MCC
Economics & Finance

Peer review of Ofwat's PR24
WACC allowance 'early-view'

February 2023

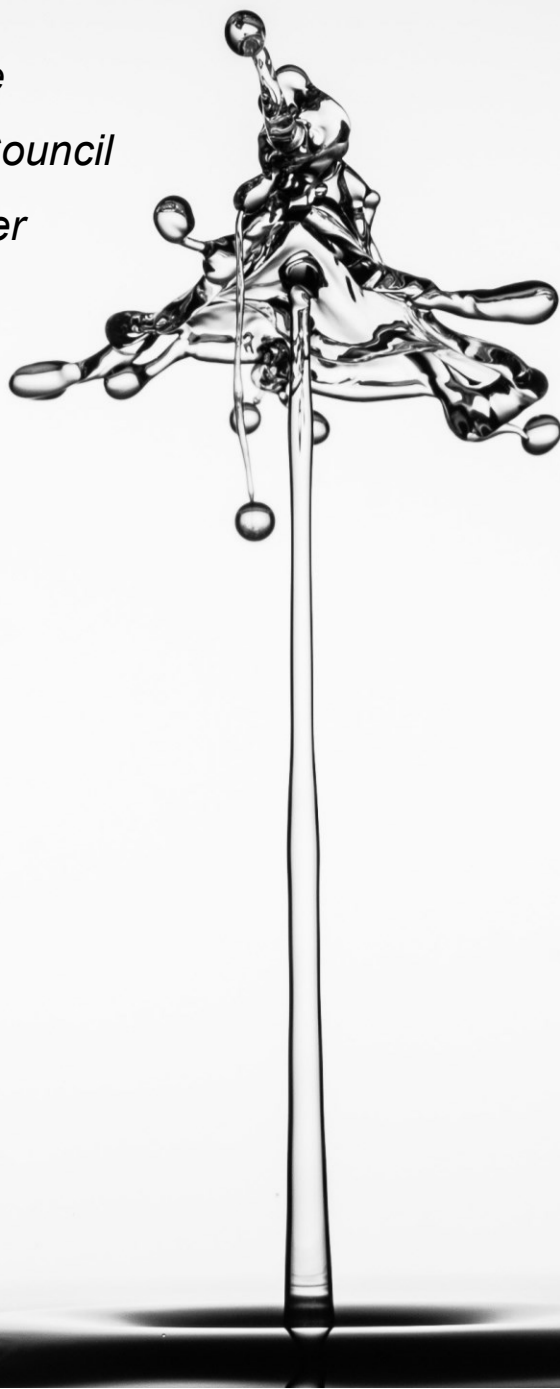*For the*

Consumer Council

for Water

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# <u>Introduction</u>

1. MCC Economics (**we** or **MCC**) were commissioned by the Consumer Council for Water (**CCW**) to review Ofwat's weighted average cost of capital (**WACC**) 'early view' for Price Review 2024 (**PR24**).

2. Our scope of work focused on Ofwat's December 2022 'final methodology' Appendix 11: allowed return on capital alongside other relevant Ofwat publications, including Ofwat's cost of debt model and the water companies' Annual Performance Reports (**APRs**). We compare Ofwat's view with two documents from the UK Regulators Network (**UKRN**): the 2018 UKRN WACC Study and the 2022 UKRN WACC guidance. We also consider regulatory precedent and published decision documents from other regulators, including international regulators such as the Australian Energy Regulator (**AER**).

3. We examine various aspects of Ofwat's indicative PR24 WACC, including:

   - the overall WACC allowance and cross-checks
   - debt and financing assumptions
   - equity assumptions, specifically the:
     - risk-free rate (**RFR**);
     - total market return (**TMR**); and
     - equity beta.

4. Our outputs include questions that Ofwat could consider in advance of taking a final view for PR24. We note indicators (**signals**) that the true WACC is below Ofwat's 'early view'. We acknowledge that the WACC allowance may change when Draft and Final Determinations are made for PR24, as seen in Ofwat's previous Price Review in 2019 (**PR19**) when there were changes to equity allowances and debt allowances. We conclude by asking whether Ofwat could save consumers £2.6 billion by setting a lower WACC allowance.

5. Our sources and terminology can be verified by clicking the embedded hyperlinks (orange text).

Executive summary

6. Following our review of the data, assumptions, and methods used by Ofwat, we find 24 signals that the true WACC is lower than Ofwat's 'early view': as shown in Figure 1 below, segregated by topic.

Figure 1: We find 24 signals that the true cost of capital is lower than Ofwat's 'early view'
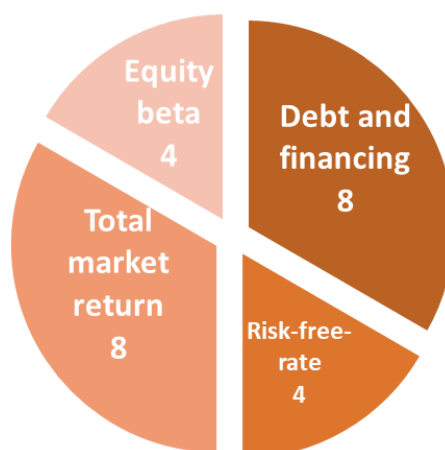
7. Accordingly, if Ofwat replaced its 'early view' with a 'market-led-view' as shown in Figure 2, it could save customers £2.6 billion over 5 years, which is worth ~£20 per household, per year.[1] We provide more detail on this calculation below (see page 34 below). The 'market-led-view' is further supported by the signals noted in the remainder of this report.

Figure 2: Ofwat's early view is higher than the market-led-view

Item	Ofwat's 'early view'	Market-led-view	Ref
Notional gearing	55%	50%	A
Allowed return on equity	4.14%	3.5%	B
Allowed return on debt	2.6%	2.0%	C
Retail margin	0.06%	0.06%	D
Allowed return on capital	3.23%	2.69%	E = A*C + (1-A)*B -D

8. We support Ofwat's proposal (see Ofwat's Appendix 10) to reduce notional gearing to avoid any (alleged or perceived) financeability constraint when setting a fair (market-led) return. Accordingly, we note three reasons below why Ofwat's assumption for notional gearing could be lower than 55% and two reasons why Ofwat's assumption for inflation-linked-debt could be higher than 33%.

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[1] Based on £2.6 billion over 5 years for a total of 26 million household customers in England and Wales (£2.6 billion / 5 years / 26 million households = £20 per year).

WACC allowance

Could Ofwat use cross-check evidence?

9. Several assumptions about debt, equity, tax, and gearing are made by Ofwat when arriving at a WACC allowance 'early view' of 3.23% (CPIH-real, 'wholesale controls'). Although the true WACC is unobservable and so certain assumptions are inevitable, we consider that Ofwat's decision would have greater weight if it were based on all relevant evidence, including cross-checks.

10. Rather than rely exclusively on 'bottom-up' Capital Asset Pricing Model (**CAPM**) assumptions, Ofwat could use 'top-down' cross-checks to identify the true WACC. Cross-checks offer several advantages, including:

- independence from Ofwat's current (and previous) views
- independence from CAPM assumptions
- independence from vested interests (eg investor or political lobbying)
- immunity from regulatory capture (eg water company lobbying)
- market prices for capital sources (eg debt and equity investors)
- market prices for capital uses (eg energy, water, and infrastructure)
- market prices for specific investments (eg Pennon's acquisition of Bristol water)
- market prices at specific points in time

11. Ofwat explains its view on cross-checks as follows:

> *"For our point estimate for the cost of equity of 4.14%, we have adopted the recommendation of the UKRN draft guidance to regulators to take as a starting point the midpoint of the cost of equity range, before considering whether there is a sufficiently compelling case from cross checks to pick a point above or below this in our field. Based on the evidence we have assessed from cross checks… we conclude there is an insufficiently convincing case for picking a point within our cost of equity range other than the midpoint."*

12. However, such reasoning raises several questions, including:

- Should the impact of cross-checks be limited to a pre-defined range?
- Is Ofwat open to considering all types of cross-check information?
- Are Ofwat's CAPM assumptions necessarily more reliable than cross-check assumptions?
- What does Ofwat mean by 'sufficiently compelling'?

13. The AER takes a different stance to Ofwat in relation to the benefits that can be provided by cross-checks:

> *"Crosschecks involve comparing estimates of the rate of return against other relevant information sources. They may provide a sense check on whether the calculated estimates appear reasonable and consistent with other sources of information. They can also provide additional information in situations where regulatory judgement may be required.*
>
> *We can apply crosschecks at the overall rate of return level, at the return on equity level and at individual levels within the return on equity (for example, risk-free rate and MRP)."*

14. Ofwat does consider *public-company* Market-to-Asset-Ratios (**MARs**) as a cross-check. However, Ofwat excludes *private-company* MARs, thereby excluding most of the relevant evidence. Significantly, this means Ofwat omits private-company MAR transactions for the water companies it regulates via price controls, including Pennon's acquisition of Bristol Water for a 44% premium, contending that:

> *"While the MAR for private transactions may be affected by a range of distorting factors such as the 'winner's curse' and/or control premia, this is less evidently true for the stock market transactions data that we consider should form the mainstay of MAR analysis."*

15. If Ofwat excludes private-company MARs from the PR24 process, it would signal an inconsistency with Ofwat's PR19 view, when private-company MARs were included, such as the 15% premium for Affinity Water.

16. The UKRN's cost of capital guidance (2022) does not pass a value judgement on the insights to be derived from public-company and private-company MAR transactions and makes explicit mention of Pennon's acquisition of Bristol Water (see footnote 55) as an example of an instance in which MAR evidence can be observed.

17. It would be helpful if the reasoning behind Ofwat's PR24 WACC methodology could be re-considered or explained further. For example:

- Are transaction (and bid) prices from private-company-investors irrelevant because those investors are irrationally exuberant?
- If private-company-investors are irrationally exuberant, should Ofwat still use this information (ie should an auctioneer accept bids it does not understand)?
- If 'the winner's curse' applies only to winning-bid-prices, could Ofwat use losing-bid-prices?

- If private-company transactions have no control premia (eg when a controlling proportion is not bought/sold) could Ofwat include these?

18. Ofwat uses a MAR technique which is almost identical to the one used by Ofgem's Electricity Distribution Draft Determination (June 2022). However, Ofwat arrives at a different conclusion from Ofgem, due to the following two disparities.

19. First, Ofgem *includes* private-company MARs, such as Pennon's acquisition of Bristol Water, whereas Ofwat *excludes* private-company MARs from Table A2.1. This has the effect of increasing Ofwat's MAR-implied cost of equity compared to Ofgem's.

20. Second, Ofwat assumes that outperformance in perpetuity is consistent with CAPM, whereas Ofgem does not do this.[2] Consequently, Ofwat derives "…an overall MARs-implied cost of equity range of 3.1% to 5.1%... [which] envelops [Ofwat's] CAPM range… of 3.7% to 4.6%..." However, Ofwat's comparison between these equity ranges is not a valid like-for-like comparison. One range (the MAR-implied cost of equity range from 3.1% to 5.1%) assumes perpetual Returns on Regulatory Equity (**RoRE)** outperformance between zero and 2%, suggesting that the price control is *not a 'fair bet'* going forward. By contrast, the other range (Ofwat's CAPM implied cost of equity range from 3.7% to 4.6%) *should be a 'fair bet'*, where the top and bottom of the range are equally plausible values. Essentially, Ofwat appears to be comparing a fair bet with an unfair bet. Assuming our analysis is correct, this poses several questions:

- Is Ofwat's CAPM range equally plausible at the high and low ends?
- Is Ofwat's assumption for perpetual RoRE outperformance a 'fair bet' scenario going forward or is it a historical scenario?
- Is Ofwat trying to set 'fair bet' zero-perpetual RoRE price controls from PR24 onwards or is it intentionally embedding outperformance going forward?

21. Ofwat's methodology arguably strains the input values for the CAPM-implied cost of equity and the MAR-implied cost of equity, to result in output values that are consistent with each other. If this is the case, Ofwat's MAR-implied cost of equity may not provide a valid, truly independent cross-check.

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[2] The distinction between Ofwat's analysis and Ofgem's analysis is important. First, Ofgem took a very different view than Ofwat, explicitly recognising that the cost of equity allowance should reflect any expected outperformance (ie, the so-called 'outperformance wedge'). Second, Ofgem conducts a 'what if' analysis, using expected outperformance assumptions to derive a cost of equity: Ofgem did not assume outperformance in perpetuity is consistent with CAPM, as Ofwat has done.

22. In December 2019, Ofwat's allowed return on capital of 2.92% for the previous price control review (CPIH-real, 'wholesale controls') was accepted without dispute by most water companies. However, by December 2022, Ofwat's early view on the allowed return on capital was 3.23% (CPIH-real, 'wholesale controls'); an increase of approximately 11%. However, if MAR evidence suggests that investors are signalling that returns are high enough already, an increase of this magnitude in the allowed return on capital looks unwarranted. On a like-for-like basis (eg 60% notional gearing for equity investors), Ofwat is increasing allowed returns for both debt **and** equity investors. We agree with Ofwat that the WACC and the allowed return should change over time, but the main objective should be setting the right allowance which does not mean an increase is necessary after costs increase.

23. In our opinion, an increased use of cross-checks will benefit Ofwat and the PR24 WACC given:

    - BEIS' desire for harmonisation among UK regulators;
    - the common objectives between UK regulators;
    - the readily available cross-check evidence; and
    - the Competition and Market Authority's (**CMA's**) view, in the RIIO-GD&T2 appeals, that cross-checks were not wrong.

24. In addition, using cross-checks is not necessarily an onerous task. For example, Ofgem published multiple cross-checks, as follows:

    - Modigliani-Miller cost of equity
    - MAR-implied cost of equity (from private-company transactions)
    - OFTO implied Internal Rate of Return (**IRR**) or costs of equity
    - Investment managers' cost of equity
    - Infrastructure fund implied equity IRR

25. Moreover, Ofwat should consider adding two more cross-checks,[3] as follows.

26. First, Ofwat could estimate the 'pure CAPM-WACC' as per the UKRN Study 2018. This cross-check could also be calculated as a time-weighted average to account for embedded (eg debt) capital over time. The benefit of this cross-check is that few

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[3] Please contact us if you would like more information on cross-checks or would like to know more about new or existing cross-checks: we do not provide detailed analysis or results for new cross-checks as it falls outside our project scope.

assumptions are required for debt costs, optimal gearing levels, or tax, giving benefits over Ofwat's WACC allowance.

27. Second, Ofwat could compare its WACC allowance from both a methodology and results standpoint with other regulators internationally. These comparisons can be particularly useful when regulators have similar tasks and objectives and regulate similar businesses. The AER has, for example, considered international approaches to regulated rates of return to highlight differences and similarities in methodologies.

Debt and 'financing': our review

Were Ofwat's allowances for debt (and financing) too high in the past?

28. Water companies received ~£2 billion in 'financing'[4] rewards for the 7 years ending March 2022.[5] This ~£2 billion dominates the incentive landscape in the water-sector (see Figure 3). By contrast, other incentives ('Expenditure'[6] and 'ODIs & Other'[7]) resulted in *penalties* rather than *rewards*.

Figure 3: Water-sector rewards (+) and penalties (-) for the 7 years ending March 2022
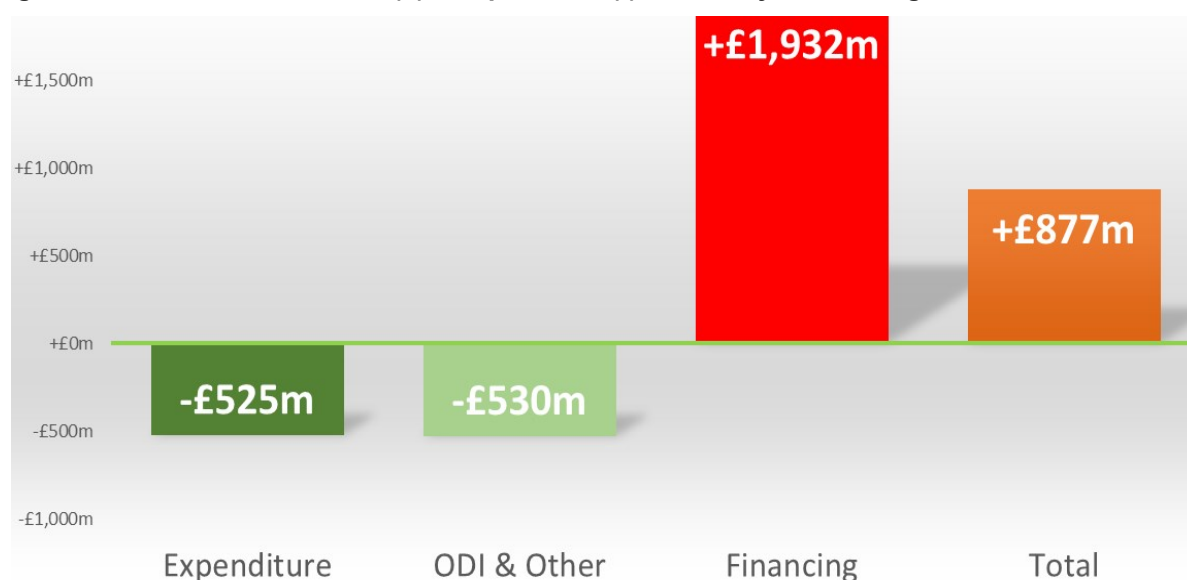
Source: MCC's analysis of CCW data and water companies' APRs for AMP 6 (5 years ending March 2020) and AMP 7 (2 years ending March 2022), using notional equity values.

29. The values above can be broken down per water company as shown in Figure 4.

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[4] See APRs, Table 1F, rows 4 to 8 inclusive. We use the term 'financing' to align with the APRs, although it is probably not the best term to use. This 'financing' category reflects: 1) gearing benefits sharing; 2) variance in corporation tax; 3) group relief; 4) cost of debt; and 5) hedging instruments. Values reflect notional equity levels not actual equity levels, ie values do not reflect the difference between notional gearing and actual gearing aside from the 'gearing benefit sharing'.

[5] This £2 billion figure reflects data from CCW and APR Table 1F. However, we see a material difference between Table 1F and Table 4H of the APRs. For example, Hafren Dyfrdwy report 'financing out/(under) performance' of 0.21% in Table 4H but a much larger value within Table 1F, section B 'financing' of 5.82% (of which 2.99% is attributed to corporation tax). Therefore, we suggest that water companies show the mathematical difference between Table 1F and Table 4H. Wessex Water says that 4H differs from 1F because "…we use the Fisher equation to calculate the allowed nominal interest rate": which is helpful but unfortunately does not let us fully understand the exact mathematical difference between Table 4H and Table 1F, or the breakdown of financing rewards of ~£2 billion for the water industry. These are very important points of detail with large amounts of money at stake – please contact us if you would like to explore this point in more detail; we would very much welcome it.

[6] Companies are rewarded for spending less than Ofwat's allowances (also known as a 'totex incentive').

[7] Incentives included here include 'C-mex','D-mex', and Retail.

Figure 4: Water company rewards (+) and penalties (-) for the 7 years ending March 2022

	Expenditure	ODI & Other	Financing	Total
Severn Trent	£ +73m	£ +253m	£ +381m	£ +707m
South West	£ +208m	£ +10m	£ +240m	£ +458m
United Utilities	£ -236m	£ +69m	£ +687m	£ +520m
Wessex	£ +69m	£ +28m	£ +151m	£ +248m
Anglian	£ +147m	£ +51m	£ -54m	£ +144m
Northumbrian	£ +60m	£ -41m	£ +82m	£ +101m
South East	£ +18m	£ -8m	£ -15m	£ -5m
South Staffs	£ +3m	£ +4m	£ -5m	£ +3m
Hafren Dyfrdwy	£ -5m	£ -2m	£ +4m	£ -3m
Portsmouth	£ -2m	£ -4m	£ -6m	£ -12m
SES Water	£ -6m	£ -7m	£ -1m	£ -13m
Bristol	£ +2m	£ -10m	£ +1m	£ -7m
Affinity	£ -16m	£ -39m	£ -9m	£ -64m
Yorkshire	£ -145m	£ +14m	£ -94m	£ -226m
Southern	£ -190m	£ -278m	£ +113m	£ -356m
Dŵr Cymru Welsh Water	£ -111m	£ -71m	£ -13m	£ -195m
Thames	£ -393m	£ -499m	£ +470m	£ -422m
	£ -525m	£ -530m	£ +1,932m	£ +877m

Source: MCC's analysis of CCW data and water companies' APRs for AMP 6 (5 years ending March 2020) and AMP 7 (2 years ending March 2022), using notional equity values.

30. Following our review of these sources, we make the following three important observations.

31. First, aside from 'financing', Ofwat appears to have set challenging targets from a sector standpoint.

32. Second, it is more useful, in our view, to state rewards in monetary terms (£ millions), rather than in notional equity percentage terms (% of notional equity, ie RoRE). For example, the impact of United Utilities' financing performance (+£687 million) is considerably greater than Bristol's (+£1 million). It is much easier to 'follow the money' than 'follow the RoRE %s.'

33. Third, the largest water companies report the largest 'financing' rewards (eg United Utilities, Thames, and Severn Trent). As such, when evaluating sector-wide policies, it can be misleading to equally weight each company. By reporting a simple average of RoRE values[8] rather than a weighted average RoRE, Ofwat materially understates the monetary value of 'financing' performance, because the large companies have materially outperformed.

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[8] See, for example, the RoRE tab in Ofwat's Monitoring Financial Resilience file here:
https://www.ofwat.gov.uk/wp-content/uploads/2022/12/MFR_2021-22_Data.xlsx

Figure 5: A breakdown of water company rewards and penalties
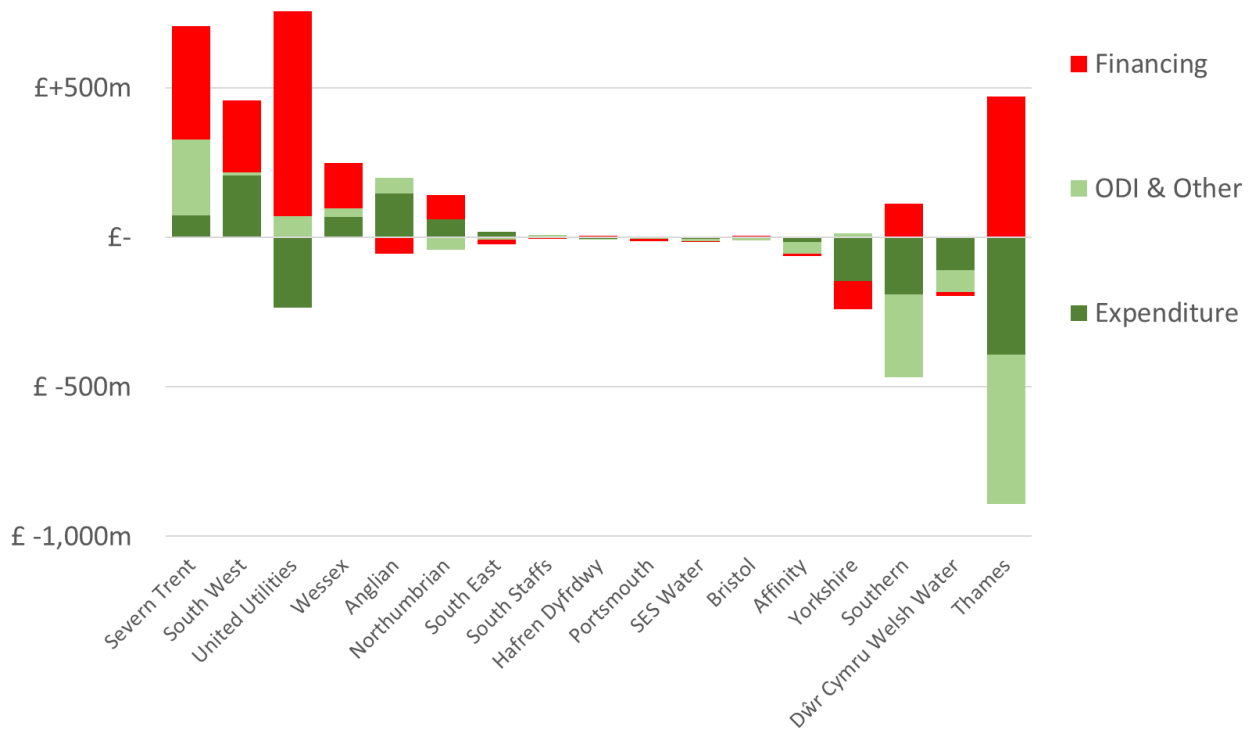
Source: MCC's analysis of CCW data and water companies' APRs.

Could Ofwat's assumption for gearing be lower than 55%?

34. Ofwat is understandably motivated to reduce notional gearing (from 60% at PR19 to 55% for PR24), given CMA's PR19 sympathy to the argument that financial ratios should be remedied by higher allowed returns.[9] We support Ofwat's proposal (see Ofwat's Appendix 10) to reduce notional gearing to avoid any (alleged or perceived) financeability constraint when setting a fair (market-led) return. Accordingly, we note three reasons below why notional gearing could be lower than Ofwat's 'early view' of 55%.

Reason 1: High Regulatory Capital Value (RCV) growth

35. We agree with Ofwat that high inflation means the RCV grows faster than sector debt balances.[10] Further, real RCV growth could easily be funded by equity if returns are attractive, taking advantage of equity demand and avoiding higher debt costs. Ofwat's cost of debt model suggests water-sector debt values from £47 billion (no new debt) to £64 billion (fully refinancing existing debt) by March 2028. If we see 7% RCV growth per year on average from Ofwat's 2022 value of £80 billion, due to high inflation and large investment programmes, the RCV would reach £120 billion. Therefore, water-sector-gearing from 40% (47/120) to 53% (64/120) by March 2028 is plausible.[11]

Reason 2: 50% notional gearing is very defensible (at CMA)

36. We agree with Ofwat that previous price controls PR94 and PR99 are relevant considerations: both had 50% gearing assumptions (see Ofwat's Figure 4.2). Accordingly, those previous price controls helped guide prudent (if not actual) treasury policies and debt raising at the time. Further, we note that water-sector-gearing declined by 5% in a short 2-year period from 2020 to 2022 (see Ofwat's Figure 4.3), which suggests that a 10% fall is achievable over a 5-year period. Relatedly, high inflation during 2022 and 2023 will continue to put downward pressure on water-sector-gearing levels for both notional and actual companies. In any case, Ofwat could double-down on the argument that the notional company is independent from actual companies: if

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[9] MCC's view is that CMA's sympathy in PR19 is very wrong (for a whole host of reasons) but we resist the temptation to explain our view in this report, as it falls outside our scope. Please contact us if you would like further information on this point.

[10] Everyone agrees that the RCV is only partially funded by debt and that only a proportion of that debt is inflation-linked. For gearing to remain constant over a range of inflation scenarios: 1) 100% of the RCV would need to be financed with debt; and 2) 100% of that debt would need to be inflation-linked.

[11] For simplicity we ignore cash balances and positive MAR values, both of which could reduce gearing further.

actual companies have higher gearing, or struggle to reduce gearing levels, this is a secondary issue (at best).

Reason 3: MAR evidence suggests a 10% reduction

37. A long-term MAR of 1.1 (see Ofwat's Figure 3.7) suggests gearing should be 10% lower, absent other corrections to equity returns. The 10% reduction should be from the actual company gearing levels (eg Ofwat uses a range of 51% to 55% for listed comparator gearing) to the new notional level of gearing (eg 50%), not from the old gearing assumption (60%) to a new gearing assumption (eg 55%). Note that the MAR of 1.1 is a long-term number and that Ofwat's 'early view' for PR24 provides higher equity returns than its previous PR19 view (on a like-for-like gearing basis). Therefore, the market should continue to believe that MAR is positive, and that market-led-gearing is lower than observed gearing (ie lower than 51% or 55%). The same logic applies to private-company MARs and private-company market levels of gearing.

Could Ofwat's assumption for inflation-linked-debt be higher than 33%?

38. We note two reasons that Ofwat's inflation-linked-debt-assumption could be higher than Ofwat's 'early view' of 33%.

Reason 1: The actual inflation-linked-debt-proportion is higher and increasing

39. Ofwat's debt model suggests that inflation-linkage is already higher than 33% (see Figure 6 below). By assuming 33% Ofwat's financeability assessments are unduly pessimistic: from a cash-flow perspective, debt interest costs are actually lower in reality than Ofwat assumes.

Figure 6: The actual inflation-linked-debt-proportion is higher than 33% and increasing
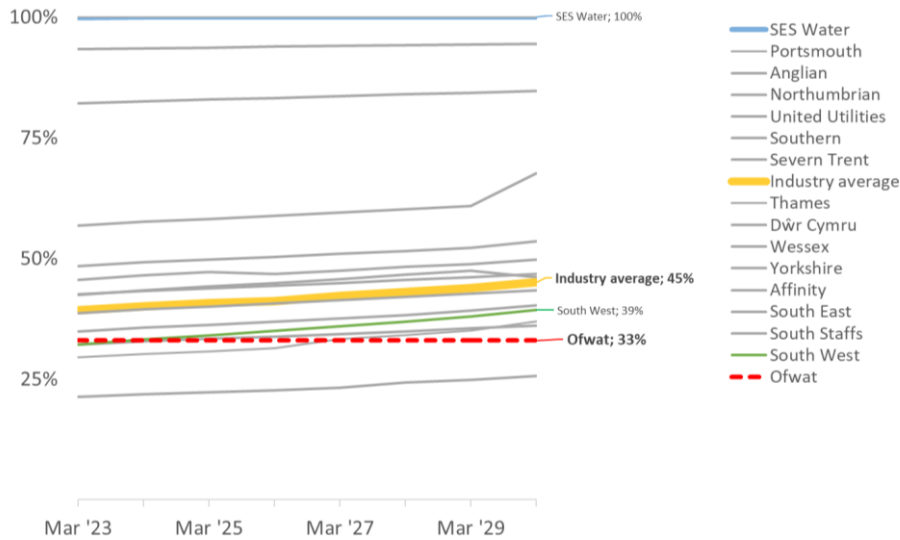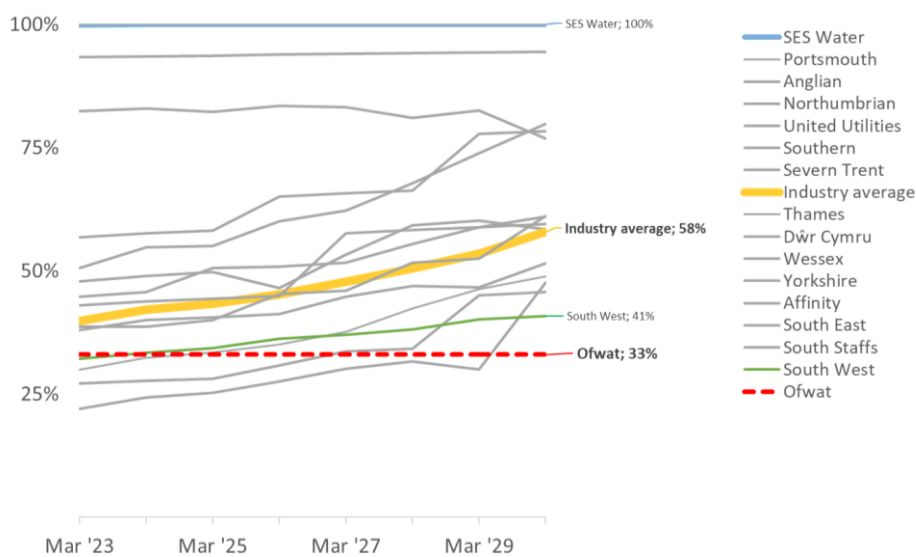

Source: MCC's analysis, Ofwat's cost of debt model excluding swaps (which increase these values further).

40. Or, if we include swaps, we find that the index-linked-proportion is closer to 60%.

Reason 2: Refinancing may increase the inflation-linked-debt-proportion

41. Further, Ofwat does not know how much debt or what type of debt will be taken by water companies in the future. This uncertainty means that water companies could use more inflation-linkage in the future, or not refinance fixed-rate bonds at all, in which case the proportion of inflation-linkage could increase towards 60%, much higher than Ofwat's 33% assumption, as shown in Figure 7 below.

**Figure 7: Refinancing may increase the inflation-linked-debt-proportion towards 60%**

Could Ofwat's debt allowance be lower than 2.6%?

42. We note eight signals that the true cost of debt is lower than Ofwat's 'early view' of 2.6% (real).

Signal 1: Could Ofwat re-consider its own debt evidence?

43. Ofwat's 'embedded debt' value of 4.38% (nominal) is at the high-end of the evidence in Ofwat's Table 4.3 and Table 4.5 as shown in Figure 8 below. We agree with Ofwat's observation that "…[Ofwat's] point estimate of 4.40% (sic) sits within, but towards the upper end of this cross-check…".

Figure 8: Most of Ofwat's 'embedded debt' values are lower than its 'early view'
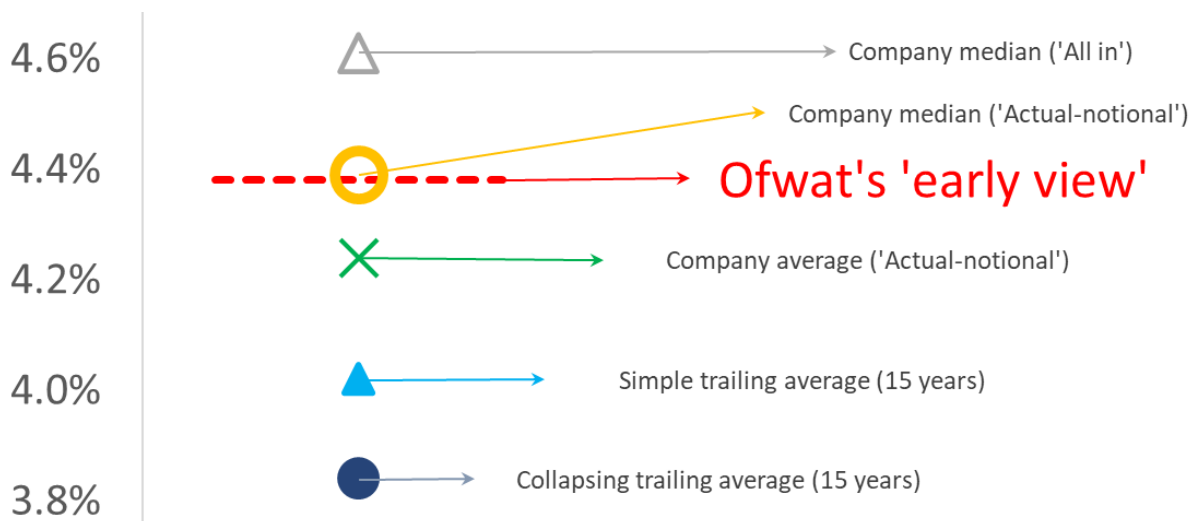
Source: MCC's analysis, Ofwat's December 2022 'final' methodology.

Signal 2: Could Ofwat review debt model calculations?

44. In the 'PR24 balance sheet cost of debt model', Ofwat adjusted the outstanding balances of CPI/RPI linked embedded debt to factor in the amortisation and accretion during the 3-year period from 31 March 2022 to the start of AMP8. For some instruments we see a material difference between Ofwat's forecasted debt balances and the water company's forecasted debt balances, thus indicating that Ofwat's methodology may be incorrect, or, inconsistent with water company forecasts. For example, an investor report published by Southern Water in March 2022, shows a European Investment Bank loan is forecasted to have an outstanding balance of £14.3 million[12], whereas Ofwat's

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[12] Investor Report and Compliance Certificate, SWS Financing Group, (published 31 March 2022).

methodology in the cost of debt model forecasts that the loan balance will be significantly higher at £62.12 million (instrument IDs SRN30 and SRN31).

Signal 3: Could Ofwat re-consider its tenor assumptions?

45. Bonds with shorter tenors (eg 10 years to maturity rather than 20 years) tend to have a lower cost. Ofwat recognises this, without fully adjusting for it. By way of explanation, Ofwat states that 60 bonds have an average tenor at issuance of 15.5 years. Table 4.6 then suggests a downward adjustment of 37bps, but instead Ofwat applies a "conservative adjustment of 15bps". In addition, Ofwat takes the view that the benchmark index (iBoxx A/BBB) tends to have a "…weighted-average years-to-maturity closer to 20 years". So, Ofwat's debt allowance assumes a longer tenor than the underlying debt costs. Further, Ofwat's equity allowance also assumes a longer tenor of 20 years for the risk-free-rate. **We *are not* saying** that tenors should be perfectly consistent within the CAPM. By contrast, **we *are* only observing** that Ofwat could be braver (eg adjust by 37bps) because Ofwat's own RFR already embeds a tenor premia.

Signal 4: Could Ofwat use short-term capital costs?

46. Short-term capital sources (eg working capital facilities, revolving credit facilities (**RCFs**), overdrafts, etc.) are a sizeable source (approximately 1.5%[13]) of actual company financing arrangements at the start of PR24 and materially cheaper (approximately 2.62%[14] in nominal terms). Notwithstanding this, Ofwat does not seem to have accounted for them in the PR24 WACC allowance 'early view'. Although, excluding short-term capital costs is common practice by most regulators, we think that they should still be considered for the above reasons.

Signal 5: Could Ofwat re-consider the proportion of 'new debt'?

47. Ofwat assumes that 'new debt' (5.49%) will be more expensive than 'embedded debt' (4.38%) and assumes a weighting of 17%:83% between 'new debt' and 'embedded debt'. This creates a risk that Ofwat's assumed proportion of 'new debt' (17%) is too high. MCC's analysis of the 2022 APR Table 4B debt instruments data in PR24 balance sheet cost of debt model indicates that '% new debt – year average' value is actually

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[13] MCC's analysis on PR24 balance sheet Cost of Debt model by including senior 'RCF/overdraft/liquidity' instruments; total principal outstanding (industry) = £63.97 billion against Ofwat's base case of £63.02 billion.
[14] Principal outstanding (RCF/overdraft/liquidity) = £955 million and interest cost = £25 million.

lower (approximately 15.3%)[15] than Ofwat's calculated value of 16.7% (which Ofwat rounds up to 17%).

Signal 6: Could Ofwat use a market-led inflation assumption?

48. Ofwat assumes 2% for inflation even though other data can be used to support a much larger value (a larger inflation assumption would reduce the debt allowance). As per Ofwat's analysis, the 'inflation swap' data suggests a CPI of 3.31% for a 15-year tenor (see Figure 3.1). The 'official forecast' approach suggests CPI of 2.78% for a 15-year CPI (see Figure 3.2). The difference between nominal gilts and real gilts ('breakeven inflation') should also be considered – real gilts will reflect CPIH expectations from 2030 onwards. The UKRN consultation in 2022 provides enough flexibility for Ofwat to use a larger inflation assumption, saying "…an alternative [to the Bank of England's target] might be preferable…".

Signal 7: Could Ofwat re-consider its inflation wedge assumption(s)?

49. Ofwat observed that, for a 20-year horizon, both 'Official forecasts' and 'Inflation swaps' produce a long-term wedge estimate in the range of 0.52% to 0.55%. However, Ofwat then uses a much larger RPI-wedge of 0.9% in its debt model (see cells C5 & C6 in the inputs worksheet). It is inconsistent, and in our view inappropriate, for Ofwat to use an historic wedge of 0.9% rather than the market-led forecast wedge of approximately 0.5%. Our analysis suggests that a long-term RPI-wedge of 0.5%, rather than 0.9% in the 'PR24 balance sheet cost of debt model', **would reduce the nominal cost of embedded debt by 14bps**.

Signal 8: Could Ofwat re-consider its re-financing assumptions?

50. Ofwat assumes that debt falling due before the end of the PR24 control period (2025-30) is refinanced at a rate equivalent to the new debt assumption. This methodology is based on two rather generous assumptions, namely water companies will refinance all the debt falling due before 2030 and all such refinancing during the 8-year period (1 April 2022 to 31 March 2030) will take place at a rate of 5.34% (except floating rate debt). We urge Ofwat to revisit this, as the allowance for embedded debt is highly sensitive to such refinancing assumptions. According to our analysis, by assuming no

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[15] MCC's analysis is based on total embedded debt at the start of PR24 at £63 billion (consistent with PR24 Balance sheet CoD model), total refinancing and accretion of debt at £18.7 million and £3.5 million respectively, and total 'RCV new debt' at £4.4 million (consistent with Ofwat) during a 5-year period.

refinancing of existing debt in the 'PR24 balance sheet cost of debt model', the weighted average cost of embedded debt for the industry **would reduce by 16bps**.

Risk-free-rate (RFR): our review

Could Ofwat's RFR assumption be lower than 0.47%?

51. We note four signals that the true RFR is lower than Ofwat's 'early view' of 0.47% (real).

Signal 1: Could Ofwat use a larger sample of data?

52. In the December 2022 'final' methodology, Ofwat proposes using a 1-month trailing average for their RFR assumption. By contrast, Ofwat proposed a lengthier period of 6 to 12 months in its July 2022 draft methodology. When rates are rising, a 1-month trailing average will be more generous than 6 to 12 months. By way of comparison, most other regulators, including Ofgem,[16] use more data (see Figure 9 below).[17] For example, CMA used a 6-month average in the PR19 re-determinations, while the UKRN 2022 guidance refers to 1-month, 6-month, or 12-month periods, which suggests that a 1-month period would be the very smallest sample.

Figure 9: For the RFR, Ofwat uses less data than other regulators
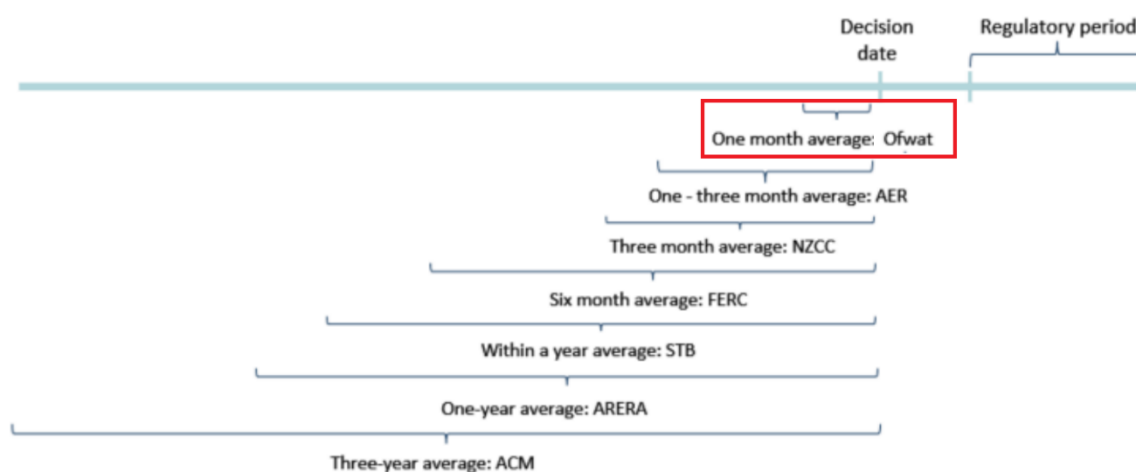
Source: MCC's analysis, adapted from Brattle's 2020 report "A Review of International Approaches to Regulated Rates of Return", page 43.

Signal 2: Could Ofwat use consistent tenor (or horizon) assumptions?

53. For RFR, Ofwat proposes a 20-year tenor, which will give higher RFR values than a 10-year or 15-year tenor. Although 20 years is in-line with UKRN guidance (2022), it suggests that this length of tenor would be at the top end by saying "...maturities of 10 to 20 years are likely to be suitable for most sectors". The difference between 10-year

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[16] Ofgem uses one month each year, which is 5 months of data over a 5-year period.
[17] In other words, other regulators use a longer-period-of-data or a larger-sample-of-data.

and 20-year tenors has been approximately 0.3% as shown in Figure 10 below. By contrast, Ofwat used a 15-year tenor in its PR19 Final Determinations.

Figure 10: Ofwat's 20-year ILG gives a larger RFR than a 10-year Index-Linked-Gilt (ILG)

Source: MCC's analysis, Bank of England.

54. Notwithstanding the above, we are not suggesting that a 10-year RFR tenor should have been chosen over the 20-year RFR tenor. The primary issue, in our view, is consistency across all WACC parameters, insofar as possible. The UKRN report (2018) recommended a consistent horizon for all CAPM parameters, whereas the tenors used by Ofwat have varied between parameters. For example, "…approximately 15 years" for debt evidence, "…2 and 5 year trailing averages of the 5 year and 10 year betas" for beta evidence, and "…10 and 20 year holding periods" for TMR evidence.

Signal 3: Would equity indexation increase consumer risk?

55. In 2021, PwC advised Ofwat that equity indexation shifts "…risks to customers" and that "Investors may value this decrease in risk…", concluding that there is a "negative impact" on water customers. However, Ofwat has not yet finalised its position on indexation, stating that it "…may need to revisit the option of indexation". As such, it is unclear whether Ofwat would, if indexation is applied, also reduce its equity beta assumption. A further concern, if Ofwat decides to introduce equity indexation at Draft or Final Determinations for PR24, is the limited timeframe that would be accorded for stakeholder engagement on such a material element of PR24 and the consequent negative impact on regulatory predictability and stability.

Signal 4: Could Ofwat publish SONIA-derived RFR evidence?

56. Ofwat's RFR estimation method relies on ILGs plus an upwards adjustment for the RPI-CPIH wedge (see Ofwat's Figure 3.3 and Table 3.4). However, SONIA swaps, adjusted by CPI swaps to account for inflation expectations, suggest materially lower RFR estimates (as shown in Figure 11 below).

Figure 11: Ofwat's (ILG-derived) RFR is higher than a market-led (SONIA-derived) RFR
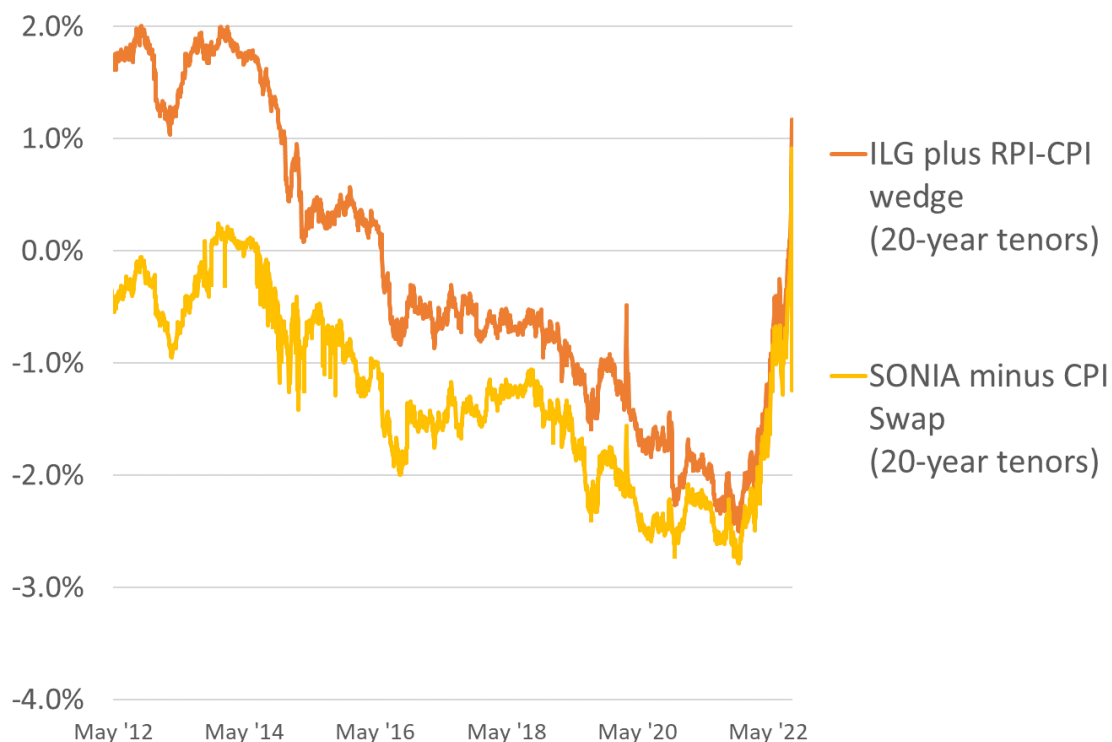
Source: MCC's analysis, Bank of England, SONIA and swap rates.

57. Ofwat recognises (see page 13) that the Bank of England describes SONIA as 'nearly risk-free', but has chosen not to use SONIA evidence in its RFR assumption. Ofwat's rationale for omitting SONIA evidence (because "…the recent environment of high inflation complicates inferences which can be drawn from SONIA...") does not appear strong or future-proof. It would be helpful if Ofwat published estimates of SONIA-derived RFR, using CPI swaps to account for inflation expectations.

Total Market Return (TMR): our review

Could Ofwat's TMR assumption be lower than 6.46%?

58. We note eight signals that the true TMR is lower than Ofwat's early view of 6.46% (real, mid-point of Ofwat's 6% to 6.92% range).

Signal 1: Could Ofwat re-consider its own TMR evidence?

59. Ofwat's TMR range of 6.00% to 6.92% is at the higher-end of the evidence in Ofwat's Table 3.13 and Table 3.14 (see Figure 12 below).

Figure 12: Most of Ofwat's TMR values are closer to 6% than 7%
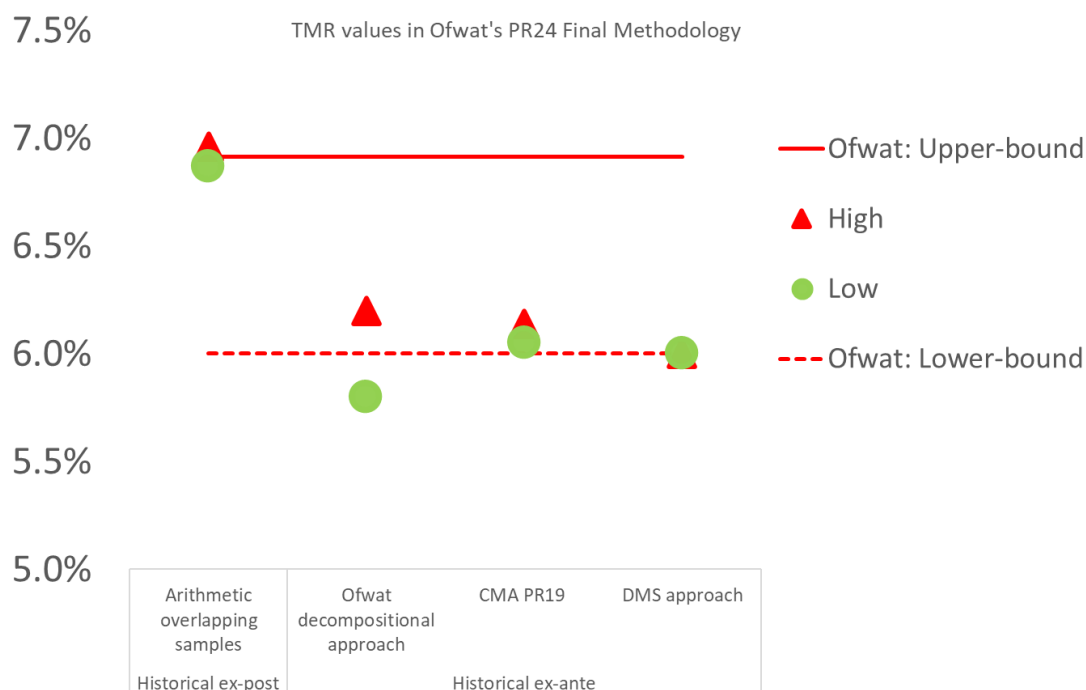
Source: MCC's analysis, Ofwat's December 2022 'final' methodology.

Signal 2: Could Ofwat re-consider the CPIH back-cast?

60. Ofwat adopts the CPIH back-cast, which was published by the Office for National Statistics (**ONS**) in May 2022 resulting in ~0.25% upward pressure on Ofwat's TMR assumption. Arguably, the CPIH back-cast is far from the optimal measure of inflation. In principle, the best inflation measure for one period is not necessarily the best inflation measure for another period (eg CPIH may be best for future periods, but RPI may be best for historical periods); a view which has been taken by other regulators. For example, Ofgem, in its Final Determinations for Electricity Distribution (December 2022 paragraph 3.43), did not adopt the CPIH back-cast on the basis that it was not necessarily a reliable estimate of inflation for the period 1950 to 1988. Adopting a

different inflation measure could have the effect of reducing Ofwat's TMR by ~0.25%, all else being equal. If ED2 licensees do not appeal Ofgem's decision, or if an appeal fails, Ofwat would have a good case for avoiding the CPIH back-cast, and for reducing its TMR estimate by ~0.25%.

Signal 3: Could Ofwat publish 'forward-looking'[18] evidence?

61. Ofwat elects not to estimate or utilise forward-looking evidence. However, the TMR is strictly a forward-looking value in the CAPM. Further, the UKRN consultation (2022) says "TMR is typically derived from three approaches", one of which is forward-looking. Accordingly, the CMA and Ofgem use forward-looking TMR evidence: both CMA and Ofgem show that forward-looking evidence suggests materially lower TMR assumptions.

Signal 4: Could Ofwat include 'non-overlapping' estimates?

62. Ofwat excludes 'non-overlapping' estimates, which suggest a lower TMR compared with overlapping estimates. We agree with Ofwat that CMA's results were counterintuitive (see footnote 48) because non-overlapping estimates were, at that time, higher than overlapping estimates. However, Ofwat's own analysis (see Table 3.6) shows that 'non-overlapping estimates' were, for the period to 2021, lower than overlapping estimates. In principle, it is preferable to use non-overlapping evidence, as it avoids misleading / unintentional / unjustified weighting towards certain periods of time (the same issue of over-weighting certain periods is discussed in the beta section below).

Signal 5: Could Ofwat avoid the apparent error on arithmetic returns?

63. Ofwat's TMR analysis on arithmetic returns (see Table 3.6) does not seem to follow CMA's arithmetic formulae, as shown in both the Northern Ireland Electricity (**NIE**) case (2014) and the Errata CMA published in 2023 for the NATS case. This is likely a consequence of CMA's non-transparent approach in the final PR19 Final Determinations, which Ofwat has evidently attempted to follow. As a result, we believe that the TMR has been over-estimated.

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[18] The term 'forward-looking' is probably an unhelpful misnomer which has led to an unhelpful confusion, which we are happy to discuss further upon request.

Signal 6: Could Ofwat include Barclays' data?

64. Arguably, Ofwat should consider Barclays' (Equity Gilt Study) data, which gives materially lower results than the (Dimson Marsh Stuanton, **DMS**) data used by Ofwat, based on the Competition Commission's (**CC's**) analysis in the NIE case (2014).

Signal 7: Could Ofwat re-consider Market Risk Premium (MRP) analysis?

65. Ofwat assumes that the TMR is more stable than the MRP, notwithstanding that most regulators internationally take the opposite view, ie that the MRP is more stable than the TMR. Unfortunately, there is currently very little discussion or evidence to favour one approach over the other, with some critics suggesting that UK regulators tend to suffer from groupthink on this matter.

66. The UKRN consultation (2022) states that "Regulators should estimate the equity risk premium (ERP) within the CAPM as the difference between the total market return (TMR) and the risk-free rate (RFR)". However, clarity is needed as to what this means: for example, one reading of it could suggest that Ofwat's methodology is upwards biased; it could suggest that regulators estimate ERP directly. To further confuse matters, Ofwat (and the UKRN consultation) use the term ERP to mean the MRP (as defined by investopedia.com). The terms ERP and MRP should not be confused or used inter-changeably, because they mean very different things.

Signal 8: Could Ofwat consider CMA's (and other) TMR errors?

67. The CMA has the capacity to fully re-determine Ofwat's PR24 decisions, and as such, it is possible that Ofwat will attempt to anticipate or replicate the CMA's *future* decisions by, for example, an over-reliance on CMA's *previous* decisions. Ofwat must therefore be aware of errors contained in those previous CMA cases (eg NATS and PR19) to ensure that they are not repeated for PR24. We focus on PR19 errors below.

68. Ofwat should not replicate the CMA's judgement-error of relying on 'non-overlapping' values (see para 9.333 here), especially when non-overlapping values exceed annual arithmetic averages. If arithmetic averages are upwards biased (as CMA itself noted at para 9.329 here), it is wrong to use even higher 'non-overlapping' values that suffer from small sample sizes. For the avoidance of doubt, **we *are not* saying** that 'non-overlapping' values: 1) should be discarded; or 2) are necessarily better than other evidence. By contrast, **we *are* saying** that 'non-overlapping' values should be appropriately considered and not: 1) unduly relied upon when they exceed arithmetic

averages which are already upwards biased for long-horizon returns; or 2) over-relied upon given the limited size of unique samples.

69. Ofwat does (thankfully) avoid CMA's logic-error of embedding inflation expectations within 'ex-post' methods (see PR19 Final Report Table 9-3 where CMA produces '**ex-post**' CED/CPI estimates which are actually adjusted for the **ex-ante** RPI-CPI wedge and quoted in "'RPI-real' terms"). However, Ofwat does appear to repeat another logic-error from CMA's PR19 report; the assumption that the same measure of inflation must be used for both historical and future periods when estimating ('ex-post') TMR. Ofwat says, on page 29, that "Using historical CPIH has the advantage of yielding an estimate of TMR for the CAPM in the correct price base". In our view, the CMA erred in its PR19 redeterminations by assuming that the same measure of inflation **must** be used for historical and future periods. Accordingly, we think it would also be incorrect for Ofwat to do so in PR24. Relatedly, the ONS (and, we suspect, investors) take the view that the best measure of inflation can, and does, change over time, ie the optimum inflation measure for the past (eg RPI or CPI) is not necessarily the best inflation measure for the future (eg CPIH). Not only **is it correct** to adjust historical data using one measure of inflation and future data with another, but it is necessary, because: 1) the best measure changes; and 2) the measures themselves change over time. Evidently, RPI is a very different measure of inflation today (in 2023) than it has been previously (eg in 1993) and it will be very different again in the future (eg in 2033). The 'correct' adjustment for inflation does not mean we need to use the same measure (RPI, CPI, or CPIH) for both historical and future periods.

70. For example, RPI may be the best measure of inflation for certain historical periods (eg if it is the only measure it must by definition be both the best and the worst)[19,] but it is clear that RPI is not the best measure for other periods (eg from 2010 the formulae effect was most prominent). By contrast, it would be erroneous for Ofwat to believe that a constant measure (eg RPI or CPIH) is consistent over time. For example, RPI will, from 2030 onwards, no longer exist in its current form – instead, CPIH data and methods will be used. Thus, it would be incorrect for Ofwat to assume that the best measure going forward (eg CPIH) is also the best measure for the past. Similarly, it was incorrect for the CMA, in Table 9-3 of its PR19 Final Report,[20] to assume it could improve the

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[19] The following phrase springs to mind here "If you ain't first, you're last" from Talladega Nights, Reece Bobby, Ricky Bobby's daddy. Although, strictly, Mr Reece Bobby was wrong: you can be both first and last in a one-horse or one-car race. Accordingly, any measure of inflation that happens to be the only method available for that period of time, is both the best and the worst.

[20] By contrast, the CMA did not make this mistake in Table 9-3 of its Provisional Findings Report.

quality of its analysis by adjusting ('ex-post') TMR into 'RPI terms'. Logically, ex-post values **should not** have an ex-ante element embedded, as the CMA has done by including the ex-ante RPI-CPI wedge.

71. Finally, Ofwat uses the term WACC in reference to the allowed return, despite the UKRN report (2018) recommending that regulators avoid this inaccuracy (recommendation 10). To avoid confusion, the phrase "WACC allowance" is better.

Equity beta: our review

Could Ofwat's Beta assumption be lower than 0.61?

72. We note four signals that the true beta is lower than Ofwat's 'early view' of 0.61 (the mid-point of Ofwat's 0.58 to 0.64 re-levered equity beta range).

Signal 1: Could Ofwat re-consider its own beta evidence?

73. Ofwat's re-levered equity beta range of 0.58 to 0.64 is at the very top end of Ofwat's own (Table 3.16) analysis, as shown in Figure 13.

Figure 13: Most of Ofwat's beta values fall below Ofwat's lower-bound
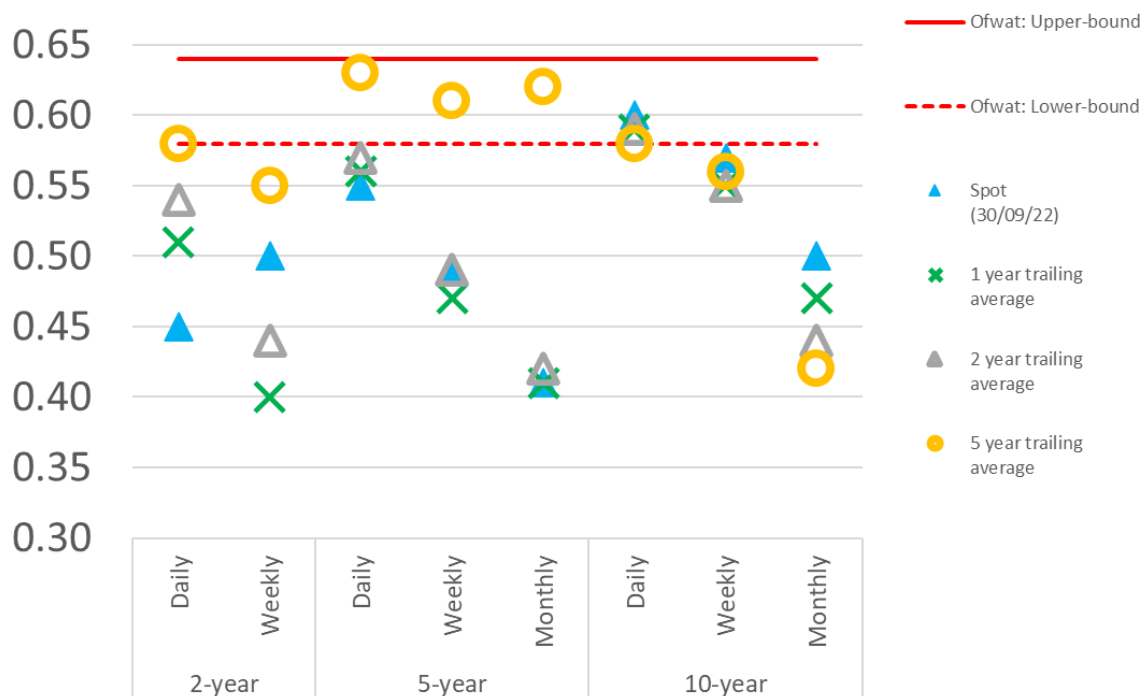
Source: MCC's analysis, Ofwat's PR24 'final' methodology (December 2022).

Signal 2: Could Ofwat publish results for other econometric techniques?

74. Ofwat could have followed the recommendation from the UKRN report (2018) to use advanced econometric techniques, such as GARCH, but appears not to have done so, instead relying on one technique, Ordinary Least Squares (**OLS**). By contrast, Ofwat's PR19 decision drew on GARCH estimates noting that GARCH reflects time-variation, unlike OLS.[21] Ofwat's PR24 beta advisors, FTI Consulting (**FTI**), do not produce GARCH estimates, because:

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[21] Ofwat's PR19 beta advisors, Europe Economics, also produced GARCH estimates (see Table 4.2).

" … we are primarily concerned with the point estimate obtained from the regression and less on its efficiency… the GARCH methodology is more focused on modelling variances and not on the coefficients of the CAPM, which need to be estimated from the variance equation. This increases the opaqueness of the results and the complexity of the process for little additional information".

75. We disagree with FTI's logic. In our opinion, it is incorrect to say that:

- GARCH is not designed to provide point estimates;
- GARCH only offers efficiency improvements;
- OLS does not model variances;
- GARCH is only designed to model variances;
- GARCH cannot estimate the coefficient of the CAPM; and
- GARCH offers little additional information.

76. Both OLS and GARCH provide us with estimates of covariances and variances; this is the mathematical underpinning of the CAPM beta:

$$\beta_i = \frac{\text{Cov}(r_i, r_m)}{\text{Var}(r_m)}$$

β_i = market beta of asset i

Cov = covariance

Var = variance

r_m = average expected rate of return on the market

r_i = expected return on an asset i

77. So, the question should not be whether to use OLS to estimate the CAPM beta or GARCH to estimate variances, but rather, how can we estimate beta? The answer is that there is more than one way. On this basis, we consider that, absent strong evidence to suggest that OLS is superior to GARCH and all other econometric techniques, it is preferable to use multiple techniques, rather than relying on just one, especially when each technique has its advantages (eg OLS is simple but GARCH accounts for time-variation).

78. For the avoidance of doubt, **we *are not* saying** that GARCH is necessarily superior to OLS. However, **we *are* saying** that:

- Importantly, GARCH has produced lower beta estimates than OLS, which tells us something about the true beta value, see Professor Robertson's beta estimates Europe Economics 5-year beta values and Ofgem's GARCH v OLS comparison. Note that GARCH does not always give lower beta estimates, but these three sources show that, when we take a large sample of data (eg 5 years or more) we see materially lower beta values from those GARCH estimates compared to OLS estimates. GARCH could give higher results than OLS if we used small samples of data, but that is irrelevant if we agree that large samples of pertinent data are readily available.

- GARCH accounts for time-variation, whereas OLS does not. Given the undisputed fact that data moves around over time, this must be a relevant factor.

- GARCH-type models, unlike OLS-type models, are often used to reflect conditional heteroskedasticity, the well-known feature exhibited in financial data and share prices.

- OLS may be unbiased, but overlapping OLS estimates will over-weight certain time-periods (as recognised by FTI).

- Excluding relevant techniques without a clear reconciliation of the differences between them or a rationale for the preferred technique could appear biased.

79. We suspect that Ofwat and FTI have been unduly influenced by the CMA's PR19 decision, which excluded GARCH beta estimates because " …we [the CMA's PR19 team] did not receive evidence that GARCH statistical calculations would materially improve our estimates versus traditional OLS methodology, and so we did not use this tool in our analysis". This rationale from the CMA is, we would argue, weak: no-one could persuade the CMA that one estimation technique is preferable to another, absent knowing the true value and absent a statistical comparison (eg r-squared or explanatory power), which neither the CMA nor Ofwat had readily available at that point. We suspect that time simply did not permit the CMA to conduct its own GARCH estimates – in which case, GARCH can offer benefits to Ofwat's evidence base.

Signal 3: Could Ofwat include Pennon data?

80. Ofwat excludes Pennon "Given the limited amount of unaffected data…". and because "…Pennon retained a significant amount of cash on its balance sheet". However, Pennon's cash balance does not impact on raw beta estimates; it only impacts on unlevered beta estimates. We believe that Ofwat could have estimated, and used,

Pennon's raw equity beta, regardless of the amount of cash retained. This approach makes us question:

- Whether Severn Trent and United Utilities would be excluded if there was a significant amount of cash on their balance sheets?

- Why was Pennon's **raw** equity beta (see Figure 14 below) excluded (raw betas are not impacted by cash balances)?

- Whether Ofwat is under-weighting recent beta evidence which shows a raw equity beta of 0.41 to 0.46 on average (see Figure 14 below)?

- Whether the creation of a 'composite' of United Utilities and Severn Trent is acceptable, given each will have their own gearing values and weighting issues?

Figure 14: Raw equity beta estimates can be materially lower than Ofwat's 0.58 to 0.64 range

Source: MCC's analysis.

Signal 4: Could Ofwat equally weight beta data over time?

81. Ofwat uses overlapping samples (see for example Table 3.18 where Ofwat shows 2-year, 5-year, and 10-year estimation windows and averages), which means that certain periods are over-weighted (as recognised by FTI). Ofwat says " …we use a narrow unlevered beta range of 0.26 to 0.29, noting that this is the range denoted by the 2 and 5 year trailing averages of the 5 year and 10 year betas". However, this range is selective: there is no principle for choosing 2-year and 5-year trailing averages of the 5-year and 10-year betas. We would like to understand Ofwat's rationale for this.

82. Ofwat's unlevered beta selection is in-line with FTI's advice " … our [FTI's] estimated unlevered beta range for informing an early view for PR24 is 0.26–0.29". We can show that this range is upwardly biased by making the following two points.

83. First, we make the principled point, that the same data and the same sample period of 10 years, can be used to justify an unlevered beta of 0.25 or 0.29, as follows:[22]

    - 0.25 is based on the 10-year daily data (OLS, equally-weighted-time-periods); or
    - 0.29 is based on the 5-year trailing average of 5-year daily data (OLS, over-weighted-time-periods).

84. Given that the exact same information can be used to give 0.29 or a materially lower 0.25, we should understand exactly why the values differ. It turns out that the lower value, 0.25, puts **equal weight** on each day in the **10-year period ending 30 September 2022**. By contrast, the higher value, 0.29, **over-weights the middle 5 years of the data**, without a good rationale for doing so, in our view. We therefore ask Ofwat to check if the overlapping data is being 'double-counted'. The OLS technique is not designed to deal with overlapping samples in this way.

85. FTI say:

    " …a balanced and pragmatic approach would be to implicitly place greater weight on unlevered beta estimates pertaining to longer term data points. We [FTI] achieve this outcome by primarily focussing on the results obtained from longer-term trailing averages and longer estimation windows."

86. We generally agree with FTI on this point. However, without a good reason for over-weighting or 'double-counting'[23] certain data, FTI's principle should logically lead to the 0.25 value, not 0.29.[24] We display this 'over-weighting' logic in Figure 15 below.

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[22] These two values, 0.25 and 0.29, are shown in Ofwat's Table 3.18 and FTI's Table 5-3.

[23] We use the term 'double-counting' quite loosely here. Strictly speaking, Ofwat and FTI have counted the same data many more times than just twice: as shown in FTI's Figure 4-2.

[24] We use the term 'double-counting' quite loosely here. Strictly speaking, Ofwat and FTI have counted the same data many more times than just twice: as shown in FTI's Figure 4-2.

Figure 15: Ofwat's beta methodology over-weights certain periods
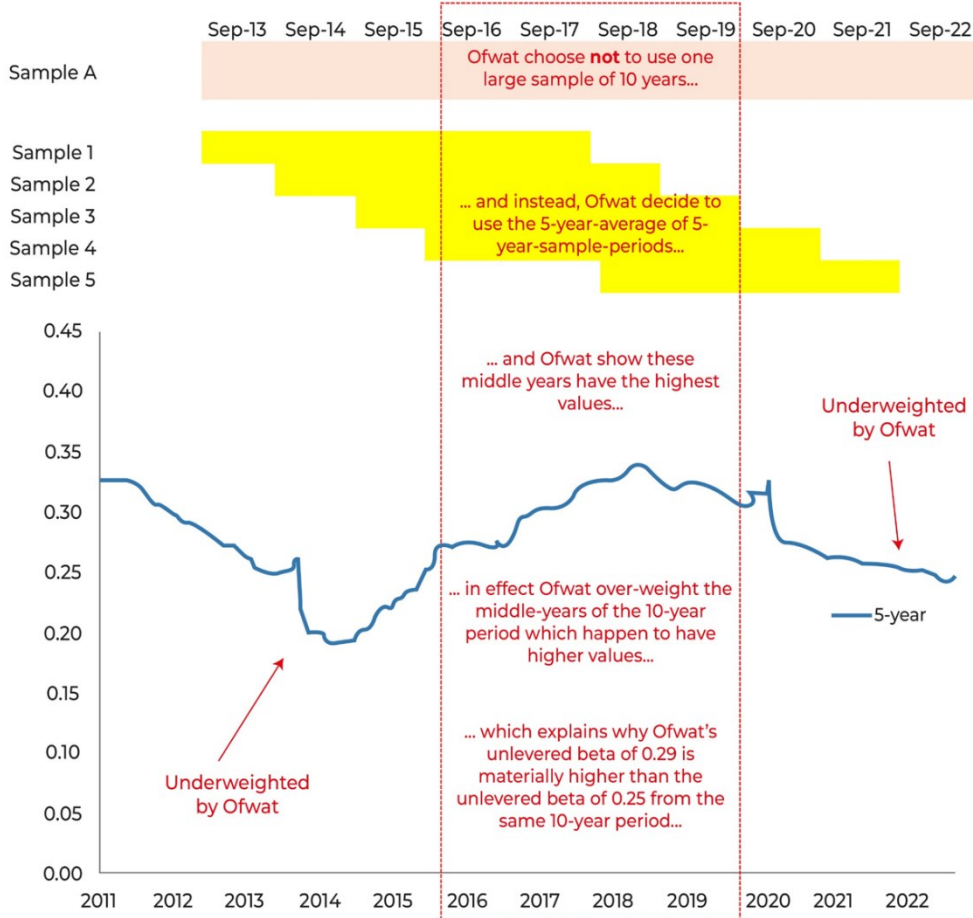
Source: MCC's analysis, Ofwat's PR24 'final' methodology (December 2022), FTI's beta report.

87. Second, we provide another mathematical demonstration of how we could upwardly bias the beta assumption, depending on how we look at the exact same data.

Figure 16: Upward biased beta analysis – how can we bias beta up by 10% from 1.0 to 1.1?

		Period i	Period ii	Ratio of the averages
		A	B	C = (A+B) / 2
Covariance	d	1.5	1.0	1.25
Variance	e	1.0	1.5	1.25
Beta 1?	f = d / e	1.5	0.7	**1.0**
Beta 2?	g = (fA + fB) / 2	**1.1**		

Source: MCC's analysis.

88. Ofwat (and FTI) risk concluding beta is higher (eg 1.1 rather than 1.0) due to the way they process the data.

Could Ofwat save customers £2.6 billion?

89. We now estimate the potential impact of a lower WACC allowance.

90. The WACC allowance % is multiplied by the RCV to calculate the monetary £ allowance, paid for by water customers each year. The RCV could be close to £100 billion by the year 2027-28 (the mid-point of the next price control).[25] If so, each 1% on the WACC allowance is worth £1 billion per year (£100 billion * 1% = £1 billion).

91. Replacing Ofwat's 'early view' with a 'market-led-view' could reduce the WACC allowance by ~0.54%, as shown in Figure 17, saving water customers £2.6 billion over 5 years ([3.23% – 2.69%] * £100 billion * 5 years = £2.6 billion).

Figure 17: 'Early view' return on capital is ~0.54% higher than a 'market-led-view'

Item	Ofwat's 'Early view'	Market-led-view	Ref
Notional gearing	55%	50%	A
Allowed return on equity	4.14%	3.5%	B
Allowed return on debt	2.6%	2.0%	C
Retail margin	0.06%	0.06%	D
Allowed return on capital	3.23%	2.69%	E = A*C + (1-A)*B -D

92. The 'market-led-view' reflects the signals that Ofwat's parameters are too high and instead is based on the following:

- 50% for notional gearing, to reflect the issues we identify in this report (see, for example, page 9 and Debt and 'financing': our review).

- For equity, we adopt Ofgem's MAR-implied cost of equity of 3.5% for Bristol Water (or we can adjust Ofwat's RFR, TMR, or beta, to reflect the issues we identify in this report).

- For debt, there are two primary ways to get to 2% (CPIH-real). First, Ofwat's own analysis shows a 15-year trailing average of debt costs is about 4% nominal which is ~2% in CPIH terms (using Ofwat's inflation adjustment method). Alternatively, we could adjust Ofwat's debt assumptions to reflect the issues we identify in this report (for example, adjusting Ofwat's nominal debt values downwards for inflation swap prices – where CPI is valued at 3.4% to 3.2% in Ofwat's Figure 3.1 – would give values approaching 2% in CPIH terms).

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[25] Using Ofwat's 2022 RCV of ~£80billion, uplifted for inflation for 6 years at 4% per year.

Appendix 1: WACC basics

Weighted Average cost of capital: the basics

$$WACC = gearing \times k_d + (1 - gearing) \times k_e$$

where:

k_d is the cost of debt

k_e is the cost of equity

Gearing	is the amount of debt financing as a proportion of the combined debt and equity value of the firm
Cost of debt (k_d)	refers to the expected return (ideally adjusted for default risk) on a traded corporate bond, for a specified horizon, and with risk comparable to regulated utilities, for a chosen leverage. By ignoring default risk, Ofwat views the cost of debt from a water company's perspective rather than an investor's perspective.

Cost of equity basics (according to CAPM)

$$k_e = R_f + \beta_e \times (R_m - R_f)$$

where:

R_f is the risk-free rate (RFR)

β_e is the equity beta

R_m is the Total market return (TMR)

Risk free rate (R_f)	is an economy-wide figure and represents the required return on a riskless asset in the CAPM
Equity beta (β_e)	is a measure of the sensitivity of a stock's return to market-wide risks, captured by returns on a broad market portfolio of equities
Total market return (R_m)	measures the return expected by the marginal investor from holding a diversified portfolio of all investible securities

Appendix 2: Cross-check arguments

Should Ofwat consider MAR evidence as a cross-check?

93. Market to Asset Ratios (**MARs**) are one of the primary cross-checks that Ofwat could use to estimate the true cost of equity/capital. If investors are rational, they will, typically, only pay more than the Regulatory Capital Value (**RCV**) if their costs (eg of equity) are lower than the allowances they expect to receive from Ofwat (eg allowed return on equity).

Water companies	Ofwat's early view	MCC's analysis
- **Anglian Water** considers MAR evidence to be an unreliable benchmark, due to subjective assumptions that are needed to decompose MAR into a useful input for calibration. - **Affinity Water** disagrees with the use of MAR as a key cross-check due to significant limitations in correctly interpreting MAR data. - **Affinity Water** also suggests that private transaction MARs are compromised, prone to biases, and cannot serve as a transparent and objective cross-check. - **South East Water** suggests that it is difficult to derive meaningful information from MAR data for assessing allowed returns. - **Northumbrian Water and Essex & Suffolk Water** suggest that MAR should not be used as a cross-check, as a MAR analysis can be influenced by a wide range of factors and controlling for those factors to identify any real premia or difference	- Ofwat says public-company MARs should form the mainstay of its analysis.	- We suggest that Ofwat includes private-company MARs alongside its consideration of public-company MARs (as it did for PR19). - **Pennon's acquisition of Bristol Water** suggests a much lower cost of equity than Ofwat's 'early view'. - We believe, and we think other regulators and the CMA believe, that MARs are a very useful cross-check which typically suggest that the true cost of equity is lower than allowed returns on equity. We do not believe this inference is sensitive to reasonable uncertainties or assumptions.

can be extremely challenging. - Southern Water suggests that MARs are driven by a wide range of factors and very limited data points, so provide limited insight into the required cost of equity. - United Utilities disagrees with proposals to use MAR as a cross-check due to volatility and the difficulty in isolating impacts, and suggests that no reliance should be placed on MARs derived from private transactions. - Wessex Water and Yorkshire Water disagree with the use of MARs and point to a commissioned report by KPMG, which concludes that the use of MARs as a cross-check is unlikely to assist regulators in determining an allowed cost of equity estimate in an unbiased and efficient way, one that facilitates investments, while furthering consumers' interests.		

Could Ofwat consider a broader range of cross-check evidence?

94. Ofwat limits its consideration of cross-checks to MARs, which leads us to consider what other information might be available.

Water companies	Ofwat's early view	MCC's analysis

- Affinity Water, Anglian Water, and Northumbrian Water and Essex & Suffolk Water suggest additional cross-checks, such as multi-factor models, financeability, and risk analysis, citing the CMA's approach as support for their use.
- Northumbrian Water and Essex & Suffolk Water suggest that an ARP/DRP cross-check or alternative hedge ratios could be considered.
- United Utilities suggests other relative valuation market-based cross-checks should be included, such as comparing water company price to earnings and enterprise value to EBITDA ratios to other sectors and the use of the dividend growth model.
- Wessex Water and Yorkshire Water point to a commissioned report by KPMG, which suggests alternative cross-checks, such as multi-factor models, financeability tests, hedge ratios, and quantification of risk exposure.
	- Ofwat notes that additional cross-checks are not required for:
	  o Financeability, as the regulatory package includes a series of mechanisms that are designed to address financeability constraints.
	  o ARP/DRP and hedge ratios, as cross-checks must be derived outside of the CAPM framework to be useful in calibrating a CAPM-based allowed return.
	  o Risk analysis, as it relies on subjective assumptions and considers all risks, which makes distinguishing between systematic risks (which are relevant to the cost of equity under the CAPM framework) and non-systematic risks particularly challenging.
	  o Multi-factor models, as various concerns exist regarding the factors used.
		- We agree with Ofwat that the cross-checks suggested by water companies (financeability, ARP/DRP, multi-factor models, etc.) are not necessarily insightful.
		- However, we do suggest that Ofwat considers a wider range of cross-checks.
		- For example, Ofwat could:
		  o Consider the cross-checks that Ofgem used for its price controls.
		  o Estimate the 'pure CAPM-WACC' as per the UKRN Study 2018, calculated as a time-weighted average.
		  o Compare its allowed return from both a methodology and results standpoint with other regulators internationally.

Appendix 3: Cost of debt arguments

Could Ofwat test different assumptions for new debt?

95. No-one knows: 1) how much new debt will be required during the 2025-2030 period; 2) how much it will cost; or 3) what form it will take. Therefore, we recommend that Ofwat test different assumptions for new debt and show the impact these have on debt allowances. Ofwat should avoid exposing consumers to its assumptions for the cost or type of new debt.

Water companies	Ofwat's early view	MCC's analysis
- Wessex Water and Affinity Water agree that the proportion of new debt for PR24 should reflect anticipated PR24 investment and RCV growth. - Affinity Water suggests that, for consistency with the approach to the allowance for embedded debt, the primary evidence to set the share of new debt should be the projected sector average debt portfolio. - South East Water disagrees with Ofwat's approach for the proportion of new debt given the scale of refinancing for infrequent issuers and suggests that the weighting should reflect Water-only-Companies (**WoCs**) issuance profiles which may be materially lower than other companies. - Severn Trent does not support an increase in the proportion of index-linked debt assumed for the notional company from its current 33% due to potential increased costs for the sector and references recent	- Ofwat assumes that all debt instruments from March 2022 which fall due over 2025-30 are refinanced as new debt at the early-view assumption of 5.34%, other than for floating-rate debt, which Ofwat assumes is refinanced like-for-like. - Ofwat published its PR24 balance sheet cost of debt model which shows its assumptions for refinancing and new debt.	- Ofwat's refinancing assumptions of 15+ years tenor, 5.34% cost, and 16.7% proportion of new debt should be tested with lower assumptions. - MCC's analysis of the 2022 APR Table 4B debt instruments data in PR24 balance sheet cost of debt model indicates that the proportion of new debt is lower (~15.3%) than the value calculated by Ofwat of 16.7%. - Ofwat should consider whether the index-linked proportion should be materially higher than 33%.

decisions by Ofgem for electricity distribution companies (25%) and electricity and gas transmission companies (30%).		

Could Ofwat test different tenor assumptions?

96. A shorter tenor (10-years to maturity) is normally cheaper than a longer tenor (20-years) so we reviewed how Ofwat accounted for this.

Water companies	Ofwat's early view	MCC's analysis
- United Utilities notes that the iBoxx A/BBB indices were distorted by long-dated instruments and the median of the index (as at 18 July) of 16 years was much closer to the water-sector average tenor-at-issuance. - United Utilities disagrees that excluding bonds with maturities of less than 10 years would further add to the outperformance from tenor due to the impact of higher liquidity costs, which, in its view, offset the reduction in yield. - Affinity Water suggests that encouraging short-term issuance may create exposure to the risk of rising interest rates, which would be passed onto customers, and also reduce the sector's financial flexibility. - Southern Water and Wessex Water suggest that adjusting the cost of new debt in PR24 for outperformance driven by tenor would incentivise shorter debt tenors, which transfers risk to customers in a more volatile interest rate environment. - Yorkshire Water disagrees with the proposed change to the averaging period, suggesting consistency of approach in these	- Ofwat observes that, on average, 15 years tenor-at-issuance is a reasonable assumption for the sector. - The benchmark index (iBoxx A/BBB) tends to have weighted average years-to-maturity closer to 20 years across the same timescale. - Ofwat acknowledges that it has decided to apply a "conservative adjustment of 15bps".	- Ofwat's debt allowance assumes a longer tenor than the underlying debt costs. - MCC agrees with Ofwat that the assumptions around the embedded longer tenor and the 'conservative adjustment' imply that a larger benchmark index adjustment could reasonably be applied.

matters is critical as change may give the impression of attempting to influence results as low as possible.		

Appendix 4: Risk free rate (RFR) arguments

Could Ofwat use different trailing average assumptions?

97. A 1-month trailing average will be more generous than 6 to 12 months when rates are rising. So, we reviewed whether Ofwat could use a different methodology.

Water companies	Ofwat's early view	MCC's analysis
- Yorkshire Water argues that a move to 6-12 month averaging from the 1-month used at PR19 might look opportunistic as, in the current environment of rising rates, it would result in a lower figure. It argued that consistency over time was important to maintaining investor confidence. - United Utilities considers a 6-12 month averaging period to be too long, and therefore supports a 1-month trailing average, while recognising that the CMA had used a 6-month trail. - The joint submission by Northumbrian Water and Essex & Suffolk Water and Wessex Water reference a commissioned report by Oxera, which uses a 6-month trailing average given its consistency with the CMA's decision for the PR19 appeals.	- Ofwat considers that a 1-month trailing average strikes a good balance between focusing on recent data, without undue influence from outliers.	- Other regulators, including Ofgem, use more data (see Figure 9 above). - CMA used a 6-month average in the PR19 re-determinations. - Further, the UKRN 2022 guidance suggests 1-month would be the very smallest sample, as it mentions 1, 6, or 12 months.

Appendix 5: Total Market Return (TMR) arguments

Could Ofwat publish forward-looking TMR estimates?

98. Ofwat has proposed to exclude forward-looking TMR evidence, which encouraged us to examine what impact a forward-looking approach might have and to consider relevant regulatory precedent and guidance.

Water companies	Ofwat's early view	MCC's analysis
- Water companies generally welcomed the approach to use ex-post and ex-ante historical approaches and not forward-looking approaches to derive the TMR range. - Affinity Water suggests that evidence from forward-looking techniques is widely acknowledged to be the least robust of possible estimation approaches. - Hafren Dyfrdwy and Severn Trent point to the CMA's conclusion regarding the limited weight to place on forward-looking estimates and support this approach.	- Ofwat proposes to derive a range for the TMR using 'ex-post' and 'ex-ante' historical approaches. - Ofwat suggests that forward-looking approaches are unsuitable as a primary tool for estimating the TMR.	- TMR should reflect expectations, not history. The past may not be a good guide to the future (or to current expectations). - Forward-looking TMR evidence suggests a materially lower TMR assumption. - Ofwat's omission of forward-looking TMR evidence appears out of step with current guidance (as seen in UKRN's 2022 consultation), other UK regulators (such as the CMA for PR19 and Ofgem for RIIO-ED2), and Ofwat's own approach (for PR19).

Could Ofwat include non-overlapping estimates?

99. We have reviewed Ofwat's approach to non-overlapping estimates, as it appears that a lower TMR could be derived if non-overlapping estimates were included in the range of estimators.

Water companies	Ofwat's early view	MCC's analysis
- United Utilities argues that a range of estimators should be used rather than solely the overlapping estimator. - Several company responses, such as Southern Water, argue that CMA's example of including the non-overlapping estimator in the set of estimators used to derive its 'ex-post' estimate, should be followed to avoid the perception that estimators are being 'cherry-picked' to contrive a low allowed return. - Affinity Water and Wessex Water note that there is no rationale that supports diverging from the CMA's approach of considering both overlapping and non-overlapping estimators. - South East and Wessex Water note that the CMA had found issues with the direct transformation from geometric returns, in that it would need to be used with caution and might be of little use.	- Ofwat proposes to derive an ex-post arithmetic range using the overlapping estimator and 10-20 year holding periods. - Ofwat excludes non-overlapping estimates.	- We suggest Ofwat includes 'non-overlapping estimates' within its evidence base, given that 'non-overlapping estimates' 1) now suggest a lower TMR; and 2) avoid double-counting the same overlapping data.

Could Ofwat avoid the CPIH back-cast when estimating TMR?

100. Ofwat proposes to use the ONS's CPIH back-cast, so we have reviewed the impact this could have on its TMR assumption and considered relevant regulatory precedent.

Water companies	Ofwat's early view	MCC's analysis
- Yorkshire Water suggests the new CPIH series is unlikely to be definitive, given the uncertainty seen with the revisions between the latest CPI and the previous CPI series. As such, the CMA's approach of considering both the RPI and CPI/CPIH historical datasets should be maintained. - South East Water, Affinity Water, and Wessex Water argue that weight should be placed on both historical CPIH and RPI. - Wessex Water suggests that CPIH is a more reliable measure of inflation, though a review of the modelled figures is warranted. - Southern Water opines that a focus on historical CPIH fails to consider relevant RPI datapoints, creating an unjustified bias.	- Ofwat intends to make use of the ONS's CPIH back-cast for the purposes of estimating TMR, given the potential for inaccuracy with the RPI conversion process, the RPI formula effect, and Ofwat's confidence in the ONS modelling approach.	- Ofwat adopts the CPIH back-cast without fully considering its reliability, which puts ~0.25% upward pressure on the TMR assumption. - Ofwat's position contrasts with Ofgem's findings and approach (covered in RIIO-ED2 Final Determinations). - If energy networks do not appeal Ofgem's decision, or if any appeal is unsuccessful, Ofwat will be in a strong position to avoid the CPIH back-cast and lower its TMR assumption by ~0.25%. - Yorkshire Water's view appears reasonable: the new CPIH back-cast series is unlikely to be definitive.

Appendix 6: Equity beta arguments

Could Ofwat publish Pennon's beta?

101.   We have reviewed Ofwat's rationale for excluding Pennon's data from its beta estimate.

Water companies	Ofwat's early view	MCC's analysis
- United Utilities supports the use of data from Severn Trent and United Utilities when estimating the raw equity beta and suggests data from Pennon should be included to the fullest extent possible where this can be used without complications from its Viridor holdings. - Wessex Water points to a commissioned report by KPMG, which notes that the inclusion of additional data would be helpful to increase the statistical robustness and representativeness of the beta estimate used to set allowed returns for the notional company and suggests that Ofwat should carefully consider how the evidence from Pennon should be taken into account, given the very limited number of listed comparators available for the sector.	- Ofwat proposes to place most weight on data from Severn Trent and United Utilities. - Ofwat omits Pennon for its 'early view' due to concerns around data availability and effects of Pennon's cash balance.	- Ofwat should estimate, publish, and use, Pennon's raw equity beta as cash balances will not impact raw beta estimates. - Ofwat should consider whether Pennon shows a closer relationship with United Utilities (or Severn Trent) than United Utilities has with Severn Trent. - We agree with KPMG that Ofwat should consider including Pennon data. We note that KPMG suggests that including Pennon puts upward pressure on the beta estimate, whereas we find that it can put downward pressure on the beta estimate (see Figure 14 above).

Could Ofwat avoid overlapping samples?

102.   Care must be taken when using several estimation periods, such that double-counting is avoided, and the most suitable ranges are appropriately weighted. We were therefore encouraged to review the issues with Ofwat's proposed use of overlapping samples.

Water companies	Ofwat's early view	MCC's analysis
- Many companies suggest avoiding a short estimation window given recent world events. - United Utilities and Anglian Water support the use of a range of estimation periods (2 years, 5 years, and 10 years), suggesting that longer estimation periods and longer averaging periods could be a viable alternative to excluding data affected by recent world events. - South East Water and Affinity Water suggest that structural breaks should be considered for UK water company betas. - Anglian Water points to precedent and Ofwat's previous caution with the use of 2-year betas for PR19 and PR14, and urges Ofwat to consider 5-year and 10-year betas as providing more useful information relative to 2-year betas. - Northumbrian Water and Essex & Suffolk Water reference a commissioned report by KPMG, and suggest weightings should be adjusted to consider short-term impacts of recent world events, pointing to CMA's removal of atypical data	- Ofwat proposes to estimate betas using 2-year, 5-year, and 10-year estimation periods, and placing most weight on longer estimation periods and trailing averages.	- Ofwat uses overlapping samples, which means data is over-weighted and leads to double-counting. - Ofwat's selected range appears upwardly biased, with the upper end of the range over-weighting the middle 5 years of data. - Recent evidence on beta may be particularly valuable for revealing the true systematic risk of water networks. For example, periods of high inflation help us understand the value that investors place on inflation-protected assets, such as water networks.

in its assessment for PR19. - Southern Water suggests that recent data may be skewed by atypical events. - Yorkshire Water suggests that applying bespoke weights to different time periods may be necessary to reflect movements seen as a result of world events.		

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