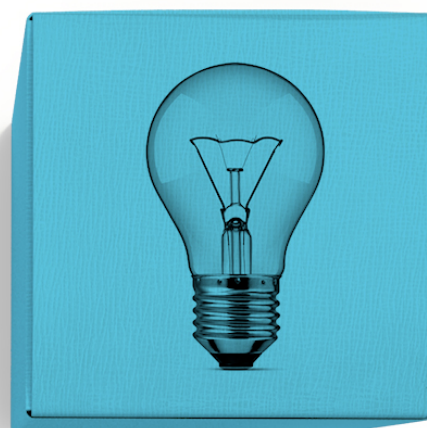


RIO-2: Use of Market Evidence

Ofgem

9 July 2020



FINAL REPORT

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EXECUTIVE SUMMARY

As part of its forthcoming determinations on the cost of equity for RIIO-2, Ofgem wishes to consider how market evidence on debt and equity valuations, in particular, valuation premia relative to Regulatory Asset Value (RAV) – often referred to as Market-Asset Ratios (MARs) – might inform these decisions. For the Sector Methodology Decision (SSMD), Ofgem set out a three-stage methodology for setting the allowed return on equity. In principle, market evidence on equity and debt valuations could be used to inform all three stages.

Evidence of MARs materially different from one for publicly listed regulated networks is conceptually a powerful piece of evidence for a regulator to inform its decision on the allowed return and potentially calibration of other components of the price control package. However, it is also important to ensure that the causes – or drivers – of any observed premia to RAV are understood and correctly attributed within a regulatory decision.

Approach

Many practitioners typically present the MAR as the ratio of the enterprise value (EV) of the regulated business to its RAV. However, for Ofgem's purposes, the equity market valuation premium – i.e. the ratio of the equity market value of the regulated utility business to the notional equity value of its RAV – is more significant. Under either MAR presentation – EV/RAV or the ratio of the market value of notional equity to notional equity – assumptions of the value of the company's debt are required to calculate the MAR.

Corporate finance theory implies that an MAR should be calculated using market values of equity and debt. Theoretically using market debt values is the right approach for Ofgem's analysis in the context of its RIIO-2 determinations. However, use of market debt values creates complications, both when calculating the MAR in practice and when attributing the proportion of an observed premium to RAV that might influence a regulatory decision. This is in addition to the challenges of accounting for the various flows to equity investors and other permanent or transient causes of market valuation premia for GB regulated utilities, before drawing inferences and conclusions for regulatory purposes from the market evidence.

When using market value of debt, a key issue to consider is the impact of the embedded debt cost commitment in GB regulated utility sectors. Utilities are given an allowance for the cost of embedded debt. This regulatory commitment has a value. At a time when interest rates have fallen the regulatory promise on the debt portion of RAV is at a premium to RAV (and vice versa). This means measured MARs that incorporate a market value of debt may include a component that reflects the decline in interest rates and does not reflect either expected outperformance or an expectation of premium allowed returns on equity. The impact may be substantial. Where a market value of debt is used, the impact of this regulatory promise needs to be reflected in the MAR analysis to avoid risks of bias in the inferences that a regulator might draw. In practice, however, this is not simple to do given the structure of the publicly listed regulated businesses in the GB, in particular, the energy networks.

Using book values of debt in the MAR calculation instead helps address some of the practical issues with calculating an MAR using market debt values. However, under some circumstances this simplification of using book values of debt can also risk creating bias in the inferences that a regulator may draw from MAR analysis, as explored within the main part of this paper. Based on current data, however, estimates based on book values of debt do not appear to be misleading.

Nevertheless, in this report we have presented both approaches – MARs based on market values and book values of debt – as part of our analysis.

Results and implications

Estimates of MARs can, in principle at least, be used most directly to help determine:

- if investors' required cost of equity is consistent with, higher than or lower than the return on equity allowed by the regulator through the price control package; subject to assessment of
- whether equity valuation premia could plausibly and reasonably be driven by other factors, e.g. structural outperformance by the company of key building blocks of the price control (e.g. totex and ODI incentives).

We make the following inferences from our analysis:

- Whilst MARs fluctuate significantly and may be estimated below one at particular points in time for particular companies, the evidence over time generally indicates an MAR for GB regulated networks of above one. At least part of this premium to RAV can be attributed to factors that are relevant to Ofgem's forthcoming RIIO-2 determinations, i.e. the premium to RAV can be attributed to the valuation of equity holders' residual claims on the asset being at a premium to notional equity.
- Recent evidence from energy comparators and time series analysis of traded GB water companies MARs around PR19 Final Determination is hard to reconcile with Ofgem's proposed CAPM parameters for cost of equity being fundamentally unacceptable to investors, particularly as PR19 is generally perceived as a 'tough price control' across a range of price control building blocks (e.g. ODIs, totex etc.).
- Finally, we consider that MAR evidence can most effectively be employed within this context to explore joint hypotheses. What assumptions on the underlying cost of equity can be reconciled with plausible expectations of GB energy networks' scope for outperformance in RIIO-2? Using stylised modelling we show:
 - A representative MAR of around 1.1 can be reconciled with an underlying cost of equity broadly in line with Ofgem's assessment of the CAPM evidence and expected long-term RORE outperformance of around 2%.
 - To the extent that MARs are judged to be towards the higher end of the range estimated in this paper (around 1.2 based on recent evidence, though higher estimates are plausible), an underlying cost of equity broadly in line with the CAPM evidence would require investors to expect long-term RORE outperformance of around 4%.
 - Were plausible expectations of RORE outperformance judged to be significantly lower than 2%, MARs of 1.1 would be more consistent with an underlying cost of equity below 4%.

It is important to interpret this evidence in light of other sources of evidence on the underlying cost of equity. We would avoid combining relatively extreme and opposing assumptions (though they may be plausible in isolation) and would be cautious of reaching strong conclusions that appear materially out of line with wider evidence.

1. INTRODUCTION

The RIIO price controls set the allowed revenues of electricity and gas networks in Great Britain (GB). As part of those price controls Ofgem will set an allowance for the cost of equity that companies are able to recover. In its Sector Specific Methodology Decision (SSMD)² for the gas and electricity transmission and gas distribution sectors, Ofgem estimated the cost of equity for these network companies at 4.80% and proposed a working assumption of 4.30% for the cost of equity allowance net of expected outperformance.

As part of its forthcoming determinations on the cost of equity for RIIO-2, Ofgem wishes to consider how market evidence on debt and equity valuations, in particular, valuation premia relative to Regulatory Asset Value (RAV) – often referred to as Market-Asset Ratios (MARs) – might inform these decisions.

As set out at SSMD, Ofgem has decided to apply a three-stage methodology for setting the allowed return on equity. In principle market evidence on equity and debt valuations can be used to inform all three stages:

- **Step 1** is a CAPM-derived WACC. The cost of equity is built up through a formula that relates the equity beta to the level of gearing. Market evidence in this step can inform the estimated gearing used to de-lever measured equity betas for comparator companies, and to inform the notional gearing used to re-lever asset betas to the notional entity's financing structure.
- **Step 2** involves cross-checks of the CAPM-derived Weighted Average Cost of Capital (WACC). Market evidence can be used alongside evidence and assumptions on price control outperformance to infer conclusions about the underlying cost of equity for comparator companies.
- **Step 3** applies an Allowed Return (AR) vs. Expected Return (ER) wedge deduction, should such a wedge be justified and evidenced. Market evidence can be used as one input into the assessment of the existence and size of any wedge³.

This process may need to be iterative: the application of adjustments through Step 2 and Step 3 may have implications for Step 1. Ofgem should re-lever its asset beta to reach a notional equity beta in a way that is consistent with its other calculation steps.

Ofgem commissioned CEPA to consider how market evidence on the value of equity and debt for regulated companies could best be applied at Steps 1, 2 and 3 of its cost of equity methodology. We were asked to assess:

- the issues associated with calculating 'Market to (regulatory) Asset Ratios' (MARs);
- recent and (to the extent possible) historic evidence on MARs; and
- where possible the implications of the MAR evidence for each Step of Ofgem's methodology.

An MAR is the ratio of a regulated company's market value to its notional value. An MAR of one indicates that a company's providers of finance expect value in line with the regulator's valuation of the notional entity, while a value above (below) one indicates greater (lesser) value.⁴

² Ofgem: 'RIIO-2 Sector Specific Methodology Decision – Finance', May 2019.

³ The relevant premia to consider for Step 3 is the forward-looking expectation of outperformance, as opposed to Step 2, where the calculation can be done at any point in time to infer a cost of equity.

⁴ The label MAR is generally used to refer to a ratio of a regulated company's total assets to the value of its RAV. However, valuation premium can also be calculated for subsets of the RAV. For example, an equity premium would relate the value of a regulated company's equity to the value of its notional equity. We use the term valuation premium in this paper to refer to any comparison between a company's assets (or subset thereof) and its RAV (or subset thereof), and the term MAR to refer specifically to the comparison between a company's total assets and its RAV.

The rest of the report is structured as follows:

- Section 2 sets out definitions, key concepts and theoretical principles that we refer to in our analysis.
- Section 3 considers options for calculating valuation premia.
- Section 4 presents our analysis of valuation premia.
- Section 5 then discusses how that evidence might be interpreted and applied within Ofgem's cost of equity estimation methodology.
- Section 6 provides our summary conclusions.

Appendix A provides a brief summary on our approach to the illustrative modelling that informs our analysis in Section 5.

2. DEFINITIONS, CONCEPTS AND THEORETICAL PRINCIPLES

In this section we set out the key definitions, concepts and the principles that we use in later sections of the report to draw interpretations from relevant market evidence for the cost of equity in RIIO-2.

2.1. KEY DEFINITIONS AND CONCEPTS

2.1.1. Asset values

The assets and liabilities of a firm can be represented as book values or market values. A book value is based on value at the point of investment or capital raising. It is a backward-looking accounting concept that is not updated as drivers of value change. By contrast a market value may be updated (continuously or at particular points in time) to reflect forward-looking expectations of the drivers of value. The market value of both equity and debt can change over time. For debt, the clearest driver is the prevailing interest rate, which represents the discount rate at which future fixed debt obligations will be valued by lenders. There is a much longer list of determinants of the market value of equity given that holders of equity are entitled to the residual cash flows of a business.

Table 2.1 below summarises four different representations of the assets of a regulated firm.

Table 2.1: Composition of regulated assets

Total assets	Debt component	Equity component
Regulatory Asset Value (RAV)	Notional debt <i>Debt share of historic capitalised expenditure</i>	Notional equity <i>Equity share of historic capitalised expenditure</i>
Present value (PV) of regulatory commitment	PV of debt regulatory commitment <i>Notional debt cash flows discounted at prevailing cost of debt</i>	PV of equity regulatory commitment <i>Equity cash flows discounted at prevailing cost of equity</i>
Company accounting value	Book value of actual debt	Book value of share capital
Enterprise Value (EV)	Market value of actual debt <i>Actual company debt cash flows discounted at prevailing cost of debt</i>	Market capitalisation

Source: CEPA

The RAV represents the underlying basis for investor valuations. However, unlike the other two measures in Table 2.1 it is not based on a discounted stream of future cash flows. It is based on historic expenditure that the regulator has committed to capitalise and subsequently remunerate. This gives rise to a regulatory commitment with respect to both notional debt and equity. The present value (PV) of the cash flows arising from this commitment will be equal to the RAV if the rate of return assumed by the regulator to generate those cash flows is equal to the prevailing costs of debt and equity and if there are no additional sources of persistent expected value.

Although the PV of the regulatory commitment cannot be directly observed we can use market data to infer its value. The Enterprise Value (EV) reflects the value of the regulated company in the markets for debt and equity. Provided investors are fully informed it will reflect the PV of the regulatory commitment in total, though the distribution of value between debt and equity may differ.

2.1.2. Market Asset Ratio

The ratio between a company's EV and its RAV is the MAR:

$$MAR = EV / RAV$$

and the related concept of an MAR premium (assuming the MAR is greater than one) is:

$$MAR\ premium = (EV - RAV) / RAV.$$

Such a premium must reflect the PV of the regulatory commitment being greater than the RAV. A premium can accrue either to debt or to equity. For the purpose of this paper – focused on allowed rate of return considerations for equity – we are primarily interested in the extent of premia accruing to equity.

2.1.3. Market Value of Notional Equity

In order to calculate the relevant premium, we must estimate the implied market value of notional equity (MVNE) to an investor. This is given by total value of the regulatory assets less the market value of notional debt (MVND), i.e. the market value of the cash flows that notional equity investors must make to the holders of notional debt:

$$MVNE = PV\ of\ regulatory\ commitment - MVND$$

This reflects that equity investors hold a claim over all residual cash flows of a business after accounting for costs and meeting debt obligations.

The concept of a market value of notional debt (MVND) does not appear in Table 2.1 but is an essential determinant of the market value of notional equity. It represents the market value of a stock of actual debt equivalent in book value terms to notional debt.

In this paper the market value of notional debt is defined as:

$$MVND = Notional\ debt * Market\ value\ factor$$

where the market value factor is given by the ratio of market to book value of actual debt.

Based on the equivalence of the PV of the regulatory commitment and the EV we can restate this as:

$$MVNE = EV - MVND = (Market\ capitalisation + MVAD) - MVND$$

where the term MVAD denotes the market value of actual debt. The ratio, or valuation premia, of interest in our analysis is the ratio of MVNE to notional equity:

$$Notional\ equity\ ratio = MVNE / Notional\ equity$$

and the related concept of a premium on notional equity:

$$Notional\ equity\ premium = (MVNE - Notional\ equity) / Notional\ equity$$

2.1.4. 'P factor' and valuation of debt regulatory commitment

The regulated company derives value from any difference between the PV of the debt regulatory commitment and notional debt. The drivers of this difference may differ from the drivers of the difference between market and book value of actual debt – for example due to differences in term structure. This represents a potential source of premium for equity investors, who are not obliged to pay out the full PV of the debt regulatory commitment to debt holders if not required by them.

A notional equity premium may therefore arise for two reasons:

- The PV of notional equity cash flows may be higher than the regulator has assumed. This may reflect either cash flows themselves being higher (e.g. through outperformance on costs, incentive payments or lower financing costs) or the cost of equity being lower than assumed.
- Equity investors may be able to accrue a share of the PV of notional debt cash flows.

The contribution of the latter can be isolated. We can define a 'P-factor' associated with the PV of the debt regulatory commitment:

$$'P\text{-factor}' = PV\ of\ debt\ regulatory\ commitment / Notional\ debt$$

The value accruing to equity as a result of this ‘P-factor’ is given by:

$$\text{Additional equity value} = \text{Notional debt} * (\text{‘P-factor’} - \text{Market value factor})$$

again, where the market value factor is given by the ratio of market to book value of actual debt.

This value is reflected in the market value of notional equity (MVNE) calculated above.

2.2. IMPLICATIONS OF OBSERVED MAR PREMIA

In principle, the notional entity should expect an MAR of one if all aspects of the price control are perfectly calibrated and if market valuations have not shifted significantly over time.

However, an actual MAR above (or below) one does not necessarily imply a “problem” or that an adjustment is required to the price control package from the regulator’s perspective. The decision to do so depends on the underlying cause of the observed premium and, of course, the reliability of the MAR evidence base to start with.

Whether evidence of a valuation premium may justify the regulator considering changes to the price control package may depend on whether out-performance is specific to the comparator company concerned (in which case it may be a legitimate outcome of the price control process⁵) or is systematic (which may be more problematic depending on the incentives which the regulator is seeking to apply through the regulatory framework).

This means that the source and explanation of the premium needs to be carefully diagnosed and assessed before evidence of MAR premia in practice can be used directly and robustly as relevant evidence to cross check, or even calibrate, particular building blocks of the price control.

We discuss the practical issues with applying MAR evidence in the context of regulatory determination in Section 5 and how we would consider it is best applied. In the subsections below we outline some of the key issues and principles we consider relevant when evaluating what information MAR premia contain and the factors or issues that can explain a premium but are not a “problem” per se for the regulator.

2.2.1. Differentiating sources of outperformance

One of the explanations for observed MAR premia is that investors have assumed that the regulated company will outperform the regulator’s assumptions. We identify three different primary drivers of cost of equity outperformance:

- outperformance on costs and incentives⁶;
- outperformance against the allowed cost of debt; and
- the investor potentially requiring a lower cost of equity than the allowed cost of equity.

In the latter case, the investor is effectively discounting future cash flows at a lower required rate of return than the assumption by the regulator meaning that the regulatory promise of the allowed return on the RAV – all else being equal – will be valued at a premium to RAV.

It is difficult to distinguish between outcomes that are the result of a fair bet – i.e. areas of outperformance that could equally have been a source of outperformance or underperformance – and the part of any MAR premium that

⁵ For example, the regulated utility may be more cost efficient than companies in the sector as a whole, and so may be rewarded through the price control if its allowed revenues are set on an industry wide cost benchmark basis.

⁶ This covers all price control building block items, provided in the form of revenue allowances. This includes both taxation and pensions.

might be due to different areas where investors know or expect the regulated company will be able to outperform the regulator's price control assumptions.

As noted above, observed premia could be driven by specific outperformance by a firm in which case this may be viewed as a natural – and intended – outcome of economic and incentive-based price control regulation. However, premia could also be driven by systematic outperformance, which might lead the regulator to conclude that elements of its price control package require rebalancing.

However, even where there is evidence of systematic outperformance that leads to sustained MAR premia, this may still not necessarily mean that an adjustment to the price control package is necessary or justified. One of the underlying objectives and principles of incentive regulation is to encourage regulated firms to reveal their efficient costs and to seek improvements in quality and cost of service through outperformance of the regulatory settlement, i.e. to promote dynamic efficiency and delivery of outputs that customers value.

Within this context, it is less clear that systematic valuation premia should always be considered a “problem” for a regulator, although we would agree that if the premia are sustained for a long period of time, it may suggest that there are underlying issues within the regulatory framework that could require resolution.

What are the implications of the above? We highlight two key issues. First, the range of different sources for outperformance raise a potential ‘joint hypothesis’ problem for the regulator: is the source of the premia a result of outperformance on incentives and assumed debt costs (or potentially other sources) or because of the regulator's assumptions on the cost of equity being different to those of investors? Decomposing the different effects is necessary to understand the appropriate regulatory response, if any, to observed valuation premia.

Second, given the underlying regulatory objectives of the price control to begin with, there are trade-offs to consider if the regulator were to respond to MAR premia and different sources of the premia may support very different interpretations and possible actions when setting future price controls.

2.2.2. Movements in the market cost of debt

Movements in the market cost of debt may affect both debt and equity values. What might the implications be for interpreting MAR premia?

We introduced above the following formula for the market value of notional equity (MVNE):

$$MVNE = PV \text{ of regulatory commitment} - MVND = (\text{Market capitalisation} + MVAD) - MVND$$

where the term MVAD denotes the market value of actual debt and MVND the market value of notional debt.

Movements in debt markets will naturally affect the PV of the regulatory commitment to fund embedded debt costs. If those market movements affect both actual and notional debt equivalently then as the above equation shows, there is no impact on the market value of notional equity. The terms reflecting the market value of actual debt (MVAD) and the market value of notional debt (MVND) would cancel out.

If, however, market movements affect actual and notional debt differently then there may be an impact on the market value of notional equity (MVNE). In the formula above, market capitalisation is effectively a balancing item for any differences between movements in the market value of actual debt and the market value of notional debt.

We are inclined to interpret these changes in equity value as a ‘fair bet’. The direction of movements in the market cost of debt are unpredictable. If (for the sake of argument) equity investors have benefited from falling debt market rates, then they would have been penalised by increasing rates. If Ofgem were to seek to adjust for equity valuation premia in its cost of equity methodology it may therefore be appropriate to strip out any portion of estimated premia relating to this effect – though we are not aware of evidence indicating such a correction is necessary.

2.3. SUMMARY - PRINCIPLES TO APPLY

We discuss the principles we adopt for our analysis below, including where we consider that an adjustment might be considered in the price control package where there are observed MAR premia (positive or negative).

- We have a general preference for using market values of debt and equity for consistency with finance theory. We acknowledge though that while market capitalisation is readily available, robust data on the market value of debt may be trickier to get hold of.
- Consistency across calculation steps is preferable to occasional use of market data.
- When it comes to market valuation ratios, we are most interested in the premium on equity. The premium on debt (insofar as it accrues to debt holders) is less directly relevant, though can be used for subsequent inferences on outperformance.
- The source and explanation of any premium needs to be carefully diagnosed and assessed before evidence of MAR premia in practice can be used directly and robustly as relevant evidence to cross check, or even calibrate, particular building blocks of the price control.
- Outcomes that are considered to derive from a 'fair bet' are not an issue. The fair bet principle recognises that, under incentive regulation firms have the ability to outperform the regulatory settlement, while also facing the risk of underperforming the regulatory settlement.

3. CALCULATING VALUATION PREMIA

In this section we focus on how to calculate valuation premia in practice. We discuss in turn: (i) the key issues around estimation of valuation premia; (ii) a presentation of our proposed calculation steps for valuation premia (we set out two approaches); and (iii) a discussion of factors that may impact the robustness of our calculations.

3.1. ESTIMATION ISSUES

There are multiple challenges in estimating valuation premia in a robust evidence-based way. We discuss the key issues within this sub-section. We consider in turn:

- What market data should ideally be used in GB regulated businesses equity valuations – e.g. market or book value of debt?
- What comparators and regulated businesses could and should be used to estimate valuation premia in the context of Ofgem's regulatory proceedings for RIIO-2?
- What should be the relevant time period of analysis and what issues may exist with estimating equity valuations robustly given data limitations?

We do not consider these issues and questions prevent the use of valuation premia as relevant evidence within GB price control regulatory proceedings. However, they highlight the considerable practical challenges in calculating valuation premia in a robust and appropriate way for use in regulatory decisions.

This is before considering the challenges with interpreting what might explain the equity market valuations of GB regulated businesses, which we address in Sections 4 and 5 of the report.

3.1.1. What market data should be used?

The EV represents the theoretical price an acquirer might pay for a GB regulated network: if an incoming investor were to settle with all the security holders in full, then the EV would represent the expected sale price. For these reasons, EV should in theory be calculated using a market value of net debt. As discussed in the previous section, our preference is to use market evidence where available.

However, using the market value of debt can be complicated by practical considerations. A company's debt may not be publicly traded, or as a result of not being publicly traded, may require further assumptions and calculations to establish a market value of debt. As a simplification, the book value of net debt is, therefore, often used in the MAR calculation. Though less theoretically robust, the known limitations of the book value-based calculation may be preferable to harder to quantify inaccuracies in estimating or disaggregating (where debt is held by a group rather than a pure play regulated entity) market values of debt.

If we are using market values of debt, then a further issue to consider is the impact of the embedded debt cost commitment in GB regulated network sectors. Networks are generally given an allowance for the cost of embedded debt. This regulatory commitment has a value: at a time when interest rates have fallen the regulatory promise on the debt portion of RAB is at a premium to RAB (and vice versa). This means that measured MARs that incorporate a market value of debt will include a component that reflects changes in interest rates. This in itself does not reflect either expected outperformance or an expectation of a premium via allowed returns on equity. However, where valuation premia are calculated based on the market value of debt particular care must be taken to interpret this component of value appropriately to avoid risks of bias in the inferences that might be drawn of *the required cost of equity*.

Market data may also not exist for individual calculation steps of equity valuations for GB regulated businesses. As we discussed in the previous section, the bias from using a book rather than market value of net debt is minimised when actual gearing is close to notional gearing or market values of debt are close to their book values. However, where these conditions do not hold, adjustments to the book value-based equity valuation calculations, or the best estimate possible of the MVNE accommodating the market value of debt, may be required.

We discuss the issues with both approaches in further detail in Section 3.2 below. The key point to note is that evidence of equity valuations for GB regulated businesses should be clear on the market data that is used, and what are the assumptions and factors that must be accounted for depending on the approach chosen.

For the purposes of our MAR calculations, we have sought to develop two sets of calculations, one set that is based on book values of debt, and one set that seeks to adjust for the impacts that the market value of debt may have on the observed valuation premia (where applicable).

3.1.2. Which comparators should be used?

In an ideal world, Ofgem would be able to estimate valuation premia for energy networks in RIIO-2 drawing on a large number of GB listed pure play regulated energy network businesses (as with asset beta). Unfortunately, only two GB listed energy companies with network activities exist and neither is pure play. As such, it is necessary to consider alternative approaches.

We focus on the following five GB listed companies:

- National Grid and SSE, which have interests in GB energy networks alongside other group businesses;
- Severn Trent (ST) and United Utilities (UU), which are near to being ‘pure play’ GB water networks; and
- Pennon, which has an interest in a GB water network alongside other group businesses.

We consider that valuations of listed companies with interests in the GB water sector reflect a close enough investment substitute for a pure play GB energy network, that some inferences can potentially be drawn for the required cost of equity in RIIO-2. This is consistent with our findings of our relative risk assessment in our report for Ofgem on beta estimation issues.⁷

However, the relevance of evidence of equity valuations in the GB water sector to the GB energy network companies (and RIIO-2 specifically) does need to be carefully considered. While components of investors’ required cost of equity would be expected to be consistent between sectors, e.g. market wide parameters such as the total market return or the risk-free rate, there may also be differences in relative risk that mean investors demand a risk premium in one sector over the other. In addition, there may be valuation drivers that impact on one sector at a point in time, that are not relevant to the other sector.

While both companies have substantial holdings in GB energy networks, we have not sought to decompose equity valuations and evidence of MAR for regulated businesses owned by PPL and CKI. In theory this is possible, as for other networks considered. However, both have a range of business interests, neither is listed in the UK and less information is available of valuations of the non-GB regulated businesses in each group.⁸ As a consequence, we consider the estimation challenges to be higher for these companies than the five comparators we focus on in our analysis.

3.1.3. Decomposition

Another complication in estimating equity valuations of GB regulated businesses if we need to separate out the ‘GB regulated’ business from the overall Group – the “decomposition” problem. The two listed companies with regulated GB energy network businesses also have a range of other activities⁹. Where the value of the non ‘GB regulated’ business is incorrectly estimated, this will bias the MAR premia for the ‘GB regulated’ business, potentially leading to incorrect inferences being drawn from the analysis.

⁷ See CEPA (2020) ‘Beta estimation issues’

⁸ PPL for example, has investments in the UK and the US.

⁹ One of the water companies, Pennon, also has a significant proportion of its business in unregulated activities.

We consider that the inferences that Ofgem might draw from evidence of MARs should be subject to sensitivity analysis of different valuation approaches for GB and non-GB regulated businesses, rather than a single approach being used. This may include developing primary estimates of valuation (e.g. EV/EBITDA) to avoid mechanistically using the latest analyst valuations at the time of determination, where the MAR informs future policy.

The calculations that we present in Section 4 are based on a survey of recent evidence that we have sourced from various equity analyst publications. Where multiple valuations have been available, we have typically taken the average of the different valuations, as opposed to relying on a single source of evidence.

3.1.4. What should be the relevant time period of analysis?

Equity valuations can be calculated at a point in time or over a period of time. Indeed, in principle, valuations of listed businesses could be updated on a daily basis using latest company share price and EV data.

In general, we prefer to present a time series of results over a sufficiently long period of time to understand trends in ratios and reduce the volatility inherent in focusing on a single point in time estimate. However, developing a time series of valuation premia in which each observation is on an equivalent basis is challenging.

Daily data for all the inputs into the calculation of MAR premia for the regulated businesses may not be available. For example, values of net debt are produced every six months, analyst reports with valuations of the non 'GB regulated' businesses follow a more 'ad hoc' timeline and RAV values are often only reported periodically. Infrequently updated inputs may require interpolation.

Where analyst estimates of business unit valuations are used in the calculations, there can also be no guarantee that a consistent approach is being used over time, and historic valuations may be undermined by more up to date and concrete market information drawn from actual transactions.

Again, we do not consider these issues necessarily prevent using MAR evidence in regulatory proceedings. However, it does suggest that evidence at a particular point in time should not be applied mechanistically. Regulators should aim to focus on longer-term trends and evidence of MAR premia (if one exists), rather than valuations at a specific point in time. Although evidence of MARs at certain points in time (e.g. the period during or following the conclusion of price review) may be informative to future regulatory judgements.

For our calculations, we have looked at valuations for our five short-listed UK comparators over a range of different time periods.

3.2. CALCULATION STEPS

In this subsection, we set out the methodologies that we have used to calculate equity valuations and MARs in the next section of the report.

We set out two approaches: both use market valuations of equity; however, the first approach uses an estimate of the *market* value of debt in our comparators, while the second approach is based on *book* values of company debt. Therefore, we refer to the two approaches as:

- the '**market value debt approach**'; and
- the '**book value debt approach**'.

To recap on the previous section, Ofgem's focus in the context of reaching relevant judgments on the allowed cost of equity in RIIO-2 is on estimating a notional *equity* valuation premium:

$$\text{Notional equity premium} = (\text{MVNE} - \text{Notional equity}) / \text{Notional equity}$$

where:

$$\text{MVNE} = \text{EV} - \text{MVND} = (\text{Market capitalisation} + \text{MVAD}) - \text{MVND}.$$

If the MVAD and MVND are equivalent, the MVNE will be equal to the market capitalisation.

As a higher-level check on the valuation on total assets and for comparability with previous analyses we are also interested in the corresponding asset valuation premium:

$$MAR\ premium = (EV - RAV) / RAV.$$

Each of these must be calculated for the GB *regulated* business. However, the relevant components are not generally available at that level of aggregation as many of the comparators are not ‘pure play’.

Therefore, the valuation premium must be estimated based on the following inputs that are available at different levels of aggregation:

- Group level inputs, including market capitalisation, the market value of (net) debt and the book value of (net) debt.
- Inputs for the non-GB regulated business(es), including analyst estimates of disaggregated EV and, for interpolation purposes, EV estimates based on common valuation multiples (e.g. multiples of EBIT).¹⁰
- Inputs for the GB regulated business(es), including the book value of GB regulated business debt (based on regulatory reporting) and the RAV and its component parts.

Crucially, this collection of inputs is missing key items. Therefore, we infer the value of the following items:

- GB regulated business market capitalisation;
- GB regulated business market value of debt; and
- the market value of notional debt.

As discussed under the principles in the previous section, the market value debt approach represents our preferred estimation approach, subject to data availability and quality. The book value debt approach may nevertheless be a pragmatic calculation method or reference point, in particular, given that the input data is more transparent and potentially requires less adjustments and, therefore, assumptions.

The book value debt approach may allow us to reach an unbiased estimate where actual gearing is approximately equal to notional gearing or where market values of debt are approximately equal to book values. Where these conditions do not hold the book value debt approach tends to systematically over or underestimate the true equity premium if no correction is applied.

As we discuss in Section 4, the market value of debt approach currently leads to a significantly larger *EV/RAV* ratio due to the market value of debt effect. The RAV remains constant, so the difference is in the EV estimates calculated. With a higher market value of actual debt, the *EV/RAV* ratio is larger. However, the differences in the implied equity MAR between the market value debt approach and the book value debt approach are not as large because similar trends affect all companies’ debt and comparator gearing levels are relatively close to notional gearing assumptions.

It is important to note that the additional premium to RAV using a market value of debt is a natural outcome of the current low interest environment that drives the market debt valuations. As discussed in Section 2, this is not a regulatory issue per se, although it highlights the additional challenges in decomposing and interpreting evidence for notional equity valuation premia.

Our approach to calculating the relevant inputs under both methodologies is summarised in Table 3.1 below. By following each of these calculation steps, we are then able to calculate MAR premia. The results for both methods are presented in Section 4.

¹⁰ We take analyst EV estimates to incorporate a book value of debt unless stated otherwise.

Table 3.1: Overview of calculation steps

Calculation Step	Market value debt approach	Book value debt approach
Task 1 Establish Group EV	Market capitalisation + Market value of net debt	Market capitalisation + Book value of net debt
Task 2 Derive GB Regulated EV with BVAD	(i) Gather information from equity analyst reports from Sums of the Parts (SotP) valuations on the GB regulated EV and the Group EV ¹¹ (ii) We take an average of the results of two approaches below to derive an estimate of the GB EV (iii) Approach 1 involves calculating the proportion of GB regulated EV in Group EV at a point in time, and multiplying the average proportion by the current Group EV (iv) Approach 2 involves taking the £m GB EV figures from analysts and reflecting the change in the Group EV from the time of valuation to the current Group EV ¹²	
Task 3 Derive GB Regulated EV with MVAD	(i) Multiply GB regulated book value debt by Group ratio of market to book value of debt (ii) Add the (MVAD – BVAD) differential to Task 2 results	N/A
Task 4 Estimate debt RAV i.e. BVND	(i) Multiply last reported RAV by pro-rated annual growth assumption ¹³ (ii) Multiply RAV by notional gearing assumption	
Task 5 Estimate market value of notional debt ¹⁴ i.e. MVND	Multiple notional debt by Group ratio of market to book value of debt	Use BVND unadjusted
Task 6 Estimate MVNE	Deduct relevant debt figures (task 5 results) from GB Regulated EVs (task 3 results) to obtain a GB Regulated market capitalisation value	

Source: CEPA

We have presented the two approaches visually in Figure 3.1 below to give an illustration of where the two approaches differ to one another.

The robustness of our results will differ both by company and by the approach taken. There are also limitations under both approaches that are present for all companies. We discuss some of the key issues that need to be considered in the subsections below.

Again, we do not consider these issues necessarily prevent using MAR evidence in regulatory proceedings. However, they highlight the considerable challenges in estimating MARs particularly when the market value of debt approach is used and an equity – as opposed to EV – valuation ratio is being sought.

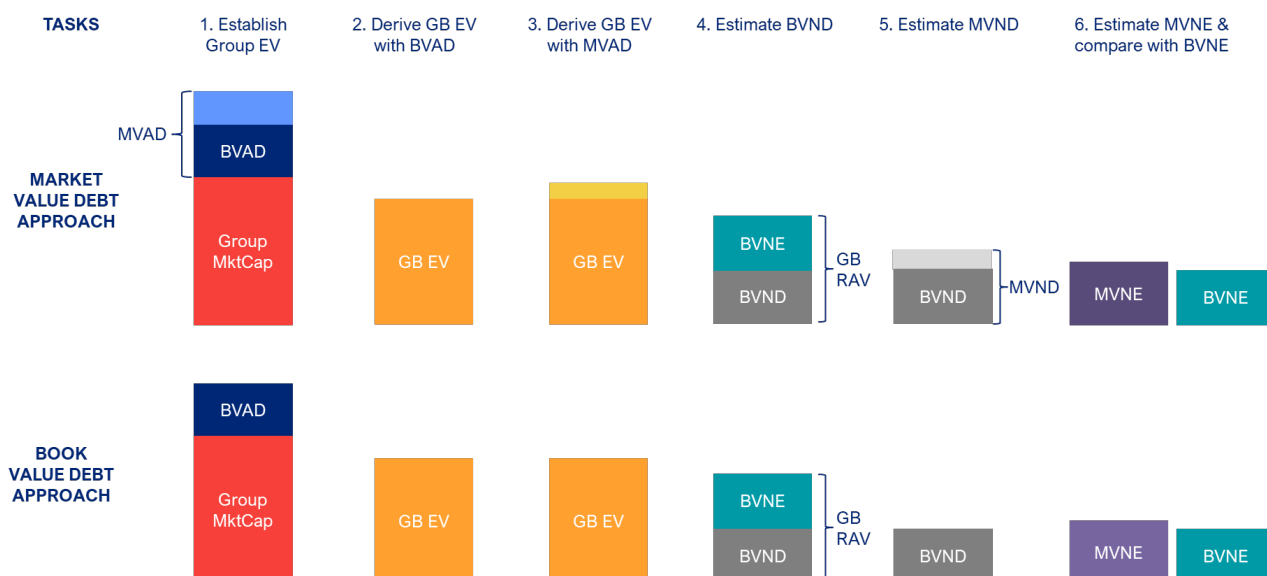
¹¹ We limit the results taken from analyst reports to one report per institution.

¹² An average is used from these estimates.

¹³ This uses the last known RAV growth rate.

¹⁴ This is linked to the discussion of the P factor in section 2 of this report.

Figure 3.1: High-level illustration of calculation approaches



Source: CEPA. Note: the MVNE figures calculated in the two approaches can be different.

3.3. ROBUSTNESS OF DIFFERENT ESTIMATES

There are a range of issues that may affect the MAR calculations:

- The fair value of debt included within company accounts may not be a perfect comparison for the book value equivalent e.g. inclusion of lease obligations or derivative positions.
- For the value of GB regulated debt, while we have taken values from regulatory reporting, there might be debt outside of the regulatory ring-fence that affects valuation and is not included elsewhere. For example, debt at the MidCo level.
- There is a wide scope for error in the valuation of the non 'GB regulated' businesses and analyst reports often have materially divergent views. The valuation might also be informed by what they consider the target value should be, rather than necessarily the current valuation inherent in the stock price. Evidence on the assumptions for debt and equity within those valuations is often not made available, with the subsequent market value adjustment challenging to do accurately. The reliability of our estimates will depend on whether analyst valuations are aligned with investors in the company.
- In our approach to obtaining a GB regulated EV we have sought to scale the value by the sum of the parts-derived group EV and the quoted EV on the day, therefore looking to minimise this potential bias.
- The true value of the GB RAV value can also differ to the last reported value as there is growth since the last reported value and there is potential for annual reporting or end of price control close-outs to impact on the RAV.
- Our estimate of the P factor in the market value of debt approach uses the ratio of the group market value of debt relative to the book value of debt to scale notional debt, which may not perfectly capture the drivers of the market value of notional debt.

As discussed above, our market value debt approach involves more assumptions and calculation steps than the book value debt approach. This stems from our preference to use market data, where available, which we consider the conceptually preferable approach. Where our two approaches yield similar results, this might provide comfort on the overall estimates (as long as the similarities are not by design e.g. a function of the adjustment factors chosen).

In terms of the robustness for different companies, Severn Trent and United Utilities have the greatest proportion of GB regulated activities and both have gearing for the GB regulated business very close to the notional assumption. However, the two companies have the largest difference between the book value and fair value of debt at the Group level (in relative terms). The recent Viridor sale from Pennon also has scope to lead to short-term fluctuations in the value of the company in recent market data.

3.4. SUMMARY

In this section we have set out the key issues and calculations around our estimation of valuation premia, provided a presentation of our proposed calculation steps for valuation premia, including our market value of debt and book value of debt approaches, and discussed factors that may impact the robustness of our calculations under both methodologies.

In the section which follows, we present the results of our calculations.

4. EVIDENCE ON VALUATION PREMIA

In this section we present the results of our equity valuation and MAR analysis. All figures in this section show calculations for the relevant GB regulated business. So, for example, an MAR premium for National Grid, shows the derived ratio for its GB regulated business activities and RAV.

The value we are most interested in for estimating the cost of equity is the measure of the notional equity premium. We begin, however, with estimates of overall asset MAR premia as these are most comparable to studies by others.

We include three separate ‘on the day’ estimates in our presentation of results. This includes the 31 December 2019, 14 February 2020 and 29 May 2020. We acknowledge that the results are sensitive to the days chosen.

We have selected the mid-February date to coincide with the cut-off for water companies to accept Ofwat’s PR19 final determinations or to challenge the price control in an appeal to the Competition and Markets Authority (CMA). With financial market uncertainty caused by the Covid-19 pandemic, more recent evidence has the potential to be more difficult to interpret at present. We include evidence from the end-May 2020 to understand how the data has evolved and ensure that the evidence reflects the latest available cut-off¹⁵.

As discussed in Section 3, we consider that evidence from regulated businesses in the GB water sector are informative as well as evidence from National Grid and SSE. With neither SSE nor National Grid being a pure play GB regulated network company, assumptions are required to isolate the value of the GB regulated business segment in each case. In contrast, Severn Trent and United Utilities are predominantly regulated assets in a sector with certain similarities to GB energy networks in RIIO-2.¹⁶

4.1. HEADLINE EV/RAV PREMIA

The subsections below present headline EV/RAV premia for the ‘GB regulated’ business on our three chosen dates: the 31 December 2019, 14 February 2020 and 29 May 2020.

An important point to note is that there is a material difference in the headline EV/RAV premia depending on whether the market value debt or book value of debt approach is used. Under both approaches the RAV is constant, however the EV differs. Where the market value of group debt exceeds the book value of group debt, the calculated EV under our market value debt approach will be higher. With prevailing interest rates for these companies falling, the market value of debt has increased relative to the book value of debt. The EV /RAV ratio is consistently higher for the market value of debt approach in our results.

Again, it is important to note that the additional premia to RAV using a market value of debt is a natural outcome of the current low interest environment that drives the market debt valuations. As discussed in Section 2, this is not a regulatory issue per se, although it highlights the additional challenges in decomposing and interpreting evidence for notional equity valuation premia, as discussed as discussed in previous sections.

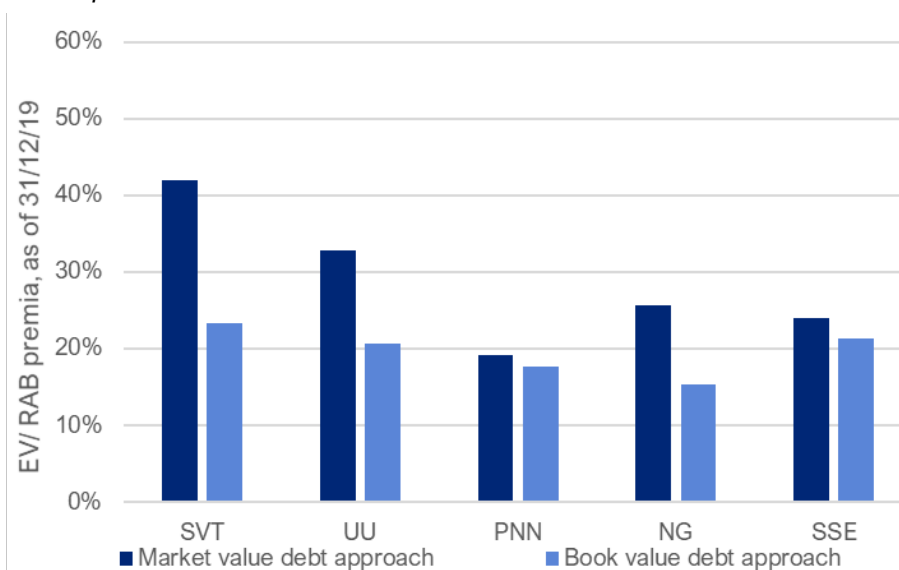
Results for 31/12/ 2019

Figure 4.1 presents headline MAR premia for our five comparator GB regulated businesses on the 31 December 2019. The MAR is consistently greater than one across all the comparators.

¹⁵ We note that information from annual accounts and reporting is still being developed, so we do not use updated values for the last reported values at the time of the analysis.

¹⁶ See our relative risk assessment in CEPA (2020): ‘RIIO-2: Beta estimation issues’, section 2

Figure 4.1 Headline MAR premia – 31/12/2019

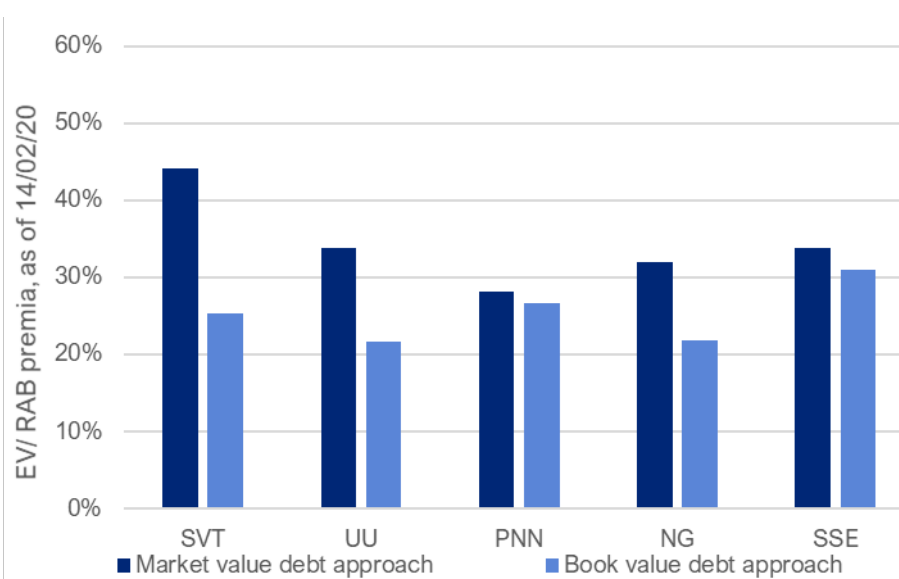


Source: Bloomberg, Company accounts, Ofwat, Ofgem, CEPA analysis.

Results for 14/02/2020

Figure 4.2 presents headline MAR premia for our five comparator GB regulated businesses, on the 14 February 2020. The mid-February 2020 figures are similar, but slightly higher than the end-December 2019 EV/RAV premia.

Figure 4.2: Headline MAR premia – 14/02/20

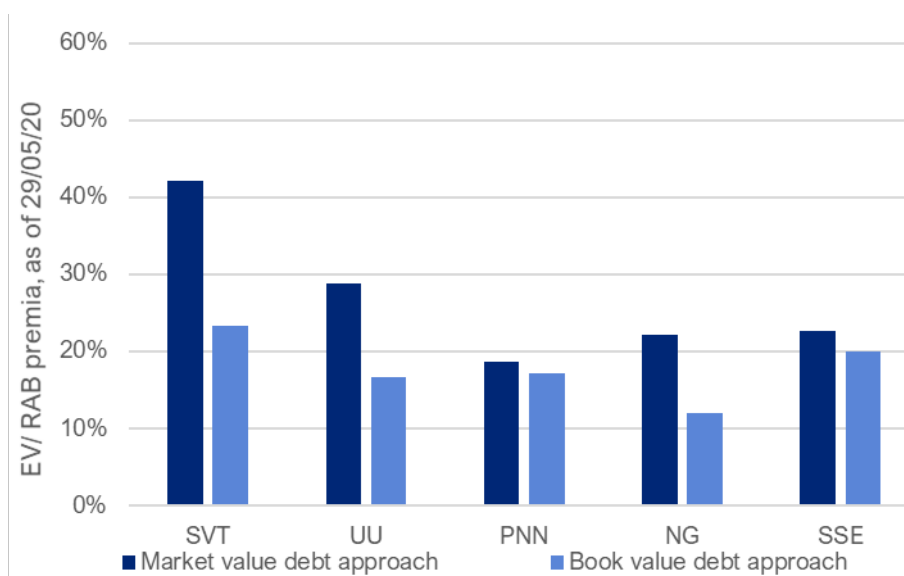


Source: Bloomberg, Company accounts, Ofwat, Ofgem, CEPA analysis.

Results for 29/05/2020

Figure 4.3 presents headline MAR premia for our five comparator GB regulated businesses, on the 29 May 2020. The premia are below what we observe for our mid-February 2020 estimate, but continue to reflect a positive headline EV/RAV premia.

Figure 4.3: Headline MAR premia – 29/05/20



Source: Bloomberg, Company accounts, Ofwat, Ofgem, CEPA analysis.

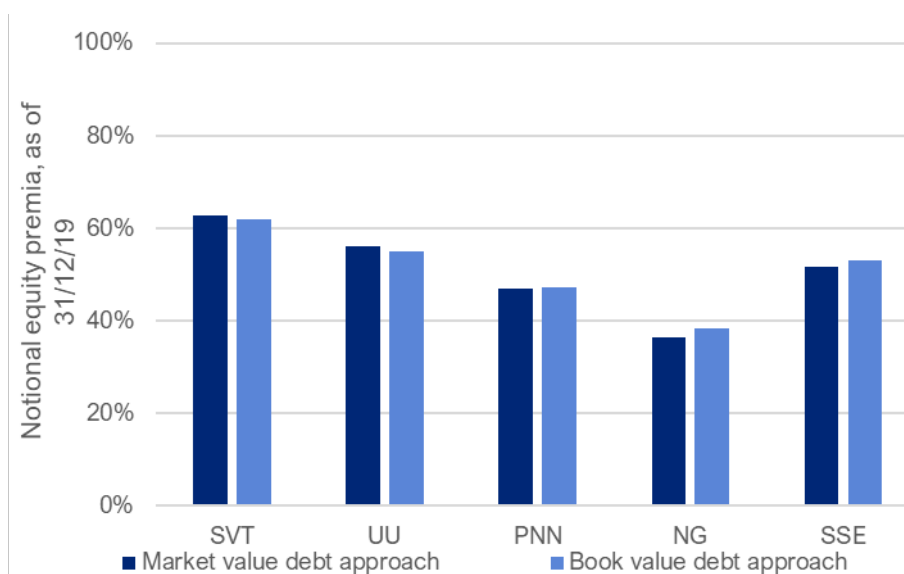
4.2. NOTIONAL EQUITY PREMIA

We present notional equity premium evidence for the ‘GB regulated’ business for the same three dates as shown for our EV/RAV analysis above. We consider that the notional equity premia are less susceptible to misinterpretation, although the headline EV/RAV ratios are more commonly shown.

Results for 31/12/2019

Figure 4.4 below shows the notional equity MAR premia for 31 December 2019. The market value of debt and market value of equity approaches yield relatively similar results for all five regulated utilities.

Figure 4.4: Notional equity premia – 31/12/2019

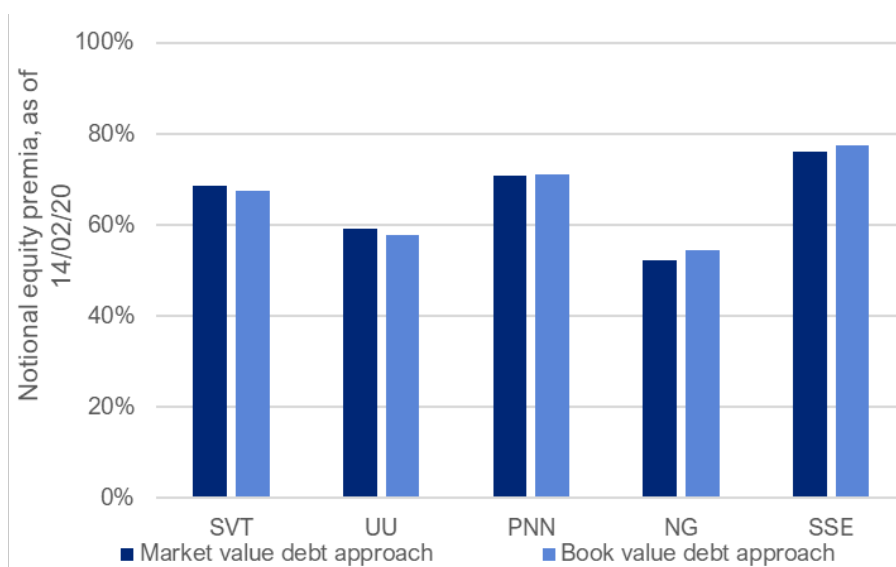


Source: Bloomberg, Company accounts, Ofwat, Ofgem, CEPA analysis.

Results for 14/02/2020

Figure 4.5 shows the notional equity MAR calculations for 14 February 2020.

Figure 4.5: Notional equity premia – 14/02/2020



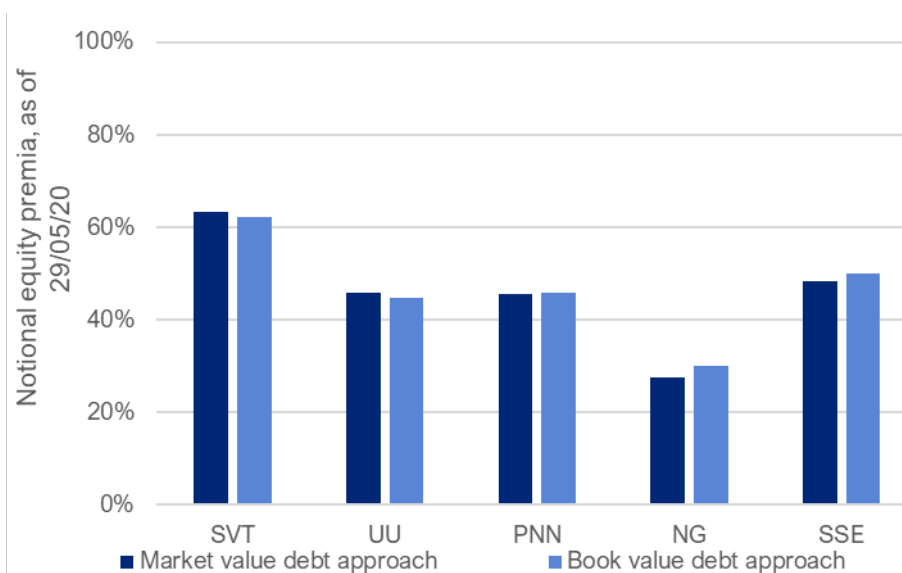
Source: Bloomberg, Company accounts, Ofwat, Ofgem, CEPA analysis

Figure 4.5 shows that notional equity premia on average increased during the first part of 2020. This is particularly relevant for the three water businesses in the sample, as by this date all three companies had chosen not to appeal Ofwat's PR19 final determination, therefore removing some uncertainty around cashflows up to 2025.

Results for 29/05/2020

Figure 4.6 shows the notional equity MAR calculations for 29 May 2020.

Figure 4.6: Notional equity premia – 29/05/2020



Source: Bloomberg, Company accounts, Ofwat, Ofgem, CEPA analysis

The latest data continues to show materially positive notional equity premia for the five regulated utilities. The notional equity premia tend to be higher than the headline EV/RAV MAR premia, with positive cashflows spread over a smaller denominator in the notional equity RAV rather than the full notional RAV.

We have highlighted our preference to consider approaches that utilise market evidence and focus on the notional equity premium rather than the headline MAR. However, as shown in this section our results using our methodology do not appear to be especially sensitive to the approach selected at this point in time (as long as the approach is applied correctly and consistently). As most commentators tend to focus on 'headline' EV/RAV premia, generally

calculated using a book value of debt, there is merit in focusing on results generated using this approach for comparability. Based on current data this would not appear to unduly affect the calculation results and interpretation, though this should be monitored for future analysis.

4.3. EXTENDING THE EVIDENCE TO TIME SERIES ESTIMATES

MAR and notional equity premia can change over time. We are also interested in understanding how MAR premia compare to other parties' estimates. This means that a time series evidence base is a useful reference. In the following sub-sections, we focus on extending the evidence above to include time series evidence and also make comparisons to estimates that other stakeholders have provided of GB regulated businesses MARs.

Basis for presentation

As discussed above, the premia on notional equity derived from our two (market and book value of debt) approaches tend to be very similar. Focusing on an approach using a book value debt approach or focusing on the headline EV/RAV premia should not lead to different implications being drawn from our 'on the day' estimates.

For time series estimates for both listed companies and for transactions, there are significant informational requirements to apply the same approaches as for 'our on the day' estimates e.g. gathering analyst reports consistently over a long-time horizon.

Regulatory precedent and analyst reports have tended to focus more on a book value debt approach and showing headline EV/RAV premia. The evidence that follows uses this same approach. It is important that the basis for the approach is considered when seeking to draw implications from the analysis.

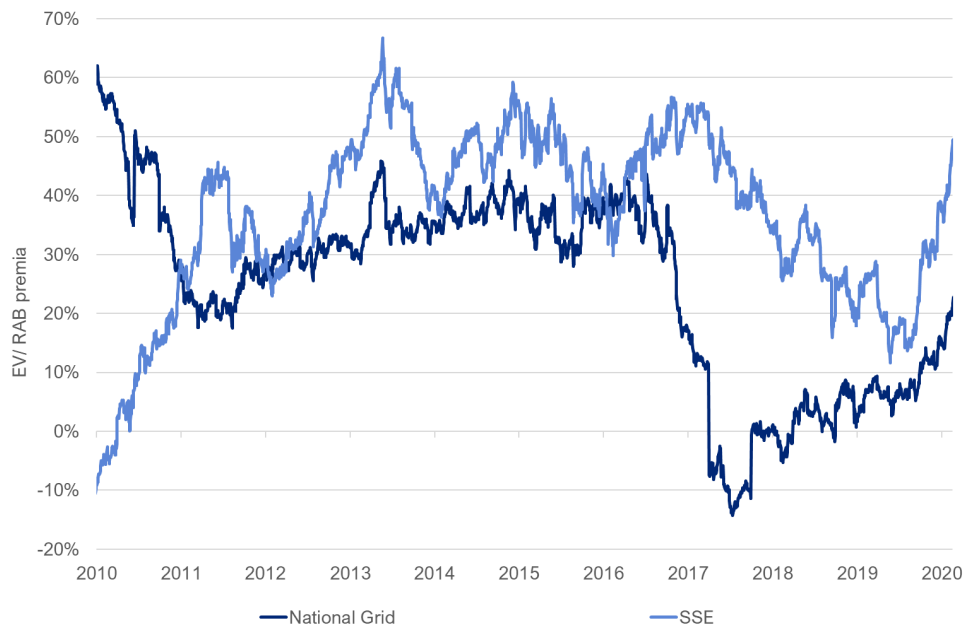
Time series for GB energy network regulated businesses

To arrive at a historic estimate of the headline EV/RAV multiple for the two GB listed energy network businesses (National Grid and SSE) we need a valuation that separates out the GB business over time.

For the purpose of back casting estimates for these two companies, we have proxied the EV of the segments of the business by the share of operating profit over time¹⁷. We also apply an interpolation for the value of the RAV over time. Figure 4.7 presents the results.

¹⁷ For example, where a company has 50% of operating profit from the 'UK regulated' business and 50% in the non 'UK regulated business', we value each segment at the Group EV multiplied by 50%. This approach is for reference purposes and is less sophisticated than our 'on the day' estimates.

Figure 4.7: Headline MAR premia for National Grid and SSE



Source: Bloomberg, Company accounts, CEPA analysis

Figure 4.7 suggests that the valuation of SSE's GB regulated businesses have been at a premium to RAV for the past decade. The MAR for National Grid has generally also displayed a premium to RAV, with the exception of the period around 2016-17, which is likely to have been affected by the gas distribution (Cadent) sale process.

Time series for GB water network regulated businesses

Figure 4.8 below shows headline MAR premia for our three listed water comparator businesses. These are based on updated valuations from a single source for the value of non 'GB regulated' assets over time for each of the three companies¹⁸. We consider that this approach is more aligned with our 'on the day' estimation approach, although it differs in that only one institution (Barclays) is used.

¹⁸ Barclays had provided this information to Ofgem, who shared the information with us for the purpose of this report.

Figure 4.8: Indicative headline MAR premia for listed water companies



Source: Bloomberg, Barclays, CEPA analysis.

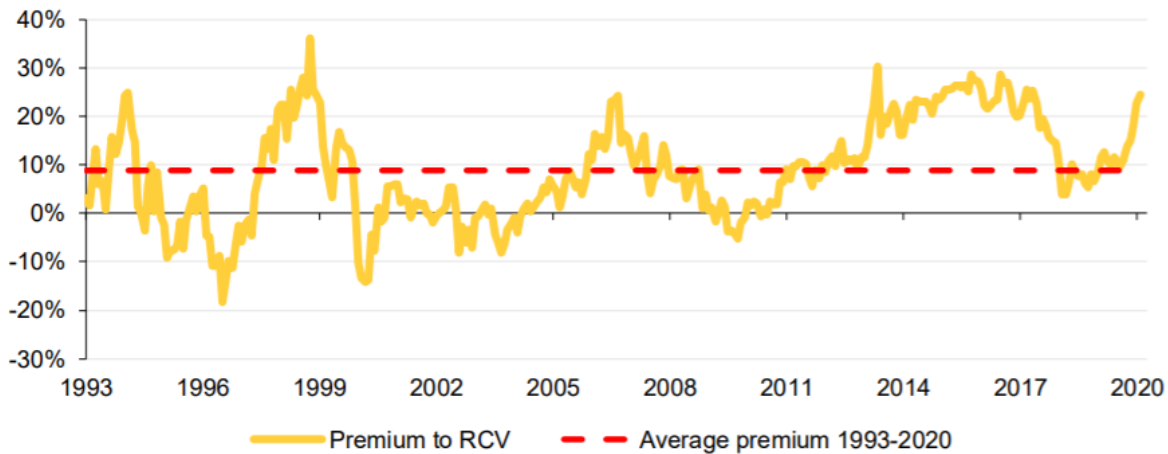
We have stronger time series data for the water sector than energy sector because the valuation of the non-regulated businesses is less of an issue for two of the listed comparators (ST and UU).

Although there is significant volatility in the data (as illustrated in Figure 4.8) the average overall asset premium over the past ten years has been 10-15% for United Utilities and Severn Trent and around 1% for Pennton.¹⁹ Headline MAR premia as of 14/02/20 were around 20-30% for the three water companies, although Pennton's valuation was considerably below this level prior to 2020, with the company's share price likely to have been affected by the recent sale of its Viridor (recycling and residual waste) businesses in March 2020. As discussed above, recent evidence up to the end of May has seen the MAR premiums come down since February.

Our findings for the water companies is broadly consistent with evidence presented by Ofwat in relation to the PR19 determination appeals. The figure below shows Ofwat's analysis of the MAR premia for two of the water company comparators (ST and UU) dating back to 1993.

¹⁹ Using a book value of debt approach.

Figure 4.9: Premium of enterprise value over RCV for Severn Trent and United Utilities, composite (1993-2019)

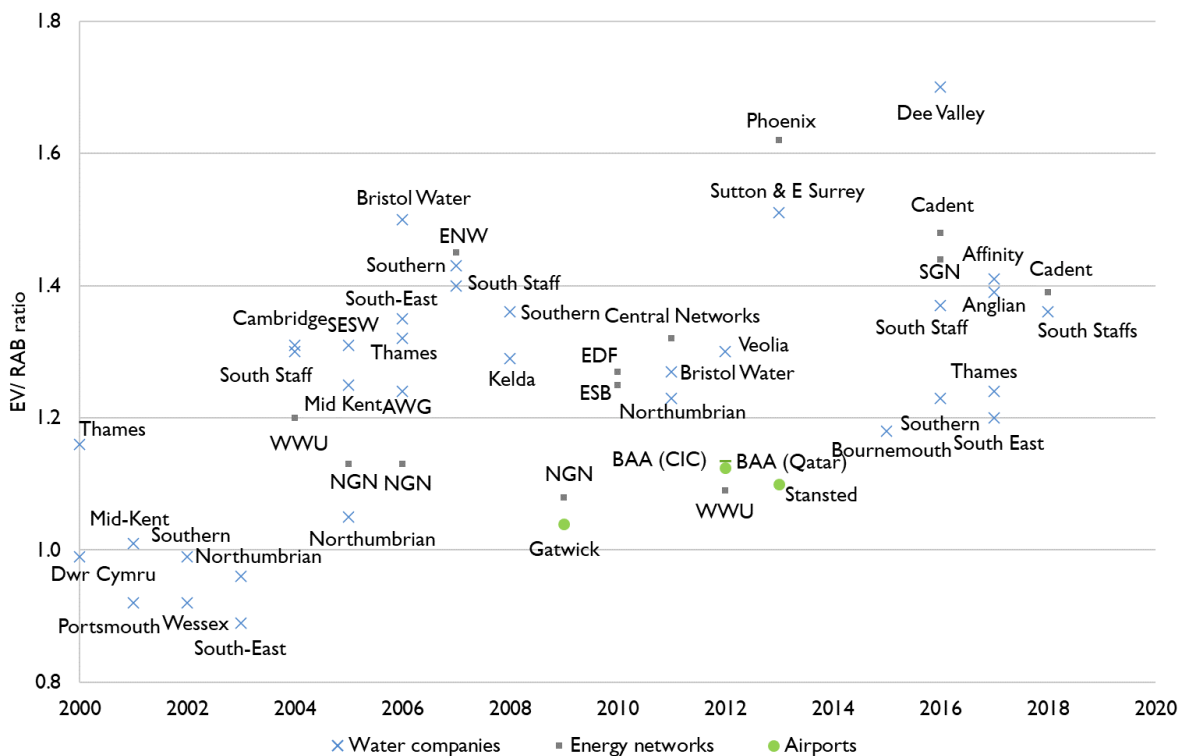


Source: Ofwat (2020) Reference to the PR19 Final Determinations – Risk and return; response to common issues.

Transaction multiples

Evidence from transactions tends to indicate a higher premium to RAV using a headline EV/RAV approach for the ‘GB regulated’ business, typically around 20% but often higher. There are, however, more reasons that a premium might be observed for these transactions than for listed companies. This includes a control premium, potential in principle for “winner’s curse” in competitive transactions, and potentially more sources of noise in the estimates than for listed companies, including from associated debt refinancing.

Figure 4.10: Transaction premia using headline EV/RAV multiples



Source: Inframation News, Utility Week, Bloomberg, Reuters and assorted news sources.

4.4. SUMMARY

Recent evidence indicates that both energy and water sector listed comparators are trading at a current notional equity premium greater than one. We do not see a clear or consistent difference between energy and water comparators in recent estimates, although National Grid has typically had a lower MAR premium.

Our time series analysis – though volatile – does not indicate recent estimates of valuation premia are out of line with past experience. Current estimates using a book value approach-based MAR indicate a premium of 15-20%. A figure in the region of 10-20% on the headline MAR (with the lower end being more informed by water sector comparators) may more accurately reflect the *persistent* asset premium.

Overall, despite the volatility inherent in this analysis we **consider that the evidence over time generally indicates that notional equity in listed GB regulated businesses trades at a premium to its book value.**

5. IMPLICATIONS OF VALUATION PREMIA

Having calculated valuation premia – both on a headline EV/RAV and notional equity basis – in this section we discuss the potential implications for Ofgem’s cost of equity estimation in RIIO-2.

The focus of our discussion is on the application and the implications of our analysis for Steps 2 and 3 of Ofgem’s cost of equity methodology – i.e.:

- What implications might be drawn for the required cost of equity in RIIO-2 given the evidence that regulated businesses have typically traded at a premium to notional equity? And/or
- What implications might be drawn for Ofgem’s AR vs ER assumption given one of the potential explanations for the observed valuation premia is expectations of future price control outperformance?

We note that at its SSMD, Ofgem also applied evidence of MAR premia in Step 1 of its cost of equity methodology reflecting the findings of the Indepen beta study. This involved application of an MAR premia assumption in both the de-levering and re-levering stages of the notional equity beta calculations.

We consider that evidence on MAR premia is most applicable to Steps 2 and 3 of Ofgem’s cost of equity methodology. However, we briefly comment on the rationale for also using MAR evidence in the de-levering and re-levering stages of Ofgem’s notional equity beta calculations.

5.1. USE OF MAR EVIDENCE

Using MAR analysis to infer the ‘true’ or ‘actual’ cost of equity is uncontroversial in principle, and well-grounded in corporate finance theory

In principle MAR evidence can be used directly to infer conclusions about the actual cost of equity for investors in regulated networks. It might also inform conclusions about any wedge between allowed and expected returns.

Using MAR analysis to infer the ‘true’ or ‘actual’ cost of equity is uncontroversial in principle, and well-grounded in corporate finance theory. A **strongly analytical approach** would therefore be to seek to try and draw direct inferences of what current MARs imply about the cost of equity.

However, in order to make inferences on the cost of equity, we would need to control for other explanations of an MAR premium. For example, if we make assumptions on factors such as assumed outperformance unrelated to the cost of equity, expected RAV growth etc, then inferences of the implied market or “true” cost of equity can in principle be derived using a set of simple formulae such as those illustrated in Table 5.1 in the following sub-section.

There are considerable practical challenges in directly inferring the underlying cost of equity using MAR evidence

Calculating a direct estimate of the required cost of equity has significant practical challenges. Assumptions are required for several parameters, as summarised in Table 5.1 below, which shows an illustrative calculation. The calculation assumes a constant level of outperformance and RAV growth into perpetuity. The results are subsequently very sensitive to the assumed level of outperformance. Our calculations in the previous section also demonstrate that equity market valuations of GB regulated businesses, while generally trading at a premium to RAV over time, are volatile. This means that picking an MAR point estimate at a given point in time to infer the ‘true’ cost of equity may be an overly mechanistic application of the market evidence.

Table 5.1: Illustrative formula-based calculation of the CoE

Item	Formula	Illustrative value
Gearing	$G = D / RAV$	60%
Allowed CoD	n/a	1.93%
Allowed CoE	n/a	4.30%
Allowed Vanilla WACC	$WACC = G * \text{Allowed CoD} + (1-G) * \text{Allowed CoE}$	2.88%
Regulatory 'Outperformance' (OP)	Annual savings, ODI + etc. as a % of RAV	0.20%
MAR (observed)	n/a	1.2
Expected real RAV growth (Gr)	n/a	0%
Implied Market or 'true' WACC	$MWACC = (WACC - Gr + OP) / MAR + Gr$	2.57%
Actual CoD	n/a	1.93%
Implied Market or 'true' CoE	$MCoE = [MWACC - (G * ACoD)] / (1-G)$	3.52%

Source: CEPA²⁰

Overall, we do not consider that an MAR-based estimate of the cost of equity would be more precise or robust than one produced using the CAPM. There are a range of possible sources and conditions for why the MAR may exceed one (see further discussion below), combined with some uncertainty over the precise value of the MAR itself. Considering the various judgements required jointly is likely to make better use of the evidence base.

MAR evidence could be used to balance judgements and assumptions of the required cost of equity and expected scope for outperformance

A more balanced approach may instead be to **use market evidence to test joint hypotheses about future expected outperformance and the underlying cost of equity**. This approach can be implemented by considering five broadly sequential but related questions:

- What is a plausible range for current MARs?
- What expectations do investors have of the long-term allowed return on equity?
- What *plausible* expectations do investors have of long-term price control outperformance?
- What discount rate(s) would reconcile the assumptions and ranges in points (a), (b) and (c)? This calculated discount rate or range of discount rates can be used as an input into Step 2 of Ofgem's proposed cost of equity methodology, as it corresponds to the actual cost of equity for investors.
- To what extent are the outperformance expectations assumed in point (c) *consistent with the regulator's objectives*²¹? This judgement can be used to inform Step 3 of Ofgem's proposed cost of equity methodology.

²⁰ Informed by discussion in CEPA (2007): 'The Allowed Cost of Capital – OFGEM: GDPCR 2008-2013 and Oxera (2007): 'Do market-to asset ratios provide reliable evidence on the cost of capital? Note prepared for gas DNs'

²¹ What might these objectives be? In this context, relevant considerations are likely to include the long-term balance of the regulatory package (potentially over multiple price controls) and consistency of outturn performance with the intended effect of regulatory incentives. We do not make a judgement in this paper of whether outperformance expectations are consistent with such objectives.

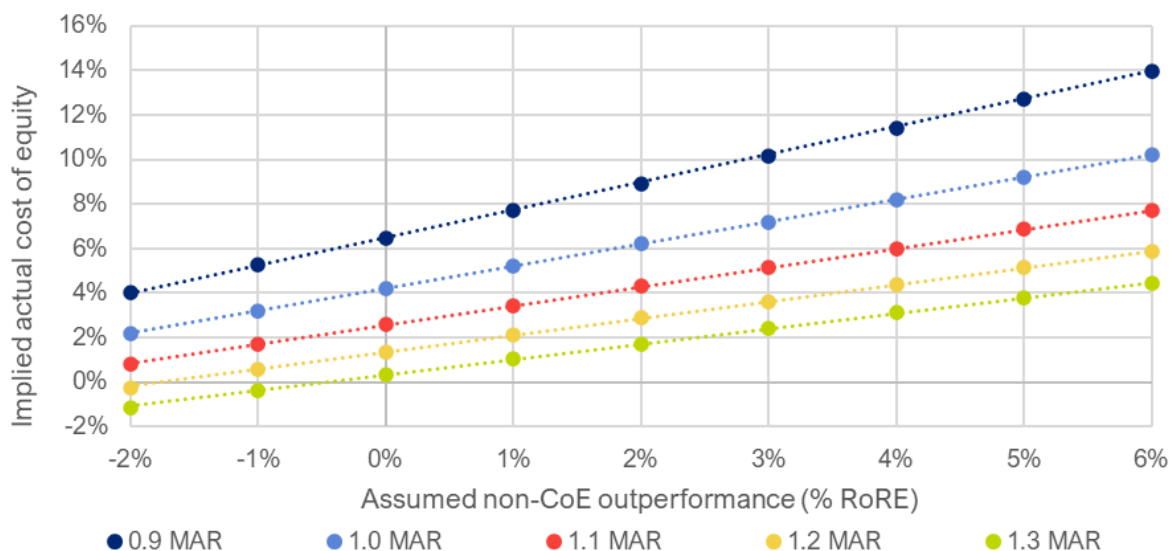
In considering these questions we would not be minded to combine relatively extreme and opposing sets of assumptions. For example, MARs towards the high end of the plausible range are less likely to be consistent with expectations of outperformance towards the low end of the plausible range.

An example of this approach is illustrated in Figure 5.1 below, which looks to show what combinations of the implied cost of equity and level of RoRE²² outperformance (fixed for a 20-year horizon) are consistent with a given MAR. The basic principles of and additional assumptions contained in the model used to produce Figure 5.1 and assess the balance of the required cost of equity and expected outperformance are summarised in Appendix A.

A key assumption is the expectation of the long-term allowed return on equity, point (b) above. We have assumed a 4.2% return in Figure 5.1 and in the analysis that follows. In the water sector, 4.2% corresponds to Ofwat's Final Determination allowed return on equity. We assume that investors will expect this rate of return to persist in the long-term. In the energy sector, a natural reference point would be the 4.3% allowed return on equity (net of the AR/ER wedge) proposed by Ofgem in the May 2019 SSMD. Different investors may have different perceptions of how the likely long-term allowed return may have developed since then. Trends in market evidence since the SSMD would tend to indicate downward pressure, while we recognise that some investors may also have factored in a softening of Ofgem's stance. We have assumed 4.2% based primarily on developments in market evidence and the guidance provided to energy sector investors by Ofwat's Final Determination (and its subsequent acceptance by a majority of companies). This assumption also facilitates comparison of our results across sectors.

Figure 5.1 plots consistent packages of assumptions for the implied cost of equity, outperformance and valuation premia, based on this modelling. Using this approach, if Ofgem were to judge, for example, that the evidence best supported an MAR assumption of 1.2, this could be consistent with a cost of equity below 2% (assuming no expected outperformance) or a cost of equity above 6% (with 6 percentage points of expected RoRE outperformance). The relevant valuation premium (MAR) judgement to use here is the premium that would apply to the notional entity – not necessarily the premium pertaining to any one company.

Figure 5.1: Relationship between cost of equity, outperformance and asset premia



Source: CEPA analysis

²² Return on Regulated Equity. This captures incentives, tax, outperformance relative to an allowance on the cost of debt and totex performance.

In selecting its final allowed return on equity Ofgem could, for example, consider using recent evidence on valuation premia to test a variety of joint hypotheses about the future expected outperformance and the underlying cost of equity in RIIO-2. However, it would need to refer to a consistent set of assumptions for outperformance and the cost of equity: for example, the more that valuation premia are assumed to be justified by future outperformance, the higher the implied cost of equity, all other things being equal, will need to be.

The set of assumptions that Ofgem considers most consistent with the available evidence may pose further challenges. If the observed valuation premia require particularly aggressive or sustained outperformance assumptions, this may add weight to the evidence supporting an adjustment as part of Step 3 of Ofgem's proposed cost of equity estimation framework. However, applying such an adjustment (or predicated any part of the cost of equity estimation framework on the assumption of systematic and sustained price control outperformance) also poses regulatory governance issues that would need to be considered, particularly if Ofgem also refers to the evidence in seeking to calibrate its approach to setting individual price control building blocks.

Below we consider how the MAR calculations from Section 4 can be applied to draw inferences, either on the headline cost of equity or assumptions on expected price control outperformance, using the type of joint hypothesis testing framework described above.

5.2. IMPLICATIONS OF MAR EVIDENCE FOR STEPS 2 AND 3 OF OFGEM'S METHODOLOGY

Current water sector MAR premia are hard to reconcile with Ofwat under-estimating the cost of equity

The three listed water networks accepted their PR19 determinations by 15 February 2020. At this point in time we estimate equity premia of above 50% in each case based on (book value approach) MAR premia above 20%.

Given Ofwat's intention to reset its approach to determining the cost of equity we do not think it is credible that investors in those companies are expecting to earn a materially higher baseline allowed cost of equity in the near future. Although investors are likely to be anticipating some degree of operational outperformance, the scope for financing outperformance has diminished in PR19 due to Ofwat's gearing gain-sharing mechanism.

In a report prepared for the ENA in the context of the PR19 CMA appeals, Oxera presented analyst expectations of outperformance in PR19 for United Utilities and Severn Trent²³. We note that the expectations were impacted by the Covid-19 pandemic, with expectations of outperformance appearing to decrease.

In February 2020, expectations of total RoRE outperformance from the quoted analysts were **1.6-3.0%** for United Utilities and **2.7-3.7%** for Severn Trent. Estimates in April 2020 had fallen to **0.2-0.9%** for United Utilities and **0.7-2.1%** for Severn Trent. The estimates provided are for PR19 only. Within our modelling, the assumption highlighted is the RoRE outperformance for each and every of the 20 years in our model. Estimates of outperformance beyond PR19 are more uncertain.

In the previous section, we presented evidence of current headline MAR premia of around 20% (book value basis) and even higher valuation premia on a notional equity basis for the two pure-play listed water companies, Severn Trent and United Utilities, although as discussed in Section 4 we recognise that the observed premia have reduced recently (see Figures 4.3 and 4.6). If we combine this evidence – valuation premia that will have accounted for the new information from Ofwat's PR19 FD and both water companies' acceptance of that FD – we can potentially draw some inferences of investors views of the cost of equity around and following the FD.

If, for example, we assume a 1.2x MAR multiple, and more recent outperformance estimates as reflecting investors' long-term expectations for both companies (e.g. 1%), then this might imply a cost of equity towards 2%. If we

²³ Oxera (2020) What explains the equity market valuations of listed water companies? A report for the Energy Networks Association.

assume future outperformance of 3% – closer to the analyst estimates in February 2020 – then the implied cost of equity would be closer to 4.0%. Alternatively, if a longer-term and more conservative assumption of the MAR premium – e.g. 1.1x – is used, alongside a long-term outperformance assumption in the range 1-3% then this could imply a cost of equity in the range 3.5-4.5%. See Table 5.2 below.

Table 5.2: Combination of implied CoE and RoRE outperformance, with a 4.2% allowed return on equity

MAR	Implied cost of equity	RoRE outperformance
1.0x	6.0%	+1.8%
	4.2%	0%
	2.3%	-1.9%
1.1x	6.0%	+4.0%
	4.2%	+1.9%
	2.3%	-0.3%
1.2x	6.0%	+6.2%
	4.2%	+3.7%
	2.3%	+1.2%

Source: CEPA analysis

A range of factors can potentially influence the valuation of a company and inferences on MAR premia need to account for their potential impact

Our analysis above seeks to control for outperformance outside of the cost of equity. This includes performance on totex, incentives, debt and tax. However, we recognise there are a range of other factors that may impact on MAR premia and that needs to be considered within the context of this type of joint hypothesis testing.

The Oxera report on equity market valuations for the ENA includes additional factors in looking to explain any premia in the water sector. These include:

- pension surplus and deficits;
- terminal value growth for CPI inflation;
- terminal value growth for future outperformance;
- revenue adjustments from PR14 reconciliations; and
- accrued dividends.

For pension surpluses and deficits, Oxera themselves do not make an adjustment for their modelling in the water sector. Our indicative modelling has been conducted in real terms, with the terminal value therefore implicitly accounting for inflation indexation in our modelling. We include outperformance assumptions for the full 20 years in our modelling. We consider that this reflects a reasonable trade-off between recognising the impact of expected outperformance, while not seeking to make future assumptions in the absence of any evidence.

Where costs have been previously incurred and revenues will be recovered in future – either through fast money or through the addition to the RCV – this will inform the valuation of the companies by investors (our modelling does not include RCVs from the PR19 price control and does not include ‘midnight’ adjustments). We agree that this is a relevant factor that needs to be accounted for in the analysis:

- For Severn Trent, we understand there is expected to be a c.£115m increase in revenues following a revenue adjustment, however this is with a c.£240m decrease in the RCV²⁴. The combined impact of this would be a <2% decrease in the company value.
- For United Utilities, we understand there is a £130m increase in revenues and a c.£73m increase in the RCV²⁵. The combined impact of this would be a <2% increase in the company value. For analysis with RCVs with the midnight adjustment included, only the revenue adjustment would need to be considered.

With respect to dividend accruals, we would expect investors to price in expectations of future dividends in pricing the equities within a business. It is unclear that our analysis should make adjustments to account for this, in a sector with a relatively steady historic profile of dividend payments.

We recognise the importance of accounting for all the different drivers of value when making inferences from MAR analysis. Indeed, there are a range of factors and conditions that are needed for the MAR to be close to 1 and these need to be considered before drawing to strong conclusions from evidence of MAR premia.²⁶

However, we are not convinced that the additional factors highlighted by Oxera make a material difference to conclusions that can be drawn from water companies' MAR premia. Our interpretation of the Oxera paper was that when including a number of these factors in their analysis, the estimated market capitalisation aligns with the actual market capitalisation for the two water companies. This might imply that the actual and allowed cost of equity are consistent for that point in time, which given the time period of analysis would have reflected investors' understanding of Ofwat's intention to reset the allowed return on equity. To the extent that these adjustments reflect unduly optimistic assumptions regarding future long-term outperformance, however, the implications are more indicative of a finding that the implied cost of equity sits below the allowed PR19 return on equity.

Overall, we find it hard to reconcile the observed premia with a material under-estimation of the cost of equity on the part of Ofwat; indeed, if anything the size of the premia across three distinct companies is hard to reconcile with operational outperformance alone.

What implications might be drawn by Ofgem from this analysis? One interpretation is the market cost of capital parameters applied by Ofwat represent an upper limit on the corresponding estimates for the energy sector.

As discussed in CEPA's separate beta estimation report for Ofgem, there is still a legitimate discussion of whether the risk premium equity investors might demand for investment in a water vs. GB energy network business is broadly equivalent or different, depending on the weight one places on different drivers of regulated utilities' betas. However, given the consistency of the market and economy wide assumptions (e.g. TMR and RfR) both regulators use in their CAPM derived cost of equity estimates, the market evidence in the water sector could suggest that Ofgem's assumptions at SSMD are unlikely to lead to a material underestimation of the cost of equity.

A further interpretation is that investors – whether in GB water or energy network businesses – are continuing to expect considerable price control outperformance. This might be considered relevant evidence for Ofgem calibrating other components of the RIIO-2 price controls as discussed below.

²⁴ Ofwat (2019) Accounting for past delivery appendix – Severn Trent. Final Determinations, December 2019.

²⁵ Ofwat (2019) Accounting for past delivery appendix – United Utilities. Final Determinations, December 2019.

²⁶ See for example, Biggar (2018): 'Understanding the role of RAB Multiples in Regulatory Processes'

Current energy sector MAR premia indicate a cost of equity assumption towards the lower end of Ofgem’s range (Step 2 of Ofgem’s cost of equity methodology) and can provide forward-looking evidence to calibrate Ofgem’s proposed AR/ER wedge (Step 3 of Ofgem’s cost of equity methodology)

The previous sections set out our conclusion that asset and equity valuations in the energy sector (and in the water sector) have persistently been at a premium to notional value. This may indicate that there is scope to re-calibrate the price control package relative to past experience in one or more of the following ways:

- Approaches to assessing efficient costs, designing incentives or estimating the cost of capital could be recalibrated.
- Following the conclusions by some of the authors of the 2018 UKRN cost of capital study²⁷, an overarching adjustment could, in principle, be considered reflecting the ability of network investors to earn expected returns greater than the baseline allowed returns.

As we discussed in Section 2, it is challenging to attribute the observed premia to a specific cause (or causes). There are reasons in principle and in practice why evidence of valuation premia is not a “problem” per se or robust enough to apply mechanistically within Ofgem’s cost equity methodology. However, this challenge in attribution does not imply that the evidence should be set aside. While focusing on one of these adjustments may be difficult to fully justify in isolation, it would not be appropriate to leave out all potential forms of adjustment.

For example, in relation to Step 2 the MAR analysis may provide further supporting evidence that Ofgem’s CAPM derived WACC is not too low. Indeed, under most plausible assumptions of future outperformance on other elements of the price control, it could suggest a lower figure for the cost of equity (or a figure towards the bottom end of the range).

We return to our summary of the relationship between the cost of equity, outperformance and MARs as illustrated in Figure 5.1. While the energy sector may best be characterised by a lower MAR assumption than for the water sector – perhaps as low as 1.1 based on recent evidence – investors’ expectations of future outperformance also appear likely to be lower. Some responses to Ofgem’s SSMD downplayed the scope for material outperformance (though further information on plausible outperformance is likely to be available in the run-up to Final Determinations).

Based on Figure 5.1, with expected RORE outperformance of 2% an MAR of 1.1 would be broadly consistent with the CAPM evidence considered by Ofgem under Step 1 of its cost of equity methodology. Should plausible investor expectations of RORE outperformance sit below 2%, an MAR of 1.1 would be more consistent with an underlying cost of equity around or even below 4%. These sensitivities might inform Step 2 of Ofgem’s cost of equity methodology.

At the same time, as we noted in Section 5.1, Step 3 of Ofgem’s cost of equity methodology asks not just whether the outperformance assumptions reflected in Figure 5.1 are *plausible* but also whether they are *consistent with the regulator’s objectives*. This analysis of MAR evidence can also inform this judgement. Figure 5.1 shows²⁸ that if the evidence supports a representative MAR of 1.1 for the notional company, then investors with an underlying cost of equity consistent with Ofgem’s assessment of the CAPM evidence would need to anticipate sustained outperformance of around 2 percentage points of RoRE. Based on a higher MAR of 1.2, those investors would need to anticipate sustained outperformance of around 4 percentage points.

²⁷ UKRN (2018): ‘Estimating the cost of capital for implementation of price controls by UK regulators’

²⁸ Albeit using a simplified and stylised cash flow model.

In the water sector, with the PR19 Final Determinations in place for the listed companies, in February investors had certainty around the PR19 allowed return on equity and other regulatory building blocks. Evidence from equity analyst reports can inform our assumption of non-CoE outperformance as a percentage of RoRE. However, our analysis of these estimates for PR19 show both that i) there is a wide range of expectations, and ii) that these expectations can change materially over time. This makes it difficult to infer the market-based expectation of this source of outperformance, and the market's expectations of outperformance may not necessarily be the appropriate assumption for Ofgem to use in discharging its duties in setting sector price controls²⁹. Ofgem might itself alternatively undertake its own modelling, though again this can be challenging to do accurately on an ex-ante basis.

5.3. IMPLICATIONS OF MAR EVIDENCE FOR STEP 1 OF OFGEM'S METHODOLOGY

Reflecting MAR evidence in Step 1 of Ofgem's cost of equity methodology is possible but there are significant issues with this approach

Gearing estimates are required for the two distinct steps required to translate equity beta measurements for comparator companies into an equity beta for the notional company in Step 1 of Ofgem's cost of equity methodology. Consistent estimation of gearing is preferable since it enters into both steps.

At SSMD, Ofgem applied an assumption of the MAR within the de-levering stage of its notional equity beta calculation and the re-levering stage.

The re-levering aspect of Step 1 of Ofgem's should in principle be carried out in a way that is consistent with the use of market evidence in other aspects of the calculation.

- Market evidence should be preferred where possible as it is more consistent with principles of corporate finance theory and asset valuation.
- Where robust market values are not available and book values must be used as proxies it may be preferable to use book values throughout the calculation steps.

The latter point is important to ensure we avoid inconsistency between the approach taken to gearing in de-levering and the gearing used for re-levering. In Section 2 we indicated that, in general, the market value of debt is preferable to the book value. The same principles that might cause the market value of actual company debt to deviate from its book value would also cause the market value of notional debt to deviate from its book value. This means that for consistency if we de-lever using a market value of debt, we should re-lever using an adjusted notional value of debt.

How should this adjusted notional value of debt be calculated? One possibility would be to estimate a market value based on the difference between the embedded rates used to calculate future cash flow allowances and the prevailing rates that reflect investors' prevailing discount rates for debt. This calculation pertains to the value of the regulator's *commitment* to provide revenue allowances in relation to debt; it does not necessarily pertain to the value of the debt itself. The ratio of market to book value for actual companies may therefore be a more appropriate assumption.

The caveats around the use of market value data for debt – discussed in Section 2 and 3 in relation to estimating asset premia – apply here too. Where a comparator company is a group with non-GB regulated businesses it may be challenging to obtain a suitable estimate of the market value of its GB regulated debt. It may not always be clear

²⁹ Ofgem's determinations should reflect the notional company. It is important that the outperformance expectations are considered in drawing inferences, as the company concerned is not necessarily representative of the sector as a whole. The outperformance assumptions also need to be considered at the time the estimate of the MAR premium is being made.

exactly on what basis market values are calculated. These considerations may make the book value of debt a useful reference point or sensitivity in the calculation.

The final – and most challenging – issue concerns the value of notional equity. For consistency with the use of market capitalisation to represent the value of equity for comparator companies and the preference for market values of debt, a market value of notional equity should be used in the re-levering equation.

Why might the market value of notional equity differ from its ‘book value’? A market value of notional equity different from its ‘book value’ is the definition of an equity premium. Thus – in principle at least – it could be argued that consistent application of a preference to use market data combined with persistent observed equity premia implies that asset betas should then be re-levered using an adjusted notional value of equity.

There are a number of reasons to be cautious in applying this, however:

- The relevant equity premium estimate is not that observed for any particular comparator company but the premium that investors in the *notional company* would expect to earn. This is unobservable. An estimate of the market value of notional equity based on valuation premia for actual companies requires a supporting judgement that those actual companies are representative of the notional company.
- The relevant equity premium estimate is that expected on a forward-looking basis. Ofgem is proposing to take into account evidence on asset or equity premia in Steps 2 and 3 of its cost of equity methodology. Its approach to other price control building blocks may also be informed by this analysis or by other analyses of systematic price control outperformance.³⁰ Either or both of these may mean that any historic premium is much reduced or even eliminated on a forward-looking equity basis.
- The application of a premium to notional equity implies that (a) the regulator expects to introduce a bias towards outperformance in the price control package, (b) that it is aware of the existence and scale of that bias and (c) that it is unable to correct for that bias despite the available evidence. If the evidence is sufficient to support the use of an adjustment in relation to Step 1, then it should also be sufficient to support adjustments elsewhere – rendering the Step 1 adjustment unnecessary.

Such an adjustment would also be unconventional: we are not aware of any precedent.

We consider that the logic and consistency arguments for adjusting the value of notional equity in the re-levering equation are, in principle at least, stronger than for making an equivalently-sized adjustment in the de-levering equation (we do not consider it appropriate to apply an adjustment on the de-levering step). However, for the various reasons outlined above, there are substantial regulatory process issues in the re-levering step as well that, in our view, would need to be considered and addressed before applying such an adjustment. Overall, we consider that evidence of observed MAR premia is more appropriate for consideration in Step 2 and 3 of Ofgem’s cost of equity methodology.

³⁰ That is to say that an expected notional equity premium might be remedied by Ofgem through further work and analysis of the other building blocks of its price controls, e.g. totex allowances arising from the cost assessment framework.

6. CONCLUSIONS

This report has set out how market evidence on the value of equity and debt for regulated companies could be applied within regulatory processes. It has considered the issues associated with calculating 'Market to (regulatory) Asset Ratios' (MARs) and specifically how they may be applied within Ofgem's three stage allowed rate of return methodology for RIIO-2 and the definition of gearing for the purpose of re-levering beta.

The analysis conducted allows us to make the following inferences:

- Whilst MARs fluctuate significantly and may be estimated below one at particular points in time for particular companies, the evidence over time generally indicates an MAR for GB regulated networks of above one. At least part of this premium to RAV can be attributed to factors that are relevant to Ofgem's forthcoming RIIO-2 determinations, i.e. the premium to RAV can be attributed to the valuation of equity holders' residual claims on the asset being at a premium to notional equity.
- Recent evidence from energy comparators and time series analysis of traded GB water companies MARs around PR19 Final Determination is hard to reconcile with Ofgem's proposed CAPM parameters for cost of equity being fundamentally unacceptable to investors, particularly as PR19 is generally perceived as a 'tough price control' across a range of price control building blocks (e.g. ODIs, totex etc.).
- Finally, we consider that MAR evidence can most effectively be employed within this context to explore joint hypotheses. What assumptions on the underlying cost of equity can be reconciled with plausible expectations of GB energy networks' scope for outperformance in RIIO-2? Using stylised modelling we show:
 - A representative MAR of around 1.1 can be reconciled with an underlying cost of equity broadly in line with Ofgem's assessment of the CAPM evidence and expected long-term RORE outperformance of around 2%.
 - To the extent that MARs are judged to be towards the higher end of the range estimated in this paper (around 1.2 based on recent evidence, though higher estimates are plausible), an underlying cost of equity broadly in line with the CAPM evidence would require investors to expect long-term RORE outperformance of around 4%.
 - Were plausible expectations of RORE outperformance judged to be significantly lower than 2%, MARs of 1.1 would be more consistent with an underlying cost of equity below 4%.

It is important to interpret this evidence in light of other sources of evidence on the underlying cost of equity. We would avoid combining relatively extreme and opposing assumptions (though they may be plausible in isolation) and would be cautious of reaching strong conclusions that appear materially out of line with wider evidence.

Use of market evidence to inform estimates of company gearing for the purpose of de-levering and re-levering betas is consistent with the theory of asset valuation. This principle applies both to actual comparator companies and to the notional entity: different steps of the calculation should be carried out on a consistent basis. We recognise though that obtaining or interpreting market evidence on the value of debt may be challenging for some comparators. The use of book value data may be judged to improve the robustness of the evidence base.

Appendix A **APPROACH TO ILLUSTRATIVE MODELLING**

We have set up a simple cashflow model with a twenty-year horizon and terminal value. The model allows us to identify consistent packages of assumptions across three dimensions: i) the implied actual cost of equity, ii) outperformance against other regulatory assumptions, and iii) the valuation premium identified.

The results presented include the following assumptions:

- an allowed return on equity of 4.2% for each of the twenty years³¹;
- a RAV that is constant in real terms;
- constant 60% gearing for both actual and notional gearing;
- a terminal value that is equivalent to the notional equity value at the start of the period;
- outperformance that remains fixed for each of the twenty years.

The implied actual cost of equity is calculated to achieve the given valuation in present value terms.

³¹ We have used the same assumption for our illustrative modelling for both the energy and water sectors. In the water sector, 4.2% corresponds to Ofwat's Final Determination allowed return on equity. We assume that investors will expect this rate of return to persist in the long-term. In the energy sector, a natural reference point would be the 4.3% allowed return on equity (net of the AR/ER wedge) proposed by Ofgem in the May 2019 SSMD. Different investors may have different perceptions of how the likely long-term allowed return may have developed since then. Trends in market evidence since the SSMD would tend to indicate downward pressure, while we also recognise that some investors may have factored in a softening of Ofgem's stance. We have assumed 4.2% based primarily on developments in market evidence and the guidance provided to energy sector investors by Ofwat's Final Determination (and its subsequent acceptance by a majority of companies). This assumption also facilitates comparison of our results across sectors.



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