Cost of Capital – CRU Approach

A look at how the Weighted Average Cost of Capital (WACC) has been applied in regulating the electricity, gas and water sectors in Ireland
CRU Mission Statement

The CRU’s mission is to protect the public interest in Water, Energy and Energy Safety.

The CRU is guided by four strategic priorities that sit alongside the core activities we undertake to deliver in the public interest. These are:

- Deliver sustainable low-carbon solutions with well-regulated markets and networks;
- Ensure compliance and accountability through best regulatory practice;
- Develop effective communications to support customers and the regulatory process;
- Foster and maintain a high-performance culture and organisation to achieve our vision.

Executive Summary

The Commission for Regulation of Utilities (CRU) is the independent economic regulator for the natural gas, electricity and water sectors in Ireland. The CRU is responsible for ensuring that customers and network users receive a quality service and value for money, while the network companies earn a fair return on their activities to make the necessary network investments. Those investments go towards the efficient operation, development and maintenance of the networks.

The CRU sets the fair rate of return that the regulated network companies can earn on the efficiently incurred capital investments in its regulated asset base. This return is known as the Weighted Average Cost of Capital (WACC). The WACC is a weighted average of the cost of debt and the cost of equity. It is the CRU’s role to set a WACC that gives a fair deal to customers and the company. If the CRU sets a rate of return that is too high, customers end up paying too much. If the CRU sets it too low, utilities cannot raise the finance to deliver the necessary level of network investment, which can result in a reduced quality of service for customers. Setting a fair rate of return helps the utilities manage their challenges, such as financing their investment programme.

The purpose of this paper is to provide stakeholders clarity on the role of the WACC in the regulatory review, in particular: what a WACC is; why it is important; and, the factors that the CRU has taken into account when setting a WACC. In addition, the CRU discusses its approach
in its recent price control decisions and highlights areas of the methodology which may require consideration in future regulatory reviews.¹

The CRU has decided to publish this information note for stakeholders following its most recent regulatory review decisions in gas, electricity and water, which explored to some extent the setting of a WACC based on shorter-term observable data. The two most recent decisions were its recent water decision, RC3, and the 2017 gas decision, PC4. Prior to these decisions, the CRU largely used long-term historical averages to set components of the WACC. By combining the long-term view with the evidence of current market data, the CRU strengthened its position to judge the best estimate of a WACC for regulated entities in PC4 and RC3.

The CRU continues to review its methodology with the aim of ensuring it provides the best outcomes for customers. Historically, the CRU has tended to estimate the WACC using a combination of historic data and market forecasts. In recent decisions the CRU placed greater weight on shorter-term observable market data when calculating a WACC. This was particularly the case for the cost of debt element of the WACC, where the CRU has incorporated the evidence from observable yields on utility bonds. By increasing the weight placed on this shorter-term evidence, the CRU expected the WACC may more appropriately reflect conditions over the upcoming regulatory periods.

However, shorter-term market data is by its nature more volatile than longer-term historical values and can lead to more changeable values of the WACC from one regulatory period to another, than has been the case to date. The CRU’s most recent regulatory review, RC3, highlighted that a WACC based solely on shorter-term observable data may be particularly susceptible to volatility in a smaller economy such as Ireland. The CRU’s approach evolved in PC4 and RC3 to incorporate shorter-term data into its WACC determinations. When taking this step, the CRU was mindful of regulatory precedent and the value of regulatory stability; it sought in these WACC determinations to generally minimise the extent and magnitude of changes in regulatory policy within a short time frame.

The extent to which the CRU uses shorter-term observable data to inform its position is a strategic consideration for future WACC determinations. The nature of regulation is that it reflects an ‘in-the-round’ assessment of the right level of prices for network businesses, taking into account differences in industry conditions for different network utilities. The CRU considers financeability and the context in which each regulatory review is conducted when forming a

¹ In electricity the CRU refers to regulatory reviews as ‘Price Reviews’, in gas these are known as ‘Price Controls’ and in water these are known as ‘Revenue Controls’.
decision on the appropriate cost of capital, rate of return and overall determination. For example, the level of risk faced by a water utility, which receives most of its funding from government sources, is different from the risk faced by either a commercial gas or electricity network company, which in turn affects the appropriate WACC. The CRU will continue to assess the range of evidence provided by different approaches to setting the WACC, particularly as part of its upcoming Price Review 5, which will set a WACC for the electricity transmission and distribution companies.
Public/Customer Impact Statement

The Commission for Regulation of Utilities (CRU) is the independent economic regulator for the natural gas, electricity and water sectors in Ireland. Our mission is to regulate water, energy and energy safety in the public interest. The CRU is responsible for ensuring that customers and network users receive a quality service and value for money, while the network companies earn a fair return on their activities to make the necessary network investments. Those investments go towards the efficient operation, development and maintenance of the networks.

Regulated utilities typically finance the network investments through debt and equity. Debt is borrowed funds (e.g. bonds), while equity is funds invested by the shareholders (owners). Both the provider of the loan (lender) and the investor (equity holder) will expect to receive a certain level of return on the funds they have provided. By taking a weighted average of the expected returns associated with the different types of financing (debt and equity) the CRU effectively determines how much return the utility will earn for each euro it invests. This average is known as the Weighted Average Cost of Capital or WACC, which is the average of the cost of debt and the cost of equity. The WACC is calculated using a formula/methodology and the CRU generally sets it for the duration of the regulatory period, usually five years.

If the CRU sets a cost of capital that is too high, customers could end up paying too much. While if the CRU sets it too low, companies may not be able to raise the finance to deliver the necessary level of network investment and other related services consumers need. Therefore, the aim is to produce the best possible estimate for an efficient company’s WACC for the next regulatory period. This will result in good value for customers and a fair return for the utility.

Ahead of each regulatory period the CRU considers evidence and insights from a range of sources in deciding on its WACC methodology. This helps the CRU judge a best estimate for the coming five years. Recently, the CRU has incorporated shorter-term data into its methodology, which should result in a WACC that better reflects conditions over the upcoming regulatory periods. In doing this, the CRU was mindful of regulatory precedent and the value of regulatory stability. It was also careful not to create a regulatory environment that is viewed as unpredictable, as this can lead to increased risk for the utilities and potentially increased cost for customers. This approach facilitates a regulatory environment that supports the investments that are in customers’ interest.

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2 For example, the interest that the borrower pays on a loan is the return that the lender receives. Similarly, a person that invests in a company expects some reward for this investment.
The purpose of this paper is to provide stakeholders clarity on the role of the WACC in its regulatory review, in particular: what a WACC is; why it is important; and, the factors that the CRU takes into account when setting a WACC. In addition, the CRU discusses its approach in each recent price control decision and highlights areas of the methodology which the CRU may adapt in future regulatory reviews.
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## Glossary of Common WACC Terms

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<thead>
<tr>
<th>Abbreviation or Term</th>
<th>Definition or Meaning</th>
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</thead>
<tbody>
<tr>
<td><strong>Beta, asset beta</strong></td>
<td>Beta is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole. An Asset Beta is a measure of the inherent systematic riskiness of a business’ operations relative to that of other businesses, before allowing for gearing.</td>
</tr>
<tr>
<td><strong>Capital asset pricing model (CAPM)</strong></td>
<td>An economic model that describes the relationship between risk and expected return for securities. The model states that the expected return of a security (or portfolio) is the rate of return on a risk-free security plus a risk premium. The risk premium depends on the volatility of the security compared with the volatility of a representative market portfolio.</td>
</tr>
<tr>
<td><strong>Cost of capital</strong></td>
<td>The minimum expected return that providers of capital require to prompt them to invest in or lend to companies, taking into account the risks involved.</td>
</tr>
<tr>
<td><strong>Cost of debt</strong></td>
<td>The minimum expected return that providers of debt finance require to prompt them to lend to companies, taking into account the risks involved.</td>
</tr>
<tr>
<td><strong>Cost of equity</strong></td>
<td>The minimum expected return that equity investors require to prompt them to invest in companies, taking account the risks involved.</td>
</tr>
<tr>
<td><strong>Debt</strong></td>
<td>The financial liability that a company owes at a period in time to providers of debt finance.</td>
</tr>
<tr>
<td><strong>Debt premium</strong></td>
<td>A premium over the risk-free rate paid to the holders of debt.</td>
</tr>
<tr>
<td><strong>Equity</strong></td>
<td>The difference between the value of a business’s assets and its liabilities. It is the stake in the business held by its shareholders. It is often referred to as ordinary share capital and includes the undistributed profits of the company.</td>
</tr>
<tr>
<td><strong>Equity risk premium</strong></td>
<td>A measure of the expected return, on top of the risk-free rate, that an investor would expect when holding the market portfolio.</td>
</tr>
<tr>
<td><strong>Financeability</strong></td>
<td>The ability of an efficient company to secure affordable and competitive financing and service its liabilities. I.e. the ability to secure debt that can be re-financed when appropriate and serviced efficiently.</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Gearing</td>
<td>A company’s debt expressed as a percentage of its total capital. In regulated utilities this is usually calculated as debt as a percentage of its RAB. Other common measures include the ratio of debt to (debt plus equity) expressed as a percentage. Gearing can be calculated using either net debt or gross debt.</td>
</tr>
<tr>
<td>Notional gearing</td>
<td>An assumed level of gearing which is used by regulators in their assessment of companies, which may differ from companies actual gearing levels.</td>
</tr>
<tr>
<td>Rate of return</td>
<td>The annual income and capital growth from an investment, expressed as a percentage of the investment.</td>
</tr>
<tr>
<td>Risk-free rate</td>
<td>The rate of return on a theoretical investment with zero risk.</td>
</tr>
<tr>
<td>Systematic risk</td>
<td>The risk inherent to the entire market. It is undiversifiable risk and therefore faced by all investors. The beta captures the extent to which a security is affected by systematic risk.</td>
</tr>
<tr>
<td>WACC</td>
<td>Weighted average cost of capital typically estimated as an average of the company’s cost of equity and cost of debt weighted by gearing.</td>
</tr>
<tr>
<td>Yield</td>
<td>The income return on an investment. This refers to the interest or dividends received from a security and are usually expressed annually as a percentage based on the investment’s cost, its current market value or its face value.</td>
</tr>
</tbody>
</table>
1 Setting the cost of capital

1.1 Introduction

The CRU, as part of its regulatory review process, sets the rate of return that the regulated network companies can earn on the efficiently incurred capital investments in their regulated asset base (RAB). This return is typically known as the Weighted Average Cost of Capital (WACC). Companies usually fund network investment through debt (borrowings) and equity (investment from shareholders). This funding comes at a cost – a lender will seek interest payments on their bond and a shareholder will expect a return on their investment. Regulators provide network companies a return to cover these costs by allowing a WACC on the investments incurred. This is a percentage on the value of its RAB over a regulatory period.

The CRU sets a WACC to enable a utility to finance investments. The cost of capital that it sets may reflect current conditions at the time that investments are made or longer-term trends or a combination of both.

A WACC allowance enables the utility to finance investments needed to provide services to customers. The CRU sets a WACC that is used to derive a fair return on the efficient capital investments made by the utility while also endeavouring to ensure that the decisions it takes would allow an efficient network business to finance its activities.

The WACC is calculated using the following formula:

\[
WACC = \left( \frac{E}{D + E} \right) \times r_E + \left( \frac{D}{D + E} \right) \times r_D
\]

Where \( r_E \) is the cost of equity, \( r_D \) is the cost of debt and \( E \) and \( D \) are the total values of equity and debt respectively used to determine the level of gearing in the company, and so giving the relative weights between the costs of equity and debt finance.

1.2 Context and purpose of this paper

In considering its approach to setting the cost of capital the CRU notes that part of the reason that regulatory reviews exist is in order to review and update methodologies and regulatory determinations, which might otherwise become outdated through time.

The aim of a regulatory decision is to come up with the best estimates for an efficient company’s WACC for the next regulatory period. This will result in a fair deal for customers and a fair return for the utility. Developing those estimates is difficult for two reasons; firstly, because there may
not be directly relevant market data (in many situations, the actual cost of debt or cost of raising equity cannot be directly observed), and secondly, because the future is uncertain. This paper sets out how the CRU has done this in the last three regulatory reviews.

The CRU is publishing this paper to provide clarity on: what a WACC is; why it is important; and, how the CRU has most recently set a WACC for the gas, electricity and water sectors. In addition, the CRU discusses the approach taken in recent regulatory reviews and highlights areas of the methodology which may require consideration in the future. It should be noted that issues relating to asset-light network companies are not discussed in this paper.

In the past the CRU has largely used longer-term historical averages to set the WACC. Recently, the CRU considered placing more weight on recent observable evidence (PC4 and RC3 decisions) while still using the historical evidence that informed earlier CRU regulatory reviews. The CRU exercises regulatory judgement in considering what weight to place on the range of evidence in each period. The CRU will continue to consider its approach in future regulatory review determinations, taking into account input from stakeholders, expert advice and latest market evidence.

In the next sections the CRU discusses the different considerations that go into setting the WACC; providing information on the most recent decisions it has taken in electricity, gas and water sectors. This discussion is split into the main areas the CRU considers when making WACC determinations, i.e. cost of equity, cost of debt, gearing, aiming-up and financeability.

1.3 Related documents

Some documents related to this publication are provided below.

- Irish Water Revenue Control Revenue Control 3 (2020 – 2024) (CRU/19/148)
- Europe Economics: Consultancy Support for Water Revenue Control 3 (2020-2024) (CRU/19/148v)
- Decision on October 2017 to September 2022 Transmission Revenue for Gas Networks Ireland (CER/17/260)
- FTI Consulting: The Cost of Capital for GNI for the period October 2017 to September 2022 (CER/17/132)
- Decision on TSO and TAO Transmission Revenue for 2016 to 2020 (CER/15/296)
- Europe Economics: PR4 WACC for EirGrid and ESB Network (CER/15/193)

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3 Note that while the focus of this paper is on the most recent decisions in each sector, the CRU may have taken alternative approaches to setting the cost of capital in earlier regulatory decisions.
2 Cost of equity

2.1 Introduction

The cost of equity is the rate of return that an investor expects to earn when investing in shares in a company. Historically, the CRU has determined a WACC using the Capital Asset Pricing Model (CAPM) approach for the electricity, gas and water sectors. CAPM is commonly used by regulators in Ireland and other jurisdictions – and is well understood by investors. The CAPM provides that the cost of equity should give shareholders a risk premium above the risk-free return according to a company’s systematic risk, i.e. the inherent risk specific to that company operating in a market that cannot be mitigated by investing in a wider range of assets. This premium (known as the ‘Beta’) depends upon whether the return to that company is more or less risky than the market return of other companies operating in the market. Therefore, in the standard CAPM there are three components which make up the expected return on any asset: the return on a riskless asset, i.e. the risk-free rate; the total market return earned by investors as a whole, reflecting systematic risk; and the particular company’s exposure to systematic risk (i.e. beta).4

Within the context of the WACC-CAPM approach, CAPM is generally most useful in estimating the cost of equity. Although the cost of debt may also be expressed in CAPM terms, the cost of debt is often calculated by adding a risk-free component to a risk premium5 or by examining observable market evidence.

To determine cost of equity, the CRU has historically used the CAPM approach for the electricity6, gas7 and water8 sectors. The CAPM is a forward-looking model, that is, it is intended to model future rather than historic returns of a company, which cannot be directly observed. The CAPM approach is by no means a perfect model - approaches to estimating key parameters of the CAPM

4 Within the context of the WACC-CAPM approach, CAPM is used to determine the cost of equity, $r_E$, by applying the following equation:

$$r_E = r_f + \beta_E \times (TMR - r_f) = r_f + \beta_E \times MRP$$

Where $r$ is the return on a risk-free asset, i.e. the risk-free rate, usually proxied by a measure of the rate on medium to long-term government bonds. $\beta_E$ is the beta, which is the correlation between the risk in company returns and those of the market as a whole, in other words, a firm’s exposure to systematic risk, which can be estimated from market data (either directly for publicly listed companies or, for privately held companies, by looking at comparator companies). $MRP$ is the market risk premium, which is the difference between the Total Market Return (TMR), an economy-wide parameter, and the risk-free rate. In practice the Total Equity Market Return is usually regarded as a good proxy for the TMR and accordingly the equity risk premium (ERP) is used as a reasonable proxy for the MRP.

5 The risk premium reflects an efficient company operating under similar business/market risk, in a similar sector.

6 CER/05/143: 2006 – 2010 Transmission Price Control Review

7 CER/03/060: Transmission and distribution tariffs objectives and principles

8 CER/14/0765: Advice to the Minister on the Economic Regulatory Framework for the Public Water Services Sector in Ireland
can be contentious and historic values of key parameters may not always be the most accurate estimators for future values. However, it is an established and well-understood approach and the CRU has favoured its use to date.

As part of the CRU’s RC3 determination, it examined two methodologies to setting the cost of equity, one which represents a longer-term historic approach and one which represents a shorter-term observable data approach. Both approaches lie within the CAPM tradition, but they implement the CAPM in different ways. A longer-term approach (the ‘historic’ approach), taken by the CRU in previous regulatory reviews, involves thinking of the WACC as an underlying equilibrium parameter, embodied in the functioning of the economy as a whole. Effectively, the WACC is inferred rather than observed (from broad economic and macroeconomic data and from historical experience) and judgements may be made to take account of various distortions in the data that might arise from factors such as quantitative easing9. This approach calculates the cost of equity from broad economic and macroeconomic data and from historical experience.

An alternative shorter-term observable approach assumes that individual parameters of the CAPM can be more-or-less directly observed in market prices of publicly traded assets, such as bonds, and the model of the cost of equity is then assembled from these individual more-or-less directly observed components. This approach is in line with the estimation practice that has come to be adopted, over the past two years, by the UK regulators that are members of the UK Regulators Network (UKRN)10. This approach has not always been a viable option for the CRU as there is less directly relevant observable data that can applied to Irish utilities than there is for UK utilities.

The following sections (2.2–2.4) examine the components of the cost of equity and how they could be calculated under longer-term and shorter-term approaches.

2.2 Risk-free rate

As the risk-free asset is a theoretical concept, risk-free rate (RFR) estimates are in practice carried out using the returns on assets that are believed to constitute good proxies of riskless assets as a reference point.

Under the historic approach, yields on European (or German specifically) Government bonds have typically been used by the CRU as benchmarks of the RFR. As CAPM is intended to model the future, an RFR benchmark that is based on these European Government bond yields may be adjusted to be forward looking by considering forecasts such as ECB growth forecasts or the ECB

9 Monetary policy in which a central bank purchases government securities or other securities from the market in order to increase the money supply and encourage lending and investment.

10 UKRN is the UK Regulators Network, a group of regulators in the UK. It includes Ofgem and Ofwat as well as several other regulators in a range of sectors.
forward curve.

Concerns that future yields would be materially different from long-term historical averages have led several UK regulators to place more emphasis on using currently observed bond yields. Under this approach the RFR is calculated by looking at short-term data, i.e. spot yields on Government bonds, and then estimating a forward-looking value by using information such as the ECB forward curve.

However, the CRU has, to date, not relied solely on government bond yields to set the risk-free rate. Instead, the CRU has, in recent years, used the yields of longer-term bonds, as well as evidence from econometric modelling and regulatory precedent to establish a composite view on likely RFR, as highlighted in the table below.

Table 1: Risk-free rate evidence

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PR4 – 2015</th>
<th>PC4 – 2017</th>
<th>RC3 - 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk-free rate (RFR)</td>
<td>Based on long-term yield of German government bonds (lower) and regulatory precedent (upper) (1.75%-2.1%, 1.9%)</td>
<td>Range of evidence, yields on European government bonds and ECB forward curve, relationship between RFR &amp; GDP, regulatory precedent (1.5%-2%, 1.9%)</td>
<td>Relationship between Eurozone RFR &amp; potential growth prior to government bonds becoming poor proxies for the RFR and adjusts for growth forecasts (1.65%-2.15%, 1.75%)</td>
</tr>
</tbody>
</table>

2.3 Equity risk premium

The next step under CAPM is to calculate what the expected excess return to equity is (i.e. equity risk premium (ERP) over a risk-free asset). As returns on equity vary substantially over short periods of time, i.e. they can be volatile, there is a risk that analysing too short a period of time would fail to capture the expected equity return. In addition, because of the magnitude of changes in returns, the addition of a particular period in time can often have a substantial effect on the mean return calculated. To address these issues, the ERP is generally estimated using very long-run historical data (often over 100 years) from the Dimson, Marsh, and Staunton (DMS) series.

There are two principal approaches to estimating the ERP on a standard historical basis. It can be estimated directly over time by calculating the return on the market in excess of an estimate of the RFR in each period, referred to as CAPM-ERP approach. Alternatively, it can be derived by estimating the Total Equity Market Return (TMR) over time (i.e. total returns earned by equity investors) and then by deducting an estimate of the current RFR, referred to as CAPM-TMR approach.

There is a view that the ERP and the RFR systematically move in opposite directions i.e. when one

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Equity returns tend to be more volatile than debt returns in the short-term.
rises the other falls and vice versa. This implies that the total market return (TMR), which is the sum of the RFR and the ERP, is more stable over time than either of the individual components. As a result, some argue that due to the relative stability of the TMR, the CAPM-TMR approach is preferable for informing the level of the ERP. However, it is also possible to adjust the CAPM-ERP to reflect the potential effects of prevailing market conditions on the ERP. In recent times the CRU has taken both approaches as highlighted by the table below.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PR4 – 2015</th>
<th>PC4 - 2017</th>
<th>RC3 - 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity risk premium (ERP)</td>
<td>CAPM-ERP. DMS long-term series, adjusted for the period of high Irish government bond yields (2009-2013) in the sample (4.6%-5%, 4.75%)</td>
<td>CAPM-TMR. TMR based on DMS long-term series, regulatory precedent. (4.5%-5.25%, 4.75%)</td>
<td>CAPM-TMR. TMR based on DMS long-term series, regulatory precedent. (4.85%-5%, 5%)</td>
</tr>
</tbody>
</table>

In regard to an approach based on shorter-term evidence, some UK regulators apply dividend growth models (DGM)\(^{12}\) to recent observable market data so as to obtain an estimate of the Total Market Return (TMR) that is more heavily informed by recent market evidence, which minus the RFR, derives the ERP. In this role the DGM functions not as an alternative model to CAPM, as it is sometimes used, but as a complement for it. This approach was considered in the CRU’s recent RC3 decision, where capital growth expectations are based on Irish GDP/GNI growth rates. There may be considerable volatility under this approach however, particularly when using data solely from a small and open economy like Ireland. GDP/GNI growth or otherwise in Ireland is exposed to trends in other markets to a greater extent than it might be in larger countries. To mitigate this, broader EU GDP growth could also be used.

### 2.4 Beta

The final step is the calculation of beta, which is the particular company’s exposure to systematic risk.\(^{13}\) This risk is non-diversifiable risk that is inherent to the market. In simple terms, the lower this number is (closer to zero) the less risky the company is relative to the market.\(^{14}\)

To date the CRU has calculated this component of CAPM using the same broad approach\(^{15}\) in electricity, gas and water. The CRU has tended to focus on two year rolling betas for a set of

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\(^{12}\) A dividend growth model estimates the cost of equity by discounting all future returns back to the present day.

\(^{13}\) Non-systematic risk does not require compensation through a risk premium in the CAPM because the risk can be diversified with a portfolio of assets.

\(^{14}\) A beta of 1 reflects the risk of the market portfolio (and beta values greater than 1 imply that the company is riskier than the market).

\(^{15}\) Noting that beta estimates are sensitive to a number of methodological choices such as time period covered, data frequency (daily/weekly/monthly/etc.), companies included, benchmark index, approach to debt beta, etc.
relevant comparator companies, placing the most weight on data from the comparators in the same sector and/or region. This is highlighted in the table below.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PR4 – 2015</th>
<th>PC4 - 2017</th>
<th>RC3 - 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset beta</td>
<td>Set of relevant UK comparators (0.31-0.44, 0.37)</td>
<td>Set of relevant International comparators, weighting on UK &amp; IRE (0.37-0.44, 0.42)</td>
<td>Set of relevant European comparators, weighted to pure water companies (0.25-0.33, 0.30)</td>
</tr>
</tbody>
</table>

### 2.5 Conclusions

In RC3, the CRU considered the weight it should place on two distinct approaches to setting the cost of equity, one which represents a longer-term historic approach and one which represents a shorter-term observable data approach.\(^\text{16}\) The advantage of the longer-term historic approach is that it has a strong theoretical basis and an established regulatory precedent, and it is therefore well understood by stakeholders. However, there is and has been for some time, considerable uncertainty with regard to the ‘true’ risk-free rate, which the historic approach attempts to derive. Some advocates of the shorter-term observable-data (i.e. UKRN) approach, are of the view that current Government bond yields accurately represent the RFR, since the yields on government bonds are observable. In addition, some advocates have taken the view that attempts of under the long-term historic approach to arrive at a ‘true’ risk-free rate by correcting for distortions, may be by their nature inexact and may lead to less reliable or accurate results.

Those in favour of the UKRN approach contend that, in practice, the use of the historic approach has resulted in WACCs that have been systematically higher in the UK, for nearly a decade, than would have been obtained by taking observable market data at face value. However, it is important to note that under the observable UKRN approach a risk-free rate estimate in 2011/12 would have produced a risk-free rate for Ireland in excess of 14% if Irish government bonds were used. In addition, the size and nature of the Irish economy means that it is quite prone to swings in GDP/GNI growth rates. This results in DGM results with large ranges, reducing the confidence that can be placed upon the overall TMR estimate. There is also less directly relevant data that can applied to Irish utilities than there is for UK utilities. The level of uncertainty is such that the CRU is of the view that it is not appropriate to rely solely upon the approach recommended by the UKRN when setting the cost of equity.

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\(^{16}\) See the RC3 consultation ([CRU19091](https://example.com/cru19091)) and decision ([CRU19148](https://example.com/cru19148)) on Irish Water’s cost of capital.
In deciding on what weight to place on long-term and short-term indicators, the CRU considers the extent to which these indicators are likely to reflect conditions in the next regulatory period. This is balanced with the need for regulatory consistency and stability. The CRU is currently of the view that the levels of uncertainty and volatility in the UKRN approach reduce the weighting that should be placed on it and that cross-checking the results produced by the CRU’s historical longer-term approach with those of the UKRN approach and regulatory precedent is the most appropriate approach to setting the cost of equity. As part of future determinations, the CRU will consider, in particular, the evidence that it uses to determine the RFR and whether it is appropriate to consistently use either CAPM-ERP or CAPM-TMR.
3 Cost of debt

3.1 Introduction

The cost of debt rate is the return a company must provide to lenders in order to be able to raise finance through borrowings. Although the cost of debt may also be calculated by CAPM, the cost of debt is usually conceived as being made up of a risk-free component and a company-specific risk premium (i.e. meaning it is not necessary to estimate a total market return and debt beta). It is important to note that the cost of debt does not require modelling (as was the case for calculating the cost of equity). The cost of debt is observable because it reflects actual borrowing costs, i.e. the rate of interest payable on bonds that are traded at a point in time. This observable evidence can then be adjusted to incorporate the cost of raising new debt over the upcoming regulatory review period.

In its recent WACC determinations, PC4 and RC3, the CRU considered a range of longer-term historical evidence and shorter-term market based observable evidence when setting the cost of debt. Supporting evidence has included an approach to calculating the cost of debt using the debt premium approach and an approach, which is based on shorter-term observable data (sometimes referred to as “all-in”), as highlighted by the table below.

Table 3: Cost of debt evidence

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PR4 – 2015</th>
<th>PC4 - 2017</th>
<th>RC3 - 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFR</td>
<td>As per cost of equity calculation</td>
<td>Cost of debt range derived using debt premium approach (DP weighted for Irish euro and sterling bonds) (upper) and a shorter-term observable evidence approach (current and historic government bond yields) (lower), point estimate taken at top of range considering regulatory precedent. (1%-2.5%, 2.5%)</td>
<td>Cost of debt range derived using debt premium approach (DP weighted for Irish euro denominated bonds) (upper) and all-in shorter-term observable data driven approach (ESB bond data) (lower), point estimate taken above midpoint considering regulatory precedent. (-0.1%-2.4%, 1.8%)</td>
</tr>
<tr>
<td>Debt premium</td>
<td>Range derived using GB and European bonds (upper) and Irish euro bonds (lower), point estimate above Irish spot and at or below European spot (0.75%-1.15%, 1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of debt (pre-tax)</td>
<td>RFR + debt premium (2.5%-3.25%, 2.9%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2 Debt premium approach

The most common approach used by the CRU to date is the debt premium approach. Under the debt premium approach, market data is used to determine the debt premium, i.e. the “spread” or “premium” of risky corporate bonds over very low risk government bonds of equivalent maturities. The yields produced are then added to an estimate of the risk-free rate (already calculated as part of the cost of equity calculation). This reflects the fact that a utility is generally viewed as riskier by lenders and, as a result, cannot borrow at the same rate as a government.

The debt premium is typically calculated by examining the spreads of Irish, UK and European corporate bonds of publicly listed utility companies, over a suitable benchmark bond such as Irish
and German Government bonds.

The adoption of this approach ensures consistency with the way in which the cost of equity is calculated, since the same risk-free rate estimate is being used. In addition, with a debt premium approach, forward-looking estimates of the risk-free rate convert readily into a forward-looking total cost of debt estimate.

3.3 Observable “all-in” approach

A shorter-term observable approach is sometimes referred to as an “all-in” cost of debt approach. Under this approach, yields are estimated directly from the bonds of utilities or comparators (e.g. utilities in other countries or a suitable index) and these yields inform the cost of debt. In Ireland there have tended to be few observable utility bonds given that only ESB and GNI debt is publicly traded. Also, as utility bonds from other countries are more likely to have a materially different risk-free rate, these comparators could not be used directly to set an all-in cost of debt. However, a wider range of ESB bonds data is now available than in the past, and therefore there is greater evidence available to the CRU to support this approach.

Often the observable “all-in” approach considers shorter-term spot yields, which tend to be more volatile. This was highlighted in the CRU’s recent RC3 decision where the cost of debt point estimate under this approach fell sharply in a short period of time – from a point estimate of 1.05% at the time of the consultation (using data available as of April 2019) to -0.1% at the time of the decision (using data available as of September 2019).

3.4 Conclusion

In the past the CRU has tended to use a debt premium approach with longer-term historical averages to set the cost of debt. In recent years (particularly since the global financial crises) the CRU has been of the opinion that longer-term averages were less likely to represent future levels of true cost of debt faced by utilities in financing their investments, and that, in estimating the WACC, more emphasis should be placed on more recent values. In RC3 and previously PC4, the CRU considered the weight it should place on longer-term and shorter-term data when setting the cost of debt, by examining the evidence provided by both the debt premium approach (longer-term) and the ‘all-in’ observable approach (shorter-term). The CRU has, in its last two

17 See the RC3 consultation (CRU/19/091) and decision (CRU/19/148) on Irish Water’s cost of capital.
regulatory determinations, used both approaches to make a judgement on an appropriate cost of debt range.

With regard to selecting the cost of debt point estimate, the CRU will continue to consider the weighting it places on each approach. The table below highlights the point estimates (2.5% and 1.8%) relative to the range in its last two WACC determinations.

![Figure 1: Cost of debt - recent CRU determinations](image)

In setting the cost of debt for PC4 the CRU considered regulatory precedent and the importance of regulatory stability. The CRU conservatively incorporated shorter-term observable evidence into its determination by selecting the upper end of the range as the cost of debt, i.e. 2.5%. In that decision the CRU stated that it intends to continue to take account of market conditions in future determinations and in particular, to keep under review the current low interest rate environment and consider how this should be reflected in the allowed cost of capital.

Adapting this approach for RC3, the CRU again made an incremental and conservative change by further taking into account the shorter-term observable evidence and regulatory precedent. The CRU placed greater weighting on shorter-term evidence in coming to its determination on an appropriate cost of debt and decided to move from the upper end of the range for RC3, while remaining above the midpoint of the range.

The CRU is of the view that it is not to the benefit of either utilities or customers for the CRU to apply a methodology that places too much weight on short-term variations in market evidence. Although this may result in greater returns to regulated utilities during times of very low yields (as is currently the case, with the market data indicating negative yields on government bonds) it may also protect customers from overpaying when yields are exceptionally high (as was the case during the economic recession shortly after 2010).
However, market yields have been very low for more than five years, and the indications are that they are expected to remain low. That cannot reasonably be characterised as short-term volatility. This is a feature of the incorporation of shorter-term evidence; it responds quicker to sustained shifts in market dynamics.

The CRU considers that taking this balanced approach improves the overall stability of the regulatory framework by reducing the likelihood of significant disparities emerging between the cost-of-debt in the market and the regulatory estimate used to calculate the utilities’ WACC over the regulatory review period.
4 Gearing

As stated, the WACC is a weighted average of debt and equity, with the weightings determined by the relative levels of debt and equity in the company’s asset base, or the company’s “gearing”. Gearing is a company’s debt expressed as a percentage of its total capital. Since the WACC is estimated for a notional efficient utility, the gearing value also reflects that of a notional efficient utility. The notional level of gearing on which the WACC calculation is based is not intended to provide guidance on the gearing level that the utility should adopt. The gearing is a hypothetical rate representing the capital structure that an efficient utility would choose in order to minimise the cost of capital.

It is the CRU’s objective to allow the regulated business to recover from customers only the required cost of capital that is based on an assumed notional or ‘optimal’ level of gearing, i.e. gearing that the CRU views as appropriate as opposed to the actual gearing of the company. Generally, regulators have tended to use an optimal or notional approach rather than the actual gearing. The justification for this is that if the actual gearing of the regulated company is non-optimal, which results in its cost of capital being raised, that extra cost should not be passed on to customers through higher bills.

Unlike the cost of debt and cost of equity the CRU has not examined significantly different approaches to setting gearing. When setting the WACC the CRU has considered data from a set of relevant comparators alongside the regulatory precedent to determine the level of notional gearing.

Other considerations, such as whether the model should assume higher equity contributions to address short term financeability issues have not been previously been taken into account in the calculation of the WACC. However, the CRU may consider changes to the gearing assumptions in future.

Table 4: Gearing evidence

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PR4 – 2015</th>
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<th>RC3 - 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gearing</td>
<td>Regulatory precedent (55%)</td>
<td>Regulatory precedent (55%)</td>
<td>Regulatory precedent and comparator evidence, weighted to water companies (50%-55%, 50%)</td>
</tr>
</tbody>
</table>
5 Other Considerations

5.1 Aiming-up

Reaching a judgement on the likely “true” value of a utilities’ cost of capital over the price control period is inherently subject to uncertainty. In making a decision, the CRU considers how this uncertainty itself should be taken into account. In particular, what would be the consequences of either over-estimating or under-estimating the WACC?

Regulators have historically taken the view that the negative impacts on the customer are greater in instances of underfunding new investments than instances where a utility is overfunded. For example, while customers might benefit from lower bills in the short run if the WACC is set too low, ultimately, they would be expected to suffer in the long run through a reduction in service standards if investment in the sector does not go ahead.\(^\text{18}\) In instances of over-funding, i.e. allowing a WACC above the efficient level, it is true that investors might receive increased returns at the expense of customers. However, this increased return may also create incentives to innovate and invest, producing new products and services, which will benefit the customer in the long-term.

While there are material consequences from both over-estimation and under-estimation of the cost of capital, the CRU and other regulators have historically taken the view that on balance the long-term consequences of under-estimation are worse. This implies that in coming to a view on the best estimate of the “true” value of the WACC, the CRU may take account of the asymmetry of consequences from getting the decision wrong.

This can be achieved by setting a WACC in excess of the level implied by the WACC formula. This increase is known as aiming-up. The CRU decided not to give an aiming-up allowance in its last two regulatory determinations, PC4 and RC3 as it considered the WACC allowance to adequately fund the utility in these instances without providing an extra buffer. In earlier decisions an aiming-up allowance was given.

Aiming-up can also be achieved using a less explicit approach, where a conservative\(^\text{19}\) view is taken when selecting the WACC within a range of suitable WACC values estimated using CRU’s preferred methodologies.

\(^{18}\) Noting that regulated utilities often have to meet certain performance standards (e.g. reliability, safety, quality of service, etc.)

\(^{19}\) In this case “conservative” means erring on the high side i.e. above the mid-point.
The CRU may also consider the context of the sector and any unique characteristics associated with the utility when coming to a decision on aiming-up. For example, the nature of the capital programme, the utility’s funding model, and levels of uncertainty may be amongst the factors that the CRU takes into account when setting the aiming-up level for the WACC, if any.

### 5.2 Financeability

The CRU, in setting the WACC, estimates the values for a notional efficient utility. The CRU recognises that the actual capital costs of a particular utility will reflect their actual gearing and actual cost of capital.

While the CRU has been mindful of achieving a regulatory settlement in which efficient utilities it regulates are financeable, this should not be construed as an obligation on the CRU to ensure that the utilities can cover all costs regardless of the circumstances. The CRU acknowledges that these utilities need to be able to raise finance (debt and equity) on reasonable terms so that they can obtain financial support to undertake their investment programme. It should also not be construed as an obligation to target any particular investment rating when determining the allowed revenues. Rather, it is a requirement that the CRU consider the capability of the utility, acting efficiently, to carry out its functions with the proposed revenue allowance.

In practice, financeability is a function of the level of timing of cashflows. There are several reasons why a utility may face cashflow constraints. Allowed capital expenditure may be high relative to the size of the regulatory asset base; asset lives used to calculate the level of depreciation may not match the actual useful life of the asset; or, there may be a mismatch between the utilities underlying capital costs and the efficient level estimated for the WACC.

The CRU carries out a financeability analysis to test whether the utility will have the capability to raise finance in order to deliver its investment programme. Therefore, the CRU does not just look at the appropriate WACC when setting allowed revenues for the upcoming regulatory review period. The nature of regulation is that it reflects an ‘in-the-round’ assessment of the right level of prices for network businesses, essentially the CRU considers whether the package (i.e. opex and capex allowances, any additional sources of return, e.g. margins for a TSO), once determined, is financeable.
Typically, the CRU’s financeability assessment is quantitative in nature and involves modelling cashflows over the regulatory period and examining the resulting financial ratios such as interest cover ratios.\textsuperscript{20}

In assessing financeability, the CRU examines whether the WACC and other financing decisions would allow an efficient investment grade rated business to raise finance and remain financeable during the regulatory period, for the planned level of investments. Where data is available, the CRU also assesses whether the actual business would meet particular financing ratios during the regulatory period.

By testing the financeability of a notional utility the regulator can retain the incentive for the utility to finance itself efficiently. The regulator is under no obligation to make every investment financing decision be profitable ex-post. However, in the event the actual utility does not appear financeable, where the network company can provide evidence that clearly demonstrates a real issue the CRU may consider the effects and examine alternative approaches to achieve necessary cashflow levels, as real financeability issues for the utility can lead to negative outcomes for customers, as discussed in Section 5.1 above.

In the event that the financeability tests do indicate that there are issues, the CRU would need to consider whether this reflected an inefficient capital structure or whether there were specific concerns around the timing and level of proposed investments that might require adjustments to the overall pricing decision.

It is important to note that the CRU could only consider taking action (particularly where that would increase costs to consumers) where the network company has clearly demonstrated a real financing issue that could have negative implications for consumers. In the absence of this information the CRU would be unable to address the underlying issues causing the financeability issue, or even confirm that the issues suggested by the notional model were likely to have any material impact on the consumer.

\textsuperscript{20} Both GNI and the ESB Group, of which ESB is a part, receive a credit rating from rating agencies (e.g. Moody’s, Standard and Poor). Financeability analysis by these agencies tends to involve a qualitative assessment (e.g. public/ private ownership model) and quantitative assessment (e.g. financial ratios).
6 Conclusion

The CRU keeps its approach to setting the WACC for price controls under review. Both longer-term evidence and shorter-term evidence approaches to setting a WACC have merit. The CRU notes that a recent feature of the underlying data used to derive the WACC is the prolonged period of low interest rates and low bond yields. Current market yields are remarkably low and have been low for a considerable period of time, with market expectation suggesting that this is likely to continue to be the case for some time. As a WACC estimate is forwards-looking, there can be merit in placing greater weight on most recent data rather than historical values if it provides a better representation of the WACC for the upcoming regulatory period. Furthermore, the longer the disconnect between the longer-term and shorter-term data persists, the less relevant the longer-term data becomes.

A key advantage of the longer-term approach to setting the cost of equity and cost of debt, is that it has a strong theoretical basis and is well understood by stakeholders, having been used by the CRU in its approach to calculating the WACC to date. A key feature of shorter-term evidence is that the WACC responds more quickly to sustained shifts in market dynamics. In the UK, the increased focus on financial versus economic data has been at least partly driven by a concern that consumers were consistently losing out in higher prices when regulators considered a more theoretical approach. However, it is worth noting that in an Irish context a shorter-term observable data approach is more volatile, in part due to the lack of data. In the years following the economic crash this approach could have led to customers in Ireland paying higher costs than they have done under the longer-term historic CRU approach.

The CRU does not propose to calculate a WACC based solely on either approach. Furthermore, the CRU is of the view that the shorter-term observable UKRN approach alone to modelling the cost of equity, is not suitable in an Irish context as this may lead to significant uncertainty and volatility. Regarding cost of debt, the CRU considers that its move to a balanced approach, which incorporates shorter-term observable evidence, leads to more reliable estimates.

The nature of regulation is that it reflects an ‘in-the-round’ assessment of the right level of prices for network businesses. The extent to which the CRU uses shorter-term observable data to inform its decisions is a strategic consideration for future WACC determinations. For the upcoming Price Review 5 project, which will set a WACC for the electricity transmission and distribution companies, the CRU is considering its WACC methodology and aims to make a determination that strikes the correct balance between the evidence to reflect conditions in the next regulatory period and consistency and predictability of estimates, in addition to the overall risk profile within the framework. The CRU also acknowledges that the context in which each regulatory review is conducted and the sector to which the review refers is important when
forming a decision on financeability, the appropriate cost of capital, and the determination as a whole.