



*Updated evidence  
on the WACC for  
PR14*

A report prepared for  
Ofwat

December 2014

**pwc**

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# *Executive Summary*

In the PR14 final methodology and August draft determinations (DDs), Ofwat stated that it would reconsider the level of the weighted average cost of capital (WACC) at Final Determination (FD). Alongside the August DDs, Ofwat set out evidence on market based movements in components of the WACC and other regulatory decisions since its risk and reward guidance. PwC has been asked by Ofwat to review company representations regarding the industry cost of capital and review updated market evidence to inform Ofwat's decision regarding the appropriate WACC to set at FD.

## **Risk and reward guidance**

In January 2014, Ofwat published its risk and reward guidance. This set out Ofwat's preliminary views on the WACC for PR14. An appointee level WACC of 3.85% was proposed for the industry. This appointee WACC – equivalent to a whole company WACC – covered both wholesale and retail activities. In order to obtain a 'wholesale WACC', Ofwat deducted 15bps from the appointee level – resulting in a wholesale WACC of 3.7%.

Subsequent to the publication of the risk and reward guidance, all Water and Sewerage Companies (WaSCs) and all but one Water only Company (WoC) accepted this industry WACC figure and prepared their revised business plans on this basis<sup>1</sup>.

## **Draft determinations**

In August 2014, Ofwat published its PR14 DDs, in which it stated its intention to review the WACC as part of the FD process:<sup>2</sup>

*“By the time final determinations are published (FDs), almost a year will have passed since our guidance was published. Due to this, as part of the FD process, we will need to consider whether there are changes in capital markets or regulatory determinations which would impact on our estimate of the cost of capital.”*

Ofwat also highlighted its intention to keep the methodology used in the calculation of the WACC unchanged. However, it indicated that it would revisit key assumptions used in the calculation of the WACC, particularly the total equity market returns, the cost of debt and inflation.

## **Company representations**

Following Ofwat's stated intention to review the industry WACC at FD, most WaSCs addressed WACC related issues in their representations<sup>3</sup>. WoCs tended to focus on company specific adjustments to the WACC, rather than the industry WACC itself<sup>4</sup>. Across all submissions related to the industry WACC, nine key issue topics arose. Table 1 below sets out these topics and a summary of our responses to each. Where applicable, we take account of these company representations in our assessment of evidence since January.

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<sup>1</sup> Revised from December 2013 business plan submissions.

<sup>2</sup> Ofwat (2014), 'Draft price control determination notice: technical appendix A6 – risk and reward', Annex 1.

<sup>3</sup> Yorkshire Water and Southern Water did not provide any commentary on the WACC in their representations.

<sup>4</sup> PwC (2014), 'Company specific adjustments to the WACC: A review of company representations'.

**Table 1 Issue topics raised in company representations and PwC summary responses**

<b>Issue topics raised in company representations</b>	<b>Company representations</b>	<b>PwC summary response</b>
<b><i>Financeability and the interaction with the WACC</i></b>	A reduction in the WACC would strain financeability and could require an adjustment to Pay-as-you-go (PAYG) ratios.	We consider the primary tool which Ofwat uses for ensuring regulated firms can finance their functions is setting allowed returns consistent with a notional cost of capital. Assessment of financeability is then separately tested by Ofwat. Companies have a range of tools (e.g. PAYG and RCV run-off) to alter their financial ratios to meet key thresholds. We do not consider the WACC should be changed to influence financeability ratios.
<b><i>Short-term market movements and the WACC</i></b>	Ofwat should take a long-term perspective and not place weight on short-term movements in markets.	We agree that Ofwat should not be unduly influenced by short-term market movements. To avoid introducing undue volatility, we have focused on long-term corporate bond rates, evidence of long-term equity returns and we have carefully considered whether short-term movements merely reflect short-term variability, or a more sustained change.
<b><i>Interest rate expectations since January</i></b>	Interest rates are still expected to rise over the 2015-20 period, as signalled by the Bank of England and market expectations, and this has not changed since January.	We have taken account of expected interest rates in our approach to adjusting the cost of new debt for forward-looking expectations, set out in Section 4 of this report. We consider a number of sources, including market expectations relating to the Bank of England's base rate.
<b><i>TMR assumptions in the medium-term as growth returns to 'normal'</i></b>	As growth returns to normal, total equity market return (TMR) would be expected to rise.	We address TMR in Section 6 of this report. Our assessment of TMR is based on both long-run historical evidence, forward-looking evidence and other regulatory decisions. We note that long-term economic growth expectations have changed little since January 2014.
<b><i>Regulatory risk in relation to changing the WACC</i></b>	Changes to the estimate and methodology on WACC would lead to higher regulatory risk.	Ofwat have stated its intention to retain the same WACC methodology as used in the risk and reward guidance. Updating WACC parameters for market movements is a standard approach to setting price controls and has been signalled by Ofwat in its methodology <sup>5</sup> and DDs.
<b><i>The interaction of market interest rates and lower inflation measures</i></b>	Falls in the corporate bond index have been offset by falls in current and forecast RPI, leaving the real cost of debt little changed.	We review the movements in inflation and the cost of debt in Sections 3 and 4 respectively.
<b><i>Measures of beta</i></b>	The asset beta of 0.3 is too low, and lower than the recent CC estimate for NIE.	The assessment of beta is largely an empirical issue. We set out our evidence in Section 7 of this report.
<b><i>Forward looking uplifts to the cost of debt</i></b>	The forward looking uplift (of 60 basis points) implies an unrealistic narrowing of corporate borrowing spreads if government bond yields rise by more than 60 basis points.	We address the forward looking uplift applied to the current cost of new debt in Section 4. We have checked that the magnitude of any forward looking uplift does not imply a steep compression in future corporate bond spreads compared to government bond yields.
<b><i>The retail deduction from the appointee WACC</i></b>	Companies propose a number of changes to the calculation of the retail margin adjustment to the appointee WACC.	We address the retail margin adjustment from the appointee WACC in Section 8. This includes a revised retail deduction based on company representations and up to date information on industry revenue requirements and Regulatory Capital Values (RCVs).

Source: Submissions to Ofwat

<sup>5</sup> Ofwat (2013), 'Setting price controls for 2015-20: final methodology and expectations for company business plans', p.132.

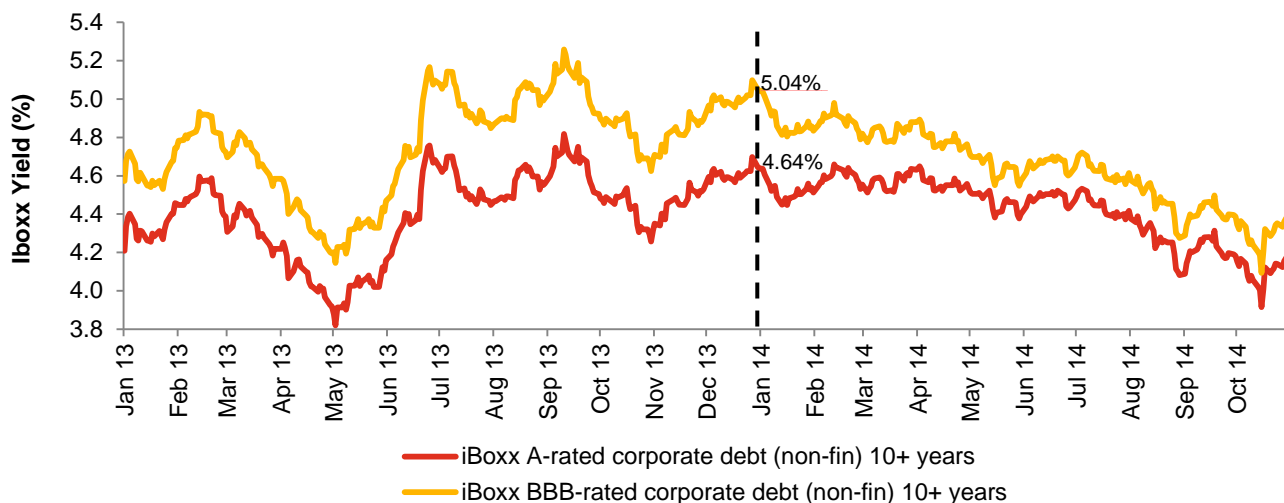
### Market evidence update

In our review, we find that updated market evidence relating to total market returns (TMR) shows relatively minor changes since the start of 2014. Long-run evidence from historical equity returns exhibit a very small increase and long-term economic growth expectations – a key input into forward looking models such as dividend growth models – have shown little change. One recent survey of the market risk premium (one component of the total market return) in the UK has fallen by 0.4 percentage points.

Updated market evidence on inflation shows that outturn RPI inflation has fallen since the start of the year, but Ofwat uses a long-term RPI estimate in its WACC calculation – consistent with long-term water company financing. Its’ assumption of 2.8% was consistent with the PR09 2.5% assumption, allowing for an increase in the RPI formula effect. It was also consistent with long-term market implied inflation over 2013, but did not reflect temporary increases at the end of 2013. There has been a reduction in implied RPI expectations derived from gilt yields since January 2014, most significantly in October 2014. It is unclear whether these recent movements reflect anything other than short-term volatility. We consider the 2.8% RPI assumption is still supported by market data.

We find that market evidence shows a clear and significant reduction in the cost of new debt since the end of 2013. This is exhibited by the sustained and substantial reduction in corporate yields relative to expectations in January 2014. These declining yields are shown in Figure 1 below.

**Figure 1 IBoxx corporate bond yields**



Source: Datastream, Capital IQ

Yields on BBB corporate debt have declined by approximately 65 basis points (bps) to the end of October 2014 relative to the end of December 2013. We consider this to represent a significant shift in financing conditions in debt capital markets.

Regarding the forward-looking uplift that Ofwat applied to the cost of new debt in the risk and reward guidance, we find that market expectations of interest rate rises have been delayed, but there remains a consensus market expectation of rising interest rates over the period 2015 to 2019. For this reason we still consider the 60 bps forward-looking adjustment to remain valid.

Updated market evidence in relation to embedded debt shows only minor changes since the start of the year. Long-term averages of corporate bond yields have not deviated significantly from the values applied in the risk and reward guidance, and the stock of water company embedded debt remains largely identical.

Lastly, we find that the most up to date market information regarding observed betas of listed water companies does not show significant change relative to the information that was available in January 2014.

### **Regulatory decisions update**

Since the publication of the risk and reward guidance there have been developments regarding regulatory determinations on the TMR assumption. In its final determination for Northern Ireland Electricity (NIE) for period 2013-17, published in March 2014, the Competition Commission (CC) maintained the proposed TMR range (of 5% to 6.5%) from its draft determination, but selected a point estimate at the top end of the possible WACC range. We have, therefore, inferred a TMR point estimate of 6.5%.

The outcome of Ofgem's consultation on TMR was also released in February 2014. In its post-consultation decision document<sup>6</sup>, Ofgem did not explicitly state its point estimate for TMR. However, the reduction in the cost of equity figure it applied to the ED1 draft determinations from 6.3% to 6.0%, implies a reduction in TMR from 6.85% to around 6.5% (holding all other cost of equity parameters constant).

Regarding inflation, in its final determination for NIE, the CC used an inflation assumption of 3.25% for 2013-17, which was above the range of 2.7% to 3.2% it had set out in its draft determination. The CC's assessment was based upon OBR's RPI forecast in December 2013.

Another relevant component of the WACC that the CC assessed in its final NIE determination was beta. The CC's empirical estimates of the betas for Pennon, Severn Trent and United Utilities ranged from 0.25 to 0.30 using 2-year daily regressions. This range represented a reduction from its draft NIE determination where the 2-year daily estimates ranged from 0.27 to 0.33.

### **Other WACC considerations**

We calculate an updated retail margin adjustment to the appointee WACC in order to calculate the wholesale WACC. This adjustment uses a post-tax retail margin, in conjunction with the latest RCV and revenue requirement data.

### **Recommendation to Ofwat for final PR14 determinations**

We find that there is insufficient evidence for a revision to Ofwat's point estimates for TMR, embedded debt cost and inflation, and therefore recommend that Ofwat leaves them unchanged at FD.

Following the same methodology as used by Ofwat in the risk and reward guidance, which used the most up to date market information on corporate bond yields, we recommend that Ofwat uses an updated cost of new debt of 2.0%. This reduction is attributable to the substantial and sustained decline in bond yields since January 2014. Such a reduction was not in line with market expectations when the risk and reward guidance was published.

The methodology for calculating the cost of new debt is most directly informed by current capital market conditions. Not only has the movement been substantial, but the cost of new debt is the most observable of the cost of capital assumptions – water companies may start to raise new debt finance in AMP6 in the coming months and the risk and reward guidance assumption for the cost of new debt is too far above current debt market borrowing rates. Retaining the risk and reward assumption of 2.65% for the real cost of new debt would therefore be highly likely to provide undeserved opportunity for finance outperformance and would therefore be detrimental to customers.

Our final recommendation is that Ofwat reduces the deduction from the appointee WACC from 15bps to 14bps to eliminate the double counting part of the retail net margin. This change reflects the most up to date data available on industry RCV and revenue requirements, as well as a small adjustment to the calculation methodology.

Using a cost of new debt of 2.0% and a deduction of 14bps for the retail adjustment, we calculate an appointee WACC of 3.74% and a wholesale WACC of 3.60%. This is set out in Table 2 below.

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<sup>6</sup> Ofgem (2014), 'Decision on our methodology for assessing the equity market return for the purpose of setting RIIO-ED1 price controls', <https://www.ofgem.gov.uk/ofgem-publications/86366/decisiononequitymarketreturnmethodology.pdf>

**Table 2 WACC calculation**

	Risk and reward guidance	PwC recommended update
Gearing	62.5%	62.5%
TMR	6.75%	6.75%
EMRP	5.50%	5.50%
Risk-free rate	1.25%	1.25%
Asset Beta	0.3	0.3
Equity Beta	0.8	0.8
Cost of equity	5.65%	5.65%
Cost of new debt	2.65%	<b>2.00%</b>
Cost of embedded debt	2.65%	2.65%
Ratio	75:25	75:25
Allowance for debt fees	0.10%	0.10%
Overall cost of debt	2.75%	<b>2.59%</b>
Appointee WACC (vanilla)	<b>3.84%</b>	<b>3.74%</b>
Retail margin adjustment	0.15%	<b>0.14%</b>
Wholesale WACC	<b>3.69%</b> <b>(3.7% rounded to nearest 5bs)</b>	<b>3.60%</b> <b>(3.6% rounded to nearest 5bs)</b>

Note: red shading denotes a change since the risk and reward guidance

Therefore, **we recommend that Ofwat uses a wholesale real, vanilla WACC of 3.6% at FD.**

# 1. Introduction

## Background

### Risk and reward guidance

In January 2014, Ofwat published its risk and reward guidance<sup>7</sup>. This set out Ofwat's preliminary views on the weighted average cost of capital (WACC) for PR14. An appointee level WACC of 3.85% was proposed for the industry.

This appointee WACC – equivalent to a whole company WACC – covers both wholesale and retail activities. In order to obtain a 'wholesale WACC', the appointee level WACC must be adjusted to remove the allowed return attributable to the retail element of the business. The appropriate size of this retail margin is discussed in another PwC report released February 2014<sup>8</sup>.

The calculation of the appointee and wholesale WACC proposed by Ofwat in the risk and reward guidance is set out in Table 3 below:

**Table 3 Risk and reward guidance WACC**

WACC inputs	Ofwat (point estimate)	Ofwat range
Total equity market return	6.75%	6.25% to 6.75%
Real risk-free rate	1.25%	0.75% to 1.25%
Equity market risk premium	5.50%	5.50%
Gearing (Net Debt:RCV)	62.50%	60% to 62.5%
Asset beta	0.3	0.3
Equity beta	0.8	0.75 to 0.80
Cost of equity (post-tax)	5.65%	4.9% to 5.7%
Ratio of embedded debt to new debt	75%:25%	75%:25%
Cost of new debt	2.65%	2.6 to 2.8%
Cost of embedded debt	2.65%	2.6% to 2.8%
Allowance for debt fees	0.1%	0.1%
Overall cost of debt	2.75%	2.7% - 2.9%
Appointee (Vanilla) WACC	<b>3.85%</b>	<b>3.6% to 3.9%</b>
Adjustment from appointee to wholesale WACC	(0.15)%	(0.15)%
<b>Wholesale WACC</b>	<b>3.70%</b>	<b>3.45% to 3.75%</b>

Source: Ofwat risk and reward guidance

Subsequent to the publication of the risk and reward guidance, all Water and Sewerage Companies (WaSCs) accepted this WACC figure and, where required by Ofwat<sup>9</sup>, revised their business plans on this basis.

### Draft determinations

In the PR14 final methodology and again in the August draft determinations, Ofwat stated its intention to review the weighted average cost of capital (WACC) as part of the final determination (FD) process:<sup>10</sup>

<sup>7</sup> Ofwat (2014), 'Setting price controls for 2015-20 – risk and reward guidance'

<sup>8</sup> PwC (2014), 'Water retail net margins', <[http://www.ofwat.gov.uk/pricereview/pr14/rpt\\_com20140214pwcnetmargins.pdf](http://www.ofwat.gov.uk/pricereview/pr14/rpt_com20140214pwcnetmargins.pdf)>

<sup>9</sup> Affinity Water and South West Water were not required to submit revised business plans, as they were awarded enhanced status in Ofwat's risk based review process.



*“By the time final determinations are published (FDs), almost a year will have passed since our guidance was published. Due to this, as part of the FD process, we will need to consider whether there are changes in capital markets or regulatory determinations which would impact on our estimate of the cost of capital.”*

Ofwat also highlighted its intention to keep the methodology used in the calculation of the cost of capital unchanged. However, it indicated that it would revisit key assumptions used in the calculation of the WACC, particularly the total market returns, the cost of debt and inflation.

### Post-draft determination representations

Following Ofwat’s stated intention to review the industry WACC at FD; several WaSCs addressed WACC in its representations. Table 4 below sets out the issues raised along with which companies raised them. Post risk and reward guidance submissions were also received from the Consumer Council for Water (CC Water). From the WaSC group of companies, Yorkshire Water and Southern Water did not mention any issues relating to the WACC in their representations.

**Table 4 Issue topics and respondents from representations**

Issue topics raised in representations	Respondents
Financeability and the interaction with the WACC.	TMS, NES, UU, ANH, WSH, WSX, SVT, SEW
Short-term market movements and the WACC	TMS, NES, UU, ANH, WSH
Interest rate expectations since January	NES, ANH
TMR assumptions in the medium-term as growth returns to ‘normal’	TMS
Regulatory risk in relation to changing the WACC	ANH, NES, SVT
The interaction of market interest rates and lower inflation measures	TMS, WSH, SVT
Measures of beta	TMS, SVT, CC water
Forward looking uplifts to the cost of debt.	TMS
The retail deduction from the appointee WACC.	TMS, NES

Source: Company representations

Overall, comments specific to the industry WACC were typically made by WaSCs, whereas Water only Company (WoC) representations tended to focus on company-specific adjustments to the industry WACC. Our report, entitled ‘*Company specific adjustments to the WACC: A review of company representations*’, which has been published alongside the FD notices, addresses representations relating to company specific adjustments in detail.

### Scope of this report

Ofwat has asked PwC to review the representations made by companies on the WACC and review market evidence relating to the WACC since the publication of the risk and reward guidance. We have also been asked to provide a recommendation to Ofwat as to whether there should be any change to the industry WACC at FD, based upon our review of company representations and updated market evidence.

### Structure of this report

The remainder of this report is structured as follows:

<sup>10</sup> Ofwat (2014), ‘Draft price control determination notice: technical appendix A6 – risk and reward’, Annex 1.

- Section 2 sets out the views contained in company representations and presents our responses on methodological aspects to the WACC calculation;
- Section 3 sets out new market and regulatory evidence on inflation and provides our view of whether we consider Ofwat should change its **RPI inflation** assumption for FD;
- Section 4 sets out new market evidence on the **cost of debt** and provides our view of whether we consider Ofwat should change its cost of debt assumption for FD;
- Section 5 sets out our views on the notional **gearing** assumption;
- Section 6 sets out new market and regulatory evidence on the **TMR** and provides our view of whether we consider Ofwat should change its TMR assumption for FD;
- Section 7 sets out the most up to date empirical evidence on **beta**;
- Section 8 sets out our views on the adjustment for **retail net margins**;
- Section 9 sets out our conclusions; and
- Appendix 1 provides additional supporting evidence.

### **Subsection structure**

Sections 3 to 8 are each structured as follows – the first part of the section sets out the methodology and sources used by Ofwat in the risk and reward guidance, the second part reviews new evidence which is now available since the publication of the risk and reward guidance, and the final part concludes with our recommendation for Ofwat.

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## ***2. Draft determination representations***

This section provides an overview of company representations to Ofwat's DDs, specifically in relation to the WACC. Overall, comments specific to the industry WACC were typically made by WaSCs, whereas Water only Company (WoC) representations tended to focus on company-specific adjustments to the industry WACC. Our report, entitled '*Company specific adjustments to the WACC: A review of company representations*', which has been published alongside the FD notices, addresses representations relating to company specific adjustments in detail.

### ***Representation responses***

We have identified nine issue topics which were raised by companies in their representations in relation to the industry WACC. These include:

1. Financeability and the interaction with the WACC;
2. Short-term market movements and the WACC;
3. Interest rate expectations since January;
4. TMR assumptions in the medium-term as growth returns to 'normal';
5. Regulatory risk in relation to changing the WACC
6. The interaction of market interest rates and lower inflation measures;
7. Measures of beta;
8. Forward looking uplifts to the cost of debt; and
9. The retail deduction from the appointee WACC.

The representations from Yorkshire Water and Southern Water contained no specific commentary on the industry WACC<sup>11</sup>.

### ***Responses to the company views expressed in representations***

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<sup>11</sup> 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. South West Water accepted the risk and reward guidance with no further comment.

## 1. *Financeability and the interaction with the WACC*

### **Respondents' view**

Of the seven WaSCs that submitted representations in relation to the WACC, all seven asserted that a reduction in the WACC would present significant challenges to financeability. For example, Wessex Water's representation stated:

*"Given that we consider Ofwat has at this stage failed to carry out its primary financing duty appropriately, a further reduction of Ofwat's assessed WACC would further exacerbate this failure."*

Additionally, most of the companies stated that changes to the WACC would mean that pay-as-you-go (PAYG) ratios<sup>12</sup> and RCV run-off would need to be amended as a result. Welsh Water's response stated that:

*"Any change in the allowed rate of return would inevitably have implications for financeability, and would necessitate a re-evaluation of financial ratios together with Pay As You Go and RCV Run off rate."*

Companies have also suggested that credit rating downgrades do not serve customers' interests in the long-term. For example, Welsh Water considered that a one notch credit rating downgrade could add over £10 to the average household bill in the long-term.

### **PwC response**

We consider the primary tool which Ofwat uses for ensuring regulated firms can finance their functions is setting allowed returns consistent with a notional cost of capital. Analysis of financial ratios (often referred to as financeability assessment) is then separately tested by Ofwat. Companies have a range of tools (e.g. Pay-as-you-go (PAYG) and RCV run-off) to alter their financial ratios to meet key thresholds. We do not consider the WACC should be changed to influence financeability ratios.

Furthermore, Ofwat carries out financeability testing on a notional basis with a notional capital structure and notional cost of debt and equity financing. This means that reductions in the WACC do not necessarily translate into lower financeability ratios. For example a reduction in the notional cost of debt will typically increase financeability ratios.

## 2. *Short-term market movements and the WACC*

### **Respondents' view**

Companies urged Ofwat to adopt a long-run perspective on the WACC parameters. They encouraged Ofwat not to overly emphasise short-term market movements. Some companies cited specific short-term factors that Ofwat should consider:

- Anglian Water cited short-term geo-political issues as a factor that may be causing some recent market movements.
- Welsh Water cited short-term international events, such as the impending prospect of quantitative easing by the ECB.
- Severn Trent Water and Thames Water, cited that falls in the iBoxx since January are not unusual or unexpected as they are in line with historical volatility in corporate bond yields.

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<sup>12</sup> The PAYG ratio controls the balance between immediate funding and funding through the RCV.

### **PwC response**

We agree with company representations that Ofwat should not be unduly influenced by short-term market movements in its assessment of WACC, but we consider Ofwat should take account of substantial market movements in order to calculate an up to date estimate of the WACC for Asset Management Period 6 (AMP6).

We note that Ofwat did take account of the significant financial volatility around the time of the PR09 Final Determination.

To avoid introducing undue volatility into our assessment of the WACC, we have focused on long-term corporate bond rates and evidence of long-term equity returns. We have also carefully considered whether short-term movements merely reflect short-term variability, or a more sustained change.

### **3. Interest rate expectations since January**

#### **Respondents' view**

Companies stated that interest rates are still expected to rise over the 2015-20 period – and that this expectation has not changed since January 2014. Northumbrian Water's representation referred to a recent speech by the Governor of the Bank of England, which in their view signalled that a rate rise was only a matter of time.

#### **PwC response**

We consider it is correct to take account of the likely evolution in interest rates over AMP6 in Ofwat's assessment of the appropriate cost of capital.

In particular, we set out our approach to adjusting the cost of new debt for forward-looking expectations in Section 4 of this report. We consider a number of sources, including market expectations relating to the Bank of England's base rate.

### **4. TMR assumptions in the medium-term as growth returns to normal**

#### **Respondents' view**

Thames Water's representation stated that:

*“the assessment of the risk-free rate and overall market returns have been affected by views of low growth rates”*

Their representation suggests that these parameters should take account growth returning to “normal levels” – as signalled by the Governor of the Bank of England in the opening remarks of the May Inflation Report.

#### **PwC response**

We address TMR in detail in Section 6 of this report. Our assessment of TMR is based on both long-run historical evidence, forward-looking evidence and other regulatory decisions. We note that long-term economic growth expectations have changed little since January 2014.

### **5. Regulatory risk in relation to changing the WACC.**

#### **Respondents' view**

In their representations, companies set out the view that changes to the estimate and methodology on the WACC would lead to higher regulatory risk. Anglian Water stated that:

*“If Ofwat reduce the cost of capital further then bondholders will see that as a further increase in regulatory risk with the consequence that, other things being equal, the cost of debt will increase to the detriment of customers in the longer term.”*

Northumbrian Water's representation also cited similar concerns regarding potential damage to investor confidence in the sector, stating that a change to the WACC at FD would:

*“effectively render all previous company representations redundant. Such late changes would significantly undermine investor confidence in the transparency of the sector’s regulatory process.”*

Other representations raised similar concerns regarding a change to the WACC towards the latter end of the price review process.

### **PwC response**

In its DDs, Ofwat stated its intention to retain the same methodology for calculating the WACC as used in the risk and reward guidance and Ofwat has signalled its intention to update the WACC parameters for market movements.

This is a standard approach to setting price controls. For example the CAA shifted its view of the appropriate cost of capital moving from draft determinations to final notices in Q6.<sup>13</sup> The CC updated the parameters in its cost of capital assessment in its final determination for Northern Ireland Electricity (even though the point estimate did not change).<sup>14</sup>

Market analysts, commentators and rating agencies have been commenting on the possibility of movement in the WACC used by Ofwat at FD.

We recommend that Ofwat should retain its existing methodology for assessing the WACC, but should update the WACC parameters for sustained movement in market evidence, consistent with what it signalled in the DDs.

## **6. *The interaction of market interest rates and lower inflation measures.***

### **Respondents' view**

Welsh Water and Severn Trent Water both acknowledged that there has been a fall in corporate bond yields since the publication of the risk and reward guidance. However, they also drew Ofwat's attention to recent reductions in both outturn inflation and inflation expectations (as shown by government bond yields). They reasoned that the combination of lower nominal debt costs and lower inflation was likely to leave the real cost of debt little changed.

### **PwC response**

We review the movements in inflation and the cost of debt in Sections 3 and 4 respectively.

## **7. *Measures of beta***

### **Respondents' view**

Thames Water and Severn Trent's representations suggested that the asset beta value of 0.3 selected by Ofwat was too low. Severn Trent noted that the 0.3 figure did not fall within the CC's 0.35 to 0.40 asset beta range used in the Final Determination for NIE. Thames Water also drew comparisons with Ofgem, who selected an asset beta of 0.38 in its recent determinations – suggesting that Ofwat's figure may be too low. Thames Water also suggested that the increase in expected return on regulated equity (RoRE) range (arising in part from a wider ODI range) is likely to lead to higher betas in future, relative to historic observed values.

Conversely, the Consumer Council for Water suggested that an equity beta estimate of 0.8 is too high, and estimate that an equity beta of 0.5 to 0.6 would be more appropriate.

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<sup>13</sup> CAA (2014), 'Estimating the cost of capital: a technical appendix for the economic regulation of Heathrow and Gatwick from April 2014: Notices of the proposed licences'.

<sup>14</sup> Competition Commission (2014), 'Northern Ireland Electricity A reference under Article 15 of the Electricity (Northern Ireland) Order 1992. Final Determination', 26 March 2014. Section 13.

## **PwC response**

This is largely an empirical issue. We set out our evidence on beta in Section 7.

We are cautious about making direct comparisons between historic RoRE performance and forward looking RoRE ranges, as they are calculated differently. The former represents a snapshot of historic performance, whereas the forward looking estimates are specifically intended to capture a P10/P90 range – i.e. there is a 10% probability of performance both above and below this range. If there has been a movement in risk, this is likely to relate to outcome delivery incentives which are company specific and therefore unlikely to have any material impact on systematic risk, and therefore the cost of equity.

## *8. Forward looking uplifts to the cost of debt*

### **Respondents' view**

Thames Water, advised by FTI Consulting, suggested that the allowed pass through from expected gilt yield rises to corporate yield rises was too low, and that a coefficient closer to one was more appropriate.

### **PwC response**

We address the forward looking uplift applied to the current cost of new debt in section 4. We have checked that the magnitude of any forward looking uplift does not imply a steep compression in future corporate bond spreads compared to government bond yields.

## *9. The retail deduction from the appointee WACC*

### **Respondents' view**

Northumbrian Water, advised by First Economics, set out three challenges to the reduction Ofwat made when transitioning from the appointee WACC to the wholesale WACC.

- Retail margins are pre-tax measures which are designed to cover both corporate tax and investor returns, whereas the vanilla appointee WACC abstracts from tax. A post-tax retail margin should be used.
- Retail margins are nominal returns. As retail price controls will not be RPI linked, the profits that retail activities deliver to investors must cover expected inflation each year. The appointee WACC used is in real terms.
- Retail margins pay for the cost of financing additional investment. A proportion of the return that companies will make through retail price controls can be attributed to capital and investments that are being kept inside the wholesale RCV. Ofwat has not properly sized the impact.

### **PwC response**

We address the retail reduction from the appointee WACC in Section 8. We calculate a revised retail deduction, based on the responses set out above and up to date information on industry revenue requirements and RCVs.

In relation to Northumbrian's first point, we agree that the retail deduction should be converted from a pre-tax margin to a post-tax margin in order to calculate the equivalent deduction on the appointee WACC.

In relation to Northumbrian's second point, this is less clear-cut as the removal of linking retail price controls to RPI was designed as an efficiency challenge, so we calculate the equivalent amount of the post-tax retail net margin as a deduction to the real appointee WACC.

In relation to Northumbrian's third point, we have made specific allowance for new retail assets which are kept outside the RCV in future and therefore reduce the size of the double count and therefore remove the amount of the retail margin deduction.

In the next six sections we review the market evidence which impacts parameters of the WACC calculation. Each section sets out the methodology and sources used in the risk and reward guidance, reviews updated

market evidence and regulatory determinations since January and concludes with our recommendation to Ofwat for an appropriate notional industry WACC at FD.



# 3. Inflation

## Risk and reward methodology and sources

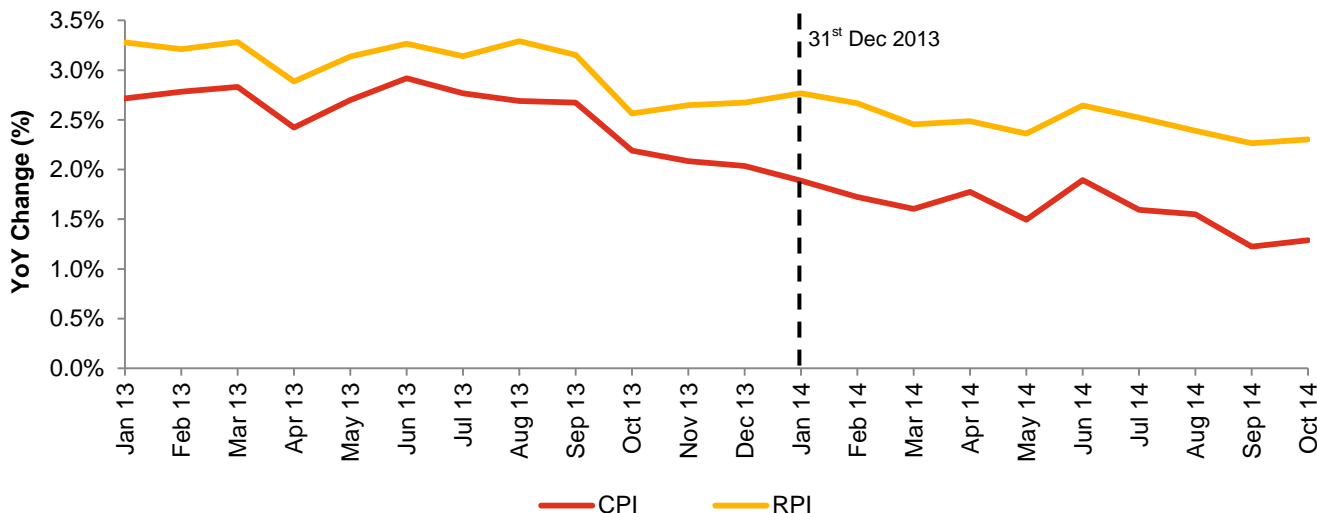
In its risk and reward guidance, Ofwat used an estimate for RPI of 2.8%. This was a long-term RPI inflation assumption, which was chosen in order to be consistent with long-term debt financing costs. It was 0.3% higher than the 2.5% RPI assumption used in PRO9, which can be consistent with the change in the formula effect.<sup>15</sup>

## Review of evidence since January

### Outturn inflation since January 2014

Since the beginning of 2014, outturn inflation, as measured by CPI and RPI has fallen (see Figure 2 below). In October 2014, the annual rate of RPI inflation was 2.3%, which represents a 0.4 percentage point decrease from the RPI inflation rate in December 2013.

Figure 2 Outturn inflation



Source: ONS

Although the RPI measure of inflation has declined since the risk and reward guidance was published, Ofwat stated that its RPI assumption was based on a long-term figure and is applied to both embedded and new cost of debt to calculate a real cost of debt. This approach means there may be short-term periods where the RPI indexation of RCV is greater or less than the inflation deduction used to calculate the real cost of debt, but such short-term variability should even out over the medium-term. Such an approach also provides greater stability for the calculation of allowed returns.

As a result, it would be inconsistent to place much weight on short-term movements in RPI. Instead, it is more appropriate to consider long-term forward looking measures of RPI.

### Regulatory decisions on RPI

In its final determination for NIE, the CC used an inflation assumption of 3.25%, which was above the range of 2.7% to 3.2% it had set out in its draft determination. The CC’s assessment was based upon OBR’s RPI forecast

<sup>15</sup> ONS (2011): CPI and RPI: increased impact of the formula effect in 2010

in December 2013. The OBR's December 2013 RPI forecast and the more recent March 2014 forecast are shown in Table 5 below.

**Table 5 OBR RPI forecasts**

OBR RPI Forecast	2014	2015	2016	2017	2018	Average (2015-18)
<b>March 2014</b>	2.6%	3.2%	3.6%	3.8%	3.9%	3.7%
<b>December 2013</b>	2.9%	3.3%	3.6%	3.7%	4.0%	3.7%

Source: OBR

Table 5 shows that expectations of short-term inflation have fallen since January 2014, as supported by other forecasters<sup>16</sup>, but the OBR's forecasts towards the middle of AMP6 are significantly higher than 2.8%, largely driven by expectations of rising interest rates (which impact RPI). Given that these forecasts are still relatively short-term in comparison to the typical financing of a water company<sup>17</sup>, we review longer-term inflation evidence below.

### Long-term inflation evidence

Over the long-term, the OBR estimate that the wedge between RPI and CPI will range between 1.3% and 1.5% (see Table 6 below). In comparison, the RPI-CPI wedge has historically been approximately 0.8%<sup>18</sup>. The forecast increase in the size of the wedge, as implied by the OBR's estimates, is attributable to the increase in the formula effect and effects from housing prices and mortgage interest payments. However, the OBR estimate that the underlying wedge attributable to the formula effect is between 0.8% and 1.0%.

**Table 6 OBR estimate of a plausible range of assumptions for the wedge between RPI and CPI inflation**

	Low	High
Formula effect	0.8%	1.0%
Housing (ex. MIPs)	0.35%	0.35%
Coverage	0.0%	0.0%
Difference in weights	0.0%	0.0%
Total RPIX-CPI wedge	1.15%	1.35%
MIPs	0.15%	0.15%
Total RPI-CPI wedge	1.3%	1.5%

Source: OBR

Expectations of future RPI inflation can also be inferred from the difference in yields between nominal and index-linked government bonds. Currently the implied RPI inflation figure obtained from data on 10 year gilts is 2.9% (see Figure 3 below). Subtracting an inflation risk premium of 0.3% from this figure<sup>19</sup>, we calculate a long-term inflation figure of 2.6%. Implied inflation from 20 year gilts is currently 3.4%, which translates into a long-term inflation figure of 3.1% after subtracting an inflation risk premium. Implied inflation figures have been relatively stable since January with the exception of a recent dip, particularly for the 10 year implied inflation figure.

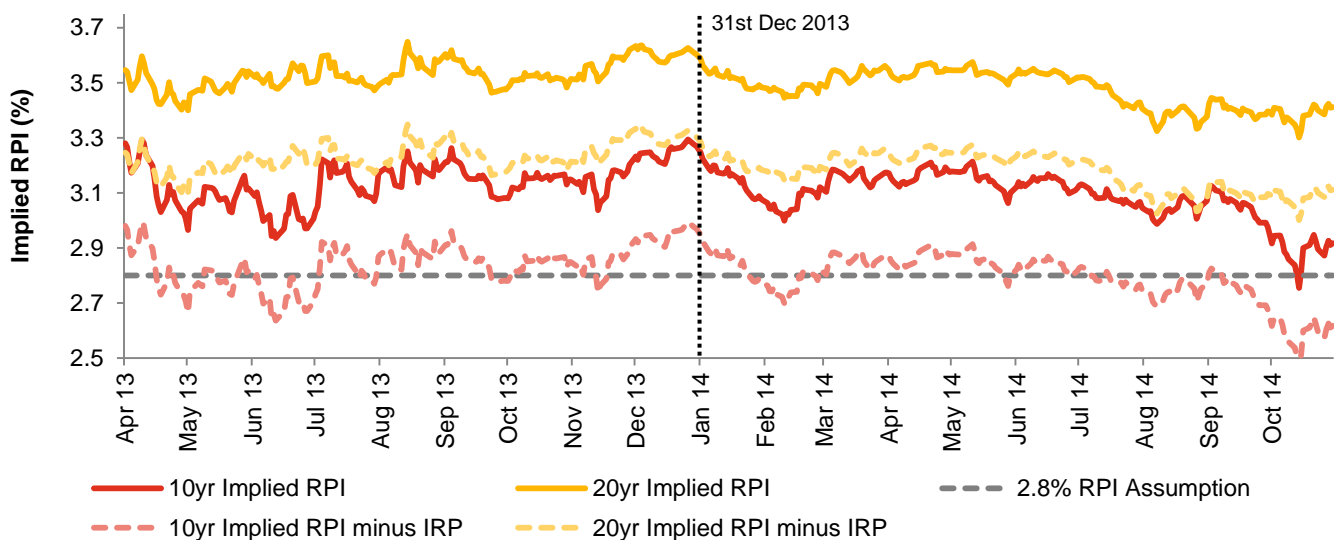
<sup>16</sup> The latest survey of independent forecasts from HMT shows that the average RPI forecast for 2014 and 2015 were 2.4% and 3.0% respectively.

<sup>17</sup> See Appendix 1.

<sup>18</sup> Between 1997 and October 2014 the average wedge between RPI and CPI has been approximately 0.8%.

<sup>19</sup> The difference in yields between nominal and real gilts captures both expected inflation as well as the inflation risk investors bear by not having their cash flows linked to RPI. The average premium on 10 year gilts between 1997 and 2007, as calculated by the Bank of England, was 0.3%. Bank of England, Quarterly Bulletin, 2012 Q3, Volume 52, no. 3.

**Figure 3 Implied RPI expectations from gilt yields<sup>20</sup>**



Source: Bank of England

While other regulators, in particular Ofgem, have used the 10 year breakeven inflation rate in its cost of debt indexation calculations, the 20 year implied inflation rate could be considered a more appropriate measure to use when deflating long-term corporate bond yields. This is because the average maturity of the bonds included in the iBoxx 10+ indices is closer to 20 years than 10 years<sup>21</sup>. The figure above shows that evidence of RPI expectations from gilt yields have declined since the risk and reward guidance, albeit with the biggest declines occurring more recently in October. Based on the above evidence, and taking into account the impact of an inflation risk premium, market expectations of RPI from 10 year gilts imply an RPI figure of 2.6%, while the equivalent figure for 20 year gilts is 3.1%.

## Conclusions

We recommend Ofwat place most weight on the long-term RPI estimate calculated from market data. Ofwat was not unduly influenced by the movements in implied RPI in the months prior to the publication of the risk and reward guidance. We don't consider Ofwat should be unduly influenced by very recent falls in implied inflation, as the RPI assumption of 2.8% is still supported by market evidence.

<sup>20</sup> IRP stands for 'Inflation Risk Premium'.

<sup>21</sup> As shown in Appendix 1, the weighted average time to maturity on outstanding water company debt is also approximately 20years. This is consistent across WaSCs and WoCs.

## 4. Cost of debt

### *Risk and reward methodology and sources*

In order to assess the appropriate cost of debt used in its estimate of the WACC, Ofwat reviewed both the actual cost of debt faced by water companies, based on their publicly traded bonds, as well as benchmark corporate debt indices. Ofwat placed greater weight on the yields of benchmark corporate debt indices, but it also considered the historical outperformance, relative to the regulatory allowed cost of debt, typically achieved by water companies.

In addition to reviewing historical evidence, Ofwat applied a forward-looking uplift to the new cost of debt, as observed in the current term structure of the government yields. This uplift is commensurate with the market expectation that interest rates will rise over the 2015-20 period.

#### **Cost of new debt**

The cost of new debt estimate in the risk and reward guidance used the most current market information available at the time. On 31 December 2013 nominal yields on A and BBB rated benchmark corporate debt indices were 4.6% and 5.0% respectively<sup>22</sup>. Applying an inflation assumption of 2.8%<sup>23</sup>, Ofwat calculated a range for the real cost of new debt of 1.8% to 2.2%, with a mid-point of 2.0%.

Given that interest rates were expected to increase over the 2015-20 period, Ofwat estimated that a forward-looking uplift of 60bps to the cost of new debt would be appropriate. The resultant real cost of new debt estimated by Ofwat ranged from 2.6% to 2.8%. This range reflected a greater weighting towards the BBB rated end of the cost of debt range<sup>24</sup>.

#### **Cost of embedded debt**

Ofwat's cost of embedded debt estimate also focused on corporate bond benchmarks. The ten year average of nominal yields on A and BBB rated benchmark corporate debt indices between 2004 and 2013 was 5.65%. Applying an assumption 2.8% for inflation resulted in a real cost of embedded debt estimate of 2.8%. Ofwat estimated that real yields at issuance on water company bonds were significantly lower than this (2.2% on average). Ofwat did not place as much weight on this evidence as not all companies have been able to outperform corporate bond indices to the same extent and some of this outperformance relates to the timing of debt issuance. Ofwat considers that water companies are able to manage the timing of debt issuance, and so it is preferable for companies to bear this risk and therefore benefit from out-performance, but suffer any under-performance. Ofwat did factor in some degree of outperformance compared to the corporate debt benchmarks, as shown by the selection of a point estimate (2.65%) which was below the long-term average cost of debt implied by the benchmark corporate bond indices (2.8%).

### *Review of evidence since January*

#### **Cost of new debt**

Consistent with the approach taken in the risk and reward guidance, we review the most current market evidence from benchmark corporate bond yields to estimate an appropriate cost of new debt.

As shown in Figure 4 below, since January 2014 corporate bond yields have experienced a gradual but sustained decrease, which has resulted in a significant overall reduction in the benchmark cost of debt. The spread between A and BBB rated debt has also narrowed. As at 31 October 2014, the nominal yield on the BBB rated iBoxx benchmark index was 4.37% and the nominal yield on the A rated benchmark was 4.17%. This

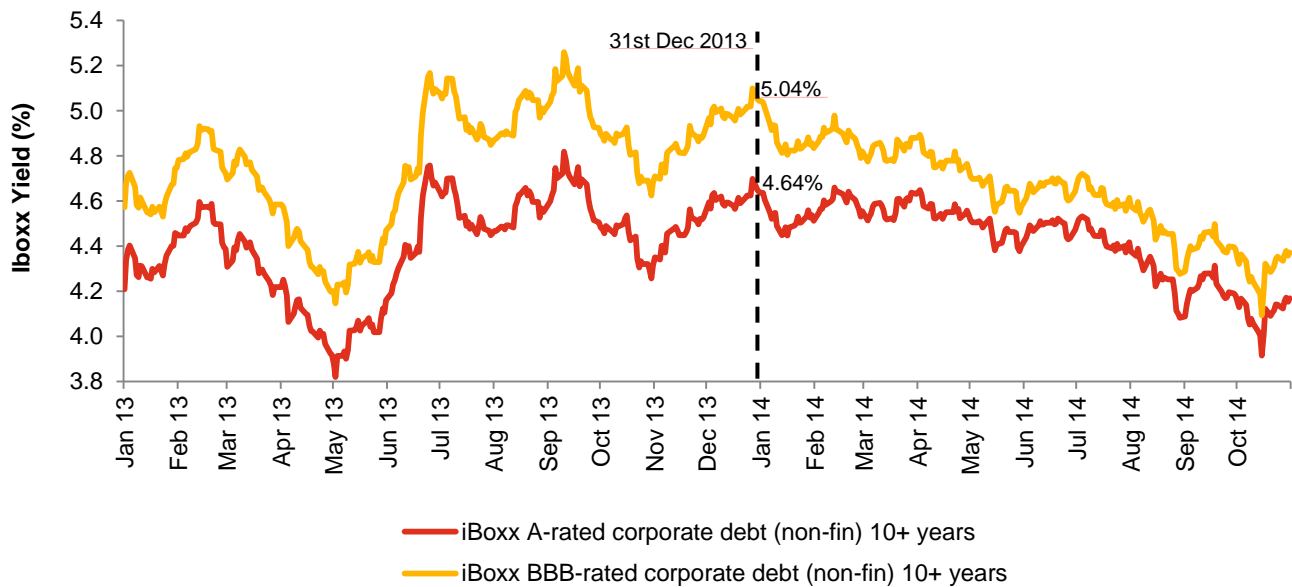
<sup>22</sup> 31 December 2013 was the data cut-off date for the risk and reward guidance published by Ofwat.

<sup>23</sup> The RPI assumption used in the risk and reward guidance is discussed in Section 3.

<sup>24</sup> Applying the 60bps forward looking uplift directly to the real cost of A rated corporate debt would have produced an estimate of 2.4%.

represents a 65bps decline in spot rates for BBB rated debt since the start of the year. We consider this to represent a significant shift in debt capital market conditions.

**Figure 4 iBoxx corporate bond yields**



Source: Datastream, Capital IQ

Given the volatility of day-to-day movements in yields and the recent falls, we are cautious about relying on the yield data from too short a time period. We have, therefore, compared the spot rate, as at 31 October 2014, against the three month average of the iBoxx index (see Table 7 below). The average iBoxx yields over the three month period leading up to 31 October 2014 are similar to current spot rates. As a result, we can be confident that prevailing market spot rates are not an anomaly due to the selection of a particular day.

**Table 7 iBoxx yield as at 31 October 2014**

	Spot	3m average
Nominal yield (A to BBB)	4.17% to 4.37%	4.19% to 4.39%
Inflation assumption	2.80%	2.80%
Real yield (A to BBB)	~ 1.35% to 1.55%	~ 1.35% to 1.55%

Source: Datastream

In order to estimate a cost of new debt for the 2015-20 period in the risk and reward guidance, Ofwat allowed for a 60bps forward-looking uplift to current market yields. The latest evidence presented in the Bank of England’s November inflation report (see Table 8 below) shows that market expectations of interest rate rises over 2015 and 2016 have reduced compared to the same period the year before, but there remains an expectation of increases in interest rates over the early part of the 2015-20 period.

**Table 8 Market expectations of base rate rises**

	2015				2016			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Nov 2013 report</b>	0.6%	0.7%	0.8%	1.0%	1.1%	1.3%	1.5%	1.7%
<b>Nov 2014 report</b>	0.5%	0.6%	0.7%	0.8%	1.0%	1.1%	1.2%	1.4%
<b>Change</b>	-0.1%	-0.1%	-0.1%	-0.2%	-0.1%	-0.2%	-0.3%	-0.3%

Source: Bank of England inflation reports

The data provided by the Bank of England does not extend to the latter part of the 2015-20 period, but it shows delayed expectations of interest rate rises and a slightly slower rate of increase.

Ofwat applied a 60bps forward-looking adjustment to the cost of debt in the risk and reward guidance. A more gradual rate of increase in interest rates could suggest a lower figure would now be appropriate.

However, the (60bps) forward-looking adjustment was lower than the expected change in UK gilts, as calculated from forward curves in January 2014. This means that the 60bps assumption implied an expectation of narrowing of corporate borrowing spreads, a point mentioned in a number of company representations (see Item 8 in Section 2).

As forward rates on gilts have declined since the risk and reward guidance, maintaining a forward-looking uplift of 60bps would imply a larger degree of pass through from gilt yield changes into corporate bond yield changes – closer to a one to one relationship.<sup>25</sup> For this reason we recommend maintaining the 60 bps forward looking uplift.

Based on the evidence above, we consider that a cost of new debt of 2.0% would be consistent with both the approach taken in the risk and reward guidance, as well as a BBB credit rating. This is shown in Table 9 below.

**Table 9 Cost of new debt**

	October 31 2014	3m average
Nominal yield (A to BBB)	4.17% to 4.37%	4.19% to 4.39%
Inflation assumption	2.80%	2.80%
Real yield (A to BBB)	~ 1.35% to 1.55%	~ 1.35% to 1.55%
Cost of new debt with forward looking uplift (+60bps)	~ 1.95% to 2.15%	~ 1.95% to 2.15%
Point estimate (15bps deducted from upper end of range to reflect a degree of outperformance compared to benchmark indices)	2.0%	2.0%

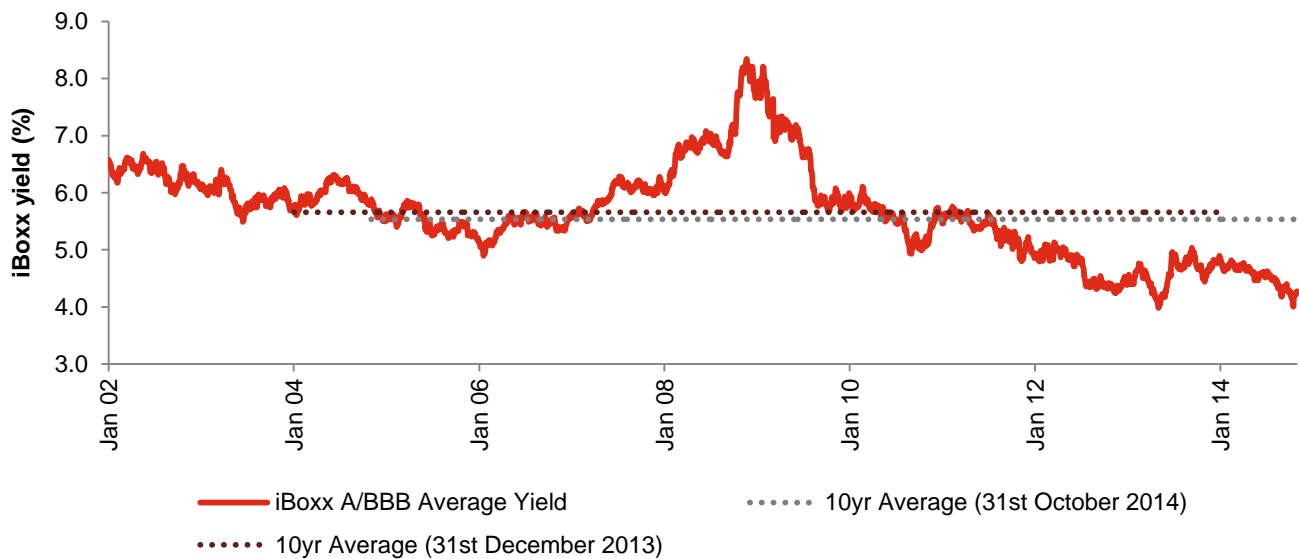
Source: Datastream

### Cost of embedded debt

The 10 year average of the A and BBB rated iBoxx indices has decreased approximately 10bps to 5.55% since January, or 2.7% in real terms. We do not consider this to represent a significant change from the January risk and reward guidance. As shown in figure 5 below, the 10 year average is very similar to that that used in January.

<sup>25</sup> The implied forward rate on 10-year nominal gilts, as at the 31<sup>st</sup> of October 2014, towards the middle of the 2015-20 period, is approximately 75bps higher than current spot rates. Therefore a 60bps forward-looking uplift allows 80% of the change in gilts yields to pass through into corporate bond yields.

**Figure 5 Long-term iBoxx averages**



Source: Datastream

In addition to corporate debt benchmarks, Ofwat’s risk and reward guidance also considered yields at issuance on water company bonds. The only change to the stock of water company embedded debt since January has been the issuance of Thames Water’s 2025 bond in June 2014<sup>26</sup>, which had a fixed nominal coupon of 4.0%. However, as the bond has a call option, and therefore cannot be considered a ‘plain vanilla’ bond, it should not form part of the bond sample used to calculate the industry’s cost of embedded debt<sup>27</sup>.

Overall, the evidence from both the stock of water company debt and corporate bond benchmarks suggests there is little change to the cost of embedded debt estimated in January. On that basis we recommend that Ofwat should not amend its assessment of the industry cost of embedded debt.

**Further considerations on the cost of debt**

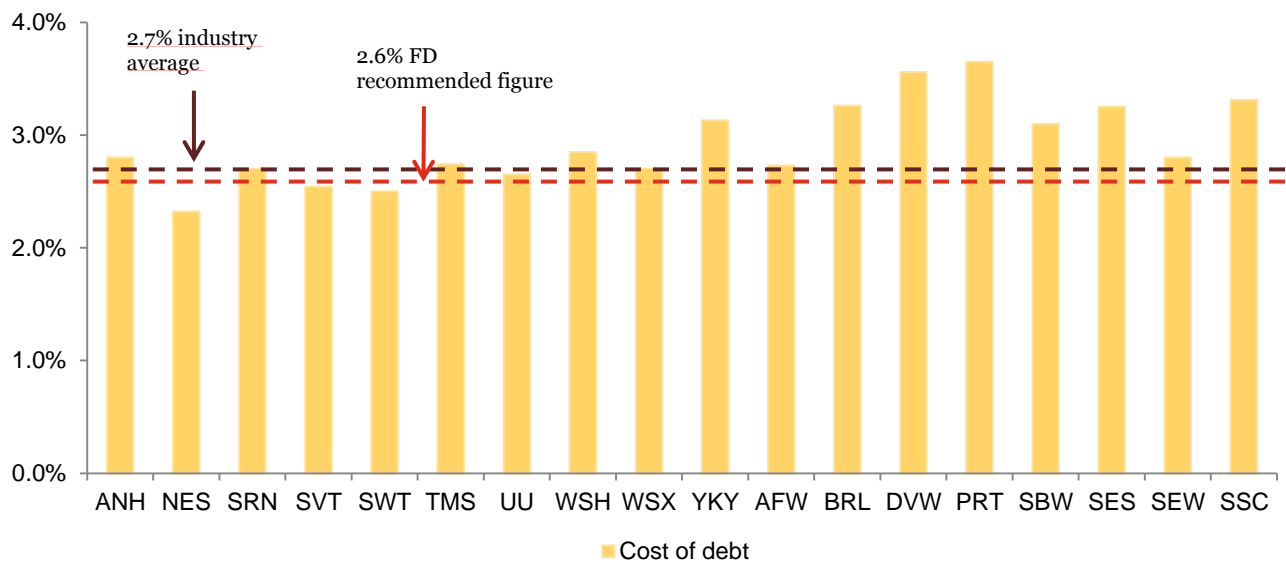
Reducing the cost of new debt to 2.0%, together with a cost of embedded debt of 2.65%, results in an overall cost of debt of 2.59% (including 10bps for issuance fees)<sup>28</sup>. While this represents a reduction from the WACC published with company DDs, it is similar to the notional cost of debt proposed by companies in their December business plan submissions. As shown in Figure 6 below, there is approximately a 10bps difference between the average industry cost of debt proposed by companies and the updated estimate cost of debt detailed above. The cost of debt analysis reflecting the latest market data is therefore broadly consistent with the notional cost of debt included in the companies’ original business plans.

<sup>26</sup> Total outstanding debt across all companies is approximately £45bn; therefore the addition of the £0.5bn Thames Water 2025 bond approximately represents a 1% change in the stock of outstanding industry debt.

<sup>27</sup> A call option allows the issuer to recall the debt at a date prior to the final maturity date; this can distort yields and create mismatched comparisons. All else equal a call option reduces the value of the bond to the purchaser. A ‘plain vanilla’ bond is a bond without embedded options.

<sup>28</sup> This is based on a weighting of 75% on the cost of embedded debt and 25% on the cost of new debt.

**Figure 6 Notional cost of debt from companies' December business plan submissions<sup>29</sup>**



Source: Company submissions to Ofwat, risk and reward guidance

As discussed above, although the 2025 Thames Water bond does not alter the calculation of the cost of embedded debt, as the most recent water company debt issuance it serves as a useful reference point for the cost of new debt. Specifically, it indicates that current market conditions allow issuances below the 2.65% real cost of new debt estimate set out in the risk and reward guidance (the real yield of the Thames bond is approximately 1.2%). Another recent issuance by Gatwick Airports Limited, shown in Table 10 below, was issued shortly after the CAA's Q6 decisions and has a real coupon of approximately 1.8%.

**Table 10 Recent GBP bond issuances by UK utilities**

Issuer	Date	Currency	Amount	Coupon	Real
Thames Water	June 2014	GBP	£500m	4.0%	1.2%
Gatwick	Mar 2014	GBP	£350m	4.6%	1.8%

Source: Capital IQ

## Conclusions

Overall, we consider that the significant reduction in corporate bond yields since January should be reflected in the real cost of new debt used in calculating the WACC for FDs. Such a significant reduction in corporate bond yields has been unexpected, given the upward momentum in bond yields observed throughout the second half of 2013. Adopting the same methodology as Ofwat's risk and reward guidance, which used the most recent market information available, we recommend a real cost of new debt of 2.0%. We consider there to be less justification for a change to the cost of embedded debt, where the degree of change has been considerably smaller, and recommend that Ofwat maintains a figure of 2.65%.

The combination of these recommendations results in an overall cost of debt of 2.59% (including 10bps for issuance fees).

<sup>29</sup> Industry average is RCV weighted.



## 5. Gearing

### *Risk and reward methodology and sources*

Ofwat's risk and reward guidance referred to the recommendations set out in PwC's report on methodological considerations for PR14<sup>30</sup>. The evidence reviewed in our report included:

- The actual gearing of water companies;
- Whether the current low interest rate environment had encourage actual gearing levels to move away from a long-term efficient gearing level;
- The gearing range that could support an investment grade rating and meet financeability requirements; and
- Regulatory benchmarks for gearing in other sectors.

Our review concluded that a range of 60% to 70% would be an appropriate assumption for notional gearing – water company December business plan submissions were consistent with this. Based on Ofwat's own financeability analysis, the risk and reward guidance used a range of 60% to 62.5% for the notional gearing assumption and a point estimate of 62.5%.

### *Review of evidence since January*

There were no company representations on the notional capital structure in the WACC. We would not expect the level of notional gearing to change unless market conditions changed substantially.

We have reviewed the most recent data on the actual gearing ratios for water companies, measured as the ratio of net debt to regulatory capital value. We find that there has been only a minor change in regulatory gearing levels. The small increase in actual gearing level between the 2013 water company regulatory accounts and 2014 was mostly driven by two companies<sup>31</sup>. The change in gearing levels between 2013 and 2014 is set out in Table 11 below.

**Table 11 Net debt as a proportion of RCV**

Company	2014 Net debt to RCV	2013 Net debt to RCV
ANH	79%	80%
TMS	77%	77%
YKY	78%	61%
WSH	63%	63%
SRN	88%	83%
NES	61%	62%
SVT	64%	61%
SWT	56%	55%
UU	65%	68%
WSX	64%	64%
SEW	81%	63%

<sup>30</sup> PwC (2013), 'Cost of capital for PR14: Methodological considerations'

<sup>31</sup> The increase in gearing for YKY and SEW has been caused by a change in the method of calculating regulatory gearing and does not represent a substantial change in external borrowings.

AFW	81%	77%
BRL	71%	65%
SSC	64%	73%
DVW	77%	74%
PRT	81%	78%
SBW	58%	55%
SES	76%	76%
<b>High</b>	<b>88%</b>	<b>83%</b>
<b>Low</b>	<b>56%</b>	<b>55%</b>
<b>Average</b>	<b>71%</b>	<b>69%</b>

Source: Water company regulatory accounts

Evidence from regulatory decisions that have occurred since the publication of the risk and reward guidance also show little development in notional gearing levels. Ofgem’s ED1 draft determinations maintained a gearing assumption of 65% for DNOs. The CC in NIE’s final determination did revise the notional gearing assumption from 50% to 45%; however, we consider this to be of little relevance as it was heavily informed by the debt financing situation of the company in question.

While the lower cost of new debt assumption (as set out in Section 4) could suggest a slightly higher notional capital structure would be sustainable, the impact on the overall cost of debt is small (16bps), and the medium-term expectation is for rising interest rates, which could reduce the sustainable notional capital structure. As a consequence, we do not consider these movements in the cost of debt are sufficient to suggest the notional gearing assumption should change.

## *Conclusions*

Overall, we find there to be no compelling evidence since January that should alter Ofwat’s conclusions on notional gearing for the industry.

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## 6. Total market returns

### *Risk and reward methodology and sources*

Ofwat's risk and reward guidance reviewed a wide range of evidence on both historical and forward looking measures of TMR. These included:

- Long-term studies of real equity returns such as the Barclays Equity Gilt Study<sup>32</sup> and the Credit Suisse Global Investment Returns Sourcebook<sup>33</sup>. The CC's analysis of these long-run datasets was also reviewed. The risk and reward guidance also considered how methodological changes to the calculation of RPI impact the estimation of an appropriate TMR assumption.
- Forward looking approaches, such as those derived from dividend growth models (DGM), provided by PwC and the Bank of England.

Ofwat also considered recent regulatory decisions by other UK regulators, namely, the CC's draft determination for NIE, CAA Q6 and ORR price review 2013. At the time of writing, Ofgem's consultation regarding its methodology for estimating TMR was also in progress.

A summary of the information reviewed by Ofwat was presented in Figure 1 of the risk and reward guidance.

In addition to the evidence discussed above, Ofwat also considered the views of academic commentators and the exceptional monetary policy that was, and continues to be, implemented by the Bank of England.

Based on this wide range of sources, Ofwat considered that there was evidence to support a lower TMR as compared to previous regulatory decisions. It concluded that a TMR in the range of 6.25% to 6.75% was justified based on all evidence considered. In its guidance, it used a point estimate of 6.75%, at the top end of the range.

### *Review of evidence since January*

#### **Historical measures of TMR**

Historical measures of TMR are typically based on long-term datasets, often covering more than one hundred years of equity returns data. Due to the extent of historical data included in these measures, additional data that have become available since the risk and reward guidance make only makes a small difference to these long-run averages. Historic data from the Barclay's Equity Gilt, shown in Table 12 below, shows that long-run UK equity returns have only changed marginally since the publication of its latest dataset in February 2014<sup>34</sup>.

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<sup>32</sup> Barclays (2014), 'Equity Gilt Study 2014'

<sup>33</sup> Dimson, Marsh and Staunton (2014), 'Credit Suisse Global Investment Sourcebook 2014'

<sup>34</sup> This dataset includes equity data through to the end of 2013.

**Table 12 Historical annual real equity returns**

Real annual equity returns since	2012	2013	Change
1899	5.0%	5.1%	+0.1%
1950	6.3%	6.5%	+0.2%

Source: Barclays Equity Gilt Study

Using long-run equity return data, one additional annual observation has a minimal impact on the overall estimate of the TMR. There is also a degree of arbitrariness about historical returns over a 115 year period compared to a 114 year period. For this reason we do not consider a movement in long-term historical returns is a sufficient basis to justify altering an assumption in the calculation of the WACC for PR14.

### Forward looking approaches

One of the most commonly employed forward looking approaches for estimating the TMR is the dividend growth model (DGM). Market developments since the publication of the risk and reward guidance indicate that the TMR estimates produced by these models have not changed significantly. For example, one of the key inputs into DGM models is the forecast or expected long-run growth rate in dividends (typically proxied by the growth of the economy). As shown in Table 13 below, there have only been marginal changes in long-term consensus growth forecasts for the UK economy since January<sup>35</sup>. While this was raised as a potential issue in Item 4 in Section 2, the impact is small.

**Table 13 Long-term consensus forecasts for UK GDP growth**

	Oct 2013	Oct 2014	Change
UK long-term GDP growth	2.1%	2.2%	+0.1%

Source: Consensus Economics

A further key driver of the TMR calculated using DGM models is the level of equity values, which in turn influences dividend yields. During 2014, the level of UK and global equity markets has been reasonable stable. For example the FTSE-100 has traded around a reasonably tight band of 6,200 and 6,850.

Based on the above evidence, an update of forward-looking models does not support a change to the TMR estimate set in the January risk and reward guidance.

### Survey evidence

Evidence for the TMR can also be drawn from surveys of the figures used by academics, analysts and companies. One such example is the survey of over 8,000 participants by Fernandez et.al (2014)<sup>36</sup>. The data indicates that views of the UK market risk premium (a key component of TMR) decreased by 40bps between 2013 and 2014. This data is shown in Table 14 below.

**Table 14 Survey evidence on the market risk premium in the UK**

	2011	2012	2013	2014
UK EMRP	5.3%	5.5%	5.5%	5.1%

Source: Fernandez et.al

Although this survey data suggests that a reduction in the TMR (holding all else constant) may be appropriate, this survey data should be considered in the broader context of the insignificant changes in TMR derived from the historical and forward looking measures discussed above. Furthermore, one of the main reasons for focusing on direct measures of TMR, rather than constructing an implied TMR through separate estimates of

<sup>35</sup> Other inputs such as dividend yield and stock market prices have not changed significantly since January. The FTSE all-share price on the 31<sup>st</sup> of December was 3,610, compared to 3,503 as at October 31<sup>st</sup>. The dividend yield on the FTSE all-share between these two dates has increased marginally from 3.3% to 3.4%.

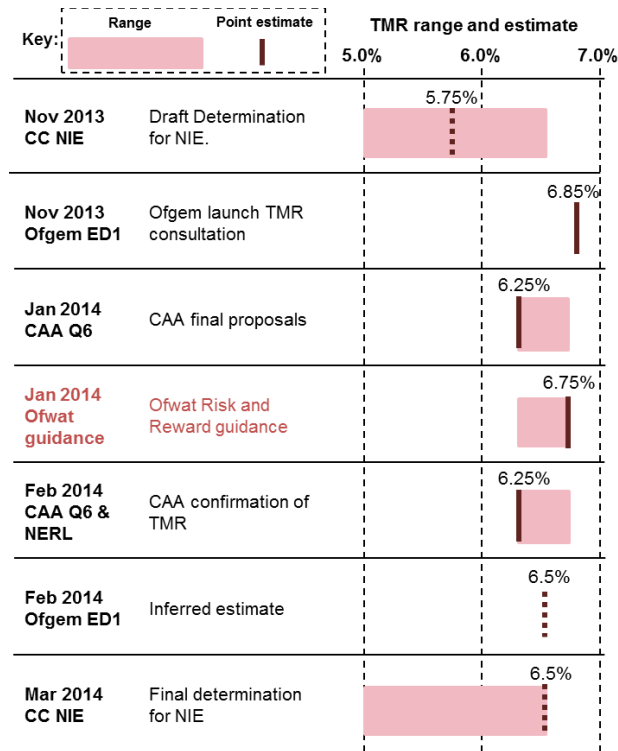
<sup>36</sup> Fernandez et.al (2014), 'Market Risk Premium used in 88 countries in 2014: a survey with 8,228 answers', IESE Business School

the risk-free rate and EMRP, is that TMR is generally a more stable parameter. This stability helps to reduce regulatory uncertainty associated with estimates of WACC.

### Regulatory decisions on TMR

Figure 7, below, shows how regulatory decisions of TMR have changed both before and after the publication of the risk and reward guidance.

**Figure 7 Total market returns in recent regulatory determinations**



Source: Regulatory determinations

Prior to publication of the risk and reward guidance, the CC had issued its draft determination for NIE. The TMR range estimated by the CC for NIE was 5.0% to 6.5%. As the WACC point estimate chosen by the CC was in the middle of its proposed range, for the purposes of Figure 1 above, we have inferred a point estimate of 5.75%<sup>37</sup>. In its final determination for NIE, published in March 2014, the CC maintained the existing TMR range but selected a point estimate at the top end of the possible WACC range. We, therefore, have inferred a TMR point estimate of 6.5%.

The CC's estimate of TMR in the NIE draft determination, in conjunction with its focus on contemporary evidence, prompted Ofgem to launch a consultation on whether it should adjust its approach to estimating TMR<sup>38</sup>. The outcome of the consultation was published in February 2014. In its post-consultation decision document<sup>39</sup>, Ofgem did not explicitly state its point estimate for TMR. However, the reduction in the cost of equity figure it decided to apply to the ED1 draft determinations from 6.3% to 6.0%, implied a reduction in TMR from 6.85% to around 6.5% (assuming all other cost of equity parameters constant). Therefore, the

<sup>37</sup> In the NIE draft determination the CC emphasises that it saw a range of 5.5% to 6.5% as supported by the weight of evidence, but retained 5.0% TMR as a possibility.

<sup>38</sup> Ofgem (2013), 'Consultation on our methodology for assessing the equity market return for the purpose of setting RIIO price controls', <https://www.ofgem.gov.uk/ofgem-publications/85020/consultationonequitymarketreturnmethodologyletter6dec2013.pdf>

<sup>39</sup> Ofgem (2014), 'Decision on our methodology for assessing the equity market return for the purpose of setting RIIO-ED1 price controls', <https://www.ofgem.gov.uk/ofgem-publications/86366/decisiononequitymarketreturnmethodology.pdf>

outcome of the Ofgem consultation may suggest that Ofgem moved from a TMR estimate that was previously above Ofwat's point estimate to one which was below.

Following the publication of the risk and reward guidance, the CAA confirmed that its TMR estimate for the Q6 and NERL determinations would be 6.25% - at the low end of a 6.25% to 6.75% range.

## *Conclusions*

Overall, we consider that there is not sufficiently strong new market evidence, of either an historical or forward looking nature, to alter Ofwat's TMR range of 6.25% to 6.75%.

Decisions on the TMR used by UK regulators are also within this range, with a concentration towards the middle of this range.

Ofwat's selection of a point estimate from within this range requires some consideration of the broader WACC calculation and other features of the PR14 price control, such as risk and incentive calibration. For the purpose of our calculation we assume that Ofwat will continue to select a point estimate at the top end of this range.

# 7. Beta

## Risk and reward methodology and sources

Ofwat’s risk and reward guidance mainly relied upon the empirical beta evidence of listed WaSCs. These were Pennon Group (South West Water is part of Pennon Group, which also includes Viridor, a waste management business), Severn Trent and United Utilities. Figure 3 and Figure 4 of the risk and reward guidance set out a time series of both five-year monthly and two-year daily asset betas for the aforementioned companies – covering a twelve year period. In estimating the time series of asset betas, Ofwat applied a Bayesian adjustment to the underlying equity betas and assumed a debt beta equal to zero.

Based on the evidence from observed asset betas, Ofwat found that values lay predominantly in the 0.2 to 0.3 range. It also set out the view that past five years had revealed the strength of water company financial performance during a period of financial crisis and recession – pointing to low systematic risk in the sector.

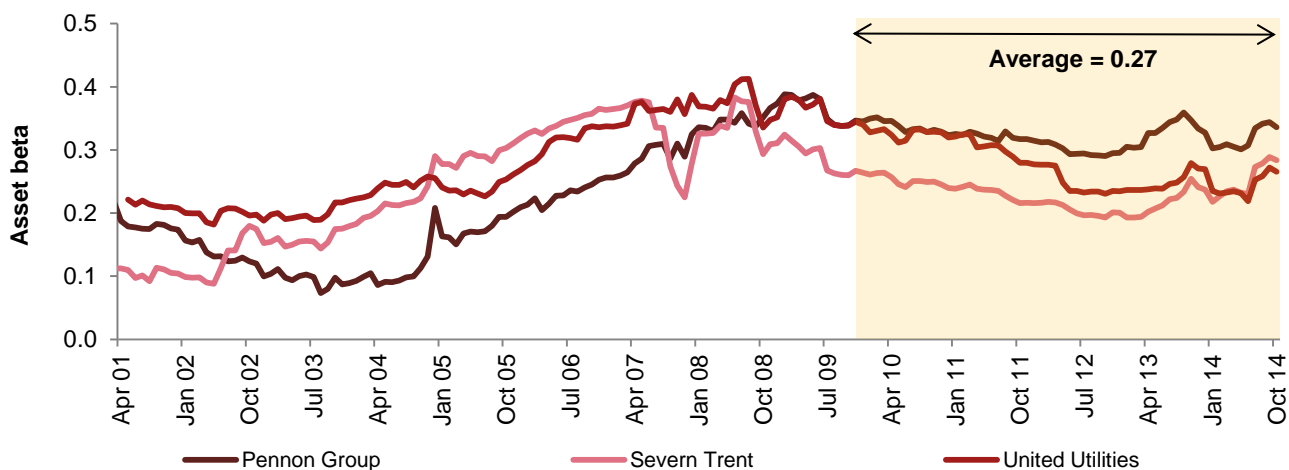
In addition to observed asset betas, Ofwat also referenced past decisions made by the CC regarding beta. It cited the 2010 determination of Bristol Water, where the CC calculated an asset beta of 0.21 to 0.31 (assuming a debt beta equal to zero) for WaSCs. The provisional determination of NIE was also cited.

## Review of evidence since January

### Observed asset betas

In Figures 8 and 9 below, we provide up to date estimates of observed asset betas for the three WaSCs covered in Ofwat’s risk and reward guidance. As shown in Figure 8 below, monthly beta estimates suggest an asset beta of 0.3 or lower may be appropriate;<sup>40</sup> the average observed asset beta across the three WaSCs for the most recent five year period is equal to 0.27.

**Figure 8 Five year monthly beta (net debt, zero debt beta, Bayesian adj)**

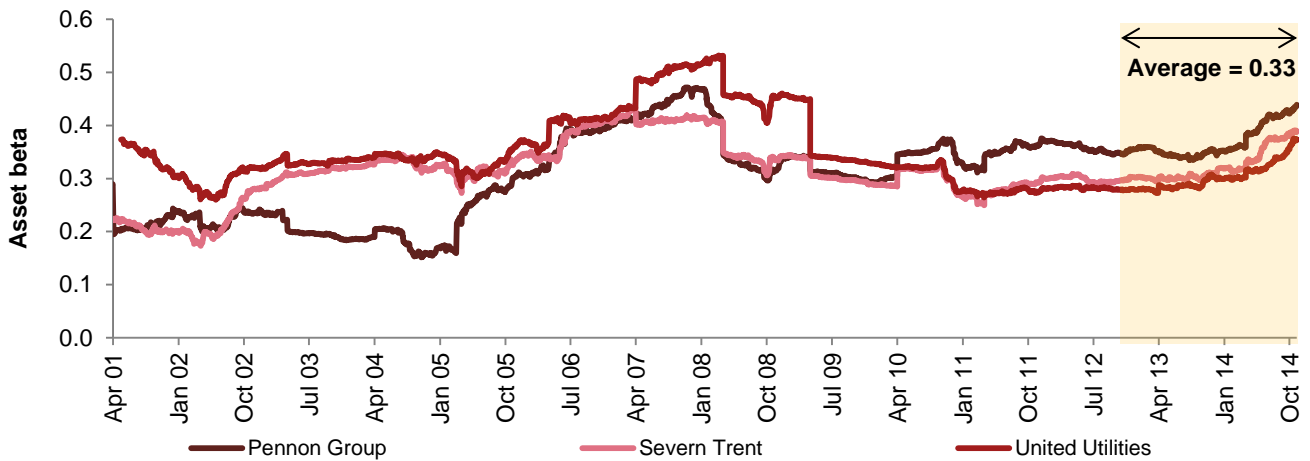


Source: Datastream, Capital IQ

Current daily beta estimates (shown in Figure 9 below) have moved above 0.3, with estimates moving higher in recent months. Severn Trent and United Utilities daily beta estimates tracked 0.3 closely over the 2009 to 2013 period. The average of daily asset betas for the period November 2012 to October 2014 is 0.33.

<sup>40</sup> Equity betas are de-levered using net debt, a debt beta is not applied, and raw equity betas are Bayesian adjusted.

**Figure 9 Two year daily beta (net debt, zero debt beta, Bayesian adj)**



Source: Datastream, Capital IQ

Overall, we find that updated empirical beta evidence continues to support an industry asset beta of 0.3.

**CC estimates of water company beta**

Since the publication of the risk and reward guidance, the CC published its final determination for NIE. The CC’s empirical estimates for the beta for Pennon, Severn Trent and United Utilities ranged from 0.25 to 0.30 using 2-year daily regressions. This range represented a reduction from its draft NIE determinations where its 2-year daily estimates ranged from 0.27 to 0.33. Therefore we find that the most recent estimates provided by the CC are consistent with Ofwat’s asset beta assumption of 0.3.

**Conclusions**

Overall, we conclude that updated evidence since the start of 2014 does not suggest that Ofwat’s asset beta assumption should be revised. We recommend Ofwat maintains an asset beta assumption of 0.3 at FD.



## 8. Retail margin

### *Risk and reward methodology and sources*

The risk and reward guidance included the detailed methodology used to calculate an appropriate retail net margin. The two main approaches adopted were:

- Benchmarking – an assessment of comparator retail margins in sectors which exhibit similar characteristics and levels of risk. Household margins were benchmarked to regulatory determinations, whereas non-household margins were benchmarked to industries opened to competition.
- Return on capital analysis – a cross-check of the amount of margin required to finance retail assets and working capital.

Based on the evidence from these assessments, a figure of 1% was selected for the household retail net margin and 2.5%, applicable to English non-households, who will face competition from 1 April 2017.

Table 15 below sets out the calculations that were applied to calculate an industry-wide wholesale WACC in the risk and reward guidance. The retail household margin of 1%, applied across the combined retail controls<sup>41</sup>, was estimated to be equivalent to a return of 0.17% on the existing industry RCV. As this figure will be applied to the wholesale RCV in future and not include new retail assets, Ofwat reduced the deduction to 0.15%, thereby reducing the total allowed return from 3.85% to 3.70% for wholesale activities.<sup>42</sup>

**Table 15 Retail margin applied in the risk and reward guidance**

Component	Calculation	Point estimate
Vanilla WACC	A	3.85%
Retail net margin	B	1.00%
Revenue requirement (2014-15) (£m)	C	£11,194
RCV (2014-15) (£m)	D	£64,912
Retail return on RCV	$E = B * C / D$	0.17%
Adjustment from Appointee to wholesale WACC	F	0.15%
<b>Wholesale WACC</b>	<b><math>G = A - F</math></b>	<b>3.70%</b>

Source: Ofwat risk and reward guidance

### *Review of evidence since January*

Based on the companies' FDs, we are able to access more current information on the industry level RCV and revenue requirement than the figures applied in the risk and reward guidance. From the company FDs, we estimate the average industry RCV over the 2015-20 period to be £63,072m and the revenue requirement to be £10,812m.

In the risk and reward guidance, the full retail margin of 1.0% was applied to the appointee level WACC. However, Northumbrian Water stated that the retail margin of 1.0% was a pre-tax figure, and that the WACC

<sup>41</sup> The 1% figure was applied across the household and non-household controls, as Ofwat deemed the uplift a compensation for additional competition in the non-household market from 2017.

<sup>42</sup> For a fuller discussion of the rationale for making a deduction for the retail net margin, please refer to our report: PwC (2014), 'Water retail net margins.' Section 4.

equivalent needed to be expressed post-tax. We agree that the retail margin used in the WACC adjustment should be a post-tax retail margin. We have therefore applied the average effective tax rate for water companies over the 2015-20 period to the 1.0% retail margin to make this adjustment<sup>43</sup>.

Whereas investors are compensated for RPI inflation in the wholesale control through indexation of revenues and the RCV, there is no such indexation in the retail controls as a form of efficiency challenge. This is why the retail margin adjustment to the appointee WACC is calculated in post-tax real terms.

Northumbrian Water also referred to the ‘double counted’ capital that is being kept inside the wholesale RCV (and therefore contributing toward wholesale returns) and separate allowance for retail margins. Over time, Northumbrian suggest that the size of this ‘double count’ reduces over time as retail assets are built up outside the RCV. We agree with this approach. While Ofwat did take account of this in the risk and reward guidance, we specifically split out the deduction made for this component in our updated analysis.

### Updated retail reduction

Table 16 below sets out the appointee WACC to which we apply an updated retail deduction. The calculation of the appointee WACC reflects the recommended changes set out in sections 3 to 7 of this report<sup>44</sup>.

**Table 16 Recommended WACC update**

	Risk and reward guidance	Recommended update
<b>Gearing</b>	62.5%	62.5%
<b>TMR</b>	6.75%	6.75%
<b>EMRP</b>	5.50%	5.50%
<b>Risk-free rate</b>	1.25%	1.25%
<b>Asset Beta</b>	0.3	0.3
<b>Equity Beta</b>	0.8	0.8
<b>Cost of equity</b>	5.65%	5.65%
<b>Cost of new debt</b>	2.65%	<b>2.00%</b>
<b>Cost of embedded debt</b>	2.65%	2.65%
<b>Ratio</b>	75:25	75:25
<b>Allowance for debt fees</b>	0.10%	0.10%
<b>Overall cost of debt</b>	2.75%	<b>2.59%</b>
<b>Appointee WACC (vanilla)</b>	<b>3.84%</b>	<b>3.74%</b>

Source: Ofwat risk and reward guidance

Table 17 below sets out a revised calculation of an appropriate retail return deduction. This adjustment is applied to an appointee level WACC of 3.74% (as calculated in table 16 above). The resulting retail margin deduction is slightly smaller than the 15bps set out by Ofwat in January.

**Table 17 Updated estimate of the retail margin deduction to calculate wholesale WACC**

Component	Calculation	Point estimate
Vanilla WACC	A	3.74%
Retail net margin (after tax)	B	0.90%
Revenue requirement (2015-20) (£m) - Average	C	£10,812
RCV (2015-20) (£m) – Average	D	£63,072
Retail return (£m)	E = B*C	£97

<sup>43</sup> Using evidence from DD’s the average effective tax rate for the industry is approximately 10%.

<sup>44</sup> Assumes gearing and the cost of equity remain constant at 62.5% and 5.65% respectively – but assumes a cost of debt of 2.59% i.e. a cost of new debt of 2.0%, a cost of embedded debt of 2.65% and an allowance for debt fees of 10bps.

Return on replaced retail assets not added to RCV <sup>45</sup>	F	£7
Retail return deduction from appointee return	G= E-F	£90
Retail return deduction as % of Wholesale RCV	H = G / D	0.14%
<b>Wholesale WACC</b>	<b>I = A – H</b>	<b>3.60%</b>

Source: Ofwat draft determination notices

## *Conclusions*

We find that a combination of the most recent RCV and revenue requirement data, in addition to the use of a post-tax retail net margin in the calculation, results in a deduction of 14bps. This is 1bps less than the equivalent deduction applied in January.

We recommend Ofwat applies a 14bps reduction for company FDs when transforming an appointee level WACC into a wholesale WACC.

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<sup>45</sup> This assumes new retail assets replace depreciation assets, with no retail assets in the wholesale RCV by 2020.

## 9. Conclusion

Our report has set out the relevant financial market developments in capital markets since the publication of Ofwat's risk and reward guidance in January 2014. We consider that these developments suggest that the WACC estimate set out in the risk and reward guidance should be updated to reflect substantial changes in debt capital market conditions.

Table 18 below sets out our recommendation to Ofwat for a revised wholesale WACC for PR14.

Based on the evidence set out in this report, we recommend that only the cost of new debt and retail margin adjustment are changed compared to the risk and reward guidance. The former change is due to a substantial change in debt market conditions relative to expectations in January 2014. The latter change reflects the most recent information available on industry level RCVs and revenues and also takes into account an improved methodology reflecting water company representations.

While we do not consider the movements in inflation, total market returns, beta and cost of embedded debt to be neither sufficient to warrant a shift in the assumptions used to calculate the WACC, we consider the movements in the cost of new debt are sufficiently large to require a change. This is because the methodology for calculating the cost of new debt is most directly informed by current capital market conditions. Not only has the movement been substantial, but the cost of new debt is the most observable of the cost of capital assumptions – water companies may start to raise new debt finance in AMP6 in the coming months and the risk and reward guidance assumption for the cost of new debt is too far above current debt market borrowing rates. Retaining the risk and reward assumption of 2.65% for the real cost of new debt would therefore be highly likely to provide undeserved opportunity for finance outperformance and would therefore be detrimental to customers.

**Table 18 Recommended WACC update**

	Risk and reward guidance	Recommended update
Gearing	62.5%	62.5%
TMR	6.75%	6.75%
EMRP	5.50%	5.50%
Risk-free rate	1.25%	1.25%
Asset Beta	0.3	0.3
Equity Beta	0.8	0.8
Cost of equity	5.65%	5.65%
Cost of new debt	2.65%	<b>2.00%</b>
Cost of embedded debt	2.65%	2.65%
Ratio	75:25	75:25
Allowance for debt fees	0.10%	0.10%
Overall cost of debt	2.75%	<b>2.59%</b>
Appointee WACC (vanilla)	<b>3.84%</b>	<b>3.74%</b>
Retail margin	0.15%	<b>0.14%</b>
Wholesale WACC	<b>3.69%</b> (3.7% rounded to nearest 5bs)	<b>3.60%</b> (3.6% rounded to nearest 5bs)

Note: red shading denotes a change since the risk and reward guidance

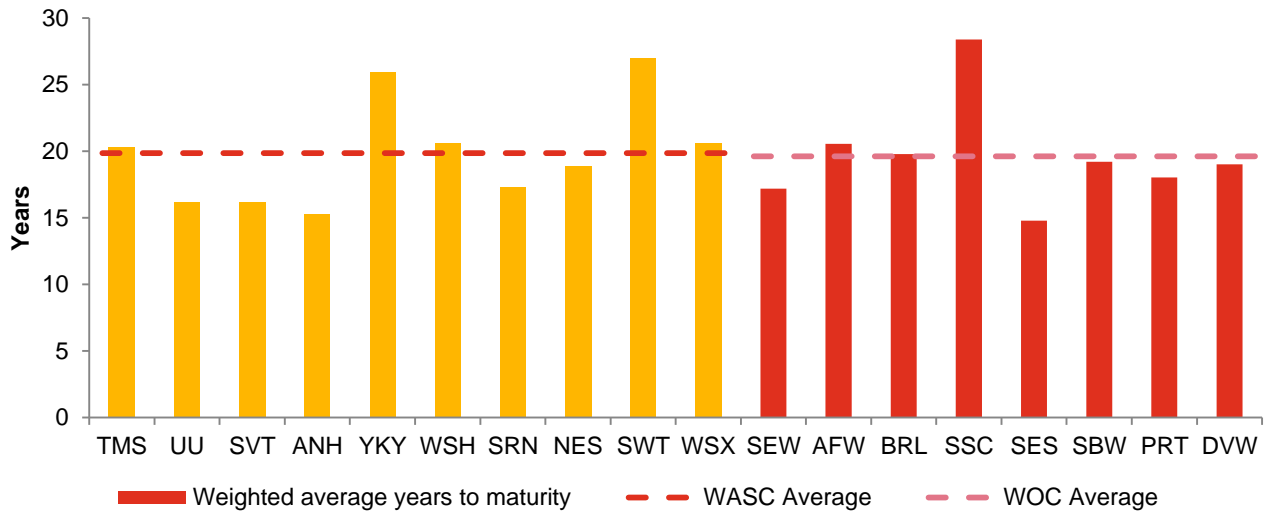
We recommend that Ofwat adopts a wholesale real, vanilla WACC of 3.6% in its final determinations.

# Appendix 1 – Supporting evidence

## Debt maturity

The debt maturity profile for water companies is around 20 years.

**Figure A1 Weighted average years to maturity on outstanding debt**



Source: Water company PR14 submissions





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