ESTIMATING THE COST OF CAPITAL FOR GD1

A NOTE FOR CENTRICA

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Submitted by:

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CEPA

CONTENTS

IMPORTANT NOTICE

1. INTRODUCTION AND EXECUTIVE SUMMARY

This note provides an initial view on the appropriate allowed Weighted Average Cost of Capital (WACC) for GD1. The note is provided on behalf of Centrica but is CEPA's own independent view. We focus on the cost of equity, but also include comment on cost of debt indexation and notional gearing. Our approach is set out in Section 2. It is based on the Capital Asset Pricing Model (CAPM) and informed by other sources of market evidence where relevant and available.

Our analysis of the cost of equity is presented in Section 3. Overall, the evidence shows significant scope for a lower cost of equity than argued for by the Gas Distribution Networks (GDNs). The allowance made by Ofgem in its most recent relevant determination – 6.7% for electricity distribution – represents the upper limit of the current cost of equity. There is evidence to suggest that the appropriate allowance for RIIO-GD1 should be within the bottom half of Ofgem's range of 6.0% – 7.2%:

- CAPM based evidence on the risk-free rate and market risk premium, regulators' determinations and long-term studies of equity market returns generally imply that the *market* cost of equity should be no higher than 7%.
- Intuitively, and based on quantitative evidence from comparator companies, a lower figure would be appropriate for gas distribution. A reduction from previous allowances would be consistent with significant observed Market Asset Ratio (MAR) premia, information from share prices and City analyst sentiment.

Section 4 briefly discusses the cost of debt. We support cost of debt indexation and the mechanism proposed by Ofgem. Specifically, we do not see compelling evidence for the addition of any uplifts to Ofgem's selected index.

Section 5 briefly discusses notional gearing. Ultimately, this will be determined in conjunction with an assessment of financeability. However, we note that Ofgem has already made significant financeability concessions and that GDNs – and other regulated entities – have sustained relatively high levels of gearing. Hence our working assumption is that the notional gearing assumption can remain unchanged.

Finally, Section 6 sets out our conclusions. The discussion focuses on cost of equity ranges, which appear relatively high when set against our evidence.

2. APPROACH

In this section we set out the key elements of our approach to assessing the cost of debt, cost of equity and notional gearing – the main inputs to the WACC. Ofgem's stated approach is broadly consistent with CEPA's approach, particularly regarding the adoption of cost of debt indexation.

2.1. Cost of equity

We set out an approach grounded in the CAPM but cross-checked against other evidence where available. This is broadly consistent with Ofgem's "total returns" approach, which incorporates CAPM parameters.

CAPM

The CAPM approach is widely used as an input by UK regulators[1], is endorsed by the Competition Commission (CC)[2], and is well understood. Our assessment of the cost of equity (R_e) will be based on assumptions regarding the appropriate risk-free rate (R_f), market risk premium (MRP) and equity beta, which are combined in the following formula:

$$R_e = R_f + \beta . MRP$$

The risk-free rate should be based on an appropriate UK riskless asset. We take an index of yields on UK Government index linked gilts (ILGs) as our main source. However, given current market conditions this data requires significant interpretation. Similarly, the appropriate value for the MRP may have been affected by recent volatility in equity markets. We do not, however, consider there is sufficient reason to depart from our standard approach, which focuses on ILGs and evidence provided by Dimson, Marsh and Staunton (DMS) – a widely cited reference on equity market returns.[3]

The approach to deriving an appropriate estimate of beta is more complex. None of the GDNs has a quoted share price as an individual entity, and so beta estimates cannot be computed directly. Instead, we must make use of estimates for relevant comparator companies.

An equity beta is a function of business risk and financing, derived from the correlation between a stock's return against the relevant market return, with financing risk itself dependent on the level of gearing. To remove financing risk and make the figures comparable, the equity beta (β_e) can be de-levered by the actual gearing level (G) to obtain an asset beta (β_a), with the use of the following formula[4]:

$$\beta_e = \beta_a + \beta_a\left(\frac{G}{1-G}\right).$$

A notional gearing level, which will also affect the allowed WACC, can be used to re-lever the asset betas to comparable equity betas. The level of notional gearing must ensure that an efficiently run firm can finance its operations and maintain an appropriate credit rating.

[1] For example, in its discussion paper 'Cost of capital and risk mitigants', Ofwat notes its wide use.

[2] Competition Commission (2010) Bristol Water Plc Price Determination, p. N4.

[3] Dimson, E., Marsh, P. & Staunton (2012) 'Credit Suisse Global Investment Returns Sourcebook 2012'.

[4] Assumes a debt beta of zero and tax implications are not considered, as per the approach of many UK regulators and finance professionals.

There is inevitably a degree of uncertainty around each of the component parameters. We therefore present ranges, and consider evidence from other sources.

Market Asset Ratios

The Market Asset Ratio (MAR) is a well-established tool used by equity analysts to compare allowed and actual returns on capital. At its simplest, the concept is that in the absence of other factors a company will earn its allowed return on its Regulatory Asset Base (RAB), and hence any premium in a company's valuation over the RAB will come from:

- expectations of earnings from incentives and efficiencies;
- an actual cost of capital that is below the allowed cost; and
- wider stock market or M&A activity.

The first factor is unlikely to account for more than 10% of the premium to RAB. The third factor can come into play as evidenced by share price movements, but sustained cross-company premia are likely to indicate a combination of the first two factors.

The most robust MAR analysis comes from values taken from actual transactions, i.e. acquisitions, rather than more volatile share prices, although the latter provide a useful cross-check and of course a time series for listed companies. Acquisitions of minority stakes are more problematic as a lack of control premium may be factored-in, but again they are a useful check.

2.2. Cost of debt

CEPA has long argued for the adoption of cost of debt indexation as a way of removing the understandable headroom allowed by regulators in a fixed rate of debt, and as a way of protecting companies from movements in that cost. We have also stated that we support Ofgem's approach to implementation through a rolling average index applied to all debt.

The GDNs have argued for a range of uplifts to the cost of debt index, including:

- a premium to reflect issuance costs;
- an inflation risk premium (which may be added to the cost of equity);
- a debt risk premium (which may be added to the cost of equity);
- a liquidity and carry costs premium;
- a new issue premium; and
- a premium to reflect the possibility of an adverse change in the composition of the index.

Given that the T1 fast-tracked proposals – which are based on revised company business plans and requests – do not include any uplift to reflect these factors, we do not address them in this note. Instead, we simply examine the ability of the GDNs to issue debt at or below the index value.

2.3. Notional gearing

Notional gearing enters our WACC calculation in two places:

- as an input to re-lever asset betas to equity betas; and
- as the weighting parameter for the average of the cost of debt and the cost of equity.

It is also relevant in the context of financeability. Notional gearing must be set at a level that would allow an efficiently run firm to finance its operations while maintaining an appropriate credit rating. In this paper we do not examine financeability. We focus on the recent experience of regulated networks, as well as drawing on the implications of the T1 fast-tracking decision.

3. COST OF EQUITY

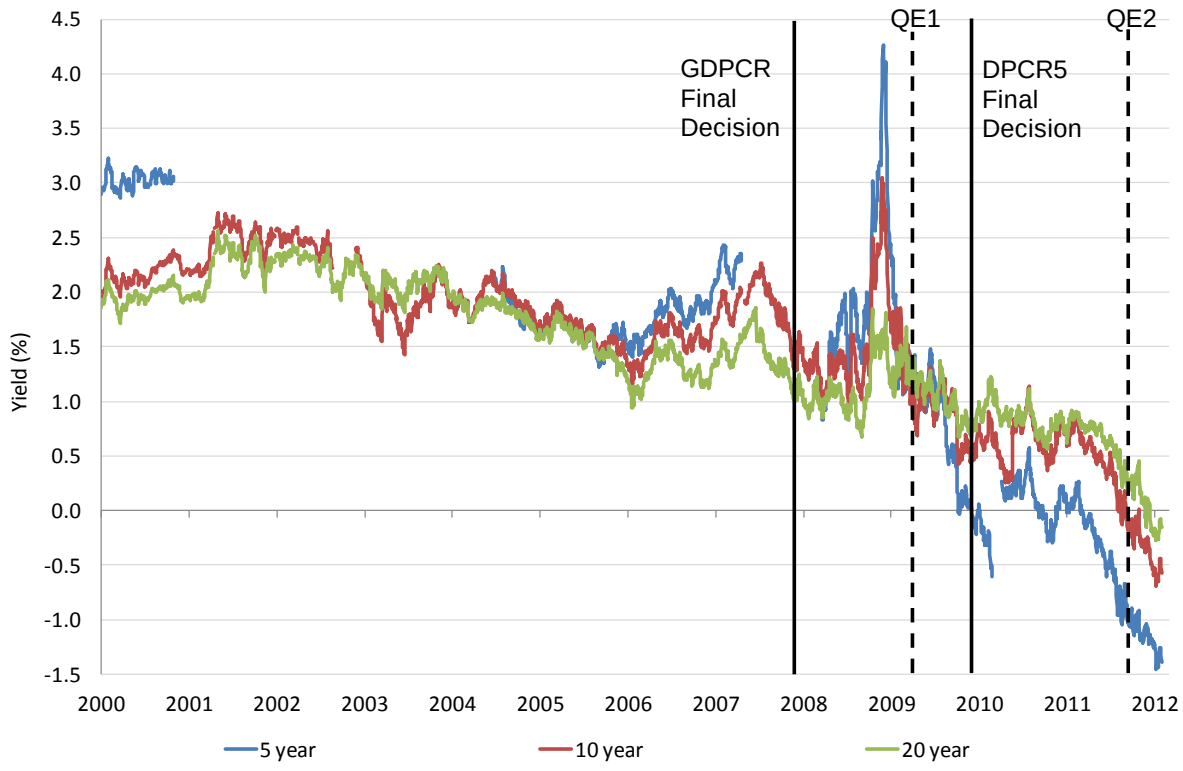
We first discuss the CAPM parameters: the risk-free rate, the MRP and beta. We then examine recent regulatory precedent and the parallel RIIO-T1 process. Finally, we present high level MAR analysis and a summary of analysts' views of total returns.

3.1. CAPM parameters

3.1.1. Risk-free rate

Our view of the risk-free rate is based on UK ILGs (see Figure 3.1 below). The figure also plots the dates of introduction of the first two rounds of quantitative easing (QE1 and QE2).

Figure 3.1: UK benchmark ILG yields (5-, 10- and 20-year maturity)



Source: Bloomberg

It is important to reflect recent evidence. This suggests a clear and sustained downward trend in the risk-free rate. Yields on ILGs as low as 1.5% predate the ongoing crisis conditions. Beyond 2006 the picture has been volatile, with very low (and even negative) rates.

In our view around 1.0% represents a more plausible lower bound. Longer-term evidence suggests a rate of up to 2.0%, and this upper limit would allow for the unwinding of certain Government-led actions.

3.1.2. Market risk premium

We focus on the latest figures for historical UK asset returns calculated in the DMS sourcebook, using the longest available time horizon.[5] The relevant measure of the market risk premium is that relative to longer term government bonds. These suggest the appropriate figure for the UK, using an arithmetic mean, is 5.0%. This is broadly consistent with previous regulatory precedent. However, there is some argument that a geometric mean figure should be taken into account to take account of investor behaviour. This is always lower than the arithmetic mean, and is 3.6% using the latest data.

Table 3.1: DMS 2012 UK premium against government bonds

Time period	Geometric Mean	Arithmetic Mean
1900-2011	3.6%	5.0%

Source: Dimson, Marsh & Staunton (2012) CS Global Investment Returns Sourcebook 2012

We have also examined a simple forward-looking view of the UK MRP developed by Barclays.[6] They calculate a premium based on the current P/E ratio, the expected growth of real earnings and dividends and the current safe rate of interest (a 10 year inflation-linked government bond). Their estimate of the MRP is 6.26% relative to bonds, notably higher than most historical estimates (including those referred to above).

In the forward-looking view developed by Barclays, however, the risk-free rate and the MRP are inextricably linked. Their starting point is an estimate of expected total equity returns. Taking this as given, a relatively low spot estimate of the risk-free rate implies a relatively high MRP and vice-versa. Their calculation incorporates the current (negative) risk-free rate of -0.44%. It would not be appropriate to use Barclays' MRP figure alongside a higher estimate of the risk-free rate of, say, 1.5%. The implied expected *total market* return on a forward-looking basis is only 5.81% – which is below Ofgem's proposed range for RIIO-GD1 of 6.0%-7.2%.

Overall, we place more emphasis on the DMS results based on the arithmetic mean, and conclude that the MRP most likely falls in the range 4.0%-5.0%.

3.1.3. Beta

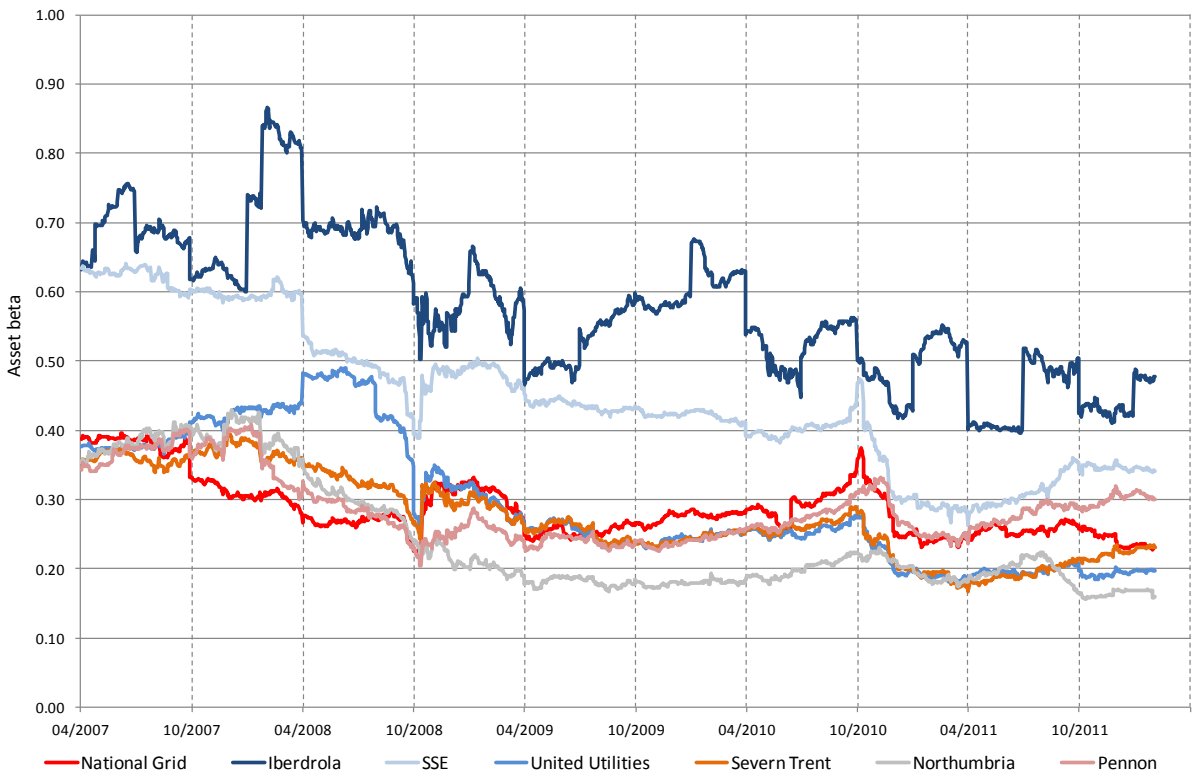
We calculate de-levered asset beta estimates for eight comparator companies, based on raw equity betas and annual data for each company's gearing (based on net debt and market capitalisation). The resulting analysis informs our overall judgement of an appropriate asset beta.

[5] Dimson, E., Marsh, P. & Staunton (2012) 'Credit Suisse Global Investment Returns Sourcebook 2012'.

[6] Barclays Capital (2012) 'Equity Gilt Study 2012'. The authors note that this is a simplified "back-of-the-envelope" calculation.

Figure 3.2 below presents the results of this asset beta analysis. These are de-levered by each company's stated gearing level.

Figure 3.2: Asset betas for comparator companies



Source: Company accounts, Bloomberg, CEPA analysis.

These estimates are then re-levered to a corresponding equity beta assumption based on notional gearing. Table 3.2 summarises the resulting equity beta estimates at a notional gearing of 62.5% for each comparator. It also reports the raw equity and asset betas on which these are based.

Table 3.2: Beta estimates for comparator companies

	Raw equity beta		**Asset beta w. actual gearing**		**Equity beta w. notional gearing of 62.5%**	
Company	**1yr average**	**5yr average**	**1yr average**	**5yr average**	**1yr average**	**5yr average**
National Grid	0.49	0.61	0.25	0.29	0.66	0.77
SSE	0.46	0.61	0.32	0.45	0.85	1.21
Iberdrola	0.91	1.07	0.46	0.58	1.23	1.55
United Utilities	0.44	0.59	0.19	0.30	0.52	0.79
Severn	0.43	0.60	0.20	0.28	0.54	0.74
Northumbria	0.39	0.59	0.18	0.25	0.49	0.66
Pennon	0.50	0.55	0.28	0.29	0.75	0.77

Source: Bloomberg

We recognise that none of our comparators is perfect. For example, while much of National Grid's business is relevant, it also includes US and non-regulated entities alongside its gas distribution assets. As noted in Section 2.1, no pure listed gas distribution comparator exists. As

a result a degree of judgement is necessary in determining where the GDNs would sit within the broad range shown in Figure 3.2 and Table 3.2 above.

Arguably Iberdrola is the least relevant of the comparators. Around half of its business is unregulated, and its activities are primarily in Spain and Latin America. It also includes significant renewables activity. Equally, however, whilst the listed water companies are often considered to be the most suitable proxies for regulated energy networks, we recognise that they may not be directly comparable to gas distribution. Overall it appears clear that similar comparator businesses exhibit significantly less systematic risk than the market as a whole (i.e. their equity beta is below one). Our results suggest an asset beta could be at the lower end below 0.3, which would translate into an equity beta below 0.8 at 62.5% gearing. It is interesting to note Cheuvreux's February 2012 discounted cash flow based valuation of National Grid uses an equity beta of 0.81.[7]

3.2. Regulatory precedent

Table 3.3 summarises the cost of equity parameters used in recent regulatory decisions in the UK. We note that, with the exception of Ofwat's determination, the MRP used by regulators has been broadly consistent with our range of 4.0%-5.0%.

Table 3.3: UK Regulatory precedents on cost of equity

Regulator	Decision	Risk-free rate	MRP	Equity beta	Cost of equity
CAA/CC	Stansted airport (2009-2014)	2.0%	3.0-5.0%	1.0 – 1.2	5.0-8.2%
CAA/CC	Heathrow airport (2009-2014)	2.5%	2.5–4.5%	0.90–1.15	4.8–7.7%
CAA/CC	Gatwick airport (2009-2014)	2.5%	2.5–4.5%	1.00–1.30	5.0–8.4%
Ofwat	Water & sewerage (2010-2015)	2.0%	5.4%[8]	0.9	7.1%
Ofgem	Electricity distribution (2010-2015)	2.0%	4.7%	1.0	6.7%
Ofcom	Mobile calls (2011-2015)	1.5%	5.0%	0.76	5.30%
CC	Bristol Water (2010-2015)	1.0 – 2.0%	4.0 - 5.0%	0.64–0.92	3.6-6.6%
Ofgem	RIIO-GD1 & RIIO-T1 (2013-21)	1.4 - 2.0%	4.0 - 5.5%	0.65 – 0.95	6.0-7.2%[2]

Note: RIIO-T1 fast-track decision uses 7.0% Cost of Equity.

3.3. RIIO T1 compared to RIIO GD1

We note that in reaching its T1 fast-tracking decision Ofgem explicitly took into account the scale of the capex programme. In reaching a cost of equity allowance towards the top end of its range, Ofgem stated that "we consider a higher capex:RAV ratio suggests a relatively high asset beta". Any attempt to draw inferences from the T1 process must take into account the relative capex risk of GD1.

[7] Cheuvreux (2012) Company Report: 'National Grid,' 1st February 2012, p.3.

[8] Ofwat chose an MRP at the top end of its range to account for the uncertain economic environment at the time of its determination. However, it also noted that expectations of the future MRP were lower than the historical average.

Table 3.4 below compares capex and repex expenditure over different price control periods. In the context of the smaller scale of GD1 capex plans it is not necessary to aim off towards the upper end of Ofgem's range for cost of equity to reflect capex risk.

Table 3.4: Total price capital expenditure as a proportion of forecast 2013/14 RAB

Price control	**Capex & repex spend GBPm (average of companies)**	**% of forecast opening RAB (average of companies)**
GDPCR	1,446	84%
RIIO GD1	2,678	66%
RIIO T1 fast-tracked	1,149	124%
RIIO T1 fast-tracked with additional spending allowed	2,999	371%

Source: Ofgem, Business plans, CEPA analysis

Note: GDPCR numbers are multiplied by a factor of 1.6 to remain consistent with an eight year price control period.

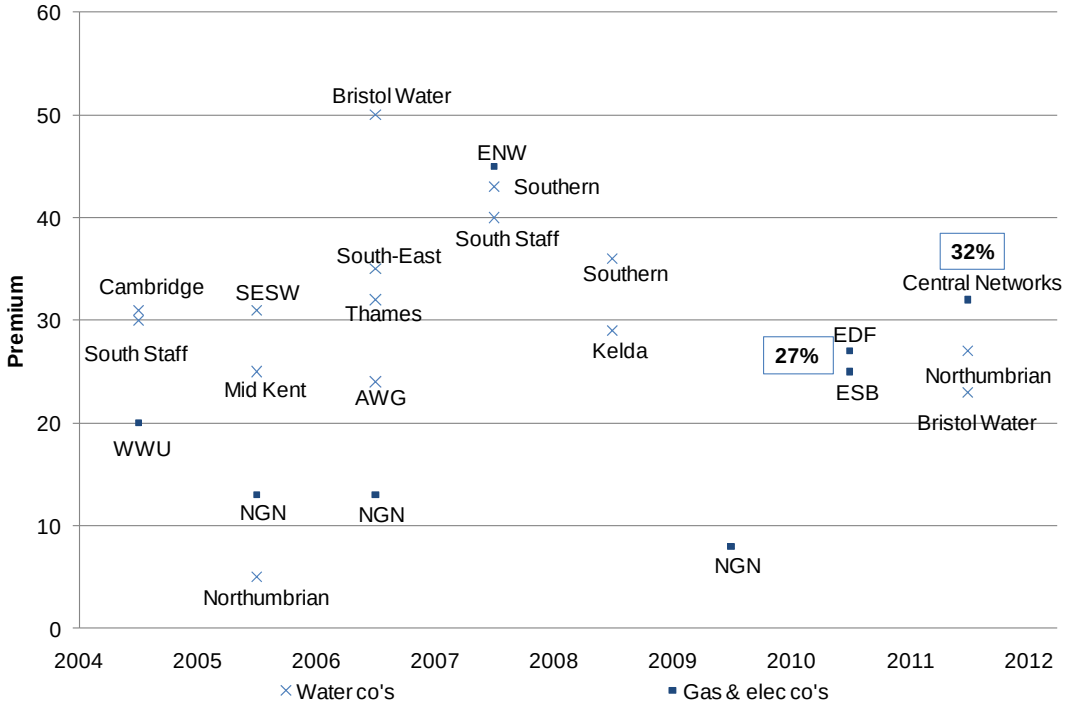
3.4. Market Asset Ratios and views of market participants

Analysis of MARs suggest that the traded values of utility companies have exceeded their RABs by 10-30% since 2004 (see Figure 3.3 below). The reasons for the existence of a premium include: potential efficiency savings; incentives; and performance compared to allowed WACC.

The assessment of many City analysts is that the observed premia reflect significant opportunities to outperform WACC allowances. Credit Suisse on 31 January noted the premium to the RAB for National Grid was 14-22%, partly based on an estimated 200bps spread between allowed returns and underlying WACC. BNP Paribas, in a report from one week earlier, estimated a premium of 18.3% based on a spread of 120bps.

Credit Suisse and other analysts' sum-of-the-parts valuations suggest at least a 10% premium for National Grid. This is despite RBS' view on Grid-owned networks: *"National Grid-owned networks have retreated to the back of the relative efficiency rankings, as measured by Ofgem"*. This may indicate that efficiency rewards are unlikely to provide a significant source of outperformance. Despite this, BNP Paribas still foresee *"a consistent positive contribution from incentives, adding 130-150bp on average over the base-allowed RoE"*.

Figure 3.3: MARs for recent UK utility transactions



Source: CEPA analysis

More generally, the consensus view of analysts appears to be that a baseline cost of equity allowance would be below 7%. The view of a BNP Paribas analyst[9] is particularly revealing:

"National Grid will face a new regulatory framework in its UK-regulated activities from March 2013 (for an eight-year period). Although we anticipate the regulator to reflect a lower 'allowed return on equity' in the new tariffs (6.7% real versus 7–7.2% today), interest rate risk should dramatically decrease through indexation of the 'allowed cost of debt', which today is fixed for the entire period. While lower interest rate risk is typically well rewarded by the market (20% historical EV/EBITDA premium for Belgian peer Elia, solely on full tariff pass-through of financial charges), the index characteristics suggest National Grid should continue to outperform on its capital structure by 90bp on average ('allowed ROCE' versus WACC) over the period. We expect regulatory incentives (network availability, safety, environment, etc.) to add on average another 60bp on top of this."

Overall, there is much evidence to support the view that a 'status quo' allowance for the cost of equity would exceed companies' actual cost of equity by a significant margin.

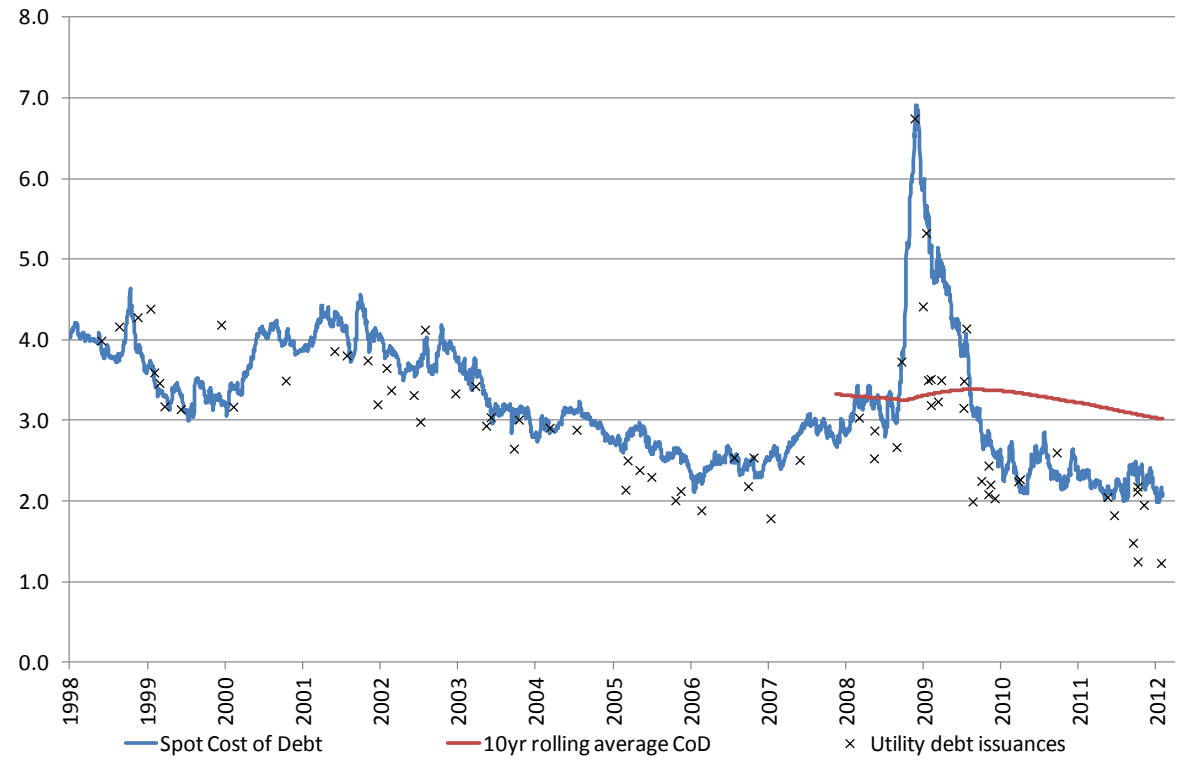
4. COST OF DEBT

As noted in Section 2.2 above, we are broadly supportive of Ofgem's approach to indexing the cost of debt. We do not examine in detail the requests made by the GDNs in relation to cost of debt uplifts. The fast-tracked T1 proposals do not incorporate any uplifts, and in the absence of clear evidence that the index would provide an insufficient allowance we would expect the same to apply in GD1.

[9] BNP Paribas (2012) Equity Research: 'National Grid,' 6th January 2012, p.4.

Figure 4.1 below summarises the performance of the proposed index since 1998. It is a combination of the iBoxx non-financials A rated 10yr+ index and the non-financials BBB rated 10yr+ index, deflated by the Bank of England's breakeven inflation measure. The figure also plots costs for specific UK regulated utility debt issuances. Ofgem has calculated that network companies have been able to issue debt at a cost around 58 bps below the index.[10] We concur with Ofgem's view the selected index has historically provided sufficient headroom.

Figure 4.1: Debt issues by network companies



Source: Bloomberg, Ofgem. Spot and 10yr average costs of debt based on relevant iBoxx indices.

5. NOTIONAL GEARING

Regulated networks have been observed to gear up significantly in the last decade or so and they have done this while maintaining investment grade credit ratings. Hence unless there are compelling reasons to believe otherwise, Ofgem's notional gearing assumption should be allowed to stand.

Furthermore:

- Ofgem has already made a significant financeability concession in moving to a front-loaded deprecation profile, to offset the impact of fully capitalising repex. This should significantly mitigate any short-term pressure.
- The notional gearing assumption for the fast-tracked T1 companies has been set at 55%, a reduction from 60%. Whilst it is important to compare cost of capital packages as a

[10] Ofgem (March 2011): "Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues", pg. 28.

whole, we interpret this as reflecting financeability and funding concerns resulting from the large capex programme and 90% totex capitalisation rate. It is not clear that a similar change is warranted in gas distribution, where capitalisation is significantly lower; indeed, equity analysts have emphasised the cash-hungry nature of transmission relative to gas distribution.

We therefore do not propose any change from the current figure of 62.5%, and note that many companies have sustained gearing levels significantly above this.

6. CONCLUSIONS

The GDNs (and the upper end of Ofgem's range) set out estimates of the cost of equity that based on our evidence exceed market levels of risk. To some extent, the GDNs appear to take the GDPCR allowance as a starting point. Our view is that the DPCR5 allowance of 6.7%, as Ofgem's most recent relevant determination, is a more appropriate starting point. Furthermore, it is important to update estimates of the parameters on which that allowance was based, to admit more recent evidence. The evidence we have presented in this note generally suggests a cost of equity in the lower half of Ofgem's range of 6.0%-7.2%.

GDNs argue that risk is higher relative to GDPCR. Material differences include:

- *Duration of price control period.* In a previous paper[11], we argued that the allowed WACC is set with reference to long-term cash flows. In this context, longer term regulatory commitments can be viewed as positive, so long as the allowed WACC is appropriate and there are sufficient measures (such as re-openers) available in the event of a material change in conditions. It is, therefore, not clear that a longer price control period requires a higher cost of equity allowance. Indeed, in a 23rd January report covering National Grid Credit Suisse stated: *"we increase our [target price] ... because RIIO gives us clarity on returns for longer"*.[12]

- *Debt indexation.* By ensuring the cost of debt allowance tracks changes in companies' actual cost of debt, indexation arguably reduces risk. There appears to be little concern that the proposed mechanism will provide an insufficient allowance: in a report on 18th January 2012, BNP Paribas states that National Grid *"confirmed, in line with our expectations that it sees itself continuing to outperform on the allowed cost of debt, which will be set as a rolling 10-year average of the real iBoxx index"*. The analysts highlight an RPI-linked bond issued in October 2011 at c.100bps below the index. Taking this into consideration we see no strong argument for accompanying cost of debt indexation with an ad hoc uplift to the cost of equity.

Ofgem's stated position is that the new RIIO framework does not increase risk. We agree that this is likely to be the case, although more detail is required to be shared with stakeholders on potential returns (and penalties) from efficiency gains and incentives.

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[11] CEPA (2010) 'Cashflow profiles and the allowed WACC,' July 2010. Available at: http://www.ofgem.gov.uk/Networks/rpix20/ConsultDocs/Documents1/Lengthening%20cashflows%20and%20the%20WACC%20July%202010.pdf.

[12] This view is also supported by Ofwat. It states in 'Cost of capital and risk mitigants – a discussion paper' that: "it is not self-evident that the duration of a price control has a direct impact on the cost of capital".