THE COST OF CAPITAL FOR GNI FOR THE PERIOD
OCTOBER 2017 TO SEPTEMBER 2022
A REPORT TO THE COMMISSION FOR ENERGY REGULATION
Table of contents

Glossary

Section
1. Introduction 1
2. Executive summary 4
3. Our approach 9
4. Cost of debt 12
5. Cost of equity 30
6. Gearing 48
7. Other factors affecting the appropriate rate of return 51
### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGL Resources</td>
<td>Southern Company Gas, formerly AGL Resources</td>
</tr>
<tr>
<td>Bps</td>
<td>Basis points</td>
</tr>
<tr>
<td>Brexit</td>
<td>The UK’s withdrawal from the European Union in accordance with the terms of Article 50 of the Treaty on the Functioning of the European Union</td>
</tr>
<tr>
<td>CC</td>
<td>UK Competition Commission</td>
</tr>
<tr>
<td>CC Northern Ireland Electricity</td>
<td>The CC’s final determination on the Utility Regulator’s disputed license modifications for NIE Electricity</td>
</tr>
<tr>
<td>CAPM</td>
<td>Capital Asset Pricing Model</td>
</tr>
<tr>
<td>CAR</td>
<td>Commission for Aviation Regulation</td>
</tr>
<tr>
<td>CER</td>
<td>Commission for Energy Regulation</td>
</tr>
<tr>
<td>CER ESBN/EirGrid PR4</td>
<td>Report prepared by Europe Economics for the CER PR4 review of cost of capital for EirGrid and ESB Networks</td>
</tr>
<tr>
<td>CER Irish Water IRC2</td>
<td>CER’s Interim Revenue Control for Irish Water for the two-year period from 1 January 2017 to 31 December 2018</td>
</tr>
<tr>
<td>CMA</td>
<td>UK Competition and Markets Authority</td>
</tr>
<tr>
<td>CMA Bristol Water</td>
<td>The CMA’s final determination on Bristol Water’s appeal of Ofwat’s PR14 final determination</td>
</tr>
<tr>
<td>CMA Energy Market Investigation</td>
<td>The CMA’s analysis of the cost of capital of UK energy firms</td>
</tr>
<tr>
<td>ComReg</td>
<td>Commission for Communications Regulation</td>
</tr>
<tr>
<td>DSO</td>
<td>Distribution Systems Operator</td>
</tr>
<tr>
<td>ECB</td>
<td>European Central Bank</td>
</tr>
<tr>
<td>E.ON</td>
<td>E.ON SE</td>
</tr>
<tr>
<td>ERP</td>
<td>Equity risk premium</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ervia</td>
<td>Commercial semi-state company which owns GNI</td>
</tr>
<tr>
<td>ESB</td>
<td>The Irish Electricity Supply Board</td>
</tr>
<tr>
<td>ESB Finance</td>
<td>Subsidiary of the Electricity Supply Board, which acts as a debt issuing vehicle</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>Eurozone</td>
<td>Monetary union comprising 19 member states of the EU, including the Republic of Ireland</td>
</tr>
<tr>
<td>Frontier</td>
<td>Frontier Economics Ltd</td>
</tr>
<tr>
<td>FTI Consulting</td>
<td>FTI Consulting LLP</td>
</tr>
<tr>
<td>GBP</td>
<td>British pounds</td>
</tr>
<tr>
<td>GNI</td>
<td>Gas Networks Ireland</td>
</tr>
<tr>
<td>HICP</td>
<td>Irish (all-items) Harmonised Index of Consumer Prices</td>
</tr>
<tr>
<td>ILG</td>
<td>Index-linked gilts</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>ITC Holdings</td>
<td>ITC Holdings Corp</td>
</tr>
<tr>
<td>Moody’s</td>
<td>Moody’s Investors Service</td>
</tr>
<tr>
<td>National Grid</td>
<td>National Grid Plc</td>
</tr>
<tr>
<td>NIE</td>
<td>Northern Ireland Electricity</td>
</tr>
<tr>
<td>Northwest Natural Gas</td>
<td>NW Natural, formerly Northwest Natural Gas Company</td>
</tr>
<tr>
<td>Ofwat</td>
<td>The Water Services Regulation Authority</td>
</tr>
<tr>
<td>Ofwat PR14</td>
<td>Ofwat’s final price control determination for 2015-2020</td>
</tr>
<tr>
<td>Ofgem RIIO ED1</td>
<td>Ofgem’s first electricity distribution price control using the 'Revenue = Incentives + Innovation + Outputs' model</td>
</tr>
<tr>
<td>OIS</td>
<td>Overnight index swap</td>
</tr>
<tr>
<td>PC3</td>
<td>The CER’s third periodic gas transmission and distribution revenue controls for the period October 2012 to September 2017</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PC4</td>
<td>The CER’s fourth periodic gas transmission and distribution revenue controls for the period October 2017 to September 2022</td>
</tr>
<tr>
<td>Pennon</td>
<td>Pennon Group plc</td>
</tr>
<tr>
<td>Piedmont Natural Gas</td>
<td>Piedmont Natural Gas Company, Inc</td>
</tr>
<tr>
<td>PwC</td>
<td>PricewaterhouseCoopers LLP</td>
</tr>
<tr>
<td>RAB/RAV</td>
<td>Regulated asset base/value</td>
</tr>
<tr>
<td>RFR</td>
<td>The risk free rate of return</td>
</tr>
<tr>
<td>RWE</td>
<td>Rheinisch-Westfälisches Elektrizitätswerk AG</td>
</tr>
<tr>
<td>Severn Trent</td>
<td>Severn Trent plc</td>
</tr>
<tr>
<td>SSE</td>
<td>SSE plc</td>
</tr>
<tr>
<td>S&amp;P</td>
<td>Standard and Poor’s</td>
</tr>
<tr>
<td>TenneT</td>
<td>TenneT B.V.</td>
</tr>
<tr>
<td>TC PipeLines</td>
<td>TC PipeLines, LP</td>
</tr>
<tr>
<td>TMR</td>
<td>Total equity market return</td>
</tr>
<tr>
<td>TSO</td>
<td>Transmissions System Operator</td>
</tr>
<tr>
<td>United Utilities</td>
<td>United Utilities Group Plc</td>
</tr>
<tr>
<td>Uregni GD17</td>
<td>The Utility Regulator’s final determination on the price control for Northern Ireland’s gas distribution networks</td>
</tr>
<tr>
<td>Utility Regulator</td>
<td>Northern Ireland Authority for Utility Regulation</td>
</tr>
<tr>
<td>WACC</td>
<td>Weighted average cost of capital</td>
</tr>
</tbody>
</table>
1. Introduction

Background

1.1 This report was prepared by FTI Consulting LLP (“FTI Consulting”) for the Commission for Energy Regulation (“CER”) in connection with its fourth periodic gas transmission and distribution revenue control for the period October 2017 to September 2022 (“PC4”). We were instructed to advise on the appropriate real rate of return that Gas Networks Ireland (“GNI”) should be allowed to earn on the operation of its transmission and distribution network assets.

1.2 GNI is the sole Transmission System Operator (“TSO”) and Distribution Systems Operator (“DSO”) for the gas network in the Republic of Ireland. GNI is owned by Ervia, a commercial semi-state company, which has responsibility for the delivery of gas and water infrastructure and services in Ireland. The TSO and DSO gas networks have been subject to ex-ante price regulation since 2002.

1.3 In line with established regulatory precedent in the Republic of Ireland and elsewhere, the CER seeks to allow the regulated business sufficient revenues to cover the total economic costs of its operations over the price control period. Economic costs include a rate of return on the Regulatory Asset Base (“RAB”). The appropriate rate of return is the expected Weighted Average Cost of Capital (“WACC”) for the regulated businesses over the price control period.

1.4 GNI has submitted financial information and forecasts for PC4 to the CER. It has also set out its assessment of the WACC for PC4, based on reports prepared by Frontier Economics Ltd (“Frontier”) comprising:

(1) a report dated 3 November 2016 (“First Frontier Report”); and
(2) a supplemental report dated 29 March 2017 (“Second Frontier Report”).

Instructions

1.5 We have been engaged to assist the CER with an assessment of the WACC for GNI’s transmission and distribution gas networks for PC4. Although some components of the allowed revenues for transmission and distribution are assessed separately, the WACC and the financeability of GNI are assessed from the perspective of GNI as a single entity.
1.6 We have been instructed to review the reports prepared by Frontier on behalf of GNI (together, the “Frontier Reports”). We comment on Frontier’s approach and conclusions where relevant.

Sources of information

1.7 In preparing this report, we have reviewed a number of sources of information. These primarily fall into the following categories:

(1) confidential financial information and forecasts submitted by GNI;
(2) financial market data;
(3) prior price control decisions by the CER and other economic regulators and competition authorities in the UK and the Republic of Ireland; and
(4) other information supplied to us by CER.

1.8 We have also had formal discussions with the CER, GNI and Frontier in meetings held on 16 February 2017 and 22 March 2017.

Restrictions

1.9 This report has been prepared solely for the benefit of the CER to inform its determination of GNI’s total allowed revenue for PC4. It should not be reproduced or circulated, in whole or in part, by any party without the prior written consent of FTI Consulting. We have agreed that CER may publish this report in the context of the PC4.

1.10 FTI Consulting accepts no liability or duty of care to any person other than the CER for the content of the report and disclaims all responsibility for the consequences of any person other than the CER acting or refraining to act in reliance on the report or for any decisions made or not made which are based upon the report.

Limitations to the scope of our work

1.11 This report contains information obtained or derived from a variety of sources. FTI Consulting has not sought to establish the reliability of those sources or verified the information provided.

1.12 No representation or warranty of any kind (whether express or implied) is given by FTI Consulting to any person (except to the CER under the relevant terms of our engagement) as to the accuracy or completeness of this report.
1.13 This report is based on information available to FTI Consulting at the time of writing of the report and does not take into account any new information that becomes known to us after the date of the report. We accept no responsibility for updating the report or informing any recipient of the report of any such new information.

Structure of this report

1.14 In Section 2, we summarise our conclusions. In Section 3, we set out our approach. In Section 4, we estimate GNI’s cost of debt. In Section 5, we estimate GNI’s cost of equity. In Section 6, we consider the gearing assumption. In Section 7, we consider other factors that might affect the appropriate allowed rate of return.
2. Executive summary

Introduction

2.1 We have been engaged to assist the CER with the assessment of the WACC for GNI’s gas transmission and distribution networks for PC4.

2.2 We have considered the approach adopted in previous CER determinations. We have assessed the cost of debt and equity from the perspective of a hypothetical standalone efficient entrant of the same scale and scope of business as GNI. We have estimated a range for GNI’s WACC on a real, pre-tax basis.

2.3 To assess each input, we have taken into account relevant theory, market data, expected future market conditions and regulatory precedent. We set out our approach in more detail in Section 3.

Cost of debt

2.4 We have followed the approach used by Frontier and previously by the CER to calculate the cost of debt. That is, we calculate the cost of debt as the sum of the estimated yield on government bonds plus a debt premium. The debt premium reflects the difference between the yield on benchmark corporate bonds and the yield on government bonds. We also consider direct calculations as a cross-check and review regulatory precedent.

2.5 On the basis of the evidence, we consider that a reasonable range for the cost of debt for GNI is between 1.0% to 2.5%. The lower end of this range is based on current market evidence and the upper end takes account of recent precedent from the CER, the historical cost of debt and other regulatory precedent. The upper end allows headroom for the possibility that real yields may increase during PC4.

We consider that 1.0% is a reasonable estimate for the debt premium, which is consistent with a range for the real yield on government bonds of 0.0% to 1.5%.
2.6 Frontier suggested that a “long-term approach” to setting the allowed cost of debt is preferable because regulatory stability reduces the cost of capital and, in the long-run and over time, under and over estimates of the cost of capital will offset one another. We do not consider it appropriate to have no regard for market evidence but accept that regulatory stability is important. We consider that the CER should make incremental and conservative adjustments to its WACC framework in response to new market data.

2.7 Therefore, based on the evidence summarised in Section 4, we recommend a point estimate for the cost of debt of 2.5%, which is at the top end of our range.

2.8 This is lower than the point estimate proposed by Frontier. However, it allows some headroom above the current actual cost of debt for future increases over PC4. We consider that this a conservative allowance compared to current market data. Consequently, we consider that a further explicit aiming up adjustment for PC4 would not be required. We discuss our assessment of the cost of debt further in Section 4.

Cost of equity

2.9 We have adopted the Capital Asset Pricing Model (“CAPM”) framework to assess the cost of equity. This is consistent with prior CER determinations and the approach adopted by Frontier. We discuss our assessment of the risk free rate, beta and the equity market risk premium in more detail in Section 5.

Risk free rate

2.10 Yields on government bonds have fallen since the PC3 determination and the Irish sovereign debt crisis that affected that assessment has abated. There is some evidence to support that some of the fall in yields is due to longer-term macroeconomic changes, rather than only the short-term market dislocations following the 2008 financial crisis, which are cited by Frontier. However, there is also evidence that government bond yields may understate the true long-term risk free rate. The UK Competition Commission (“CC”) noted in the UK there is no mechanistic way of interpreting current market yields.

2.11 UK economic regulators now appear to consider that the risk free rate is likely to fall in the range 1.0% to 1.5%. However, we acknowledge that recent CER determinations have reflected a view that the true risk free rate remains between 1.9% and 2.0% and that market conditions have not materially changed since the time of those determinations.
2.12 Based on the evidence we have reviewed, we consider that the risk free rate in Ireland is likely to lie in the range 1.5% to 2.0%. This range is based on the upper end of recent UK regulatory determinations and the CER’s recent determination. In the interests of supporting stability in regulatory policy for Irish utilities, we advise that any change from recent determinations is incremental in nature. In the interests of supporting stability in Irish utility regulation policy, we recommend that the CER adopts a point estimate for the risk free rate of 1.9%, consistent with other recent determinations.

Equity market risk premium

2.13 Based on an assessment of the empirical evidence and regulatory precedent, we consider that a reasonable range for the total equity market return is 6.5% to 6.75%. Based on our proposed range for the risk free rate (i.e. 1.5% to 2.0%), this implies a range for the equity risk premium of 4.5% to 5.25%. The point estimate proposed by Frontier of 4.75% falls within this range. Taking into account our recommended point estimate for the risk free, we recommend a point estimate for the equity risk premium of 4.75%.

Beta

2.14 We have adopted an empirical approach to estimating beta, based on market data. We place primary weight on evidence from comparable listed companies from the UK. We observe that betas have increased since the financial crisis. We conclude that a reasonable range for GNI’s asset beta is between 0.37 and 0.44. We recommend a point estimate of 0.42, which is slightly above the mid-point of this range, reflecting the slightly higher average beta for the international comparators. This implies an equity beta of 0.93.

Gearing

2.15 Our assessment of gearing is based on a review of regulatory precedent, the views of credit ratings agencies and GNI’s historical gearing. We consider that a reasonable gearing assumption for GNI is 55%, consistent with GNI’s proposal. We discuss our review of the gearing assumption in more detail in Section 6.

Regulatory precedent

2.16 Table 2-1 below summarises the overall pre-tax WACC allowed in recent regulatory determinations in the UK and Republic of Ireland. We provide these for comparison purposes and note that the overall WACC reflects the combined impact of estimates of each of the underlying parameters i.e. the costs of equity and debt and the gearing.
In forming our final recommendation, we have taken into account the views of the CER concerning the weight that should be placed on regulatory precedent, in particular recent determinations by the CER.

Table 2-1: Regulatory precedent on real pre-tax WACC

<table>
<thead>
<tr>
<th>Regulatory decision</th>
<th>Date</th>
<th>Real pre-tax WACC&lt;sup&gt;(1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>CER Irish Water IRC2</td>
<td>Dec 2016</td>
<td>5.05%</td>
</tr>
<tr>
<td>CER ESBN/EirGrid PR4</td>
<td>Dec 2015</td>
<td>4.74%</td>
</tr>
<tr>
<td>Uregni GD17&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>Sep 2016</td>
<td>3.97% and 4.01%</td>
</tr>
<tr>
<td>CMA Bristol Water</td>
<td>Oct 2015</td>
<td>4.09%</td>
</tr>
<tr>
<td>Ofwat PR14</td>
<td>Dec 2014</td>
<td>4.04%</td>
</tr>
<tr>
<td>ComReg</td>
<td>Dec 2014</td>
<td>6.00%</td>
</tr>
<tr>
<td>Ofgem RIIO ED1</td>
<td>Jul 2014</td>
<td>4.09%</td>
</tr>
<tr>
<td>CAR</td>
<td>Oct 2014</td>
<td>5.80%</td>
</tr>
<tr>
<td>CC Northern Ireland Electricity</td>
<td>Mar 2014</td>
<td>4.49%</td>
</tr>
<tr>
<td>CER PC3&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>Nov 2012</td>
<td>6.70%</td>
</tr>
</tbody>
</table>

Sources: Published documents from relevant authorities.

Notes: (1) For the purposes of comparability, each WACC is expressed before any additional adjustments and UK determinations have been adjusted for the difference in corporate taxation rates between the UK and Republic of Ireland; (2) The Utility Regulator’s determination related to two firms for which it calculated different costs of debt and therefore a different overall WACC; and (3) the PC3 WACC included a substantial uplift for the impact of the Irish financial crisis.

From Table 2-1, we observe that recent regulatory determinations in the UK have tended to adopt lower estimates of the real pre-tax WACC than recent CER determinations. We discuss the conclusions on the individual parameters that underlie these WACC estimates in the following sections of this report.

Summary of our proposed WACC for GNI

Table 2-2 below summarises our view of the reasonable range for each input and our proposed overall reasonable range for the WACC.
Table 2-2: FTI proposed WACC for GNI

<table>
<thead>
<tr>
<th>Input</th>
<th>GNI proposal</th>
<th>FTI recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk free rate</td>
<td>1.9%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Equity risk premium</td>
<td>4.75%</td>
<td>4.75%</td>
</tr>
<tr>
<td>Asset beta</td>
<td>0.44</td>
<td>0.42</td>
</tr>
<tr>
<td>Equity beta</td>
<td>0.98</td>
<td>0.93</td>
</tr>
<tr>
<td><strong>Cost of equity (post tax)</strong></td>
<td><strong>6.54%</strong></td>
<td><strong>6.32%</strong></td>
</tr>
<tr>
<td>Tax rate</td>
<td>12.5%</td>
<td>12.5%</td>
</tr>
<tr>
<td><strong>Cost of equity (pre-tax)</strong></td>
<td><strong>7.48%</strong></td>
<td><strong>7.22%</strong></td>
</tr>
<tr>
<td>Reference bond yield</td>
<td>1.9%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Debt premium</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td><strong>Cost of debt</strong></td>
<td><strong>2.9%</strong></td>
<td><strong>2.5%</strong></td>
</tr>
<tr>
<td>Gearing</td>
<td>55%</td>
<td>55%</td>
</tr>
<tr>
<td><strong>WACC (pre-tax)</strong></td>
<td><strong>4.96%</strong></td>
<td><strong>4.63%</strong></td>
</tr>
</tbody>
</table>

Sources: Section 4, 5 and 6.

2.20 We do not consider it appropriate to make any explicit adjustment to the proposed WACC for Brexit. This is firstly because Brexit has not given rise to exceptional market conditions which might affect GNI’s WACC and there is only a risk that such conditions might arise in the future. Even if such market conditions arise, it is then unclear what the scale and direction of the impact would be. We discuss this further in Section 7.

2.21 Secondly, we consider that our recommended point estimate for the WACC is conservative, for the reasons set out in Section 4 and 5.
3. Our approach

Introduction

3.1 The WACC reflects the combination of a firm’s cost of equity and cost of debt, weighted according to the relative market value of debt and equity. In this section, we summarise the WACC calculation and our framework for assessing each input.

Relevant WACC calculation

3.2 We estimate GNI’s cost of debt and equity in real terms (i.e. excluding the impact of inflation) because GNI’s asset base is indexed to the Irish (all-items) Harmonised Index of Consumer Prices (“HICP”). This is consistent with common regulatory practice, which seeks to ensure that allowances for capital costs are not overstated.

3.3 The returns to debt and equity investors receive different tax treatments. Returns to debt investors (i.e. interest payments) are typically deductible before corporation tax. The WACC can be expressed on one of the following bases:

(1) pre-tax, in which the cost of equity is grossed-up to reflect the return the firm must earn before tax to fulfil equity investor requirements, which receive returns after the deduction of corporation tax;

(2) post-tax, in which the cost of debt is reduced to reflect the benefit of the “tax shield”; and

(3) “vanilla” in which the cost of debt is expressed on a pre-tax basis and the cost of equity on a post-tax basis.

3.4 It should not matter which approach is adopted, so long as the correct methodology is then selected to determine allowable revenues. The selected approach is usually one of regulatory preference, commonly influenced by prior precedent. Adopting the same approach aids regulatory consistency.
3.5 The CER has historically expressed the WACC on a real, pre-tax basis.\(^2\) Consequently, in this report, we also determine the return on a real, pre-tax basis.\(^3\) The pre-tax WACC is calculated as:

\[
WACC = k_e \times \frac{E}{D+E} \times \frac{1}{(1-T)} + k_d \times \frac{D}{D+E}
\]

where:
- \(k_e\) is the cost of equity (i.e. the return required by shareholders);
- \(k_d\) is the cost of long-term debt (i.e. the return required by debt holders);
- \(E\) is the market value of equity;
- \(D\) is the market value of (long term) debt; and
- \(T\) is the marginal rate of tax on corporate income.

**Framework for estimating each input**

3.6 We have assessed the costs of debt and equity by reference to economic theory and regulatory practice. We adopt the commonly used regulatory principle that regulated firms should be allowed to recover the costs of a hypothetical standalone efficient entrant of the same scale and scope of business. In general, we do not make adjustments for the particular circumstances of GNI.

3.7 In respect of each component of the calculation we have:

1. considered the relevant economic and corporate finance theory;
2. considered GNI’s / Frontier’s position;
3. reviewed relevant current market data and forward-looking expectations;
4. considered regulatory precedent in the Republic of Ireland and the UK; and
5. recognised that there is uncertainty in the estimation of the WACC.

Consequently, we determine a reasonable range for each parameter.

3.8 We have assessed the expected average WACC over the course of PC4. Frontier adopts a similar framework. We explain in subsequent sections, where our approach and/or findings differ.


\(^3\) Frontier expressed the WACC on the same real, pre-tax basis. First Frontier Report: page 8.
3.9 In performing our assessment, we have been instructed to place weight on the approach that the CER has adopted in prior controls, whilst having regard to other accepted practice and current market data.
4. **Cost of debt**

**Introduction**

4.1 In this section, we summarise the approach we have used to estimate the cost of debt and GNI’s approach. We then examine certain market evidence and review regulatory precedent. Finally, we set out our recommendations.

**Our approach**

4.2 The cost of debt can be calculated by reference to the firm’s actual cost of debt, reflecting a combination of debt previously issued (i.e. embedded debt) and new debt to be issued over the relevant period. However, this approach is often dismissed by regulators due to *inter alia* efficiency concerns.

4.3 The CER previously considered the cost of debt on a notional basis (i.e. the cost to a hypothetical entrant). In these circumstances, the cost of debt can be measured by reference to the expected yield to maturity on the regulated company’s own recently issued bonds and/or by reference to a range of current empirical market evidence.

4.4 The notional cost of debt can be estimated by reference to comparable companies and can be decomposed into two components: the yield on government bonds (or other proxies) and the difference between this yield and the yield on comparable corporate bonds (i.e. the “debt premium”).

4.5 Based on regulatory theory, we consider that the CER’s approach is appropriate, so long as it does not give rise to financeability issues. Hence, if the cost of embedded debt were found to be significantly higher than the allowed notional cost of debt, this would require further regulatory consideration.

4.6 As a simple check, we have examined GNI’s expected share of embedded debt compared to its total debt funding over PC4, as shown below.

---

The figure shows that, by the end of the first year of the price control period, embedded debt makes up less than 50% of GNI’s total debt. Embedded debt then continues to fall over time. Given the high proportion of new debt, we consider it reasonable to set the cost of debt on a notional forward-looking basis (from a financeability perspective). However, this conclusion should be considered further by the CER when it tests GNI’s financeability over PC4.

**GNI’s proposal**

Frontier proposed the debt premium approach to setting the cost of debt, as described above. Frontier added a debt premium of 1.0% to the “long term” real risk free rate that it used for the calculation of the cost of equity (i.e. 1.9%). In the Second Frontier Report, it reiterated that it considered a “long run” estimate of the cost of debt was preferable. It noted that this would maintain...

“...consistency with the CER’s recent WACC determinations and provides the stability and predictability of the regulatory regime that is required by investors and also underpins the long-term investment in the sector.”

---

5 First Frontier Report: page 17.

4.9 Frontier estimated the debt premium by calculating the difference between the nominal yield on a set of comparator corporate bonds and the nominal, current yield on government bonds of similar tenor. It proposed a range for the debt premium of 0.96% to 1.14%, with a point estimate of 1.0%. Frontier proposed a range for the real cost of debt of between 2.86% and 3.14%, with a point estimate of 2.90%.

4.10 In the Second Frontier Report, Frontier argued, inter alia, that the use of a “long run” cost of debt estimate “could ... be considered analogous” to methodologies used by other regulators which explicitly take account of historical debt costs, such as those used by Ofgem and Ofwat in the UK.

4.11 Frontier stated that:

“... we have cross-checked the point estimate using direct estimates of the long-term cost of debt (as proxied by the iBoxx index) and current Irish inflation index. Our cross-check suggests a long-term average cost of debt of c.3.2%, which is above GNI’s 2.9% point estimate.”

**Empirical evidence on government bond yields**

4.12 A benchmark yield, such as government bond yields, is used in two steps of the cost of debt calculation. First, the debt premium is calculated by deducting the nominal government bond yield from the yield of comparator corporate bonds. Second, the estimated debt premium is added to the real government bond yield to calculate the real cost of debt. It is important in each step to use consistent estimates of the government yields.

4.13 It is common regulatory practice to use the yield on government bonds of the relevant economy: in this case, Irish government bonds. However, during the Eurozone financial crisis, a substantial spread opened up between the yields on bonds issued by different Eurozone governments. This reflected an increase in the perceived risk that some Eurozone countries – including the Irish state – might default on their debts. Given this, it might be argued that Irish government bonds can no longer be considered risk free. We understand that the current Irish sovereign credit rating is currently A/A3, rather than AAA, which is typically taken to represent a risk free bond.

---

7 First Frontier Report: page 17.
4.14 To overcome this issue, in recent determinations, the CER used the yields on other AAA rated Eurozone government debt.\(^ \text{10} \) This approach appears reasonable, and we have adopted this approach.

**Nominal government bond yield for calculating the debt premium**

4.15 To calculate the debt premium, we agree with the approach adopted by Frontier, which deducts the nominal yield on government bonds (of similar tenor) from the nominal yield of benchmark corporate bonds.\(^ \text{11} \)

**Reference real government bond yield**

4.16 Determining the real government bond yield to which the debt premium is added is a more difficult exercise. The majority of government bonds issued in the Eurozone have a fixed nominal rate. To estimate the real yield on these bonds it is necessary to deduct expected price inflation from the nominal yield. Although a real yield can be inferred in this way, estimates of expected inflation are uncertain.\(^ \text{12} \)

4.17 A common approach is to consider the yields on index-linked government bonds (“ILGs”), which exclude inflation risk. However, there is a more limited supply of relevant ILGs. In addition, we are concerned that the high demand for inflation protection from institutional investors may have reduced the yields on these products.

4.18 Figure 4-2 below presents the nominal yield on a generic 10-year maturity German government bond over the last two price control periods. We present the yield on 10-year maturity UK and Irish government bonds for reference.

---

\(^ {10} \) CER (23 November 2012) ‘Decision on October 2012 to September 2017 transmission revenue for Bord Gáis Networks’: page 104.

\(^ {11} \) First Frontier Report: page 17.

\(^ {12} \) The nominal yield may also incorporate a premium for inflation risk.
The figure shows that nominal yields to maturity have fallen over time and are now close to zero. The annualised rate of Eurozone HICP inflation in December 2016 was 1.1%. Inflation is forecast to increase by the ECB to 1.3% in 2017 and to 1.5% and 1.7% in 2018 and 2019, respectively. Given that the yield on 10-year German government bonds is currently below 0.5%, this implies that the expected real yield is currently negative.

---

13 ECB Statistical Data Warehouse.
14 ECB (December 2016) ‘Eurosystem staff macroeconomic projections’.
15 The Fisher equation holds that, for low values of inflation and interest rates:

\[ \text{nominal \ RFR} \approx \text{real \ RFR} + \text{inflation} \]

16 The Irish government does not currently issue ILGs.
In Figure 4-3, we present the yield on German ILGs and UK ILGs for comparison purposes. We note that the German government has only relatively recently begun to issue a limited amount of ILGs.\textsuperscript{16}

**Figure 4-3: Mid yield to maturity of British and German 10-year generic inflation-indexed government bonds (%)**

![Graph showing yield comparison between British and German ILGs](image)

*Source: S&P CapitalIQ.*

From the figures above, our analysis suggests that the real yield on Eurozone government bonds are currently low compared to the historical average and current real yields are close to zero, confirming the finding in paragraph 4.19 above.

\textsuperscript{16} The Irish government does not currently issue ILGs.
In addition, we have considered the market implied forward yield, which can be derived from the Eurozone yield curve, using the theory of the term structure of interest rates. The figure below shows the historical actual and market-implied forward nominal yields for 10-year maturity Eurozone bonds as well as actual and forecast Eurozone HICP inflation.

**Figure 4-4: Historical and market-implied future yield on 10-year German government bonds compared to Eurozone inflation**

![Graph showing historical and market-implied future yields compared to Eurozone inflation]

*Source: ECB and FTI Consulting calculations.*

The figure shows that Eurozone inflation is currently higher than nominal yields, implying negative real yields as noted above. It also suggests that the market expects nominal yields to rise over the coming years, but only gradually, and will remain substantially below their historical levels. This implies that real yields may not recover to pre-financial crisis levels during PC4.

---

The theory of the term structure of interest rates holds that the expected spot rate on an m-year bond in t-years’ time ($y_{m,t}$) can be calculated from the current spot yields on bonds with maturity of bonds of ‘t’ and ‘t+m’ years maturity as follows:

$$y_{m,t} = \left(\frac{(1 + y_{t+m})^{(t+m)}}{(1 + y_t)^t}\right)^{1/m} - 1$$

4.24 We note that both nominal yields and future inflation are uncertain and this uncertainty is greater over longer forecast horizons. This uncertainty needs to be considered when determining the reference real government bond yield for regulatory purposes.

**Empirical evidence on the debt premium**

4.25 The debt premium is the difference between the yield on the benchmark corporate bonds and the market yield on benchmark government bonds. We have estimated the debt premium based on the comparable corporate bonds considered in the First Frontier Report and those considered in the CER PC3 determination. The debt premiums are calculated as the premium over the term-matched benchmark government bond. We also consider GNI’s recently issued debt instruments.

4.26 Figures 4-5 and 4-6 summarise how debt premiums have changed over time based on Frontier’s comparator set. Figure 4-7 plots similar spreads for the PC3 comparators.

---

18 The specific bonds considered in PC3 have matured, so we use other bonds issued by the same companies.

19 That is a government bond with a maturity date close to that of the subject bond.
Figure 4-5: Spread of Euro denominated bonds used in First Frontier Report (bps)

Source: Bloomberg data and FTI calculations.

Figure 4-6: Spread of Sterling denominated bonds used in First Frontier Report (bps)

Source: Bloomberg data and FTI calculations.
Our analysis suggests that higher debt premiums, which were associated with the Irish sovereign debt crisis, have reduced to lower levels. The debt premiums have become more stable from the start of 2015. Consequently, we have calculated average premiums based on the last 12 months of available data (i.e. post financial crisis). Tables 4-1 and 4-2 summarise the average spreads for two groups of comparators over the last year.\textsuperscript{20}

\textsuperscript{20} The spread is calculated for each trading day between 1 January 2016 to 31 December 2016 inclusive.
Table 4-1: Spread of Euro and Sterling denominated bonds used by Frontier

<table>
<thead>
<tr>
<th>Corporate bond</th>
<th>Currency</th>
<th>Credit Rating</th>
<th>Years to maturity</th>
<th>2 year average spread (bps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bord Gais Eireann(^{(1)})</td>
<td>Euro</td>
<td>A</td>
<td>1</td>
<td>63.4</td>
</tr>
<tr>
<td>ESB Finance</td>
<td>Euro</td>
<td>A-</td>
<td>1</td>
<td>61.2</td>
</tr>
<tr>
<td>ESB Finance</td>
<td>Euro</td>
<td>A-</td>
<td>3</td>
<td>73.7</td>
</tr>
<tr>
<td>ESB Finance</td>
<td>Euro</td>
<td>A-</td>
<td>7</td>
<td>108.1</td>
</tr>
<tr>
<td>ESB Finance</td>
<td>Euro</td>
<td>A-</td>
<td>10</td>
<td>128.7</td>
</tr>
<tr>
<td>ESB Finance</td>
<td>Euro</td>
<td>A-</td>
<td>14</td>
<td>141.1</td>
</tr>
<tr>
<td>NIE Finance</td>
<td>Sterling</td>
<td>NR</td>
<td>2</td>
<td>114.2</td>
</tr>
<tr>
<td>ESB Finance</td>
<td>Sterling</td>
<td>A-</td>
<td>3</td>
<td>115.3</td>
</tr>
<tr>
<td>NIE</td>
<td>Sterling</td>
<td>BBB+</td>
<td>9</td>
<td>127.3</td>
</tr>
</tbody>
</table>

Average (Euro-denominated) 96.0  
Average (Sterling-denominated) 118.9  
Average 103.7

Source: Bloomberg data and FTI calculations. Note: (1) Previous name for GNI.

Table 4-2: Spread of Euro denominated bonds issued by PC3 comparators

<table>
<thead>
<tr>
<th>Corporate bond</th>
<th>Currency</th>
<th>Credit Rating</th>
<th>Years to maturity</th>
<th>2 year average spread (bps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.ON</td>
<td>Euro</td>
<td>BBB+</td>
<td>6</td>
<td>117.2</td>
</tr>
<tr>
<td>RWE</td>
<td>Euro</td>
<td>BBB-</td>
<td>7</td>
<td>138.2</td>
</tr>
<tr>
<td>TenneT</td>
<td>Euro</td>
<td>A-</td>
<td>10</td>
<td>104.2</td>
</tr>
<tr>
<td>TenneT</td>
<td>Euro</td>
<td>A-</td>
<td>13</td>
<td>115.7</td>
</tr>
</tbody>
</table>

Average 118.8

Source: Bloomberg data and FTI calculations.

We observe that longer-maturity bonds attract higher premiums. GNI proposes to raise new debt with a range of maturities, but with a weighted average tenor of 10 years.\(^{21}\)

---

\(^{21}\) GNI submission SD031: 3B. The weighted average tenor is calculated by weighting the tenor of each bond by the value of its principal.
4.29 GNI has also issued corporate bonds on 28 November 2016.\textsuperscript{22} We have calculated their average spread over benchmark government bonds from 1 December 2016 to 31 December 2016.

**Table 4-3: Spread of newly issued GNI corporate bonds**

<table>
<thead>
<tr>
<th>Years to maturity</th>
<th>Credit Rating</th>
<th>Average spread (bps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 years</td>
<td>A</td>
<td>103.7</td>
</tr>
<tr>
<td>20 years</td>
<td>A</td>
<td>152.2</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>127.9</td>
</tr>
</tbody>
</table>

*Source: Bloomberg, S&P CapitalIQ and FTI calculations.*

4.30 Based on the analysis above, we agree with Frontier that an appropriate estimate of the debt premium is around 100 bps (i.e. 1.0%). Our recommendation is influenced by our consideration of the reference real government bond yield to which the premium is added, which we discuss at the end of this section.

### Cross-check to direct estimates of historical cost of debt

4.31 Frontier suggests that a “long run” estimate of the cost of debt is preferable and asserts that Ofgem and Ofwat’s cost of debt methodologies are “analogous” to the CER’s methodology.

4.32 We disagree with Frontier’s assertion that the CER’s previous approach should be seen as analogous to Ofgem and Ofwat’s approaches because in the past the CER has adopted a forward-looking approach. As such, in PC3 the CER allowed a specific debt allowance for the crisis, which took account of the forward cost of debt (i.e. it did not adopt a longer-term historical average, which may have reduced the weight that would have been placed on crisis market conditions).

4.33 We have analysed the maturity profile of GNI’s debt and its expected refinancing over PC4 above. From this, we observed that the majority of GNI’s debt has been recently financed or will be refinanced in the initial years of PC4. On this basis, we consider that it is reasonable to set the cost of debt by reference to the forward-looking expectations of debt costs over PC4.

\textsuperscript{22} One was for €500m, due to mature in 2026, and one of €125m due to mature in 2036.
4.34 As a cross-check, we have considered whether Frontier’s approach is consistent with a historical cost approach. Frontier cross-checked their point estimate using direct estimates of the long-term cost of debt (as proxied by the iBoxx index) and current Irish inflation index. We consider that Frontiers’ calculation may be flawed because the period over which Frontier calculates the average encompasses the Eurozone financial crisis. This approach adds a large “crisis premium” to the estimated historical cost of debt. The CER already included an explicit uplift for the “crisis premium” in PC3, which we discuss further in Section 7. It might be unreasonable to include this uplift again in PC4 now that the market conditions have abated.

4.35 The figure below shows our calculation of the implied historical real cost of debt calculated as an average of the Eurozone iBoxx A and BBB corporate bond indices and historical Eurozone HICP inflation.

---

23 There are two further issues. First, the real cost of debt should not be estimated by deducting a forward-looking inflation expectation from historical average nominal yields. It is well understood that periods of higher inflation are associated with higher yields and vice versa. The expected real return at a given point in time is calculated by deducting forward-looking expectations of inflation from current nominal yields to maturity. Equivalently, the historical realised real return should be calculated by deducting historical inflation from historical yields. Second, the use of an Irish inflation index is not appropriate. As set out above, we are assessing the real return required by a debt investor from a whole Eurozone perspective, so the Eurozone HICP should be used.
The figure illustrates how Frontier’s ten year historical average calculation is distorted by the impact of the Eurozone debt crisis. To the extent that historical debt costs are an appropriate cross-check, we consider that it is more appropriate to examine the implied historical real cost of debt during periods of “normal” market conditions prevailed. The figure shows that, since the European financial crisis has abated, the real cost of debt as estimated from corporate indices was below the 2.9% proposed by Frontier. The average real yield during the period outside the crisis from January 2006 to December 2016 was 2.5% and the average since the crisis (i.e. August 2012 to December 2016) was 2.3%.

Regulatory precedent

In this section, we consider regulatory precedent on the real cost of debt and whether expected future changes in cost of debt should be taken into account.

Regulatory precedent on cost of debt

We summarise below recent regulatory precedent on the cost of debt and note the assumed credit rating for the regulated businesses.
Table 4-4: Regulatory precedent on the cost of new debt

<table>
<thead>
<tr>
<th>Regulatory decision</th>
<th>Date</th>
<th>Assumed credit rating</th>
<th>Debt premium</th>
<th>Real cost of new debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>CER Irish Water IRC2</td>
<td>Dec 2016</td>
<td>BBB+ or above</td>
<td>1.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>CER ESBN/EirGrid PR4</td>
<td>Dec 2015</td>
<td>BBB+ or above</td>
<td>1.0%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Uregni GD17</td>
<td>Sep 2016</td>
<td>BBB- or above</td>
<td>N/A</td>
<td>2.53% to 3.13%</td>
</tr>
<tr>
<td>CMA Bristol Water</td>
<td>Oct 2015</td>
<td>BBB+</td>
<td>N/A</td>
<td>1.6%</td>
</tr>
<tr>
<td>Ofwat PR14</td>
<td>Dec 2014</td>
<td>A/BBB</td>
<td>N/A</td>
<td>2.00%</td>
</tr>
<tr>
<td>ComReg</td>
<td>Dec 2014</td>
<td>BBB-</td>
<td>1.75%</td>
<td>3.58%</td>
</tr>
<tr>
<td>Ofgem RIIO ED1</td>
<td>Jul 2014</td>
<td>A/BBB</td>
<td>N/A</td>
<td>See chart</td>
</tr>
<tr>
<td>CAR</td>
<td>Oct 2014</td>
<td>BBB</td>
<td>N/A</td>
<td>3.0%</td>
</tr>
<tr>
<td>CC Northern Ireland Electricity</td>
<td>Mar 2014</td>
<td>BBB+</td>
<td>N/A</td>
<td>2.14%</td>
</tr>
<tr>
<td>CER PC3</td>
<td>Nov 2012</td>
<td>BBB+</td>
<td>1.3% to 1.6%</td>
<td>4.8% to 7.1%</td>
</tr>
</tbody>
</table>

Sources: Published documents from relevant authorities. Notes: (1) range of values due to different costs of new debt for PNGL and FE; and (2) this includes a Eurozone Crisis Premium.

For its ED1 and other recent determinations, Ofgem adopted an annual indexed approach to setting the cost of debt. Ofgem calculated the current real cost of debt on a daily basis using benchmark indices and allowed a real cost of debt calculated on a trailing average basis. For “slow track” companies, this is an up to 20-year average (calculations begin from November 2004) and for “fast track” companies, this is a 10-year trailing average. Figure 4-9 below illustrates the calculated real cost of current debt and the resulting trailing average.
Ofgem calculates that the real cost of current debt has been below 2.9% since October 2009 and has remained below 2.0% since October 2012. With respect to the overall allowed cost of debt, we observe that this has fallen over time and stands at 2.3% for slow track companies at the end of November 2016. The allowed cost of debt for “fast track” companies is 2.2%,\(^\text{24}\) and this is calculated over a period that spans the financial crisis.

We note that the real cost of debt allowed by the CER in two recent determinations was higher than the estimate of the cost of new debt adopted by the CMA for Bristol Water, Ofwat’s PR14 determination and Ofgem’s RIIO determination.

Where regulators have assessed a higher cost of debt, we observe that this may be associated with lower credit ratings. Both the Uregni GD17 and ComReg 2014 assessments were based on an assumed credit rating of BBB- or above, compared to GNI’s assumed credit rating of BBB+ or above.

\(^{24}\) Ofgem Cost of Debt Indexation Model 31 October 2016.
Regulatory precedent regarding expected future changes in cost of debt.

4.43 Regulators have adopted different approaches to expected future increases in the cost of debt. In its NIE determination, the CC did not include an uplift in the allowed cost of debt on the grounds that:25

“We consider that the timing of any future debt issuance is a matter for NIE taking into account its view of debt market conditions over the price control period. It could adopt hedging strategies to lock in current rates if it considered this to be appropriate. Hence, we did not consider that it was necessary to provide NIE with any additional allowances, over and above that which it would face if it went to the debt markets now, in anticipation of higher rates in the future.”

4.44 In its GD17 determination, the Utility Regulator allowed an uplift for future expected increases in rates.26

Conclusion

4.45 Frontier suggested that a “long-term approach” to setting the allowed cost of debt was preferable because regulatory stability reduces the cost of capital and, over the long-run, under and over estimates of the cost of capital will offset one another.27 We agree that regulatory stability is desirable and that the CER should make incremental and conservative adjustments to its WACC framework in response to new market data.

4.46 In reaching our conclusion on a range and point estimate for the cost of debt, we have considered the following:

(1) current real government bond yields are close to zero or even negative. When combined with debt premium of 1.0%, this implies an overall real cost of debt up to 1.0%;

(2) direct evidence based on GNI’s currently issued bonds, which have current nominal yields of between 1.0% and 1.5%.28 When combined with positive Eurozone inflation this implies a real cost of debt of less than 1.0%;

25 CC, NIE Final Determination: paragraph 13.76.
26 Uregni GD17 Final Determination: Table 190.
27 Frontier response to CER follow up questions.
28 Source: Bloomberg.
there is uncertainty in relation to future yields. If nominal yields were to rise to 1.4% over PC4, as implied by the market implied forward yield curve, and if inflation was to fall towards the bottom of the ECB’s lower bound forecast for 2018 of 0.7%, this would imply a positive real yield of circa 0.7%. Adding a debt premium of 1% suggests a real cost of debt of 1.7%. Alternatively, lower yields and inflation towards the upper end of the forecast range would imply a lower real cost of debt;

(4) to the extent that historical debt costs are an appropriate cross-check, we consider that it is more appropriate to examine the implied historical real cost of debt during periods of “normal” market conditions prevailed. The average real yield during the period outside the crisis from January 2006 to December 2016 was 2.5% and the average since the crisis (i.e. August 2012 to December 2016) was 2.3%.

(5) recent CER determinations have allowed an overall cost of debt of between 2.9% and 3.0%; and

(6) UK regulatory regimes that have explicitly taken into account historical debt costs. Ofgem’s most recent determination (which updates the cost of debt annually) allows a real cost of debt of between 2.2% and 2.3%.

Based on the evidence, we consider that a reasonable range for the cost of debt for GNI is **1.0% to 2.5%**.29 The lower end of this range is based on current market evidence and the upper end takes account of recent precedent from the CER, the historical cost of debt and other regulatory precedent. The upper end allows headroom for the possibility that real yields may increase during PC4.

We do not consider it appropriate to have no regard for market evidence but accept that regulatory stability is important. The CER will need to balance these elements. If the CER considered it appropriate to place greater weight on regulatory stability, then a reasonable point estimate for the cost of debt would be **2.5%**, which is at the top end of the range. This also allows some headroom above the current actual cost of debt for future increases over PC4. We consider that this a conservative allowance compared to current market data. Consequently, we consider that a further explicit aiming up adjustment for PC4 would not be required.

We recommend that the CER should continue to take account of prevailing market conditions in its future determinations.

---

29 We consider that 1.0% is a reasonable estimate for the debt premium, which is consistent with a range for the real yield on government bonds of 0.0% to 1.5%.
5. Cost of equity

Introduction

5.1 We have adopted the Capital Asset Pricing Model (“CAPM”) methodology to calculate the cost of equity. Although other methodologies can be used to estimate the cost of equity, regulators have tended to prefer CAPM. The CER has used CAPM in its previous determinations. Frontier has also used CAPM.

5.2 The cost of capital is calculated using the formula:

$$k_e = r_f + \beta \times (r_m - r_f)$$

where:

- $k_e$ is the expected rate of return for the risky asset;
- $r_f$ is the rate of return on a ‘risk free’ asset (the “risk free rate” or “RFR”);
- $\beta$ is the ‘beta’ factor, which is correlation of the return on the risk asset with the expected returns on a diversified portfolio of all investable assets; and
- $r_m$ is the expected rate of return on a market value-weighted portfolio of all assets (the ‘market portfolio’). The term $r_m - r_f$ in the CAPM is referred to as the market risk premium (“MRP”).

---

30 These include the Dividend Growth Model, the Fama French Three Factor Model and Arbitrage Pricing Theory.
31 Sudarsanam et al. (2011): ‘Cost of Equity for Regulated Companies: An international Comparison of Regulatory Practices’: Table 3.3.
32 CER’s ESB/EirGrid PR4 (January 2015) and Irish Water IRC2 (December 2016) determinations.
Risk free rate

Theory and practice

5.3 The RFR theoretically represents the return required by investors on an investment that is devoid of all risk, including interest rate risk, inflation risk, default risk and liquidity risk. Established regulatory practice estimates the RFR empirically, by reference to the returns on a risk free asset. The identification of the risk free asset is not always straightforward, though government bonds have traditionally been considered the best proxy. Consequently, the RFR is commonly calculated from the yield on longer-dated government bonds in the country for which the cost of capital is to be calculated.

5.4 The CER has previously considered evidence from the yields on AAA-rated Eurozone government debt (rather than Irish government bond yields). In principle, we consider that this approach remains appropriate.

5.5 It is generally accepted that an estimate of the long term RFR is required. However, market yields, even on longer-dated government debt, have fluctuated over time. Since the global financial crisis, academics and practitioners have argued that factors may have distorted bond markets. Consequently, it is necessary to consider whether observed market yields today provide evidence for the long term expected RFR.

GNI’s proposal

5.6 Frontier proposes a risk free rate of between 1.9% and 2.0%. They suggest that current market evidence understates RFR, and adopt a “long term view on the risk free rate” consistent with the CER and other regulators. Frontier’s Second Report expanded on this, stating that:

“...the rationale to date behind the CER’s approach in relation to the RFR has been to discount short term data due to a concern that that a combination of QE and a ‘flight to safety’ has been artificially depressing sovereign yields. In our view, this rationale makes sense and continues to hold.”

34 First Frontier Report: pages 10 to 11.
Current bond yields and our interpretation

5.7 In Section 4, we noted that the current real yields on government bonds are close to zero or even negative. The current yield curve implies that yields are expected to rise over the course of PC4, but to a level that remains substantially lower than the historical average.

5.8 A number of explanations have been advanced for the underlying cause of these historically low yields and the period for which they are likely to persist. Explanations include long-term macroeconomic changes and short-term market dislocations. These include demographic changes,\(^{37}\) expectations of weak future growth,\(^{38}\) market distortions resulting from extraordinary monetary policy; and a flight to quality / increase in risk-aversion by investors.

5.9 The last two of these explanations imply that current yields are affected by shorter-term one-off factors. Hence, the yields may understate the “true” long run risk free rate, which should be embedded in an investor’s long run expected return on equity. By contrast, the first two explanations imply that the risk free rate itself may have fallen. It is not straightforward to distinguish between these alternative explanations, and ultimately the assessment will require regulatory judgment.

5.10 We note that there is some empirical analysis that suggests the fall in real interest rates around the world began prior to the financial crisis.\(^{39}\) On interpretation of this data might support the view that some of the observed fall reflected longer-term factors, rather than transient market dislocations stemming from the global financial crisis. The ECB also published a paper in 2014 discussing specific challenges in estimating a Euro area RFR.\(^{40}\) It noted that yields have been affected by a number of factors and that some implied that the current low yields are a temporary distortion. However, other factors implied a longer-term change.


\(^{40}\) ECB Monthly Bulletin (July 2014) ‘Euro area risk-free interest rates: measurement issues, recent developments and relevance to monetary policy’.
5.11 We consider that there is mixed evidence on the factors that have influenced the RFR and that it is not possible to determine with certainty the degree to which short term and long term factors have affect current yields.

Other evidence for the RFR

5.12 Given the issues discussed above, regulators have sought other sources of empirical evidence to determine the RFR. The ECB notes that one source of market evidence is interest rate swaps.\textsuperscript{41} While longer-dated swaps are more likely to incorporate a degree of credit risk, overnight index swap ("OIS") rates do not suffer this problem. The ECB’s analysis based on OIS does not imply a materially different RFR to that implied by current bond yields.\textsuperscript{42}

5.13 Some macroeconomic models suggest that there may be a relationship between the RFR and other macroeconomic variables. Some macroeconomic models predict that, in the long-run, the real RFR tends to converge toward the long run real GDP growth rate.\textsuperscript{43} Mainstream economic forecasts project that Eurozone GDP will continue to grow in real terms, but at a slower rate than the long-run historical average. The ECB expects real term growth of 1.7% in 2016 and 2017, slowing to 1.6% in 2018 and 2019.\textsuperscript{44} The ECB expresses significant uncertainty regarding its forecasts further ahead.\textsuperscript{45} Assuming that there is a clear and robust relationship between the real growth rate and the real RFR – which is not necessarily the case – these forecasts support the view that the real RFR is lower than the 1.9% proposed by Frontier.

5.14 We consider there is a lack of consensus concerning the weight that should be placed on these alternative sources of evidence.

\textsuperscript{41} Ibid.

\textsuperscript{42} ECB Monthly Bulletin (July 2014) ‘Euro area risk-free interest rates: measurement issues, recent developments and relevance to monetary policy’: Chart 3.

\textsuperscript{43} The Ramsey-Cass-Koopmans long run growth model is an example of such a model.

\textsuperscript{44} Source: ECB (December 2016) ‘Eurosystem staff macroeconomic projections’. The ECB predicts that the Irish economy will continue to achieve rapid GDP growth in real terms, of 3.3% in 2017, falling to 3.0% in 2018 and 2.8% in 2019. Despite this positive outlook, Ireland forms a small proportion of the Eurozone economy as a whole and suffered a deeper recession than the Eurozone as a whole.

\textsuperscript{45} The ECB forecasts growth for 2019 of 0.4% to 2.8% (with a central projection of 1.6%).
Regulatory precedent

5.15 We have reviewed recent regulatory precedent regarding the interpretation of current market conditions and the implications for the risk free rate. Table 5-1 sets out recent regulatory decisions from the UK and the Republic of Ireland.

Table 5-1: Precedent regulatory decisions on RFR

<table>
<thead>
<tr>
<th>Regulatory decision</th>
<th>Determination date</th>
<th>Real risk free rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CER Irish Water IRC2</td>
<td>Dec 2016</td>
<td>2.00%</td>
</tr>
<tr>
<td>CER ESBN/EirGrid PR4</td>
<td>Dec 2015</td>
<td>1.90%</td>
</tr>
<tr>
<td>Uregni GD17</td>
<td>Sep 2016</td>
<td>1.25%</td>
</tr>
<tr>
<td>CMA Bristol Water</td>
<td>Oct 2015</td>
<td>1.25%</td>
</tr>
<tr>
<td>Ofwat PR14</td>
<td>Dec 2014</td>
<td>1.25%</td>
</tr>
<tr>
<td>ComReg</td>
<td>Dec 2014</td>
<td>2.10%</td>
</tr>
<tr>
<td>Ofgem RIIO ED1</td>
<td>Jul 2014</td>
<td>1.0% to 1.5%</td>
</tr>
<tr>
<td>CAR</td>
<td>Oct 2014</td>
<td>0% to 1.5%</td>
</tr>
<tr>
<td>CMA Northern Ireland Electricity</td>
<td>Mar 2014</td>
<td>1.0% to 1.5%</td>
</tr>
<tr>
<td>CER PC3(1)</td>
<td>Nov 2012</td>
<td>3.5% to 5.5%</td>
</tr>
</tbody>
</table>

Sources: Published documents from relevant authorities. Note: (1) The risk free rate in this determination included a substantial uplift for the impact of the Irish financial crisis.

5.16 Since 2014, regulators in the UK have determined that the RFR falls in a range of 1.0% to 1.5%. This contrasts with earlier determinations, where regulators adopted an estimate of around 2.0%.\(^{46}\) However, in Ireland, ComReg concluded that the RFR was higher noting that, while the rate implied by the yield on German government bonds was lower, it placed weight on Irish regulatory precedent for a higher RFR. The CER also adopted a higher RFR of 1.9% to 2.0%. We note, the CAR concluded that the RFR fell in broad range of 0.0% to 1.5%.

---

\(^{46}\) See Figure 8 of the First Frontier Report. Determinations by Ofwat, Ofgem, the Utility Regulator and the CC used an RFR of 2.0% in determinations between 2009 and 2012.
5.17 In the UK, the CC made a number of observations in 2014 in relation to the interpretation of the current low level of government bond yields: 47

(1) UK ILG yields provided the best evidence for the UK RFR and nominal yields could also be used if assumptions are made about expected inflation and any inflation risk premium;

(2) longer-dated gilt yields may be affected by pension funds (a UK-specific consideration) and shorter yields may be affected by extraordinary monetary policy;

(3) the effects of monetary policies and pension fund dynamics are increasingly well understood by the markets, which means that yields should provide a better guide to future expected returns; and

(4) there is no "mechanistic" way of interpreting market yields.

5.18 Together, these observations provided a rationale for the CMA’s adoption of a lower RFR assumption. By selecting an estimate of the RFR somewhat above the current market yield, the CMA’s determination implicitly incorporated an assumption that the RFR would increase. We note that this adjustment was based on the CMA’s judgment.

Conclusion

5.19 Yields on all government bonds have fallen since the PC3 determination and the Irish sovereign debt crisis that affected that assessment has abated. There is some evidence to support that the fall is due to longer-term macroeconomic changes, rather than only the short-term market dislocations following the 2008 financial crisis. However, there is also some evidence that government bond yields may understate the true long-term risk free rate. The CC has noted in the UK that there is no mechanistic way of interpreting current market yields. As such, a degree of regulatory judgment is required to determine an appropriate rate. Factors such as regulatory consistency are an input into this judgment.

5.20 UK economic regulators have recently selected an RFR in the range 1.0% to 1.5%, reflecting financial markets in the UK. However, recent CER and ComReg determinations in Ireland have adopted an RFR of 1.9% to 2.1%. We note that market conditions have not materially changed since these determinations.

47 CMA, NIE decision.
5.21 We consider that the RFR in Ireland might lie in the range 1.5% to 2.0% for regulatory purposes. This range is based on the upper end of recent UK regulatory determinations and the most recent Irish determinations. To support the stability of the CER’s regulatory policy, we consider that the CER could support a point estimate for the RFR of 1.9%, consistent with other recent determinations. The slight reduction from 2.0% would reflect the market evidence of a longer-term shift in the real RFR. If current market conditions persistent, the CER may be justified in adopting a lower RFR estimate in the future.

**Market risk premium**

*Theory and practice*

5.22 The MRP is the return that an investor expects in excess of the risk free return from a fully diversified portfolio of all investable assets. It is not practical to calculate the return on a true portfolio of all investable assets, so regulators estimate the expected return on a broad equity market portfolio as a proxy. The difference between the expected equity market return and the expected risk free return is referred to as the MRP or the equity risk premium (“ERP”).

5.23 The MRP is commonly calculated by reference to historical realised returns, historical \textit{ex-ante} expected returns or forward-looking expectations. The first of these approaches has been widely used by regulators in the UK and abroad.\footnote{Sudarsanam et al. (2011): ‘Cost of Equity for Regulated Companies: An international Comparison of Regulatory Practices’: Table 3.4.}

5.24 There are two principal approaches to estimating the MRP on a 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. 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. We have used the second approach in this case due to common regulatory practice.\footnote{Wright, S. and Smithers, A. (2014) ‘The Cost of Equity Capital for Regulated Companies: A Review for Ofgem’: pages 10 to 11. See CC’s approach in its 2014 NIE determination.}

\textbf{GNI’s proposal}

5.25 Frontier proposed a range for the ERP of 4.6% to 5.1%, calculated by deducting their point estimate for the RFR of 1.9% from a range for the TMR of 6.5% to 7.0%.\footnote{First Frontier Report: page 20.} They noted that the CER’s recent determination on the ERP of 4.75%,\footnote{Ibid.} was consistent with a point estimate for the TMR of 6.65% and an RFR of 1.9%.
Empirical evidence for the TMR

5.26 Given the range of alternative approaches to estimating the TMR, it is common practice to consider a range of evidence. Frontier cites the latest estimates for Ireland from the Credit Suisse Global Investment Returns Sourcebook 2016, which was compiled by Dimson, Marsh and Staunton.\(^5^3\) This indicated a TMR of 7.0% and an ERP of 4.8%.\(^5^4\) Regulators have commonly placed weight on long run evidence from this dataset including the CC in its NIE determination.\(^5^5\) They also cited regulatory precedent for the TMR of 6.5% to 6.75%.

5.27 The Dimson, Marsh and Staunton estimate of the ERP is a direct estimate (i.e. calculated as the return on the market in excess of an estimate of the risk free return in each period). Combined with Frontier’s proposed RFR of 1.9%, this implies a TMR of 6.65%.

5.28 There is limited other direct empirical evidence relating specifically to Ireland. However, evidence of investors required returns from the UK might provide a relevant benchmark, given its close economic integration with the Republic of Ireland.

5.29 First, Smithers and Wright (2014) proposed an overall estimated range for the arithmetic TMR of 6.25% to 7.25%,\(^5^6\) which is derived from their own analysis of the Dimson, Marsh and Staunton dataset for the UK.

5.30 Second, the historical \textit{ex ante} analysis by Dimson Marsh and Staunton cited by the CC in its NIE determination suggested a range for \textit{ex ante} expected TMR of between 5.5% and 6.0%.\(^5^7\) \textit{Ex ante} approaches, disaggregate historical realised returns into \textit{expected} returns and unexpected positive or negative impact on realised returns.

\(^{5^3}\) First Frontier Report: page 19.

\(^{5^4}\) Credit Suisse Global Investment Returns Sourcebook 2016: page 111.

\(^{5^5}\) CC Northern Ireland Electricity Final Determination: paragraphs 13.138 to 13.141.


\(^{5^7}\) CC Northern Ireland Electricity Final Determination: paragraph 13.145.
5.31 Third, forward-looking estimates of the expected TMR for the UK, based on Bank of England calculations using assumed future dividend growth rates, fall in the range 5.0% to 6.5%. These estimates are sensitive to the long run assumed dividend growth rate, which is highly uncertain. Therefore, we place less weight on this evidence.

5.32 In conclusion, empirical evidence suggests that the reasonable range for the TMR lies between 5.5% and 7.25%.

**Regulatory precedent**

5.33 The table below sets out the MRP in recent regulatory decisions in the UK and Ireland. It also shows the assumed TMR range, calculated by adding the RFR adopted in each determination to the MRP. We note that, in some determinations, regulators select a point estimate for the WACC without adopting a specific point estimate for each of the underlying parameters.

**Table 5-2: Precedent regulatory decisions on market risk premium and implied total market return**

<table>
<thead>
<tr>
<th>Regulatory decision</th>
<th>Determination date</th>
<th>Market risk premium</th>
<th>Total market return</th>
</tr>
</thead>
<tbody>
<tr>
<td>CER Irish Water IRC2</td>
<td>Dec 2016</td>
<td>4.75%</td>
<td>6.75%</td>
</tr>
<tr>
<td>CER ESBN/EirGrid PR4</td>
<td>Dec 2015</td>
<td>4.75%</td>
<td>6.65%</td>
</tr>
<tr>
<td>Uregni GD17</td>
<td>Sep 2016</td>
<td>5.25%</td>
<td>6.50%</td>
</tr>
<tr>
<td>CMA Bristol Water</td>
<td>Oct 2015</td>
<td>5.25%</td>
<td>6.50%</td>
</tr>
<tr>
<td>Ofwat PR14</td>
<td>Dec 2014</td>
<td>5.50%</td>
<td>6.75%</td>
</tr>
<tr>
<td>Ofgem RIIO ED1</td>
<td>Dec 2014</td>
<td>4.0% to 5.0%</td>
<td>5.0% to 6.5%</td>
</tr>
<tr>
<td>ComReg</td>
<td>Jul 2014</td>
<td>5.0%</td>
<td>6.75% to 7.5%</td>
</tr>
</tbody>
</table>
| CAR                          | Oct 2014           | 5.0%                | 6.5% 
| CMA Northern Ireland Electricity | Mar 2014        | 4.0% to 5.0%        | 5.0% to 6.5%        |
| CER PC3\(^{(1)}\)            | Nov 2012           | 4.0% to 5.0%        | 7.5% to 9.5%        |

\(^{(1)}\) CC Northern Ireland Electricity Final Determination: paragraphs 13.151 to 13.155.
Sources: Published documents from relevant authorities. Note: (1) The risk free rate in this determination included a substantial uplift for the impact of the Irish sovereign debt crisis. (2) In the CAR’s most recent airport charge determination, although it adopted a point estimate of the ERP of 5.0%, this was in conjunction with an RFR of 1.5%, implying an overall TMR of 6.5%.

5.34 We observe that while there is wider range of values for the ERP, there appears to be regulatory consensus that the TMR lies in the range 6.5% to 6.75%.

**Conclusion**

5.35 Based on empirical evidence and regulatory precedent, we consider that a reasonable range for the TMR is 6.5% to 6.75%. Based on an RFR of 1.5% to 2.0%, this implies a range for the MRP of 4.5% to 5.25%. The point estimate proposed by Frontier of 4.75% falls within this range. Taking into account our recommended point estimate for the risk free, we consider that a point estimate for the market risk premium of **4.75%** could be supported by the CER.59

**Beta**

**Approach**

5.36 We have used an empirical approach to determine beta. As GNI is not publicly traded, its equity beta cannot be measured directly. Following common practice, we have based our analysis on a set of comparable companies. As estimates of beta can vary over time and between companies, we have examined the historical evolution of beta over time.

**GNI’s proposal**

5.37 Frontier proposed a range for the asset beta of between 0.43 and 0.45, with a point estimate of 0.44. This is based on a two-year average of traded regulated network utility companies in the UK.60

---

59 Estimate based on the average TMR of 6.5% to 6.75% less 1.9%.
60 First Frontier Report: pages 20 to 21.
Comparator companies

5.38 Frontier explained that their comparator set was based on traded regulated network utilities in the UK and that this comparator set was used by the CC in its NIE determination in 2014.\(^{61}\) Table 5-3 below summarises the characteristics of the comparators used by Frontier. This includes: (1) main business activities; (2) country of operation; (3) extent of regulation in their businesses; and (4) size based on turnover.

Table 5-3: Comparators used for beta analysis in First Frontier report

<table>
<thead>
<tr>
<th>Business activities</th>
<th>Country</th>
<th>Extent of price regulation</th>
<th>Turnover (2015 £m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNI</td>
<td>Rep. of Ireland</td>
<td>All business areas</td>
<td>321</td>
</tr>
<tr>
<td>National Grid</td>
<td>UK</td>
<td>Majority of business areas</td>
<td>15,201</td>
</tr>
<tr>
<td>SSE</td>
<td>UK</td>
<td>Small proportion of business areas</td>
<td>31,654</td>
</tr>
<tr>
<td>United Utilities</td>
<td>UK</td>
<td>Majority of business areas</td>
<td>1,730</td>
</tr>
<tr>
<td>Severn Trent</td>
<td>UK</td>
<td>Majority of business areas</td>
<td>1,801</td>
</tr>
<tr>
<td>Pennon</td>
<td>UK</td>
<td>Water and wastewater business</td>
<td>1,352</td>
</tr>
</tbody>
</table>

Sources: Bloomberg and corporate websites.

5.39 We note that SSE has significant unregulated activities. Of its total external revenue in 2016 of GBP 29bn, approximately GBP 20bn was earned through generation and approximately GBP 8bn was earned from retail supply. Just GBP 1bn was earned from its network.\(^{62}\) Both generation and supply are subject to competition, neither is price regulated and both are likely to be subject to more market risk. Figure 15 of the First Frontier Report shows that SSE’s beta is consistently higher than that of the other comparators.

---

\(^{61}\) CC Northern Ireland Electricity Final Determination: Table 13.9.

\(^{62}\) SSE plc Annual Report 2016, Note 5.1, page 130.
In the Second Frontier Report, Frontier disagreed with our initial proposal to exclude SSE from the set of comparable companies to GNI. Although Frontier acknowledged that SSE’s Networks business represented only a small proportion of its total revenues, it pointed out that the division represents a larger share of its operating profits. Frontier concluded that:

“Given the percentage of SSE’s return driven by network activities, we suggest it is appropriate to consider SSE amongst the comparator set.”

We do not agree with Frontier’s argument. SSE itself acknowledges in its Risk Appetite Statement that there are significant differences in the risks of its difference divisions, stating:

“Each of SSE’s business divisions has a distinctly different risk profile. For example, the Networks business is heavily regulated and is characterised by stable, inflation linked cash flows whereas the Wholesale business is heavily exposed to energy market and commodity risk. Affordability, transformation and political risk particularly affect the Retail business, while Enterprise is exposed to the risks that come with rapid growth in a highly competitive market place.”

On this basis, we consider that it is unlikely that SSE provides a reasonable comparator for the operator of a regulated gas network and we exclude it from our analysis.

For PC3, CER’s advisors considered a wider set of eight international comparators. We have also examined these companies. Table 5-4 below summarises the key characteristics of these companies.

---

64 SSE plc 2016 Annual Report, p17.
Table 5-4: Comparators used for beta analysis in PC3

<table>
<thead>
<tr>
<th>Business activities</th>
<th>Country of operations</th>
<th>Extent of regulation</th>
<th>Turnover (2015 £m(^{\text{(1)}}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>APA Group Gas transmission and distribution</td>
<td>Australia</td>
<td>Assets in certain geographies</td>
<td>1,003</td>
</tr>
<tr>
<td>TC Pipelines Gas transmission</td>
<td>USA</td>
<td>Majority of business areas</td>
<td>220</td>
</tr>
<tr>
<td>AGL Resources Electricity and gas distribution</td>
<td>USA</td>
<td>Majority of business areas</td>
<td>11,441</td>
</tr>
<tr>
<td>Piedmont Natural Gas Gas distribution</td>
<td>USA</td>
<td>Utilities business</td>
<td>587</td>
</tr>
<tr>
<td>Northwest Natural Gas Gas distribution</td>
<td>USA</td>
<td>Gas storage and utilities businesses</td>
<td>474</td>
</tr>
<tr>
<td>ITC Holdings Electricity transmission</td>
<td>USA</td>
<td>Transmission business</td>
<td>684</td>
</tr>
</tbody>
</table>

Sources: Bloomberg and corporate websites. Note: (1) Converted from dollar amounts using average GBP/USD spot rate in 2015.

5.44 However, because these businesses are outside of Europe and are subject to different risks and regulatory frameworks we place less weight on these comparators.

**Beta calculation**

5.45 We have obtained equity beta estimates for each comparator group. We have calculated asset beta estimates using historical gearing ratios.\(^{65}\) This is the same approach adopted by Frontier.\(^{66}\)

5.46 Following the preferred approach set out in the Smithers & Co (2003) report (and consistent with the calculations of Frontier and the approach used by the CER in other determinations) we calculate beta using 2-year daily data from 2006 to 2016. As a crosscheck, we estimate betas using weekly data. Figures 5-1 and 5-2 summarise the 2-year daily asset betas for each of the comparator groups.

---

\(^{65}\) We assume no debt beta, in common with approach adopted in PC3 and in other recent CER decisions.

5.47 We note that the UK comparators betas appear highly correlated.

Figure 5-1: Asset beta estimates of the Frontier comparator group, excluding SSE (2-year daily)

Source: Bloomberg

Figure 5-2: Asset beta estimates of the PC3 comparator group (2-year daily)

Source: Bloomberg
5.48 For the UK comparators, we observe a fall in the asset beta around the onset of the financial crisis, followed by a recovery. This apparent increase in relative riskiness may reflect a fall in overall market volatility, rather than an increase in the volatility of the comparator companies’ returns. Market volatility during the financial crisis was higher than usual. Consistent with Frontier, we consider that average betas since the crisis are likely to provide a better estimate of GNI’s beta over PC4.

5.49 In Tables 5-5 below, we present our average beta calculations for the Frontier comparator group.

Table 5-5: Average beta for Frontier comparator group (ex. SSE)

<table>
<thead>
<tr>
<th>Comparator</th>
<th>1 year average</th>
<th>2 year average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 year</td>
<td>2 year</td>
</tr>
<tr>
<td></td>
<td>daily</td>
<td>weekly</td>
</tr>
<tr>
<td>National Grid</td>
<td>0.396</td>
<td>0.388</td>
</tr>
<tr>
<td>United Utilities</td>
<td>0.380</td>
<td>0.404</td>
</tr>
<tr>
<td>Severn Trent</td>
<td>0.378</td>
<td>0.425</td>
</tr>
<tr>
<td>Pennon</td>
<td>0.413</td>
<td>0.426</td>
</tr>
<tr>
<td>Average</td>
<td><strong>0.392</strong></td>
<td><strong>0.411</strong></td>
</tr>
</tbody>
</table>

Source: Bloomberg and FTI calculations. Note: Averages are taken over the two-year period up to 31/12/2016. The reference index used to calculate all these betas is the FTSE All-share.

5.50 We observe that the calculated averages are robust to the different calculation frequencies and the period of averaging.67

5.51 In Tables 5-6 below, we present our average beta calculations for the PC3 comparator group.

---

67 We also calculated betas over a five-year period based on monthly data, which yielded lower estimates. However, as we note above, these estimates include the period of the financial crisis when measured betas were generally lower for these companies.
Table 5-6: Average beta for PC3 comparator group

<table>
<thead>
<tr>
<th>Comparator</th>
<th>1 year average</th>
<th>2 year average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 year</td>
<td>2 year</td>
</tr>
<tr>
<td></td>
<td>daily</td>
<td>weekly</td>
</tr>
<tr>
<td></td>
<td>2 year</td>
<td>daily</td>
</tr>
<tr>
<td></td>
<td>2 year</td>
<td>weekly</td>
</tr>
<tr>
<td>APA Group</td>
<td>0.504</td>
<td>0.561</td>
</tr>
<tr>
<td>TC Pipelines</td>
<td>0.676</td>
<td>0.862</td>
</tr>
<tr>
<td>Piedmont Natural Gas</td>
<td>0.277</td>
<td>0.293</td>
</tr>
<tr>
<td>Northwest Natural Gas</td>
<td>0.317</td>
<td>0.290</td>
</tr>
<tr>
<td>ITC Holdings</td>
<td>0.304</td>
<td>0.282</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>0.416</strong></td>
<td><strong>0.458</strong></td>
</tr>
</tbody>
</table>

Source: Bloomberg and FTI calculations. Notes: Averages are taken over the period up to 31/12/2016; we have omitted AGL Resources due to data limitations. For APA group, the reference index is the Australian “All Ordinaries” index and for the other comparators we use the S&P 500.

5.52 Using UK comparators based on 2-year data suggests that a reasonable range for the beta is 0.37 to 0.44 (see figures in bold in relevant table above). Based on this range we consider that a point estimate of 0.42 (which is slightly above the midpoint) could be supported by the CER.

5.53 A point estimate of 0.42 is consistent with the higher “average” for the international comparators based on two-year data. We note that the betas for international comparators vary widely from a minimum of 0.26 to a maximum of 0.86. This suggests that some of these companies are less comparable to GNI and that an average across these comparators may be less meaningful.

Conclusion on the inputs to the cost of equity

5.54 In Table 5-7 below, we summarise our view of the reasonable range for each input for the cost of equity. For comparison, we also present Frontier’s proposals.
### Table 5-7: Summary of FTI recommended cost of equity and GNI proposals

<table>
<thead>
<tr>
<th>Input</th>
<th>GNI proposed</th>
<th>FTI analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Risk free rate</td>
<td>1.90%</td>
<td>2.00%</td>
</tr>
<tr>
<td>Equity risk premium(^{(1)})</td>
<td>4.60%</td>
<td>4.75%</td>
</tr>
<tr>
<td>Asset beta</td>
<td>0.43</td>
<td>0.45</td>
</tr>
<tr>
<td>Equity beta</td>
<td>0.96</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Cost of equity (post tax)</strong></td>
<td>6.30%</td>
<td>6.75%</td>
</tr>
</tbody>
</table>

Sources: Paragraphs 5.21, 5.35 and 5.52-53 above. Note: (1) We combine our ranges of estimates for the risk free rate and equity risk premium so as to be consistent with our estimated range for the total equity market return of 6.5% to 6.75%.
6. **Gearing**

**Introduction**

6.1 Gearing is defined as the ratio of a company’s debt to its equity capital, usually expressed in percentage form as follows:

\[
\frac{D}{D + E}
\]

6.2 In this section, we first discuss how gearing affects the WACC. We then consider relevant empirical evidence and regulatory precedent. We then conclude on the appropriate level of gearing for GNI.

**How gearing affects the WACC**

6.3 Gearing primarily affects the WACC through the relative weighting of debt and equity. Equity capital typically has a higher required return than debt capital, due to the greater risk borne by equity investors. In isolation, higher gearing levels reduce the WACC. However, gearing also affects the WACC in two further ways.

6.4 First, higher gearing increases the riskiness of equity holders’ returns. This increases the calculated equity beta, which increases the cost of equity. This partially offsets the reduction in the WACC discussed above. Second, gearing is one of the factors considered by credit ratings agencies in their assessment of the creditworthiness of companies. In general, companies with higher credit ratings have lower debt costs. Therefore, an increase in gearing may result in a higher cost of debt if the change leads to a lower credit rating.

**GNI's proposal**

6.5 Frontier proposes a gearing assumption of 55%. They note that this is consistent with the PC3 determination and that it is “broadly consistent” with GNI’s actual gearing.68

---

Empirical evidence

6.6 GNI’s level of gearing was *circa* 55% as at 31 December 2015.\(^{69}\) Figure 6-1 below presents GNI’s initial forecast of its gearing over PC4, based its initial proposed business plan capital investment.

**Figure 6-1: GNI’s forecast gearing over PC4**

![Bar chart showing GNI's forecast gearing over PC4 from 2017 to 2021.](chart.png)

*Source: GNI submission SD031: 3A(ii).*

6.7 Although GNI forecasted an increase in its gearing over PC4, GNI’s actual financial plans do not inherently provide direct evidence for the appropriate notional gearing. In addition, these forecasts are based on GNI’s proposed capital expenditure plans, rather than its final plans as approved by the CER.

6.8 GNI currently receives credit ratings from Moody’s and S&P of A3 and A, respectively. Moody’s has stated that, “*Any debt-funded acquisition or increase in leverage [by GNI] to a level persistently above 60% (Net Debt to RAV) could lead to a downgrade.*”\(^{70}\) On this basis, we consider that a notional gearing of 55% is consistent with GNI maintaining its current credit rating, which is comfortably investment grade.

---

\(^{69}\) Moody’s Credit Opinion, 18 August 2016.

\(^{70}\) Moody’s Credit Opinion, 18 August 2016.
Regulatory precedent

6.9 The table below summarises the allowed level of gearing levels in recent regulatory determinations.

Table 6-1: Precedent regulatory decisions on gearing

<table>
<thead>
<tr>
<th>Regulatory decision</th>
<th>Determination date</th>
<th>Gearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>CER Irish Water IRC2</td>
<td>Dec 2016</td>
<td>45%</td>
</tr>
<tr>
<td>CER ESBN/EirGrid PR4</td>
<td>Jan 2015</td>
<td>55%</td>
</tr>
<tr>
<td>Uregni GD17</td>
<td>Sep 2016</td>
<td>55%</td>
</tr>
<tr>
<td>CMA Bristol Water</td>
<td>Feb 2015</td>
<td>62.5%</td>
</tr>
<tr>
<td>Ofwat PR14</td>
<td>Dec 2014</td>
<td>62.5%</td>
</tr>
<tr>
<td>ComReg</td>
<td>Dec 2014</td>
<td>30%</td>
</tr>
<tr>
<td>Ofgem RIIO ED1</td>
<td>July 2014</td>
<td>65%</td>
</tr>
<tr>
<td>CAR</td>
<td>May 2014</td>
<td>50% to 60%</td>
</tr>
<tr>
<td>CMA Northern Ireland Electricity</td>
<td>Mar 2014</td>
<td>45%</td>
</tr>
<tr>
<td>CER PC3</td>
<td>Nov 2012</td>
<td>55%</td>
</tr>
</tbody>
</table>

Sources: Published documents from relevant authorities.

6.10 Recent Irish regulatory precedent is generally lower than the gearing levels adopted by UK regulators. This can be explained by differences in corporate tax regimes. Ireland has lower tax rates so the benefits of the tax shield are lessened.

Conclusion

6.11 We consider that a reasonable notional gearing assumption for GNI is 55%, consistent with PC3. This also consistent with the gearing assumption proposed by Frontier for GNI.
7. **Other factors affecting the appropriate rate of return**

**Introduction**

7.1 In PC3, the CER adjusted the WACC for the impact of exceptional market conditions.\(^{71}\) In this section, we first briefly comment on the impact of the global financial crisis. We then consider the impact of the UK’s withdrawal from the European Union (“EU”) in accordance with the terms of Article 50 of the Treaty on the Functioning of the European Union – commonly referred to as “Brexit” – following a referendum held on 23 June 2016.

**Impact of the global financial crisis on Ireland**

7.2 In PC3, the cost of capital included an allowance for a “Eurozone Crisis Premium”, which was added to both the cost of debt and cost of equity. Frontier stated that, in recommending a WACC:\(^{72}\)

> “We have been mindful of the particular economic situation that Ireland and the Eurozone more generally are in and the footprint that the recent Irish sovereign debt crisis has left on GNI’s cost of finance.”

7.3 We consider that much of the market dislocation and associated uncertainty that affected Ireland and other Eurozone economies at the time of PC3 has now largely subsided. To the extent that there is any residual impact of the global financial crisis, we have considered this in our interpretation of the historical evidence, as noted in the preceding sections. Our finding is consistent with Frontier. Consequently, we would not propose to adjust the WACC in PC4 for the impact of the global financial crisis.

---

\(^{71}\) CER (23 November 2012) ‘Decision on October 2012 to September 2017 transmission revenue for Bord Gáis Networks’: Section 11.3.

\(^{72}\) First Frontier Report: page 9.
Impact of Brexit

GNI’s position

7.4 Frontier stated that:73

“[T]here is currently significant market uncertainty due to the, as yet, unknown consequences of Brexit, which could result in severe financial market conditions in both the short and medium term. As a result, it is important that the CER is conservative in its approach to setting WACC allowances to ensure that there is sufficient headroom on the allowed WACC to allow for any volatility in the market due to Brexit.”

7.5 In a separate response, Frontier acknowledged that “it is obviously very difficult to predict how an unknown and highly uncertain outcome may affect GNI’s WACC”, but suggested that possible consequences include:74

(1) an increase in Irish sovereign bond yields, which would increase GNI’s cost of debt;

(2) a “flight to safety” by investors and/or further exceptional monetary policy, which might reduce yields on risk free assets; and

(3) higher equity market volatility, resulting in a higher implied equity risk premium and/or lower estimates of beta.

7.6 We note that Frontier published a review of the impact of Brexit on the cost of capital. However, this review was based on market data shortly after the Brexit referendum.75

7.7 In the First Frontier Report, it expressed the view that due to Brexit:76

“[T]he CER should either implement a specific aiming up allowance, or use point estimates towards the high end of the range for the various WACC parameters.”

73 First Frontier Report, page 23.
74 Frontier Economics (23 January 2017): Response to follow-up questions from FTI Consulting.
75 Frontier Economics (10 August 2016) ‘Paying the full WACC? Impact of Brexit on the cost of capital’.
76 First Frontier Report: page 23.
In the Second Frontier Report, Frontier similarly expressed the view that an appropriate allowance for the risks it refers to could be made “either through an appropriately conservative approach to estimating the building blocks of the WACC or through an explicit aiming up allowance.”

**Our approach**

We agree that the future impact of Brexit on the Irish economy and the consequences for GNI’s cost of capital are uncertain. No regulatory determinations in the Republic of Ireland have yet considered this issue.

To consider the issue further we have observed the impact Brexit has had on the markets between the 23 June 2016 referendum and the time of preparing this report. We also consider the possible longer-term impacts of Brexit and the possible implications for the WACC.

**Observed impacts of Brexit**

In Figures 7-1 and 7-2 below, we show the movements in yields on UK and Eurozone government bonds and the performance of UK and Irish stock indices over the period prior to and following the UK referendum.

**Figure 7-1: Effect of Brexit referendum UK and German government bond yields**

---

A general prediction is that Brexit would lead to a reduction in the yield on government bonds, which might imply a reduction in the RFR and a lower cost of capital. The data shows that there was a drop in yields at the time of the referendum; however, yields have subsequently increased.

**Figure 7-2: UK and Irish equity performance following Brexit referendum**

The figure above shows that there was a short-term market reaction to the outcome of the UK referendum. Subsequently however, fears of a market downturn as a consequence of the referendum result appear to have been overplayed.
The longer term impact remains more uncertain. In a publication issued in August 2016, Frontier noted that:\textsuperscript{78}

“In the medium-term, there could be more movement in these markets depending on the terms on which the UK exits the EU; whether or not the UK remains in the single market; and how its trading arrangements with the EU and elsewhere evolve more generally. There is at present little basis on which to speculate how this may affect investor perceptions of risk in the long run.”

We agree that from current data we are unable to determine how the markets will react in the future. In the article, it appears that Frontier considered that the market impact of Brexit could lower the cost of capital. They state:\textsuperscript{79}

“Regulators will need to be careful in interpreting market data and making consistent estimates which are appropriate for price controls which span several years. If the WACC is genuinely lower as a result of Brexit, this will generally be good news for customers if regulators can translate this into lower bills. But setting the allowed return too low off the back of market evidence that may prove to be ephemeral will deter much-needed investment, particularly in times of greater market volatility and economic uncertainty.” (Emphasis added)

We consider that market recovery in the period following the referendum and our long run approach to assessing the WACC reduce the risk of underestimating the WACC.


Forecasts of the possible future impact of Brexit

7.17 The impact of Brexit on Ireland is highly uncertain. In part, this is because the form of the UK’s future legal and economic relationships with the EU remain largely unknown. The Governor of the Central Bank of Ireland has noted that this could lead to volatility in financial markets and the macro-economy:

“Looking ahead, the design and timing of the new relationship between the UK and the EU remain quite uncertain. It is reasonable to expect some volatility in financial markets and macroeconomic variables as the negotiations move along.”

7.18 Even if the form of the future relationship were known, there would still be uncertainty surrounding the economic impact on the UK. In addition, the knock-on impact on the Republic of Ireland would be uncertain.

Impact on the UK

7.19 A meta-analysis of estimates of the impact of Brexit on the UK describes the range of estimates as “amazingly wide”. It notes that the most optimistic study suggested that Brexit could increase GDP by over 11 per cent while the post pessimistic studies suggested a negative impact of around 20 per cent of GDP.

7.20 Although some forecasts of the short term impact of a vote to leave the EU have proven to be too pessimistic, we do not consider that this necessarily provides any indication of the reliability of estimates of the longer term impact of Brexit, after the UK’s withdrawal from the EU actually takes effect.

---

80 The UK Prime Minister, Theresa May, outlined some general objectives in a speech at Lancaster House on 17 January 2017.

Impact on the Republic of Ireland

7.21 Economists, politicians and other commentators have suggested that Brexit may have a particularly significant impact on the Republic of Ireland.\textsuperscript{83} Studies have identified that there is substantial economic integration between the UK and Ireland. For example, a 2013 report commissioned jointly by the Department of the Taoiseach in Ireland and the Department for Business Innovation and Skills in the UK found that: (1) the UK is a major trade partner for Ireland in goods and services; (2) the UK is a major source of tourist visitors to Ireland; (3) there is significant bilateral direct investment from the UK into Ireland (and vice versa); and (4) there is a “significant exchange of labour in a wide range of sectors” between the two economies.\textsuperscript{84}

7.22 Given these economic linkages, it is complicated to evaluate the impact that Brexit might have on the Irish economy, particularly given the uncertainty about the form of the UK’s future relationship with the EU. We have reviewed studies of possible impacts on both financial markets and the real economy in the Republic of Ireland.

7.23 In relation to financial market impact, the International Monetary Fund (“IMF”) expressed the view that:\textsuperscript{85}

“The UK vote to leave the EU is very likely to have negative effects on the Irish financial system, at least in the short term… Adverse effects are likely to come mainly through banks’ operations in the UK and a slowdown affecting Irish firms, employment, and investment, rather than short-term market volatility and funding risk. The impact could be large, but should still be manageable.”

\textsuperscript{83} For example, the website of Fine Gael, the Irish governing party says “This is probably the greatest economic challenge facing not just Ireland but the EU in the last 50 years… £1.2 billion per week in goods and services is traded between Ireland and the UK and therefore, Brexit has implications for business and self-employed people right across the country.” A study by the Irish Economic and Social Research Institute: Barrett et al (Nov 2015), ‘Scoping the Possible Economic Implications of Brexit on Ireland’ found that Brexit could reduce bilateral trade flows between Ireland and the UK by 20 per cent or more as well as having impacts through foreign direct investment and migration.

\textsuperscript{84} PA Consulting Group and Cambridge Econometrics (June 2013) ‘Evaluating the value of the economic relationship between the United Kingdom and Ireland’.

Regarding the impact on the real economy, a study by the European Union Committee of the United Kingdom House of Lords concluded that:  

“Any potential negative impact of Brexit will probably be more significant for Ireland than for any other Member State, in particular in the event of any economic downturn in the UK, or in the event of tariffs or other barriers to trade being introduced between the UK and the EU.”

The Governor of the Central Bank of Ireland, Philip Lane, expressed the following view of the short term impact from Brexit on the Irish economy in a speech on 28 October 2016:

“[T]he extensive linkages between the UK and Ireland mean that Irish economic performance is especially sensitive to shifts in UK output levels and the Sterling-euro exchange rate. Accordingly, the Central Bank of Ireland has adjusted its 2017 growth forecast from 4.2 percent to 3.6 percent. ... [W]e view Brexit as a major downside risk for the Irish economy and will be closely monitoring developments in the UK economy as the full impact of Brexit takes hold.”

We note that, although this is a significant downward revision, real GDP growth of 3.6% is markedly above the forecast Eurozone average growth rate. Furthermore, studies have observed that, while there is a high degree of integration between the Irish and UK economies, there could also be off-setting benefits for certain sectors of the Irish economy, as a result of its continuing membership of the EU and the Eurozone.

The House of Lords study for example concluded that:

“Notwithstanding the potentially negative economic outlook overall, some sectors may stand to benefit. As an English-speaking member of the Single Market, Ireland may be able to attract increased inward investment post-Brexit. The contingency planning undertaken by the Irish Government also means that it is well placed to respond to the economic challenges that Brexit will represent.”

---

87 Speech by Philip Lane at the Euro50 Group and CIGI Breakfast Meeting, Washington DC, on 9 October 2016.
The balance of evidence suggests that the impact of Brexit on the Irish economy is highly uncertain.

The impact on the WACC

Irrespective of the impact of Brexit on the Irish economy, we consider that its impact on GNI’s WACC over PC4 may be limited. In respect of the cost of equity, we estimate the required return on equity based on estimates of the total return on equity over the very long run. Frontier itself does not suggest a higher ERP, noting that:

“For the purposes of setting WACC allowances for regulated utilities, many regulators draw evidence from historical averages of observed market returns over very long-term time horizons, often using the database developed by academics Dimson, Marsh and Staunton (DMS) and published by the Credit Suisse Global Investment Returns Sourcebook.”

The concern with the calculation of the RFR is that a “flight to safety” and/or quantitative easing could reduce the yield on government bonds, implying a reduction in the RFR. In Section 5, we propose a range for the RFR which is above current real yields on government bonds, based on recent regulatory precedent pre Brexit. Hence, it is unlikely that we have underestimated the RFR.

Frontier explains that greater market volatility would be likely to decrease the estimated beta of regulated utilities, all else being equal. In Section 5, we explain that we have avoided placing excessive weight on short run fluctuations in estimated beta by considering 1 and 2-year averages. Our approach is likely to be conservative (i.e. overstates the cost of capital) if the concern is that estimated betas might fall in the future.

---


With respect to debt, Frontier has noted that falls in government bond yields have been matched by falls in A- and BBB rated corporate bond indices, suggesting that Brexit could lead to cheaper debt for utilities.\(^{91}\) In addition, in Section 4, we explain that we have taken a conservative approach to the cost of debt because expected real yields on government bonds are currently negative. We also explained that GNI could hedge its exposure to future fluctuations in the cost of debt, particularly in the near term.

On balance, we do not consider that the uncertain impact of Brexit on the Republic of Ireland financial markets and economy provide a strong justification for a higher cost of capital.

**Impact of other political uncertainty**

**GNI’s position**

In the Second Frontier Report, Frontier identified additional factors other than Brexit which it suggested might be relevant to GNI’s WACC for PC4.\(^{92}\)

“The uncertainty relating to Brexit is exacerbated by uncertainty regarding the future direction of US economic and trade policy, and by the potential impact of elections in a number of Eurozone countries (including France and Germany).”

**Our view**

We do not consider that periodic national elections should be viewed as exceptional events in developed economies with stable democracies. While the outcome of elections may be a source of uncertainty about future economic policy-making, we do not consider that there is any clear or objective basis on which to conclude that the uncertainty regarding the true parameters for components of GNI’s WACC has materially increased. Further, we consider that these are short term factors whose impact on markets – and therefore the WACC – is transient.

---


Conclusion

7.36 In summary, we consider that:

(1) the Brexit referendum has impacted the markets during the period over which we have performed our empirical analysis. On that basis, some of its impact will be reflected in our assessment;

(2) Brexit is likely to have some further impact in the future, however the nature, direction and magnitude of this impact are uncertain, as Frontier acknowledges. However, there are some reasons to believe that Brexit may reduce the cost of capital for utilities;

(3) for the calculation of the cost of equity we have adopted longer term estimates, which are not impacted by short term volatility;

(4) Frontier suggested that bonds yields may increase, resulting in an increase in the cost of debt. However, Frontier also expresses the view that the cost of debt could fall. The IMF considers that Ireland’s financial system has become more robust and the main risk to the Irish economy from Brexit is that economic growth is lower; and

(5) to the extent that GNI considers that there is a risk that the cost of debt might increase during PC4, it has the option to use financial instruments to “lock in” the current low cost of debt.

7.37 At the time of the PC3 determination, exceptional market conditions already existed and it was unclear when they would abate. In these circumstances, it was appropriate to include an additional allowance. However, in PC4, similar exceptional market conditions have not yet arisen and there is only a risk that they might in the future. Even if such market conditions were to arise, it is then unclear what the scale and direction of the impact would be.

7.38 We agree with Frontier that, where an “appropriately conservative” point estimate of the WACC is adopted, then an explicit aiming up allowance is not required in addition. We consider that, in several respects, our proposed point estimate is conservative and therefore no aiming up adjustment is required.