT's specific debt issuance schedule. Ofwat also recognises that the cost of TTT's embedded debt could be different to the industry as a whole, and "*it is likely that such factors will be taken into account in arriving at the overall cost of debt*".[18]

2.3.2. Ofgem's cost of debt allowance for SHETL reflects its specific circumstances as a relatively small TO

For the gas distribution (RIIO-GD1), and gas and electricity transmission (RIIO-T1) price controls, Ofgem adopted a cost of debt indexation based on 10-year trailing average of benchmark index yield for most network companies. However, for Scottish Hydro Electric Transmission's (SHETL), Ofgem developed a bespoke cost of debt index with a weighting based on the company's investment profile (proxied by change in RAV).

In its decision, Ofgem stated that the expected atypical investment and debt profile as the reason to adopt a bespoke approach: "*we acknowledged that a simple trailing average index may not fully reflect the cost of debt of a company with a rapidly-growing RAV if interest rates change sharply*."[19]

2.3.3. UREGNI recognises debt profile of NI gas distribution networks

UREGNI has established a cost of debt indexation mechanism which recognises the benchmark cost of debt at the time of actual issuance for both Phoenix Natural Gas (PNG) and Firmus Energy (FE), gas distribution networks in Northern Ireland.

Specifically, UREGNI proposes to set a cost of debt allowance based on the benchmark value in the month corresponding to the networks' debt issuance. UREGNI's approach recognises the concentrated and lumpy financing requirements for these two entities.[20] PNG's

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[17] Ofwat (September 2014), Draft license for the Infrastructure Provider of Thames Tideway Tunnel, p. 65, para. 6.7

[18] Ibid, p.18

[19] Ofgem (February 2012), RIIO T1: Initial Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd, para. 5.44

[20] UR (September 2016) Final Determinations, Annex 14 http://www.uregni.gov.uk/uploads/publications/Annex_14_-_Rate_of_Return_Adjustment_Mechanism.pdf

circumstance is particularly analogous to that of PW: with PNG having a single public bond given its small size relative to the minimum efficient scale to access public bond markets.

2.4. Conclusions: Recognising PW's Embedded Debt Drawing on Benchmark Meets Ofwat's Objectives

Ofwat's proposed approach to embedded debt at PR19 may not allow PW to recover historical embedded debt costs given that Ofwat intends to set *"a common allowance for the cost of debt based on evidence from benchmark and sector average costs."*[21]

As we set out in this section, UK regulators, including Ofgem, Ofwat and UREGNI have introduced cost of debt allowances that reflect actual debt issuance profiles where a company has an atypical debt profile, e.g. because of the small size of the networks in the case of SHETL and NI gas distribution, or the relative size of the investment programmes, in the case of TTT.

Recognising the embedded debt costs associated with PW's atypical debt structure would meet Ofwat's objectives for setting the cost of debt allowance. Drawing on the examples of the regulatory approaches elsewhere, if PW's cost of debt allowance were based on a notional capital structure and the benchmark value in the year of issuance, customers would not face the costs of *financing inefficient financing structures* (Ofwat's first stated reason for retaining its PR14 approach) and *customers will only face the efficient cost of debt for a notionally structured company* (Ofwat's second reason).

The approach also provides incentives for companies to optimise capital structure and minimise yield at issuance, as the cost allowance is based on an efficient market benchmark (e.g. iBoxx 10Y+ corporate non-financials), and a notional structure, and therefore independent of companies' actual debt costs, and capital structure decisions. That is, the approach *provides incentives for companies to outperform* (Ofwat's third reason).

[21] Ofwat (September 2016), Water 2020: consultation on the approach to the cost of debt, p.16

3. The iBoxx Index Is an Efficient Benchmark

We consider PW should be compensated for its actual embedded debt costs based on the benchmark index value at the time of issuance. The approach could be incorporated within Ofwat's proposed option for setting the overall cost of debt at PR19 (option 3), or indeed Ofwat's alternative options.

In setting the cost of debt allowance based on an index, the selected benchmark index needs to reflect the efficient costs of a water company, thus providing a reasonable prospect for the water company to recover its (efficient) costs and no more. In this section, we show that it would be reasonable to compensate PW for its embedded debt costs based on an average of A and BBB rated iBoxx corporate non-financial indices with ten or more years remaining maturity.

We first summarise Ofwat's evidence on outperformance of the benchmark index. We then explain that the outperformance is largely explained by rating differences, and in general there is no evidence that companies systematically outperform (the so-called "halo effect" does not exist). We also discuss the reasons why the iBoxx 10Y+ index can be considered as representative of networks efficient financing, drawing on Ofgem and Ofwat decisions for energy companies and TTT respectively.

3.1. Summary of Ofwat Evidence on Outperformance

Ofwat stated that there is evidence of a persistent and significant difference between corporate debt benchmarks and the water sector average debt costs. Specifically, Ofwat considers that the yield on the benchmark iBoxx A/BBB 10Y+ index has been consistently higher than the average water sector cost of debt, i.e. in the range of 0.3-0.8 per cent outperformance (see Table 3.1.), and around 0.5 per cent over the period of analysis. At PR14 Ofwat addressed the apparent sector wide outperformance by making a downward adjustment of 15 bps to the benchmark value in determining the embedded debt allowance.[22]

In its consultation paper, Ofwat did not support its option 2, where both the embedded debt and forecast debt are based on a benchmark index, citing concerns that the sector as a whole outperforms the index, and the risk that companies may over-recover embedded debt costs.[23]

[22] Ibid, p.9

[23] Ibid, p.26

Table 3.1
Ofwat's Comparison of the Average Water Industry Cost of Debt and iBoxx Index

Year (end-March)	Water industry cost of debt (mean)	IBoxx 10yr+ NFC A/ BBB (ten year trailing average)	Difference
2008	5.8%	6.2%	-0.4%
2009	5.5%	6.2%	-0.7%
2010	5.5%	6.2%	-0.7%
2011	5.5%	6.1%	-0.6%
2012	5.4%	5.9%	-0.5%
2013	5.5%	5.8%	-0.3%
2014	5.2%	5.6%	-0.4%
2015	4.7%	5.5%	-0.8%

Source: Ofwat (September 2016), Water 2020: consultation on the approach to the cost of debt, p.23

3.2. Rating Differences Explain a Large Element of the Apparent Outperformance

We disagree with Ofwat's conclusion that the water sector outperforms the benchmark index. In undertaking its comparison, Ofwat has not controlled for differences in the rating of the companies' debt relative to the index which in large part explains the gap.

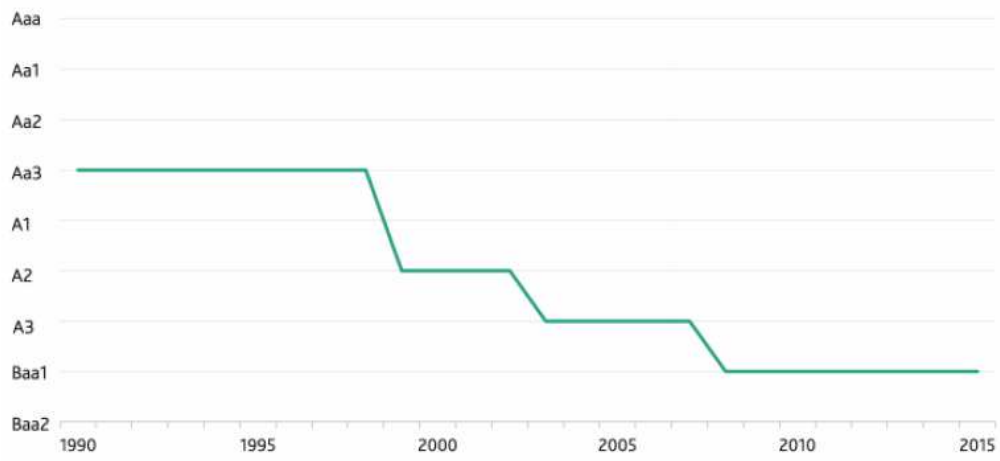
The evidence shows that most water utilities were rated in the broad A category over the past twenty years or so – i.e. the period which covers water companies' debt issuance included in Ofwat's industry debt costs. Based on Moody's analysis, water company debt is on average rated A1/A2 over the period, suggesting a two notch difference relative to the index average A3/Baa1. Based on an assumed difference of 15 bps for each rating notch,[24] the two notch difference in the average rating between water sector debt and the index equals around 30 bps, and therefore explains most of the 50 bps apparent outperformance over Ofwat's period of analysis as presented in Table 3.1.[25]

A higher average rating and lower debt cost relative to the benchmark does not represent outperformance per se: the difference in rating relative to the benchmark reflects companies' decisions on capital structure relative to the notional capital structure and rating assumed by Ofwat at review. This is a risk to be borne by companies.

[24] The spread between iBoxx A index and iBoxx BBB index is c. 43 bps on average (based on data from 1998 to 2016). This translates into c.15 bps per sub-notch (there are three sub-notches between A and BBB).

[25] Further analysis of the rating of each individual debt instrument would need to be undertaken to quantify the precise effect which is beyond the scope of our review.

Figure 3.1
Moody's Analysis Shows that Water Companies Adopted Higher Ratings on Average than the Average Rating of the Benchmark Index
(Average Industry Rating Over Time)



Source: CEPA (August 2016), Alternative approaches to setting the cost of debt for PR19 and H7, figure 2.9

3.3. Differences in Timing and Tenor May Also Explain Apparent Outperformance

As well as rating differences, debt timing may also explain an element of the apparent outperformance. Ofwat's benchmark cost of debt is based on an average iBoxx index over the past ten years. In undertaking its comparison with industry costs, Ofwat implicitly assumes that the sector issues debt in equal increments over the relevant 10 year period. As shown in Figure 2.1 above, the sector historical debt issuance has not been uniform over the recent period, with a substantive element of outstanding company debt issued prior to the most recent 10 year period included in the benchmark index value.

The overall effect of the timing of debt issuance on sector debt costs relative to the benchmark average cost over the past ten years is unclear.[26] However, as we explain in section 2.2.1, in the case of PW, Ofwat's proposed use of a ten year average iBoxx index value penalises PW. As a relatively small company, PW cannot maintain a diversified debt portfolio and as a consequence its debt is relatively concentrated – with a substantive debt issue in 2002 when debt market costs were higher compared to the 10 year benchmark average adopted by Ofwat.

As acknowledged by Ofwat, there may also be differences in tenor between water company and the iBoxx constituent bonds that explain an element of the apparent outperformance,

[26] Debt issued prior to the 10 year period may typically have been issued at higher cost than the 10 year trailing average benchmark used in Ofwat's analysis but the overall effect is unclear.

although our analysis shows that that the average tenor at issuance of water companies debt is in line with the average remaining tenor of the iBoxx index at around 20 years.[27]

3.4. There is No Evidence to Support the "Halo Effect"

Ofwat also considered "*regulated utility companies may benefit from lower debt costs relative to a company of the same credit rating through perceptions of lower relative risk*"[28] (the so-called "halo effect"). In other words, Ofwat considers that setting aside differences in rating, tenor and time-profile between the sector and the benchmark, there is an element of pure outperformance of the index associated with perceptions of lower risk.

Conceptually, we would not expect a halo-effect: rating agencies reflect the extent to which the regulatory regime improves credit risk in the rating methodology, and therefore the lower risk is reflected in the rating. For example, Moody's rating methodology assigns 40 per cent weighting to a "*regulatory environment and asset ownership*" factor of which 15 per cent is for the sub-factor "*stability and predictability of the regulatory regime*".[29]

Moreover, the empirical evidence does not support the existence of a halo effect once we adjust for differences between utility bonds and the benchmark index (e.g. credit rating, tenor, etc.), that is once we compare the index to companies' bonds on a like-for-like basis. Indeed, the CMA also considered evidence on the halo effect as part of the appeal of Ofgem's RIIO-ED1 decision by British Gas Trading (BGT).[30] Although it found some evidence for the halo effect before 2009, the CMA noted that there was no evidence of a halo effect since 2009, and that any historical halo effect had diminished over time.[31] We summarise in Appendix B the relevant analyses on the halo effect.

3.5. The iBoxx Index is Representative of Networks' Debt Costs

Ofgem considered the choice of the benchmark index at the Strategic Review for the electricity and gas transmission companies (RIIO-T1) and gas distribution companies (RIIO-GD1).[32] In making its decision, Ofgem considered a number of criteria[33], and it rated the iBoxx index "well" on "representative of the networks" and "transparency of methodology".[34] Specifically, in relation to the "representative of the networks" criterion,

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27 Source: NERA analysis of all water company nominal bullet bond issuances; Ofgem, (31 March 2011) Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues, p. 22

28 Ofwat (September 2016), Water 2020: consultation on the approach to the cost of debt, p.13

29 Moody's Investor Service (November 2014,), *"Rating Methodology: Regulated Electric and Gas Networks"*, p.5

30 CMA (2015) British Gas Trading Limited v The Gas and Electricity Markets Authority, Figure 15, p.137, para 8.8 (c)

31 CMA (2015) British Gas Trading Limited v The Gas and Electricity Markets Authority, Figure 15, p.150

32 Ofgem (17 December 2010) Consultation on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues; https://www.ofgem.gov.uk/ofgem-publications/48273/t1-and-gd1-finance.pdf

33 The set of criteria were: "coverage"; "transparency of methodology"; "representative of the networks"; "objective", "predictable"; "user familiarity"; "risk of discontinuation". Source: Ofgem (31 March 2011) Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues, Table 3.5; https://www.ofgem.gov.uk/ofgem-publications/48262/gd1decisionfinance.pdf

34 Ofgem (31 March 2011) Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues, Table 3.5; https://www.ofgem.gov.uk/ofgem-publications/48262/gd1decisionfinance.pdf

Ofgem stated that the iBoxx index includes a high proportion of utilities. It also considered that the iBoxx index has a remaining maturity which is "broadly in line" with the tenor at issuance of network companies' debt, and that "*the iBoxx indices have the advantage of including bonds of longer than ten years maturity, thus better capturing the debt profiles of network companies.*" [35]

On the basis of its evaluation, Ofgem decided to use the iBoxx index as the basis for the cost of debt indexation mechanism for RIIO-T1 and RIIO-GD1,[36] and adopted the same approach for RIIO-ED1.[37]

For TTT, Ofwat also considered the relevance of the index, and determined to use iBoxx BBB rated index reflecting the expected notionally efficient credit rating of the infrastructure provider, and a trailing average period that reflected the actual debt profile of the TTT.[38]

In conclusion, we consider that the iBoxx index provides a reasonable measure of efficient debt issuance costs for water companies (and regulated networks more generally). It comprises a large number of constituent bonds and is therefore a broad market measure. It also comprises a high proportion of utility companies which should have similar debt financing requirements and therefore debt costs as water companies. [39] The index also has a remaining tenor which approximates to the average tenor at issuance of network companies' debt of around 20 years. In addition, no single company materially affects the average tenor of the index or the index value, and therefore the allowance is independent of actual debt costs, thus providing strong incentives for companies to minimise debt costs.

For these reasons, we consider that the iBoxx index provides a reasonable basis to set PW's embedded cost of debt allowance.

3.6. Conclusions

Ofwat considers that it should not set an embedded debt cost allowance based on an iBoxx benchmark given the historical outperformance by the sector of the index, and proposes to retain its approach to embedded debt as per PR14. It cites the outperformance of the index as a reason for not supporting option 2 to setting debt costs (a full indexation approach).

We disagree that companies have outperformed the index: the substantive element of the so-called outperformance reflects the stronger rating of companies' debt issues over the period

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[35] Ofgem (31 March 2011) Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues, para. 3.34; https://www.ofgem.gov.uk/ofgem-publications/48262/gd1decisionfinance.pdf

[36] Ofgem (31 March 2011) Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues, para. 3.37; https://www.ofgem.gov.uk/ofgem-publications/48262/gd1decisionfinance.pdf

[37] Ofgem (4 March 2013) Strategy decision for the RIIO-ED1 electricity distribution price control Financial issues, para 2.14; https://www.ofgem.gov.uk/ofgem-publications/47071/riioed1decfinancialissues.pdf

[38] Ofwat (September 2014), Draft license for the Infrastructure Provider of Thames Tideway Tunnel, p. 65, para. 6.7

[39] For example, we expect that utility companies have similarly long-lived assets, with a corresponding need to issue relatively long-term debt to finance such assets. The iBoxx A and BBB rated 10Y + maturity indices comprise around 110 bonds in total, with utility bonds comprising around 50%. Source: Ofgem (31 March 2011) Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues, Figure 3.3; https://www.ofgem.gov.uk/ofgem-publications/48262/gd1decisionfinance.pdf

of analysis relative to the A/BBB iBoxx index. A stronger rating and lower yield does not represent outperformance per se but rather reflects companies' capital structure decisions.

Any remaining outperformance observed by Ofwat may be related to differences in timing of companies' debt issues relative to the ten year average index value. However, in the case of PW, PW is penalised by Ofwat's proposed approach to setting embedded debt cost based on benchmark average over the past ten years.

The iBoxx index is representative of network companies' efficient financing costs, as considered by Ofgem at previous energy reviews and Ofwat itself in designing a mechanism for TTT. We consider that PW's embedded debt costs should be based on the iBoxx index value at the time of issuance which will compensate PW for efficient costs and no more. Such an approach could be incorporated within Ofwat's preferred option 3 for setting the overall cost of debt at PR19, or indeed its alternative options.

4. Conclusion

Ofwat's proposed approach to setting the embedded cost of debt allowance at PR19, based on industry average and benchmark cost, may not compensate PW fully for its efficiently incurred embedded debt costs.

In contrast to Ofwat's intended approach, there is strong regulatory support for compensating PW for its efficiently incurred historical cost of debt, e.g. by setting an embedded cost of debt allowance based on the benchmark index value at the time of issuance. UK regulators, such as Ofgem in the case of SHETL, Ofwat for TTT, and most recently UREGNI for gas distribution networks in NI, have set cost of debt allowances based on the actual debt issuance profile where the company has atypical debt issuance – such as the case with PW.

There is no evidence that the sector systematically outperforms the benchmark index; in large part Ofwat's cited outperformance is explained by the historically stronger rating profile of companies' debt relative to the average A and BBB rated iBoxx indices. The index is representative of network companies. By setting the embedded cost of debt allowance based on the benchmark index, PW will recover its efficient costs and no more. The approach also achieves Ofwat's stated objectives for setting the cost of debt, in terms of ensuring consumers do not finance inefficient costs or structures, and the arrangements provides for strong incentives to minimise debt issuance costs.

Finally, we note that Ofwat's proposed approach to the cost of debt at PR19 would exacerbate the negative impact on financial metrics from the anticipated change in indexation from RPI to CPI. As set out in a separate NERA report, [40] PW's financial structure exposes it to unique risks from a change from RPI to CPI indexation as PW's share of index linked debt (ILD) as a proportion of its RCV is around 70 per cent, one of the highest in the industry. The failure to recognise PW's efficiently incurred embedded debt costs will further weaken PW's credit metrics for PR19: the solution is to recognise PW's embedded debt costs based on a benchmark index.

[40] See NERA (May 2016), Financeability Impact of Ofwat's Indexation Proposals

Appendix A. Efficiency of Portsmouth Water's 2002 Debt Issuance

This appendix draws on analysis from NERA's earlier report for PW[41], in setting out evidence on the efficiency of PW's existing RPI index-linked debt (ILD) 2002 issue. We show that PW's 2002 debt instrument is efficient: its yield at issuance is below the benchmark yield at the time of issuance, and the tenor is in line with other issues. We also set out evidence in relation to the efficiency of Artesian finance, and the direct benefits to consumers from a reduced small company premium.

A.1. Introduction

We consider the efficiency of PW's debt taking into account the following factors:

- Efficiency of the *cost* at which PW issued debt (section A.2);
- Efficiency of the *tenor* for which PW issued its debt (section A.3); and
- Efficiency of Artesian finance (section A.4).

A.2. Comparison of PW's Cost of Debt Against Benchmarks

PW issued its debt on 26 June 2002 at a real cost of 3.635%. To assess the efficiency of the *cost* at which PW issued, we compare the real cost of PW's debt (3.635%) to a benchmark measure of market cost of debt at the time of PW debt issuance (26 June 2002).

We use the average of the A and BBB iBoxx GBP corporate non-financials index with 10+ years maturity as the benchmark measure of market cost of debt at the time of PW's debt issuance. We consider the A/BBB iBoxx index represents an appropriate benchmark, given that Ofwat used the same index as a basis for determining allowed cost of debt for PR14. Ofgem also uses this index to set allowed cost of debt under its debt indexation mechanism. We deflate the iBoxx benchmark cost (expressed in nominal terms) with a 20 year breakeven inflation estimate from the 26 June 2002 to obtain a benchmark measure of market cost of debt in real terms. The 20 year breakeven inflation corresponds to the average maturity of the A/BBB iBoxx index which was around 19 years at the time of PW debt issuance.

The results of our calculations are shown in Table A.1.

[41] See NERA (May 2016), Financeability Impact of Ofwat's Indexation Proposals

Table A.1
Comparison of PW Cost of Debt to A/BBB iBoxx at Time of Issuance (26/6/2002)

	%
A iBoxx index yield (26/6/2002)	6.1
BBB iBoxx index yield (26/6/2002)	6.7
Average A/BBB iBoxx index yield (26/6/2002)	6.4
20 Year breakeven inflation (26/6/2002)	2.7
Real cost of debt benchmark (26/6/2002)	**3.7**
PW actual real cost of debt	**3.6**

Source: NERA calculations based on Datastream and Bank of England data

As can be seen in Table A.1, we calculate a benchmark market cost of debt of 3.7% (real) at the time of PW debt issuance, which is slightly higher than PW's actual cost of debt of 3.6%. Based on this we conclude that PW's debt was issued at an efficient cost, given that PW's actual cost of debt is *below* the market benchmark.

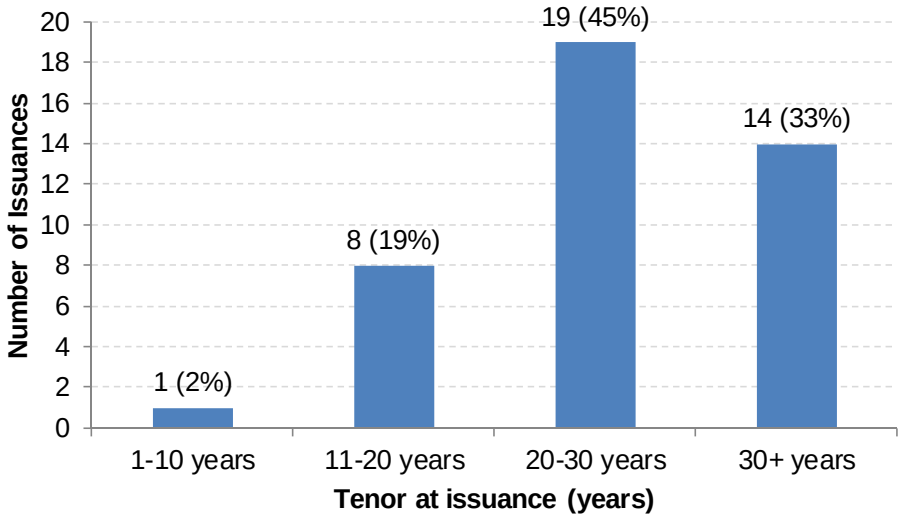
A.3. Comparison of PW's Tenor Against Benchmarks

PW issued its debt in 2002 for a 30 year tenor. To assess the efficiency of issuing for a tenor of 30 years, we have considered the distribution of tenor at issuance for comparable debt issuances at around the time of PW debt issuance. Specifically, we compiled a set of benchmark bonds from Bloomberg based on the following criteria:

- Utility issuer;
- GB domicile;
- Currency of issuance GBP;
- Issued between 1/1/2000 and 31/12/2004 (i.e. approximately two years before and after PW's debt issuance); and
- Repayable at maturity.

Our criteria provide us with 42 benchmark bonds. The distribution of tenor at issuance for the selected benchmark bonds is shown in Figure A.1.

Figure A.1
Distribution of Tenor at Issuance for Utility Bonds 2000-2004



Source: NERA calculations based on Bloomberg data

The majority of comparator bonds issued at around the time of PW debt issuance have relatively long tenors: 45% of the comparator bonds had a tenor at issuance of between 20 and 30 years and 33% of the bonds had a tenor at issuance greater than 30 years. PW's tenor at issuance of 30 years therefore appears consistent with the industry benchmark data. We conclude there is no evidence to suggest that the 30 year tenor was inefficient.

A.4. Efficiency of Artesian Finance

Ofwat has recognised the benefits of Artesian finance in reducing the Small Company Premium over time. For example, in the 2004 Final Determination Ofwat stated:

> *"There is evidence that the small company debt premium (both on interest rates and transaction costs) has decreased since the last review. This is in part due to developments in the sector, enabling the smaller companies to gain greater access to a variety of debt sources."*[42]

Artesian finance structure was put in place to allow small companies (like PW) to overcome liquidity and size limitations in accessing bond markets and has helped reduce financing costs compared to what they would have been otherwise. However, to take advantage of interest rates available under Artesian finance, companies had to borrow relatively large sums and for long term (when compared to the size of their business). The need for issuing relatively large sums to take advantage of competitive rates was discussed in a report by NERA on the small company premium at PR04:

[42] Ofwat (2 December 2004), Future water and sewerage charges 2005-10 Final determinations, p.227

> *" the gearing levels of the companies that have issued debt through Artesian are significantly above Ofwat's assumed gearing level of 50:50 debt:equity. There is thus evidence to suggest that the use of Artesian loans is not competitive at small loans amounts (which is to be expected if transaction costs are relatively similar across issue sizes)."*[43]

Due to its small size, PW was unable to spread borrowings over several tranches and several years while also taking advantage of the rates available under Artesian finance. As a result, PW has a single debt issuance, issued at a time when the market cost of debt was relatively high compared to current market costs. However, this does not mean that PW's financial structure is inefficient. The Artesian loan allowed PW to issue debt at efficient cost (as demonstrated by our analysis in section A.2 and A.3) and therefore represented an efficient financial decision at the time.

A.5. Conclusions

Our review of PW's embedded debt suggests that the cost of the debt instrument, its tenor, and the issuance through the Artesian vehicle all lead to an efficient financing decision. Specifically, we note:

- The cost of PW's debt is consistent with the benchmark cost of debt at the time of issuance (as measured by the average A/BBB iBoxx index, deflated using 20 year breakeven inflation data). The iBoxx index represents an efficient benchmark as acknowledged by Ofwat in its use of the benchmark for the Thames Tideway Tunnel, as well as recognised as such by Ofgem and CMA (at RIIO-ED1 appeal).
- The 30 year tenor is in line with tenor at issuance for comparable bonds issued at around the time of PW debt issuance (33% of comparable bonds were issued at a tenor of 30 years and greater).
- Ofwat has recognised the benefit of Artesian finance via reduction in small company premium over time, and therefore it is clear that PW's financing decisions (through the use of the Artesian vehicle) have benefitted customers.

In conclusion, as described in the main report, we consider that PW should be compensated for embedded debt costs based on the market benchmark at the time of issuance.

[43] NERA (2003), Recent evidence on small water company and of capital premium, p.35

Appendix B. Evidence on the Halo Effect

In this appendix, we review evidence on the so-called halo effect in relation to Ofgem's analysis at recent energy price controls, CMA's consideration of the halo effect at the recent RIIO-ED1 appeal. We also review CEPA, Ofwat's consultants, review of the evidence. We show that there is no evidence to support the halo-effect when a comparison of network debt issues and the benchmark index is undertaken on a like-for-like basis.

B.1. Ofgem's So-Called Halo Reflects Sample Bias

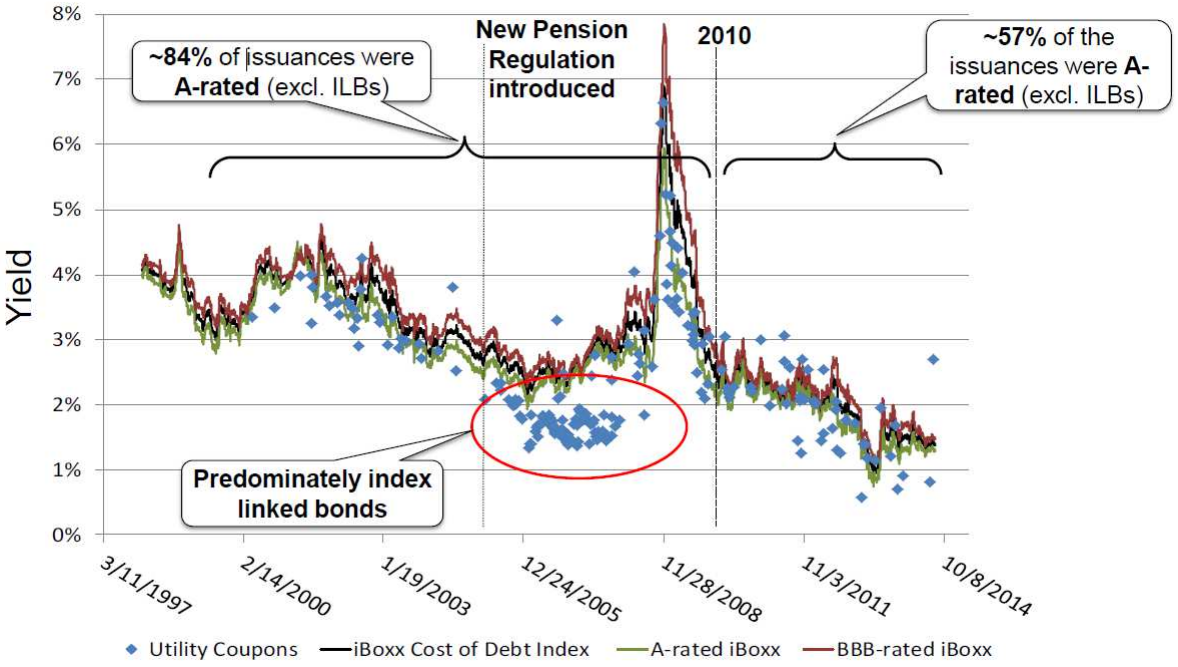
At RIIO-ED1 Strategy Decision, Ofgem compared the *yield at issue* of utility bonds with iBoxx A/BBB index and concluded that utilities can issue cheaper debt than the index. [44] However, a report by us for Western Power Distribution (WPD) showed at the so-called "halo effect" was almost entirely explained by: I) the inclusion of utility index-linked debt (ILD) which were significantly cheaper for a specific period of time, potentially driven by new regulations, [45] (see Figure B.3); and II) the stronger rating of network companies' bonds which were predominantly A rated over the period of analysis, compared to the benchmark average of the iBoxx 10Y+indices for A/BBB index. Our analysis showed that correcting for these two errors results in a spread between the relevant iBoxx benchmark and the utility *yield at issue* of only 1 to 4 bps.[46]

[44] Ofgem (March 2013), RIIO-ED1 Strategy decision, p.12

[45] The low yield of index-linked bonds was due to inelastic demand driven by the new pension regulation.

[46] See for example reports commissioned by WPD, SPED and Energy Networks Association from NERA Economic Consulting over the course of RIIO-ED1. Links: http://www.westernpower.co.uk/docs/About-us/Stakeholder-information/Our-future-business-plan/Supporting-Financing-plan/NERA-Analysis-of-Ofgem-s-Halo-Effect.aspx; http://www.spenergynetworks.co.uk/userfiles/file/App12_201408_NERA_AnalysisOfOfgemCostOfDebtDraftDetRIIOED1.pdf.; http://www.spenergynetworks.co.uk/userfiles/file/App13_201409_NERA_ResponseToOfgemProposalsCoECoD.pdf

Figure B.1
Ofgem's "Halo effect" is Driven by ILD Issues in 2005-2008, and Stronger Rating of Utilities Prior to the Financial Crisis



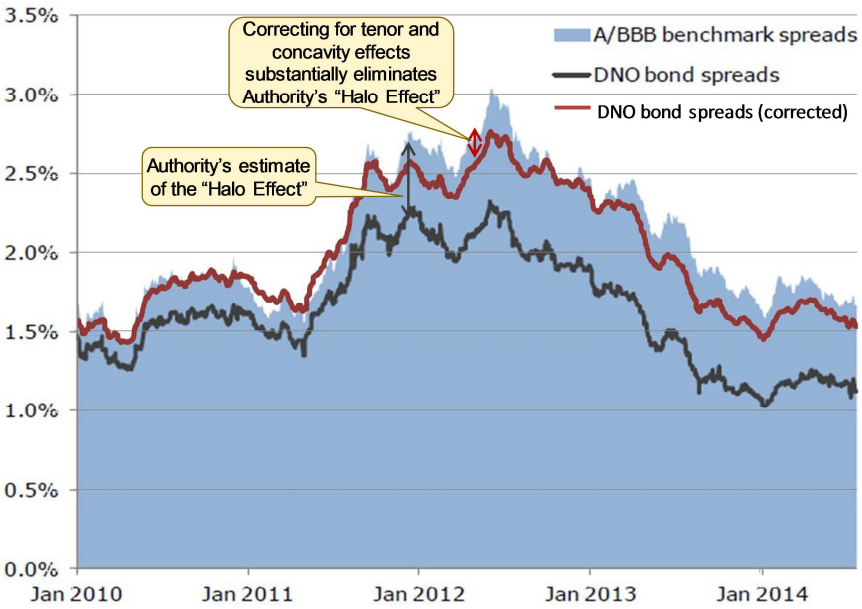
Source: NERA analysis of Ofgem data

At its Draft Determination, Ofgem presented an alternative analysis on the halo effect to correct for the errors identified above. In its revised analysis, it compared the *yield to maturity* data for DNO bonds and the iBoxx index, and concluded that DNO bonds' spread over UK gilts is systematically smaller than that of the iBoxx index. However, as with its earlier analysis, we showed that the apparent halo effect reflected sample bias in the selection of companies' bonds, principally, that the remaining tenor of DNO bonds was systematically shorter than that of the index (which results in a lower yield).

We showed that controlling for the difference in tenor, and other effects[47], substantively eliminates the so-called "halo effect" (see Figure B.2).

[47] For example, the concavity effect, which relates to the concave shape of the yield curve, i.e. that the yield increases as the tenor of the bonds increases, but at a decreasing rate. This means that the average yield of two bonds with a maturity of 5 years and 25 years is not the same, but in fact smaller than the yield on a 15-year bond (i.e. a bond with their average maturity). This thus implies that a portfolio of bonds with a high variability in the tenor of the composite bonds (e.g. the utilities bond portfolio), will have a lower average yield than a portfolio with a low variability (i.e. the iBoxx index), even if the bonds have the same average tenor.

Figure B.2
Ofgem's "Halo effect"is Substantively Eliminated Once the Comparison with the Benchmark is Made on a Like-for-like Basis



Source: NERA analysis. See *http://www.spenergynetworks.co.uk/userfiles/file/App13_201409_NERA_ResponseToOfgemProposalsCoECoD.pdf*

In its Final Determinations, Ofgem accepted that its analysis did not take account of differences in tenor.[48] Based on its revised analysis, it estimated a substantially reduced halo which it considered to be "*negligible*" for the substantive period of its analysis. [49]

B.2. CMA Found Halo Effect Diminished, at the RIIO-ED1 Appeal

The CMA also considered evidence on the halo effect as part of the appeal of Ofgem's RIIO-ED1 decision by British Gas Trading (BGT).[50] The CMA undertook its own analysis of the existence of the halo effect based on utility *yield at issue*. Although it found some evidence for the halo effect before 2009, the CMA noted that there was no evidence of a halo effect since 2009, and that any historical halo effect had diminished over time.[51]

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48 Ofgem (December 2014) Final Determinations – Overview, Appendix 8, para. 1.2; https://www.ofgem.gov.uk/ofgem-publications/92249/riio-ed1finaldeterminationoverview-updatedfrontcover.pdf

49 Ofgem (December 2014) Final Determinations – Overview, Appendix 8, para. 1.4; https://www.ofgem.gov.uk/ofgem-publications/92249/riio-ed1finaldeterminationoverview-updatedfrontcover.pdf

50 CMA (2015) British Gas Trading Limited v The Gas and Electricity Markets Authority, Figure 15, p.137, para 8.8 (c)

51 CMA (2015) British Gas Trading Limited v The Gas and Electricity Markets Authority, Figure 15, p.150

B.3. CEPA Analysis for Ofwat Suffers from Sample Bias

CEPA, Ofwat's consultant, also carried out an assessment of the halo effect drawing on a sample of water companies' bonds only (Ofgem and CMA's analysis described above draws on water as well as other network debt) in its cost of debt indexation proposal for Ofwat. [52] CEPA reports an average halo effect of 36 bps over 2006-2009 and 29 bps over 2011-2013, and yet no halo post 2013, based on a comparison between the *yield at issue* of water company bonds and the iBoxx A/BBB index. We consider CEPA's analysis draws incorrect conclusions for the following reasons:

- **Failure to adjust for differences in tenor for the sample relative to the index:** As acknowledged by CEPA, the tenor of the individual bonds within its (small) sample is different (typically shorter) than the tenor of the iBoxx index. CEPA has attempted to adjust for the tenor difference between the individual bond issuances and the benchmark index by adjusting companies' yield at issue according to a Bloomberg yield curve, e.g. for shorter dated bonds is makes an upward adjustment to the yield at issue based on the term structure of bonds .[53]

  However, CEPA has not provided any details of the adjustments it has made, and the approach is subject to error. For example, we are concerned with its use of the Bloomberg yield curve to derive a tenor adjustment given the limited number of constituent bonds in the Bloomberg index.[54]

- **Impact of the financial crisis on benchmark BBB rated bonds:** CEPA observes significant "outperformance" during the period of the global financial crisis. However, it is likely that the supposed outperformance reflects a spike in BBB corporate bonds during the crisis, and therefore a spike in the index value relative to predominantly A rated network bonds. As we show in Figure B.3, the spread between A and BBB yields spiked during the financial crisis. Given most water bonds were A-rated at the time, the so-called halo effect reflects the rating difference between A-rated water bonds and the average of A and BBB rated bonds in the iBoxx indices.

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[52] CEPA (August 2016), Alternative approaches to setting the cost of debt for PR19 and H7

[53] See CEPA report, footnote 34

[54] For example, the Bloomberg non-financial A BVAL curve has 53 constituent bonds which cover tenors from less than 1Y to 30+Y or fewer than two bonds per tenor on average, which provides a weak basis for its tenor adjustment.

Figure B.3
Water Company Bond Yield at Issue vs. iBoxx

Source: NERA analysis of CEPA report

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