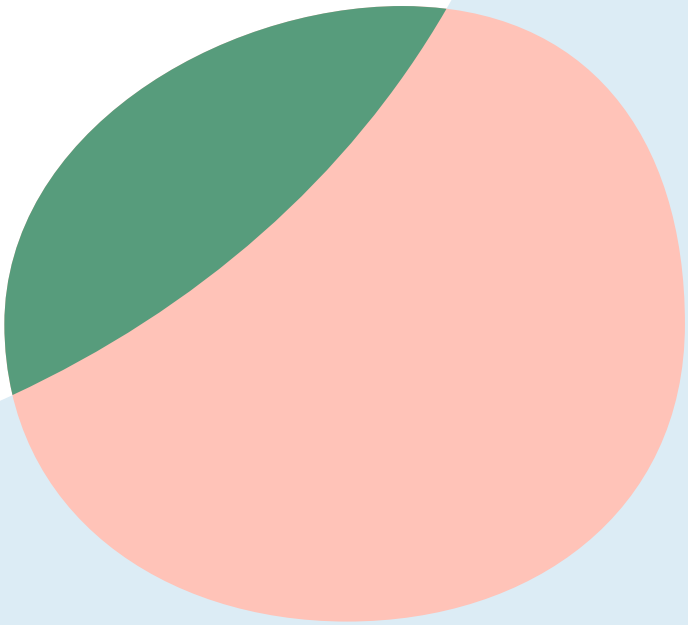
July 2023

Position Statement on return on RCV calculations in the PR24 financial model



Ofwat

About this document

This paper sets out our response to our consultation, published on 5 April 2023, 'Consultation on return on RCV calculations in the PR24 financial model'.

This paper sets out:

- the issue and why we have made a change.
- the reasoning for our alternative approach.
- resultant changes to the regulatory framework now and in future.
- our reaction to issues raised in consultation responses.

We expect the allowed return on capital revenue modelling calculations featured in PR24 draft and final determinations in 2024 to reflect the changes mentioned in this paper.

Contents

1. Executive summary

This document sets out our decision for PR24, following our consultation on whether we should amend our existing approach to calculating allowed return revenues in the PR24 financial model and, if so, which new approach we should adopt.

The importance of present value neutrality

Present Value (PV) neutrality is an important principle in our regulatory framework ensuring that investors are fairly compensated for the time value of money.

PV neutrality applies if the present values of future cashflows associated with the RCV (allowed return, RCV run-off) equal the present value of that RCV (all discounted at the allowed return on capital). A clear majority of respondents (10 out of 13) agreed in principle that water cashflows should be PV neutral in accordance with this definition – even if there was disagreement on the extent to which this should be reflected in the PR24 financial model.

Following internal and external review of our current 'Average RCV' allowed return on capital formula we conclude that it produces cashflows that are not consistent with PV neutrality, and with a tendency to overcompensate companies by an indicative 0.11% Return on Regulatory Equity (RoRE).

We consider that this deviation from PV neutrality is of sufficient magnitude to warrant a change in approach. We do not agree that our intervention is based on an incomplete analysis of cashflow timing distortions or that our approach is one-sided – we are open to considering alternative requests to remedy other cashflow timing effects. While recognising that our decision will affect revenues, and thus is relevant to financeability and financial resilience, we consider that publishing our decision now is appropriate to give the sector and its investors time to consider its implications, and to raise any further issues as required in advance of draft and final determinations.

Our approach to addressing the PV neutrality issue

We have decided to change the formula in the PR24 model for calculating allowed revenue to make it more consistent with the principle of PV neutrality. We consider that changing the allowed return calculation in the model is a more transparent and logical approach than adjusting the wholesale WACC because the discounting calculation is presented within the model itself, and does not create another allowed return concept to add to the appointee and wholesale WACC allowances.

We have considered carefully the merits of the two alternative approaches defined in our consultation to improve PV neutrality: the 'Discounted Closing Balance' approach and the 'PV Neutral' approach, bringing to bear an expanded set of modelling tests to assess the performance of each approach against the criterion of PV neutrality.

In our consultation paper we favoured the 'PV Neutral' approach. We noted that it was more complex than that used by other regulators, but that we believed that the precision in PV neutrality that the formula delivered justified the additional complexity over the 'Discounted Closing Balance' approach. We set out that the difference in performance was slight however – with the 'Discounted Closing Balance' approach giving PV cashflows that were only 0.001% higher than the RCV, compared to 0.000% for the 'PV Neutral' approach.

Following a review of responses and an expanded set of modelling tests, we have decided to adopt the 'Discounted Closing Balance' approach instead. This decision recognises the arguments from responses that real world factors (e.g. inflation above or below our long-term assumption) can drive perturbations against a PV outcome even for the most precise of formulas, lessening the weight we consider should be placed on the marginally better performance of the 'PV Neutral' approach. Responses expressing a preference also preferred the 'Discounted Closing Balance' option by 5 to 2, and we agree with the accompanying reasoning that it is the less complex and more intuitive alternative option, while also achieving the beneficial outcome of alignment with the calculation approach used by Ofgem, the CAA and UREGNI. Government expects regulators to work together to identify areas where further alignment in cost of capital methodologies could be achieved.[1]

Changes to the PR24 framework

Various responses argued that our approach to the retail margin and retail margin adjustment ought to change if we decided to move away from our current 'Average RCV' approach. We agree that our commitment to PV neutrality should extend beyond the calculation of the allowed return allowance, however we did not consult on the retail margin. This document accordingly does not contain decisions affecting this policy area, however we welcome further submissions from interested stakeholders as part of PR24. We will set out our decision on retail margins and the retail margin adjustment as part of draft determinations in summer 2024.

We were not convinced by responses arguing that our consultation proposal's assumption of revenue flows received mid-year also required a change in our approach to estimating equity beta and historical TMR. We have previously avoided making ex-post adjustments to betas estimated on historic data in order to capture forward-looking risk factors. This recognises that the risk of miscalibrating the size of adjustment is high, and that beta data may over time embed the impact of our change. We were also not convinced that proposals to re-estimate long-run historical estimates of TMR based on mid-year compounding were

[1] BEIS: Economic regulation policy paper (January 2022), p.20.

necessary given our preferred option, or that the data existed to support such an exercise. Finally, we note that other current users of the 'Discounted Closing Balance' approach (i.e. Ofgem, CAA, UREGNI) have not deemed it necessary to implement these proposed changes to equity beta and TMR estimation in their own price review methodologies.

We recognise that our proposals are liable to entail a reduction in revenues of around 11 bps on the Return on Regulated Equity (RoRE), although this may not reflect the net position in the long term if we decide to remedy other cashflow timing distortions affecting PV neutrality. We did not agree with some suggestions that we would need to compensate investors for this loss in revenue, as we consider this would not address the issue of returns being materially higher than required to achieve PV neutrality.

This document is published alongside a financial model which has had the 'Discounted Closing Balance' approach implemented in its allowed return revenue calculations. We recognise that our proposal implies the need for our suite of PR24 models to change to secure consistency with our approach. This particularly relates to the need for time value of money adjustments to reflect mid-year cashflows, though we are open to considering requests to remedy other cashflow timing effects. We will not change the current reconciliation models from PR19 due to be run at PR24, in the interests of certainty and predictability. Any changes will therefore be fully forward-looking, applying only to PR24 models and their iterations for future controls.

2. Introduction

An external review of the Final Methodology PR24 financial model was carried out by CubeLynx between January and March 2023. We published the external review report alongside our PR24 financial model.

The CubeLynx review raised an issue with the calculation used to calculate the return on RCV, suggesting that it departed from the convention used by Ofgem to maintain financial capital on a discounted cashflow basis, instead giving a structurally higher allowance.[2]

On 5 April 2023, we therefore published a consultation on whether or how this issue should be resolved,[3] and in particular to consider how (if at all) the calculation should be changed. We set out three options for calculating the allowed return revenue in the financial model in future.

Our current 'Average RCV' approach:

$$\left(\frac{Opening\ RCV + Closing\ RCV}{2}\right) \times Wholesale\ WACC$$

'Discounted closing balance' approach:

$$\left(\frac{Opening\ RCV}{2} + \frac{Closing\ RCV}{(1 + Wholesale\ WACC)\ \times 2}\right)\ \times Wholesale\ WACC$$

'PV neutral' approach:

$$Allowed\ return = WACC\ \times \frac{\left(RCV_{Closing} \times f + RCV_{Opening} \times (1 - f)\right)}{1 + (f \times WACC)}$$

Where:

$$f = \frac{(1 + WACC)^{0.5} - 1}{WACC}$$

[2] Cubelynx, 'Ofwat, Review of PR24 Final Methodology Model: Model Review Report',, p8, April 2023
[3] Ofwat, 'Consultation on return on RCV calculations in the PR24 financial model', April 2023

Our consultation asked three questions:

- **Question 1** – Do you agree that the value of RCV should match the PV of return and run-off cashflows generated by that RCV?
- **Question 2** – How should we take account of the timing of cashflows in calculating return on RCV? Should we amend the Wholesale WACC or should we amend the return on RCV calculation?
- **Question 3** – Should we amend the return on RCV calculation to the simple discounted closing balance method or the more complex fully PV approach?

To facilitate the exchange of views amongst interested parties, we also held a workshop on 20 April 2023 to elicit discussion on the questions.

We received 13 responses to this consultation, 12 from regulated water companies, and one from CCWater. The issues raised in these responses are discussed in the following chapters (See also Annex A for a tabulated account of issues and our account of them). We have carefully considered all responses in coming to our position in this area.

3. The importance of PV neutrality

3.1 Introduction

Present Value neutrality is an important principle in our regulatory framework, ensuring that investors are fairly compensated for the time value of money. PV neutrality applies if the net present values of future cashflows associated with the RCV (allowed return, RCV run off) equal the net present value of the RCV (all discounted at the allowed return on capital).

RCV is the regulatory value of investments made by companies, subject to any incentive adjustments. It is important to investors in their assessment of the value of the regulated company and conditions their expectations around future cashflows. For companies to be indifferent about whether to receive funding as RCV or cash, our policy approach assumes that the present values of future cashflows associated with RCV should equal the present value of the RCV.

3.2 Stakeholder submissions

Question one of our consultation document asked:

> "Do you agree that the value of RCV should match the PV of return and run-off cashflows generated by that RCV?"

Overall, 10 out of the 13 replies agreed that in principle the present value of revenue for the allowed return and run-off should equal the present value of additions. However, eight of these replies qualified their agreement, arguing that there were significant additional considerations which affected how practical it was to reflect this in the PR24 financial model.

We received comments in the following areas:

- **Appropriate level of precision:** It was argued that we were following an arbitrarily higher standard of precision in exploring remedies to the PV neutrality issue. One company cited our not making an adjustment for the 'convenience yield' in the risk-free rate for our 'early view' allowed return. It was also argued that our embedded cost of debt allowance did not include swap costs, despite evidence that some companies incurred these costs. Several companies also noted that our 'early view' did not contain an allowance for the cost of carry, despite Ofgem having allowed this in its recent determinations.
- **Completeness of proposals:** Several responses noted that there were multiple factors that impacted on PV neutrality (e.g. inflation, and the timing of customer receipts, financing payments). These submissions argued that, as our proposals

focused only on revenue, it was not possible to say whether they would overall improve the PR24 framework's conformity with the principle of PV neutrality. Two companies provided relevant worked examples:
    - Northumbrian Water provided an example setting out that if financing outflows could be considered as falling mid-year, then financial surplus over PV requirements we alleged to occur under our existing approach was completely offset by the higher PV cost of having to make earlier mid-year financing cost payments.
    - Thames Water provided an example setting out that PV neutrality was not achieved in an example where inflation was unusually high in one year, due to the lag in reflecting inflation in revenues.
- **The Competition Commission and PR09:** Several responses noted that the CC's redetermination of Bristol Water's price control incorporated an adjustment to our 'Average RCV' to achieve greater consistency with PV neutrality. These responses argued that we were therefore aware of the PV neutrality issue from that point onwards, and therefore could not justify changing course by claiming we were correcting an anomaly in our framework that we were until recently unaware of.
- **Recourse to other considerations:** Several responses argued that the consultation focused too narrowly on mathematical precision and that the revenue impact of our proposals meant they ought to be agreed only once they were considered as part of an 'in-the-round' assessment of the PR24 package, including an assessment of financeability.

3.3 Our position

We continue to consider that the deviation from PV neutrality observed in our current 'Average RCV' approach is significant enough, at 0.11% RoRE to warrant consideration of a change in calculation approach. We also note from a review of other regulators operating a 'return on regulated asset base' model that our current approach is a departure from the norm.

Appropriate level of precision

We do not accept that our justification for not including a 'convenience yield' or swaps in our PR24 Final Methodology 'early view' of the allowed return on capital, rests on arguments around precision, and that our stance on PV neutrality is therefore inconsistent. We noted in our final methodology that empirical UK convenience yield estimates for the 10-20 year investment horizon used in our methodology were not available, and that swaps were not an intrinsic part of debt financing, but a choice made by companies.[4] As regards the cost of carry, we signalled a willingness to consider water sector-specific evidence supporting the inclusion of this uplift as part of PR24 business plan submissions. In all these areas we will

[4] Ofwat, 'PR24 Final Determinations Appendix 11: Allowed return on capital', December 2022

consider any further relevant evidence and set out our considered decisions as part of draft and final determinations in 2024.

Completeness of proposals

We were not convinced by arguments in responses that we would need to systematically gather evidence on all actual cashflows before taking a decision on how the allowed revenue is calculated. Firstly this is because we do not agree that we have failed to consider all of the cited cashflow timing factors. Secondly, this is because we have reservations around the robustness of examples used by responses to justify the importance of some of these omissions. Finally, we are open to considering alternative requests to remedy other cashflow timing effects.

In several respects, our existing framework already makes accommodations for cashflow timing mismatch. For instance, the retail margin funds working capital balances required where there is a gap between paying for wholesale services and receiving payment. In addition to this, the time value of money adjustment included in reconciliation models ensures that the reconciled amounts reflect that surpluses or shortfalls of cash could otherwise have been invested. In section 5 we discuss changes that would have to be implemented in these parts of our framework for consistency with our decision.

Northumbrian Water use a cashflow modelling example to argue that our failure to consider the timing of payment to investors leads us to understate the net present value implied by our current 'Average RCV' approach. We recognise that the PV calculation in Northumbrian's example results in a PV-positive outflow that exactly balances the PV-positive surplus from using the 'Average RCV' approach. We consider however that this is the result of the financing cash outflow being constructed such that it has identical characteristics to the return on capital inflow generated by the 'Average RCV' approach. We note various assumptions in the company's mid-year financing cashflows calculation that are not aligned with evidence from the sector. For instance, Severn Trent, United Utilities and Pennon have final dividends which are payable after the year they relate to: these companies' final dividends for the year to 31 March 2023 were payable on 14/07/23,[5] 01/08/23,[6] and 04/09/23,[7] respectively. In addition, the PV debt outflows in the company's example are exaggerated because they assume that all debt is amortising; yet our analysis of the 2021-22 APR suggests that less than 10% of the sector's outstanding debt was amortising on 31 March 2022.[8]

While noting Thames Water's finding that a year of higher-than-target inflation can drive a divergence from PV neutrality due to lags in inflation indexation, we were not convinced that this required us to abandon any efforts to improve the PV neutrality of our allowed revenue

[5] Severn Trent plc (SVT) Dividends (dividendmax.com) (retrieved 30.06.2023)
[6] United Utilities, Class A Shares Information (retrieved 30.06.2023)
[7] Pennon Group, 'Dividends' (retrieved 30.06.2023)
[8] Source: Ofwat analyslis of 2022 APR Table 4B. Analysis confined to c.£61bn of 'pure debt' instruments only.

calculation. In particular, we were not convinced that lags in inflation indexation systematically introduce a deviation from PV neutrality, as a lag in below-target inflation is revenue (and thus PV) positive in the same way that a lag in higher-than-target inflation is not.

We are nonetheless open to considering requests to remedy other cashflow timing impacts – including in a way that would financially benefit companies. In considering requests for such remedies, we will have due regard to:

- the materiality of the impact,
- the tendency of the remedy to improve accuracy,
- its consistency with other regulators' approaches; and
- the impact on the complexity and transparency of our methodology

The Competition Commission and PR09

We note that the Competition Commission's critique of the then Ofwat model and subsequent downwards adjustment to the allowed WACC in their financial model appears to have been made with a logic consistent with our proposals (i.e. to avoid a too-high return allowance implied by the 'Average RCV' approach).[9] Irrespective of whether we chose in subsequent controls to retain an unadjusted 'Average RCV' approach, this does not constitute an appropriate reason to embed this approach for all subsequent price controls, if we consider it to be flawed after considering Cubelynx's review, evidence from other sectors, and our own modelling.

Recourse to other considerations

We recognise that our decision to adopt a different allowed return revenue calculation will affect revenues, and thus that there may be an impact on financeability. We nonetheless consider that waiting until draft determinations in summer of 2024 would not give companies and their investors enough time to consider and plan for our post-consultation decision. We consider that a prompt publication of our decision and its implementation in the financial model will give companies an opportunity to raise any further issues. We will consider these issues and any appropriate remedies as part of draft and final determinations.

[9] See Competition Commission, 'Bristol Water Redetermination: Appendix A', Annex 7 and pN46.

4. Our approach to addressing the PV neutrality issue

4.1 Introduction

In this section we discuss stakeholder submissions on the question of which alternative to our current 'Average RCV' approach we should adopt.

4.2 Stakeholder submissions

Question two of our consultation document asked:

> " How should we take account of the timing of cashflows in calculating return on RCV? Should we amend the Wholesale WACC or should we amend the return on RCV calculation?"

For the 6 responses that expressed a preference, 5 of these favoured making a change to the return on RCV calculation, and only one favoured amending the wholesale WACC.

The respondent supporting making an amendment to the wholesale WACC argued that it would be more transparent and obvious to observers outside the water industry. However, transparency was also cited in support of amending the return on RCV calculation.

Question three of our consultation document asked:

> "Should we amend the return on RCV calculation to the simple discounted closing balance method or the more complex fully PV neutral approach?"

Of the 7 responses that expressed a preference for one of the above approaches, 5 favoured the discounted closing balance approach, with the remaining 2 supporting the 'PV Neutral' approach. The remaining responses argued that our existing calculation should not be changed, referring to arguments which we have addressed in the previous section.

The responses that expressed a preference for the 'Discounted Closing Balance' approach variously cited as advantages over the 'PV Neutral' approach that it was more transparent and less complex, as well as being more widely adopted by other UK economic regulators and hence our adoption would increase regulatory consistency.

Responses expressing a preference for the 'PV Neutral' approach cited its increased mathematical precision in calculating PV neutral cashflows. One response argued that the additional complexity was worth the better performance in ensuring an accurate calculation of the allowed return revenue in the financial model.

4.3 Our position

Transparency

We consider that changing the allowed return revenue calculation in the model is a more transparent and logical approach than adjusting the wholesale WACC because the discounting calculation is presented within the model itself, and does not create another allowed return concept to add to the appointee and wholesale WACC allowances. Moreover, while adjusting the WACC allowance down to create an 'Accounting Rate of Return' (ARR) has been used to improve PV neutrality in the past, the approach used seems to have changed over time.[10]

The 'PV neutral approach' is arguably the least transparent approach as it lacks an intuitive explanation of the 'f-factor' in its calculation. This is in contrast to both the discounted closing balance and ARR approaches, which justify the use of a discount factor of 0.5 through recourse to cashflows received mid-year, which are more valuable to the investor from a PV perspective (compared to end-of-year cashflows), as they are received earlier.

Consistency

The UK Government in 2022 set out an expectation for regulators to work together to identify areas where further alignment in cost of capital methodologies could be achieved.[11] We note that in their most recent controls, Ofgem, the CAA, and the UREGNI have all amended the return on RCV calculation through using the 'Discounted Closing Balance' approach, and all these regulators have no plans to depart from this approach in future. From the perspective of promoting alignment of approach across UK regulators, there is therefore a clear argument for us using this widely-adopted approach.

Modelling tests

As part of assessing the approaches to the return on RCV and its PV neutrality we performed two tests using a discounted cashflow model, the results of which are shown in table 1 below.

We recognise that real-world factors such as variations of inflation may work against a perfectly PV outcome even against the most mathematically precise of formulae. We accordingly consider that a perfectly PV outcome is an unrealistic criterion for adopting a given formula for our allowed revenue calculation. We have accordingly decided to use a criterion of 0.05% of the relevant opening balance to determine whether a given formula passes or fails our tests. Further information on our modelling tests can be found in annex B.

[10] For instance, Para 8.25 of CAP1115 (2014) states that for Q5, the ARR was used to adjust the WACC point estimate, while for Q6, the CAA has used the ARR concept to help determine a subjective choice of a point in its WACC range.
[11] BEIS, 'Economic Regulation Policy Paper', p20, January 2022

Table 1: Results of modelling tests

Test Area	Approach		
	PV Neutral	Discounted Closing Balance	Average RCV (current approach)
1) PV Return on RCV and Run off = PV Opening balance and additions	Pass	Pass	Fail
2) PV of equity cashflows = zero	Pass	Pass	Fail

Note: More details of the calculated Present Values and assumptions can be found in Annex B

Test 1: PV Return on RCV and Run off = PV Opening balance and additions

This test checks that the net present values of future cashflows[12] associated with the RCV (allowed return, RCV run-off) equal the net present value of the RCV.

The 'PV Neutral' and 'Discounted Closing Balance' approaches both pass against our materiality threshold of 0.05%, with a variance of 0.00% and 0.01%, respectively.

Our current 'Average RCV' approach can achieve results closer to PV neutrality by either assuming a) all additions and run-off occur at the beginning of the year, with other flows occurring mid-year, or b) that all additions and run off occur mid-year with other flows (e.g. return on RCV) occurring at the end of year. Using these assumptions the average RCV approach would pass test 1 based on our materiality threshold. These alternative assumptions are however unsatisfactory as a representation of reality, given that for a) additions to RCV and depreciation are in practice not constrained to be at the start of the year, and for b) that return on RCV revenues occur throughout the year, not just at the end.

Test 2: PV of equity cashflows = zero

This test checks that the discounted sum of the equity cashflows equals zero when considering the notional equity share of RCV.[13]

No approach achieves perfect PV neutrality. The 'PV Neutral' and 'Discounted Closing Balance' both pass against our materiality threshold with a variance of 0.00% and 0.02% respectively. Absolute PV neutrality for both approaches can be achieved if gearing is assumed to be zero, however this is an unrealistic assumption.

The Average RCV approach' gives variance which is 0.41% of notional equity and so significantly beyond the 0.05% threshold and cannot pass with any amended assumptions including the modified assumptions that could be applied in test 1.

[12] Discounted using the allowed return on capital
[13] Discounted using the cost of equity

Conclusion

In our consultation paper we favoured the 'PV Neutral' approach. We noted that it was more complex than that used by other regulators, but that we believed that the precision in PV terms that the formula delivered justified the additional complexity over the 'Discounted Closing Balance' approach. We set out in that document however that the difference between the approaches in mathematical terms was slight, when considering the variance of PV cashflows against the opening RCV balance. The 'PV Neutral' approach showed no divergence, whereas the 'Discounted Closing Balance' approach resulted in a positive variance of only 0.001%

Consultation responses backed the 'Discounted Closing Balance' approach over the 'PV Neutral' approach by 5 to 2, for those expressing a preference. They also raised valid points about real world factors (e.g. inflation above or below our long-term assumption) that could drive perturbations against a PV outcome even for the most precise of formulas. For these reasons, we have re-evaluated the weight we placed on the 'PV Neutral' approach's ability to secure a perfectly PV-neutral outcome in the simplified environment of assumptions we used in our modelling, relying instead on a tolerance threshold of 0.05% of the opening balance for deviations from PV neutrality.

With these considerations in mind, we have decided to instead adopt the 'Discounted Closing Balance' approach for PR24. Its performance is broadly equivalent to the 'PV Neutral' approach in our updated suite of tests. We also agree with respondents that it is the less complex and more intuitive alternative option, while also achieving the beneficial outcome of alignment with the calculation approach used by Ofgem, the CAA and UREGNI.

5. Changes to the PR24 framework

5.1 Introduction

This section addresses consultation responses that argue that moving away from our current 'Average RCV' approach would imply the need for changes to our regulatory framework. We also set out where we may make further changes as part of PR24.

5.2 Stakeholder submissions

Responses argued that the PR24 approach to the following areas should change as a result of our proposals:

- **Retail Margin Adjustment:** Several responses juxtaposed the 'high-level' approach to calculating the retail margin with the more detailed focus of our proposals governing the calculation of the allowed return. One response argued that the retail margin should also be seen as being earned mid-year, and hence should also be subject to a downwards PV adjustment. Northumbrian Water proposed an alternative approach to calculating the retail margin adjustment to make it more company-specific and thus more reflective of companies' actual cost base.
- **Total Market Return:** Several companies argued that our proposals implied a need to revise our 'early view' approach to TMR estimation. It was argued that semi-annual averaging was required, which would increase the arithmetic average of TMR, and that our assumption of mid-year cashflows was not consistent with the compounding assumptions in the historical data series used to estimate TMR.
- **Equity beta:** One response argued that historical beta data informing our allowed return on equity estimates was predicated on an expectation that we would use our current formula. It was argued that the change would require an ex-post uplift to beta to account for this.
- **Compensation for investors:** Several responses argued that investors expected us to use our current approach and pitched their return on capital expectations accordingly. These responses argued that any revenue negative impacts from switching to a different approach would need to be offset with higher revenue elsewhere.
- **Changes to PR24 models:**
  Several companies argued that our proposals implied a need to rework all models to reflect mid-year cashflows and that the cost of implementing such changes would outweigh any purported benefit in terms of increased PV neutrality.

5.3 Our position

Retail margin adjustment

We observe three areas where responses have raised issues that could have implications for the calculation of allowed revenues around the retail margin adjustment.

- If retail margin revenues are received through the financial year (and hence on average mid-year), a similar logic to that contained in this paper's proposal could support a discounted closing balance approach. As our PR24 model does not include the concept of opening or closing turnover, this could be approximated by multiplying turnover in a given year with the formula (Retail Margin / (1+Retail Margin) ^ 0.5),
- We assumed for our PR24 final methodology that the notional company finances fixed retail capital assets at the appointee WACC. This raises the prospect that a more detailed modelling approach assuming mid-year cashflows could change the allowance for fixed capital assets, changing the size of retail margin adjustment.
- Northumbrian's alternative approach to our final methodology retail margin adjustment could result in an adjustment more tailored to company circumstances. However, its proposal to use company-specific data to drive the calculation raises questions around the incentives that companies might have to manage their balance of debtors and creditors efficiently, or secure an efficient working capital financing rate.

We note however that we did not consult on the retail margin or retail margin allowance, and hence there is a risk in changing policy of overlooking the views of stakeholders who may hold views in this area.

We accordingly have not made decisions in this document affecting this policy area, however we welcome further submissions from interested stakeholders as part of PR24. We will set out our decision on retail margins and the retail margin adjustment as part of draft determinations in summer 2024.

Total Market Return:

Wessex Water notes that our primary source of data for historical equity returns does not use a consistent assumption for compounding across the 122 year dataset. It cites the following statement by the authors of Credit Suisse Global Investment Returns Yearbook to support its claim that returns post-1955 are compounded monthly while those before are compounded annually:

> 'Before 1955 all cash flows are assumed to occur at the end of the year, including dividends, special dividends, returns of capital, and cash from acquisitions.'[14]

The company argues that this discontinuity in approach means that our proposal creates an inconsistency in the treatment of the rate of return and the cost of capital.

United Utilities makes a similar argument, adding that if the arithmetic average equity return was calculated in semi-annual returns, its volatility would be higher, thereby leading to a higher estimate of TMR.

We do not agree that our assumption of mid-year allowed revenue cashflows commits us to assuming a particular frequency of historical equity return compounding or averaging returns in half-yearly increments.

The purpose of the long-run equity returns series is to provide one perspective on the annualised forward-looking returns investors might expect, if they thought the future would turn out to be like the past. While recognising that changes in the compounding assumption will affect the effective rate earned, it is difficult to conceive of a constructive alternative to using the pre-1955 figures with end-of-year compounding, given the lack of granular returns data that would enable figures consistent with the post-1955 series to be constructed.

Moreover, our assumption of mid-year revenues recognises that allowed return revenue accrues over the course of a year (and hence on average at the midpoint; day 182.5). This does not invalidate returns data constructed on an annualised basis, but rather recognises that this annualised return is accrued earlier, and hence is worth more to its recipient in present value terms.

We note that other regulators using the 'Discounted Closing Balance' approach (i.e. Ofgem, CAA, UREGNI) do not estimate historical TMR using half-year increments to reflect their use of the 'Discounted Closing Balance' approach.

Equity beta:

At previous price reviews, we have tended to make a judgment on beta based on econometric analysis of historical data. As part of this approach, we have avoided making ex-post adjustments to this judgment in order to capture forward-looking risk factors. For instance, although the introduction of a revenue control (at PR09) and new debt indexation (at PR14) were two historic Ofwat policies that reduced systematic risk, we did not use these changes to adjust down our econometric estimate of beta.

This policy recognises that there is a significant risk of miscalibrating the size of adjustment. In addition, it recognises that changes in our regulatory approach may be reflected in beta

[14] Credit Suisse, 'Global Investment Returns Yearbook', p211

data over time, and so impact on beta data used for setting allowed returns in future. We do not therefore consider it necessary to change our beta estimation approach from our PR24 final methodology to reflect our post-consultation decision.

Compensation for investors:

While we consider that there are strong arguments for making our adjustment on the grounds of improving PV neutrality and in terms of consistency with other regulators, we acknowledge that there is an indicative -11bps RoRE impact for investors.

However, we consider that offsetting this RoRE impact by allowing higher revenues elsewhere is not an appropriate response, as we consider this would not address the issue of returns being materially higher than required to achieve PV neutrality. As set out in Section 3, we are however open to considering other remedies for cashflow timing impacts that cause divergence from PV neutrality - including those that would financially benefit companies.

Changes to PR24 models: Financial model

We have updated the financial model which this document accompanies to align to our current position. This is explained of the cover sheet of the financial model.

Changes to PR24 models: Other models

We do not agree that our entire modelling suite needs adjusting to incorporate half-year cashflows throughout, but we will consider any proportionate changes on a model by model basis where justified, and where appropriate data supports this change.

We agree that the decision to change the allowed return revenue formula in this paper creates a need to update other models where there is a time value of money adjustment. This would not include PR19 reconciliation models run at PR24, in the interests of certainty and predictability.

Changes to PR24 models: Reconciliation models

As discussed in section 3 we consider our assumption of mid-year cashflows is reasonable, however a number of reconciliation models currently assume cashflows happen at the end of the year as demonstrated in table (2.1).

Table 2.1 Illustration of our current approach to time value of money adjustments

	Year 1	Year 2	Year 3	Year 4	Year 5
Cashflow	10	10	10	10	10

Years discounted	4	3	2	1	0
WACC	3%	3%	3%	3%	3%
Discount factor	1.13	1.09	1.06	1.03	1.00
Adjusted cashflow	11.26	10.93	10.61	10.30	10.00

Our proposal for future reconciliation models would be to adjust the mechanism for discounting to show cashflows occurring throughout the year. An increase in the years discounted by 0.5 years assumes that on average cashflows occur mid-year. This is shown in table 2.2 below.

Table 2.2 Illustration of our proposed approach to time value of money adjustments

	Year 1	Year 2	Year 3	Year 4	Year 5
Cashflow	10	10	10	10	10
Years discounted	4.5	3.5	2.5	1.5	0.5
WACC	3%	3%	3%	3%	3%
Discount factor	1.13	1.09	1.06	1.03	1.00
Adjusted cashflow	11.42	11.09	10.77	10.45	10.15

Annex A – Issues raised and our response

GENERAL COMMENTS			
Issue:	**Description of issue:**	**Raised by:**	**Our response:**
Inconsistent criteria for intervening to change approach	Ofwat is inconsistent in terms of the criteria it applies to make a change to its existing approach: a) We did not make an allowance for the 'convenience yield' in index-linked gilts even though our calculations estimated it at 7bps on the RFR. (SVE) b) We did not allow for swap costs despite evidence they affect company cashflows (SVE)	SVE	a) **Disagree:** SVE imply that a proportionate approach would be to include the 7bps 'convenience yield' in our 'early view' risk-free rate'. Firstly, it is not clear this would be appropriate, as it is based on instruments that use a 2 year maturity horizon rather than the 20 years used in our 'early view'. Secondly, the two figures are not alike in materiality. Adding 7bps to the risk-free rate is an impact that is <0.01% RoRE, vs the indicative 0.11% RoRE from our preferred option. b) **Disagree:** We set a cost of debt allowance to fund the notional company's cost of financing investment. Our position remains that swaps are not an intrinsic part of debt financing, but a choice made by companies.
Ofwat is wrong to aim for PV neutrality	Argument that we should not expect cashflows to be PV neutral in practice and trying to fix it in isolated parts of the model risks introducing further discrepancies and complexity: a) Treatment of inflation, timing of customer receipts and treatment of retail control will all have effects on present value. Ofwat's proposals don't consider these, so there is a risk any changes will exacerbate PV neutrality, not fix it (TMS, WSX). b) The PR24 modelling framework is intentionally designed around annual cash flows. Redesigning it to cope with	ANH, NES, TMS, WSX	a) **Partially agree:** We agree that the factors cited could have an impact on PV neutrality, however we consider there is a benefit to regulators adopting a common approach in terms of increasing the transparency and consistency of approaches in UK regulation. We are open to considering requests to remedy other cashflow timing distortions (see section 3.3). b) **Partially agree:** We recognise in section 5.3 that some changes will be needed in our models – particularly around time value of money adjustments. We do not agree that all models need to be redesigned around half-year timing increments, or that the data currently exists to do so.

GENERAL COMMENTS			
Issue:	**Description of issue:**	**Raised by:**	**Our response:**
	mid-year cashflows will introduce considerable additional complexity for little tangible benefit, for instance the need to update the reconciliation models that assume end-of-year cashflows (NES, UUW).		
The consultation analysis is not comprehensive enough to justify decision making	Argument that the analysis in our consultation does not provide a comprehensive enough exploration of relevant cashflows, which undermines the robustness of any conclusions: a) Ofwat's analysis does not consider financing cost cashflows, which could be considered as falling mid-year as well, which would make the 'Average RCV' approach PV neutral in a simple worked example. (NES) b) We have not reflected inflation in our modelling but a simple worked example shows that it makes our 'Fully PV' option give a result that is not PV neutral because inflation is reflected with a time lag. (TMS)	NES, TMS	a) **Disagree:** We consider that NES's example contains assumptions that do not reconcile well to evidence on cashflows from the sector, such as final dividends paid significantly after the end of the reporting year, and low prevalence of amortising debt (See section 3.3). b) **Partially agree:** TMS' example of inflation resulting in a non-PV outcome illustrates that the lag in reflecting inflation can drive outcomes that are not PV neutral. We nonetheless consider that there would be a degree of offsetting of impacts above- and below- target inflation given the Bank of England's symmetrical target, such that other initiatives to increase PV neutrality could still overall achieve an improvement relative to the status quo.
Interaction with other aspects of PR24 may offset revenue gain to customers	Argument that our proposals imply mid-year discounting and so would require updates to our allowed return estimation framework: a) Applying mid-year would tend to reduce the retail margin adjustment, increasing the wholesale WACC (TMS) b) Using mid-year compounding to estimate TMR from historical returns would increase	TMS, UUW, SVE, ANH, NES, WSX, SEW	a) **Partially agree:** We agree our proposals could have implications for that the retail margin adjustment (see section 5.3), however we have not made decisions in this paper as we did not consult on this policy area. We welcome further submissions as part of PR24. b) **Disagree:** We do not agree that assuming revenue is received mid-year requires estimating the TMR on a mid-year basis. This is as we consider our change relates to making an adjustment

GENERAL COMMENTS			
Issue:	**Description of issue:**	**Raised by:**	**Our response:**
	the TMR estimate as higher-frequency data is more volatile and so give higher arithmetic averages (UUW) c) Sector equity betas reflect the current approach therefore a change might need an ex-post uplift to beta. (SVE, ANH) d) Investor expectations of using the existing approach mean revenue-negative changes need to be offset elsewhere (WSX, NES, SEW)		to reflect the earlier receipt of allowed revenues, without implications for the validity of the annualised figures. Moreover, it is not clear how mid-year compounding could be achieved in the historical dataset given the first half of the dataset assumes end-of-year compounding, and DMS does not split out total return into the share from capital growth and dividends/buybacks. We note that neither Ofgem nor CAA comply with this expectation despite using the DCB approach. c) **Disagree:** We have not tended to make ex-post beta adjustments in past price controls, and continue to consider that the right approach remains to focus on econometric beta estimates. d) **Disagree:** There are strong arguments for making the adjustment on the grounds of improving PV neutrality and in terms of consistency with other regulators. Offsetting the cash impact with higher revenues elsewhere would defeat the point of pursuing improved PV neutrality.
Need to take an 'in the round' view	Argument that the consultation focused too narrowly on mathematical precision in a single element of the control, arguing other considerations were relevant: a) Judgment in the round considering other decisions taken at draft and final determinations (SVE) b) Impact of proposals on financeability (TMS)	SVE, TMS	a) **Partially agree:** We consider it is best to provide early clarity of our decision and observe good practice in consulting by disclosing our decision to consultees in a prompt manner. We can consider further issues this raises as part of PR24. b) **Partially agree:** As the change is to the financial model, we would expect it to be reflected in notionalised cashflows and so included as part of our financeability assessment.

GENERAL COMMENTS			
Issue:	**Description of issue:**	**Raised by:**	**Our response:**
Existing approach is a policy choice after being aware of this issue	Argument that the Competition Commission overwrote Ofwat's 'Average RCV' formula with a more PV neutral one in the Bristol Water 2010 appeal, but Ofwat continued to use their legacy approach for PR14 and PR19. This means Ofwat cannot justify changing course by claiming it is correcting an anomaly in its framework that it was unaware of.	ANH, SEW, UUW, WSX	**Disagree:** Irrespective of whether we chose in subsequent controls to retain an unadjusted 'Average RCV' approach, this does not constitute an appropriate reason to embed the 'Average RCV' approach for all subsequent price controls, if we consider it to be flawed after considering Cubelynx's review, evidence from other sectors, and our own modelling.
Ofwat's proposals are one-sided as they don't address other cashflow timing distortions.	Argument that our proposals were inconsistent with other areas of our regulatory framework which either ignore or provide a cursory treatment of cashflow timing distortions. Issues raised: a) Using lagged (November) inflation to index bills means that compensation for high inflation has a timing difference that is not adjusted for and is recouped over a long period (SRN). b) We don't currently allow for a 'cost of carry' allowance in our cost of debt to reflect drawdown before RCV creation (WSX, SES, SEW)	WSX, SRN, SES, SEW	a) **Partially agree:** We recognise that variations to outturn inflation against our inflation target can drive divergence from PV neutrality for all calculations featured in our consultation, however (noting the Bank of England's symmetrical target), there is likely to be a smoothing effect over the longer term. We are not therefore convinced that a mechanism to correct for these PV perturbances would offer sufficient benefits relative to our decision in this paper. b) **Agree:** We have however signalled openness to considering further water sector-specific evidence on the cost of carry as part of PR24.
Ofwat has not applied a similarly detailed approach to the retail margin.	Argument that we should for consistency's sake also revise our approach to estimating the margin adjustment. Related points include: a) The retail margin adjustment calculation is generic not company specific, so some companies earn more/less than their cost of capital. (NES, WSX, SEW)	ANH, NES, WSX	We note that issues raised relate to a policy area which we did not consult on. To avoid failing to capture views of interested stakeholders we do not make decisions on the retail margin adjustment in this paper. a) **Partially agree:** This is however a challenge to the notional approach to setting allowed returns. While using a more company-specific approach might result in more

GENERAL COMMENTS			
Issue:	**Description of issue:**	**Raised by:**	**Our response:**
	b) We have not applied mid-year discounting to the retail margin adjustment calculation, which would likely change the adjustment from appointee to wholesale WACC (ANH, NES).		precise allowances, it could also result in weaker incentives to manage working capital costs. b) **Agree:** We agree that applying the logic of mid-year cashflows to the retail margin adjustment calculation could change the allowance for return on fixed capital assets, thereby changing the level of retail margin adjustment.
Superior qualities of the 'Discounted Closing Balance' approach over the 'PV neutral' approach	Argument that we should adopt the Simple PV approach, because: a) It is simpler/more transparent, and this may avoid modelling error (SRN, TMS, WSH SWB) b) It is more familiar to stakeholders (SRN). c) Its use brings Ofwat into line with Ofgem / CAA / UREGNI (SRN).	SRN, TMS, SWB,	**Agree:** We agree we should adopt the 'Discounted Closing Balance' approach. This is because it is the less complex and more intuitive alternative option, while also performing well on PV neutrality criteria – as set out in our testing. It is also more consistent with the approach used by Ofgem, the CAA and UREGNI. In addition, as set out in section 4.3, we have re-evaluated our view of the significance of the slightly better performance of the 'PV Neutral' approach in terms of achieving PV Neutral outcomes.
Ofwat's proposals do not cover past price reviews.	Argument that if this is an historic issue we could consider quantifying the impact, with a view to sharing it with customers.	CCW	**Disagree:** In the interests of certainty and predictability, we do not consider that it would be appropriate to re-open previous price control determinations.

Annex B – Modelling tests

Section 4.3 details a number of modelling tests against our three options for calculating revenue for the allowed return:

- 'Average RCV' – the approach in place when we published our consultation.
- 'Discounted Closing Balance' – an alternative approach used by Ofgem, CAA and UREGNI
- 'PV Neutral' – an alternative approach we proposed to use in our consultation paper. outlined approaches in our consultation document.

Tables 3.1 and 3.2 below shows the timing assumptions we have used in our tests, for the purposes of applying inflation and discounting.

Table 3.1 Timing assumptions for modelling tests

	Inflation	Discounting
Opening balances	Start of year	Start of year
RCV additions	Mid-year	Mid-year
RCV Run-off	Mid-year	Mid-year
RCV return	Mid-year	Mid-year
Interest[15]	Mid-year	Mid-year
Closing balance	End of year	End of year

Table 3.2 Other assumptions

	Assumption
Opening RCV	£100m
Additions to RCV	£0
Depreciation lifetime	10 years
Real WACC	3%

[15] The financial model assumes debt is raised through the overdraft functions with any movements in cash having a 50% adjustment when calculating interest to reflect mid year cashflows.

We recognise that real-world factors such as variations of inflation may work against a perfectly PV outcome even against the most mathematically precise of formulae. We accordingly consider that a perfectly PV outcome is an unrealistic criterion for adopting a given formula for our allowed revenue calculation. We have accordingly decided to use a criterion of 0.05% of the relevant opening balance to determine whether a given formula passes or fails our tests. For Test 1 the related balance is the £100m opening RCV balance. For Test 2 the related balance is £45m (£100m RCV adjusted for the 55% PR24 notional gearing assumption).

Tables 3.3 and 3.4 below provide further information on the results of these tests.

Table 3.3 Further results for Test 1: PV Return on RCV and Run off = PV Opening balance

	Approach		
PV Return on RCV and Run off = PV Opening balance	**PV neutral**	**Discounted Closing Balance**	**Average RCV**
Variance to RCV (£m)	-	0.01	0.19
Variance as proportion of RCV	-	0.01%	0.19%
Pass criterion[16]	<0.05%	<0.05%	<0.05%
Score	Pass	Pass	Fail

Table 3.4 Further results for Test 2: PV of equity cashflows = zero

	Approach		
PV of equity cashflows = zero	**PV neutral**	**Discounted Closing Balance**	**Average RCV**
Variance to Notional equity (£m)	0.00	0.01	0.18
Variance as proportion of Notional equity	0.00%	0.02%	0.41%
Pass criterion [17]	<0.05%	<0.05%	<0.05%
Score	Pass	Pass	Fail

[16] Test 1 threshold equates to £0.05m (0.05% of £100m=£50,000)
[17] Test 2 threshold equates to £0.0225m (0.05% of £45m=£22,500)

Ofwat (The Water Services Regulation Authority) is a non-ministerial government department. We regulate the water sector in England and Wales.

Ofwat
Centre City Tower
7 Hill Street
Birmingham B5 4UA
Phone: 0121 644 7500

This document is also available from our website at www.ofwat.gov.uk.

Any enquiries regarding this publication should be sent to mailbox@ofwat.gov.uk.

OGL