

Appendices and Glossary

Appendices

A. Ofwat's duties under the Water Industry Act 1991

B. List of enhancement categories, and Ofwat's FD assessment methodology

C. Cost of Capital

Glossary

Appendix A: Ofwat's duties under the Water Industry Act 1991

1. The appendix sets out Ofwat's general duties under the WIA91.
2. Ofwat's general duties are set out in Part I WIA91.¹ Section 2, as amended, sets out Ofwat's general duties applicable when exercising its powers and duties.
3. The general duties in section 2 are split into primary and secondary duties. Ofwat's primary duties are detailed in sub-section (2A) with additional definitions and provisions in sub-sections (2B) to (2E). Ofwat's secondary duties are detailed in sub-section (3).
4. Section 2A sets out the power of the Secretary of State, in relation to England, and the Assembly, in relation to Wales, to issue guidance to Ofwat on its strategic priorities and objectives, and requirements of them in formulating such guidance for England.²
5. Under section 12(3) WIA91 the CMA is required to carry out the redeterminations in accordance with the general duties in Part 1 WIA91.³
6. In the remainder of this appendix, we set out the relevant elements of sections 2 and 2A WIA91.⁴

Section 2 General duties with respect to water industry

(1) This section shall have effect for imposing duties on the Secretary of State and on the Authority⁵ as to when and how they should exercise and perform the powers and duties conferred or imposed on the Secretary of State or the Authority by virtue of any of the relevant provisions.

(2A) The Secretary of State or, as the case may be, the Authority shall exercise and perform the powers and duties mentioned in subsection (1) above in the manner which he or it considers is best calculated—

(a) to further the consumer objective;

¹ WIA91, [Part I](#)

² WIA91, [section 2A as amended by section 24 Water Act 2014](#)

³ WIA91, [section 12](#)

⁴ Sections 3 to 5 WIA91 set out environmental duties which are not discussed further here.

⁵ The Authority is defined in WIA91, [section 219](#) as the Water Services Regulation Authority (Ofwat)

(b) to secure that the functions of a water undertaker and of a sewerage undertaker are properly carried out as respects every area of England and Wales;

(c) to secure that companies holding appointments under Chapter 1 of Part 2 of this Act as relevant undertakers are able (in particular, by securing reasonable returns on their capital) to finance the proper carrying out of those functions;

(d) to secure that the activities authorised by the licence of a water supply licensee or sewerage licensee and any statutory functions imposed on it in consequence of the licence are properly carried out and

(e) to further the resilience objective.

(2B) The consumer objective mentioned in subsection (2A)(a) above is to protect the interests of consumers, wherever appropriate by promoting effective competition between persons engaged in, or in commercial activities connected with, the provision of water and sewerage services.

(2C) For the purposes of subsection (2A)(a) above the Secretary of State or, as the case may be, the Authority shall have regard to the interests of—

(a) individuals who are disabled or chronically sick;

(b) individuals of pensionable age;

(c) individuals with low incomes;

(d) individuals residing in rural areas;

(e) customers, of companies holding an appointment under Chapter 1 of Part 2 of this Act, whose premises are household premises (as defined in section 17C); and

(f) customers, of companies holding an appointment under Chapter 1 of Part 2 of this Act, whose premises are below the consumption threshold and in the area of a relevant undertaker whose area is wholly or mainly in Wales, but that is not to be taken as implying that regard may not be had to the interests of other descriptions of consumer.

(2D) For the purposes of subsection (2C) above, premises are below the consumption threshold if the total quantity of water estimated to be supplied to the premises annually for the purposes of subsection (2) of section 17D below is less than the quantity specified in that subsection.

(2DA) The resilience objective mentioned in subsection (2A)(e) is—

(a) to secure the long-term resilience of water undertakers' supply systems and sewerage undertakers' sewerage systems as regards environmental pressures, population growth and changes in consumer behaviour, and

(b) to secure that undertakers take steps for the purpose of enabling them to meet, in the long term, the need for the supply of water and the provision of sewerage services to consumers, including by promoting—

(i) appropriate long-term planning and investment by relevant undertakers, and

(ii) the taking by them of a range of measures to manage water resources in sustainable ways, and to increase efficiency in the use of water and reduce demand for water so as to reduce pressure on water resources.

(2DB) For the purposes of subsection (2DA)—

(a) the reference to water undertakers' supply systems is to be construed in accordance with section 17B;

(b) the reference to sewerage undertakers' sewerage systems is to be construed in accordance with section 17BA(7).

(2E) The Secretary of State and the Authority may, in exercising any of the powers and performing any of the duties mentioned in subsection (1) above, have regard to—

(a) any interests of consumers in relation to electricity conveyed by distribution systems (within the meaning of the Electricity Act 1989);

(b) any interests of consumers in relation to gas conveyed through pipes (within the meaning of the Gas Act 1986);

(c) any interests of consumers in relation to communications services and electronic communications apparatus (within the meaning of the Communications Act 2003), which are affected by the exercise of that power or the performance of that duty.

(3) Subject to subsection (2A) above, the Secretary of State or, as the case may be, the Authority shall exercise and perform the powers and duties mentioned in subsection (1) above in the manner which he or it considers is best calculated—

(a) to promote economy and efficiency on the part of companies holding an appointment under Chapter 1 of Part 2 of this Act in the carrying out of the functions of a relevant undertaker;

(b) to secure that no undue preference is shown, and that there is no undue discrimination in the fixing by such companies of water and drainage charges;

(ba) to secure that no undue preference (including for itself) is shown, and that there is no undue discrimination, in the doing by such a company of—

(i) such things as relate to the provision of services by itself or another such company, or

(ii) such things as relate to the provision of services by a water supply licensee or a sewerage licensee;

(c) to secure that consumers are protected as respects benefits that could be secured for them by the application in a particular manner of any of the proceeds of any disposal (whenever made) of any of such a company's protected land or of an interest or right in or over any of that land;

(d) to ensure that consumers are also protected as respects any activities of such a company which are not attributable to the exercise of functions of a relevant undertaker, or as respects any activities of any person appearing to the Secretary of State or (as the case may be) the Authority to be connected with the company, and in particular by ensuring—

(i) that any transactions are carried out at arm's length;

(ii) that the company, in relation to the exercise of its functions as a relevant undertaker, maintains and presents accounts in a suitable form and manner;

(e) to contribute to the achievement of sustainable development.

(4) In exercising any of the powers or performing any of the duties mentioned in subsection (1) above in accordance with the preceding provisions of this section, the Secretary of State and the Authority shall have regard to the principles of best regulatory practice (including the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed).

(5) In this section the references to water and drainage charges are references to—

- (a) any charges in respect of any services provided in the course of the carrying out of the functions of a relevant undertaker; and
- (b) amounts of any other description which such an undertaker is authorised by or under any enactment to require any of its customers or potential customers to pay.

(5A) In this section—

‘consumers’ includes both existing and future consumers; and

‘the interests of consumers’ means the interests of consumers in relation to—

- (a) the supply of water by means of a water undertaker's supply system to premises either by water undertakers or by water supply licensees acting in their capacity as such; and
- (b) the provision of sewerage services either by sewerage undertakers or by sewerage licensees acting in their capacity as such.

(6) For the purposes of this section—

(a) subject to subsection (6A) below, the reference in subsection (1) above to the relevant provisions is a reference to the provisions contained in—

(i) Part 2 of this Act (except section 27A and Schedule 3A),

(ii) any of sections 37A to 38, 38ZA, 39, 39ZA, 39B to 39D, 40E to 40J, 42, 51CD to 51CG, 63AC to 63AF, 66B, 66CA to 66H, 66K, 66L, 66O(2), 95, 95ZA, 96, 96ZA, 99, 105ZF to 105ZI, 110F to 110J, 110L to 110O, 117E to 117O, 117R, 117S, 143B to 143E, 144ZA to 144ZF, 153, 181, 182, 185, 192A, 192B, 195, 195A and 201 to 203 below, and

(iii) any of sections 42 to 54 of the Water Act 2014.

(6A) Subsections (2A) to (4) above and sections 2A and 2B below do not apply in relation to anything done by the Authority in the exercise of functions assigned to it by section 31(3) below (‘Competition Act functions’).

(6B) The Authority may nevertheless, when exercising any Competition Act function, have regard to any matter in respect of which a duty is imposed by any of subsections (2A) to (4) above and sections 2A and 2B] below, if it is a matter to which the CMA could have regard when exercising that function.

(7) The duties imposed by subsections (2A) to (4) above and sections 2A and 2B below do not affect the obligation of the Authority or, as the case may be, the

Secretary of State to perform or comply with any other duty or requirement (whether arising under this Act or another enactment, by virtue of any EU obligation or otherwise).

Section 2A Strategic priorities and objectives: England

(1) The Secretary of State may from time to time publish a statement setting out strategic priorities and objectives for the Authority in carrying out relevant functions relating wholly or mainly to England.

(2) The Authority must carry out those functions in accordance with any statement published under this section.

(3) In formulating a statement under this section, the Secretary of State—

(a) must have regard to the duties imposed on the Authority under section 2,

(b) must have regard to social and environmental matters, and

(c) may have regard to such other matters as the Secretary of State thinks fit.

(4) Before publishing a statement under this section, the Secretary of State must consult—

(a) the Authority,

(b) the Council,

(c) relevant undertakers,

(d) water supply licensees and sewerage licensees,

(e) the Environment Agency,

(f) the Welsh Ministers,

(g) the NRBW, and

(h) anyone else the Secretary of State thinks appropriate.

(5) Before publishing a statement under this section the Secretary of State must—

(a) lay a draft of the statement before Parliament, and

(b) then wait until the end of the 40-day period.

(6) The Secretary of State may not publish the statement under this section if, within the 40-day period, either House of Parliament resolves not to approve it.

(7) 'The 40-day period' means the period of 40 days beginning with the day on which the draft is laid before Parliament (or, if it is not laid before each House on the same day, the later of the days on which it is laid).

(8) When calculating the 40-day period, ignore any period during which Parliament is dissolved or prorogued or during which both Houses are adjourned for more than 4 days.

(9) In this section 'relevant functions relating wholly or mainly to England' means the functions mentioned in section 2(1) so far as they relate to appointment areas wholly or mainly in England.

(10) In subsection (9) 'appointment area' means an area for which an appointment is held under Chapter 1 of Part 2.

Appendix B: List of enhancement categories, and Ofwat FD assessment methodology

Table 1: Water enhancement, Ofwat FD methodology by category

<i>Category</i>	<i>WINEP?</i>	<i>Starting Point</i>	<i>Light-touch approach</i>	<i>More detailed approach</i>
Drinking Water Protected Areas	Yes	Business Plan	Shallow dive	Deep dive
Eels Regulations	Yes	Business Plan	Shallow dive	Deep dive
Invasive non-native species	Yes	Business Plan	Shallow dive	Deep dive
Investigations	Yes	Business Plan	Allow full	Deep dive
Making ecological improvements at abstractions	Yes	Business Plan	Shallow dive	Deep dive
Water Framework Directive measures	Yes	Business Plan	Shallow dive	Deep dive
Meeting lead standards	No	Model	Median of model	Deep dive
Metering (excluding new connections)	No	Model	Median of model + frontier shift	Deep dive
Supply/demand: 2020–25 (excl. metering)*	No	Model	Median of model	Deep dive
Supply/demand: Internal interconnections*	No	Business Plan	Shallow dive	Deep dive
Supply/demand: Investigations and future planning*	No	Business Plan	N/A (no totex allowed)	N/A (no totex allowed)
Supply/demand: Leakage (only allowed if at frontier, based on outcomes model)*	No	Business Plan	Shallow dive (if above median unit cost)	N/A
Supply/demand: Long-term*	No	Business Plan	Compared with industry median costs	Deep dive
Improvements to river flows	No	Business Plan	Allow full	N/A (none material)
Improving taste/odour/colour	No	Business Plan	Shallow dive	Deep dive
Investment to address raw water deterioration	No	Business Plan	Shallow dive	Deep dive
Resilience	No	Business Plan	N/A (conducted deep dive on all)	Deep dive
SEMD and non-SEMD	No	Business Plan	Allow full / allow none	Deep dive
Aggregated free form lines	No	Business Plan	Shallow dive	Deep dive

*Although Supply/Demand was a single cost category, it was assessed as a combination of 5 components
Source: [Relevant enhancement feeder models](#) (available on Ofwat website)

Table 2: Wastewater enhancement, Ofwat FD methodology by category

<i>Category</i>	<i>WINEP?</i>	<i>Starting Point</i>	<i>Light-touch approach</i>	<i>More detailed approach</i>
Chemical removal schemes	Yes	Model	Median of model + WINEP catchup + frontier shift	Deep Dive + WINEP catchup + frontier shift
Event durations monitoring at int. dis.	Yes	Model	Median of model + WINEP catchup + frontier shift	Deep Dive + WINEP catchup + frontier shift
Flow monitoring at STW	Yes	Model	Median of model + WINEP catchup + frontier shift	Deep Dive + WINEP catchup + frontier shift
P-removal	Yes	Model	Median of model + WINEP catchup + frontier shift	Median of model (incl. alternative) + WINEP catchup + frontier shift
Schemes for FTFT	Yes	Model	Median of model + WINEP catchup + frontier shift	Deep Dive + WINEP catchup + frontier shift
Storage at STW	Yes	Model	Median of model + WINEP catchup + frontier shift	Deep Dive + WINEP catchup + frontier shift
Storage in the network	Yes	Model	Median of model + WINEP catchup + frontier shift	Deep Dive + WINEP catchup + frontier shift
Chemical investigations	Yes	Business Plan	WINEP catchup + frontier shift	N/A (none material)
Conservation drivers	Yes	Business Plan	WINEP catchup + frontier shift	Deep Dive + WINEP catchup + frontier shift
Eels regulations	Yes	Business Plan	WINEP catchup + frontier shift	N/A (none material)
Groundwater schemes	Yes	Business Plan	N/A (only 1 company with totex)	Deep Dive + WINEP catchup + frontier shift
N-removal	Yes	Business Plan	WINEP catchup + frontier shift	N/A (none material)
Reduction in sanitary parameters	Yes	Business Plan	WINEP catchup + frontier shift	N/A (none material)
UV disinfection	Yes	Business Plan	WINEP catchup + frontier shift	Deep Dive + WINEP catchup + frontier shift
Wastewater investigations	Yes	Business Plan	WINEP catchup + frontier shift	Deep Dive + WINEP catchup + frontier shift
Discharge relocation	Yes (NEP)	Business Plan	N/A (only 1 company with totex)	Deep Dive + WINEP catchup + frontier shift
Monitoring pass forward flows	Yes (NEP)	Business Plan	N/A (no totex allowed)	N/A (no totex allowed)
P-removal technology	Yes (NEP)	Business Plan	N/A (only 1 company with totex)	Deep Dive + WINEP catchup + frontier shift
First time sewerage (s101A)	No	Model	Median of model	N/A (all used model)
Odour	No	Business Plan	Shallow dive	N/A (none material)
Resilience	No	Business Plan	N/A (conducted deep dive on all)	Deep dive
Security	No	Business Plan	Allow full	Deep dive
Sludge quality and growth	No	Business Plan	Shallow dive	Deep dive
Aggregated free form lines	No	Business Plan	Shallow dive	Deep dive

Source: [Relevant enhancement feeder models](#) (available on Ofwat website)

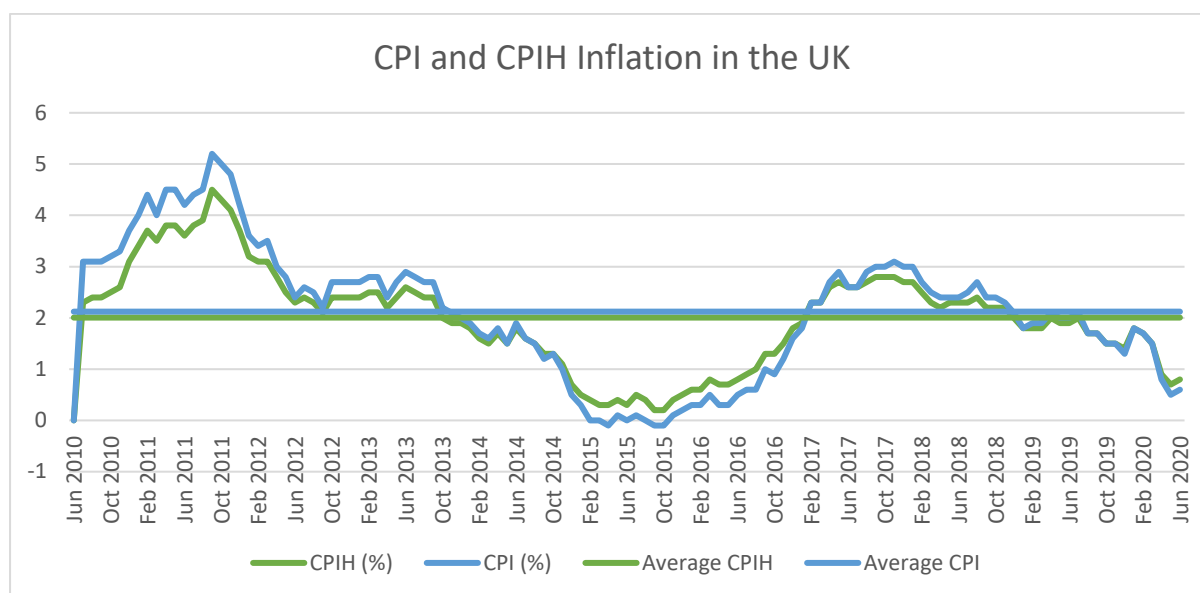
Appendix C: Cost of Capital

1. This appendix included supporting materials used in our analysis and estimation of an appropriate cost of capital allowance within our determination.

Inflation

2. We have provisionally decided to use the Bank of England's 2% CPI target as the basis of our CPIH estimate for the price control. In considering the appropriate inflation assumption, we assessed the Bank of England's historic performance at attaining this target rate. As discussed in the body of the report, while the rate has rarely been at the target, on average, it has been very close to this level.

Figure 1: UK CPI and CPIH inflation since June 2010



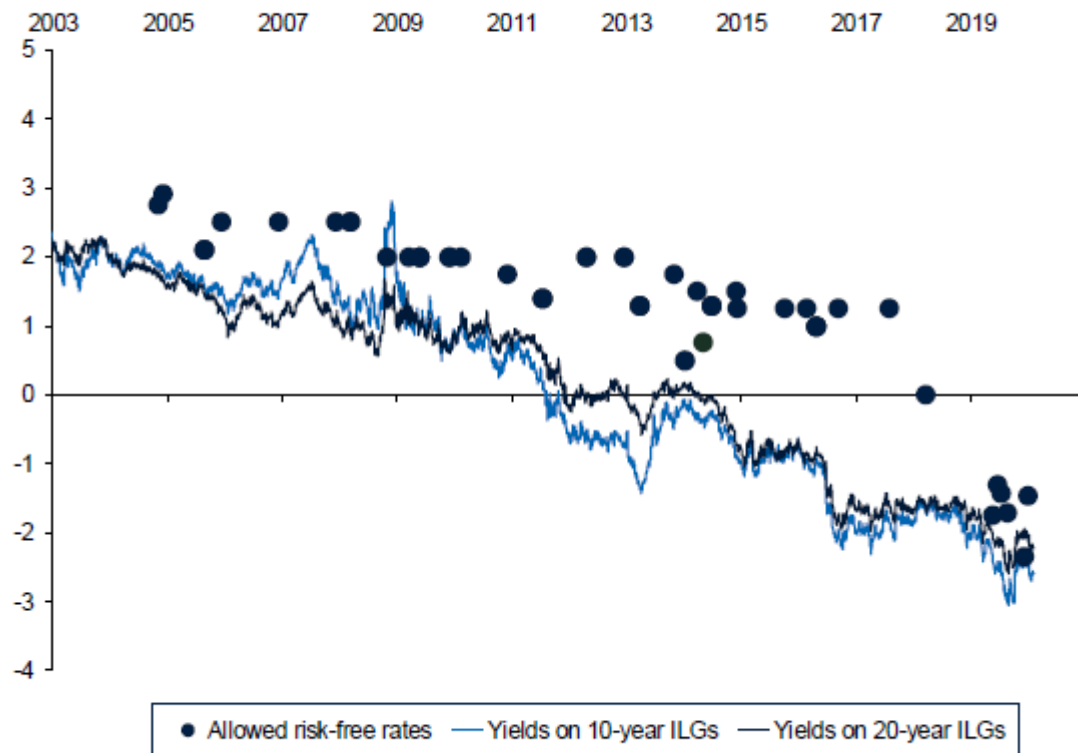
Source: CMA analysis using ONS data

RFR

3. Figure 2 below demonstrates falling ILG rates over recent years. In the vast majority of cases, regulators have set their estimate of the RFR higher than the market-implied level. The average gap appears to increase after 2012 as a result of real yields moving into negative territory. The gap appears to narrow again at the end of this period, potentially as a result of the findings of the 2018 UKRN review into the cost of capital, which advocated using market rates even if negative.

Figure 2: Chart showing interest rates and past regulatory decisions on RFR

Figure 5.1 Regulatory precedents on the risk-free rate

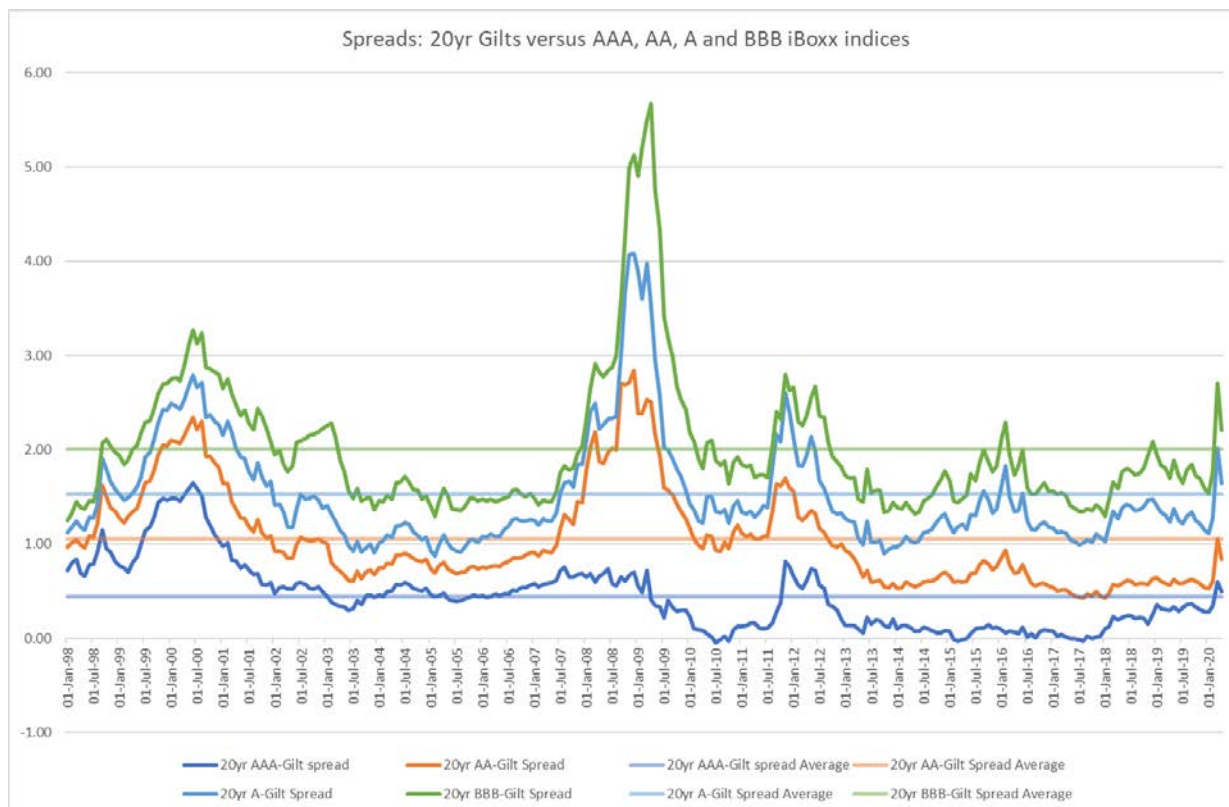


Source: Oxera analysis based on past regulatory determinations.

Source: Oxera (2020), *Are sovereign yields the risk-free rate for the CAPM?*, May 2020.

4. Figure 3 demonstrates spreads of various credit ratings over ILG rates. Whilst AAA rates do appear to be least sensitive to market conditions (compare AAA and AA spreads during the 2008/9 global financial crisis) this analysis does seem to show that even the highest-rated non-government borrowers trade at an average of 50bps higher than the ILG rate.

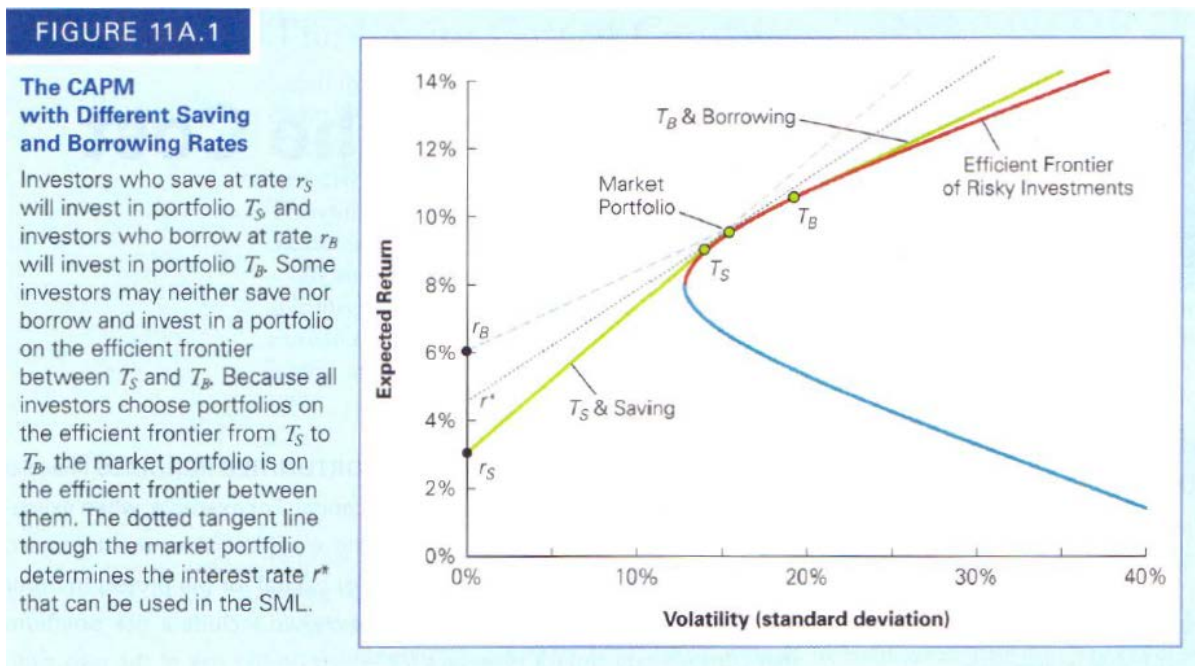
Figure 3: Spreads over 20yr ILGs



Source: CMA analysis using Bank of England and iBoxx data

5. In paragraph 9.77 we highlight Berk and DeMarzo’s explanation of the CAPM with different savings and borrowing rates available to different investors. Berk and DeMarzo’s figure 11A.1 (see Figure 4) below demonstrates the different securities market lines (SMLs) available to investors depending on the rate at which they can borrow, and that this leads the market rate to sit a level between the rates achievable by these different classes of investor. For our purposes, we interpret this as the true RFR sitting between the rates available to our best proxies - government rates, represented by ILGs, and private investors, represented by AAA non-government bond indices.

Figure 4: Extract from Berk and DeMarzo showing CAPM outputs with different savings and borrowing rates available to different investors



Source: Berk and DeMarzo

6. In its report for Bristol Water, Economic Insight produced the following analysis (see Figure 5) of the difference between index-linked and nominal approaches after adjustments:

Figure 5: Economic Insight analysis for the difference between deflated nominal gilts and index-linked gilts methods after adjustments

Table 7: Differences between index-linked and nominal approaches after adjustments

Variable	Risk premium based on 2004-2013	Risk premium based on 2004-2007
Yield on nominal gilts - adjusted for forward rates (Ofwat)	1.10%	1.10%
RPI inflation (Ofwat)	3.00%	3.00%
Yield on nominal gilts deflated (Ofwat)	-1.84%	-1.84%
Inflation risk premium (Bank of England)	0.15%	0.09%
Real RFR implied by nominal approach - post adjustments	-1.99%	-1.93%
Index-linked RFR (Ofwat)	-2.35%	-2.35%
Liquidity risk premium (Bank of England)	0.15%	-0.02%
Real RFR implied by index-linked approach	-2.50%	-2.33%
Difference between deflated nominal gilts and index-linked gilts methods after adjustments	-0.51%	-0.40%

Source: Economic Insight

Source: Economic Insight, Review of Ofwat's Approach to the WACC at PR19 FD, March 2020

- We have provisionally chosen not to apply a forward rate adjustment to any of our debt-based metrics. If we had chosen to apply a forward rate adjustment, it would be relatively minor based on current market rates. Our calculations use the following formula:

$$\left(\frac{(1 + r_T)^T}{(1 + r_t)^t} \right)^{\frac{1}{T-t}} - 1$$

Where t is the time into the future at which we want to estimate rates, in our example 2 years (roughly half way through the price control from here), T is our target maturity plus t , in our case 22 years, and r is yield.

- Table1 shows our calculations using the various steps in the formula above and concludes that the average forward rate adjustment over the last 6 months would have been 0.10%

Table 1: Calculation of the forward rate adjustment

<i>Formula element</i>	<i>Value in Years</i>	<i>31 Jan 20</i>	<i>29 Feb 20</i>	<i>31 Mar 20</i>	<i>30 Apr 20</i>	<i>31 May 20</i>	<i>30 Jun 20</i>
t	2	0.46%	0.34%	0.14%	0.03%	-0.03%	-0.07%
T	22	1.07%	0.99%	0.90%	0.63%	0.63%	0.69%
Target Year Yield	20	1.03%	0.94%	0.86%	0.61%	0.60%	0.66%

Formula element	Formula	31 Jan 20	29 Feb 20	31 Mar 20	30 Apr 20	31 May 20	30 Jun 20
a	$(1+rt)^T$	1.264	1.242	1.218	1.148	1.148	1.163
b	$(1+rt)^t$	1.009	1.007	1.003	1.001	0.999	0.999
c	a/b	1.252	1.234	1.214	1.147	1.149	1.165
d	$1/(T-t)$	0.05	0.05	0.05	0.05	0.05	0.05
e	c^d	1.011	1.011	1.010	1.007	1.007	1.008
f	$e-1$	1.13%	1.06%	0.98%	0.69%	0.70%	0.77%
g	20-yr Yield	1.03%	0.94%	0.86%	0.61%	0.60%	0.66%
'Pickup'	f-g	0.10%	0.12%	0.12%	0.08%	0.10%	0.11%

Source: CMA calculations using Bank of England data

9. Using the above calculation, we can see that the average implied increase in rates over the last 6 months has been only 10bps.

Beta

10. In response to our RFI, Europe Economics provided the following updated estimates of unlevered beta:

Figure 6: Europe Economics corrected unlevered beta estimates

Table 2: Unlevered beta evidence (end of February 2020)

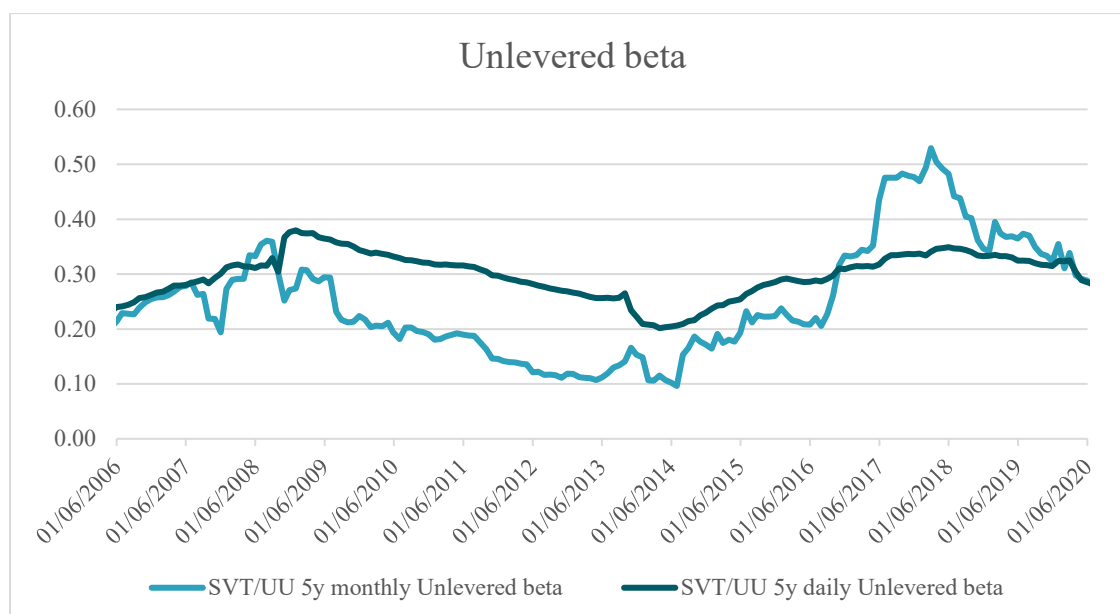
		Spot end Feb 2020	1-yr average	2-yr average	5-yr average
Severn Trent	2-yr daily	0.28	0.27	0.29	0.33
	2yr weekly	0.29	0.25	0.32	0.36
	5-yr daily	0.33	0.33	0.34	0.32
	5-yr weekly	0.35	0.34	0.36	0.35
United Utilities	2-yr daily	0.28	0.27	0.28	0.33
	2yr weekly	0.29	0.24	0.28	0.34
	5-yr daily	0.32	0.32	0.33	0.31
	5-yr weekly	0.34	0.32	0.34	0.31
SVT/UU	2-yr daily	0.28	0.27	0.28	0.33
	2yr weekly	0.29	0.25	0.30	0.35
	5-yr daily	0.32	0.32	0.33	0.31
	5-yr weekly	0.35	0.33	0.35	0.33

Source: Thomson Reuters and Europe Economics calculations

Source: Europe Economics

- We did not find conclusive evidence that daily betas were downward biased. Our own analysis of beta for the two listed water companies suggested that for the vast majority of the 2006-2020 period, monthly betas were actually lower than daily betas:

Figure 7: SVT/UU monthly and daily betas

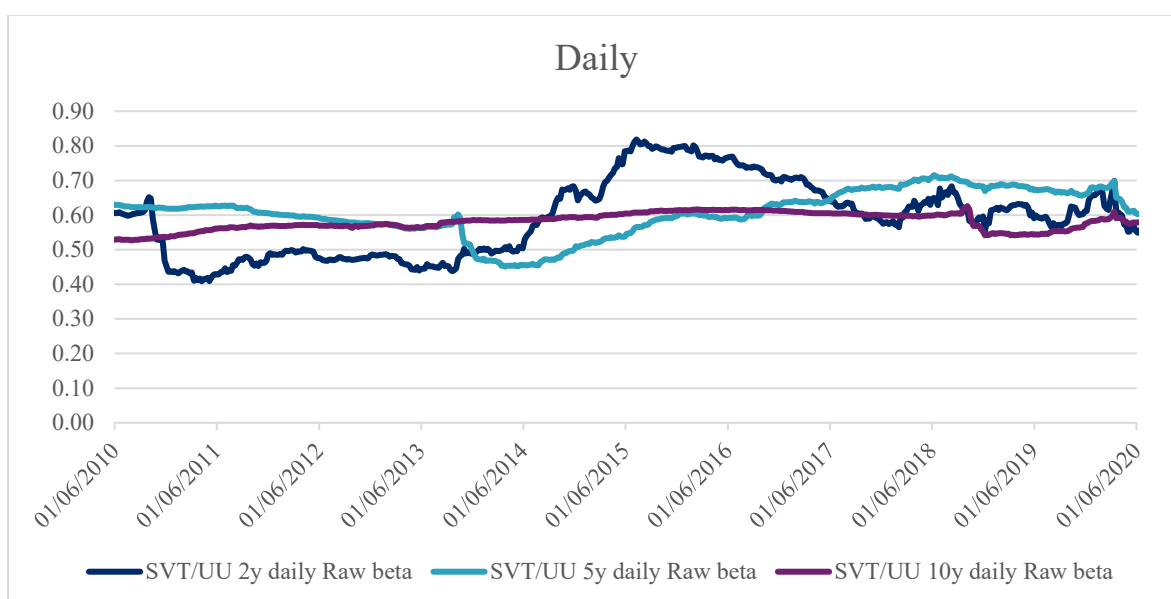


Source: CMA analysis using Thomson Reuters data.

Note: Data reflects a market capitalisation-weighted average of Severn Trent (SVT) and United Utilities (UU) prices over relevant frequencies and horizons.

12. To complement the data tables in the body of the report, please see below for the graphical representation of our beta data over time:

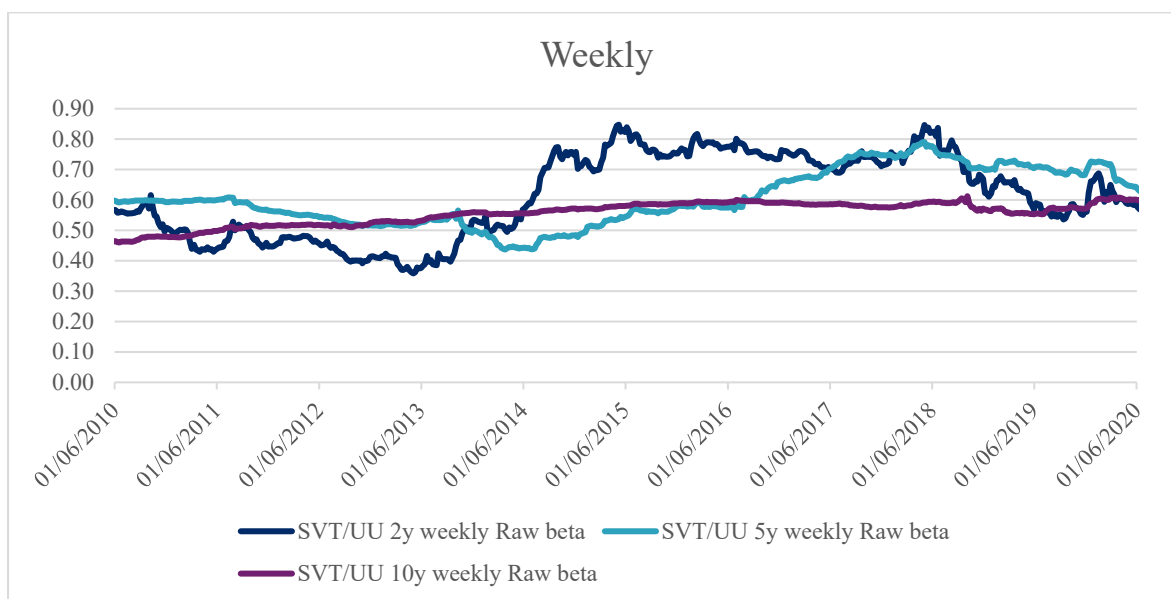
Figure 8: SVT/UU 2-year, 5-year and 10-year daily betas



Source: CMA analysis using Thomson Reuters data

Note: Data reflects a market capitalisation-weighted average of Severn Trent (SVT) and United Utilities (UU) prices over relevant frequencies and horizons.

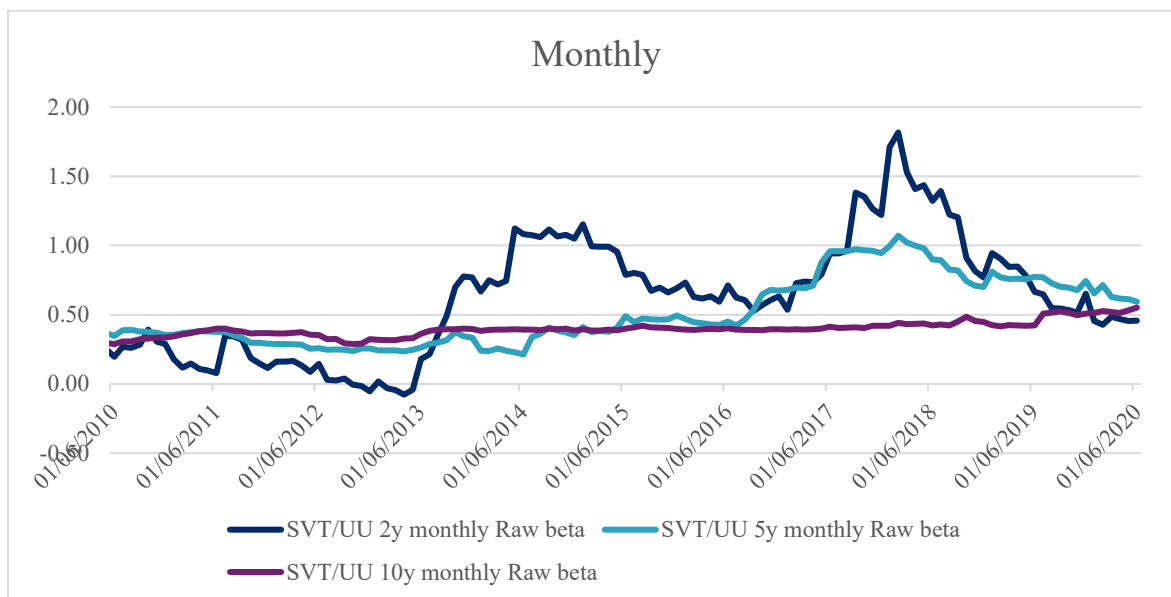
Figure 9: SVT/UU 2-year, 5-year and 10-year weekly betas



Source: CMA analysis using Thomson Reuters data

Note: Data reflects a market capitalisation-weighted average of Severn Trent (SVT) and United Utilities (UU) prices over relevant frequencies and horizons.

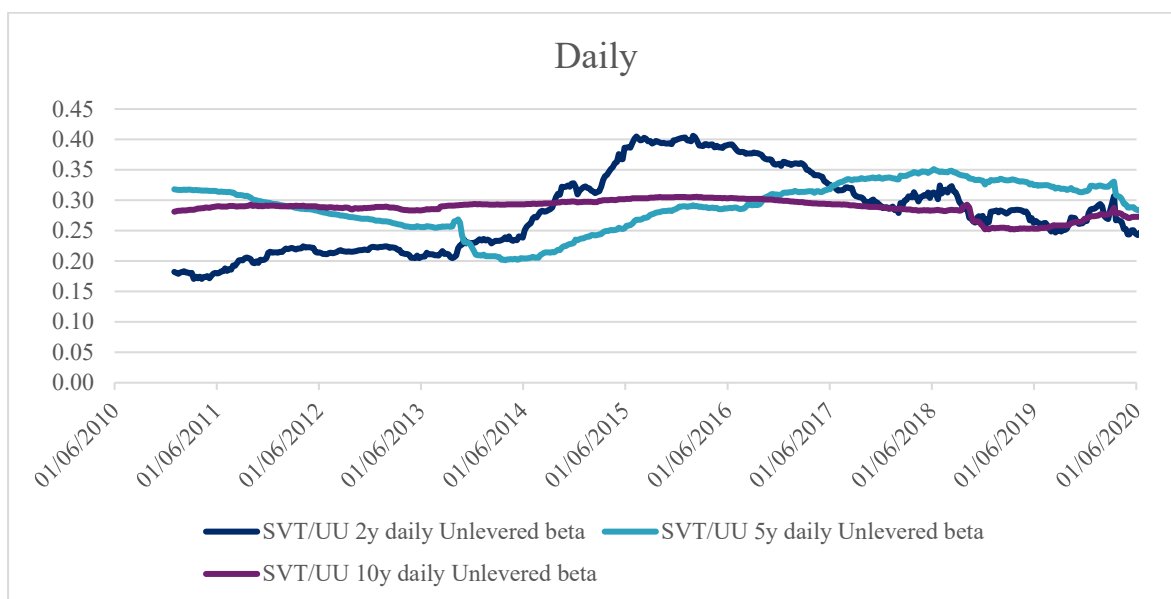
Figure 10: SVT/UU 2-year, 5-year and 10-year monthly betas



Source: CMA analysis using Thomson Reuters data

Note: Data reflects a market capitalisation-weighted average of Severn Trent (SVT) and United Utilities (UU) prices over relevant frequencies and horizons.

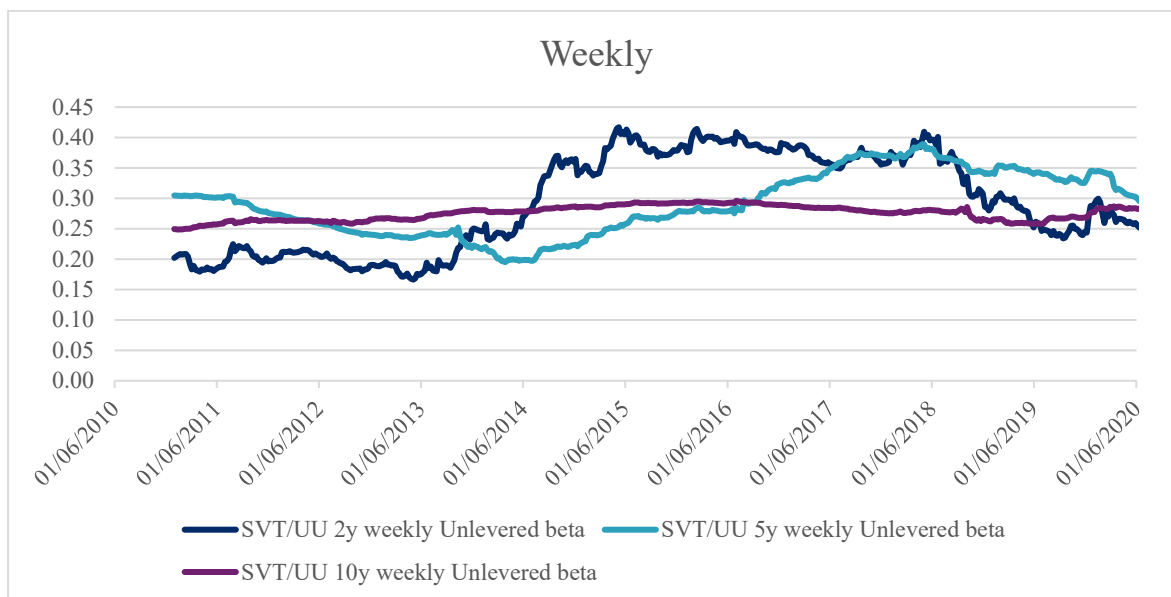
Figure 11: SVT/UU 2-year, 5-year and 10-year daily betas



Source: CMA analysis using Thomson Reuters data

Note: Data reflects a market capitalisation-weighted average of Severn Trent (SVT) and United Utilities (UU) prices over relevant frequencies and horizons.

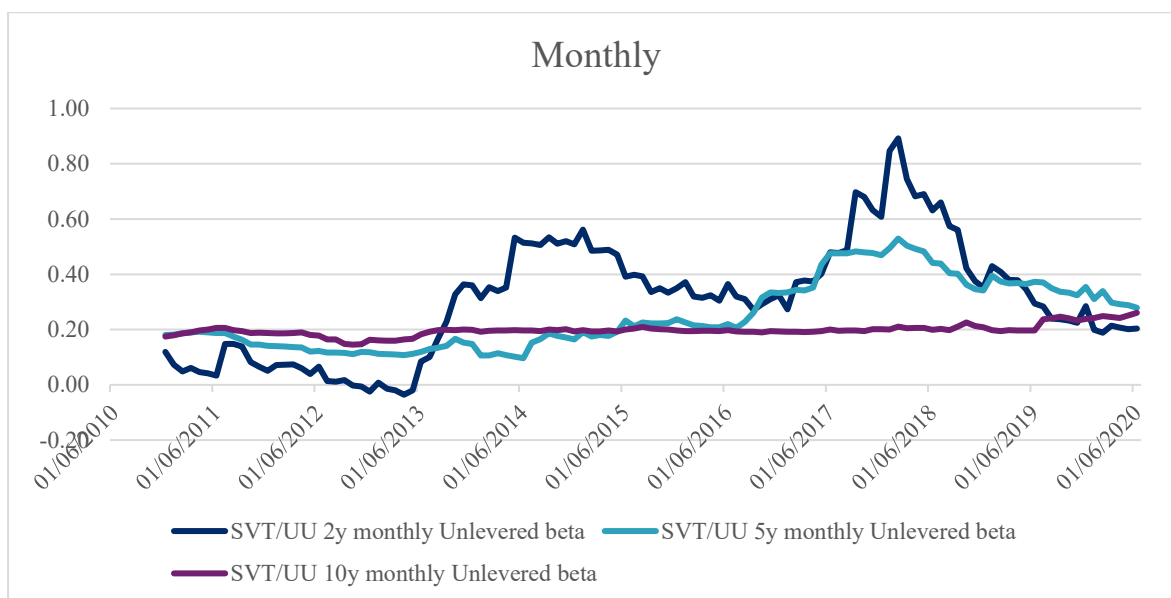
Figure 12: SVT/UU 2-year, 5-year and 10-year weekly betas



Source: CMA analysis using Thomson Reuters data

Note: Data reflects a market capitalisation-weighted average of Severn Trent (SVT) and United Utilities (UU) prices over relevant frequencies and horizons.

Figure 13: SVT/UU 2-year, 5-year and 10-year monthly betas



Source: CMA analysis using Thomson Reuters data

Note: Data reflects a market capitalisation-weighted average of Severn Trent (SVT) and United Utilities (UU) prices over relevant frequencies and horizons.

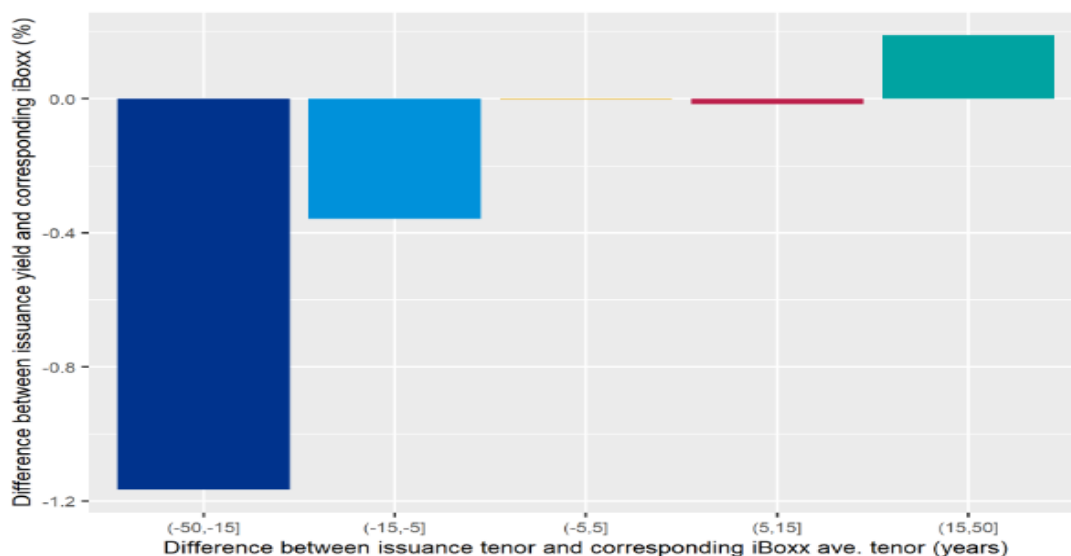
Cost of Debt

13. KPMG provided analysis which suggested that, once tenor and credit rating are controlled for, there is no outperformance wedge present in water sector borrowing rates. In Figure 14 below, KPMG suggest minimal difference

between water bond yields and the iBoxx index at 5 years either side of the benchmark's average maturity.

Figure 14: KPMG analysis of water bond yields versus the iBoxx index

Figure 85 Differences in water bond yields relative to the appropriate iBoxx index by tenor bucket



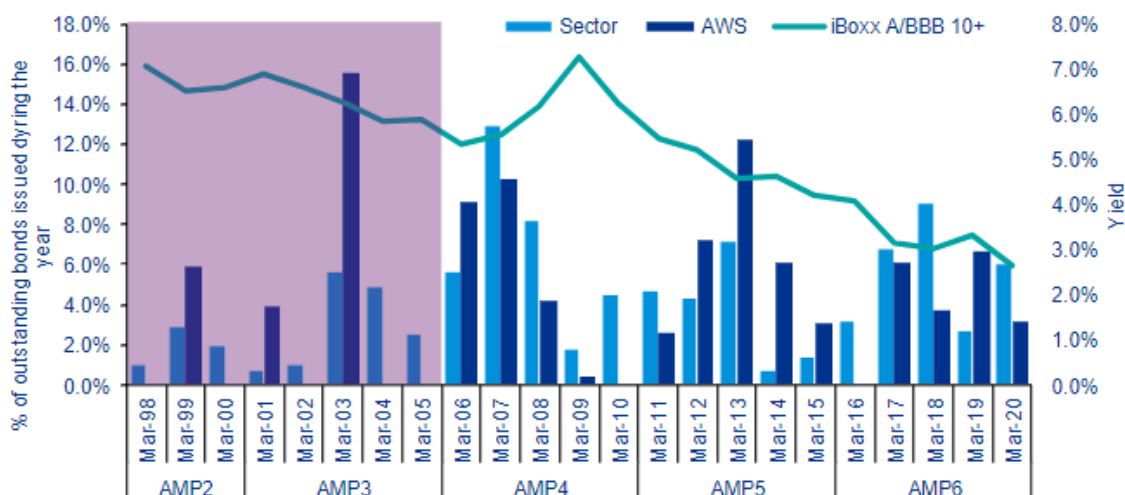
Source: KPMG Cost of Capital Report, Figure 7 (SOC441)

Source: Anglian SoC using KPMG, p298

- Anglian provided the following chart to demonstrate that 20% of sector debt and 25% of Anglian debt was raised outside of Ofwat's 15-year trailing average:

Figure 15: Anglian and sector issuance by year versus prevailing benchmark yields

Figure 86 Issuance profile of Anglian Water Services (AWS) and the sector



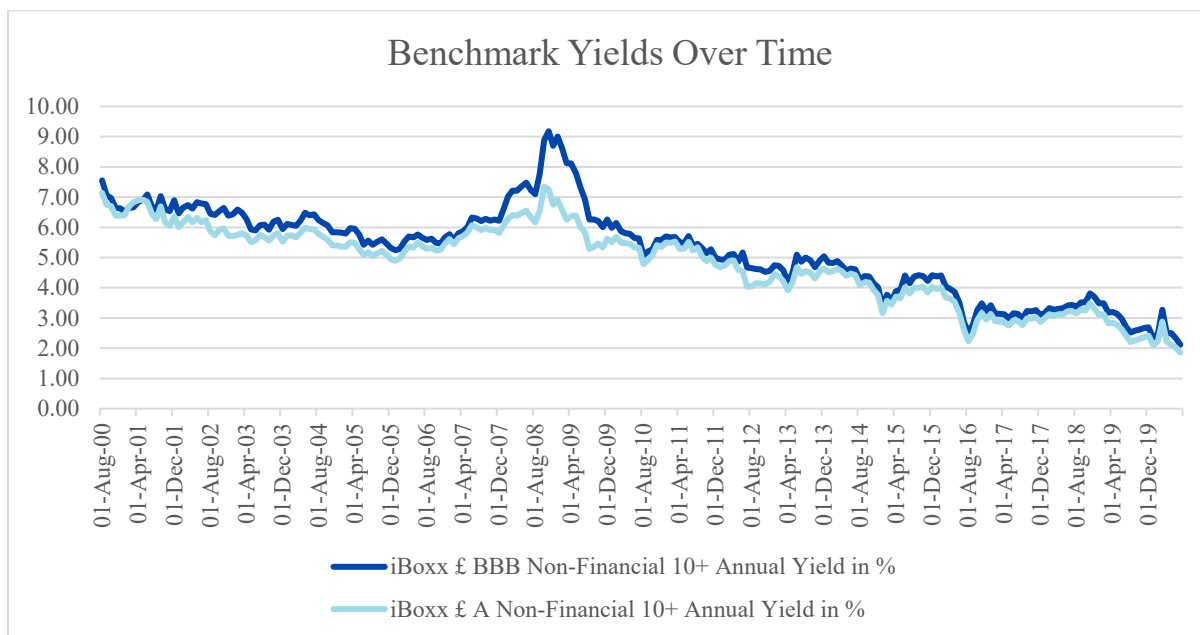
Source: KPMG Embedded Debt Report, Figure 1 (SOC441)

Source: Anglian SoC using KPMG analysis, p299

- We note that costs of debt suggested by our benchmark indices are likely to fall, on average, over the price control as more expensive historical debt falls

out of debt portfolios. The downward path in yields, outside of the spike during the global financial crisis, can be seen in the chart below:

Figure 16: A and BBB iBoxx yields over the last 20 years

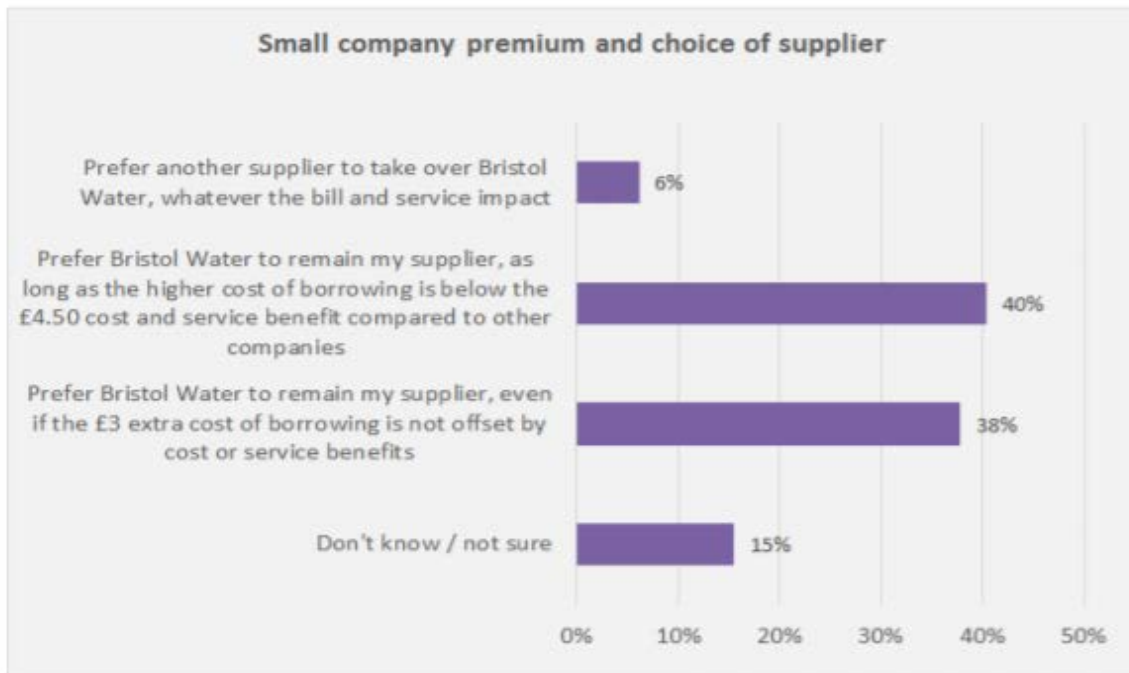


Source: CMA analysis of iBoxx data

Bristol CSA

- In support of their proposed uplifts to debt and equity cost allowances, Bristol provided the following charts as evidence of customer support research.

Figure 17: ICS Customer research on cost of finance



Source: Bristol's Reply to Ofwat's Response, p34

17. As discussed in paragraph 8.518, Ofwat suggested specific wording that Bristol should use in its additional customer research. Bristol provided an extract from their customer research to show the updated question:

Figure 18: Extract from Bristol's customer research

Figure A3 Extract from Bristol Water customer research informing April 2019 business plan

The water companies in England are a mix of larger companies and smaller companies. Your water company is one of the smaller companies.

Your water company believes that being smaller means they can provide you with a better level of service by responding to issues more quickly and tailoring their services to the local community. They are also more likely to employ people from their local areas and buy goods and services from other local businesses.

Your water bill is lower than the average water bill in the industry, although some of the costs included in the bill are slightly higher due to the small size of Bristol Water. This includes for example the cost of borrowing from banks and other lenders.

The impact of these higher costs on the current average bill is estimated to be about £1.80 per household per year (c.1% of the water bill) and is included in the projected bill estimates presented to you in earlier questions.

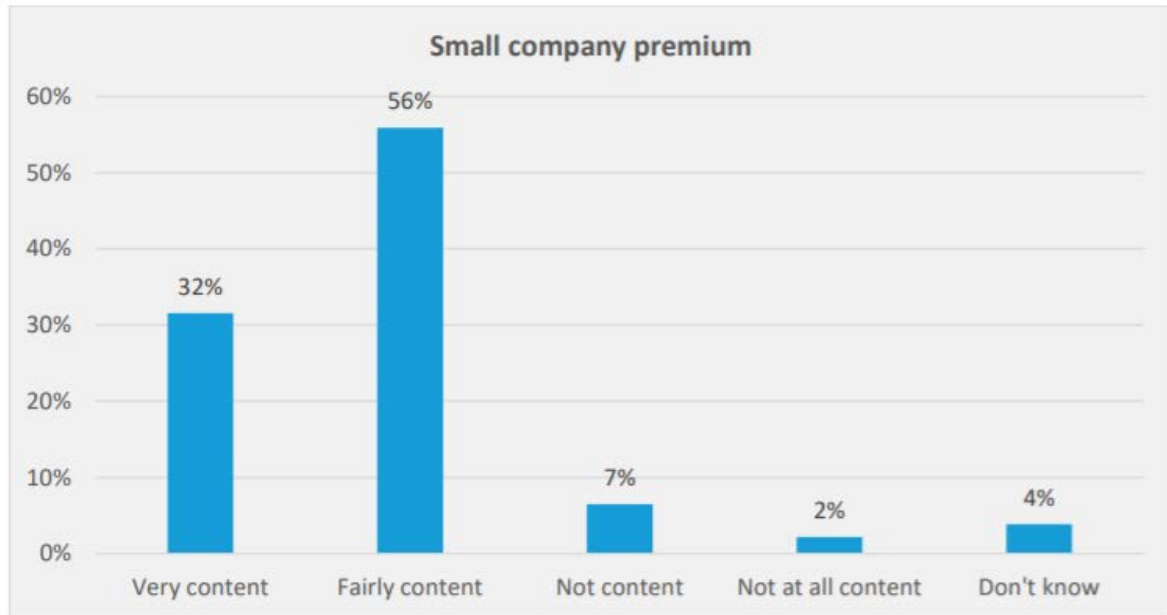
Q12 Please indicate how happy you are to continue paying this amount for your local water service?

Source: Bristol's Reply to Ofwat's Response, p35

18. Bristol stated that this round of customer research found 88% support for the CSA valued at the 'around £1.80 figure mentioned in the updated question. This is shown in Figure 19.

Figure 19: Customer research data from Bristol's updated questioning

Figure A4 Bristol Water customer support for CSA



Source: Bristol's Reply to Ofwat's Response

19. On the basis of this research, Bristol concluded the customers would be happy to support a CSA of up to £3 with no direct or specific offsetting benefits, in comparison to their proposed uplift to WACC which equated to £2.91 per customer (shown in Figure 20).⁶

⁶ [Bristol's Reply to Ofwat's Response](#), paragraph 145–154

Figure 20: Bristol calculation of per customer increase from its proposed WACC uplift

Table A4 Calculation of Bristol Water proposed WACC uplift

cost of embedded debt uplift	0.38%
embedded debt ratio	95%
cost of new debt uplift	0.25%
new debt ratio	5%
value embedded debt £m	1.14
value new debt £m	0.04
cost of uplift to embedded debt per hh customer £	1.64
cost of uplift to new debt per hh customer £	0.06
equity uplift on 13bps on beta	0.40%
value of equity uplift £m	0.84
£ per hh customer	1.21
Combined debt + equity £ per customer	2.91

Source: Bristol's Reply to Ofwat's Response, p37

Retail Margin Adjustment

20. Ofwat provided the following tables to demonstrate how they had calculated its retail margin adjustment:

Figure 21: Ofwat's calculation of a 4bps retail margin adjustment

Component	Calculation	Point estimate (nominal)	Notes
2) Required revenue for return on working capital	I = G x H	£40m	
Total retail-specific capital costs	J = C + I	£59m	
Retail margin allowed revenue apportioned to households	K	£93m	From draft determination financial models
3) Required return for additional systematic risk	L = K – J	£34m	
Average RCV	M	£84,125m	From draft determination financial models
Retail margin adjustment	N = L / M	0.04%	

Component	Calculation	Point estimate (nominal)	Notes
Fixed asset balance for retail controls (2020-25 average)	A	£386m	From draft determination financial models
Cost of financing fixed assets	B	5.02%	Appointee allowed return on capital
1) Required revenue for return on retail fixed assets	C = (A x B)	£19m	
Average annual debtor days	D	40	From April revised business plans.
Average annual turnover	E	£11,989m	From draft determination financial models
Days in a year	F	365	
Average annual working capital requirement	G = (D / F) x E	£1,309m	
Working capital financing rate	H	3.06%	From April revised business plans. ¹⁸

Source: Ofwat PR19 FD

21. Northumbrian provided Figure 22 to illustrate the sensitivity to the retail margin adjustment of flexing various input assumptions.

Figure 22: Northumbrian: Ofwat retail margin adjustment sensitivity analysis

Component	Calculation	Ofwat	KPMG low end pre-tax WACC, FD working capital	KPMG low end pre-tax WACC, Net working capital	KPMG high end pre-tax WACC, Net working capital
Fixed asset balance - retail (2020-25 average)	A	£386m	£386m	£386m	£386m
Cost of financing fixed assets	B	5.02%	5.91%	5.91%	6.25%
1) Req. revenue for return on retail fixed assets	C = A x B	£19m	£23m	£23m	£24m
Working capital	F = (D / 365) x E	£1,314m	£1,314m	£903m	£903m ⁹⁷
Working capital financing rate	G	3.06%	5.91%	5.91%	6.25%
2) Req. revenue for return on working capital	H = F x G	£40m	£78m	£53m	£56m
Total retail-specific capital costs	I = C + H	£60m	£100m	£78m	£82m
Retail margin allowed revenue apportioned to HH	J	£93m	£93m	£93m	£93m
3) Req. return for additional systematic risk	K = lower of J – I and zero	£34m	£0m	£17m	£12m
Average RCV	M	£84,125m	£84,125m	£84,125	£84,125m
Retail margin adjustment	N = L / M	0.04%	0.00%	0.02%	0.01%

Source: Northumbrian, KPMG, Ofwat.

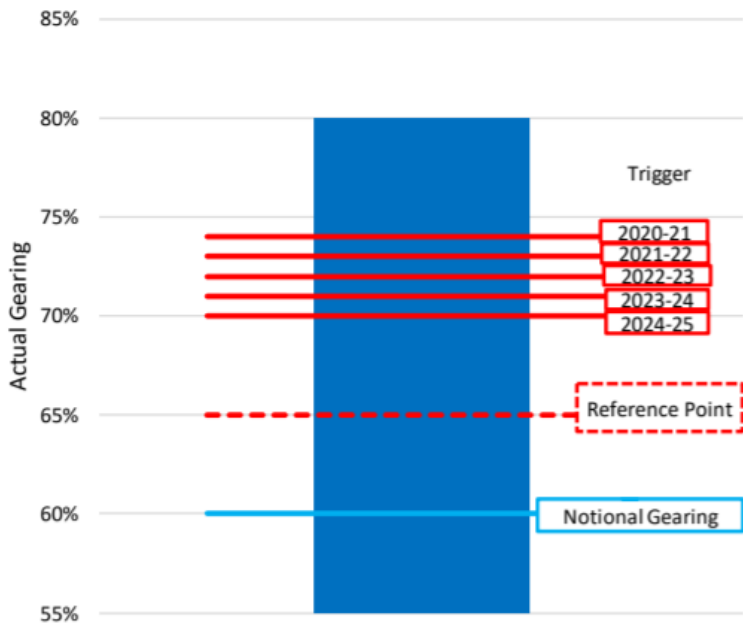
Gearing Outperformance Sharing Mechanism

22. The formula to calculate sharing payments under the gearing outperformance sharing mechanism is:

$$\text{Sharing payment amount} = (\text{Gearing} - 65\%) \times 50\% \times (\text{Allowed Nominal Cost of Equity} - \text{Actual Cost of Debt}) \times \text{Closing RCV Nominal}$$

Ofwat also provided the following diagram (Figure 23) to demonstrate the calculation of its gearing outperformance sharing mechanism:

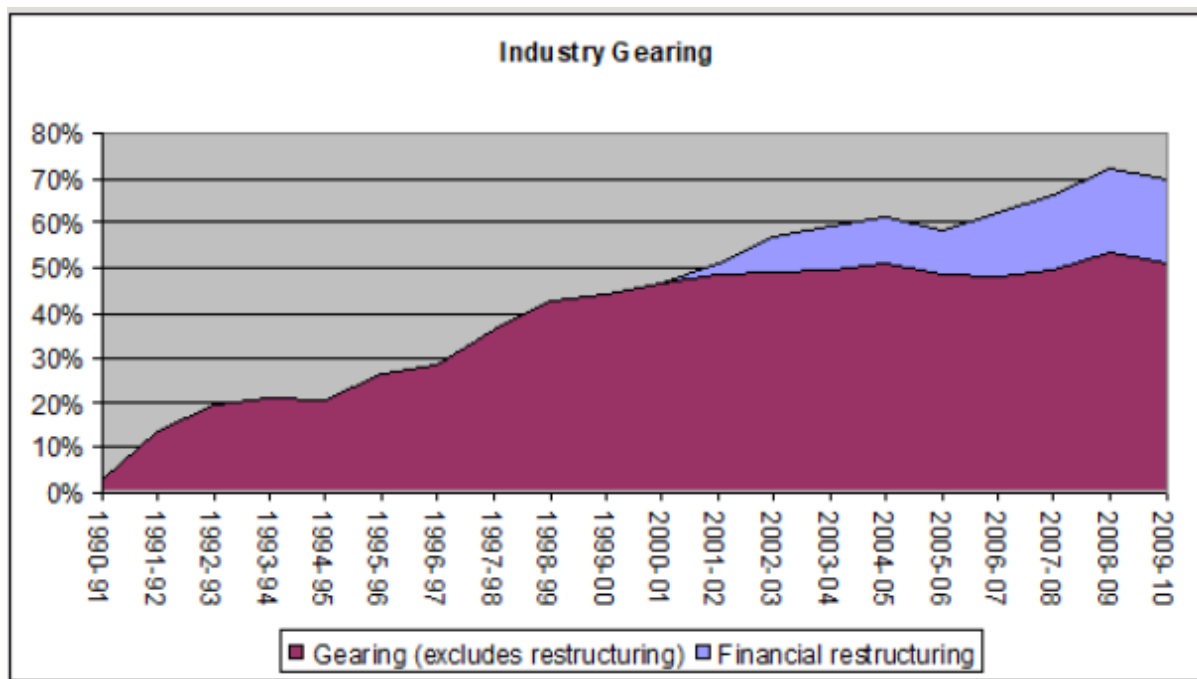
Figure 23: Ofwat’s gearing outperformance sharing mechanism reference and trigger points



Source: Ofwat PR19 FD

23. Ofwat also provided the following chart (Figure 24) as evidence of rising gearing within the industry, including the use of financial restructuring.

Figure 24: Ofwat chart showing industry gearing since 1990



Source: Reference to PR19 FD: Risk and return – response to common issues in companies’ SoC

Glossary

Affinity	Affinity Water Limited
AFW	Industry acronym for Affinity Water Ltd
AICR	The Adjusted Interest Cover Ratio (AICR) is sometimes referred to by the Main Parties as the Adjusted Cash Interest Cover Ratio (ACICR). We refer to it as AICR.
AMP6	The period between 2015 and 2020, during which PR14 applies
AMP7	The period between 2020 and 2025, during which PR19 applies
Anglian	Anglian Water Services Ltd
ANH	Industry acronym for Anglian Water Services Ltd
APR	Annual performance report
AWGL	Anglian Water Group Ltd, the ultimate holding company of Anglian Water Services Ltd
base costs	Routine costs that companies incur to provide a base level of service
Bespoke PCs	Company-specific PCs
Botex	Botex is a measure of base expenditure equal to Opex plus base Capex (ie excluding Capex for enhancement)
Bristol	Bristol Water plc
BRL	Industry acronym for Bristol Water
Bristol 2010 Determination	The CC's determination in Bristol Water plc A reference under section 12(3)(a) of the Water Industry Act 1991 Report, of 4 August 2010
Bristol PR14 Determination	The CMA's determination in Bristol Water plc A reference under section 12(3)(a) of the Water Industry Act 1991 Report, of 6 October 2015
BVP	Best value plan

Capex	Capital expenditures, commonly known as Capex, are funds used by a company to acquire, upgrade, and maintain physical assets such as property, buildings, an industrial plant, technology or equipment.
CAPM	The Capital Asset Pricing Model describes the relationship between systematic risk and expected return for assets, particularly stocks.
caps and collars	Limits on outperformance and underperformance for an ODI, respectively
CC	The Competition Commission
CCG	Water company customer challenge groups
CCWater	The Consumer Council for Water
CED	Consumption expenditure deflator
CKHH	CK Hutchison Holdings Limited (CKHH), the ultimate legal owner of Northumbrian Water Ltd
CMA	The Competition and Markets Authority
C-MeX	Customer measure of experience
COLI	Cost of living index
Common PCss	The PCs applying to all WASCs and the PCs applying to all WOCs
CPI	Consumer Price Index
CPIH	Consumer Prices Index Including Owner Occupiers' Housing Costs
CRI	Compliance Risk Index
CRT	Canal & River Trust
Deadband	A range of values below a PC and/or above a PC where companies will not incur a penalty for underperformance or a reward for outperformance

Disputed Determination	Ofwat's PR19 FD in respect of the four Disputing Companies
Disputing Companies	Anglian, Bristol, Northumbrian and Yorkshire collectively
DAF	dissolved air flotation
DDM	dividend discount model
D-MeX	Developer services measure of experience
DMS	Dimson, Marsh and Staunton dataset
DWI	The Drinking Water Inspectorate, which provides independent assurance on the quality of drinking water.
Dŵr Cymru Welsh Water	Dŵr Cymru Cyfyngedig (Welsh Water)
EBSD	Economic balancing of supply and demand ('EBSD') modelling
EE	Europe Economics
ENA	The Energy Networks Association
Enhanced ODIs	Payments for performance that shifts the frontier of outcomes
enhancement costs	Costs required to enhance the capacity or quality of the service beyond the base level
ERP	Equity risk premium
Financing Duty	The duty to secure that companies are able to finance the proper carrying out of their functions
FFO/net debt	Funds from Operations to net debt, a ratio used by Standard & Poor's
frontier shift	The reduction of cost allowances on an annual basis to account for the expected productivity improvements in the sector
FTFT	Flow to full treatment

GHT	Gregory, Harris and Tharyan
GOSM	Gearing Outperformance Sharing Mechanism
Hafren	Hafren Dyfrdwy Ltd
HDD	Industry acronym for Hafren Dyfrdwy Ltd
IED	The Industrial Emissions Directive
ILGs	RPI index-linked UK government bonds, known as Index-Linked Gilts
JKM Estimator	the Jacquier, Kane and Marcus estimator, a holding period-weighted average of geometric and arithmetic averages
Main Parties	Ofwat and the four disputing companies collectively
MARs	Market-to-asset ratio(s)
MPE	Materials, plant and equipment
NATS/CAA	The NATS (En Route) plc /CAA regulatory appeal, which reported in July 2020
NERL	NATS (En Route) plc
NES	Industry acronym for Northumbrian Water Limited
NPV	Net present value
Northumbrian	Northumbrian Water Limited
Notified Item	<p>An item that Ofwat notifies a water company has not been allowed for (either in full or in part) when setting price controls. Notified Items can be considered in an interim determination, along with Relevant Changes of Circumstance.</p> <p>Relevant Changes of Circumstance are described in companies' Licence Condition B.</p>
OBR	Office for Budget Responsibility

Ofwat	Ofwat is the Water Services Regulation Authority, the economic regulator of water and sewerage companies in England and Wales.
Ofwat's FD	Ofwat's PR19 final determination
Ofwat's Response	Ofwat's response of May 2020 to the Disputing Companies' Statements of Case
Ofwat's Further Submission	Ofwat's submission of June 2020 to the CMA
ODI	Outcome Delivery Incentives are the financial or reputational (non-financial) incentives for companies to outperform and avoid underperformance against each of their performance commitments
OLS	Ordinary least squares
ONS	The Office for National Statistics
Opex	Operational Expenditure. Operating expenses are the costs a company incurs for running their day-to-day operations
P-removal	Phosphorus removal
PAYG	Pay As You Go is the proportion of total allowed expenditure that is recovered in each year of the price review period
P10/P90	P10 is the level at which there is only an estimated 10% chance that the outcome performance level would be worse. P90 is the level at which there is only an estimated 10% chance that the outcome performance level would be higher.
PC	Performance Commitments are the level of performance that companies commit to deliver for customers and the means to hold companies to account for their service delivery. Each performance commitment has an associated outcome delivery incentive (ODI) Ofwat sets common core performance commitments for all companies. Individual companies may also have bespoke performance commitments.

Periodic reviews (or price reviews)	Ofwat is required to carry out 5-yearly periodic reviews (sometimes referred to by the Main Parties as price reviews) designed to limit the revenue allowed to the relevant company and as a result the charges levied by it.
Portsmouth	Portsmouth Water Ltd
Priority Services Register	The means by which water companies identify customers who may need special assistance
PR14	Ofwat's periodic price review for 2014, covering the price control period from 2015-2020 and corresponding to AMP6
PR19	Ofwat's periodic price review for 2019, covering the price control period from 2020-2025 and corresponding to AMP7
PRT	Industry acronym for Portsmouth Water Ltd
RCV	<p>Regulatory Capital Value is a component used by Ofwat to calculate price limits. It represents a measure of the capital base of a company and reflects the allowed expenditure to be recovered from future customers.</p> <p>Expenditure not recovered in the current period through PAYG is added to RCV and recovered in future periods through RCV run-off. The RCV is inflated each year to maintain the RCV at current prices.</p>
RCV run-off	RCV run-off is a measure of the annual depreciation of the RCV to reflect the long term nature of the benefit to customers of the previous investment a company has made in its assets
the References	Ofwat's referral of the Disputed Determinations to the CMA
RFR	<p>The Risk Free Rate is the theoretical rate of return on an investment with zero risk. It is the benchmark to measure other investments that include an element of risk.</p> <p>Government bond yields are the most commonly used risk free rates for assets</p>
ROCE	Return on capital employed
RoRE	Return on regulated equity

RPE	Real price effects
RPI	Retail Price Index
SELL	Sustainable economic level of leakage
SEMD	The Security and Emergency Measures (Water and Sewerage Undertakers) Direction 1998 directs undertakers to maintain plans to provide a supply of water at all times.
SES	Sutton & East Surrey Water plc (trading as SES Water)
SEW	Industry acronym for South East Water Ltd
Severn Trent	Severn Trent Water Ltd (England)
SFA	stochastic frontier analysis
SML	securities market lines
SoC	Statement of Case
South East	South East Water Ltd
Southern	Southern Water Services Ltd
South Staffs	South Staffordshire Water
South West	South West Water Ltd
SPS	A strategic policy statement, setting out strategic priorities and objectives which Ofwat must act in accordance with when it is carrying out its functions
SRN	Industry acronym for Southern Water Ltd
SSC	Industry acronym for South Staffordshire Water plc
STW	Sewage treatment works
SVE	Industry acronym for Severn Trent Water Ltd
SWB	Industry acronym for South West Water Ltd
TFP	Total factor productivity
Thames	Thames Water Utilities Ltd

TMR	Total market return
TMS	Industry acronym for Thames Water Utilities Ltd
Totex	Total expenditure, covering both Opex and Capex
UKRN	UK Regulators Network
United Utilities	United Utilities Water Ltd
UUW	Industry acronym for United Utilities Water Ltd
UWWTD	Urban Waste Water Treatment Directive
WACC	Weighted average cost of capital
WASC	Water and sewerage company
Wessex	Wessex Water
WFD	Water Framework Directive
WIA91	The Water Industry Act 1991
WINEP	Water industry national environment plan
WOC	Water only company
WRc	The firm of engineering consultants assisting the CMA on technical engineering matters in this determination
WRFIM	Wholesale Revenue Forecasting Incentive Mechanism
WRMP	Water resources management plan
WRZ	Water Resource Zone
WSH	Industry acronym for Dŵr Cymru Cyfyngedig (Welsh Water)
WSX	Industry acronym for Wessex Water Services Ltd
WTW	Water treatment works
YKY	Industry acronym for Yorkshire Water Services Ltd
Yorkshire	Yorkshire Water Services Ltd