Cost of Debt methodologies

CWaPE

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FINAL REPORT

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1. INTRODUCTION AND REPORT STRUCTURE

The Commission Wallonne pour l'Énergie (CWaPE) is currently in the process of defining the tariff methodology for five electricity and gas distribution system operators (DSOs) in the Walloon region for the regulatory period 2025-29. The tariff methodology includes the definition of the authorised return ('marche benefits equitable'), calculated on basis of a weighted average cost of capital (WACC) formula, applicable to the Regulated Asset Base (RAB). This study concerns the allowance to be made for the DSOs' cost of debt.

Preparatory work relating to the upcoming regulatory period began in 2019. CWaPE originally intended to publish a tariff methodology covering the period 2024-28 on 1 November 2022. However, following feedback from stakeholders, CWaPE and the DSOs agreed to postpone the adoption of the 2024-2028 tariff methodology to 1 June 2023 and to modify the regulatory period of this tariff methodology to 2025-2029. Stakeholder feedback on the cost of debt highlighted concerns that volatility in debt markets was not sufficiently reflected in the proposed allowance.

CEPA has been engaged to provide CWaPE with supporting evidence in reaching its determination. This report is a survey of the methods and approaches used by other regulators to account for volatility in financial markets and arrive at an allowance for the cost of debt.

This report has been written recognising that the regulatory process for the upcoming period has been underway for over three years. It is aimed at those with a working knowledge of areas of debate and familiarity with relevant concepts concerning regulatory cost of capital estimation. We do, however, briefly set out some key concepts and definitions in Section 2.

Following this introduction, the report is structured in two parts. Part A contains a concise overview of our main findings. It includes the following sections:

- Section 2 summarises the objectives of the study and key concepts.
- Section 3 presents a brief comparative analysis of the regulatory regimes used as case study evidence for this study.
- Section 4 addresses six specific key questions that we have been asked to consider as part of this study.
- Section 5 summarises our overall conclusions.

Part B contains the case studies on which our findings are based. This includes structured case studies for seven core jurisdictions that we have been asked to focus on. It also includes a non-exhaustive set of supplementary case studies on adjustment mechanisms used to address volatility based on our wider experience.

2. OBJECTIVES AND KEY ISSUES

In Section 2.1 we summarise the main objectives of this study and the specific questions we have been asked to consider in developing and interpreting an evidence base for CWaPE to refer to. Section 2.2 elaborates on some key concepts and definitions that help to clarify the scope of the study.

2.1. OBJECTIVES OF THIS STUDY

Our overall objective is to identify, based on a survey of regulatory regimes, methods available to take into account financial market volatility in setting an allowance for the cost of debt for regulated DSOs.

In tackling this overall objective, we have been asked to consider six specific questions:

1. Which methods have been used by regulators to take financial market volatility into account when setting the cost of debt?
2. What are the options in terms of adjustment mechanisms, in particular the use of cap and floor on the cost of debt, with ex-post compensation for changes of interest rates beyond these thresholds?
3. What are the options in terms of weighting the cost of old vs new debt when setting the cost of debt; what is the regulatory practice in comparable context?
4. Are there alternative approaches to the use of historical data when setting parameter values of the cost of debt in line with market expectations?
5. Would use of the Bloomberg Utilities BBB index (IGEEUB10 BVLI Index) to set the cost of old/new debt be consistent with regulatory practice in comparable context?
6. What is the impact of the Quantitative Easing (QE) policy of the European Central Bank (ECB) on the cost of equity and cost of debt? How has it been taken into account by regulators when setting DSO's cost of capital?

We have been asked to focus on seven geographical regions: Flanders, Netherlands, Germany, Luxembourg, France, Brussels and the UK. We have also included supplemental case studies from other geographies and sectors where we considered that those examples could provide value to our analysis.

We have not been asked to recommend a particular approach, nor to provide an opinion on the appropriate level of the cost of debt allowance in this case. Rather, this study will help CWaPE to distinguish between features that are commonly applied in practice and those that are less well-supported by regulatory precedent. This is based on a clear, factual evidence base together with (a) an assessment of the applicability of different approaches to the context of regulation in Wallonia and (b) a synthesis of themes and findings looking across the case study examples considered.

CWaPE is required to set a cost of debt allowance for five DSOs. Those DSOs have different characteristics, including varying refinancing needs during the regulatory period and different financial structures. We assume that CWaPE will maintain its approach of setting a single industry-wide cost of debt allowance using a normative approach based on a nominal WACC. We have not been asked to comment on alternative approaches based on individual, DSO specific allowances, nor on the particular suitability of any approach to any individual DSO. We have not been asked to evaluate the actual debt costs of the DSOs, nor whether their debt has been raised efficiently.

2.2. KEY CONCEPTS AND DEFINITIONS

The objectives of this study and the specific questions highlighted above have been motivated by changes in the market environment. In this section we briefly provide some context on these changes. We also set out some common concepts and definitions that we refer to in Sections 3-5.

Volatility

Whilst there is no strict distinction, the cost of debt is driven by both short- and long-term factors. Day-to-day fluctuations can make it challenging to estimate a cost of debt that is representative of market conditions at a particular point in time. Longer term factors may mean that a portfolio of corporate debt raised at different points over a period of several years includes debt at diverse rates[1].

We understand that stakeholder comments on CWaPE's proposed approach focus on those longer term issues. Nominal yields on corporate and government debt are currently higher than in the preceding seven years; inflationary expectations have also been higher. At the same time, the ECB has indicated scope for Quantitative Tightening (QT), reversing the programme of bond purchases under QE.

This is best illustrated graphically, as in Figure 2.1 below which presents rates for a particular index of corporate debt – the Bloomberg BBB Utilities index. From 2015 to 2021, this index was relatively stable, with rates between 0% and 2%, periods of higher rates tending to offset periods of lower rates. Under such conditions any assessment of an allowance on the cost of debt would be relatively insensitive to the precise time period considered[2]. During 2022, however, market conditions changed. Debt raised in 2022 would no longer have attracted a similar rate to the preceding few years, as shown in Figure 2.1. Debt raised in 2023 has to date remained at those elevated levels.

Figure 2.1: Yields on Bloomberg BBB Utilities index (IGEEUB10)

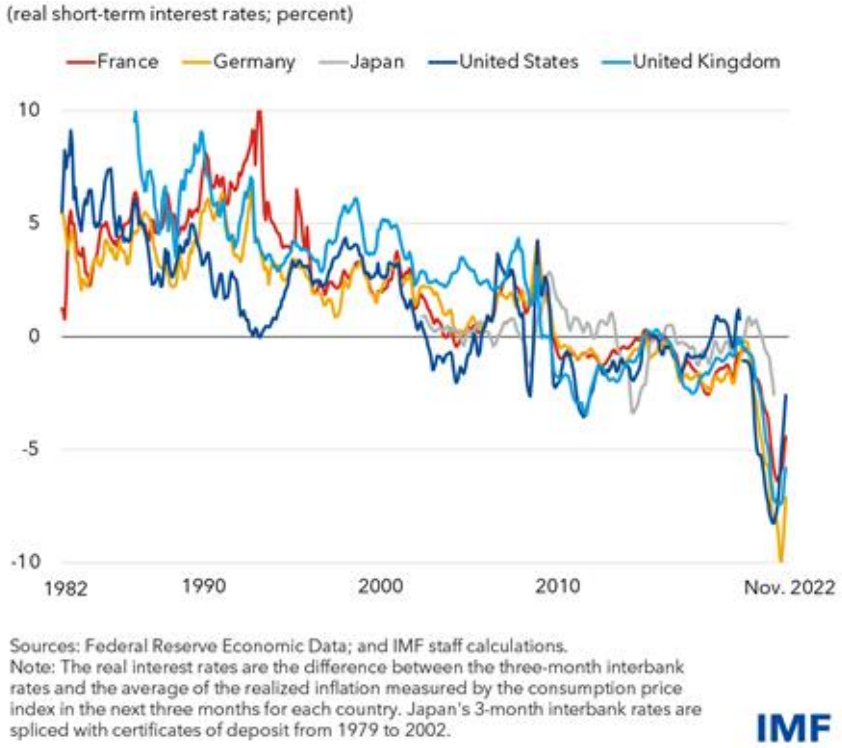
Source: Bloomberg

The nominal cost of debt can, in principle, be disaggregated into components reflecting the underlying real rate of return and expected inflation. Evidence suggests that expected inflation is particularly relevant to current nominal rates. Figure 2.2, for example, shows that underlying real rates internationally remain at low levels.

[1] Each individual rate can be assumed to be consistent with market conditions at the time it was raised.

[2] To the extent that the debt portfolio under a normative approach involves shorter tenor debt that has been issued in this period.

Figure 2.2: Historical trends in short-run international real risk-free rates



Source: IMF

This report reflects CWaPE's decision to adopt a nominal cost of capital allowance and therefore considers volatility from the perspective of the overall nominal rate. However, it is possible to address different aspects of financial market volatility separately.

Impact of volatility across embedded and new debt

Debt yields change over time and in ways that are not always accurately predicted by financial markets. If yields on new debt increase outturn costs for a regulated network and allowances for debt are not adjusted, then there will be an expected shortfall (at least until the next tariff period begins and newer outturn data is taken into account).

Volatility is most relevant for the cost of new debt. Regulated businesses will typically have a portfolio of embedded debt raised over a period of multiple years. Where the proportion of new debt in this portfolio is small, the overall impact of volatility on the overall cost of debt is also small (and vice-versa).

A shorter price control should reduce the impact of volatility for two core reasons:

- A smaller proportion of new debt will be issued on average.
- The period until the tariff reset is shorter.

Volatility can be relevant for embedded debt for the regulated entity. This is the case where debt is not fixed rate debt – see the sub-section below – and where volatility leads to variation in debt costs between an allowance for the cost of debt and individual DSO's debt costs.

Types of debt

Regulatory determinations typically rely on public evidence where available. For setting the cost of debt, bonds have publicly available pricing information and are often used as an evidence base for the cost of debt. The benchmark shown in Figure 2.1 is based on nominal fixed-rate bonds.

However, a nominal fixed-rate bond is only one type of debt instrument. Other debt instruments include:

- floating rate debt, whereby a spread component is fixed but an underlying reference rate is variable; and

- index-linked debt, whereby the rate payable is updated based on an inflation index.

These instruments will have different risk profiles to nominal fixed rate debt and may mitigate or exacerbate sources of volatility, due to the variable nature of interest rates on these non-fixed debt instruments. A review of the debt instruments used by DSOs may be informative as a cross-check around how their debt costs move in relation to movements in the broader market – though we are focused on a normative, rather than actual debt, approach.

The type of debt may have implications for the methodology adopted. For example, a firm with entirely floating rate debt will be more impacted by movements in the risk-free rate than a firm with entirely fixed rate debt.

Elements of a cost of debt approach

There are a number of methodological choices available to a regulator when setting an allowed cost of debt. We have sought to group these choices into four components in Table 2.1.

Table 2.1: Elements of a regulatory cost of debt approach

Category	Key questions
1. Philosophy	a) Is the allowance based on actual costs or a 'normative' allowance set independently of actual costs? b) Is the allowance fixed ex ante or does it adjust during the price control, and if so what form of adjustment is used?
2. Structure	a) Is the allowance determined in real or nominal terms? b) Are separate estimates made for individual components of the cost of debt (i.e. risk-free rate and debt premium) or is the allowance 'all-in'? c) Are separate estimates made for embedded debt (i.e. debt raised prior to the price control concerned) and new debt (i.e. debt raised during the price control)?
3. Evidence	a) What companies or benchmark indices are considered? What characteristics are filtered (e.g. credit rating, business entity, tenor)? b) From which time periods is evidence considered? c) Is evidence used mechanistically or assessed holistically? d) Are any adjustments made to the evidence?
4. Calibration	a) What trailing average period(s) is (are) used? b) What weights are given to embedded and new debt? c) If an adjustment mechanism is used, when and how are updates made? d) If adjustments are bounded or constrained, what thresholds are applied? e) How (if at all) are transaction costs captured?

Our study is focused on how to take into account market volatility. Of the above list, some of the choices are especially relevant in this context (1a-b, 2c, 3b, 3c), and we focus our discussion in Sections 3-5 on these.

Sources of evidence

Past market volatility will, of course, have been resolved in the data at the point a price control determination is made. There may nevertheless be questions concerning how that volatility is interpreted for the purpose of setting an allowance. A regulator may also anticipate future volatility in the outturn data that emerges during a price control. The question of which sources of evidence to use, and how, is therefore particularly relevant.

We distinguish between four kinds of evidence available to a regulator in setting a cost of debt allowance:

- **Historical** data pertains to past periods.
- **Contemporaneous** data relates to prevailing market conditions.

  Whilst there is no strict dividing line between 'historical' and 'contemporaneous, we suggest that as a rule of thumb contemporaneous data can typically be thought of as relating to the current year while historical data typically spans a period of multiple years.

- **Forward-looking** data relates to estimates of future rates; these may be based on inferences and calculations from market data, surveys or independent forecasts.
- **Outturn** data relates to rates that are not known at the beginning of a regulatory period but that become available during the regulatory period.

PART A: MAIN FINDINGS & OPTIONS

3. COMPARATIVE ASSESSMENTS

From our case study review, we can see that regulators have taken various different approaches to setting a cost of debt allowance. In some cases, these differences are fundamental and are likely to reflect differences in the desired risk allocation: the approach adopted on the cost of debt leads to different risk allocations faced by the company. For example, a pass-through regime transfers risk from regulated companies to consumers.

We have grouped regulatory approaches to setting the cost of debt allowance into four overarching categories, shown in Table 3.1 below (these categories broadly correspond to different 'philosophies' for the cost of debt as outlined in Table 2.1). Across each of these approaches there will be common questions, e.g., what evidence should be taken into consideration. There will also be questions specific to the approach in question.

Table 3.1: Overarching approaches used to set the cost of debt

Approach	Regulatory precedent for using such an approach (energy, unless otherwise stated)
Pass-through of actual debt costs	Germany, Belgium (federal), Brussels
Fixed ex-ante allowance	Flanders, Luxembourg, Sweden*, Greece*
Adjustment mechanism (unbounded)	Netherlands, GB, England & Wales (water)*, Austria*, Australia*
Adjustment mechanism (bounded)	Ireland*, Italy*, Slovakia*, Australia (water)*

*Note: * denotes supplementary case study.*

We have not been asked to review in detail those approaches which adopt a pass-through of actual debt costs, though they are included in Table 3.1 for completeness. CWaPE is not reviewing its decision to adopt a normative approach to determining a cost of debt allowance. Table 3.1 includes three broad types of normative allowance:

- Under a **fixed ex-ante allowance**, the regulator determines an allowance at the start of the price control and this remains fixed, i.e. it is not adjusted during the price control for any outturn data.
- Under an **adjustment mechanism (unbounded)**, the regulator updates one or more parameters on the cost of debt during the price control based on outturn data. This approach is typically applied as 'indexation' of the cost of debt (or its component parts) to a chosen measure or measures.
- Under an **adjustment mechanism (bounded)**, the regulator also applies updates during the price control based on outturn data. However, those adjustments are subject to certain conditions: changes may be applied only once a threshold is breached or may be made only within a specified range.

All three categories of normative approach (and indeed the pass-through approach) have been adopted by two or more of our case study regulatory regimes. The use of a bounded adjustment mechanism, however, is limited to regimes outside the seven core case studies from neighbouring regimes.

The approaches adopted by regulators often reflect the context in which a decision is being made, including relevant legislation and the characteristics of the regulated companies. We have generally found that a high degree of flexibility exists as part of relevant legislation and rules are not prescriptive. The choice of a normative approach is generally informed by duties to compensate for efficient costs and ensuring that the firms are able to invest in and operate their networks safely.

However, there is no 'one size fits all' solution that is a function of legislation or across regulatory precedent beyond the predominance of a normative approach in the case studies we have considered.

In addition to differences in broad approach, there are also significant differences in application. Each approach entails a number of further, more detailed methodological choices. We do not cover these in this section but provide a discussion in addressing the detailed questions in Section 4 and in summarising our findings in Section 5.

4. KEY QUESTIONS

In this sub-section we address each of the six key questions for this study, as set out in Section 2.1. We look to bring out the key themes and look to identify the rationale for different positions to the extent that different regulators have adopted different policy options on the cost of debt.

4.1. WHICH METHODS HAVE BEEN USED BY REGULATORS TO TAKE FINANCIAL MARKET VOLATILITY INTO ACCOUNT WHEN SETTING THE COST OF DEBT?

As outlined in Section 2, and particularly in Table 2.1, regulators have a progressively more detailed set of decisions to make regarding their approach and methods to setting the cost of debt. We have assessed how financial market volatility can be reflected at each stage of decision-making.

4.1.1. Overall philosophy

Regulators can choose between a spectrum of options around allocating risk of market movements under a normative approach. At one end of the spectrum is a fully fixed ex-ante allowance. At the other end of the spectrum is an adjustment mechanism that looks to fully reflect changes in market evidence. This decision partly reflects the view of the regulator how to best respond to volatility.

We see examples of regulators sat at both ends of this spectrum (e.g. Luxembourg – fully ex-ante, GB – ex-post adjustment mechanism). Some regulators consider it better to manage volatility mechanistically through ex-post adjustment mechanisms, whilst others consider that ex-ante mechanisms do not place an unfair burden on regulated networks.

There are then a variety of options available in between. These include:

- partial sharing of market movements e.g. Ireland.
- mid-period re-openers e.g. Italy.
- triggers for re-opening a fixed allowance e.g. Italy.
- limits to total changes under an adjustment mechanism e.g. Slovakia.

Looking at the case studies as a whole, we have seen the direction of travel move towards adjustment mechanisms. Examples in our case studies include GB and Australia. In GB, part of the move towards an adjustment mechanism reflected the predictive power of forward curves and outturn yields that differed materially to expected debt yields. When considering the appropriate risk allocation and balance between risk and reward, a move to indexation was adopted (and has since been retained) in the RPI-X@20 review of network regulation in 2010[3].

The Australian Energy Regulator (AER) begun a transition towards an adjustment mechanism in 2013. Their allowed rate of return objective under the National Energy Rules (NER) requires the rate of return to be "commensurate with the efficient financing costs of a benchmark efficient entity".[4] The AER recognised that their previous approach of estimating the cost of debt with no adjustment mechanism reflected the return on debt of a benchmark efficient entity that raises all debt required to satisfy its financing needs once per regulatory control period. However, the AER considered that raising all finance once at the start of a regulatory period, this would not be the financing strategy of the benchmark efficient entity, who the regulator considered would hold a debt portfolio with staggered

[3] Source: Ofgem (Oct 2010)

[4] NER clause 6.5.2(c) and 6A.6.2(c)

maturity dates. This motivated the AER's introduction of an adjustment mechanism and transition towards using a trailing average based on annually calculated cost of debt estimates.[5]

4.1.2. Structure, evidence and calibration

Within each overall philosophy or approach, regulators must also determine how to structure the cost of debt allowance, what evidence to use and how to calibrate the allowance. The decisions to be made will differ for each approach, and so we discuss ex ante approaches and adjustment mechanisms separately. We focus on those aspects of setting the cost of debt that are most relevant to taking into account volatility (from Table 2.1, these topics are likely to be 2c (separate estimation of new and embedded debt), 3c (mechanistic judgement of evidence), 4c (calibration of an adjustment mechanism) and 4d (thresholds to apply to bounded adjustment mechanisms).

Under adjustment mechanisms

Approaches with adjustment mechanisms take into account market volatility by design: for example, automatic updates based on market indices will tend to reflect whatever volatility is present in the outturn data and ensure that the allowance is reflective of those movements in market yields.

The structure reflects a rolling approach of estimated new debt becoming embedded debt when the outturn evidence becomes available.

We discuss in Section 4.2 the different options that are available to calibrate adjustment mechanisms, both unbounded and bounded versions. We note that the case studies of adjustment mechanisms vary between setting a real and nominal cost of debt.

Under ex ante approaches

Ex ante assessments, however, may require the use of more explicit techniques to take market volatility into account. We interpret most regulators as taking this into account via recognition of embedded and new debt.

As with adjustment mechanisms, there are a number of policy choices available. Structure is one category we consider. We have tended to observe in our case studies that a nominal WACC more commonly uses an ex ante approach; under such an approach regulators take a view on ex ante real rate and inflation simultaneously. However, we have not seen reasons that preclude regulators choosing between adjustment mechanisms and ex-ante approaches based on the use of nominal or real WACC frameworks.

When setting an ex-ante allowance, it is rare to use only historical evidence and assume that the cost of an embedded debt portfolio should necessarily be representative of the cost of new debt (we have not seen an example of this in our case studies).

Even where no explicit structural separation is made to reflect separate costs of embedded and new debt, discretionary adjustments or the exercise of judgement offer ways to take into account volatility. Regulators may decide to allocate the risk of market movements to companies through the use of an ex-ante allowance, but provide implicit headroom to provide a buffer against market rate increases (e.g. through a weaker credit rating, longer tenor or selective trailing average).

Regulators tend not to be explicit around the rationale for such adjustments. However, we do see variations and limited cases of more explicit adjustments e.g. France, Italy.

4.1.3. Summary

It is hard to conclude that there are examples where regulators have not actively sought to take into account financial market volatility in their cost of debt methodologies:

[5] Source: AER (Dec 2013)

- Many regulators have chosen to use adjustment mechanisms to reflect market data.
- Some regulators have sought to balance different sources of evidence to recognise the balance between embedded and new debt, and the movements in nominal debt yields when doing so.
- The few regulators that neither use adjustment mechanisms nor distinguish between embedded and new debt have ensured a margin of discretion or judgement in their allowances. The approaches may not be as transparent as other methodologies, but it is at least plausible that these are exercised with financial market volatility in mind.

4.2. WHAT ARE THE OPTIONS IN TERMS OF ADJUSTMENT MECHANISMS, IN PARTICULAR THE USE OF CAP AND FLOOR ON THE COST OF DEBT, WITH EX-POST COMPENSATION FOR CHANGES OF INTEREST RATES BEYOND THESE THRESHOLDS?

4.2.1. Comparing unbounded and bounded adjustment mechanisms

The case study review in Part B of this report shows that unbounded indexation mechanisms are used e.g. in GB. The unbounded adjustment mechanisms are simple and do not require judgement around the setting of any thresholds that would be relevant with a bounded adjustment mechanism; instead an index is considered to be a proxy for efficient industry debt costs and is updated for outturn data.

A bounded adjustment mechanism may be selected due to concerns over the broader impacts on the regulatory settlement. This could include the implications of debt changes in assessing the financeability of DSOs, the ability of the DSOs to manage risks of a given size, the appropriate risk-return balance of the settlement, or implications for tariff volatility. The selection of relevant bounds or thresholds would be informed by the rationale for applying a bounded adjustment mechanism in the first instance.

We define two different forms of bounded adjustment mechanism:

- Under a **cap and floor** mechanism, the allowance can be adjusted (bi-directionally) up to pre-agreed thresholds. For movements beyond the thresholds, it may be that (i) no further adjustment is applied, or (ii) only a partial adjustment is applied or (iii) a separate mechanism is triggered.
- Under a **deadband** mechanism, the allowance remains fixed unless thresholds are breached. When the thresholds are breached, the allowance can be updated.

These can each be contrasted to unbounded adjustment mechanisms where allowances change to reflect whatever data exists.

We are reliant on supplementary case studies for identifying bounded adjustment mechanisms: we draw on examples from Italy, Slovakia and an older Irish example here. The bounded adjustment mechanisms also typically have less of a track record than the unbounded adjustment mechanisms.

4.2.2. Options for calibrating adjustment mechanisms

An unbounded adjustment adjusts for outturn data during the price control. In principle, the movements in the allowance do not necessarily need to be one-for-one with movements in the relevant benchmark. For example, the allowance could adjust at 50% of the benchmark movement, though we do not see this approach adopted in any of our case study examples.[6]

[6] This is not to say that sharing mechanisms on the cost of debt or cost of capital are not used. In the UK, Ofwat's approach to the Thames Tideway Tunnel in the water sector originally incorporated a sharing mechanism for changes in the cost of debt. There are also examples of gainsharing mechanisms in Public Private Partnership (PPP) models.

Under both the bounded and unbounded versions of adjustment mechanisms, the application of indexation could be applied on a periodic (most commonly annual) average basis, or applied as an ex-post reconciliation amount. The decision here has implications for tariff stability, regulatory burden and the ability of the DSOs to absorb changes in market rates until the end of the tariff period.

- An ex-post update involves no within-period adjustments for movements in the cost of debt, though there will be a larger directional impact at the start of the next price control if the difference between expected costs and outturn costs is large.
- An ex-post update does not require calculations to be made periodically, only at the end of the period.
- An ex-post update requires the regulated company to absorb the differences in expected and outturn debt costs until the new tariff period. The risk exposure is informed by the length of the price control and the size of this difference.

The structure of adjustment mechanisms can also be developed in different ways. This includes whether indexation applies to one or more parameters (e.g., risk-free rate only) or whether it is simply the cost of debt is indexed. In our examples, the majority use the all-in cost of debt (with the older Ireland example focused on the risk-free rate). We have presented a case study from the GB water sector where new debt only is indexed, with a fixed allowance for embedded debt. The GB water sector example differs to other comparators in using an ex-post reconciliation method.

4.3. What are the options in terms of weighting the cost of old vs new debt when setting the cost of debt, what is the regulatory practice in comparable context?

In addressing this question, it is first necessary to acknowledge that weights could be set either explicitly, based on specified proportions of embedded and new debt, or implicitly through an all-in allowance that is designed to be broadly reflective of the balance between embedded and new debt. It is also possible to set variable weights reflecting company-specific characteristics. However, as the focus of the study is on setting a single industry-wide allowance, we do not discuss this option here.

Table 4.2 below summarises options and regulatory precedent around weights on embedded and new debt. We note that none of our case studies place full weight on new debt or embedded debt only; all regimes assume a mix. We can see that an implicit weight is more common than an explicit weight, though both are used.

Table 4.2: Approaches to weighting embedded vs. new debt costs

Approach	Regulatory precedent
Explicit weight	Flanders, GB (water)*
Implicit weight *(based on assumed trailing average/tenor)*	Netherlands, GB, Luxembourg, France, Australia*, Australia – water*

*Source: see Part B. Note * denotes supplemental case study.*

Where the distinction is made, the specific weights to be applied to new debt are generally intended to reflect the expected balance between new and embedded debt. This balance will be influenced by the rate at which debt matures and is refinanced and the extent of growth in the asset base. Whilst these are to some extent idiosyncratic to the industry and companies concerned, we can identify a range of outcomes broadly consistent with regulatory practice:

- In the GB water example, the weight on new debt was set for the 2020-25 price control at 20%.
- In the Flanders example, the weight on new debt was set at 40% for a four-year price control.

- Although it is not necessarily stated explicitly, in a hypothetical regime based on a rolling ten-year trailing average, the average weighting on new debt over a five-year price control would be 25%.[7]

We note that the weight on new debt should reflect expectations over the relevant tariff period, not simply the weight at the end of the control. For example, as in the simplified calculations for our illustrative indexation example, if there is 50% of new debt by the end of the price control and this has grown linearly during the control (from 0%), an average would be 25%.

It is clear that the weightings to be applied can be quite variable from case to case. There is no clear correct answer – though in our view regulators do typically seek to rationalise the weighting with reference to the financing needs of the regulated entities, whether on a normative or actual basis. In the case of the Walloon region, where we understand that the expected refinancing amounts over the 2025-29 tariff period vary considerably, the actual company data does not appear to offer clear guidance for setting a single weighting.

4.4. Are there alternative approaches to the use of historical data when setting parameter values of the cost of debt in line with market expectations?

As outlined in Section 2.2, we refer to long-term outturn data available at the time the determination is made as "historical" data. And as shown in Figure 2.1, historical data may not always be representative of expectations for future market rates.

Alternatives to historical data do exist:

- If market rates are judged to have undergone a one-off step-change, then **contemporaneous data** may adequately capture market expectations of future rates.
- If market rates are judged to be experiencing a predictable, ongoing trend, then **forward-looking data** (e.g. market-implied forecasts or independent forecasts) may better reflect expectations of future rates.
- Finally, **outturn data** is a further alternative, tightening the link to actual market rates rather than ex ante expectations of market rates.

All three alternatives to financial data are used by regulators. The use of outturn data is not limited to pass-through regimes: as discussed in Section 4.2, many regulators apply adjustment mechanisms based on outturn data. The use of forward-looking evidence – specifically in relation to the cost of debt – is limited in our case study review. There is one example in our supplementary case studies from Sweden, where a long-term normalised rate is used for the risk-free rate. This is informed by forward-looking survey evidence.

It is largely a matter of regulatory judgement which of these alternatives is used. This judgement may take into account:

- accuracy – whether outturn costs are likely to differ from the evidence;
- bias – whether the evidence is likely to systematically overstate or understate future costs; and
- complexity and predictability – whether regulated companies are able to anticipate their allowances.

Historical data reflects a view that the future will be like the past. As Figure 2.1 demonstrates, this is at best unlikely to be accurate and at certain times (e.g. immediately after a shift in rates) can be biased either upwards or

[7] This is based on a simplified calculation for illustrative purposes. Assuming that the opening asset base is comprised of 100% embedded debt and that 10% of the asset base is issued as new debt over the course each year. The average proportion of new debt in the first year would be 5% based on 0% opening value and 10% closing value. The average across all five years calculated in the same way would be 25%.

downwards. Contemporaneous data reflects a view that the future will be like the present. This is less likely to be biased and may often be reasonably accurate.

Forward-looking data can perform better than contemporaneous and explicitly builds in market expectations – though accuracy is far from guaranteed. For example, prior to moving to greater use of adjustment mechanisms many GB regulators had reference to forward curves in setting the cost of capital in a fixed ex-ante approach. However, these forward curves were seen to have limited predictive power and their use has been reduced since – both in relation to the cost of debt but also in relation to the risk-free rate in the cost of equity.

Outturn data will be unbiased and accurate as a reflection of market realities – but at the cost of a degree of uncertainty over future allowances. They may also be perceived to introduce complexity into the calculations, though the range of regulators using adjustment mechanisms demonstrates that this complexity is not a barrier to their application.

Finally, it is important to note that evidence from one category of debt cannot necessarily be assumed to be informative for other categories of debt. For example, market expectations and realities for five-year debt may differ from those for twenty-year debt; trends in A rated debt may not correspond to those for BBB rated debt. This applies equally whether referring to historical, contemporaneous, forward-looking or outturn data.

4.5. Would use of the Bloomberg Utilities BBB index (IGEEUB10 BVLI Index) to set the cost of old/new debt be consistent with regulatory practice in comparable context?

Box 4.1: Overview of the Bloomberg Utilities BBB index

The IGEEUB10 BVLI Index is a corporate cost of debt index published by Bloomberg, a well-known and established provider of finance data, as well as news, software and technology. Like all such indices, it reports the yield on selected bonds.

This particular index selects bonds with the following characteristics:

- Issued by Europe-based utilities.
- Senior, unsecured, fixed rate bonds.
- Composite credit rating of BBB+ to BBB-.
- Constructed 10yr tenor (from the BVSC0021 BVAL yield curve).

Bloomberg does not provide a list of the specific bonds or constituents. We understand that Bloomberg makes adjustments to the data to restate data for each constituent as though it had an outstanding maturity of ten years.

The index begins in 2009, so as of 2023 evidence is available for up to a 14 year trailing average.

To address this question, we first consider how regulatory practice in comparable contexts is carried out. What decisions do regulators make in selecting an index and how are these decisions guided? We consider whether there is any reason to reach a different judgement regarding the reference index to be used for embedded and new debt.

On the basis of our review of regulatory precedent, most regulators appear to select an index or benchmark upon consideration of the following factors:

- The index should be sufficiently **liquid and broad**, so that data is robust and an individual company cannot overly influence the results.
- The **source** of the data should be **credible, independent and transparent**.
- Where an adjustment mechanism is used, the regulator should have confidence in the **ongoing availability of the index**.

- The indices should be **robust to changing market** conditions, remaining reflective of efficient debt costs in different states of the world. For example, the regulator may look at performance of industry bonds and the benchmark index during financial crises.
- The index should be **consistent with the regulatory regime**, including assumptions underpinning the cost of debt and other relevant parameters.

The first four of these bullets are relevant to all regulators and we consider that there are no specific issues for CWaPE that would render these points invalid. Based on our case study analysis, we have not seen clear reasons for why the proposed index would be inappropriate, and in fact have seen this specific index used in both Austria and Sweden.

The final bullet shown above ('consistent with the regulatory regime') is more challenging. Different regulators have used different regulatory frameworks, but we can see that the indices selected typically use:

- A tenor around 10yrs or longer[8].
- A credit rating from broad BBB to broad A.
- Utilities or non-financial corporates.
- A notable financial provider e.g., Bloomberg, Thomson Reuters or S&P (for Markit iBoxx).

We consider that the regime applied by CWaPE is sufficiently similar to our comparators that the same features should apply. However, it is important that any assumptions are consistent with specific assumptions on financeability (e.g. credit ratings), licence conditions and risk allocation.

We have not seen any examples of different indices being used (mechanistically) for embedded versus new debt, and have not seen any theoretical rationale for what that should apply in this case.

We have only sought to comment on the suitability of this index from the perspective of consistency with regulatory practice in other contexts; we have not reviewed the DSOs' debt. In principle, we would expect regulated networks to issue longer rated debt to reflect the long-life nature of assets. We would expect that they would retain an investment grade credit rating; Moody's rating for Resa is A2 (an A rating equivalent using the S&P ratings scale), but we are unaware of ratings for any other DSOs. This may indicate that a broad BBB assumed rating potentially allows some DSOs to outperform the allowance, based on the difference in credit rating alone.

Further analysis on the suitability of the index could involve an assessment of:

- *Pricing*: How do DSO debt issuances compare to yields from potential benchmarks (when adjusted for tenor). This can be important in the context of state-owned utilities who may have credit ratings close to the sovereign – though may not be relevant where a regulator makes an allowance on the basis of a notional company.
- *Financeability*: Supplemental analysis on financeability and the ability of the Walloon DSO's to sustain suitable credit ratings may be useful.

An assumed BBB rating sits at the lower part of the regulatory precedent we have considered. This is supportive of financeability, but is potentially more generous from a pricing perspective.

[8] We note that care needs to be taken on tenor, where a 10yr+ index is used. Such an index uses a minimum tenor, so the weighted average tenor changes over time. Depending on the yield curve, this can materially impact on rates.

4.6. What is the impact of the quantitative easing policy of the European Central Bank (ECB) on the cost of equity and cost of debt? How has it been taken into account by regulators when setting DSO's cost of capital?

The focus of this study is on regulatory allowances for the cost of debt and so we have not conducted an overall review of the future impact of QE on the cost of capital. These impacts are complex. Forecasting future impacts is very challenging. It would involve, for example, taking a view on the ECB's monetary policy stance (both now and in the future) and assessing impacts on yield curves and inflationary expectations, among other things.

Rather, we consider which components of the cost of capital might be affected by QE and whether the regulators' methods would or would not take these effects into account. The salient question for regulators is a simpler one concerning whether there are any features present in historic data that are unlikely to be present in future data.

There are potentially different impacts from QE with respect to the cost of capital.

- 'Absolute' impact: QE may have plausibly reduced yields for relevant government and corporate benchmarks used as evidence in setting the cost of capital.
- 'Relative' impact: If we move to a rate environment where the effects are expected to be unwound, e.g., through QT, this could create an asymmetry in potential future yield movements in the upcoming tariff period. This is relevant in the absence of adjustment mechanisms applying.

As a broader point, consistency over time is important. An approach from a regulator should be robust to both upward and downward movements in yields. An approach that changes approach in a different expected rate environment is problematic, especially where the approach is expected to represent a 'fair bet' over the medium term and not necessarily within a single tariff period. For example, use of a longer trailing average (a 'dragging anchor') approach to the risk-free rate can lead to over-recovery where rates have trend downwards, but will lead to under-recovery if rates then trend upwards. If a longer trailing average is only considered suitable in a falling rate environment, this creates a one-way bet for regulated companies, which is inappropriate for consumers.

From our core case study review we have seen examples of both explicit and implicit adjustments for QE – Flanders with an explicit upwards adjustment of 63bps[9] (though applied only to the risk-free rate on the cost of equity), and France (ET sector) with the use of a longer tenor, hence higher cost of debt. We have also seen cases where regulators have aimed up on market evidence, though the reasoning is not necessarily ascribed to the impact of QE. However, the majority of case studies rely directly on market evidence without adjustment.

When considering the use of any adjustment, it is important to consider the interactions between the cost of equity and the cost of debt. This includes the following points:

- A risk-free rate on debt is not equivalent to the risk-free rate on equity, where it is capturing the cost of embedded debt (not just current debt). The impact of QE may not be constant in its impact on yields and so any adjustment may differ on debt and equity.
- There is a risk of inconsistency if any uplift applied to the risk-free rate on the cost of equity is higher than the assumed debt premium, when considering prevailing costs of debt and equity. This would create a logical flaw where the all-in cost of (new) debt was less than the risk-free rate used on the cost of equity[10].

Where an adjustment is applied, it is important that this applies evidence from any academic literature appropriately. Let us take an example of where a firm is able to borrow at 3.0% during a time with QE and the literature suggests that corporate debt yields would have been 5.0% without QE, i.e. 200bps higher. It would not be

[9] Based on an adjustment on OLO bonds of 70-100bps and 20-100bps on German bunds (with a 75% weight on OLO data).

[10] We are referring to the prevailing / spot cost of debt and equity i.e., they are considered on a like-for-like basis.

appropriate to use market evidence (i.e. 3.0%) and then apply a 200bps adjustment (as the adjustment would be fully additive to the company's actual debt costs).

We also note that a study of the impact of QE on one market may not be informative of the impact of QE in the given reference market.

Use of an adjustment mechanism will address the 'relative' impact point, whereby market evidence from during the tariff period is used. This avoids the need to take an explicit view on future rate movements as these will be compensated through an updated allowance.

5. CONCLUSIONS

In this section we focus on the practical implications of this study. What approaches to reflecting market volatility in the cost of debt allowance are well-supported by regulatory precedent? In which situations and under what circumstances are different approaches more or less suitable?

5.1. OVERVIEW

Regulators are typically guided in some form by an objective or principle to consider the cost-reflectivity of the allowances they set. Regulated companies typically hold portfolios of debt raised over a period of many years or decades, and typically issue debt during a price control. This may be through refinancing existing debt and raising debt to finance new investment.

It is therefore not unreasonable to think of debt costs as comprising costs of debt raised before the price control (embedded) and costs of debt raised during the price control (new). Where debt costs are stable over a long-period of time this distinction matters less. Figure 2.1 shows, however, that market rates can vary significantly – even over quite short periods of time. Though rates were relatively stable between 2015 and early 2022, in other periods of time companies (regulated and unregulated) have been subject to shifts in debt costs that are at least partly uncontrollable.

A key implication of this volatility is that new debt will be issued at different rates from old debt. Setting allowances based on historic data is not necessarily biased: we can see a period of falling rates and a period of rapidly increasing rates in recent history. But volatility can be: (a) protracted – the falling rate trend played out over many years; and (b) unpredictable – mean reversion has been predicted in the UK for a decade and at this point it is far from clear for how long currently elevated rates will persist. This means that even an unbiased approach can be a poor predictor of costs for an extended period of time.

Under what conditions would revenues still be cost reflective?

- Pass-through – though with a lag
- Index – a bit like a pass-through of the market or industry cost of debt
- Ex ante forecast of new debt costs with limited adjustment mechanism for outturn data – i.e., a watered down version of indexation
- Ex ante forecast of new debt costs using market or other forecasts of market rates – though market forecasts are imperfect
- Ex ante forecast of new debt costs assuming current rates will be maintained – though this may involve the regulator taking a contrary view (to the markets) of future rates

From the regimes we have considered, there is no clear-cut support for one approach over the others. We therefore summarise our findings based on an assessment of when each various features might be considered more or less suitable. Table 5.1 below outlines the key features relating to market volatility, the extent of regulatory precedent for each, and our assessment of the conditions under which each is most suitable.

Table 5.1: Key methodological features addressing cost of debt volatility

Methodological feature	Regulatory precedent	Most suitable when…
Distinction between embedded and new debt	12 of 15 regimes reviewed	• Intention is to set a cost-reflective allowance • Regulated companies face rates that vary over time • Regulated companies expect to raise finance during a price control (whether to finance expansion or refinance a portion of their existing portfolio)

Methodological feature	Regulatory precedent	Most suitable when…
Use of forward-looking data	Sweden[11] (in a non-mechanistic sense)	• Credible forecasts exist for parameters concerned • Bill stability outweighs the value of linking the allowance to outturn data
Within price control adjustments using outturn data[12]	Netherlands, GB, England & Wales (water), Austria, Ireland, Slovakia, Italy, Australia, Australia – water	• Cost of debt movements are (at least in part) uncontrollable • Intention is to allocate cost of debt risk (at least in part) to consumers • Robust, cost-reflective outturn data is available • Implications for bill volatility are manageable
Conditional adjustments	Slovakia, Ireland Italy, Australia – water	• Bill volatility considerations are particularly relevant • Intention is to change allocation of risk for changes in cost of debt of different magnitudes • Other regime features are in place to support the variable risk allocation
Discretionary adjustments or application of judgement	Flanders, Luxembourg, France, Sweden, Greece	• Evidence needs correction for bias • A wide range of values may be plausible and consistent with available evidence
Pass-through of actual debt costs	Germany, Belgium (federal), Brussels	• Cost of debt risk to be allocated to consumers in full • Limited concerns around companies' incentives to minimise debt costs

5.2. KEY DISCUSSION POINTS

We pick up in the following sub-sections the five themes discussed in Table 5.1 of applying a normative approach to setting a cost of debt allowance in a number of areas.

Different forms of evidence in ex ante regimes

The majority of regulatory approaches recognise a distinction between embedded and new debt costs. Some do this by separating out those two components of the cost of debt, with different evidence brought to bear in each case. The cost of new debt allowance can, for example, be guided by:

- contemporaneous evidence – for example, both the Flanders and Dutch regulators refer to short (1-year and 3-year respectively) trailing averages, effectively increasing the weight applied to those data points;
- forward-looking evidence – as applied by the Swedish regulator and commonly by other regulators in relation to the cost of equity; and

Few base their determinations on historic evidence only – and those that do typically incorporate some form of discretionary adjustment or judgement based on a range of plausible values. New debt allowances will typically be informed by more contemporaneous data to proxy expected debt costs over the coming tariff period.

[11] This is the only example reviewed in which forward-looking evidence is applied to estimation of the cost of debt allowance. Reference to forward-looking evidence is more common in relation to the cost of equity allowance.

[12] In practice, the main examples are based on separation indexation of (a) the real all-in cost of debt allowance and (b) the rate of inflation. In principle, regulators could choose to index the nominal all-in cost of debt allowance; or they could choose to index the risk-free rate or debt premium separately. The practice of separate indexation of the risk-free rate is more commonly applied to that parameter as a component of the cost of equity allowance.

Applying adjustment mechanisms

It is also common for regulators to use outturn evidence in various forms of adjustment mechanism for the cost of debt. Across the case study examples we have considered, we have found seven examples – nearly half of the regulators reviewed.

Use of adjustment mechanisms do not negate requirements to make judgements on the scope of evidence. The adjustment mechanisms require commitment to a given index or source of evidence, that is seen to be appropriate across all stages of the economic cycle. This includes making decisions on rating, company classification and tenor for the index itself. Further questions on calibration exist around the use of the trailing average. These practical challenges have been addressed in each of the case studies considered.

It is helpful to think of a spectrum of alternatives based on the extent to which they react to outturn data. A purely ex-ante allowance represents one end of a spectrum; at the other end of this spectrum, periodic mechanistic updates during the price control are most reactive. These approaches can be linked to different overarching philosophies: a pure ex-ante approach apportions all risk of market movements to the company, whilst ex-post adjustment allocates that risk to the consumer.

Most regulators in our study have chosen one or the other end of the spectrum. Relatively few have chosen an intermediate option based on partial adjustment mechanisms – and those that have, have not done so consistently. In Ireland, Italy and the Slovakian ED sector, cost of debt allowances are subject to a deadband, with adjustments triggered only if costs rise or fall beyond a pre-specified threshold. In the Slovakian GD sector, however, adjustments are made only up to the pre-specified threshold and not beyond.

It is therefore difficult to generalise from these examples. One way of rationalising bounded or constrained adjustment mechanisms would be with reference to the degree to which market movements of different sizes are controllable or manageable by companies. However, looking across the examples above, it is not clear that the regulators concerned have reached a consistent view on this point. Regulators may also consider bill stability, with limitations on within-period adjustments helping to promote this. Again, however, in the examples above, some approaches appear to support bill stability specifically for small movements in market rates while others support bill stability specifically for large movements in market rates.

Volatility in inflation

We discussed in Section 2 different sources of volatility when setting an all-in nominal cost of debt allowance. Inflation in this nominal cost of debt allowance is implicit rather than explicit. A nominal allowance using an adjustment mechanism therefore explicitly captures inflation expectations in the yield.

When setting a real cost of debt, for example under an approach where the asset base is subject to inflation indexation, inflation expectations can be updated as part of an adjustment mechanism and volatility may be limited to the real cost of debt.

The choices made on the structural framework to adopt will directly impact on volatility, but also have broader implications for risk allocation. A nominal returns framework tends to have more front-end loaded revenues versus a real returns framework with inflation indexation. This impacts on cost recovery.

Discretionary adjustments and the application of judgement

Some case studies include adjustments to the market evidence. In some cases, these adjustments are explicit and have a defined reason e.g. Flanders adjustment, whilst other times this is more implicit and may be related to broader trends or movements in market evidence. Rationale to support regulatory positions is a key component of ensuring stability and predictability of a regime.

Whilst regulators often exercise some judgement or apply some discretion, there is no clear pattern of regulators doing so specifically in response to QE. In many cases, regulators may expect any impact of QE on debt rates to be captured more or less automatically by the evidence they take into consideration. This is particularly likely to be the

case where regulators apply mechanistic adjustments based on outturn data. In such cases, regulators may see little reason to comment specifically on QE.

Risk allocation and financeability

Decisions need to be considered holistically and there may be implicit trade-offs made as part of a regulatory determination. An example of this may be with the choice of benchmark index and the extent to which regulated companies bear risk of market movements. If regulated companies face risk of market movements, using a BBB index may provide a partial protection against adverse movements where the expected credit rating of the DSOs are slightly better. Additional analysis on financeability could also inform such a decision.

PART B: CASE STUDIES & DESKTOP REVIEW

6. CORE CASE STUDIES

As noted we have focused our evidence base on seven 'core' case study examples: Flanders, Netherlands, Germany, Luxembourg, France, Brussels and the UK[13]. In each case we present evidence below of the elements of each regulator's approach to the cost of debt, based on the structure set out in Table 2.1.

Our focus is on energy regulation for DSOs. We specify gas or electricity sectors in the case study. We have selected the most recent determination, as we see no reason in principle for the approach to setting efficient debt costs to differ.

Case study: Flanders

Category	Description (with rationale where available)
Regulator	Vlaamse Regulator van de Elektriciteits- en Gasmarkt (VREG)
Sector	Both Electricity Distribution & Gas Distribution (same WACC for both sectors)[14]
# of companies	10 electricity DNOs, 10 gas DNOs
Length of control (yrs)	4 years (2021 - 2024)
Legislative framework / rules	Het Energiedecreet The VREG sets the tariff methodology in such a way that, amongst other aims, The tariffs reflect the actual costs incurred, insofar as they correspond to those of an efficient comparable entity or activity (Energiedecreet 4.1.32. §1 5) The remuneration of capital invested in regulated assets must enable the DSO to make the necessary investments for performance of its tasks and provide access to capital (Energiedecreet 4.1.32. §1 9)
Inflation treatment	Nominal WACC
Normative or actual debt	Normative debt, to induce an efficiency-incentive
If normative, please continue – otherwise please stop	

Category	Description (with rationale where available)
Degree of Judgement	Primarily mechanistic, with two judgement-based adjustments: i. Exclusion of 2017-2020 evidence for the cost of embedded debt (RfR and DP) ii. Adjustment for QE (in previous price control, not in current price control)
Inputs used for debt (additive or all-in)	Additive.
Treatment of new & embedded debt	Separate cost of new & embedded debt. Risk-free rate calculated as average over 12 months for new debt, average over 120 months for embedded debt. Weighing is 75% Belgian / 25% German for both embedded and new debt.
Debt weighting (implicit or explicit)	Explicit new debt weight.

[13] [include point around relying on translation]

[14] VREG (2021) "Tarriefmethodologie voor distributie elektriciteit en aardgas gedurende de reguleringsperiode 2021-2024; Bijlage 2 Rapport kapitaalkostenvergoeding"

Category	Description (with rationale where available)
	Based on a 60 / 40 weighting for embedded and new debt, using actual industry evidence on expected weights in the given tariff period.
Allowance determination (fixed or adjusted)	Fixed allowance.

Category	Description (with rationale where available)
Debt vs equity	
Single RfR across debt and equity?	Yes (for new debt only) Same RfR across new debt and equity. Different RfR is used for embedded debt.
Debt benchmarks	
Credit rating	Single A rating
Industry	European utilities
Benchmark source	Thomson Reuters A rated EUR Eurozone Utility (bonds) index with 10 years to maturity
Tenor	10 years
Calibration	
Trailing average length (embedded)	6 years for embedded debt, based on the 2010-2016 period. VREG considered that rolling forward that approach was not suitable. The VREG updated the approach for embedded debt for the following reasons: (i) the VREG increased allowed income in 2016-2020 to permit decrease of tariff deficits from 2010-2014, and (ii) DNOs received financial support from Flemish Government from 2017 as compensation for green-electricity-certificates and heat-power-certificates. This resulted in DNOs being able to pay off embedded debt without issuing new debts. As a consequence, the cost of embedded debt (RfR and DP) is based on the 2010-2016 period, rather than the 2010-2020 period i.e., no debt is expected to be raised in 2017-20.
Applied to:	Embedded only
Trailing average period for new debt	1 year
Use of forward-looking evidence	None mentioned
Adjustment mechanism (if relevant)	
Form of adjustment	None mentioned
Adjustment applies to	N/A
Bound to adjustments	N/A
Other	
Explicit adjustment for QE	Use an upwards adjustment of 63bps applied to the risk-free rate prior to 2021 i.e., for equity only. Intention was to adjust for downward pressure on interest rates from QE. VREG's consultant recommended no longer adjusting for QE[15], given that they

[15] Europe Economics (Feb 2020)

Category	Description (with rationale where available)
	are operating in an economic environment where interest rates have been low or negative for long times.
Implicit adjustment for QE	N/A – use explicit adjustment.
'Aiming off' / use of headroom	Not mentioned
Transaction costs	Included, upwards adjustment of 15bps to all debt
New Issue premium applied	Not mentioned
Illiquidity premium applied	Not mentioned

Case study: Germany

Category	Description (with rationale where available)
Regulator	Bundesnetzagentur
Sector	Electricity
# of companies	4 TSOs and ~900 DSOs
Length of control (yrs)	5 years
Legislative framework / rules	The Energy Industry Act (Energiewirtschaftsgesetz (EnWG)) The Bundesnetzagentur's aims include safeguarding competition and enabling efficient investment. The Energy Industry Act includes debt costs as a controllable cost that should be renumerated efficiently.
Inflation treatment	Actual debt costs.
Normative or actual debt	Actual debt. Actual debt costs are considered as part of the regulator's wider cost efficiency assessment. There is a true-up between expected and actual company cost of debt with a two-year lag.
If normative, please continue – otherwise please stop	

Case study: Netherlands

Category	Description (with rationale where available)
Regulator	Autoriteit Consument & Markt (ACM)
Sector	Both Electricity Distribution & Gas Distribution[16]
# of companies	6 electricity DNOs, 6 gas DNOs
Length of control (yrs)	4 years (2022 – 2026)
Legislative framework / rules	Elektriciteitswet 1998, artikel 41, eerste lid States that the ACM is responsible for setting a discount on incomes to promote efficient business operations. In doing so, the ACM should take in consideration, amongst other factors, a reasonable return for investment. The aim is that the DNOs

[16] ACM (2021) "Bijlage 3 bij het methodebsuilt regionale netbeheerders gas en elektriciteit 2022-2026; Uitwerking van de methode van het redelijke rendement (WACC)"

Category	Description (with rationale where available)
	at the least do not achieve more returns than is customary in the economy. Further states that
Inflation treatment	Real for electricity, nominal for gas. The ACM use a nominal framework for gas, considering the potential for reduced future network use.
Normative or actual debt	Normative debt, to determine cost of debt of an efficient distributor
If normative, please continue – otherwise please stop	

Category	Description (with rationale where available)
Degree of Judgement	Mechanistic
Inputs used for debt (additive or all-in)	All-in yields
Treatment of new & embedded debt	Rolling debt approach (*closest to*). Use a 'trapjesmodel' (staircase model) which assumes regulated companies finance existing investments with 10-year loans, and refinance 10% of their debt every year.
Debt weighting (implicit or explicit)	Implicit new debt weight. Use a 'trapjesmodel' (staircase model) which assumes regulated companies finance existing investments with 10-year loans, and refinance 10% of their debt every year.
Allowance determination (fixed or adjusted)	Adjusted allowance. Yearly updating of the cost of debt based on outturn index data, since there have historically been big differences between estimated interest on obligation-indices of EU utilities and outturn interest.[17]

Category	Description (with rationale where available)
Debt vs equity	
Single RfR across debt and equity?	N/A, do not split out RfR + DP for debt
Debt benchmarks	
Credit rating	Single A rated (S&P, equivalent to Moody's A2)
Industry	European Utilities
Benchmark source	Bloomberg, BVF EUR Utility (A) 10 Year Index (C58310Y) – parameter PX_LAST
Tenor	10 years, using liquid (i.e., highly traded) bonds to ensure yields are robust.
Calibration	
Trailing average length (embedded)	Average daily yield to maturity of comparable debt in the relevant calendar year in the staircase model
Applied to:	Embedded only
Trailing average period for new debt	Three-years average of spot rate
Use of forward-looking evidence	None

[17] The RfR for the cost of equity is also updated yearly based on outturn index data.

Category	Description (with rationale where available)
Adjustment mechanism (if relevant)	
Form of adjustment	Yearly adjustment
Adjustment applies to	All debt
Bound to adjustments	N/A
Other	
Explicit adjustment for QE	No QE adjustment
Implicit adjustment for QE	No QE adjustment
'Aiming off' / use of headroom	Not mentioned
Transaction costs	Included, increase of 15bps. From previous studies, the ACM concluded that transaction costs associated with financing through debt justify an uplift of 10 to 20bps. ACM decided to take the average of these low and high estimates.
New Issue premium applied	Not mentioned
Illiquidity premium applied	Not mentioned

Case study: Ofgem RIIO-GD2

Category	Description (with rationale where available)
Regulator	Ofgem
Sector	Gas
# of companies	8
Length of control (yrs)	5
Legislative framework / rules	RIIO framework – Setting revenue using incentives to deliver innovation and outputs. Ofgem is governed by the Gas and Electricity Market Authority (GEMA) that determines Ofgem's strategy. Under the Utilities Act 2000, with a view to promoting effective competition, GEMA must have regard to "the need to secure that licence holders are able to finance the activities which are the subject of obligations on them".[18]
Inflation treatment	Real WACC plus CPI(H) indexation Deflate nominal 'all in' yields for each date of the trailing average to CPIH real yields using the 5-year OBR forecast for CPI available for each date and the Fisher equation. The trailing average of the resulting real yields provides the CPIH real allowed return on debt.
Normative or actual debt	Normative
If normative, please continue – otherwise please stop	

[18] Under the Gas Act and the Utilities Act, and the Energy Act 2008 and 2010 in the case of Gas Act functions.

Category	Description (with rationale where available)
Degree of judgement	Primarily mechanistic Cost of debt allowance with reference to the yield of the iBoxx Utilities 10yr+ index. The allowance is calculated using an extending 10 to 14-year trailing average. 0.25% is added to the index for additional borrowing costs including transaction costs, liquidity, cost of carry, and CPIH issuances, which was ultimately a matter of judgement.
Inputs used for debt (additive or all-in)	All-in. Cost of debt allowance is calculated with reference to the yield of the iBoxx Utilities 10yr+ index. There is no separate risk-free rate or debt premium estimated with respect to the cost of debt.
Treatment of new & embedded debt	Rolling debt approach. The actual debt costs and structure of embedded costs for the regulated companies are considered when calibrating the iBoxx index but one cost of debt is applied to all new and embedded debt. This led to the 10-14 year trailing average calibration. However, an additional allowance is provided for the issuance of new CPI/CPIH debt. In RIIO-GD2, Ofgem changed to indexing the RAB using CPI inflation instead of RPI. As a result, companies are incentivised to raise new debt that is CPI linked instead of RPI linked, but the market for CPI linked debt is relatively immature. This additional allowance (5bps) is applied to the overall cost of debt allowance, not just new debt.
New debt weighting (implicit or explicit)	Implicit new debt weight. In calculation of the CPIH issuance allowance and calibration of the trailing average time period, Ofgem assumed that the proportion of new debt issued in RIIO-GD2 would be between 15% and 22% of total debt.
Allowance determination (fixed or adjusted)	Adjusted allowance. The cost of debt allowance is set each year according to updated data for the benchmark index.

Category	Description (with rationale where available)
Debt vs equity	
Single RfR across debt and equity?	n/a
Debt benchmarks	
Credit rating	Implied rating is around BBB+
Industry	Utilities
Benchmark source	iBoxx
Tenor	10yr+
Calibration	
Trailing average length (embedded)	10 – 14 years
Applied to:	Both new and embedded debt
Trailing average period for new debt	n/a
Use of forward-looking evidence	No use of forward-looking evidence

Category	Description (with rationale where available)
Adjustment mechanism (if relevant)	
Form of adjustment	Real Utilities iBoxx yield indexation
Adjustment applies to	All debt
Bound to adjustments	No bounds to adjustment
Other	
Explicit adjustment for QE	n/a
Implicit adjustment for QE	n/a
'Aiming off' / use of headroom	n/a
Transaction costs	Companies received a total +25bps (+31bps for small companies) of additional borrowing costs above the benchmark index which were modelled to be more than sufficient to cover expected costs under a range of RPI, LIBOR and totex scenarios.
New Issue premium applied	No additional allowance. Ofgem analysis found a small positive halo, but they decided not to deduct from the Utilities iBoxx yields as the amount was small and they have a preference to be conservative.
Illiquidity premium applied	+5bps to cover potential additional costs of CPI/CPIH new debt issuance and RPI/CPIH embedded debt basis mitigation based on the illiquidity of the CPIH debt market. +6bps small company premium for notional licensees expected to issue smaller size or less frequently than other networks.

Case study: Luxembourg

Category	Description (with rationale where available)
Regulator	Luxembourg Regulatory Institute
Sector	Electricity
# of companies	1
Length of control (yrs)	4
Legislative framework / rules	Regulation (EU) 2019/943 Under this regulation, charges applied by network operators shall "reflect actual costs incurred insofar as they correspond to those of an efficient and structurally comparable network operator". Tariff methodologies need to incentivise "efficient investments".[19]
Inflation treatment	Nominal WACC
Normative or actual debt	Normative
If normative, please continue – otherwise please stop	

Category	Description (with rationale where available)
Degree of judgement	Primarily judgment

[19] Regulation (EU) 2019/943. Section 2, Article 18, para 1-2.

Category	Description (with rationale where available)
	Analysed a range long-term government bonds and debt spreads for energy companies rated above A- to derive a range for the risk-free rate and debt premium. Judgement to select comparators and point estimates within range (including reference to QE as a driver of lower yields).
Inputs used for debt (additive or all-in)	Additive
Treatment of new & embedded debt	Rolling debt approach. New and existing investments are renumerated at one WACC without consideration of whether new debt is raised.
New debt weighting (implicit or explicit)	Implicit new debt weight. Calculates debt spread using a 5-year average of Bonds with remaining term of 7-13 years.
Allowance determination (fixed or adjusted)	Fixed allowance. The nominal pre-tax cost of debt is fixed at 2.18% each year for the regulatory period.

Category	Description (with rationale where available)
Debt vs equity	
Single RfR across debt and equity?	Yes
Debt benchmarks	
Credit rating	Above A-
Industry	Energy
Benchmark source	No benchmark used. Comparator company cost of debt.
Tenor	Remaining term of 7-13 years.
Calibration	
Trailing average length (embedded)	5-year average
Applied to:	Both
Trailing average period for new debt	n/a
Use of forward-looking evidence	None
Adjustment mechanism (if relevant)	
Form of adjustment	No adjustment through the period.
Adjustment applies to	n/a
Bound to adjustments	n/a
Other	
Explicit adjustment for QE	No explicit adjustment.
Implicit adjustment for QE	No implicit adjustment.
'Aiming off' / use of headroom	No consideration of headroom.

Category	Description (with rationale where available)
Transaction costs	No consideration of transaction costs.
New Issue premium applied	No consideration of new issue premium.
Illiquidity premium applied	No consideration of illiquidity premium.

Case study: France

Category	Description (with rationale where available)
Regulator	Commission de Regulation de l'Energie (CRE)
Sector	Electricity Transmission (TURPE 6 HTB)[20]
# of companies	1 (RTE)
Length of control (yrs)	4 years
Legislative framework / rules	Articles L. 341-2, L. 341-3, and L.341-4 of the French energy code The tariffs for the public transmission network is calculated in a transparent and non-discriminatory manner, to cover all the costs borne by the operators of these networks, insofar as these correspond to the costs of an effective network manager. The tariffs include normal renumeration, which contributes to making the investments necessary for the development of the network. The methods used to establish tariffs are set by the Commission de Regulation de l'Energie (CRE)
Inflation treatment	Nominal WACC
Normative or actual debt	Normative
If normative, please continue – otherwise please stop	

Category	Description (with rationale where available)
Degree of Judgement	Primarily mechanistic Consultant gave a range of options for cost of debt, based on a mechanistic approach, CRE picked a number in that range, unclear how the CRE decided upon that number
Inputs used for debt (additive or all-in)	Additive
Treatment of new & embedded debt	No mention is made of new and embedded debt. Assume they are treated the same.
Debt weighting (implicit or explicit)	Implicit new debt weight
Allowance determination (fixed or adjusted)	Fixed allowance

[20] CRE (2021) "Deliberation of the French Energy Regulator Commission of 21 January 2021 deciding on the tariffs for the use of public transmission electricity grids (TURPE 6 HTB)"

Category	Description (with rationale where available)
Debt vs equity	
Single RfR across debt and equity?	Single RfR across debt and equity
Debt benchmarks	
Credit rating	A
Industry	Non-financials
Benchmark source	iBoxx EUR Non-Financials A
Tenor	10yr+ (approximately 15 years over RfR and DP, 14 years for iBoxx)
Calibration	
Trailing average length (combined)	10 years
Applied to:	Embedded + new
Trailing average period for new debt	n/a
Use of forward-looking evidence	None mentioned
Adjustment mechanism (if relevant)	
Form of adjustment	N/A
Adjustment applies to	N/A
Bound to adjustments	N/A
Other	
Explicit adjustment for QE	Not mentioned
Implicit adjustment for QE	The regulator extended the tenor of reference rate to 15yrs from 10yrs
'Aiming off' / use of headroom	A range of WACC is proposed by the consultants, in which the RCRE picks a value
Transaction costs	Include transaction costs of 15 bps, based on comparison to other European regulators, particularly the Dutch and Belgian regulators
New Issue premium applied	Not mentioned
Illiquidity premium applied	Not mentioned

Case study: Brussels

Category	Description (with rationale where available)
Regulator	BRUGEL
Sector	Electricity Distribution[21]
# of companies	1 DSO (Sibelga)
Length of control (yrs)	5 years

[21] Brugel Tariefmethodologie Elektriciteit 2020 - 2024

Category	Description (with rationale where available)
Legislative framework / rules	Ordonnantie betreffende de organisatie van de elektriciteitsmarkt in het Brussels Hoofdstedelijk Gewest The tariffs for the public transmission network is calculated in a transparent and non-discriminatory manner. The tariffs allow the operator whose efficiency is close to the market average to recover the totality of its costs and a normal return on capital.
Inflation treatment	N/A – use actual debt costs.
Normative or actual debt	Actual debt.
If normative, please continue – otherwise please stop	

7. SUPPLEMENTARY CASE STUDIES

We have supplemented the core case studies with additional examples of approaches taken by regulators to the cost of debt, where we consider it relevant to the question of dealing with market volatility. This list is not intended to be exhaustive, but aims to provide a broader context of regulatory best practice. For these supplementary case studies we have focused on specific features rather than providing details of each element of setting the cost of debt allowance.

Ireland – Gas – 2012 to 2017 (PC3)

We have reviewed the PC3 price control despite the fact that it is not the currently applicable price control. This is because it represents the point at which a particular mechanism of interest was introduced.

Adjustment mechanism – deadband and within set bounds

The Irish regulator, CRU, set a WACC for PC3 that was significantly higher than the prior price control[22]. This was driven by financial market conditions after the global financial crisis and the start of the Eurozone sovereign debt crisis.

The CRU included a trigger mechanism whereby the WACC would be reviewed annually and operating with a floor and ceiling on the potential movements in that WACC. There were intended to be minimum thresholds that would apply before any adjustment to the actual WACC was made. The trigger adjustment was based on movements in Irish sovereign yields, with a scalar of 60% on the cost of new debt and equity.

Feature of interest: use of adjustment mechanism with deadband and bounds.

Great Britain – Water – 2020 to 2024 (PR19)

Unbounded adjustment mechanism

The England and Wales regulator, Ofwat, regulates 17 companies across water and wastewater. The approach to the cost of debt at PR19 includes setting separate weights for embedded and new debt. A weight of 20% was applied to new debt, based on expected investment and debt issuance in the upcoming price control period at the industry level.

A fixed allowance is set for embedded debt. The cost of new debt is subject to an end-period reconciliation, linked to movements in a benchmark index (this is equivalent to an indexation measure).

Feature of interest: use of adjustment mechanism on new debt only.

Australia – Energy – 2022 AER Rate of Return Instrument

Unbounded adjustment mechanism

The Australian regulator, AER, transitioned from setting a cost of debt using a fixed 'on-the-day' approach to using an adaptive ten-year trailing average portfolio approach to better address market volatility. Under the 'on-the-day' approach the cost of debt allowance for the entire regulatory period was fixed and estimated as the return on debt at the start of the regulatory period (over a nominated averaging period). In contrast, under the ten-year trailing average portfolio approach the cost of debt allowance for the forthcoming year is a simple average of the annual cost of debt estimate for that year and the annual cost on debt estimates for the nine previous years, meaning the cost of new debt is incorporated into the cost of debt allowance.[23]

The cost of debt each year is calculated as the sum of the risk-free rate and debt premium averaged over a period nominated by each regulated network each year. This averaging period can be between 10 days and 12 months

[22] Source: CRU (Nov 2012)

[23] Source: AER (Dec 2018) and AER (Feb 2023)

long and must start after it has been nominated and end 4 months before the relevant regulatory year. This allows each network to match the cost of debt with their debt issuances.

Feature of interest: move to an adjustment mechanism.

Australia – Water – 2018 Review of WACC methodology

Trigger to change cost of debt methodology

The Australian regulator, IPART, uses a measure of uncertainty to trigger a switch from a mechanistic approach to setting the cost of debt to a judgement-based approach. IPART calculates an "uncertainty index" to measure market volatility. As long as this index falls within one standard deviation of the long-run average, IPART calculates the cost of debt as the midpoint between a 10-year trailing average and a 4-year trailing average cost of debt. This reflects a distinction between current and historical debt costs. These trailing averages are calculated each year and a "true-up" allowance is passed through to the water networks.

If the uncertainty index falls outside one standard deviation of the long-run average, IPART may use their judgement to set the cost of debt (and all other WACC parameters). IPART's use of judgement may change on a case-by-cases basis but in their 2012 decision for Sydney Water they decided to use the upper bound of their range of WACC estimates "due to current market uncertainty".[24]

Feature of interest: using judgement when markets are volatile.

Austria – Electricity transmission – 2023 to 2028 (Fourth regulatory period)

Unbounded adjustment mechanism

For the fourth regulatory period, the regulator, eControl has adopted a new approach, rather than utilise a fixed allowance methodology[25].

The regulator sets a cost of debt that is based on the prevailing cost of debt in a given year. The risk-free rate and debt premium are updated annually to reflect current market conditions[26]. The risk-free rate uses interest rates for Finland, Netherlands and Austria across different maturities and periods of time. The regulator uses the Bloomberg EUR Europe broad BBB 10yr index, and a composite index based on iBoxx EUR BBB 7-10yr and iBoxx EUR BBB 10yr+ indices.

Feature of interest: move to an adjustment mechanism.

Sweden – Gas – 2023 to 2026

Fixed ex-ante: combined new and embedded debt

The regulator, Ei, has adopted an additive approach to setting the cost of debt (i.e., risk-free rate plus debt premium) for its seven regulated gas companies[27]. Ei sets a cost of debt that does not distinguish between embedded and new debt.

For the risk-free rate the regulator uses a long-term normalised rate. This is informed by forward-looking evidence from two sources; a PwC annual survey and Swedish Economic Institute forecasts. The PwC normalised rate was 200bps above the prevailing market rate at the time of the survey.

The debt premium is based on the average spread between the Bloomberg EUR Europe broad BBB 10yr index and German sovereign 10yr yields over a five-year trailing average period.

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[24] Source: IPART (Feb 2018) and IPART (June 2012)

[25] Source: Moody's (Jan 2023)

[26] Source: Randl and Zechner (Oct 2022)

[27] Source: Montell & Partners (2022)

Feature of interest: use of forward-looking evidence to estimate the risk-free rate.

Slovakia – Electricity Distribution (ED) and Gas Distribution (GD) – annual

Adjustment mechanism: deadband and outside bound

Separate approaches apply to ED and GD sectors in Slovakia[28]. The regulatory bodies are URSO and RONI.

In GD, the WACC is updated annually in the review period, but cannot change by more than +/- 10%.

In ED, if a parameter changes by more than 20% in a given year, the WACC is reset for the remainder of the price control.

Feature of interest: use of bounds as part of an adjustment mechanism.

Greece – Electricity Transmission - 2018-2021

Fixed ex-ante allowance – combined new and embedded debt

The regulator, RAE, set the cost of capital for ADMIE based on an initial set of proposals from the company itself[29]. This case study example was raised by a respondent to CWaPE's previous consultation.

A separate cost of debt is set for each year of the price control, but is not updated. We understand that the regulator has approved the all-in cost of debt proposed by the company. This is with the use of a risk-free rate of 0.70%, above the market-based risk-free rate of 0.32% proposed by the company. No clear rationale is provided for the use of 0.70% rather than 0.32% on the risk-free rate.

Feature of interest: possible aiming-up on a parameter.

Italy – Gas and electricity – 2022-27

Adjustment mechanism – deadband

ARERA's estimate of the notional cost of debt is based on a separate cost of embedded debt and new debt[30].

The cost of embedded debt is based on the 10yr average of the iBoxx EUR European broad BBB 7-10 and 10yr+ indices. New debt is given a 15% weight and is based on the spot yield of the aforementioned iBoxx indices, plus two adjustments: a forward premium of 25bps and an uncertainty premium of 50bps. The forward premium was based on expected yield movements, as implied by sovereign curves. The uncertainty premium was included to account for the risk of spot rates rising faster than forward rates would suggest (leading to financeability issues). The 50bps figure is informed by aiming up within relevant regulatory precedent.

Under the six-year period, some parameters will be updated as part of a mid-term review i.e., for the final three years. A trigger mechanism also operates in preceding years where the WACC is re-opened if calculations point to an increase of above 50bps.

Features of interest: use of aiming up and application of adjustment mechanisms.

[28] Source: Moody's (Jan 2023)

[29] Source: RAE (Mar 2018)

[30] Source: Oxera (Feb 2022)

Appendix A SUPPORTING MATERIAL

In this annex we provide relevant supporting material on the background to the setting the cost of capital and the previous CWaPE approach.

A.1. DECISION-MAKING FRAMEWORK FOR WACC

A.1.1. Theoretical approach

We work within a typical cost of capital theoretical framework informed by the Capital Asset Pricing Model (CAPM). In this, the cost of capital is expressed as a weighted average of the cost of debt and cost of equity – the WACC. The components of the WACC and their relevance to this assignment are:

- The **cost of debt** – the focus of this exercise. This may or may not be sub-divided into further components, for example, the risk-free rate and a debt premium.
- The cost of equity – this will be relevant to this exercise only to the extent that impacts on the cost of debt (or cost of debt parameters) are read across to allowances for the cost of equity. We do not consider the cost of equity in general.
- Gearing and tax – we do not consider these.

Broadly speaking, the objective of the regulator in relation to the cost of debt is to use available data from regulated company and external benchmarks to set an allowance for historic and forward-looking costs. Regulators often set allowances for cost of capital parameters with reference to principles and objectives. For example, these may include:

- consistency with the applicable legal and regulatory framework;
- cost reflectivity;
- risk allocation;
- incentive compatibility; and
- consistency, transparency, robustness and predictability in use of data.

In this context, "reflecting market volatility" may be a principle or objective in its own right, or it may be judged to be captured in other principles or objectives.

Different methods and estimates of the cost of debt may therefore be appropriate in different circumstances. We do not comment on the appropriateness of any benchmark methods or estimates. Rather, we build up a picture of the extent of use of different methods and how these choices have been made in the context of financial market volatility.

Some regulators may choose to make financial market volatility an explicit part of their decision-making process. Others may adopt methods that capture volatility without necessarily making this aspect of their decision-making process clear.

A.2. CWAPE TARIFF METHODOLOGY DECISION

In this sub-section we briefly review the CWaPE consultation on the approach to the cost of debt. We include a brief summary of some of the issues raised by stakeholders.

A.2.1. Decision

In the Draft Tariff Methodology 2024-2028, CWaPE introduced a normative approach for calculating the cost of debt with a debt premium (0.77%) added to the risk-free rate used for the cost of equity (0.93%). This was proposed as an ex-ante allowance, with no adjustment mechanism operated to revisit this allowance (1.70%).

For the risk-free CWaPE has used a long-term approach, using a 10yr arithmetic average of 10yr OLO rates on bonds issued by the Belgian State. For the debt premium, CWaPE used a 10yr average of the spread on a 10yr corporate bond index, namely the Bloomberg broad BBB utilities index (IGEEUB10). No allowance is provided for transaction costs as these costs are non-recurring and should not be funded under such a framework.

A.2.2. Consultation responses

We do not provide an exhaustive list of responses to the draft tariff methodology decision as this is not in scope of the project. However, we provide examples of the type of response received to give broader context for the undertaking of our study. The consultation responses reviewed have been from consultants appointed by DSOs, who typically consider that the cost of debt allowance is insufficient and may not deal with the uncertainty in financial market conditions[31].

Views put forward by the consultants included that:

- *Use of an adjustment mechanism (all)*: Use of an ex-post mechanism would mitigate risks from increased market volatility and the meaningful risk exposure faced by DSOs.
- *Use of actual debt (all)*: An actual debt approach should be used, as use of a normative approach risks underfunding actual DSO's external debt financing costs that have been incurred in accordance with good market practices.
- *Use of transaction costs (all)*: Transaction costs should be allowed as costs incurred by an efficient entity, in line with regulatory precedent across Europe.
- *Trailing average used (risk-free rate)*: A 10yr trailing average fails to take prevailing market conditions into account and covers a period where QE has artificially depressed traded yields.
- *Use of forward-looking evidence (risk-free rate)*: Forward-looking evidence should be used as using historical data only fails to cover the prevailing risk-free rate for debt expected to be issued to cover investment during the tariff period.
- *Use of Walloon as a benchmark (risk-free rate)*: The Walloon Region has a credit rating of A3 and this creates a larger debt premium versus the Belgian Federal State.
- *Benchmark tenor (risk-free rate and debt premium)*: A longer tenor should be used as a 10yr tenor risks underestimating the length of investment for DSOs.
- *Use of small company premium (debt premium)*: DSOs are smaller than the large international comparators used in the Bloomberg utilities index and may either not have access to such debt markets, or access these markets at a premium to the cost implied by the index alone (potentially due to size of debt issues on bond markets).

[31] We have reviewed three consultant reports from Tandem (on behalf of Resa, July 22), NERA (on behalf of Resa, August 22) and Oxera (on behalf of ORES, Jun 22).

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