

## A response on the cost of equity for PR3

Note prepared for EirGrid<sup>1</sup>

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### Introduction

The Commission for Energy Regulation (CER) has published its consultation on the mid-term WACC review, stating that their minded-to position on the cost of capital for ESB and EirGrid on a forward looking basis is 5.1-5.3% in real terms (2014-15). The components of this position are detailed in Annex A, which has further details on the cost of capital estimates from Europe Economics (EE).

### Key messages

CEPA's key concerns with the CER's proposed decisions are that:

- The CER, and its consultants, EE, have adopted a new approach to the country/ crisis risk premium (CRP) that is inconsistent with its own previous decisions and European regulatory precedent (some of which are referenced in EE's own report). CEPA is strongly of the view that the approach of including any CRP within the risk free rate (ideally via a country specific risk free rate and equity risk premium) is the correct approach.
- The CER/ EE's approach results in an Irish cost of equity which is forecast to be lower than the equivalent German cost of equity in 2014-15. We believe this is contrary to common logic and does not align with the evidence presented in EE's report.
- As a further illustration of the failings of the CER/ EE approach, the cost of equity becomes smaller than the cost of debt on a post-tax basis with a significant CRP<sup>2</sup> (see Annex F). This clearly does not fit with standard financial/economic theory or regulatory precedent.
- We also do not believe that a substantial narrowing in the ratio of the cost of equity-to-cost of debt that occurs under the CER/EE's parameters is appropriate and this would not occur under the approach which CEPA has proposed and upon which EirGrid has based its submission.

Overall CEPA believes that there is a general inconsistency in how EE has used its own analysis. In particular, we are concerned that they do not include a CRP in 2013, despite noting evidence about elevated Irish rates and greater Irish volatility (as well as observable data on CDS spreads and sovereign gilt yield spreads).

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<sup>2</sup> This figure is around c.8%; the difference between Irish and German sovereign bonds peaked at c.9% during the PR3 period.

## Approaches to calculating the cost of equity – CEPA approach

EirGrid is an Irish business operating on behalf of Irish customers. Given this context, there are two approaches to calculating the cost of equity which would be methodologically consistent. This is detailed in the table below.

Table 1: Approaches to calculating the cost of equity

	Approach 1	Approach 2
Risk free rate	Irish	European*
Equity Risk Premium (ERP)	Irish	European
Equity beta	Irish	European
Country/ crisis risk premium (CRP)	No	Yes (if appropriate)

Note: the European estimates for the risk free rate uses German bonds

**Approach 1:** this relies on Irish data for the risk free rate and ERP, as well as an equity beta calculated against the Irish market (as such, no country risk premium needs to be calculated).

**Approach 2:** this relies on European data for each element of the cost of equity, with a CRP adjustment (if there is a difference in risk).

The key theoretical requirement is that once a risk free rate is chosen, both the debt premium and equity premium (ERP and equity beta) should be calculated with respect to this risk free rate. These approaches should lead to equivalent answers if applied consistently.

The preferred CEPA approach would be to use country specific data for each parameter (Approach 1). Such an approach avoids difficulties with quantifying the CRP and determining where this should be added. The equity beta will also need to change to be consistent with the market in question under Approach 2, e.g. the equity beta should reflect the specific country's market within Europe. Approach 1 is supported by regulatory precedent in Ireland and in European countries significantly affected by the recent global crisis such as Italy, Spain and Portugal (as noted by EE and discussed later in this note).

EE state that the use of benchmark Irish bonds for the risk free rate is not appropriate given that the yields are materially elevated compared to other Eurozone countries, such as Finland, France, Germany and the Netherlands, and Irish yields are subject to significant volatility.<sup>3</sup> As noted above, other countries in Europe facing a similar situation to Ireland have used their own bonds.

The ruling out of Irish bonds as a risk free rate by EE and the use of German bond data implies that Ireland, at least in a sovereign sense, is considered 'riskier' than Germany. As such, if a CRP is applied to European data, one would expect it to be positive.

Whilst we may not agree with EE ruling out the use of Irish data, having decided against the use of Approach 1 the remaining theoretically robust and consistent approach for EE would be to use Approach 2, i.e. using European data and then including a positive CRP.

We note that such an approach is made more difficult by the fact that Europe as a whole does not have observable bond yields. The European ERP from Dimson, Marsh and Staunton (DMS)<sup>4</sup> is

<sup>3</sup> EE (2013) Technical report, August 2013

<sup>4</sup> The Credit Suisse Global Investment Returns Report (Dimson, Marsh and Staunton)

calculated against a weighted index of 13 different countries, but the German data alone leads to a far higher ERP estimate<sup>5</sup>. This added complexity would again favour using Approach 1. We consider next whether the EE approach using a non-Irish risk free rate is appropriate, both in terms of whether it is theoretically robust and whether it reflects and factors in the positive CRP one would expect to be faced by an Irish company like EirGrid.

***Key message: CEPA would favour using Irish data for each cost of equity element, but a consistent approach is possible using European data.***

### **Approaches to calculating the cost of equity – EE approach**

EE calculate the cost of equity for three separate time periods: i) 2011-12; ii) 2013; and iii) 2014-15. We describe each of the EE methodologies in the table below.

*Table 2: EE cost of equity approach*

	<b>2011-12</b>	<b>2013</b>	<b>2014-15</b>
Risk free rate	German	German	German
Equity Risk Premium (ERP)	Irish (x1.2)/ European (x1.2)	Irish/ European	Irish/ UK regulatory precedent
Equity beta	As per PR3	As per PR3	As per PR3
Explicit country risk premium	No	No	No

*Source: CER*

The German risk free rate has been lower than the Irish risk free rate since 2008. EE must apply a figure which is higher than the relevant Irish data point for either i) the ERP, ii) the equity beta or iii) as an explicit CRP, if Approach 2 is to be equivalent to Approach 1 (i.e. reflecting that Ireland is a riskier market than Germany) given the risk free rate differential.

The equity beta remains unchanged in each part of the EE analysis (equal to 0.67), so any changes must come through the ERP or explicit CRP. EE do not favour using an explicit CRP, so implicitly add a CRP to the ERP, but do not conclude which is the preferred method for quantifying this ERP adjustment. We look at the estimates for 2011/12, 2013 and 2014/15 in turn.

*2011-12 (DMS 2011 – Europe = 5.2%, Ireland = 4.9%<sup>6</sup>)*

The European ERP from DMS is higher than the Irish ERP from the same source. The DMS figure used for both countries is the equity premium above bonds (but a different bond index is used for Ireland as a proxy for the risk free rate compared to Europe). DMS use the Irish rate as the starting point for the lower bound and the European data for the starting point for the upper bound. These figures are then multiplied by 1.2 (i.e. a c.1% uplift to both bounds). This gives an ERP range of 5.9-6.2%.

If this figure were to be calculated from the relative volatility of the Irish equity market compared to the German equity market, it may be appropriate to assume that any adjustment made is to include a CRP (see Annex B). However EE do not state this as the reason for their adjustment, and given both EE's explanatory footnote<sup>7</sup> and the additional evidence from other sources, it may

<sup>5</sup> There are questions on the use of this data, given the observed figure and hyperinflation.

<sup>6</sup> For the years 1900-2010

<sup>7</sup> The Credit Suisse Global Investment Returns Report 2013 (Dimson, Marsh and Staunton)

be that the adjustment has been made due to a belief that the DMS evidence is understating the true ERP.<sup>8</sup> As any CRP is added to the ERP, the maximum (implicit) CRP that is possible to be applied to EirGrid's cost of equity from this approach is 0.5% to 0.7% - owing to the impact of the equity beta as estimated by EE on the ERP.

*2013(DMS 2011 – Europe = 5.2%, Ireland = 4.9%<sup>9</sup>)*

The same approach and data as had been used for 2011-12 is adopted by EE for 2013, but with no adjustment. The ERP range is therefore 4.9-5.2%. Given that two years of additional data is available after the DMS 2011 figures, in our opinion the choice of this time period requires justification. The updated figures with two years of additional data are 0.4 percentage points lower for Europe and 0.3 percentage points lower for Ireland. Again we face the difficulty in assessing whether this higher figure (0.1-0.4% higher on a cost of equity basis) is an implicit CRP or an upwards adjustment of the ERP based on other information, such as regulatory precedent, academic literature or further market evidence.

*2014-15 (DMS 2013 – Europe = 4.8%, Ireland = 4.6%)*

At the lower bound, EE use the Irish ERP and at the upper bound rely upon UK regulatory precedent. The use of the Irish ERP is intimated as an adjustment for including a CRP. Given that the Irish ERP is lower than the European ERP, this has created a negative CRP, which does not appear to be justified by any available evidence. The top end of the range, which is based on UK regulatory precedent, is slightly above the European ERP figure such that there may be a very small implicit CRP in the cost of equity. At the mid-point there is no CRP included at all, despite the market evidence (including CDS spreads, volatility and sovereign yields) indicating that a positive (and sizeable) CRP would be appropriate.

### *Summary*

The figures used by EE are sourced from DMS, whose figures for Ireland are lower than other country specific evidence as noted in Annex C. The overall ERP should include a CRP under the EE approach, but there is no CRP included for 2014-15 (and a negative CRP under EE's preferred point estimate at the top end of their specified range), at most a small CRP for 2013 and up to 0.7% for 2011-12 if the 20% uplift is deemed a CRP adjustment.

We note that the equity beta has remained unchanged in each case. It is not clear whether the equity beta has been calculated against the Irish economy or European economy initially, as the same equity beta is used by EE with both an Irish ERP and European ERP.

If this is calculated against the Irish economy, we might expect that the equity beta would be lower than any beta estimate calculated against a relatively less risky index, such as the European index. As quoted in a cost of capital paper by a major investor, RARE Infrastructure fund:

*for "riskier" countries, the global asset beta is likely to be higher than the local asset beta (measured against a local market).<sup>10</sup>*

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<sup>8</sup> Details are provided in Annex C of this report. The Damodaran 2011 and 2012 figures for the Irish ERP are 7.25% and 9.60%. The Fernandez *et al* 2011 ERP estimate for Ireland is 6.0%. The DMS figure for 2011 is just 4.9%.

<sup>9</sup> For the years 1900-2010

<sup>10</sup> RARE Infrastructure Fund (2012) RARE Cost of Capital, September 2012.

The CRP included within the EE estimates may also be exaggerated given that the DMS is clearly the lowest figure of the data sources noted in Annex C.

Table 3: Maximum estimates of the CRP for EirGrid (based solely on DMS data)

%	2011-12	2013	2014-15
Max implied CRP impact on CoE	+0.5 to +0.7	+0.1 to +0.4	-0.1 to +0.1

Source: CEPA

Note: excludes consideration of equity beta

**Key message:** *It is not clear that any positive CRP is included in the EE calculation of the cost of equity. Any CRP that is included is relatively small for 2011-12 and becomes relatively smaller until there is no CRP for 2014-15. Given the data source selected and unadjusted equity beta, in practice EE may actually be implicitly including a negative CRP.*

*CEPA would note that this differs from the cost of debt where Irish utility bonds both have been and continue to trade at a premium to European utility bonds of a similar credit rating. EE has recognised and included this higher cost of debt in its cost of capital calculations yet made no similar adjustment to the cost of equity.*

### CEPA Evaluation of the EE approach

EE's statement that Irish sovereign bond yields are elevated and more volatile than German/European rates should indicate that the forward looking CRP assumed by EE in the CEPA analysis above is not appropriate and there should be a positive ERP.

We think that the EE approach for 2014-15 is certainly not consistent with the (lower) Irish ERP used instead of a (higher) European ERP. Not using updated data in forming the 2013 cost of equity is not a methodologically sound approach, whilst using the 20% uplift to the ERP for 2011-12 does not correspond to the three methods EE note as potential approaches (see Annex B). We find that the use of the Irish ERP in the forward looking rate, but not in the Irish risk free rate is not consistent. An argument may be put forward that the 'aim up' incorporates any required CRP.<sup>11</sup> The rationale behind this is to cover for a possible under-recovery in 2011-13, so it does not appear as though that was the objective of any aim up. It is unclear why this would not be included in the parameter values if this was used in place of a CRP. Nonetheless we have shown what impact this could have on forward looking cost of capital parameter values in Annex E.

#### *Approach to including the CRP*

As we have previously set out, the CEPA preferred approach when including a CRP is to include this within the risk free rate term, such that it applies in full for both the cost of debt and cost of equity. We believe that this approach is methodologically consistent; and is the same approach as

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<sup>11</sup> An 'aim up' of 5% or 10% is noted by EE in their report, with a slight preference for the inclusion of a 5% aim up on the cost of capital.

used by the CER/NIAUR for their Best New Entrant Peaking Plant 2013 decision<sup>12</sup>, where the risk free rate including CRP was 4.50% for the period 2013-15.<sup>13</sup>

As noted in Table 3, the EE approach gives a maximum CRP of under 10bps per annum for 2013-15. These figures differ significantly despite being set for the same country and the same time period by the same regulatory authority (this parameter is independent from company specific factors).

### Quantification

One of EE's proposed approaches to quantify a CRP involves analysing CDS spreads and differences in sovereign yields. EE however do not conduct this analysis within their report. The figure below illustrates the difference in CDS spreads between Irish and German ten-year debt, as calculated by CEPA. This has averaged approximately 140bps for 2013 and has remained relatively stable. During the PR3 period, the difference has been as high as 900bps.

Figure 1: CDS spreads – Germany and Ireland



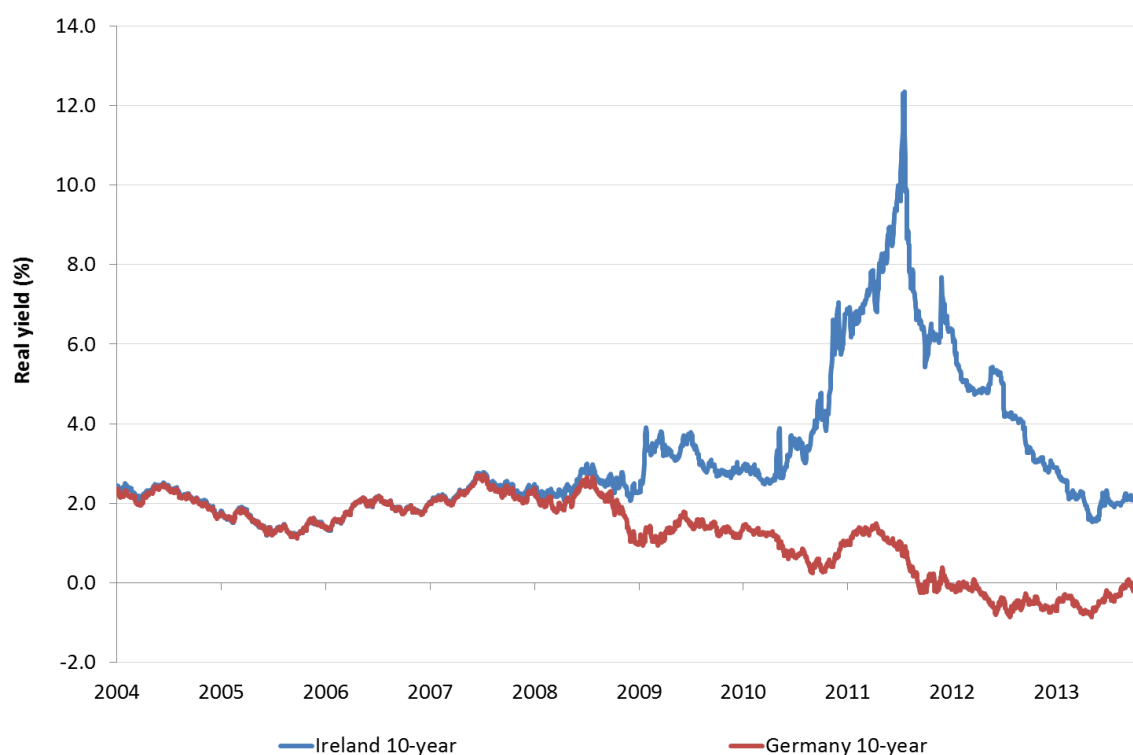
Source: Bloomberg, ECB

The average difference in the risk free rate between 2000 and 2013 was 141bps (similar to recent differences in CDS spreads). For the period between 2000 and 2007, the difference is just 12bps. With EE taking German rates prior to 2008 for the risk free rate, the difference in rates between Ireland and Germany after 2008 is not captured by the risk free rate term employed by EE.

<sup>12</sup> CEPA was the appointed consultant for this work, though CEPA presented a range from which the CER/NIAUR chose a point estimate.

<sup>13</sup> CER (2012) Fixed Cost of a Best New Entrant Peaking Plant, Capacity Requirement and Annual Capacity Payment Sum for the calendar year 2013. Decision paper. 31 August 2012.

Figure 2: Differences in yield between Irish and German sovereign debt



Source: Bloomberg, ECB

We now look at what market evidence says for this comparison on a forward looking basis.

Table 4: Forward evidence on the risk free rate

Date	Irish 10yr (%)	German 10yr (%)	Difference (bps)
Current spot (22 Oct)	3.55	1.80	176
15 Dec 2013	3.61	1.83	177
15 Mar 2014	3.71	1.90	180
15 Jun 2014	3.80	1.97	183
15 Sep 2014	3.89	2.04	185
15 Dec 2014	3.97	2.11	186
15 Mar 2015	4.03	2.18	185
15 Jun 2015	4.08	2.25	183
15 Sep 2015	4.11	2.32	179
15 Dec 2015	4.15	2.39	176

Source: Bloomberg

This table shows that the difference between the German and Irish ten year bond yields are expected to remain relatively constant at c.180bps over 2014-15. We are surprised that EE given its own evidence, our analysis and our understanding of prevailing market conditions (both spot rates and forward data) believes that equity investors in Ireland would not require higher returns than from investing in Ireland compared to the equivalent company in Germany. In our view, EE

has provided no evidence that the observed difference between Ireland and Germany will dissipate during the course of PR3.

*Key message: Ireland appears to be perceived as riskier than Germany, with market evidence showing a significant premium of up to 200bps on a forward looking basis and up to 900bps on a backward looking basis, yet the approach proposed by EE for the assessment of the cost of equity provides only inadequately for the backward looking adjustment (through the unsubstantiated 20% uplift) and does not account at all for the difference in perceived risk on a forward looking basis*

### Relationship between cost of debt and cost of equity

The debt premium and equity premium (ERP multiplied by equity beta) represent the company specific non diversifiable risks versus a risk free asset. As such, given a constant risk free rate, it may be assumed that an increase in risk for the company should lead to an increase in both the debt and equity premium required (at least in the medium and long term).

What is of interest is the ratio of the equity premium to the debt premium, this can be thought of as:

$$Ratio = \frac{\beta_e \times ERP}{\beta_d \times DRP}$$

Now, the ratio could change because of changes in the beta values, but if we begin by assuming they are fixed (which could be the case for the whole economy), then the relationship is:

$$Ratio = \frac{ERP}{DRP}$$

How would we expect this ratio to change as the state of the economy, as determined by the risk-free rate changes? In both cases we know that in the short- to medium term there is a compensating movement in the risk premium but that the movement is smaller than the change in the risk-free rate. Evidence for this can be found in:

- CEPA's 2013 report to the Australian Energy Regulator entitled '*Advice on estimation of the risk free rate and market risk premium*';<sup>14</sup> and
- PwC's recent advice to the CAA with respect to the impact of changes in the risk-free rate on the overall cost of debt for Heathrow and Gatwick airports.<sup>15</sup>

So, both elements will change as the risk-free rate changes, but by a smaller amount. Consequently, while the ratio may change, the degree of change is likely to be small. This means that while the difference between the cost of equity and the cost of debt may narrow, for a significant change to occur a major change in one of the beta values would be needed.

Our analysis indicates that there is a substantial narrowing of the gap between the cost of equity and cost of debt on a post-tax basis as the CRP increases under the EE approach. Since no change

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<sup>14</sup> [http://www.aer.gov.au/sites/default/files/AER%20Final%20report%20110313%20Clean\\_1.pdf](http://www.aer.gov.au/sites/default/files/AER%20Final%20report%20110313%20Clean_1.pdf)

<sup>15</sup> PwC (2013) Estimating the cost of capital for designated airports, October 2013. This paper updated a previous, April 2013, version.



in the beta values has been proposed by the CER or EE we find the significant narrowing of the difference to be inappropriate, or at least unexplained.

***Key message: The relationship between the cost of debt and cost of equity should remain approximately stable. The approach and parameters values adopted by EE do not achieve this.***

### **Further market evidence**

In this section we look at further evidence from regulatory decisions. We also believe that it is useful to consider how the cost of equity, namely dealing with the CRP, is dealt with from an investor perspective. For this we rely on the RARE Infrastructure Fund approach to assessing the cost of capital. We discuss the RARE Infrastructure Fund cost of capital approach and further details on this paper are provided in the text box below<sup>16</sup>.

#### *Box 1. RARE Infrastructure Fund Cost of Capital paper (September 2012)*

This paper is written by the Australian infrastructure fund, RARE. As investors they discuss their methodology in estimating the cost of capital and their preference for an international CAPM. RARE is a global investor and the international CAPM model used is based on the assumption that capital markets are or will be fully integrated.

In calculating a cost of equity, RARE use a risk free rate with a global market risk premium which is multiplied by the equity beta. An additional CRP is then added to the CAPM equation in full (i.e. effectively with the risk free rate rather than being added to the ERP). Despite the assumption of full integration, they still find that a CRP is appropriate.

RARE state that:

*'there are additional factors in the CAPM framework that reflect individual country risks that are non-diversifiable, and subsequently demand an extra risk premium.'*

RARE use a base assumption of 5.0% for the ERP and note that the average used by practitioners for developed countries is above this figure.

They state that in theory an international CAPM would not require a CRP, yet in practice there are persistent risks which are not diversifiable globally. There is also evidence of historical risk premia for certain markets and survey evidence which indicates that investors reflect different ERP in company valuations. For Ireland, the approach would suggest that they would apply a CRP to Ireland, as 'for some countries with heightened concerns about sovereign credit worthiness, we include a CRP.' This is 0.7% for Italy and 2.0% for Portugal.

As noted previously in the CEPA report, the equity beta must be adjusted to reflect local industry characteristics rather than applying to the global index and for 'riskier' countries, the global beta will be above a beta measured against the local market.

For Ireland, RARE use a combination of methods put forward by Professor Damodaran in arriving at a CRP of 1.8%.

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<sup>16</sup> RARE Infrastructure Fund (2012) RARE Cost of Capital, September 2012.

The CRP estimated for Ireland by RARE is 1.8%<sup>17</sup>.

#### *Regulatory precedent - Ireland*

The first set of decisions to draw upon is regulatory precedent in Ireland. We have already noted the Best New Entrant 2013 decision, with the CRP added to the risk free rate. This led to a 4.5% risk free rate. This was 275bps above the decision for Northern Ireland.

The CER, in PC3 for Bord Gais, arrived at the same 4.5% figure for the risk free rate in November 2012 – less than 12 months ago - using the same approach (i.e. adding the CRP to the risk free rate). This cost of capital works on a cap and floor arrangement with a pre-tax WACC between 5.2% pre-tax and 8.2% pre-tax. We understand that the WACC is now at its floor of 5.2% pre-tax, down from 6.39% at the time of the decision<sup>18</sup>. This would indicate that the risk free rate has fallen to c.3.2%. The risk free rate for 2013-15 assumed by EE is c.1.8%, therefore this might imply a 1.4% CRP relative to EE's risk free rate.

EE's approach is therefore not consistent with Irish precedent.

#### *Regulatory precedent - Europe*

EE note several international regulatory determinations in Spain, Portugal and Italy. Before looking at the determinations, we first look at the long-term interest rates as estimated by the ECB over different averaging periods (other country information is in Annex D).

*Table 5: Long term interest rates by country*

Average period	GER	IRE	ESP	ITA	POR
<b>Long term interest rates</b>					
Since Jan 00	3.47	5.00	4.49	4.55	5.49
Jan 00 to Aug 08	4.15	4.26	4.27	4.43	4.35
Aug 08 – present	2.47	6.10	4.81	4.74	7.16
2011-present	1.90	6.79	5.39	5.16	9.29
2013-present	1.51	3.87	4.70	4.37	6.35
Latest value	1.89	3.95	4.42	4.54	7.06
<b>Difference to German rates</b>					
Jan 00 - present	-	1.54	1.02	1.09	2.02
Jan 00 - Aug 08	-	0.11	0.12	0.28	0.20
Aug 08 - present	-	3.63	2.34	2.27	4.69
2011- present	-	4.89	3.48	3.26	7.39

<sup>17</sup> For Ireland, five different approaches are used. These are: i) the average ERP vs the US ERP in Fernandez et al (2011); ii) the Equity Premium / default rate estimates are Damodaran (2012) scores based on the volatility of equities vs bonds multiplied by the default rate; iii) the equity volatility / base equity volatility score is from Damodaran (2012), and estimates a CRP based on volatility in local vs US equity markets; iv) the IHS converted score is based on IHS Global Insight risk scores, converted to a risk premium using regression techniques; and v) the implied premium of local markets vs MSCI world index is  $(\beta - 1) \times \text{global ERP}$ .

<sup>18</sup> CER (2012) Decision on October 2012 to September 2017 transmission revenue for Bord Gais Networks, Decision paper, 23 November 2012.

Average period	GER	IRE	ESP	ITA	POR
2013 - present	-	2.36	3.19	2.86	4.84
Latest value	-	2.06	2.53	2.65	5.17

Source: ECB

Note: This involves monthly data on harmonised long-term interest rates

Based on rates since the start of 2000, each of the four countries in question have average long-term interest rates over 1.0% above German long-term rates. This increases to over 2.0% when looking at latest values. This indicates that Germany is perceived as lower risk than these countries and that a positive CRP would be appropriate if using a German-derived risk free rate and German ERP (in practice, European DMS estimates), but when considering a company with primary operations in a different country (e.g. Ireland).

We show which data was used for calculating the risk free rate for the examples of regulatory precedent noted in the EE technical report.

Table 6: Recent Risk-Free Rate Determinations in Spain, Italy and Portugal

Country	Sector	Regulator	Date of publication	Risk-Free Rate (nominal)	Estimation Method
Italy	Telecommunications	AGCOM	Nov 10	3.9	10-year Italian bonds (spot)
Italy	Electricity Distribution & Transmission	AEEG	Dec 11	5.24	10-year Italian bonds
Italy	Airports	ENAC	Oct 12	5.43	10-year Italian bonds
Spain	Telecommunications	CMT	Dec 12	5.53	10-year Spanish bonds
Portugal	Electricity Distribution & Transmission	ERSE	Dec 11	3.41	Mean of German, Finnish, French, Austrian and Dutch 10-year bonds
Portugal	Telecommunications	ANACOM	Oct 12	5.36	Mean of Belgian, Spanish, French, Irish, Italian and Portuguese 10-year bonds
Portugal	Gas Distribution & Transmission	ERSE	Jun 13	4.9	Mean of German and Portuguese 10-year bonds

Source: EE, Regulatory determinations

None of the approaches above use the German risk free rate by itself (as EE have done for each time period). This results in higher figures than the EE approach would have yielded. The Italian and Spanish regulatory precedents above use domestic rates for the risk free rate, whilst the Portuguese regulators do use German data, but only in combination with other (higher yielding)

government bonds.<sup>19</sup> The closest approach to EE's is the ERSE December 2011 decision in Portugal. This also corresponds to the lowest nominal rate above.

The ERSE December 2011 decision used an ERP of 6.5% and was the only decision to rely upon a single point estimate in the calculation of the ERP. This data point is based on survey evidence by Fernandez et al<sup>20</sup>, whose approach and results are detailed in Annex C. If the latest version of this survey was to be used for Ireland on a forward looking basis, the ERP would be 6.2%, 140bps above the mid-point of the EE ERP (see Annex C for further details).

In addition to using Spanish bonds for the risk free rate, the Spanish regulator used a range of Spanish specific data on the ERP. The evidence considered included survey data, methods using historical data and forecasting methods. The Italian regulators adopted a similar approach, using Italy-specific data for the ERP, having used Italian bonds in calculating the risk free rate. The approaches used a mix of DMS data, the Fernandez *et al.* survey data, analysis from Professor Aswath Damodaran and regulatory precedent. Each of these data points are described further in Annex C, but the Fernandez *et al.*, and Damodaran data lead to higher (and in the case of Damodaran, much higher) estimates of the ERP compared to evidence from DMS.

The rationale behind the Spanish and Italian regulators using the national ERP data is based on their use of national risk free rate data. We therefore do not believe that the EE approach is consistent with any of these international examples of regulatory precedent (cases which EE themselves have referenced) for countries who were 'severely affected by the sovereign debt crisis.'<sup>21</sup>

***Key message: The Irish and European regulatory precedent examples, as well as information from a real world investor, supports the CEPA preferred approach of using national data for each cost of equity parameter where available. Where regulators have not adopted this approach, which itself is rare, they have only done so in tandem with uplifted estimates of the ERP. Therefore neither the regulatory precedent nor real world investor information supports the EE approach.***

## Conclusion

This report has noted several methodological flaws identified within the EE approach, namely:

- The EE approach is not supported by regulatory precedent in Ireland or Europe.
- The EE approach to the Irish CRP for 2011-13 is, even as a best case, significantly below the figure indicated by market evidence. The CRP included for these years could actually be negative due to higher estimates of the Irish ERP from alternative data sources (which have been quoted in international regulatory precedent) and no adjustment by EE to the equity beta.
- On a forward looking basis, EE has not included a positive CRP and, for the same reasons as for 2011-13, the 2014-15 period is likely to contain a negative CRP in practice. This

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<sup>19</sup> The additional countries have yields which are 0.4-1.0% higher than German figures since August 2008.

<sup>20</sup> Fernandez, Aguirreamalloa and Corres (2011) Market Risk Premium used in 56 countries in 2011 – a survey with 6,014 answers, IESE Business School.

<sup>21</sup> Europe Economics (2013) Technical Report, August 2013, p4.

therefore results in underestimates of the cost of equity on both a backward and forward looking basis.

In addition, the EE approach does not appear logical from a more practical and less theoretical perspective either, given that a negative CRP would imply that equity investors would require a lower return from investing in a company in Ireland compared to the equivalent company in Germany. This goes against both the theoretical discussions and empirical market evidence. Looking further at the implications of the EE approach, we have concerns about the implied relationship between the cost of debt and cost of equity. This is borne out by the EE estimates where the relativity of the cost of debt and equity varies considerably across the period but this variance is however unexplained.

## ANNEX A: THE CER CONSULTATION & EE REPORT

The Commission for Energy Regulation (CER) have published their consultation on the mid-term WACC review, stating that their minded-to position on the cost of capital for ESB and EirGrid on a forward looking basis is 5.1-5.3% in real terms. The components of this position are detailed below.

Table A1: Comparison of different party's submissions

	ESB 14-15	EirGrid 14-15	CER 14-15	
	Point	Point	Low	High
Gearing	55%	55%	55%	55%
Tax rate	12.5%	12.5%	12.5%	12.5%
Crisis premium	2.0%	-	-	-
Risk free rate	0.2%	2.75%	1.75%	2.0%
Equity Risk Premium	4.8%	4.75%	4.60%	5.00%
Asset beta	0.40	0.45	0.30	0.30
Equity beta	0.80	1.00	0.67	0.67
Post-tax cost of equity	6.0%	7.5%	4.82%	5.33%
Debt premium	1.3%	0.5%	1.7%	2.2%
Pre-tax cost of debt	3.5%	3.25%	3.45%	4.20%
Pre-tax WACC	5.0%	5.64%	4.37%	5.05%
Additional factors	1.2%	-	-	-
Estimates of real pre-tax WACC	6.2%	-	-	-
Aim up of 5%	-	-	4.59%	5.31%
	ESB 14-15	EirGrid 14-15	CER 14-15	
Comparison across estimates	6.1%	5.64%*	5.1%	5.3%

\* under-recovery in previous years

Source: CER

The CER's consultants, Europe Economics (EE), have provided their estimates on the specific parameters on the cost of capital (henceforth referred to as the EE report and EE technical report)<sup>22</sup>. The purpose of this note is to comment on the appropriate cost of equity, in particular the use of a consistent risk free rate and equity risk premium (ERP) for the market in question, in this case for the Irish economy. We look at whether a country premium is appropriate, how this might be quantified and where this would be applied under a CAPM framework. We then look more at whether the Europe Economics use of the ERP accurately reflects the circumstances for EirGrid.

<sup>22</sup> Europe Economics (2013) Mid-term WACC for ESB and EirGrid, August 2013.  
Europe Economics (2013) Technical Report, August 2013.

Table A2: Comparison of EE estimates

	2011-12	2013	2014-15
Gearing	55%	55%	55%
Tax rate	12.5%	12.5%	12.5%
Risk free rate	1.4-2.0%	1.4-2.0%	1.75-2.0%
Equity Risk Premium	5.9-6.2%	4.9-5.2%	4.6-5.0%
Asset beta	0.30	0.30	0.30
Equity beta	0.67	0.67	0.67
Post-tax cost of equity	5.3-6.1%	4.7-5.5%	4.82-5.33%
Debt premium	4.7%	1.8%	1.7-2.2%
Pre-tax cost of debt	6.1-6.7%	3.2-3.8%	3.45-4.20%
Vanilla WACC	5.8-6.4%	3.9-4.6%	4.07-4.71%
Pre-tax WACC	6.1-6.8%	4.2-4.9%	4.37-5.05%
Pre-tax WACC 5% up	-	-	4.59-5.31%
Pre-tax WACC 10% up	-	-	4.81-5.56%

Source: Europe Economics

## ANNEX B: EUROPE ECONOMICS ESTIMATES OF ERP

### How would you estimate a country premium?

In their Technical Report, Europe Economics discuss the following three approaches to calculating the country risk premium (CRP)<sup>23</sup>:

1. *Default spread* - This method measures the CRP in terms of the risk of a country defaulting and therefore is calculated using the spread of a “riskier” country’s government bond with that of the benchmark risk-free country. This approach is feasible only if the bonds issued by both the risky and the benchmark countries are denominated in the same currency. A similar approach for calculating the CRP was used by Oxera when calculating the spread between bond yields of Irish utilities with that of utilities in “safer” Eurozone markets such as Germany and the Netherlands. The formal estimation for the CRP using this method is as follows –

$$CRP = r_{f,a} - r_{f,b}$$

Where  $r_{f,a}$  denotes the yield on the government bond in country A (the riskier country) and  $r_{f,b}$  denotes the yield on the government bond in country B (the risk-free country).

2. *Relative market volatility* - This approach estimates the CRP by taking the equity risk premium (ERP) of the benchmark country and adjusting it by the ratio of the volatility of the domestic market over that of the benchmark market.

$$CRP = ERP_b \left( \frac{\sigma_a}{\sigma_b} \right)$$

Where  $\sigma_a$  and  $\sigma_b$  are the standard deviations of the domestic and benchmark market indices respectively.

3. *Default spread adjusted by the relative volatility of the stock market versus the bond market* – This method uses the country default spread as a basis for the CRP, and this is then adjusted to reflect the volatility of the domestic equity market in the “risky” country relative to the government bond market in the risk-free country.

$$CRP = (r_{f,a} - r_{f,b}) \left( \frac{\sigma_{equity,a}}{\sigma_{gov.bond,b}} \right)$$

### How should this country premium be integrated into the CAPM framework?

Europe Economics use three approaches, these are:

- Adding the country premium to the risk free rate;

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<sup>23</sup> Europe Economics (2013) ‘Mid Term Review of Electricity Networks WACC – Europe Economics Technical Report’, Europe Economics, August 2013.



- Incorporate the CRP into the equity risk premium; or
- Adding the CRP to the CAPM, weighted by a company specific measure of exposure.

### 1. Adding the CRP to the risk free rate

Formulation:  $R = R_0 + CRP + B(ERP)$

Depending on the estimation method used for calculating CRP, this can lead to inconsistencies in the CAPM formula. This includes:

- Inconsistent use of the risk free rate. By this they mean you are using a different risk free rate for  $R_0$  and ERP; and
- Adjustment to the equity beta implying that all companies in the risky country are equally exposed to country risk.

### 2. Incorporate CPR into MRP

Formulation:  $R = R_0 + B(ERP + CRP)$

This formulation doesn't assume all companies are equally exposed to risk (instead exposure to CRP is translated through their beta). Also, certain estimation method ensures that the CAPM equation uses consistent risk free rate. The effect is an increase in the benchmark ERP depending on the volume of the risky/benchmark market.

### 3. Adding to CAPM and include a measure of company exposure (gamma) that is separate from broader market risk (beta)

Formulation:  $R = R_0 + B(ERP) + \gamma_i CRP$

This is the most general method and disentangles the company's exposure to risky and benchmark markets. However, it requires estimation of the company specific exposure parameter (which they have a couple suggestions).

### Europe Economics conclusions

EE find that these approaches either cause methodological inconsistencies (1), or are practically too demanding (3).

Instead there is evidence that otherwise identical bonds in different countries contain a country idiosyncratic element. This means that the CRP can be accounted for by simply reflecting a higher debt premium into the cost of debt, as opposed to adding CRP to the underlying riskless rate. Furthermore, to account for the possibility that the Irish market may not be fully diversified, they suggest reflecting CRP by calculating WACC based on the Irish ERP.

## ANNEX C: DATA ESTIMATES FOR THE IRISH AND EUROPEAN ERP

### Irish ERP

#### *Dimson, Marsh and Staunton (DMS)*

The Credit Suisse Global Investment Returns Report (Dimson, Marsh and Staunton, February 2013) estimates that the arithmetic mean Irish equity premium over bonds between 1900 – 2012 is 4.6% p.a. with a 2.2% real return on bonds each year. The equity premium compares to a British equity premium of 5.0% and a US equity risk premium of 6.2% over the same period. The figure for Europe is 4.8%, but is denoted in US dollar terms and using US inflation, suggesting that the rate is only appropriate for the US investor.

However, the Irish figure cannot be considered to be of the same robustness as the US or UK figures, due to the data on which it is based. The lack of a robust index from the start of the twentieth century, or a carefully constructed one as is the case for the UK, means that the authors of the report have had to combine a range of data sources to develop indices for equity returns and bonds. Where historical Irish data has not been available, it has been supplemented by UK data, leading to pooling of Irish and British risk.

The makeup of the equities and bond indices used in the Credit Suisse report is summarised below.

- Equity: Dimson, Marsh and Staunton created a market capitalisation weighted index of Irish equity prices from 1900-1933 based on stocks traded on the Dublin and Cork stock exchanges. From 1934 until 1983, they used the Irish CSO Price Index of Ordinary Stocks and Shares. Until 1987, these estimates incorporate United Kingdom dividend yields. After 1988, they use the Irish Stock Exchange Equity index.
- Bonds: the authors use UK bond returns up to 1978. Between 1979-98, the return on an Irish twenty year gilt is used (based on estimates by Raida Stockbrokers) and only from 1999 is there a 15 year Irish government bond index available from Datastream.

The DMS still remains the best available data point in our opinion for the Irish ERP, but it is not perfect and thus other reference points could be useful.

#### *Damodaran database*

Professor Aswath Damodaran considers country premiums from the perspective of credit rating and relative default risk. Damodaran takes the US as the risk free asset and applies an adjustment based on appropriate spreads around the probability of default for each country internationally.

*Table C1: Estimates of the Irish ERP*

	Jan 2011	Jan 2012	Jan 2013	Jul 2013
Irish ERP	7.25%	9.60%	9.40%	9.88%
Irish country premium	2.25%	3.60%	3.60%	4.13%

*Source: Damodaran data online*

Whilst we would not advocate adopting a 9.9% ERP, this evidence does suggest that a 4.6% ERP for Ireland, as noted by DMS (and less than half the most recent figure above) may be underestimating the Irish ERP.

## Survey evidence

Further evidence on the possible underestimation of the Irish ERP, though not to the same extent, is noted in an international review of survey evidence by Fernandez, Aguirreamalloa and Corres 2011<sup>24</sup> and 2013<sup>25</sup>.

Table C2: Estimates of the Irish ERP from survey evidence

	Ireland	UK	Germany	US	Spain	Portugal	Italy
<i>2013 data</i>							
Average	6.2%	5.5%	5.5%	5.7%	6.0%	6.1%	5.7%
Median	7.0%	5.0%	5.0%	5.5%	5.5%	5.9%	5.5%
<i>2011 data</i>							
Average	6.0%	5.3%	5.4%	5.5%	5.9%	6.5%	5.5%
Median	5.1%	5.0%	5.0%	5.0%	5.0%	6.1%	5.0%

Source: Fernandez, Aguirreamalloa and Corres (2011 & 2013)

This analysis suggests that the Irish ERP is higher than the ERP for the UK, Germany or the US. This is contrary for each country to the data used for DMS, in our opinion being caused by the idiosyncracies with the Irish DMS data as noted previously. The rates for Spain, Portugal and Italy are above German rates, whose own average is 0.7% above the latest European DMS figure.

We think that these data entries should be taken alongside regulatory precedent when making a decision. The change in the median estimate would suggest that there is still volatility in the ERP.

## European ERP

### *Dimson, Marsh and Staunton (DMS)*

For Europe, the equity premium measure used by EE is calculated as the returns above a GDP-weighted risk free rate index from 13 European countries. In calculating their risk free rate, EE use German data as this is the most riskless asset. It is difficult with the data available to estimate what effect this is having, but taking the lowest risk free rate with an ERP calculated against a currently higher risk free rate may be underestimating the ERP. This index is also denominated in US dollars, so it may be capturing currency based changes also. We provide the rates against US treasury bills as a reference point to consider.

Table C3: DMS estimates of the European ERP

1900-	2010	2011	2012
Equity premium versus bonds	5.2%	5.0%	4.8%
Equity premium versus US bills	5.8%	5.7%	5.1%

Source: Dimson, Marsh and Staunton, Credit Suisse Investment Returns Reports (2011-13)

## Use of this data

<sup>24</sup> Fernandez, Aguirreamalloa and Corres (2011) Market Risk Premium used in 56 countries in 2011 – a survey with 6,014 answers, IESE Business School.

<sup>25</sup> Fernandez, Aguirreamalloa and Corres (2013) Market Risk Premium used in 51 countries in 2013 – a survey with 6,237 answers, IESE Business School.

In the table below we illustrate which approach has been referenced in each regulatory decision.

*Table C4: Recent Equity Risk Premium Determinations in Spain, Italy and Portugal*

Country	Decision	DMS data	Fernandez et al	Damodaran
Ireland	CER Aug 12	Yes		
Ireland	CER Nov 12	Yes		
Italy	AGCOM Nov 10	Yes	Yes	
Italy	AEEG Dec 11	Yes		Yes
Italy	ENAC Oct 12	Yes	Yes	Yes
Spain	CMT Dec 12	Yes	Yes	Yes
Portugal	ERSE Dec 11		Yes	
Portugal	ANACOM Oct 12	Unclear		
Portugal	ERSE Jun 13	Unclear		

*Source: EE, Regulatory determinations*

*Note: this contains the summary to the best of our knowledge.*

## ANNEX D: LONG TERM INTEREST RATES IN EUROPE

Table D1: Long term interest rates by country

Average period	GER	IRE	ESP	ITA	POR	FRA	BEL	NET	AUT	FIN
<b>Long term interest rates</b>										
Since Jan 00	3.47	5.00	4.49	4.55	5.49	3.77	3.99	3.67	3.80	3.69
Jan 00 to Aug 08	4.15	4.26	4.27	4.43	4.35	4.23	4.31	4.22	4.27	4.25
Aug 08 - present	2.47	6.10	4.81	4.74	7.16	3.09	3.52	2.85	3.12	2.86
2011-present	1.90	6.79	5.39	5.16	9.29	2.72	3.28	2.31	2.61	2.27
2013-present	1.51	3.87	4.70	4.37	6.35	2.16	2.39	1.90	1.96	1.81
Latest value	1.89	3.95	4.42	4.54	7.06	2.49	2.75	2.32	2.34	2.19
<b>Difference to German rates</b>										
Jan 00 - present	-	1.54	1.02	1.09	2.02	0.30	0.52	0.20	0.34	0.22
Jan 00 - Aug 08	-	0.11	0.12	0.28	0.20	0.08	0.16	0.08	0.13	0.11
Aug 08 - present	-	3.63	2.34	2.27	4.69	0.62	1.05	0.38	0.65	0.38
2011- present	-	4.89	3.48	3.26	7.39	0.82	1.38	0.41	0.70	0.37
2013 - present	-	2.36	3.19	2.86	4.84	0.65	0.88	0.39	0.45	0.30
Latest value	-	2.06	2.53	2.65	5.17	0.60	0.86	0.43	0.45	0.30

Source: ECB

Note: This involves monthly data on harmonised long-term interest rates

## ANNEX E: IMPACT OF AIM UP ON DIFFERENT COST OF CAPITAL ELEMENTS

The EE report notes that there may be an aim up required for the 2014-15 EirGrid allowance based upon potential under-recovery in previous years. Based on the mid-point of the EE range for 2014-15, we estimate what would be the corresponding change in parameter values for an uplift of 5% or 10%.

Table E1: Equivalent impact of 5% aim up

%	EE mid-point (no aim up)	RfR adjustment	ERP adjustment	RfR + ERP adjustments	RfR + Debt premium adjustments
Gearing	55.0	55.0	55.0	55.0	55.0
Risk free rate	1.88	2.10	1.88	1.99	2.34
Debt premium	1.95	1.95	1.95	1.95	1.49
<b>Cost of debt (pre-tax)</b>	<b>3.83</b>	<b>4.05</b>	<b>3.83</b>	<b>3.94</b>	<b>3.83</b>
Equity Risk Premium	4.80	4.80	5.50	5.14	4.80
Equity beta	0.67	0.67	0.67	0.67	0.67
<b>Cost of equity (post-tax)</b>	<b>5.08</b>	<b>5.30</b>	<b>5.54</b>	<b>5.42</b>	<b>5.54</b>
Tax	12.5	12.5	12.5	12.5	12.5
<b>Cost of equity (pre-tax)</b>	<b>5.80</b>	<b>6.06</b>	<b>6.33</b>	<b>6.19</b>	<b>6.33</b>
<b>Pre-tax WACC</b>	<b>4.71</b>	<b>4.95</b>	<b>4.95</b>	<b>4.95</b>	<b>4.95</b>

Note: grey shading denotes a change in parameter value from the EE mid-point values

Table E2: Equivalent impact of 10% aim up

%	EE mid-point (no aim up)	RfR adjustment	ERP adjustment	RfR + ERP adjustments	RfR + Debt premium adjustments
Gearing	55.0	55.0	55.0	55.0	55.0
Risk free rate	1.88	2.32	1.88	2.10	2.80
Debt premium	1.95	1.95	1.95	1.95	1.03
<b>Cost of debt (pre-tax)</b>	<b>3.83</b>	<b>4.27</b>	<b>3.83</b>	<b>4.05</b>	<b>3.83</b>
Equity Risk Premium	4.80	4.80	6.20	5.50	4.80
Equity beta	0.67	0.67	0.67	0.67	0.67
<b>Cost of equity (post-tax)</b>	<b>5.08</b>	<b>5.52</b>	<b>6.01</b>	<b>5.77</b>	<b>6.00</b>
Tax	12.5	12.5%	12.5%	12.5%	12.5%
<b>Cost of equity (pre-tax)</b>	<b>5.80</b>	<b>6.31</b>	<b>6.87</b>	<b>6.59</b>	<b>6.86</b>
<b>Pre-tax WACC</b>	<b>4.71</b>	<b>5.19</b>	<b>5.19</b>	<b>5.19</b>	<b>5.19</b>

Note: grey shading denotes a change in parameter value from the EE mid-point values

## ANNEX F: SENSITIVITY TESTING ON DIFFERENT APPROACHES

This table shows the different approaches that can be taken to applying the country/crisis risk premium (CRP) to the cost of capital (WACC). The CEPA approach should a CRP be required is to add this to the risk free rate (see the main text for further commentary). The EE approach is to adjust the debt premium and ERP (though no positive adjustment has been made to the ERP on a forward looking basis for the WACC).

Table F1: Sensitivities on the WACC based on the approach to the CRP

CRP	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
<i>CEPA approach (adjusting the risk free rate)</i>											
CoD (post-tax)	2.50	3.50	4.50	5.50	6.50	7.50	8.50	9.50	10.50	11.50	12.50
CoE (pre-tax)	5.94	7.09	8.23	9.37	10.51	11.66	12.80	13.94	15.09	16.23	17.37
CoE (post-tax)	5.20	6.20	7.20	8.20	9.20	10.20	11.20	12.20	13.20	14.20	15.20
WACC (pre-tax)	4.05	5.11	6.18	7.24	8.31	9.37	10.44	11.50	12.56	13.63	14.69
CoE - CoD (post-tax)	<b>2.70</b>	<b>2.70</b>	<b>2.70</b>	<b>2.70</b>	<b>2.70</b>	<b>2.70</b>	<b>2.70</b>	<b>2.70</b>	<b>2.70</b>	<b>2.70</b>	<b>2.70</b>
<i>EE approach (adjusting debt premium and equity risk premium by the CRP)</i>											
CoD (post-tax)	2.50	3.50	4.50	5.50	6.50	7.50	8.50	9.50	10.50	11.50	12.50
CoE (pre-tax)	5.94	6.70	7.47	8.23	8.990476	9.75	10.51	11.28	12.04	12.80	13.56
CoE (post-tax)	5.20	5.87	6.53	7.20	7.87	8.53	9.20	9.87	10.53	11.20	11.87
WACC (pre-tax)	4.05	4.94	5.84	6.73	7.62	8.51	9.41	10.30	11.19	12.09	12.98
CoE - CoD (post-tax)	<b>2.70</b>	<b>2.37</b>	<b>2.03</b>	<b>1.70</b>	<b>1.37</b>	<b>1.03</b>	<b>0.70</b>	<b>0.37</b>	<b>0.03</b>	<b>-0.30</b>	<b>-0.63</b>

Note: 0% CRP is indicative of possible figures for a German company (2% RfR, 4.8% ERP, 0.67 equity beta, 55% gearing, 0.5% debt premium)