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Company specific adjustments to the WACC

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Executive Summary

In this report we review the evidence submitted by Water Only Companies (WoCs) and their advisors to support an uplift to the industry-wide allowed weight average cost of capital (WACC) set by Ofwat for the 2014 Price Review ("PR14"). In order to justify a company-specific uplift in the WACC, Ofwat requires that companies demonstrate that there are net benefits to customers from allowing companies to recover any higher financing costs. Ofwat is separately reviewing whether individual water companies create such a benefit to customers in England and Wales. Our report considers the evidence as to whether WoCs face incremental higher finance costs over the efficient notional cost of capital, as set out in Ofwat's PR14 Risk and Reward Guidance[1]. Ofwat will then decide on whether to allow an uplift to the cost of capital on the basis of its assessment of both costs and benefits.

Overall, we find that small WoCs have a higher cost of debt finance of around 25 basis points (bps[2]), but that no uplift should be applied to the cost of equity.

Company segmentation

In the 2009 Price Review ("PR09") Ofwat divided companies into three segments: Water and Sewerage Companies ("WaSCs"), Large Water Only Companies ("large WoCs")[3] and Small Water Only Companies ("small WoCs"). No companies or advisors made the case that the company segmentation in PR09 was unsuitable. We reviewed the distribution of Regulatory Capital Values ("RCV") across the industry, existing debt structures and debt financing requirements over AMP6 to determine whether the segmentation of companies used in PR09 is still suitable.

Our review of RCVs across the sector revealed a clear demarcation between the same three segments used in PR09. For example, the largest WoC has under half the RCV of the smallest WaSC over the 2015-20 period. Our review of existing debt structures showed that small WoCs rely upon a different financing mix compared to WaSCs and Large WoCs. And lastly, our review of debt financing requirements showed that small WoCs would be unlikely to require bond finance over the 2015-2020 period. We consider that this evidence collectively provides support to the continuation of this three part segmentation of the industry.

The cost of debt for WoCs

All of the WoCs[4] set out arguments and evidence to suggest that the cost of debt they pay is higher than the level set out in Ofwat's Risk and Reward Guidance. Between them they argued that:

1. The actual cost of embedded debt for WoCs is higher than Ofwat's guidance figure.

2. WoC bonds command a premium over WaSC bonds, primarily due to their relative illiquidity.

3. WaSCs have access to a wider range of funding sources, whilst WoCs may have to rely upon bank debt for the PR14 period.

4. Issuance costs are proportionally larger for the smaller debt issuances of the WoCs.

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[1] Ofwat (2014), 'Setting price controls for 2015-20 – risk and reward guidance'.

[2] One basis point is equivalent to 0.01%

[3] Affinity Water and South East Water.

[4] Affinity Water is the exception to this, while they did set out a case in their original business plan submissions they subsequently accepted the 3.70% wholesale WACC following their draft determination. They did so on the grounds that: (i) they were keen to proceed with implementing their business plan; (ii) Ofwat's decision on retail margins gave them a financial advantage when compared to companies with lower revenue to RCV ratio; and (iii) that there were financial and non-financial benefits that would accrue from having an enhanced business plan.

Use of actual embedded debt costs

We concluded in our methodological considerations report[5] that no change to the methodology for setting the cost of capital was required by Ofwat in PR14. In particular, we recommended the continued use of a notional capital structure and efficient cost of debt benchmarks. We cautioned against a move towards using actual capital structures and actual embedded debt costs as this could reduce incentives for companies in the water industry to finance themselves efficiently. Our recommendation was that companies are able to manage finance risk through the timing of debt issuance, and instruments chosen. This means that companies should bear timing risk and gain or lose from any financing out- or under-performance relative to an industry benchmark. This means we do not recommend Ofwat uses actual embedded debt costs to set the cost of debt for WoCs, Instead, we review embedded debt costs to assess whether there is any systematic difference between the debt finance costs of WaSCs and WoCs.

Review of differences in embedded debt costs

We found little evidence to suggest that the large WoCs have a higher cost of embedded debt than the WaSCs.

Lending through the 'Artesian Finance' facility accounts for a high proportion of the debt finance used by small WoCs. Following Ofwat's clarifications with the WoCs over the costs they face on their Artesian financing, we have estimated that the small WoCs pay a premium of around **26bps** on average on this Artesian Finance compared to an equivalent WaSC bond financing benchmark.

Evidence from bond issuances is sparse for small WoCs. Small company size means bond issuances have been rare, leading to very few data points to review. Based on this limited evidence we find that small WoC bonds have an average interest rate premium of approximately **30bps** compared to WaSC bonds.

Impact of different sources of finance

WoCs typically use more bank debt than WaSCs, partly as a consequence of not being able to access bond markets in small quantities. We find that most small WoCs, on a notional basis, are unlikely to require new debt in amounts that are sufficiently large to make bond issuance a feasible option in AMP6. This is consistent with the submissions of the WoCs to Ofwat. Evidence from pricing of existing bank debt and also from interviews with commercial banks shows that WoCs face bank costs **20-40bps** above WaSC bank costs.

Looking ahead into the 2015-20 period we find that there could be cost advantages of shorter-term bank financing, which is a particular benefit to WoCs, who have an average of 9% bank debt in the financing structure compared to 1% for WaSCs. Quantifying this benefit is not simple because of less transparency of bank debt and because variable bank debt is often converted or swapped into fixed debt. Were Ofwat to make a more specific assumption on the portion of bank finance in the notional WoC financing mix, there would be other implications to consider, such as the impact on refinancing risk, interest rate volatility and issuance costs. Over the long-term, a specific assumption on the portion of bank finance in notional WoC financing mix may not be in the interests of consumers.

Issuance costs

Lastly, our review of issuance costs for WoCs suggests that sector allowance of **10bps**, as set out in the Risk and Reward Guidance should be sufficient to cover issuance costs.

Overall, we conclude the cost of debt finance for small WoCs is around 25bps higher than the industry notional cost of debt benchmark.[6]

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[5] PwC (2013), "Cost of capital for PR14: Methodological considerations".

[6] We note that the rationale for this adjustment is based on the cost of debt decision Ofwat provided in their Risk and Reward Guidance document. Should Ofwat decide to review their cost of debt estimate for the industry, the size of this adjustment may have to be reconsidered in light of any changes.

The cost of equity for WoCs

Most WoCs have suggested that their activities have a higher cost of equity because of higher operational leverage. This builds on the approach used by the Competition Commission ("CC") in considering Bristol Water's price determination following PR09. Conversely, none of the WaSCs sought to distinguish the nature of risks between their water and wastewater activities. One WoC did not set out a case that its cost of equity is higher than the level outlined in Ofwat's Risk and Reward Guidance.

Conventionally, 'operational leverage' is a measure of the proportion of total company costs that are fixed. In this specific regulatory context, the WoCs refer to the size of revenues and costs in comparison to RCV. The WoCs' interpretation of operational leverage for regulated utilities is therefore more about how either revenue or cost risks have an impact on returns. In their view, the impact on returns will be greater if a revenue or cost shock is higher relative to the capital invested in the business. So a regulated utility which has lower comparative level of capital employed will have more volatile returns for a given revenue or cost shock when compared to a similar firm with high comparative level of capital employed.

We find that there is no significant difference between either the historical revenue variation or operating expenditure across the different company segments. WoCs are projected to have higher revenue and totex to RCV ratios for AMP6, but it is striking that differences in Totex/RCV ratio across the WaSCs water and wastewater activities is relatively small, suggesting that the reason why WoCs have higher ratios is not inherent to the differences between water or wastewater activities, but due to the initial setting of RCVs at privatisation and subsequent additions and depreciation since privatisation.

We considered a number of situations where cyclical profit variation was caused by revenue risks, cost risks and a combination of the two. In each of the scenarios considered, we do not a find a credible situation where WoCs are exposed to greater systematic risks as a consequence of their different cost structures compared to WaSCs.

Furthermore, there are key changes to the PR14 regulatory framework relative to past determinations which should limit the impact of any historical cost structure differences comparing WoCs to WaSCs:

1. The new total expenditure ("totex") regime, specifically Pay-As-You-Go (PAYG) and run-off rate flexibility it affords, will give companies more discretion over the size of annual returns and long-term development of RCV. Any difference in future cost structures will be the result of company management choices rather than inherent risk differences.

2. Outcome Delivery Incentives (ODIs), uncertainty mechanisms, and wholesale cost menus can be used to balance risk profiles within an overall risk range. We note that the forward looking ranges for return on regulated equity ("RoRE") are more aligned across the industry than historical analysis of RoRE ranges.

We conclude that the operational leverage metric used by WoCs has a number of weaknesses. It essentially treats operational costs as fixed and capital costs as variable or discretionary in response to cost or revenue shocks. Over a price control period, operational costs should be able to vary to mitigate risk impacts and over a longer term capital costs are a fixed economic cost to the business, rather than a buffer for absorbing risk. We also find that empirical evidence of betas does not support a higher cost of equity for one listed water company with a high totex to RCV ratio.

Other arguments submitted were in relation to equity illiquidity costs and issuance costs which apply to floated small companies. We do not recommend that Ofwat makes allowances for any specific form of company ownership.

Overall, we recommend that there should be no cost of equity adjustment for either large WoCs or small WoCs.

1. Introduction

In this report we review the evidence submitted by Water Only Companies (WoCs) and their advisors to support an uplift to the industry-wide allowed weight average cost of capital (WACC) set by Ofwat for the 2014 Price Review ("PR14"). In order to justify a company-specific uplift in the WACC, Ofwat requires that companies demonstrate that there are net benefits to customers from allowing companies to recover any higher financing costs. Ofwat is separately reviewing whether individual water companies create such a benefit to customers in England and Wales. Ofwat will then decide on whether to allow an uplift to the cost of capital on the basis of its assessment of both costs and benefits.

Background

In January 2014, Ofwat set out its assessment of the industry wide cost of capital estimate for PR14[7]. The weighted average cost of capital (WACC) set out by Ofwat was 3.70% at the wholesale level. This WACC was based on a notional gearing assumption of 62.5%, a cost of debt of 2.75% and a cost of equity of 5.65%. The evidence used to calculate these figures was primarily based on Water and Sewerage Company ("WaSC") benchmarks for example, beta estimates were drawn from the three large WaSCs that are publicly listed, and debt finance benchmarks were drawn from corporate bond markets.

We present a summary of the WACC calculations in Table 1 below.

Table 1 Ofwat Risk and Reward WACC calculation

WACC inputs	Ofwat (preliminary point estimate)
Total equity market return	6.75%
Real risk-free rate	1.25%
Equity market risk premium	5.50%
Gearing (Net Debt:RCV)	**62.50%**
Asset beta	0.3
Equity beta	0.8
Cost of equity (post-tax)	**5.65%**
Ratio of embedded debt to new debt	75%:25%
Cost of new debt	2.65%
Cost of embedded debt	2.65%
Allowance for debt fees	0.10%
Overall cost of debt	**2.75%**
Appointee (Vanilla) WACC	**3.85%**
Adjustment for retail margins[8]	-0.15%
Wholesale (Vanilla) WACC	**3.70%**

Source: Ofwat Risk and Reward Guidance

All of the WoCs requested an uplift to this wholesale WACC of 3.7%[9] in their June 2014 business plan submissions. They all proposed both a higher cost of debt and a higher cost of equity, with the exception of

[7] Ofwat (2014), *'Setting price controls for 2015-20 – Risk and Reward Guidance'*, January

[8] Affinity Water acknowledged in their risk and reward submission that Ofwat's decision on retail margins gave them a financial advantage when compared to companies with lower revenue to RCV ratio.

[9] Affinity Water was granted enhanced status in the PR14 review process and did not submit a June business plan. It accepted Ofwat's Risk and Reward Guidance and did not request any uplift to the notional industry WACC.

Sembcorp Bournemouth Water, who only proposed a higher cost of debt, Table 2 sets out a summary of the company proposals (for a list of company acronyms please see Appendix F).

Table 2 WoC Wholesale WACC adjustments

Company	Proposed cost of debt adjustment	Proposed cost of equity adjustment	Proposed WACC adjustment	June Wholesale WACC
SEW	0.40%	0.30%	0.36%	4.06%
BRL	0.55%	1.00%	0.70%	4.40%
SSC	0.53%	0.22%	0.40%	4.10%
SES	0.35%	0.76%	0.50%	4.20%
SBW	0.33%	0.00%	0.19%	3.89%
PRT	0.40%	0.66%	0.50%	4.20%
DVW	0.85%	1.90%	1.20%	4.90%

Source: Company submissions, Ofwat

All WaSCs accepted Ofwat's proposed wholesale WACC of 3.70% in their June submissions. Therefore, it is only the WoCs that are seeking these adjustments.

This report responds to each of the arguments submitted by the WoCs in support of these company specific adjustments, and then concludes whether we consider WoCs face higher financing costs compared to the notional industry WACC. As aforementioned, we do not comment on whether there are benefits to customers across England and Wales from having smaller WoC appointees - this assessment is being conducted separately by Ofwat.

For AMP6 company specific projections, where appropriate, we have used data directly from company submissions. These figures may be subject to interventions by Ofwat in setting draft and final determinations, but for the purposes of this report we consider their use suitable.

Structure of this report

We structure our report based on the two main components of a potential company specific adjustment to the WACC: debt and equity.

In **Section 2,** we review WoC arguments for an uplift to the cost of debt, market evidence on the cost of debt for WoCs and conclude on the appropriate uplift, if any, to the cost of debt.

In **Section 3,** we review WoC arguments for an uplift to the cost of equity, and conclude on the appropriate uplift, if any, to the cost of equity.

In **Appendix A,** we set out the amount of new debt each company needs over AMP6 out on a notional basis.

In **Appendix B,** we present various metrics which support the conclusions on the relative risk of WaSCs and WoCs.

In **Appendix C**, we present the average debt maturity profile of WaSCs and WoCs.

In **Appendix D**, we show how a short-term debt profile will be more variable than a longer term debt profile.

In **Appendix E**, we present current financial gearing ratios across the water sector.

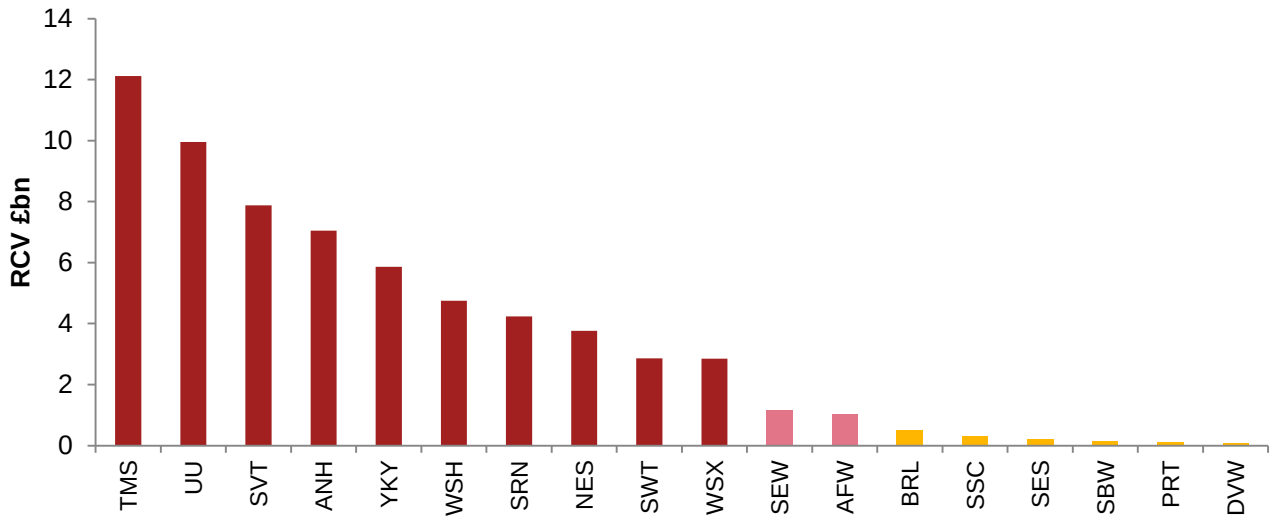
In **Appendix F**, we set out the company acronyms used throughout this report

2. Company-specific adjustments to the cost of debt

2.1 Segmentation of companies

For PR14 we consider that the segmentation of companies as set out in PR09 continues to be justified based on RCV size, existing debt structure and demarcation of debt finance requirements. Figure 1 below sets out the average RCV for each of the companies over 2015-2020, and supports the definition of three segments: (i) WaSCs; (ii) large WoCs and (iii) small WoCs, these are shaded, red, pink and yellow respectively. We set out why in the paragraph below.

Figure 1 Average RCV over 2015-2020



Source: Company submissions

The large WoCs, South East and Affinity, are expected to have an average RCVs over 2015-20 of approximately £1.1bn. This is more than double the RCV of the next largest WoC (Bristol) and is approximately half the RCV of the smallest WaSC (Wessex). This evidence supports the continued use of the WaSC, large WoC, small WoC segmentation.

The financing requirements of both large WoCs over AMP6 are large enough in size for bond financing to be a feasible option. As shown in Table 18 in Appendix A, on a notional basis, both Affinity and South East will need to refinance more than £100 million of debt over AMP6. Amounts less than £100 million may only be suited to private placements or bank financing; a level of financing requirement which applies to WoCs with RCVs of Bristol's level and lower (under £500m). This suggests that the smaller WoCs do not have the same financing options as the larger WoCs and provides further rationale for segmenting WoCs into these large and small categories.

Therefore, we define large WoCs as South East and Affinity, and small WoCs as Bristol, South Staffordshire Cambridge, Sutton & East Surrey, Sembcorp Bournemouth, Portsmouth and Dee Valley.

2.2 The case for a company specific adjustment to the cost of debt

Each of the WoCs set out a case for using a higher cost of debt assumption in the WACC compared to Ofwat's January guidance WACC in their June submissions. A summary of the size of these uplifts and their accompanying rationale is set out in Table 3 below.

Table 3 Company cases for a cost of debt uplift

Company	Cost of debt uplift	Rationale
SEW	0.40%	South East states that the optimal size for a single bond issuance is £350m. Bond issues that are smaller than this require increasing premiums as the size declines. South East also provides evidence from Frontier Economics that shows that their own traded bond yields are above those of WaSC comparators.
AFW	0.10%	Affinity initially suggested they were at a disadvantage on bond financing compared to a WaSC as their typical bond issuance was likely to be 'sub benchmark' in size (less than £250 million for fixed rate bonds). As these bonds are not eligible for inclusion in bond indices they have less liquidity, which requires a premium. After being identified as potentially enhanced, Affinity has since accepted the 2.75% cost of debt.
BRL	0.55%	Bristol cites Oxera's report[10] which attributes higher debt costs to company size. Smaller size both restricts the number of sources of funding available and creates inefficiencies, relative to larger debt issuances, such as liquidity premia and issuance costs. Bristol also asserts that there is a need for longer-term financing for smaller companies as they access debt markets less frequently.
SSC	0.53%	South Staffordshire Cambridge suggests that their actual embedded cost of debt should be used as they consider it was efficiently incurred at the time of issue.
SES	0.35%	Sutton & East Surrey mainly refers to a report produced by Frontier Economics to support their proposed cost of debt uplift. This report highlights three factors that increase risk for debt investors: a higher degree of operational leverage; increased credit risk due to smaller size; and additional transaction costs that small companies face.
SBW	0.33%	Bournemouth focuses on the coupon on their Artesian borrowing of 3.08%. They request that Ofwat take this into account and adjust the cost of debt approach to allow Bournemouth their actual embedded debt cost. They differentiate between using the actual embedded cost of debt and the need for a small company debt premium.
PRT	0.40%	Portsmouth also cites Oxera's 2013 report written on behalf of the small WoCs. They focus on Oxera's estimated margin of 0.4% on WoC embedded debt and also suggest there should be an additional premium to reflect the difficulties WoCs have had in taking advantage of the lower cost of debt finance available in recent years.
DVW	0.85%	Dee Valley disagrees with Ofwat's approach to setting the WACC and believes that their actual embedded cost of debt should be allowed. Their suggested uplift is based on a calculation of their actual embedded debt cost.

Source: Company submissions

The companies make four main arguments:

- The higher actual cost of embedded debt WoCs are said to face relative to the notional cost of debt set out in Ofwat's Risk and Reward Guidance.
- WoC bonds are argued to be at a cost disadvantage to WaSC bonds due to their smaller size.

[10] Oxera (2013), 'What is the evidence on required returns for water-only-companies at PR14?

- WoCs may be less able to access a range of sources of debt financing. Bank financing may be the only recourse for small WoCs.

- WoCs face higher issuance costs.

In the remainder of this section, we review past approaches to company specific WACC adjustments in Ofwat's determinations. We then address each of the issues set out above.

2.3 Previous approaches to company-specific adjustments

Historically, Ofwat has allowed different WACCs for WaSCs and WoCs. The table below sets out the company specific adjustments included in the final determinations of PR04 and PR09. The uplifts are shown in parentheses; there was zero uplift where there are no parentheses.

Table 4 PR04 and PR09 company specific adjustments

	Cost of Equity	Cost of Debt	Gearing	WACC (vanilla)	WACC uplift
PR04[11]					
WaSC	7.7%	4.3%	55%	5.8%	-
Large WoC	8.2% (+0.5%)	4.4% (+0.1%)	55%	6.1%	+0.3%
Medium WoC	8.9% (+1.2%)	4.6% (+0.3%)	55%	6.5%	+0.7%
Small WoC	9.0% (+1.3%)	4.7% (+0.4%)	55%	6.6%	+0.8%
Very small WoC	9.2% (+1.5%)	4.8% (+0.5%)	55%	6.7%	+0.9%
PR09					
WaSC	7.1%	3.6%	57.5%	5.1%	-
Large WoC	7.1%	3.7% (+0.1%)	52.5%	5.3%	+0.2%
Small WoC	7.1%	4.0% (+0.4%)	52.5%	5.5%	+0.4%

Source: Final determinations PR04 and PR09

Overall, there was a reduction in the allowed uplift from PR04 to PR09; however comparisons are complicated by the slightly different segmentation used in the two determinations. In PR04 there was an allowed uplift to the cost of equity but this was not deemed necessary in PR09. The allowed cost of debt uplift was relatively constant between the two determinations.

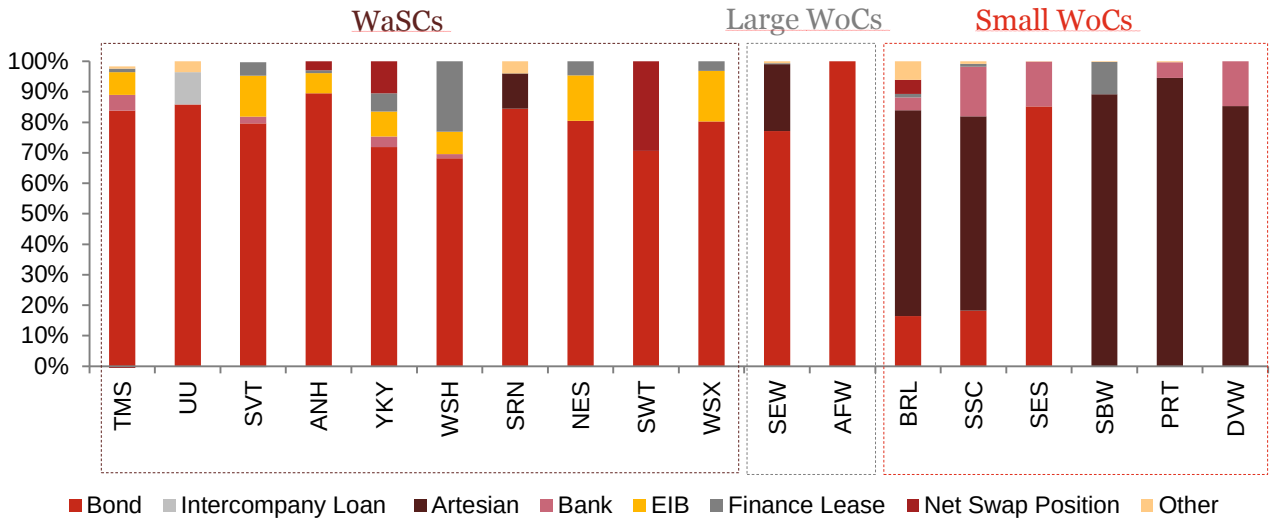
The Competition Commission (CC) calculated a cost of debt for Bristol Water using their actual debt costs; this was 3.9%, which implied a premium of 0.3 percentage points relative to the PR09 WaSC cost of debt assumption. The CC also applied a discount to the cost of equity of 0.5 percentage points relative to Ofwat's PR09 figure, having calculated a cost of equity of 6.6% compared to Ofwat's 7.1%.

2.4 Debt structures

Understanding the different sources of financing included in companies' debt structures is useful in order to understand the differences in the cost of debt faced by WaSCs and WoCs. Figure 2 below shows the composition of debt across the water industry.

[11] In the PR04 final determination, there were four bands of WoC. Very small WoCs had RCV's less than £70m, small WoCs had RCV's from £70m to £140m, medium WoCs has RCV's £140m to £280m, and large WoCs had RCV's of £280m to £700m.

Figure 2 Debt composition of water companies as at March 2013



Source: Company submissions

The majority of WaSC debt is bond financed (80%). This supports the use of corporate bond benchmarks to set the industry cost of debt assumption. WaSCs also make limited use of bank financing, which constitutes only approximately 1% of their debt portfolio. One WaSC (Southern Water) has used the water industry pooled financing vehicle set up by the Royal Bank of Scotland (RBS) and structured around Artesian Finance plc.

The large WoCs have a similar debt structure to the WaSCs with bond financing constituting the majority of their debt. The size of bonds issued by the large WoCs overlaps with the size of bonds issued by the WaSC group, this is despite their significantly smaller RCV size[12]. While they issue relatively fewer bonds, they have been long-term in nature. Whereas Affinity is entirely bond financed, some of South East Water's debt has been issued through Artesian Finance plc.

Box 1: Artesian Finance plc

In 2002, the Royal Bank of Scotland (RBS) created the first Artesian Finance facility with the purpose of pooling the debt financing needs of small water companies and, in doing so, reducing the higher financing costs typically associated with small debt issuances. Between June 2002 and December 2005 six WoCs, and one WaSC, borrowed through the Artesian financing facilities. They were primarily used by the WoCs given that most WaSCs are large enough to issue their own fixed income securities. There were three tranches of Artesian Financing, in 2002, 2003 and 2005, maturing in 2032, 2033 and 2045 respectively.

The majority of small WoC debt comprises long-term Artesian financing. Small WoCs typically supplement this with bank financing, which accounts for an average of 9% of overall debt financing. This is a notably higher proportion of bank financing than that used by the WaSCs, which, as set out above, was 1%.

In Section 2.5 below we discuss this Artesian Finance component. Given it is such a large constituent of the debt portfolio of small WoCs it is a critical component in assessing the embedded cost of debt.

[12] For example, Affinity has fixed rate bonds ranging in size from £80m to £250m and South East has index-linked bonds ranging in size from £34m to £200m. These overlap with recent WaSC issuances sizes.

2.5 Use of actual embedded debt costs

A number of the WoCs propose that Ofwat should use their actual embedded debt cost in the calculation of an appropriate cost of debt. In particular, they argue that these costs were efficiently incurred at the time the debt was issued.

We reviewed the methodology of setting the cost of capital in our methodology paper and concluded that no change to the overall approach was required[13]. In particular, we recommended that a notional capital structure and efficient cost of debt benchmarks should form the basis of the allowed cost of capital. We cautioned against a move towards the use of actual capital structures and actual embedded debt costs as this could reduce incentives for water companies to finance themselves efficiently. Our recommendation was that companies are able to manage finance risk through the timing of debt issuance and the nature of debt instruments used and, therefore, that companies should bear the timing risk and any gains or losses arising from out or underperformance relative to the industry benchmark. This aligns the cost efficiency incentives for finance costs to those for retail costs and wholesale expenditures where regulatory challenge is based on 'benchmark' competition, an approach consistently used since privatisation.

We note that, in particular cases, regulators do set the cost of debt with greater weight given to actual embedded debt costs, for example, when there are limited comparators or appropriate benchmarks[14]. However, given the available evidence, we do not consider that this invalidates our recommended approach of setting an efficient benchmark for the cost of debt. Following this, we do not recommend that Ofwat use companies' actual embedded debt costs to set the cost of debt for WoCs. However, we review embedded debt costs below to assess whether there are systematic differences between the debt finance costs of WaSCs and WoCs.

2.6 Review of embedded debt costs

In this section we review the embedded debt costs of WoCs to determine whether there are systematic differences between WoC and WaSC debt financing costs. As noted above, we do not consider differences in cost due to the timing of debt issuances to be relevant to assessing an efficient cost of debt. The relevant comparison is, therefore between the cost of debt incurred by WaSCs and WoCs at similar dates of issuance.

Artesian debt

Artesian finance is arranged through a special-purpose vehicle (SPV) involving a number of linked transactions for which there is limited publicly available data compared to bond finance. Determining the true cost of debt faced by water companies that have borrowed through one or more of the Artesian facilities requires detailed information from companies.

Following June submissions, Ofwat therefore clarified with each water company that has borrowed through the Artesian facility what their true effective interest rate was.

Company responses revealed that the structure of the Artesian borrowing differs between companies. The Artesian borrowings for some companies are structured in a similar fashion to a conventional loan, where a fixed loan amount and interest rate are agreed at issue. In these instances, the coupon set at issue, and submitted in the company business plan tables, represents the cost the company faces on this debt.

For other companies, the proceeds received were larger than the principal loan value, generating a premium. Where this is the case, the coupon is still relevant to the company in the context of calculating the cash interest payments due, but the coupon does not reflect the effective cost of debt. The relevant metric is the effective rate

[13] PwC (2013), 'Cost of capital for PR14: Methodological considerations'.

[14] For example, in their final determination for NIE, the Competition Commission focused on NIE's actual interest cost on their outstanding bonds. This was due to uncertainty around whether there should be a Northern Ireland premium on NIE's cost of debt. The real cost of existing debt for NIE was calculated as 3.2%, this was then weighted 90:10 with real new debt cost to reach a final cost of debt figure for NIE [Competition Commission (2014), 'Northern Ireland Electricity Limited price determination', *A reference under Article 15 of the Electricity (Northern Ireland) Order 1993,* Para 13.66 – 13.70]. In other cases, where the focus of a regulator was on a single entity that is lacking in industry peers, such as the CAA's regulation of NATS, there was also more weight placed on actual embedded cost of debt, rather than a notional industry figure.

of interest in relation to the proceeds received, equivalent to a gross redemption yield to maturity. This is the approach we use when assessing the cost of bond debt.

We have made adjustments, where appropriate, to the real coupon data provided by companies to reflect the effective cost of debt for Artesian borrowings. The effective real rate of interest from the Artesian issues are set out in

Table 5 below (excluding issuance costs, and adjusting for inflation where relevant). The spread is calculated with reference to the average of the A/BBB iBoxx corporate debt benchmark[15] with 15 bps subtracted. This subtraction is made because Ofwat's Risk and Reward Guidance used a real embedded cost of debt assumption of 2.65% (excluding issuance costs) which was 15bps lower than the long-term average of the real iBoxx benchmark yield.

Table 5 Artesian effective interest cost estimates

Tranche	Date	Company	Estimate of real effective interest	Real iBoxx on issue date	Spread over iBoxx(-15bps)
Artesian I	Dec 2002	SEW	3.69%	3.87%	-0.03%
Artesian I	May 2003	BRL	3.11%	3.33%	-0.07%
Artesian I	Feb 2004	BRL	3.11%	2.89%	0.37%
Artesian I	Jun 2005	BRL	3.11%	2.69%	0.56%
Artesian I	Jun 2002	PRT	3.63%	3.68%	0.10%
Artesian I	Aug 2002	DVW	3.64%	3.61%	0.18%
Artesian I	Jul 2004	SRN	2.99%	3.09%	0.05%
Artesian II	Jul 2003	SRN	3.31%	3.08%	0.38%
Artesian II	Jun 2005	SEW	2.80%	2.64%	0.31%
Artesian II	May 2003	BRL	3.40%	3.34%	0.21%
Artesian II	Feb 2004	BRL	3.08%	2.94%	0.29%
Artesian II	Apr 2005	SBW	3.08%	2.94%	0.29%
Artesian III	Dec 2005	SSC	3.09%	2.43%	0.81%
		Average	**3.23%**	**3.12%**	**0.26%**

Source: Ofwat, PwC calculations

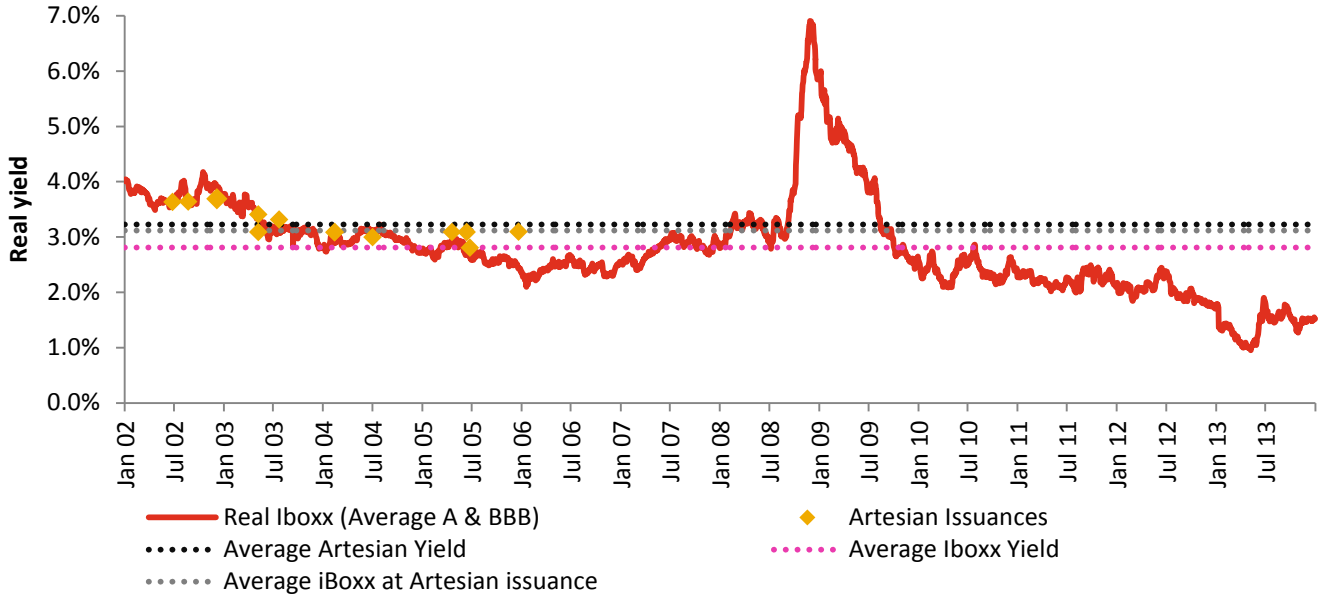
The average spread between the effective cost of Artesian loans and WaSC financing is estimated to be 26bps.

Figure 3 below sets out the data from the table above, plotting the effective interest paid on various Artesian Finance arrangements against a blend of the real iBoxx A and BBB indices[16]. The black dashed line shows the average effective rate on the Artesian issuances, while the dashed grey line shows the average real iBoxx yield on the specific dates when Artesian loans were made (the 15bps subtraction has not been applied to the iBoxx curve). The spread between these two lines corresponds to 11 basis points (0.11%). The lower pink dashed line shows the average of the real iBoxx indices over the 2002 to 2013 period as a whole, which shows that the timing of the issuances is the key reason for higher actual embedded debt costs for WoCs.

[15] iBoxx corporate non-financial A and BBB 10+ years indices

[16] Deflated using 10-year breakeven inflation rate from the Bank of England.

Figure 3 Artesian effective interest rates compared to the real yield on iBoxx indices



Source: Ofwat, Bank of England, Datastream

Evidence on the uplift on the cost of embedded debt for large WoCs using Artesian facilities is mixed. Affinity does not use the facility. For South East Water, which borrowed twice using Artesian facilities, the spreads to the iBoxx benchmark were -18 bps and +26bps showing that it has both out- and under-performed the water industry benchmark.

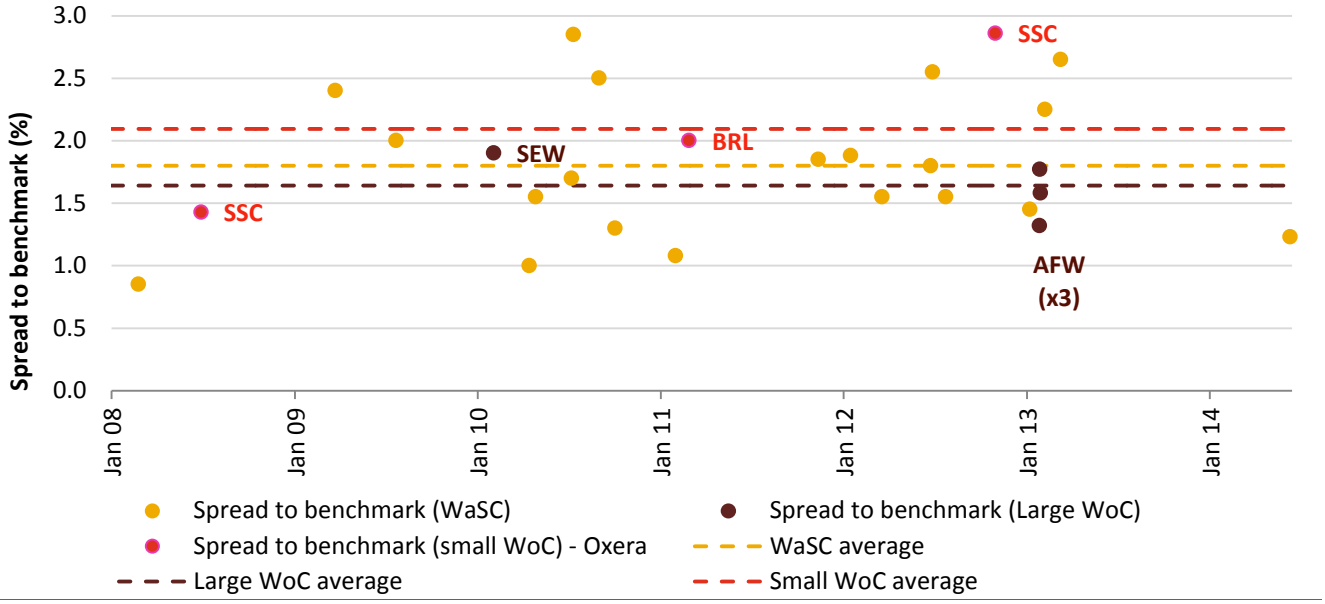
For the small WoCs, we calculate a premium of **26 bps** based on the whole Artesian facility. We note that there is little relationship between the size of the WoC and the uplift compared to the industry benchmark, showing how the Artesian facility, and industry collaboration does appear successful at reducing company size based cost of debt differentials.

WoC bond financing

While bond issuances by WoCs have been limited, there is some evidence that provides insight on whether WoC bonds require higher yields compared to WaSC bonds. This evidence is summarised in Figure 4 below, which sets out the spread of bond yields to the relevant benchmark gilt at issuance. We calculate spreads over benchmark gilts of comparable maturity, as there is a range of different maturities within the sample of bonds. Furthermore, an alternative approach of looking directly at yields at issue for WoC bonds versus WaSC comparator bonds is unsatisfactory due to limited availability of appropriate comparators.[17]

[17] Oxera provide evidence of this nature on behalf of the small WoCs. In the case of their South Staffordshire comparison, we find the comparators to be of poor quality, due to differences in gearing - as reflected in credit rating gaps, and differences in the size of bonds used as comparators.

Figure 4 Water company bond issuances (spread to benchmark gilt), 2008 to 2014



Source: Company submissions, Dealogic, Capital IQ

The average spread at issue for WaSCs between January 2008 and June 2014 was 1.80%. While there are significantly fewer bond comparators available for the large WoC group, and despite their smaller size relative to WaSCs, the average spread at issue on their bonds was 1.64% during the same period, although the timing of Affinity Water's securitization plays a significant part in reducing the average spread.

For small WoCs there are three instances in which the bond market has been accessed. The spreads associated with these bonds varies. The estimated spread at issue for the most recent South Staffordshire bond was 2.86%. On average the small WoC spreads are 2.10%, **30bps** above that of the WaSCs.

Bank debt

We now review the cost of bank debt which accounts for an average of 9% of overall WoC financing.

Based on information in the PR14 business plans submissions, we estimate that typical bank floating debt costs for WoCs, measured as a spread over LIBOR, are approximately 110 bps. For WaSCs this figure was approximately 90 bps, indicating a difference between WoCs and WaSCs of around **20bps**.

Ofwat has also requested debt pricing information for water companies through interviews with commercial banks. These interviews indicated that the average cost of WoC bank debt was Libor + 111 bps, similar to the historical Libor + 110 bps from the business plan submissions. The interviews also gave an indication that the spread of WaSC bank debt compared with WoC bank debt **is around 40bps**, as shown in Table 6 below.

Table 6 Cost of bank debt -bank interview evidence

	Bank A	Bank B	Bank C	Bank D	Average of mid-points
Cost of WaSC bank debt	LIBOR + 60 to 65 bps	LIBOR + 65 to 85 bps	LIBOR + 75 to 95 bps	LIBOR + 55 to 65 bps	LIBOR + 70 bps
Cost of WoC bank debt	LIBOR + 120 to 170 bps	LIBOR + 100 to 115 bps	LIBOR + 100 to 115 bps	LIBOR + 75 to 95 bps	LIBOR + 111bps
Spread between WoC and WaSC bank debt	60 to 105 bps	30 to 35 bps	20 to 25 bps	20 to 30bps	41 bps

Source: Interviews with commercial banks, Ofwat calculations

Based on these two sources, we obtain a range of **20-40bps** for the premium on WoC bank debt costs relative to WaSCs. However, with variable interest rates such as LIBOR currently around 0.7% (6 month), the nominal cost of bank debt is approximately 1.8%, which is -1.0% in real terms, using the 2.8% RPI inflation assumption used in Ofwat's Risk and Reward Guidance.

Therefore, those WoCs which are using floating rate bank financing are currently outperforming relative to Ofwat's notional industry cost of debt assumption of 2.65% on this component of their debt. The margin of this outperformance is 3.65%. Even if we allow for an upward trend in bank debt costs over AMP6, there could still be a cost advantage of up to 183bps relative to the 2.65% industry cost of debt figure. This is shown in Table 7 below.

This is likely to represent the upper end of potential outperformance as some of the WoCs' bank debt is likely to have been fixed at higher interest rates. Nevertheless, while WoC bank debt costs may have a positive spread over that of WaSCs, as they tend to hold a higher proportion of bank debt on average (9% compared to 1%), there could be a cost advantage to WoCs over the 2015 to 2020 period due to the lower cost of bank debt relative to the industry cost of debt.

Table 7 Projections of the cost of funding advantage from bank debt

		AMP6 projections					
	Current	2015	2016	2017	2018	2019	Average
6 month Libor[18]	0.70%	1.23%	2.12%	2.73%	3.15%	3.47%	2.54%
WoC Spread[19]	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%
Nominal cost of floating debt	1.80%	2.33%	3.22%	3.83%	4.25%	4.57%	3.64%
Real cost of floating debt	-0.97%	-0.46%	0.41%	1.00%	1.41%	1.72%	0.82%
Floating Bank Debt Premium/Discount to 2.65%							-1.83%

Source: PwC calculations

2.7 Review of new debt costs

Large WoCs

For large WoCs, which are more likely to access bond markets to meet their financing needs, reviewing the recent trading history of the bond yields compared to WaSC bonds can inform us on the likelihood of there being a premium on new issuances.

[18] 6 month Libor projections are based on forward rates for 6 month nominal gilts with an uplift of 30bps for the difference between gilts and Libor. The 30bps point premium is based on a 2014 average, and is also consistent with pre-financial crisis norms.

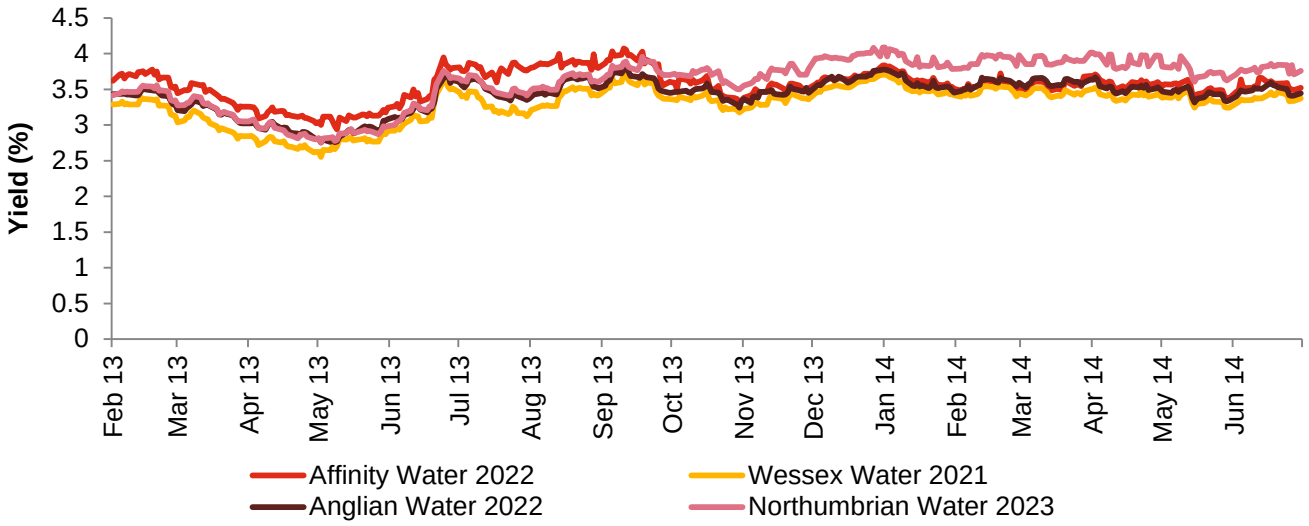
[19] 1.1% spread assumption based on bank interview evidence and company submissions.

We review two large WoC bonds below, one for Affinity Water and one for South East Water. In their report on behalf of the small WoCs, Oxera investigated the Affinity bond maturing in 2022 shown in Table 8 and Figure 5 below. Based on data up to September 2013, Oxera concluded that the available evidence suggested that Affinity's traded bond commanded a premium to similar WaSC bonds. We replicate this analysis below for a more up to date sample. Table 8 below, sets out the characteristics of WaSC comparator bonds used. In selecting the comparators, we sought to match the currency of issue, offer amount, coupon type, maturity date and credit rating to that of the WoC bond.

Table 8 Comparators used to assess spread to Affinity 2022 bond

Company	Currency	Offer amount	Type	Maturity	Credit rating
AFF (WoC)	GBP	£80m	Fixed	30-Sep-22	A-
ANH (WaSC)	GBP	£250m	Fixed	30-Jul-22	A-
NES (WaSC)	GBP	£350m	Fixed	06-Feb-23	BBB+
WSX (WaSC)	GBP	£200m	Fixed	24-Sep-21	BBB+

Figure 5 Yields to maturity on Affinity and WaSC comparator bonds



Source: Datastream, Capital IQ

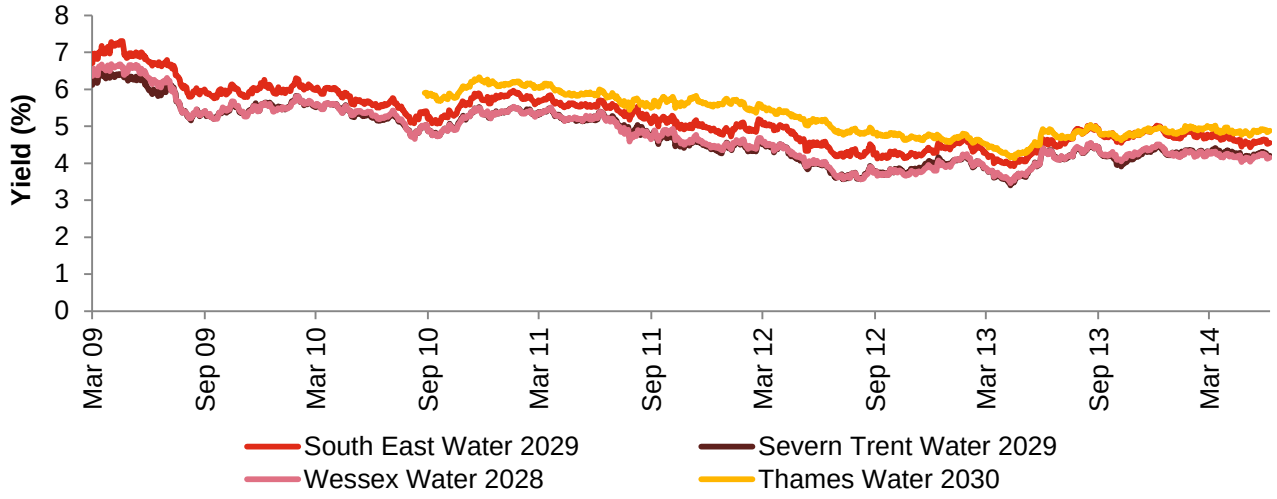
While the yield on Affinity's bond was above those of similar WaSC comparators until September 2013, it has subsequently fallen towards the bottom of the WaSC range. This suggests that investors do not always require a premium on Affinity Water's debt compared to similar WaSC bonds.

Figure 6 below shows a similar comparison but for the traded yields on South East's bond maturing in 2029 relative to a number of WaSC comparators. Frontier Economics presented analysis on behalf of South East, which suggested a premium over WaSC comparator bonds of 30bps. We set out the details of comparator bonds used in Table 9 below.

Table 9 Comparators used to assess spread to South East 2029 bond

Company	Currency	Offer amount	Type	Maturity	Credit rating
SEW (WoC)	GBP	£166m	Fixed	29/03/2029	BBB
SVT (WaSC)	GBP	£425m	Fixed	07/06/2029	BBB+
WSX (WaSC)	GBP	£200m	Fixed	10/03/2028	BBB+
TMS (WaSC)	GBP	£300m	Fixed	13/09/2030	BBB

Figure 6 Yields to maturity on South East Water and comparator WaSC bonds



Source: Datastream, Capital IQ

Figure 6 above shows that the spread between the South East bond yield and the yields on Severn Trent and Wessex bonds has increased, but the Thames Water bond yield has been consistently above that of South East. As with the Affinity 2022 bond presented above, the evidence for a premium from this analysis is inconclusive.

Based on the evidence above, there is no evidence of a consistent premium on large WoC bonds relative to WaSC bonds.

Small WoCs

We have found no available data for traded yields on small WoC bonds issued by Bristol Water and South Staffordshire Water. Therefore, we cannot replicate the analysis we conducted for the large WoC bonds above. However, bond financing is not likely to be a source of new debt for WoCs in AMP6 (see Table 18 in Appendix A). Therefore, small WoCs are likely to be entirely reliant upon bank financing during AMP6. Over-reliance on bank financing is not suitable for the whole industry, as in the long-run bond finance is likely to be cheaper and also because shorter-term bank financing carries higher refinancing risk compared to bond finance. However, the current low interest rate environment means that shorter-term bank debt is likely to remain below the notional cost of debt benchmark.

As set out in Table 10 below, assuming a bank lending cost for WoCs of 110bps over LIBOR, we can estimate their nominal interest costs. Then, using an RPI inflation assumption of 2.8% we can convert this into a real interest cost. This analysis shows that the real bank borrowing costs over AMP6 could be significantly lower than Ofwat's notional cost of debt assumption. We calculate a cost of debt discount of 135 bps on average over AMP6 from this new bank debt.

Table 10 Projections of new bank debt costs

		AMP6 Projections					
	Current	2015	2016	2017	2018	2019	Average
FLOATING DEBT							
6 month Libor[20]	0.70%	1.23%	2.12%	2.73%	3.15%	3.47%	2.54%
WoC Spread[21]	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%
Nominal cost of floating debt	1.80%	2.33%	3.22%	3.83%	4.25%	4.57%	3.64%
Real cost of floating debt	-0.97%	-0.46%	0.41%	1.00%	1.41%	1.72%	0.82%
Premium/Discount to 2.65%							**-1.83%**
FIXED DEBT							
6 month Libor	0.70%	1.23%	2.12%	2.73%	3.15%	3.47%	2.54%
Swap Spread[22]	1.65%	1.49%	1.11%	0.90%	0.77%	0.68%	0.99%
5 year swap rate	2.35%	2.72%	3.23%	3.63%	3.92%	4.15%	3.53%
WoC spread	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%
5 year fixed rate cost	3.45%	3.82%	4.33%	4.73%	5.02%	5.25%	4.63%
Real fixed rate bank cost	0.63%	0.99%	1.49%	1.88%	2.16%	2.38%	**1.78%**
Premium/Discount to 2.65%							**-0.87%**
Proportion Fixed							50%
Proportion Floating							50%
Cost of new bank debt Premium/Discount to 2.65%							**-1.35%**

Source: PwC calculations

While the cost of bank debt may be lower than the allowed notional industry cost of debt, there are additional risks which require consideration in setting a cost of new debt assumption for WoCs based on bank debt and a new cost of debt assumption for WaSCs based on bond debt. Specifically, bank debt is generally shorter-term in nature, and hence would introduce additional refinancing and interest rate risk for companies. Furthermore, this explicit separation of different financing sources for different company types could introduce increased regulatory uncertainty for future determinations. Therefore, we do not recommend that much weight is placed on the discount that exists at present.

2.8 Impact of small WoC financing mix

In Figure 2 we showed that small WoCs typically have a different financing mix compared to WaSCs. Determining the appropriate premium for small WoCs is, therefore, dependent on how much consideration is given to the different composition of debt finance used by WoCs in setting an appropriate notional financing mix. This is particularly relevant in the context of how much bank financing to assume in the small WoC finance mix. The impact of two different financing mix assumptions is shown in Table 11.

[20] 6 month Libor projections are based on forward rates for 6 month nominal gilts with an uplift of 30bps for the difference between gilts and Libor. The 30bps point premium is based on a 2014 average, and is also consistent with pre-financial crisis norms.

[21] 1.1% spread assumption based on bank interview evidence and company submissions.

[22] Current swap spread calculated from 5 year sterling swap rate and Libor in July 2014. Swap rate spreads over LIBOR in subsequent years decrease as LIBOR rises. The scale of spread reduction in each year it proxied by the flattening of the yield curve throughout AMP6, as implied by forward rates.

Table 11 Cost of debt adjustments based upon different financing mix assumptions

Debt finance mix scenarios in AMP6	1 WoC with closest capital structure to WaSCs i.e. bond financing is the dominant component	2 Comparisons of WaSC and WoC financing on a like for like basis
Embedded cost of debt	Bond uplift of 30bps (100%)	Bond uplift of 30bps Artesian finance uplift of 26bps Bank uplift of 20-40bps
New cost of debt	Bond uplift of 30bps	Bond uplift of 30bps Bank uplift of 20-40bps
Overall impact (assuming 75% embedded debt and 25% new debt over AMP6)	**Overall uplift = 30bps**	**Overall uplift = 20 to 40bps**

Source: PwC Calculations

In the first option, we consider the case where a WoC is financed like a WaSC, which is primarily bond financed. This suggests a required uplift of 30bps to the cost of debt. However, we consider this approach to be unsatisfactory as it assumes bond/capital market financing for WoCs, which is not how most WoCs have financed their business.

The second option is the case where we have no assumptions regarding WoC and WaSC financing mix and therefore compare the cost of finance on a like for like basis. The uplift across these sources is between 20bps and 40bps, but we note both Artesian issues and bank interview responses are influenced by one observation which is significantly higher than the rest. On this basis we conclude on a best estimate of **25bps**.

In Table 12 below we also review a third option where we consider a financing mix more closely aligned to the typical financing currently used by WoCs. In particular, we assume 9% bank debt in the cost of embedded debt and assume that bank debt is used to finance 100% of new debt. However, WaSCs are still assumed to use long-term bond finance. In this option we are making a significantly more specific assumption on water company financing.

Table 12 Cost of debt adjustment based on actual financing mix

Debt financing mix in AMP6	3 WoC with bond, Artesian and bank debt
Embedded cost of debt	Bond uplift of 30bps (11%) Artesian finance uplift of 26bps (80%) Bank finance benefit over AMP6 of **-92 bps**[23] (9%)
New cost of debt	Bank finance benefit over AMP6 of **-135bps**, assuming WaSCs do not use bank finance
Overall impact (assuming 75% embedded debt and 25% new debt over AMP6)	**Weighted uplift = minus 22bps**

Source: PwC Calculations, Company submissions

While the approach taken in the table above is supported by the evidence on actual WoC financing, it is counter to the notional capital structure approach, which uses high level efficient financing benchmarks and leaves actual financing decisions to water company management. While the cost of debt for WoCs could be 22bps cheaper than for WaSCs during AMP6 using this approach, there are a number of reasons why we consider it should not be used to set the appropriate cost of debt:

a) Not all WoCs have made extensive use of bank finance. This means that the current low cost of bank finance is only a gain for those water companies which have used bank finance and, as a consequence, bear the risk associated with bank finance.

b) Using an assumption of bank finance reduces the assumed average debt maturity for WoCs. Currently average debt maturities are comparable across WaSCs and WoCs (see Appendix C), but by the end of PR14, using a bank finance assumption for new debt and the ageing of Artesian debt towards maturity would mean that a notional WoC would have a significantly lower debt maturity profile. This is likely to result in greater interest rate variability and additional debt refinancing risk (which is borne by equity investors). In Appendix D (Figure 20) we show the interest rate variability of shorter debt maturity financing compared to longer term debt maturity financing. While this shows that a shorter debt maturity financing strategy would be currently cheaper, but over a 15 year historical period it has been 39% more volatile[24].

c) In the long-term, making specific bank financing assumptions may incentivise greater use of bank finance which may not necessarily be in the best interests of customers.

d) The amortisation of issuance fees from bank sources of finance will need to be carried out over a shorter maturity profile, and hence may require an uplift to the allowance for issuance fees.

While a number of WoCs have benefitted from current low bank debt costs, we do not consider Ofwat should expressly incorporate a specific assumption on the use of bank debt in the notional financing mix for small WoCs. Rather, the uplift to the industry cost of debt assumption should be drawn from comparisons of debt financing costs across a range of sources. We note that WoCs may choose to use higher proportion of bank financing in 2015-20 period due to the attractive short term interest rates, however, the risks of doing so should

[23] Assuming 50% of bank debt is floating and fixed component is not a discount to industry figure.

[24] Translating this into an impact on equity costs is not straightforward.

remain with the company and we suggest there should be no expectation that this would form the basis of any future regulatory assessment of the cost of debt.

2.9 Issuance costs

Ofwat's Risk and Reward Guidance allowed a 10bps uplift for costs associated with debt issuance. Most WoCs have argued that they require a higher premium than WaSCs for this component of the cost of debt as some issuance costs are fixed, and hence with smaller issuances, are proportionally larger relative to the amount raised.

Conceptually, the arguments raised by the WoCs are valid. It is unlikely that all the costs involved at issuance will be proportional to the amount raised. We note, however, that WaSCs issue bonds of various sizes, combining smaller issuances with larger ones. Therefore, the magnitude of these inefficiencies is likely to be small; otherwise WaSCs would issue debt more consistently in larger tranches. As noted in Section 2.4 there is a significant overlap between the size of bonds issued by WaSC and large WoCs.

Our approach to assessing the validity of arguments for an issuance cost allowance larger than 10bps is to review WoC issuance costs. Specifically, we look at issuance costs from Artesian Finance debt which constitutes a large proportion of WoC debt, particularly that of small WoCs[25]. This information is set out in Table 13 below.

Table 13 Artesian issuance cost approximation

Company	Bond	Issue Cost (£m)	Amount (£m)	Term (years)	Issue cost / Amount	Amortized over term
Bristol	Artesian I	2.6	99.6	28	2.6%	0.09%
Bristol	Artesian II	1.5	58	30	2.6%	0.09%
Southern	Artesian I	1.3	175	28	0.7%	0.03%
South Staffordshire	Artesian III	1.6	128.4	40	1.3%	0.03%
Bournemouth	Artesian II	n/a	n/a	n/a	n/a	0.01%
South East	Artesian I	2.4	135	30	1.8%	0.06%
South East	Artesian II	0.4	34	28	1.1%	0.04%
Dee Valley	Artesian I	1.2	35	30	3.5%	0.12%
Portsmouth	Artesian I	n/a	n/a	n/a	n/a	0.07%
					Average	**0.06%**

Source: Company responses, PwC calculations

The table above shows that issuance costs from Artesian debt, when amortized over the life of the debt, are approximately 6bps per annum on average. This shows that there is some headroom in Ofwat's 10bps allowance, even if debt issuances were assumed to have shorter maturities at issuance. Therefore, we recommend Ofwat maintains their 10bps allowance for issuance costs across all water companies.

2.10 Summary of findings

Large WoCs

Our findings for large WoCs are as follows:

- The majority of large WoC debt financing compromises bonds, with the remainder being sourced from Artesian Finance.

[25] We also note an allowance of 10 basis points for amortised debt issuance costs is also consistent with other regulatory determinations. The CC in the case of Bristol Water estimated that issuance costs for a company of Bristol Water's size were around 10 basis points. The CC continued this approach of allowing 10 basis points for issuance fees in the final determination for Northern Ireland Electricity. In the recent determination for Heathrow, the CAA also allowed 10 basis points for issuance costs.

- On average South East's Artesian issuances have zero spread over the prevailing iBoxx at the time of issuance.
- Evidence from bond spreads at issuance show large WoCs do not consistently command a positive premium over WaSC bonds.
- Evidence from traded bond yields suggests there is no discernible difference in the current costs of bond financing relative to WaSCs.
- 10bps is sufficient to cover issuance costs for bond issues and Artesian issues.

Small WoCs

Our findings for small WoCs are as follows:

- The majority of small WoC debt financing is comprised of Artesian issuances, with the remainder primarily consisting of bank debt.
- There is evidence from Artesian issues that WoC require an uplift of **26bps** compared to WaSC benchmarks and the industry cost of debt assumption.
- Evidence from small WoC bond issuances, although sparse, suggests a premium of **30bps** compared to WaSC benchmarks.
- Evidence on bank debt suggests a premium of **20-40bps** on comparable bank financing
- However, in a low interest rate environment, shorter-term bank financing is low cost compared to the cost of debt set out in Ofwat's Risk and Reward Guidance. This cost advantage is expected to persist for much of AMP6. WoCs have historically been compelled to use this source of finance, because they have been unable to access bond markets, but this has worked to their favour.
- 10bps is sufficient to cover issuance costs.

2.11 Conclusion

For large WoCs we find that most evidence indicates that no premium exists, and therefore we recommend that no adjustment to the cost of debt is appropriate.

Although there is limited publicly available data on debt for small WoCs, the majority of evidence available suggests there is a premium on small WoC debt over WaSCs and large WoCs. Overall, we conclude small WoCs incur debt financing costs of around **25bps** above WaSCs. This assessment is based on the industry-wide cost of debt estimate Ofwat provided in their Risk and Reward Guidance document. Should Ofwat decide to review their cost of debt estimate for the industry, the size of this adjustment may have to be reconsidered in light of any changes. Our conclusions on the appropriate difference in cost of debt for WoCs compared to the industry notional cost of debt assumption are summarised in Table 14 below.

Table 14 PwC conclusion on difference in cost of debt for WoCs compared to industry

Segment	PR09	PR14 (recommended)
Large WoC	+0.10%	+0.00%
Small WoC	+0.40%	+0.25%

3. Company specific adjustments to the cost of equity

3.1 The case for a company specific adjustment to equity

In their June submissions, most WoCs set out a case for using a cost of equity assumption that is different to the industry-wide cost of equity assumption used in the appointee WACC proposed by Ofwat in January. A summary of the size of these uplifts and their accompanying rationale are set out in Table 15 below.

Table 15 Company cases for a cost of equity uplift

Company	Cost of equity uplift	Rationale
SEW	0.30%	South East bases their uplift on the CC's 2010 methodology in the determination for Bristol Water, which applies an uplift to the industry asset beta for higher operational leverage (gearing).
AFW	-	Frontier Economics set out a cost of equity range on behalf of Affinity of 7.1% to 8.3% (above an industry range of 6.3% to 7.4%). The higher range is associated with Affinity specific risk factors such as a large investment programme, operational leverage and other revenue risks. As part of the process of Ofwat awarding Affinity with enhanced status, Affinity accepted the Ofwat 5.65% cost of equity.[26]
BRL	1.00%	Bristol considers there has been no reduction in relative risk between WoCs and WaSCs since 2010. Therefore, they consider the CC's 0.43 asset beta as still valid. They remove the debt beta assumption to obtain an asset beta of 0.3625.
SSC	0.22%	South Staffordshire Cambridge bases their asset beta on Oxera's assessment of the appropriate asset beta for small WoCs. This report also used past approaches such as the CC's analysis in the review of Bristol Water price determination in 2010.
SES	0.76%	Sutton and Easy Surrey's arguments for receiving a higher cost of equity are based on an operational leverage calculation conducted on their behalf by Frontier Economics.
SBW	0%	Sembcorp Bournemouth accepts Ofwat's Risk and Reward cost of equity.
PRT	0.66%	Portsmouth's case is centred around operational leverage, based on analysis conducted on their behalf by Frontier Economics.
DVW	1.90%	Dee Valley's case for receiving an uplifted cost of equity is based on three pieces of analysis. The first concerns issuance costs, the second trading costs and the third is the same operational leverage argument used by other WoCs.

Source: Company submissions

From the summaries of the submissions above, the main reason used by WoCs to justify an uplift to the cost of equity is due to higher operational leverage. This builds on the approach used by the Competition Commission (CC) in its consideration of the referral of Bristol Water's price determination following PR09. There are also

[26] Affinity Water accepted the 3.70% wholesale WACC following their draft determination. They did so on the grounds that: (i) they were keen to proceed with implementing their business plan; (ii) Ofwat's decision on retail margins gave them a financial advantage when compared to companies with lower revenue to RCV ratio; and (iii) that there were financial and non-financial benefits that would accrue from having an enhanced business plan.

reasons suggested by Dee Valley that are specific to their public listed ownership structure. In submissions from WoCs there has also been reference to the 'implicit' equity premium in PR09 due to different treatment of gearing for WoCs while holding other parameters constant.

Conversely, none of the WaSCs sought to distinguish between the risk of water and wastewater activities. For example, Thames Water stated in their business plan:

> *"We have also considered whether there are good reasons to distinguish different costs of capital between water and wastewater businesses. Our view is that there is no compelling evidence to make such a distinction"*[27]

3.2 Our approach

Historically, arguments for an uplift to the cost of equity for WoCs have been centred around size effects, where the case is made that investors require higher returns on smaller companies. While WoCs have generally moved away from this line of argument in their PR14 submissions, we begin by addressing the evidence regarding this point below. We then take the WoC arguments in turn; In particular we break the operational leverage argument into a number of key building blocks. In the rest of this chapter we therefore consider the following questions:

- Was there an implicit small company premium in PR09?
- Are WoCs exposed to greater:
  a. Revenue and/or volume risks?
  b. Operating expenditure (opex) risks?
  c. Capital expenditure (capex) risks?
- Do WoCs have higher operating leverage?
- Is historic RORE and forward looking RORE variation is greater for WoCs?
- Can operational leverage be estimated by comparing the ratios of operational cash flows to revenue?
- Does higher operational leverage have a direct impact on the cost of equity?
- Do smaller listed water companies require an illiquidity premium?

3.3 Is there a size premium?

The issue of size and its potential impact on allowed returns has been extensively reviewed by Ofwat. Back in PR04, Ofwat concluded there was "*very little evidence that investors differentiate between the water and sewerage companies in terms of required returns*"[28]. The CC agreed with this view in the Bristol Water PR09 appeal and did not incorporate a premium specifically for size effects: "*We consider that the arguments for a higher cost of equity due to small size in itself are weak*"[29]

Small company adjustments are generally considered as stand-alone premiums or as additional factors included in a pricing model such as the Fama-French three factor model. However, academic evidence on the

[27] Thames Water PR14 Business Plan.

[28] Ofwat (2004), 'Future water and sewerage charges 2005-10: Final determinations', pg.225.

[29] Competition Commission (2010), 'Bristol Water plc - A reference under section 12(3)(a) of the Water Industry Act 1991', Appendix N, para 137.

validity of the small company premium shows that there is a lack of consensus on whether size premium exists as a direct result of company size. Indeed, some empirical studies have suggested that the data shows negative premiums in both the UK and the US.[30]

In addition, Fama and French (2007) found that the size premium was explained almost entirely by a minority of small stocks that earn extremely positive returns and become big stocks[31]. Such companies are not appropriate comparators, as Ofwat should be setting an equity premium for companies with a predictable and modest growth outlook, not ones with the possibility of extremely positive returns.

So the academic view, which has now prevailed for a number of years, is that there is significant doubt on whether a small company effect exists[32]. A comprehensive 2011 study[33] that reviewed size effects in equity returns reinforced this doubt, concluding that, on the basis of decades of empirical research, there is not a persuasive answer on whether size is responsible for stock returns. This inconclusiveness in the literature confirms the views of Ofwat and the CC that there is insufficient evidence for an uplift based purely on the basis of size.

3.4 Was there an implicit small company premium in PR09?

In PR09 Ofwat concluded that there was insufficient evidence to show that WoCs faced different systematic risk to WaSCs. However, it did conclude there were higher specific risks and that credit rating agencies require WoCs to achieve higher credit ratios to attain given ratings. For this reason Ofwat used a lower financial gearing assumption in the WACC for WoCs. This was supported by the differences in financial gearing in their capital structures.

The application of the lower financial gearing assumption was treated carefully. As the lower gearing assumption was intended to increase allowed revenues, the cost of equity was kept the same for both WaSCs and WoCs, but the lower proportion of debt finance increased the overall cost of capital for WoCs. This is explained below:

"We have maintained the cost of equity that we have used at the industry level in our cost of capital calculation to improve the cash flows of the water only companies. This cost of equity is higher than it might otherwise be under a CAPM approach at 52.5% gearing, as we have not adjusted the equity beta for the water only companies."[34]

It is clear that the PR09 adjustment was not intended to suggest the cost of equity, or asset betas for WoCs are different to WaSCs.

Inspection of current financial gearing ratios across the water industry suggests the difference between WaSC and WoC gearing has narrowed and therefore a PR09 style adjustment is no longer supported by actual gearing differences (see Appendix E). While it is possible that higher gearing in WoCs contributes to a higher cost of debt, we have separately considered this in Section 2.

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[30] Dimson and Marsh (1999), 'Murphy's law and market anomalies', *Journal of Portfolio Management*.

[31] Fama, E.F., French K.R, (2007), *Migration*, CRSP Working Paper, 614.

[32] A recent paper by Schaeffler and Weber (2013) suggests that a simplified two-factor model with a size factor could be used to more accurately set the allowed equity returns for regulated network operators. Specifically, they argue that this approach may be appropriate where the comparators used to calculate the cost of equity are significantly larger than the firms the regulator is setting the equity returns for. However, the Schaeffler and Weber analysis is primarily concerned with the lack of comparability of the betas used to calculate required returns and the companies that these returns are applied to in the context of electricity regulation. Specifically, many of the comparator betas used in the regulation or electricity assets are those of integrated utilities, whereas the regulated entity is generally a pure network operator. This is less of an issue for the UK water sector as water companies do not face the distinction between generation and network activities.

[33] Mathijs A. van Dijk (2011) Is size dead? A review of the size effect in equity returns, *Journal of Banking & Finance*, Volume 35, Issue 12, December 2011

[34] PR09 Final Determination, Pg. 135.

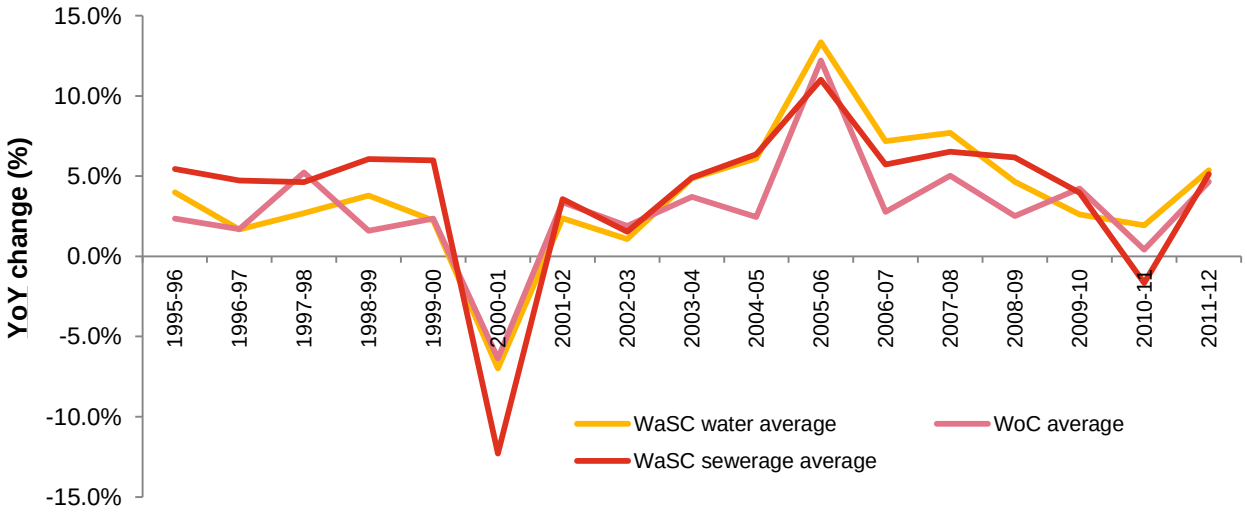
3.5 Are WoCs exposed to greater risks (revenue, opex & capex)?

Revenue/Volume risks

Regulated water utilities have minimal exposure to revenue and/or volume risks. This is partly because demand is highly insensitive to the broader economy and also because of the protection provided by the regulatory regime.

Figure 7 below shows historical revenue variation by company segment, and while this is an imperfect measure of revenue risk, because annual variations may be recovered through regulatory mechanisms, it shows no clear differences between segments (see Appendix B for additional analysis of revenue risk).

Figure 7 Year on year change in revenue by company segment



Source: Ofwat

In the current AMP, the revenue correction mechanism (RCM) largely removes risk associated with household demand[35].

In PR14, Ofwat has moved to a revenue control for both wholesale controls and adopted a revenue forecasting incentive, the Wholesale Revenue Forecasting Incentive Mechanism (WRFIM)[36].

The revenue control along with the proposed WFRIM reduces the impact of revenue deviations from volume variances by:

- Allowing companies' to adjust allowed revenues for each year to take account of differences between actual and projected revenues in previous years; and
- Incentivising companies to avoid revenue forecasting errors by applying a penalty to variations that fall outside a set uncertainty band (or 'revenue flexibility threshold').

Subject to forecasting accuracy, both WaSCs and WoCs are protected from volume risks through wholesale revenue controls. We therefore consider revenue risks are minimal in the water sector and not a source of differentiation between WaSCs and WoCs.

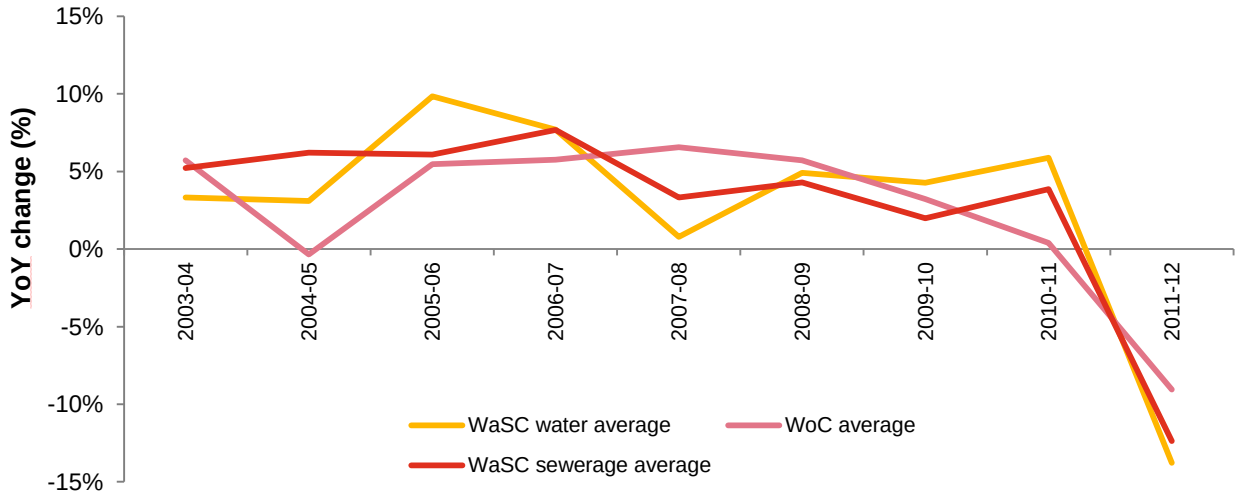
[35] The revenue correction mechanism does not cover non household users with over 50m litres of demand per annum.

[36] Ofwat (2014), *'Consultation on the revenue forecasting incentive mechanism for AMP6'*.

Operating expenditure

We have carried out similar analysis of operational cost variation. This data has been captured by Ofwat in segmental regulatory reporting and is set out below in Figure 8 (See Appendix B for additional analysis). As with revenue above, there is no clear difference between WaSCs and WoCs.

Figure 8 Year on year change in operating expenditure by company segment



Source: Ofwat

Capital expenditure

We have also reviewed the movements in capital expenditure. However, capital costs by their very nature are more variable and impacted by the timing of large-scale capital expenditure projects. Historically there have been much bigger changes in the net capital expenditure for WoCs, partly as a consequence of their relatively low RCV starting point and specific investment programmes, rather than the risk associated with such expenditures. We address the impact of a low RCV in the next section.

Our review of cost and revenue risks suggests that there is no evidence that WoCs are inherently more risky than WaSCs. This is consistent with the findings in our report to Ofwat on the cost of capital methodology in PR14.[37]

3.6 Do WoCs have higher operating leverage?

Conventionally, 'operational leverage'[38] is a measure of the proportion of a firm's total costs that are fixed, where fixed costs are costs that do not vary when output varies. A higher proportion of fixed costs means a firm has higher operational leverage and this amplifies the effect of revenue risks on the risks of a firm's cashflows or profits.

WoC interpretation of operational gearing

The WoCs' interpretation of operational leverage for regulated utilities is more about how either revenue or cost risks impact returns. In this interpretation, if a revenue or cost shock is large relative to the capital invested in the business, then the impact on returns will also be large. So a regulated utility which has a lower comparative level of capital employed will have more volatile returns for a given revenue or cost shock when compared to a similar firm with a high comparative level of capital employed. In other words, it is the 'low RCV' which drives the WoCs' interpretation of higher operating leverage, rather than the conventional definition which relates to a high degree of fixed costs.

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[37] PwC (2013), "Cost of capital for PR14: Methodological considerations", Table 4.1.

[38] Also commonly known as operational gearing.

The WoCs, and their advisors, suggest that water activities have a lower profit margin in relation to their revenues. This is driven by the smaller mix of capital costs (including deprecation) compared to operational costs for water activities. Wastewater activities correspondingly have a higher amount of profit margin as a proportion of revenue. This is because wastewater activities require more capital investment with a lower associated operating cost per £ of revenue generated. The profit margin is here is defined as an operating cashflow margin, rather than an accounting or economic margin, which would include capital costs (e.g. depreciation) in the case of accounting margins and both capital and financing costs in the case of economic margins.

Comparison of WoC and WaSC cost structure

It is true that for AMP6, the simple average Revenue/RCV ratio for WoCs is higher than for the WaSCs group (see Table 16 below). The figure for the WoC group is also higher than for the water activities of the WaSCs. Also, the Totex/RCV for the WoCs is higher than for the WaSCs group, and the equivalent figure for the WoC group is also higher than for the water activities of the WaSCs.

It is striking that the difference in the Totex/RCV ratio across the WaSCs' water and wastewater activities is relatively small, suggesting that the reason why WoCs have a higher ratio is not so much due to the inherent differences in the cost structures of providing water or wastewater activities, but by the original setting of the RCV at privatisation and subsequent additions and depreciation.

Table 16 Revenue and totex to RCV ratios for AMP6

	Revenue / RCV	Totex / RCV
WoC	23.5%	21.3%
WaSC	15.4%	12.8%
WaSC water activities	16.7%	14.3%

Source: Company submissions

Therefore, for AMP6, WoCs are projected to have smaller RCVs relative to the size of their businesses (as measured by totex or revenue). However, the new totex regime that is being implemented in PR14 (specifically Pay-As-You-Go (PAYG) and run-off rate flexibility) will both WoCs and WaSCs flexibility on how quickly they can recover expenditure. Therefore, companies now have more control over the proportion of costs which are funded in any one year and the long-term development of RCV (and associated ratios). Such ratios, as set out in Table 16 above will not therefore be evidence of an inherent difference in risk between providing water and wastewater activities.

In the remainder of this section we set out a number of situations, or examples, of how operational leverage could impact business and equity risk for WoCs differently to WaSCs. These situations depend on differing assumptions on the degree of risk associated with both revenues and costs.

Operational leverage with revenue risk

In the conventional use of an operating leverage framework, revenues, operational costs and capital costs are all exposed to risk, both systematic risk and specific risk. Typically, capital costs are more fixed in nature than operational costs, so a high amount of capital costs, relative to operational costs, will typically increase operational leverage and risk. Conventionally the ability of management to change operational costs (as opposed to capital costs) as demand changes is expected to reduce operating leverage and hence mitigate demand risks.

This situation seems of limited relevance in the context of water regulation with revenue cap controls. This is because revenue risks are minimised by the regulatory framework. This point was made by economic consultants NERA in their paper prepared for London Heathrow[39]:

[39] NERA (2013), 'Relative risk of London Heathrow: A report for London Heathrow'.

"However, in the regulatory context, the risk associated with operating leverage depends mainly on the regulatory framework, which determines how demand fluctuations translate into revenue volatility. Companies regulated under a revenue cap are protected from revenue fluctuations by the regulatory mechanism and hence the extent to which they can adjust their costs in response to revenue fluctuations is not a relevant risk factor. Conversely, the revenue of companies regulated under a price cap will fluctuate in direct proportion to demand. This makes their ability to adjust costs an important risk factor."

Therefore, we conclude there is unlikely to be any operating leverage impact as a consequence of revenue or volume risks, and therefore small WoCs cannot attribute any higher operational leverage effect to demand risks.

Operational leverage with operational cost risk

We therefore now consider a situation where revenues are deemed fixed. We also assume that capital costs are fixed. We can consider a situation where operational costs are exposed to risk, either of a systematic or specific nature.

Where operational cost risks are systematic in nature (i.e. where costs can change as a result of wider economic or market developments that affect most or all businesses simultaneously – an example for WoCs and WaSCs is energy prices) and revenue is fixed, this can be expected to reduce equity risk. This is because, in positive cyclical times, a business with fixed revenue would not benefit from revenue increases, but would bear higher costs (because in an economic upturn there would be increased demand for resources, tending to increase the prices of inputs). Conversely, in weaker cyclical times, such a business would benefit from lower cost pressures, but would still maintain its fixed revenue. As a consequence, the performance of such a business will be negatively correlated with the performance of more normally structured businesses in the wider economic and market (for which the predominant impact of cyclical changes is a change in demand and hence revenue), and therefore it will be valuable to equity investors as part of a diversified investment portfolio, since its countercyclical performance would dampen fluctuations in returns across the whole portfolio. This means that the combination of fixed revenues with systematic operational cost risks does not contribute to higher operating leverage, or a higher cost of equity – on the contrary, such a combination in principle implies a negative equity beta.

In the case where operational cost risks are specific in nature (e.g. project overruns), there may be an impact on the financeability of a WoC, as debt providers are concerned with all downside risks. However, this should not impact the cost of equity, which only incorporates a risk premium for systematic risks.

So, in the situation where a WoC has higher operational costs (in relation to revenues or RCV in comparison to a WaSC), and where revenues are fixed and operational costs exposed to systematic risk, there is no case to suggest a positive impact on the cost of equity for WoCs.

The situation described here did not appear to be the one considered by the CC in its review of Bristol Water's Price Determination at PR09. Bristol Water suggested that "*water company opex tended not to vary with volume*"[40] and the CC's approach suggested that higher operational costs lead to higher operational leverage, i.e. operational costs are more fixed and therefore contribute to higher leverage.

Operational leverage with capital expenditure risk

The situation where revenues and operational costs are fixed, but capital costs are exposed to systematic risks is a difficult situation to envisage. Capital expenditures which have been made in the past are sunk and are therefore not exposed to risk. Depreciation and return are therefore a fixed cost to the business – this is particularly clear in an environment where an economic regulator sets revenues to allow the regulated company to recover the return of capital (depreciation) and return on capital. There may be systematic risks relating to future capital expenditure, but these can be expected to have the same systematic risk properties as operational costs, i.e. they lower risk because of the negative correlation with wider economic and market factors.

[40] Competition Commission (2010), 'Bristol Water plc - A reference under section 12(3)(a) of the Water Industry Act 1991', Appendix N, para 123.

So, in the presence of systematic capital expenditure risks and with no demand risk, it is possible for a WaSC with high capital expenditure to have a lower systematic risk compared to a WoC. However, in recent years, some of the water companies with the highest capex to revenue ratios have been WoCs, consistent with high RCV growth in previous AMPs[41]. This would suggest the WoCs have the lower systematic risk profile.

Furthermore, we consider that capital cost risks tend to be specific in nature and linked to asset condition or the risks relating to particular large projects. This view was shared by the CC who concluded "*we did not see evidence that the risks associated with capex were positively correlated with market risks*"[42]

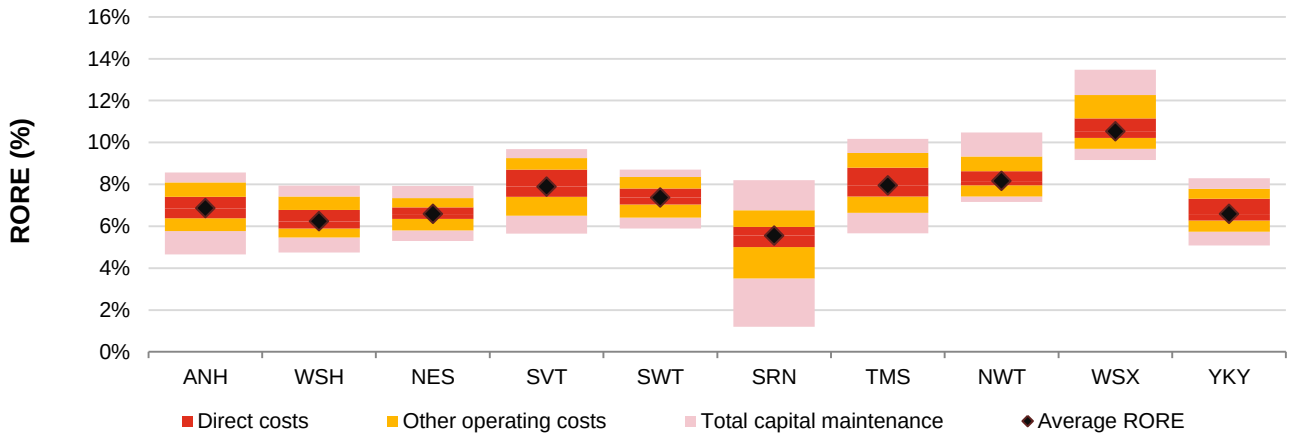
We therefore conclude that capital costs are unlikely to result in an operational leverage or cost of equity impact on WoCs.

Conclusion on operating leverage
In each of the three situations considered above, we do not find a credible situation where WoCs are exposed to greater systematic risks as a consequence of their different cost structures compared to WaSCs.

3.7 Is historic RORE and forward looking RORE variation is greater for WoCs?

Figure 9 and Figure 10 below show RoRE variation measured over the period 2001/2 to 2012/13, firstly for WaSCs, then for WoCs. This analysis was prepared for the Risk and Reward Guidance Ofwat released in January 2014.

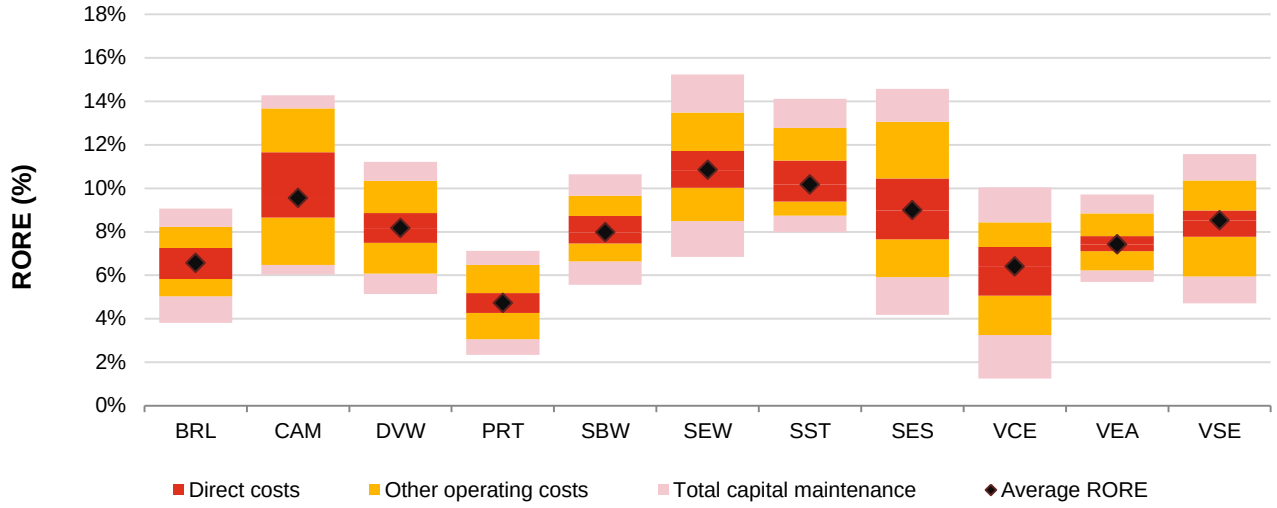
Figure 9 RORE variation for WaSCs



Source: Ofwat

[41] See Appendix B.
[42] Competition Commission (2010), 'Bristol Water plc - A reference under section 12(3)(a) of the Water Industry Act 1991', Appendix N, para 130.

Figure 10 RORE variation for WoCs



Source: Ofwat

The figures suggest that WoCs are more sensitive to cost risks, in comparison to the value of their regulated equity[43]. Historic RORE variation for WoCs is around double that of WaSCs. There may be a number of reasons for this and it is difficult to apportion historical performance to individual types of risk. Our view, consistent with Ofwat in PR09, is that WoCs have greater specific risk, possibly due to a lower level of operational diversification or sensitivity to key business events (such as management team changes).

In its Risk and Reward Guidance publication, Ofwat set out its guidance for RORE risk ranges over AMP6. These were set on a consistent basis for WoCs and WaSCs. Both WoCs and WaSCs can use outcome delivery incentives (ODIs), menus and uncertainty mechanisms to move closer to this desired risk outcome. If WoCs have more (specific) cost risk in relation to regulated equity, then they will have less capacity to bear as much risk in ODIs to balance the overall risk profile. In Ofwat's PR14 Draft Determinations, forward looking ROREs are more consistent across the industry compared to the historical RORE analysis[44].

In conclusion, historic RoRE has been more variable for WoCs. However, the tools given to companies in PR14 mean that these differences should shrink in AMP6, and in any case in our view such variability has been driven by specific risk factors and these do not increase the cost of equity. Previously, Ofwat has dealt with this by using a lower financial gearing assumption, but this seems less warranted now by inspecting WoCs' actual financial gearing. It does, however, support the rationale for a higher cost of debt, which we recommend in Section 2.

3.8 Can operational leverage can be approximated by comparing the ratios of operational cash flows to revenue?

In Section 3.6 we concluded that is not clear-cut how operating leverage impacts WoCs differently to WaSCs. In this section we review measures of operating leverage.

There are a number of ways of measuring operational leverage, but there is no consistently used measure. Part of the problem is that a robust and consistent classification of costs into variable and fixed costs is rarely available. For this reason, practitioners tend to use proxies, or indicators for operational leverage, rather than detailed cost analysis.

[43] We note that this analysis does not take account of financing risk.

[44] Ofwat (2014), 'Draft price control determination notice. Technical appendix A6 – risk and reward'

The WoCs have proposed the CC's definition of operational leverage used in the CC's determination on Bristol water after PR09. This is based on cash flow from operations as a proportion of overall revenues[45]. The WoCs claim that the smaller the proportion of operational cash flow in revenue, the greater the leverage in relation to cyclical profit fluctuations.

We note that the CC itself urged caution with this measure:

"This [approach], however, assumes that cyclical profit fluctuations are the only source of systematic risk and would overstate the effect if there are other sources of systematic risk, such as regulatory risk."[46]

We consider there is a fundamental problem with this measure. As set out in Section 3.6 we cannot establish any conceptual basis where WoCs have greater exposure to systematic risk as a result of higher ratio of operational cash flows to revenue. This measure does not incorporate any detailed assessment of revenue and cost risks, nor how they interact with the different cost structures of WoCs and WaSCs to result in higher operational gearing. We also consider four additional challenges with this particular measure of operational leverage proposed by the WoCs and its impact on the cost of equity:

(i) Assumption that operational costs are fixed / increase operating leverage

(ii) Assumption that depreciation is variable / reduces operating leverage

(iii) Financing costs reduce leverage

(iv) Highly variable results, when applied across the industry

We address each of these in turn below:

(i) Assumption that operational costs are fixed / increase operating leverage

Operational costs are fixed in the WoCs' calculation of operational leverage. However, over an appropriate five year period operational costs could and should be able to vary. Water company management should be able to reconfigure operational costs following a cost shock and mitigate some of its impact. This means that the WoCs' definition of operational leverage is likely to overstate any operating leverage effect.

(ii) Assumption that depreciation is variable / reduces operating leverage

The WoCs' definition of operational leverage effectively treats depreciation as a component of profit. Under this definition depreciation reduces operational leverage, because the larger the profit element, the smaller the impact of a particular cost shock on profit. This approach essentially views depreciation as a discretionary payment, providing a buffer which can be used to absorb cost shocks. In contrast, we consider depreciation to be a fixed economic cost because it relates to historic expenditure, so cannot be altered as a result of changes in output (it is a sunk cost) and the regulatory regime is designed to allow regulated companies to recover their investments (and hence incentivise continued investment). Higher depreciation should therefore increase, not reduce, operational leverage.[47]

Considering depreciation as variable or discretionary cost is also inconsistent with Ofwat's approach to financeability, in which depreciation is a key source of funds to cover the cost of servicing debt, when cost of debt is allowed in real terms and financeability assesses ability to cover nominal debt costs.

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[45] Cashflow from operations (revenue less operational costs and tax) can also be calculated as the sum of depreciation and returns.

[46] Competition Commission (2010), 'Bristol Water plc - A reference under section 12(3)(a) of the Water Industry Act 1991', Appendix N, para 129.

[47] A WaSC with higher depreciation than a comparable WoC may have lower bankruptcy risk, because depreciation is not a cash flow item. Bankruptcy risk can have an impact on the cost of equity, but has limited relevance in the context of water utility regulation where Ofwat has duties to secure that water appointees are able to finance their functions.

(iii) Financing costs reduce operating leverage

The WoCs definition of operational leverage means that higher returns (in relation to revenue) reduce leverage. The return component is again assumed to be discretionary and therefore available to absorb the impact of systematic risks. One challenge to this assumption is that debt finance costs are generally not variable and are required to be paid to keep the company solvent. Under Ofwat's notional gearing assumption of 62.5%, debt finance costs are a significant fixed expense.

While in the short term the element of "profit" relating to equity is a discretionary payment and able to bear systematic risk, over the long-term companies are required to earn the cost of equity to encourage continued and incremental equity investment. Furthermore, it seems illogical to argue that equity bears less risk for a WaSC because having proportionally more equity provides a WaSC with more scope to absorb cost fluctuations by passing on the risk of these to equity investors.

Rather than focussing on the size of regulatory profit, or accounting profit, we consider economic profit is a better measure. In a regulated industry this is targeted to be zero at the beginning of a price control period. In this situation there is no discretionary profit buffer. Instead, operating leverage should be determined by the mix of fixed and variable costs within total economic costs.

(iv) Highly variable results when applied across the industry

In order to calculate an uplifted asset beta for Bristol Water, the CC used the following calculations:

$$Revenue = Opex + Depreciation + Tax + Return\ on\ capital$$

$$Cash\ flow\ from\ operations = Revenue - Tax - Opex = Depreciation + Return\ on\ capital$$

In the CC's methodology, the profit and loss account is converted into a common size basis and then cash flow from operations as a proportion of revenue is used to calculate an asset beta uplift.

Figure 11 Cost of equity as implied by the CC's methodology for uplifting asset beta

Source: Company submissions, PwC calculations

The figure above shows that the range of cost of equity across the companies from the CC approach is very wide. The range varies from 6.1% to 9.9% on a forward looking basis (averages over AMP6).

This is a much wider range than WoC advisor reports suggested as our approach uses forward looking data, not historical numbers. This casts doubt on the suitability of the CC's approach for calculating a company specific uplift for all WoCs. The approach suggests implausibly large differences in the required cost of equity across the WoC group.

In conclusion, we consider there are severe limitations in the WoCs' definition of operational leverage and using this measure as a basis of differential systematic risk.

3.9 Does higher operational leverage have a direct impact on the cost of equity?

One of the implications of the revenue control and minimal revenue risk is that cost risks must be the driver of any impact on the cost of equity. It is generally considered that revenue or demand risks are the key determinants of systematic risks (which is why utility asset betas are typically low). Cost risks are typically highly specific in nature – e.g. the risk of project overruns and weather related events. So while it is difficult to separate systematic and specific cost risks, we would not anticipate a large impact from cost risks, even if amplified through a low RCV effect.

In this subsection, we review empirical evidence on the differences between water and wastewater activities through the analysis of betas. This is possible (although with a limited sample) because there are three listed three listed WaSCs and one listed WoC.

Table 17, below, shows empirical analysis of the beta differential across water and integrated water and wastewater service providers. For Dee Valley, given the lower observed liquidity of the stock we use the Dimson beta.[48]

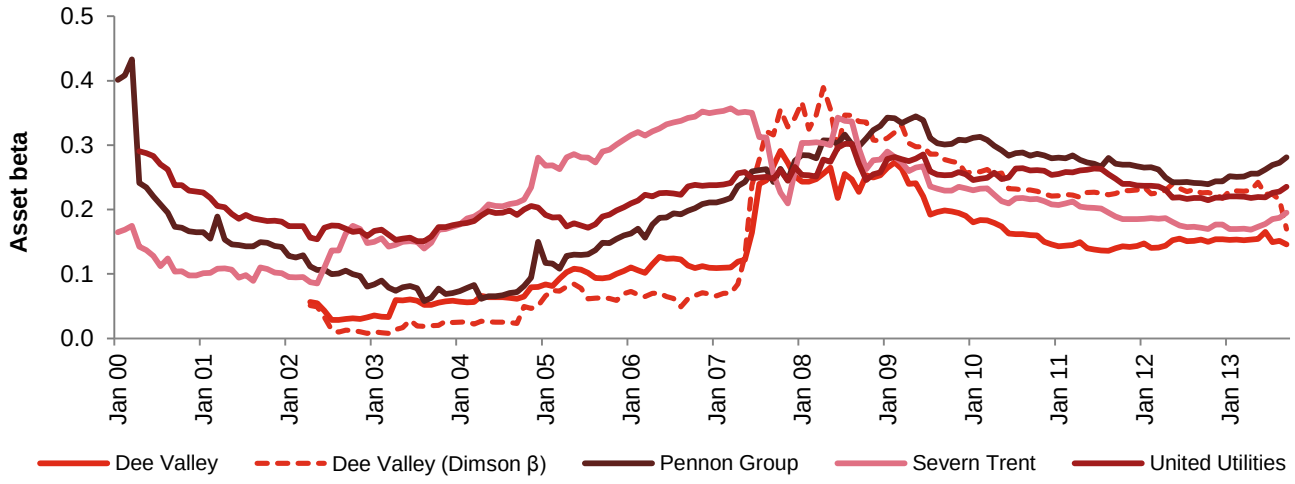
Table 17 Empirical asset betas across segments

Company	March 2008		September 2013	
	Equity beta	*Asset beta*	*Equity beta*	*Asset beta*
Pennon Group	0.63	0.28	0.70	0.28
Severn Trent	0.64	0.30	0.51	0.20
United Utilities	0.65	0.25	0.58	0.24
Dee Valley (Dimson beta)	0.72	0.35	0.37	0.17
Water and Sewerage average	0.64	0.28	0.60	0.24
Water only Average	0.72	0.35	0.37	0.17

Source: Datastream, Capital IQ

Figure 12 below plots these asset betas as a time series.

Figure 12 Time series of water industry asset betas



Source: Datastream, Capital IQ

[48] The 'Dimson' Beta uses leads and lags in the regression calculation to adjust for the effects of illiquidity on the beta estimation. We use a lag of 1 month for monthly beta calculations.

In 2008, the average asset beta across the listed WaSCs was slightly lower than the WoCs, which could suggest that wastewater activities on average had lower betas compared to water activities. More recent estimates though (as of September 2013) suggest the opposite – with WoCs appearing to be less risky than WaSCs.

The evidence set out above has limitations, in particular the estimation of Dee Valley's beta, but shows that there are weak empirical grounds to support a risk differential between WaSCs and WoCs.

3.10 Do smaller listed water companies require an illiquidity premium?

Frontier Economics on behalf of Dee Valley presented evidence that on top of any operational leverage adjustments, Dee Valley should receive a premium of 0.12% for higher equity issuance costs relative to WaSCs and also an illiquidity premium of 0.98% (based on bid-ask spreads).

After assessing Frontier's calculations, we find that when we use the Cost of Equity set out in the January Risk and Reward Guidance of 5.65%, this premium for issuance costs falls to 0.09%.

Furthermore, Frontier's calculations for an illiquidity premium assume a holding period of 5 years. This was based on the approach used in the CC's assessment of a small company equity premium for Mid-Kent water[49]. However, the CC also stated that, "holding periods may be longer than five years because less liquid shares with higher bid/ask spreads would tend to be more attractive to investors intending to hold for longer periods." [Para 8.39]. When we look at shareholdings in Dee Valley over time, holding periods of the largest shareholders are often greater than five years. The largest common stock holder, for example, has left its holdings unchanged for 10 years. This suggests that a holding period assumption of 5 years may significantly understate reality. Using a longer-term holding period would considerably reduce any premium due to illiquidity.

This means than any empirical estimate of illiquidity premium is substantially smaller than Frontier's estimate. There is then the question of whether Ofwat should take into consideration the specific ownership form of Dee Valley, as the only small publicly listed company.

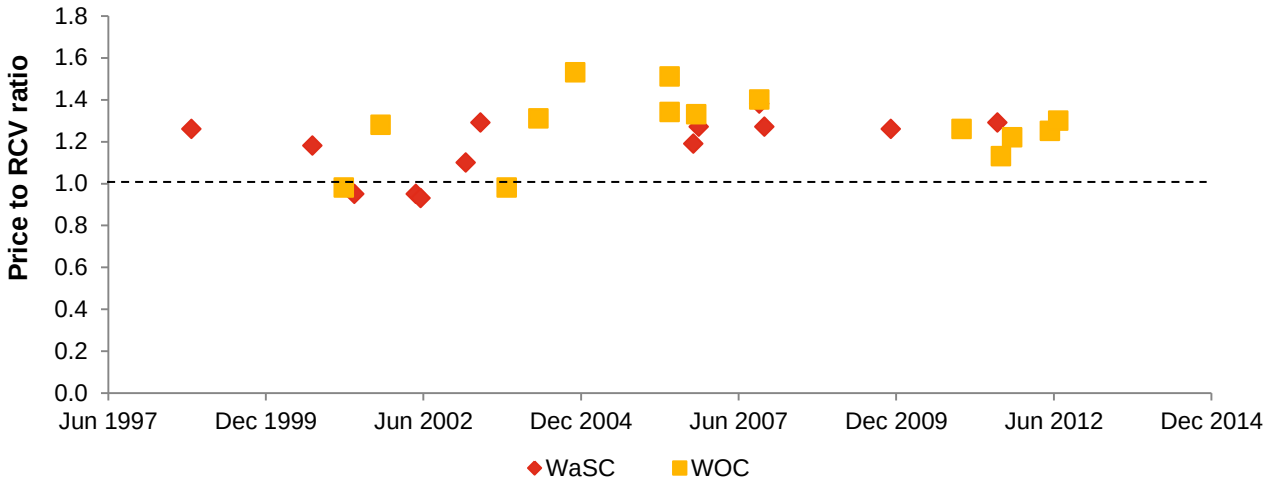
We consider Ofwat should neither incentivise nor disincentivise any particular form of ownership. However, this means that it should not reward any particular ownership form differently to others. This means that Dee Valley should not receive an uplift to its cost of equity on account of its particular form of ownership.

Rather, we should review if there are any reasons why investors in WoCs require any illiquidity premium for investing in smaller companies or WoCs as a whole. This can be tested by reviewing the transaction values across the industry. As many regulators have pointed out, there may be a number of factors which drive business or share transactions, but if WoC investors required a much higher return, or premium for illiquidity, compared to that allowed by the prevailing regulatory settlement, then we would expect to see reduced valuations for WoC businesses.

The figure below shows whole business and part share transactions in the water sector over the past 20 years. There is no tendency for lower valuations for WoC businesses or share trades. In fact, the average price to RCV ratio for WoCs (1.27x) is higher than WaSCs (1.18x).

[49] Competition Commission (2000), 'Mid Kent Water plc: A report on the references under sections 12 and 14 of the Water Industry Act 1991'.

Figure 13 Price to RCV ratios implied by equity transactions for water companies



Source: Dealogic, PwC calculations

3.11 Summary of findings

In summary, there is no clear evidential difference in the nature of costs and their associated risks in providing water and wastewater services. The only identified difference relates to the mix of operational and capital expenditures. WaSCs are more capital intensive, as measured by the proportion of revenue accounted for by returns and depreciation. However, it not clear whether operational leverage is impacted by the mix of operational and capital costs; indeed, over an appropriate 5 year period, we would typically expect higher operational costs to reduce operational leverage and higher capital costs to increase operational leverage. On this basis it is not clear which type of water company has the higher operational leverage.

Not only is there uncertainty over the impact of the mix of operational and capital expenditures on operational leverage, there is also no recognised methodology for translating any differences into a cost of equity difference, the methodology that the WoCs and their advisors have employed has several drawbacks.

There are several further reasons why we suggest that Ofwat do not make any adjustment to the asset beta, or allowed returns more broadly, on the basis that a company is engaged in just water only activities:

(i) Few other regulators have made mechanical adjustments for operational leverage;

(ii) The new PR14 totex regime adds flexibility for companies around the size of their annual profits and long-term growth in the RCV. This removes inherent risk differences, because companies can now better control their risk profile;

(iii) The new PR14 approach to setting similar RORE ranges across the industry reduces overall risk differences across the industry;

(iv) Supporting empirical evidence from asset beta observations suggests no difference in the systematic risk of water and wastewater activities.

(v) Business plan submissions from WaSCs do not differentiate return requirements between water and wastewater activities. Strikingly the difference in the operating gearing measures for the water activities of WaSCs are far closer to their wastewater activities and different to the WoCs water activities. This suggests that the difference in operational leverage for WoCs is not due to the provision of water activities alone, and instead reflects the historical evolution of the RCV in the WoCs.

3.12 Conclusion

Overall we find evidence to support differences in current cost structures for WaSCs and WoCs. But there is weak evidence to support the direction and magnitude of any impact on the cost of equity for WoCs. We therefore do not recommend that Ofwat makes an uplift to the cost of equity for WoCs.

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Appendix A – New debt amounts 2015-2020

The table below sets out an approximation for the amount of new debt financing needs over AMP6 based on a notional structure. The first two companies in the table are the large WoCs, followed by the six small WoCs and the then lastly the WaSC group.

For the proportion of new debt, we assume a notional figure of 25%. Average AMP6 RCV is taken from business plan submissions. Average notional debt is the RCV multiplied by an assumed notional gearing of 62.5%. Lastly, this notional debt level is multiplied by the 25% to estimate the need for new debt over the 2015-20 period.

Assuming that new debt requirements of under £100m are unsuitable for bond market financing, it is unlikely that small WoCs will access bond markets, and hence will have to rely upon other financing sources[50].

Table 18 Approximation of new debt needed over AMP6

	Proportion of new debt (notional)	Average AMP6 RCV (£m)	Average Notional debt AMP6 (£m)	Approximation for new debt needed over AMP6 (£m)
SEW	25%	1167	729	182
AFW	25%	1013	633	158
BRL	25%	497	310	78
SSC	25%	323	202	51
SES	25%	219	137	34
SBW	25%	147	92	23
PRT	25%	123	77	19
DVW	25%	86	53	13
TMS	25%	12122	7576	1894
UU	25%	9952	6220	1555
SVT	25%	7880	4925	1231
ANH	25%	7048	4405	1101
YKY	25%	5864	3665	916
WSH	25%	4751	2970	742
SRN	25%	4239	2649	662
NES	25%	3763	2352	588
SWT	25%	2865	1791	448
WSX	25%	2852	1783	446

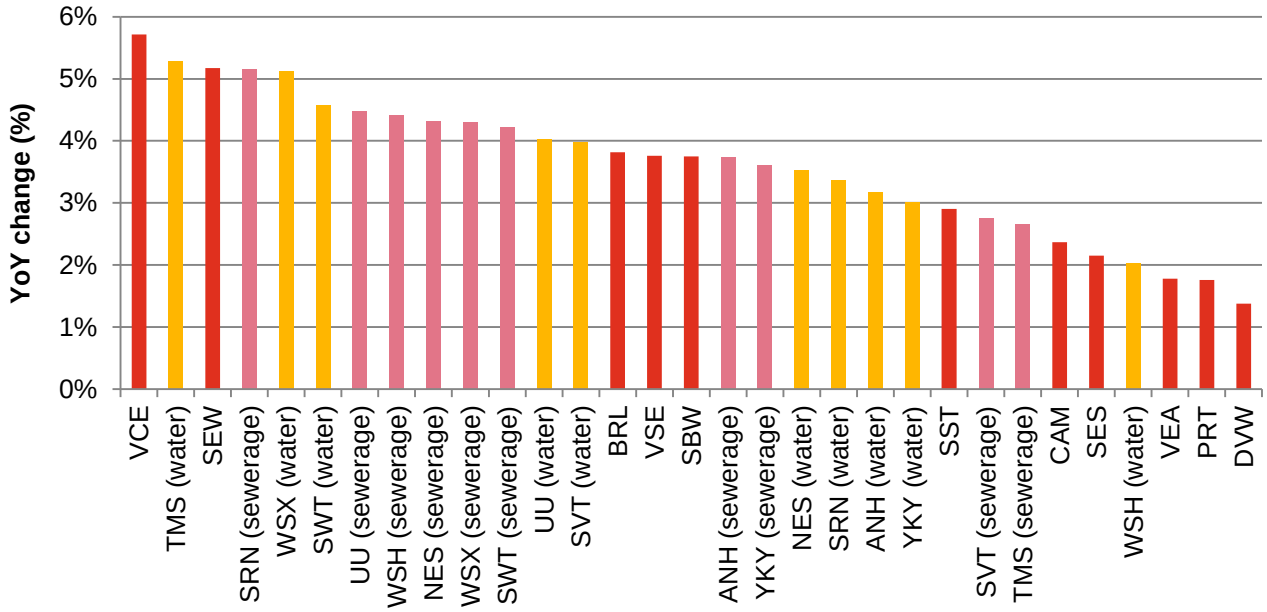
Source: Company submissions

[50] However, we note that in the past there have been private placements below this £100m threshold.

Appendix B – Relative risk measures

Revenue Variation – [pink represents WaSC sewerage, red represents WoC, yellow represents WaSC water]

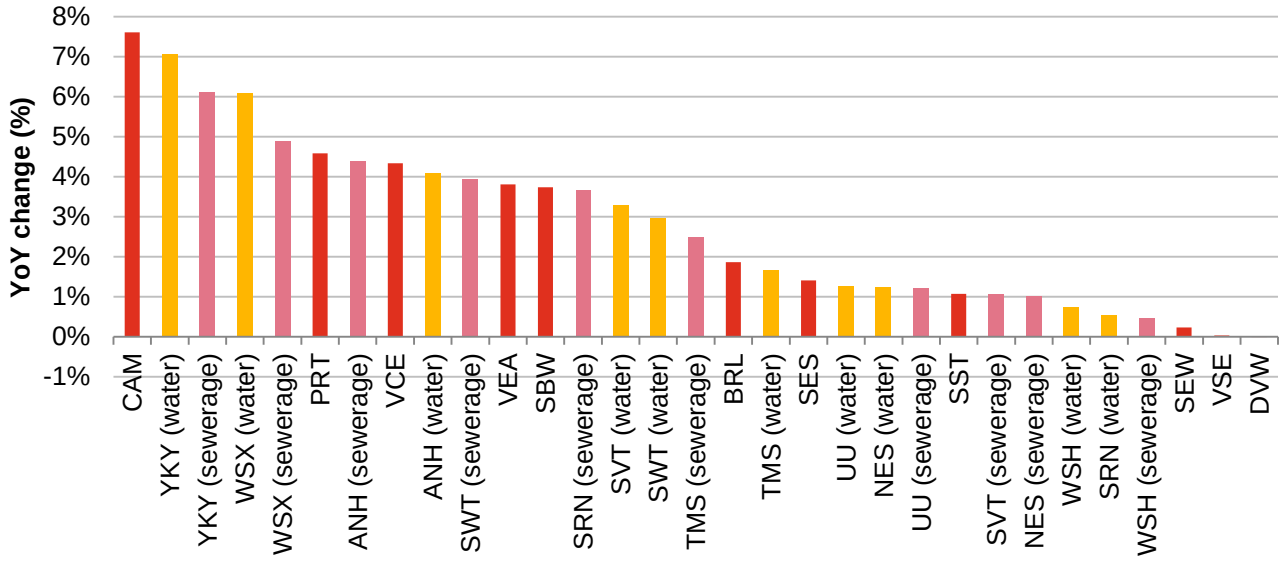
Figure 14 Average annual change in revenue 1995-96 to 2011-12



Source: Company submissions

Opex Variation

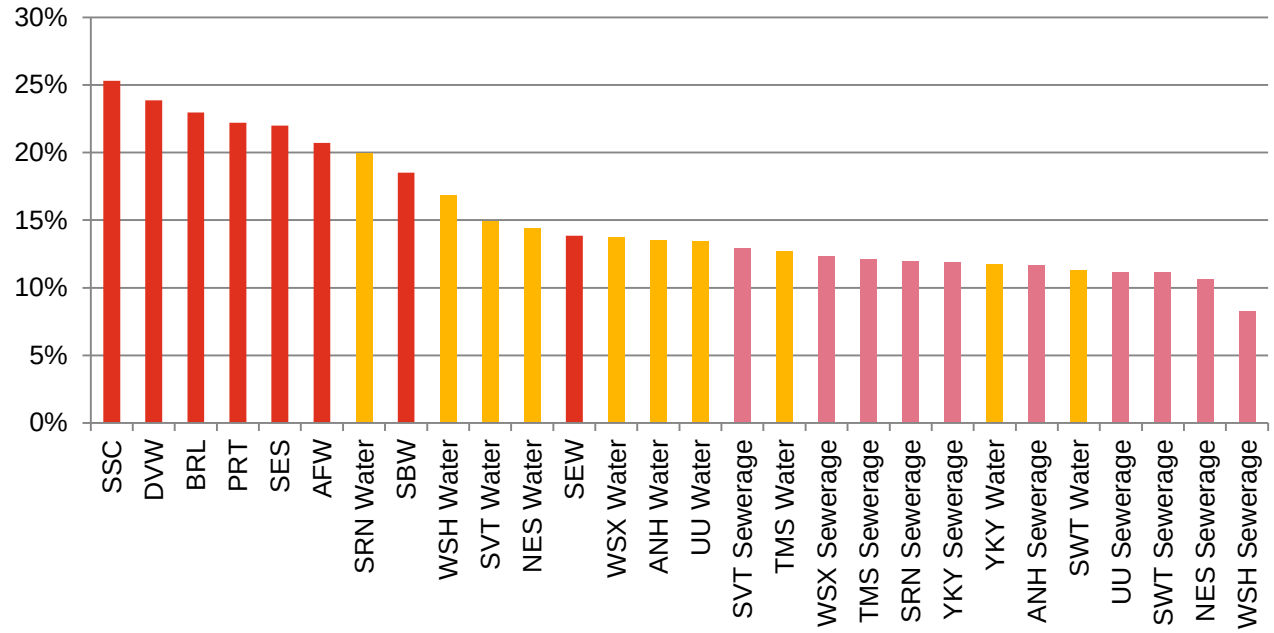
Figure 15 Average annual change in operating cost 2003-04 to 2011-12



Source: Company submissions

Totex to RCV ratio

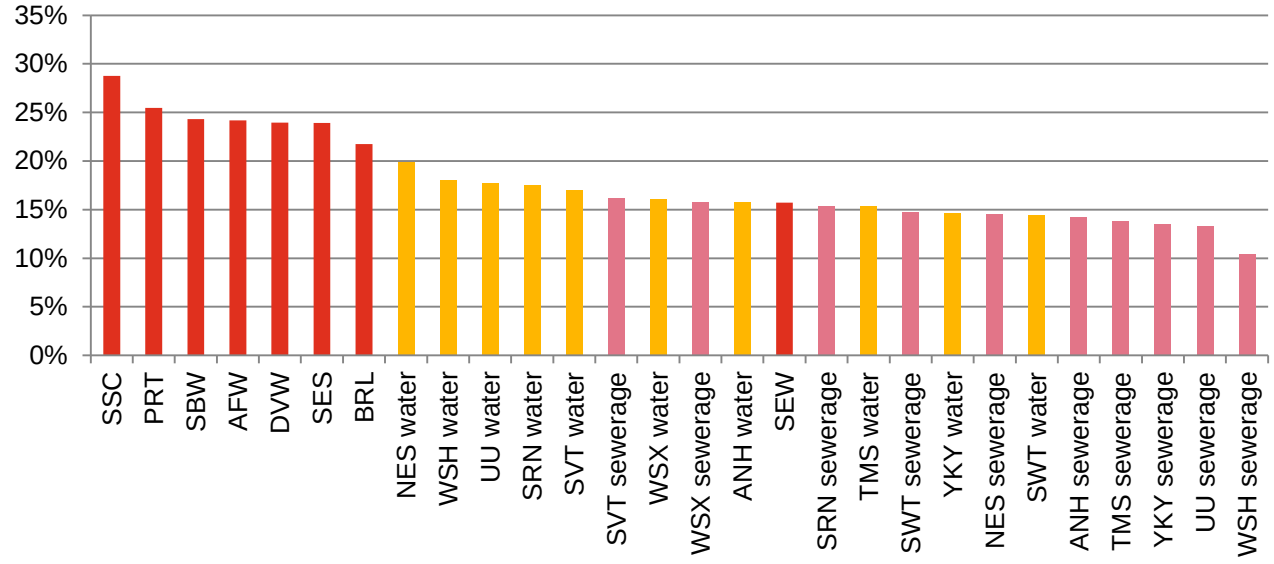
Figure 16 Totex as a proportion of RCV for AMP6



Source: Company submissions

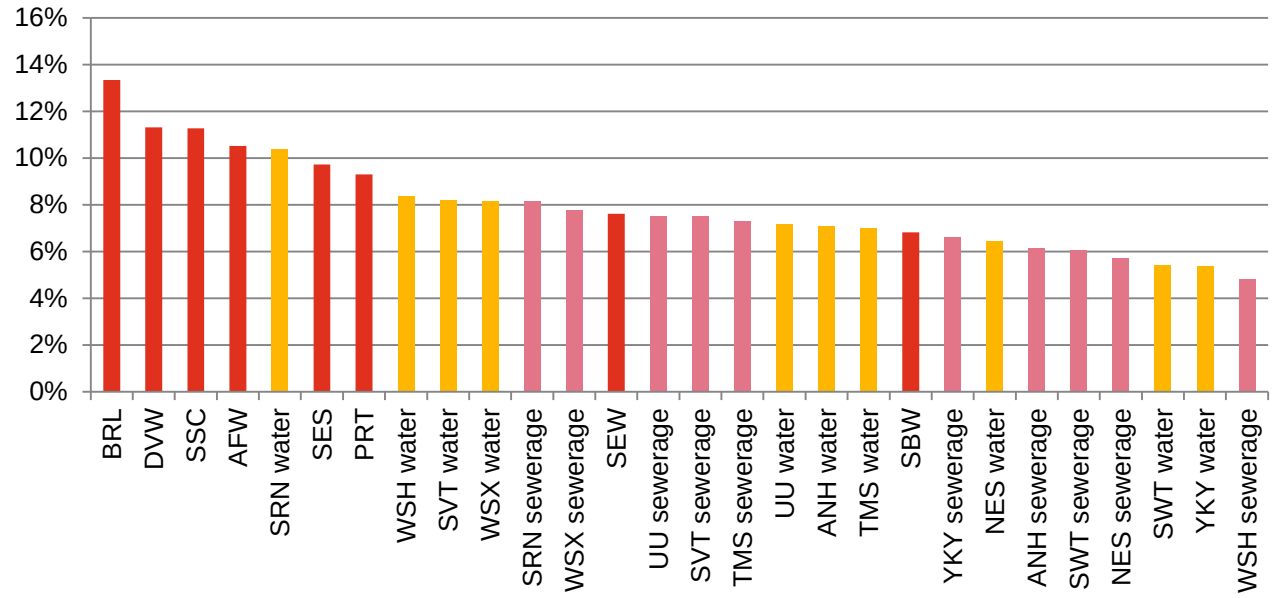
Revenue to RCV ratio

Figure 17 Revenue as a proportion of RCV for AMP6



Source: Company submissions

Figure 18 Net Capex as a proportion of RCV (AMP6 average)

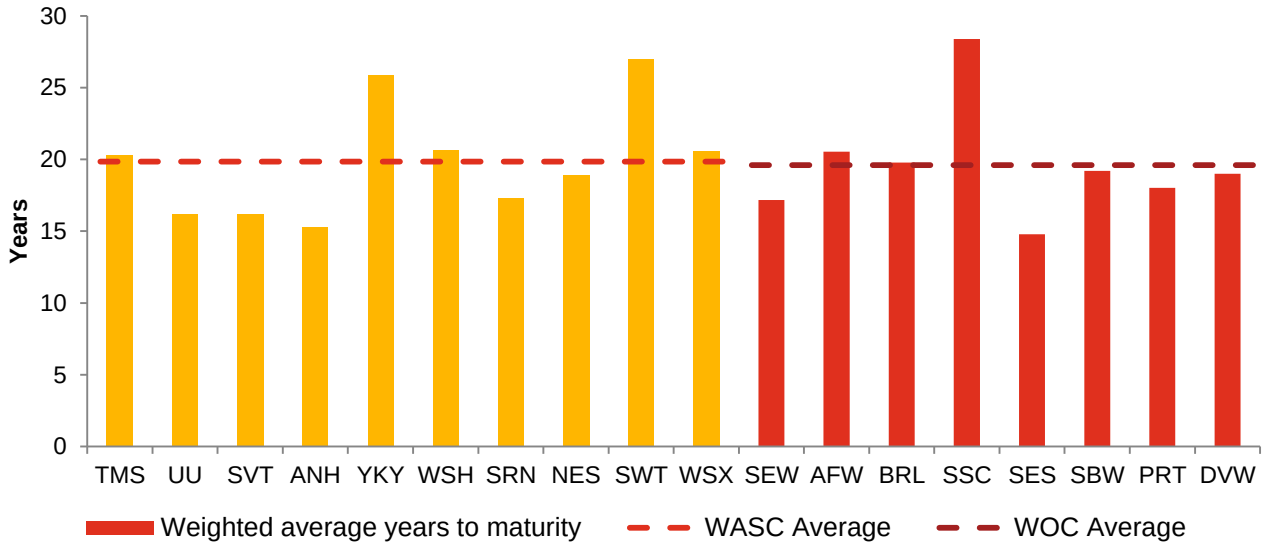


Source: Company submissions

Appendix C – Debt maturity profiles

The debt maturity profile for WoCs and WaSCs is currently very similar as shown in the figure below. Basing new debt assumption on bank debt will shorten maturity profile. A combination of new short term bank debt and Artesian financing heading closer to maturity could reduce average debt maturity for a notional WoC closer to 10 years.

Figure 19 Weighted average years to maturity on outstanding debt



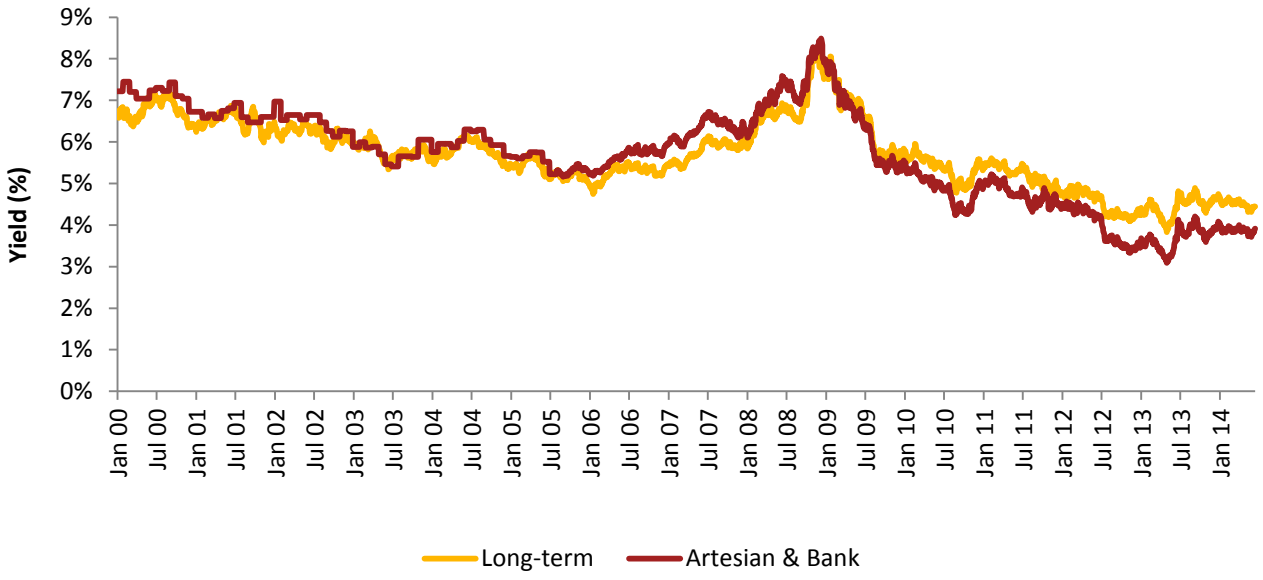
Source: Company submissions

Appendix D – Impact of debt maturity

In Figure 20 below, we set out a likely interest cost for two debt maturity profile. In the first, we use long-term bond finance based on the average of the iBoxx 10+ year A and BBB indices. The second has a shorter term maturity profile and is based on a weighting of 10-15 year iBoxx yields and 3-5 year iBoxx yields, with the intention of mimicking a portfolio with Artesian and bank debt maturities.

There is observably more volatility for a shorter-term financing mix. The standard deviation of the Artesian and bank mix over the period shown is 1.39 times more than the long-term mix. Therefore, a decision to use a lower (current) cost of debt may lead to higher volatility, and a higher cost of debt in the future.

Figure 20 Yields over time of long-term and shorter-term debt portfolios



Source: Datastream and PwC calculations

Appendix E – Water sector gearing

The tables below set out 2013 gearing for WoCs and WaSCs splitting each group into securitised and non-securitised companies. Overall, the gearing of the WoCs is currently not markedly different from WaSCs.

Table 19 2013 gearing levels by Water Company

WaSCs	
Securitised	
ANH	80%
TMS	77%
YKY	61%
WSH	63%
SRN	83%
Average	**73%**
Non-Securitised	
NES	62%
SVT	61%
SWT	55%
UU	68%
WSX	64%
Average	**62%**

WoCs	
Securitised	
SEW	63%
AFW	77%
Average	**70%**
Non-Securitised	
BRL	65%
SSC	73%
DVW	74%
PRT	78%
SBW	55%
SES	76%
Average	**70%**

Source: Regulatory Accounts

Appendix F – Company acronyms

The table below matches company three letter acronyms to their full names.

Table 20 Company acronyms

Acronym	Company Name
TMS	Thames Water
UU	United Utilities
SVT	Severn Trent Water
ANH	Anglian Water
YKY	Yorkshire Water
WSH	Dwr Cymru
SRN	Southern Water
NES	Northumbrian Water
SWT	South West Water
WSX	Wessex Water
SEW	South East Water
AFW	Affinity Water
BRL	Bristol Water
SSC	South Staffordshire Cambridge Water
SES	Sutton and East Surrey Water
SBW	SembCorp Bournemouth Water
PRT	Portsmouth Water
DVW	Dee Valley Water

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