Commission for
Communications Regulation

Response to Consultation and
Decision Notice

Eircom's Cost of Capital

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1 Executive Summary

This Decision Notice and Decision Instrument follows on from the consultation document "Review of Eircom's cost of capital", published in November 2007 ("the Consultation").[1]

This final decision relates to the appropriate rate of return on capital or investment employed by Eircom in the production of its regulated fixed-line services. It is based on the substantial body of empirical estimation and analysis carried out by Oxera Consulting Limited on behalf of the Commission for Communications Regulation ("ComReg") and ComReg's own consideration of that analysis. Oxera's assessment was published with the Consultation.[2] Oxera subsequently undertook a further assessment of the issues raised by respondents which has been incorporated into ComReg's final decision on Eircom's cost of capital. Given the uncertainty and volatility in the international financial markets, which affects the rates of return required by investors, ComReg also explored this issue in detail with Oxera and considered that recent market developments since ComReg's initial assessment should be incorporated into the final cost of capital determination for Eircom.

The objective for setting the weighted average cost of capital ("WACC") is to allow a sufficient return to investors that provides adequate incentives for investment. Hence, the associated implications on Eircom's incentives and ability to invest have also been examined. In light of its objective to promote efficient and timely investment, including Next Generation Network ("NGN") investment, and to stimulate innovation in telecommunications infrastructure and services, ComReg has concluded the following:

- The WACC methodology and the Capital Asset Pricing Model ("CAPM") is the appropriate methodology to derive an overall nominal pre-tax cost of capital for Eircom's fixed-line business.
- An overall WACC range of 7.77% to 11.08% for Eircom's fixed-line business is appropriate and will therefore be maintained as originally proposed in the Consultation.[3]
- Within this range, a WACC of 10.21% is considered the appropriate point estimate of the WACC for Eircom; this value takes into consideration the impact of recent international financial turmoil.

The overall approach to setting the WACC is compatible with providing investment incentives to Eircom. In putting in place a new WACC, ComReg explored the possible

[1] ComReg (2007) *Review of Eircom's Cost of Capital*, ComReg Document 07/88.

[2] ComReg (2007) Eircom's Cost of Capital Prepared for ComReg, ComReg Document 07/88a.

[3] ComReg (2007) op. cit.

application of split rate WACCs and capital expenditure ("capex") triggers[4] as potential measures to incentivise new investment, including capex on Next Generation Access ("NGA") infrastructure. ComReg solicited views on whether a single WACC is appropriate for Eircom and whether or not the use of capex triggers is appropriate as a means of incentivising investment.

In relation to the issue of a split WACC, while industry respondents support in principle the estimation of a split WACC, they consider that it would be premature to do so at this time. In view of the analysis undertaken and having full regard to the submissions made in response to the Consultation, ComReg concludes that a single WACC of 10.21% is a reasonable estimate of Eircom's investment and business risk profile. However, ComReg may revisit the question of whether a split cost of capital for different regulated business areas might be appropriate for Eircom, subject to the availability of robust evidence on risk differentials. ComReg might therefore undertake additional work in this area in the future, if it is deemed appropriate.

In relation to capex triggers, one respondent indicated that it is not opposed to some flexibility in the application of the CAPM methodology but suggests that this should be done in a 'careful if pragmatic fashion paying heed to the impacts on consumers and competitors'. The other respondent believes that capex triggers are probably more suitable for a monopoly provider, yet as Eircom does not have a legal monopoly this mechanism might not be the most appropriate.

ComReg recognises that there is ongoing need for investment in telecoms infrastructure in Ireland. Accordingly, the WACC of 10.21% for Eircom allows for an appropriate return on future investments in that infrastructure.

In order to incentivise new NGN/NGA specific capex, ComReg may consider in the future whether an increase or uplift on the WACC of 10.21% linked to those investments might be appropriate. At this stage, ComReg has no robust evidence before it on the existence of risk differentials between NGN/NGA and the rest of Eircom's regulated assets. Moreover, Eircom has so far made no clear commitment to the characteristics and size of the potential capex programme in NGN/NGA. Therefore, given the current capex projections, no uplift has been applied at this time. ComReg may reassess this finding in light of any substantial new information submitted to it.

The Decision Instrument setting out Eircom's new WACC is contained in Appendix A. A WACC of 10.21% will apply to Eircom from 22 May, 2008, as a basis for allowing Eircom an adequate rate of return for regulatory purposes, including the setting of relevant regulated wholesale prices and it will be used in Eircom's separated accounts. Information that may be confidential/commercially sensitive has been redacted from this document and where relevant, this has been indicated throughout.

[4] Split rate WACCs are differential WACCs applied to different portions of the regulated business. 'Capital expenditure triggers' is a generic term for a regulatory measure that introduces financial rewards or penalties (or both) linked to a specific level and /or type of capex undertaken by the regulated company.

2 Background to this Decision

2.1 In November 2007, ComReg published the Consultation setting out its proposed approach to estimating Eircom's WACC.[5] ComReg explored a number of issues in detail with Oxera regarding the calculation of Eircom's cost of capital for its fixed-line business. Oxera's Report was published in conjunction with ComReg's Consultation.[6] The implications on Eircom's incentives and ability to invest were also examined.

2.2 The WACC provides a measure of the appropriate rate of return on capital or investment employed by Eircom in the execution of its regulated fixed line services. The cost of capital is a weighted average of two components: the cost of equity (r_e); and the cost of debt (r_d). The weighting is determined by the relative proportions of debt and equity held by the firm. As such a firm's cost of capital is calculated according to the following formula (on a pre-tax basis):[7]

$$WACC = (r_d \times g) + [r_e \times (1-g)]/(1-t)$$ [8]

2.3 The correct determination of the cost of capital is a very important element in the regulatory process. It has an impact on Eircom's regulated revenues, the tariffs other operators pay for access, the overall competitive process, and ultimately the end prices paid for by consumers. When ComReg sets price controls for services supplied in markets where firms have Significant Market Power ("SMP"), ComReg must decide what would constitute an adequate rate of return on capital employed in the execution of Eircom's regulated services.[9] (It should be noted that Eircom has SMP in a number of relevant markets). An existing WACC value of 11.5% is currently used by ComReg as one input into the setting of charge controls and price caps for retail and wholesale services, as well as calculating the

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[5] ComReg (2007), *Review of Eircom's cost of capital*, Document 07/88, 1 November. This document is referred to throughout as "the Consultation".

[6] Oxera's report was published at the same time as the Consultation in the interests of transparency. ComReg (2007), *Eircom's Cost of Capital Prepared for ComReg*, ComReg Document 07/88a. This document is referred to throughout as Oxera's Report.

[7] For a full glossary of terms see Appendix B below.

[8] Where:
r_d = Cost of Debt = (Risk-Free Rate + Debt premium);
r_e = Cost of Equity = (rf + β * Equity Risk Premium);
r_f = nominal Risk-Free Rate ("RFR");
dp = debt premium;
β = Beta;
g = gearing;
t = tax rate.

[9] According to Article 13 (1) of the Access Directive (2002/19/EC), National Regulatory Authorities ("NRAs") may impose price controls on operators with SMP, including obligations of cost orientation and cost accounting. NRAs are required to take into account the investment made by the operator and allow a reasonable rate of return on adequate capital employed, taking into account the risks involved.

return on capital employed in Eircom's regulated accounts.[10] For instance, the existing WACC of 11.5% is a key input in the calculation of the Retail Price Cap ("RPC") for Eircom's retail narrowband access services and the wholesale access price for Eircom's local loop.[11] A number of pricing decisions are currently being reviewed, amongst others, the price of the local loop and interconnection charges, including the imposition of a wholesale price cap. If it is considered, following these market review processes, that determinations of SMP should be made in particular markets and charge controls or price caps are appropriate, then the WACC will form a key input into determining the appropriate pricing mechanisms.

2.4 Since 2003, various aspects of the Irish economy and financial markets, as well as the structure of the telecoms industry more generally, and of Eircom in particular, have changed. These changes might have implications for Eircom's cost of capital. As a result, ComReg has reviewed what constitutes an adequate return on investment for Eircom. ComReg's key preliminary views were outlined in the Consultation and are summarised below:

- The WACC for Eircom's fixed-line business should be set within a range of 7.77% to 11.08% and that a WACC approximately in the mid-point of this range (9.43%) would constitute an adequate return on investment for Eircom.
- Efficient investment incentives would be promoted via an approach to capital structure and tax allowances that combined a notional level of gearing with the statutory corporation tax rate of 12.5%.
- There is no robust evidence available to ComReg to support the application of a disaggregated WACC (split cost of capital) across Eircom's regulated businesses.
- A single WACC of around the mid-point of the aforementioned range is a reasonable measure of Eircom's investment/business risk profile at this time.

2.5 Thus, ComReg's preliminary view implied that the appropriate WACC going forward should be lower than the previous determination of 11.5%. However, in the Consultation, ComReg gave consideration to its statutory obligations under the Communications Regulation Act, 2002 to promote efficient and timely investment (including NGN investment) and to stimulate innovation in telecommunications infrastructure and services.[12] For this reason, ComReg explored a number of potential incentive based measures to promote efficient investment incentives for Eircom. One measure considered was the possibility of

[10] Eircom's current WACC is 11.5% (calculated on a pre-tax nominal basis) for all relevant regulatory purposes. This was put in place in 2003 following a detailed review.

[11] ComReg does not propose to change at the present time the WACC of 11.5% underlying the RPC. If, however at a future date ComReg believes it is necessary to change this, it will consult on the matter.

[12] Setting a rate of return that is too low could make future investment unattractive to investors. Similarly, setting it too high would allow the regulated company to earn excessive returns at the expense of its wholesale and retail customers while also potentially distorting pricing signals to investors.

setting different rates of return between existing investments and new investments, or setting different rates for different business divisions within Eircom. Another measure considered was the use of capex triggers, whereby commitments to significant new investment projects, if deemed appropriate and justified, could result in a higher WACC for those new investments, while the remaining assets would be characterised by a lower rate of return. ComReg indicated in the Consultation that if Eircom committed to clear investment plans and such a capex programme was considered a significant addition to Eircom's Regulatory Asset Base ("RAB"), then ComReg would consider carrying out a further review of risk differentials between NGN/NGA and other regulated assets.

2.6 ComReg solicited views on the full range of issues covered in the Consultation and Oxera's Report. Two responses were received, from Eircom and BT. ComReg has reviewed carefully and in detail all comments by those respondents to the Consultation and would like to thank both respondents for submitting their views and contributing to the decision making process. All views of respondents have been taken in to account when arriving at the final decision in relation to an appropriate WACC for Eircom's regulated fixed line business which is set out in Appendix A.

3 Responses to Issues Raised in the Consultation

Introduction

3.1 On the basis of the substantial body of empirical analysis carried out by Oxera in relation to the appropriate rate of return on capital invested by Eircom, ComReg set out a proposed approach for determining an appropriate and robust estimate of the cost of capital for Eircom's fixed-line regulated business. This approach, which built on the CAPM-based WACC methodology, presents ranges for each parameter value in the model based on a broad range of evidence available to ComReg from which provisional conclusions were drawn and proposals made.

3.2 ComReg indicated that it considered the CAPM-based WACC methodology to be the appropriate methodology to calculate the cost of capital for Eircom's fixed-line regulated business. ComReg presented the estimation techniques it used to calculate each cost of capital parameter value, which was carried out under two alternative gearing scenarios (a notional gearing assumption and an actual gearing structure). Respondents' views were requested on the overall methodological approach and specific methodologies used to estimate each parameter.

3.3 Based on Oxera's assessment of the issues, the Consultation set out ComReg's preliminary view that the WACC should be set in the range of 7.77% to 11.08% over the forthcoming regulatory period. ComReg was also of the preliminary view that a WACC approximately in the mid-point of this range (9.43%) would constitute an adequate return on investment for Eircom. Respondents were asked to comment on the proposed WACC range and propose a specific value within the range that they considered appropriate. ComReg also invited respondents' views on any additional factors that required analysis by ComReg.

3.4 In addition, ComReg indicated that there are a number of key policy considerations that should be taken into account when estimating an appropriate WACC for the forthcoming regulatory period. These policy considerations involve the need to create appropriate incentives for future investment in telecoms infrastructure in Ireland and the appropriate approach to capital structure incentives and financing. Hence, ComReg explored a number of potential incentive based measures to promote efficient investment incentives for Eircom. ComReg solicited views on whether the proposed WACC range (from 7.77% to 11.08%) would support incentives for long-term investments in infrastructure assets and would provide an adequate allowance for bearing any associated systematic risks. In the event that this was not the case, ComReg requested views on ways to incentivise investments, including the possible application of a split WACC, the use of capex triggers and/or through taxation policy.

3.5 Responses were received from Eircom and BT. The following sections set out the issues raised by respondents, ComReg's examination of respondents' comments and its final conclusions. ComReg notes that respondents did not comment directly on the turmoil that has occurred in the international financial markets recently and its affect on the matters under consideration. Given the importance of this matter, it is also addressed by ComReg in Section 4.

Methodology Used to Calculate the Cost of Capital

3.6 ComReg proposed that the WACC methodology should continue to be used to calculate an appropriate cost of capital for Eircom's fixed-line business and that the CAPM should continue to be used to estimate the cost of capital. Respondents were asked whether they agreed that the CAPM-based WACC methodology continues to be the most appropriate basis for estimating Eircom's cost of capital.

Views of Respondents

3.7 As in the previous cost of capital determination in 2003, there is broad agreement among respondents that the CAPM-based WACC methodology continues to be the most appropriate basis for estimating Eircom's cost of capital. While noting that there can be some empirical shortcomings in the CAPM methodology, as is also the case with alternative methodologies, the respondents agree with ComReg that CAPM has a clear theoretical foundation and is the most widely used and generally accepted method.

ComReg's Position and Conclusion

3.8 ComReg and Oxera examined the suitability of the CAPM based approach in WACC determinations as compared to alternatives.[13] In light of the respondents' views above, the views expressed by ComReg in the Consultation and, given the importance of maintaining regulatory consistency, the CAPM-based WACC methodology will continue to be used to derive an overall nominal pre-tax cost of capital for Eircom's fixed-line business.

Estimation of Eircom's Asset Beta[14]

3.9 Based on Oxera's assessment, it was proposed that Eircom's fixed-line asset beta was in the range of 0.45 to 0.70, with a midpoint estimate of 0.57. The asset beta used to set Eircom's current WACC was 0.8, which is above the upper end of the range proposed by Oxera. This range was estimated using a combination of methodologies and data sources explored by Oxera.[15]

3.10 The first approach adopted by Oxera to estimate Eircom's asset beta involved the estimation of Eircom Group's beta as a proxy for Eircom's fixed-line beta. This approach incorporated three methodologies:

- Oxera carried out statistical estimation of Eircom's equity beta using different data frequencies (daily, weekly, monthly), different market indexes (FTSE in the UK, ISEQ in Ireland) and various time periods (between March 2004 and

[13] See paragraphs 3.3 - 3.6 of the Consultation and pages 11-13 of Oxera's Report.

[14] Appendix B contains a short discussion on the issue of the asset beta.

[15] Oxera's approach to estimating Eircom's fixed line beta is set out in section 5, pages 22-23 of Oxera's Report. Tables 5.10 and 5.11 of Oxera's report present a summary of beta estimates from the various approaches. In addition, other specific business factors, such as capital intensity, as well as the business characteristics of Eircom's various divisions were explored by Oxera to provide an insight into the level of systematic risk faced by Eircom.

September 2005). The implied asset betas were de-levered from the equity betas estimates.

- Oxera also examined third-party estimates of Eircom's equity beta. These estimates came from Bloomberg and the London Business School Risk Management Service.
- Oxera considered the beta estimates of a set of comparator companies with a large proportion of value attributable to fixed-line operations.

3.11 Oxera used clustering analysis to select a set of markets (countries) to identify the appropriate comparator companies referred to in paragraph 3.10.[16] The incumbent telecoms provider in each comparator country was chosen as the relevant comparator company.[17] The equity betas of comparator companies whose business mix was most similar to that of Eircom's (i.e. with a large proportion of their operating profit attributable to fixed-line operations) were used as direct comparators to Eircom.

3.12 The second approach adopted by Oxera to estimate Eircom's asset beta involved the direct estimation of Eircom fixed-line beta using two proxies:

- Oxera analysed an extended set of comparator companies. The beta estimates for the comparators were dis-aggregated in order to estimate betas for the fixed-line business. The dis-aggregation was performed in order to control for the potential risk differentials between different business activities (fixed versus mobile) in a robust manner. The result of this analysis is a range of estimates for the fixed-line operations of Eircom.
- Oxera looked at relevant regulatory precedent on the choice of asset beta for regulated telecoms incumbents in the UK and New Zealand as a proxy for Eircom's fixed-line beta.
- Oxera also included ComReg's beta estimate from the previous WACC review, recognising the importance of regulatory precedent. Oxera did however note that caution should be applied when considering the estimates from the previous WACC review given the results of the methodologies undertaken by Oxera and the time that has elapsed since the last WACC review.

[16] Clustering analysis is a statistical technique that employs a number of user-specified criteria to select countries with telecoms market characteristics similar to those of Ireland in order to infer a beta range for Eircom based on beta estimates for the selected comparator companies using market data.

[17] See Section 5.1.3 and Appendix 2 of Oxera's Report for further information on the clustering analysis used by Oxera.

Table 1: Summary of Beta Estimates

	Low	Midpoint	High
Direct statistical estimation	0.28	0.49	0.69
Third-party estimates	0.31	0.41	0.51
Peer comparison	0.56	0.64	0.71
Implied fixed-line comparators	0.44	0.56	0.67
Regulatory precedent	0.50	0.65	0.80
Previous WACC Determination	0.60	0.70	0.80
Average of Beta estimates	**0.45**	**0.57**	**0.70**

Source: Oxera's Report, Table 5.10 and Table 5.11

3.13 The average of the results of each of these methodologies gave a final range estimate of Eircom's asset beta of between 0.45 and 0.70, with a midpoint of 0.57.

3.14 Respondents were asked whether they agreed with the proposed approach to estimating Eircom's fixed line beta.

Views of Respondents

3.15 One respondent supports the use of different methodologies to estimate Eircom's asset beta. This respondent notes that the estimates for Eircom's beta are below those estimated in the last review, and argues that this is consistent with other evidence.

3.16 The other respondent raised concerns about the methodologies used for estimating Eircom's fixed-line beta and suggests alternative calculations resulting in a change in the asset beta range from the proposal of 0.45 - 0.70 to **[Confidential].** This respondent indicates that Eircom's beta cannot be estimated directly from market data as it is no longer a listed company, and the two periods during which Eircom was listed were characterised by takeover speculation. In addition, this respondent disputes the set of comparators and precedents used by Oxera, and with the dis-aggregation of the beta between the fixed-line and mobile business. Specifically, this respondent makes the following comments on Oxera's asset beta estimation:

- The selected variables used for the clustering analysis relate only to the retail market conditions and therefore do not fully reflect Eircom's business structure, as the wholesale access and the wholesale core network are the two largest divisions of Eircom in terms of capital employed. In addition, the respondent believes that the variables selected fail to reflect accurately the effects of fixed-mobile substitution;
- Comparator asset betas do not require adjustment to take account of mobile assets since the risk of mobile telephony is now comparable to fixed line telephony;

- In terms of regulatory precedents, this respondent proposes a different set of regulatory decisions that results in an asset beta range of **[Confidential].** As such, the respondent argues that there is no justification in changing the asset beta value of 0.8.

ComReg's Position

3.17 As stated in the Consultation, ComReg was of the view that the application of the various methodologies to produce a range for Eircom's asset beta constituted a rigorous and evidence-based approach. Each methodology acts as a separate data point in the analysis while also providing a cross-check on the other results. Nevertheless, in light of the above responses to the Consultation and in view of the sensitivity of the overall WACC range to the values of the underlying parameters, in particular the asset beta estimate, Oxera has undertaken further analytical work in relation to the proposed beta estimation performing a series of robustness checks. In particular, Oxera explored the use of market data to derive direct beta estimates, the application of clustering analysis and an analysis of the regulatory precedents used.

3.18 On the basis of the above analysis, ComReg is of the view that there is no reason for excluding direct estimates of Eircom's beta obtained from using market data. Following best practice, Oxera excluded the period prior to acquisition (i.e. the 'event' period between the start of acquisition rumours and the subsequent period when Eircom was acquired by Babcock & Brown). Oxera performed tests to confirm that the adopted approach was robust and the resulting betas estimates were statistically significant. In addition, Oxera shows that the liquidity of Eircom's stock during the listed period was comparable to that of other European telecoms companies.

3.19 Following advice from Oxera, ComReg is of the view that there appears to be no reason to alter the original comparator approach adopted by Oxera for the following reasons:

- The variables used by Oxera for the analysis already capture the main features of the telecoms markets as they combine information in relation to the telephony, broadband and mobile business.
- The inclusion of variables proposed by the respondent makes little difference to the analysis and may in fact introduce a bias in the estimates due to double counting as some of the new variables proposed by the respondent repeat the information already considered in the variables proposed by Oxera.
- Considering each variable in the cluster analysis individually, as proposed by one respondent, does not allow for consideration of all the relevant criteria simultaneously, which might be seen as the essence of the clustering analysis. This is likely to lead to arbitrary interpretations of the relative importance of the results from individual analyses.
- The comparator set used by Oxera does not change when additional variables, suggested by one respondent, are included in the clustering analysis.

3.20 Furthermore, ComReg is of the view that the methodology used by Oxera, which disaggregated the comparator betas to account for operations in the mobile

business, is valid and supported by empirical evidence as well as regulatory precedent. There are a number of arguments that suggest the possibility that mobile operations might be characterised by a different level of risk than fixed-line operations. Firstly, demand, revenue and profit volatility is higher in the mobile business than in fixed-line business. And secondly, mobile networks are still developing and face future technological risks. As a result, it is appropriate to allow for the possibility that a fixed-line business might be less risky than a mobile business, as reflected in the original analysis. Oxera's analysis does not *a priori* assume that the beta of fixed and mobile operations is the same.

3.21 As noted above, one respondent suggests an alternative analysis of regulatory precedents on beta, which excludes some of the precedents used by Oxera in the original analysis. However, this respondent offers no justifications for the new selection. Where there is no clear justification for excluding specific regulatory precedents, it seems logical and reasonable to take all relevant cases into account. The additional regulatory precedent on beta estimates suggested by this respondent supports the original beta range.

3.22 Based on a thorough analysis of the comments raised by respondents on this key determinant of the WACC, ComReg has not been presented with sufficient persuasive evidence to warrant a change in the original asset beta range proposed by Oxera of 0.47 to 0.7, with a midpoint estimate of 0.57. Furthermore, the different methodologies adopted by Oxera in estimating Eircom's beta consistently showed that more recent estimates of Eircom's beta are below 0.8, the asset beta level determined at the last WACC review.

Conclusion

3.23 **For these reasons, ComReg concludes that the range of 0.47 to 0.7, with a midpoint estimate of 0.57, should be retained for Eircom's asset beta in determining an overall WACC.**

Approach to Gearing and Taxation

3.24 The Consultation and Oxera's Report considered two approaches for calculating Eircom's overall WACC; one based on a notional gearing structure[18] and another using the actual financial structure of Eircom.[19] ComReg noted that other sectoral regulators have more recently been setting cost of capital estimates in line with notional levels of gearing that they consider to be consistent with maintaining an investment grade credit rating. The notional level of gearing has a number of merits. It allows flexibility to the company to adopt the most efficient capital structure and reduces the degree of regulatory intervention in the financing of the

[18] A notional level of gearing is based on the gearing that might be characteristic of a reasonably financed company carrying out the same operation as Eircom using relevant benchmark data. See Section 6.2 of Oxera's report for a full discussion of how Oxera examined Eircom's notional level of gearing.

[19] An actual level of gearing is calculated using information on Eircom's pre-acquisition debt and transaction enterprise value to estimate gearing. See Section 6.1 of Oxera's report for a full discussion of how Oxera examined Eircom's actual gearing.

business. It also reflects the inherent uncertainty regarding the future evolution of the capital structure of the business.

3.25 Nevertheless, ComReg indicated that there are some reasons to use actual rather than notional gearing, particularly in cases where actual gearing might significantly exceed notional levels.[20] Not investigating actual gearing might also ignore some of the implications of the changes to Eircom's capital structure that have taken place since its acquisition. A review of the capital structure decisions of comparators indicates that Eircom's level of actual gearing is above the average actual level of gearing of its peers. ComReg noted that such changes might have implications for the level of gearing appropriate for the cost of capital determination, as well as for the appropriate way to remunerate Eircom for tax.

3.26 In relation to the sensitivity of the overall WACC to the different gearing approaches, ComReg indicated that at the proposed notional level of gearing between 30% and 50%, the proposed nominal pre-tax WACC was estimated to lie in the range of 7.77% to 11.08%. At the actual level of gearing, the nominal pre-tax WACC was estimated to lie in the range of 7.68% to 10.49%, which is slightly below the range estimated at the notional level of gearing.

3.27 In light of the proposal to use a notional gearing assumption, the choice between a statutory tax rate or an effective rate was also considered. This is relevant because a high level of gearing gives rise to potentially large debt tax shields.[21] ComReg highlighted that the relatively significant changes in Eircom's capital structure since the previous WACC review introduced a number of challenges: the sharing of the potential benefits of the debt tax shield between Eircom and its customers; the appropriate remuneration for tax; and the promotion of financial stability whilst also promoting a favourable investment climate such that future efficient investment/innovation in telecoms infrastructure is encouraged in Ireland.

3.28 Using an effective tax rate brings tax allowances closer to the actual taxes paid by the company and may redistribute some of the potential tax benefits of debt (arising from a highly geared capital structure) from the company to consumers. ComReg notes that a number of UK regulators have adopted effective tax rates for this reason. An alternative approach to taxation by the regulator is to apply the statutory tax rate and assume a higher notional level of gearing. This would result in a decrease in the implicit tax allowance over and above the vanilla WACC[22] and therefore, redistribute some of the tax benefits of leverage to consumers.

3.29 In the event that an assumed notional level of gearing is lower than actual gearing, applying a statutory tax rate would enable Eircom to keep the benefits of any debt tax shields above the assumed notional level and would therefore be favourable to

[20] Eircom's notional level of gearing was set at 25% in the previous review. Oxera's analysis of actual gearing showed that this notional level is significantly below Eircom's current actual gearing.

[21] A tax shield is the reduction in income taxes that results from using an allowable deduction from taxable income. As interest on debt is a tax-deductible expense, increasing debt can act as a tax shield.

[22] The post-tax vanilla WACC is calculated using the pre-tax cost of debt and the post-tax cost of equity. See Section 7.1 of Oxera's Report for a discussion of vanilla WACC.

Eircom. The implied tax allowance in the cost of capital might therefore be larger than actual taxes paid. As discussed earlier, Eircom's actual gearing is notably higher than the assumed gearing of 25% used in the previous WACC review, and therefore, adopting the statutory tax rate might continue to create tax benefits to Eircom for continuing with its current debt rich capital structure.

3.30 However, ComReg recognised that a significant change in the regulatory treatment of gearing and/or taxation may have important financial consequences for Eircom at this time and may have further implications for the incentives for investment in the future. Hence, the treatment of taxation is an important issue, primarily in terms of how it interacts with the proposed approach to gearing levels. However, there are some clear benefits of using the statutory tax rate, not least because of the likely complexities in estimating effective tax rates for Eircom and the practical difficulties in predicting how these would evolve over the review period.

3.31 ComReg proposed to use a notional level of gearing in the range of 30% to 50% with the statutory corporation tax rate of 12.5%. The proposed approach to gearing and taxation is broadly consistent with the approach taken in the previous review, thereby providing a degree of regulatory consistency and certainty to Eircom's investors. Moreover, this approach does not provide incentives for Eircom to significantly increase gearing and therefore assume greater risk of financial distress. ComReg's proposed approach removes some benefits of gearing, to the extent that it is possible within the scope of this WACC review, by using a notional gearing level that is closer to Eircom's actual gearing level than in the previous WACC review. At the same time, the proposed approach is also considered compatible with the promotion of investment incentives because it would allow Eircom to continue to retain some tax benefits going forward.

3.32 Respondents were asked whether they agreed with ComReg's proposal to use a notional gearing approach in combination with the current statutory tax rate and whether the proposed approach is consistent with efficient capital structure incentives and is appropriate in terms of potential financial risks (i.e. sufficient to address the risk of Eircom adopting an excessively risky financing structure over the period of this review).

Views of Respondents

3.33 Both respondents agree with the use of a pre-tax nominal WACC using a notional level of gearing and the statutory tax rate of 12.5%.

3.34 On the specific question of gearing, one respondent states that the use of actual gearing levels would be inappropriate, **[Confidential]**, and favours the use of the more stable benchmark-based notional level of gearing in deriving Eircom's cost of capital. The other respondent stated that ComReg's proposed approach promotes regulatory consistency.

3.35 Whilst agreeing with the use of a notional level of gearing rather than actual gearing, one respondent disagreed with the proposed range of gearing levels (30% to 50%) claiming that the range was not well developed or well founded. This respondent questions the set of comparators employed to estimate the gearing levels used in Oxera's Report. It argued that it could not see any justification for

increasing the gearing level above that used in the prevailing WACC determination and ComReg risks regulatory inconsistency if it does so. Nevertheless, the respondent did point out that changing the notional level of gearing makes little difference to the overall WACC.

3.36 In relation to the treatment of tax, both respondents agree with the use of the statutory tax rate in the WACC formula. According to one respondent, the statutory tax rate is a fixed observable number and it supports regulatory consistency. The other respondent does not believe it is appropriate or straightforward to calculate an effective tax rate and contends that provision be made within the current consultation process for a further review of Eircom's WACC should there be any material change to either the statutory tax rate of 12.5% or to Eircom's effective tax rate. A combination of effective tax rates and actual gearing is not supported by this respondent, as this could reduce the pre-tax WACC, with consequences for Eircom's investors.

3.37 This respondent considers that ComReg's mandate and expertise does not encompass putting in controls for financial structure. It also considers that taxation policy should not be decided or changed by ComReg. Instead, this respondent supports the use of the standard corporate tax rate for the WACC calculation, although it argues for the use of an EU average tax rate in calculating the WACC to encourage investment. According to this respondent, ComReg is advocating the use of a discriminatory approach to taxation as far as Eircom is concerned when it presents arguments for "clawing back" the tax benefits of gearing. It believes that moving to an effective tax rate regime (or indeed setting the WACC with reference to post-tax WACC comparators) could have important consequences for Eircom's investors and adverse consequences for future investment incentives. In addition, as Ireland has a relatively low corporate tax rate, the value of the tax shield to businesses is less than in other European countries that also use a pre-tax nominal WACC for telecom price regulation.

3.38 The other respondent estimates that a statutory tax rate in combination with notional gearing allows Eircom a slightly higher WACC than if actual gearing percentages and an effective tax rate (estimated at zero) is used. It considers this is entirely sufficient to preserve Eircom's incentives to invest. It notes that Eircom might be enjoying large tax shield benefits due to its high gearing and suggests two reviews be carried out: the first to assess the size of Eircom's tax shield benefits since the last review, which would determine which stakeholders have benefited from the move to a very high level of gearing; and the second to investigate the effects of moving to a post-tax WACC if Eircom structurally separates its business.

ComReg's Position

3.39 In view of the respondents support for the use of a pre-tax nominal WACC using a notional level of gearing and the statutory tax rate of 12.5%, ComReg considers at this stage that it would be appropriate to assume a notional level of gearing of 40% in combination with the current statutory tax rate of 12.5% when finally determining the WACC for the following reasons:

- A statutory tax rate together with an increase in the notional gearing level to 40%[23] implicitly transfers some, but not all, of the potential tax shield benefits back to consumers.
- Moving to an approach that has the potential to share a greater proportion of tax benefits with consumers than under the previous WACC review does not provide incentives for Eircom to adopt a capital structure that might potentially expose it to greater risk of financial distress.
- A statutory tax rate in combination with a notional level of gearing is likely to give Eircom a higher pre-tax WACC, compared with alternative approaches based on actual gearing and/or an effective tax rate.
- It is considered compatible with the promotion of investment incentives because it would allow Eircom to continue to retain some tax benefits going forward. This is consistent with granting Eircom incentives to invest.
- The proposed approach is broadly consistent with the approach taken in the previous review, thereby providing a degree of regulatory consistency to Eircom's investors.

3.40 For these reasons, ComReg's view after further consideration of this issue remains that which was expressed in the Consultation.[24] In light of the above, ComReg considers there is justification for increasing the notional gearing level above that used in the previous WACC determination. Accordingly, ComReg concludes that it is appropriate to assume a notional level of gearing of 40% in combination with the current statutory tax rate of 12.5% when determining the final WACC.

3.41 ComReg notes the comments of one respondent suggesting a review of Eircom's tax shield benefits and the effects of moving to a post-tax WACC if Eircom structurally separates its business. ComReg does not consider that it would be appropriate at this point in time to undertake an extensive assessment of Eircom's effective tax rate given the complexities involved. However, future developments might necessitate a further review of this issue.

Conclusion

3.42 **ComReg concludes that it is appropriate to assume a notional level of gearing of 40% in combination with the current statutory tax rate of 12.5% when finally determining the WACC.**

[23] In the 2003 WACC review, a gearing level of 25% was considered appropriate at that time and was estimated based on the gearing levels of comparator companies and the relevant operating and tax environment.

[24] Paragraphs 3.16 to 3.31 of the Consultation.

Approach to Other WACC Parameters

3.43 In the estimation of the other parameters that constitute the WACC, namely: the Risk Free Rate ("RFR"), the Equity Risk Premium ("ERP"), and the debt premium, Oxera looked at a variety of sources, using both historical data and forward-looking estimates. Oxera also considered relevant benchmarks including previous regulatory determinations where appropriate. Such an approach provides a crosscheck on the results. In view of Oxera's comprehensive approach, ComReg was of the preliminary view that the proposed approach to the estimation of the RFR, the ERP and the debt premium, was broadly consistent with providing an adequate return on capital sufficient to encourage future efficient investment in telecommunications infrastructure in Ireland.

3.44 Respondents were asked whether they agreed that the proposed approach for the calculation of the components of the WACC was reasonable.

The Equity Risk Premium

3.45 Oxera estimated the Equity Risk Premium ("ERP") to lie in the range of 4.8% to 6.0%. This range was based on several sources, including data presented by Dimson, Marsh and Staunton ("DMS") for 2006, Irish regulatory precedent and ComReg's previous determination. The source of the lower value of the ERP range (4.8%) was the midpoint of the geometric means relative to bonds (3.6%) and the arithmetic mean relative to bills (6.0%), from the DMS dataset.[25] The upper value of the ERP range (6.0%) proposed by Oxera reflected recent Irish regulatory precedent.

Views of Respondents

3.46 Respondents did not focus extensively on the ERP. However, comments were made on the methodology and specific sources used to calculate forward-looking values of the ERP from historical returns.

3.47 One respondent believes that one of the most significant changes in the calculation of the average WACC is ComReg's proposal to reduce the ERP from 7.0%[26] to a value in the range 4.8% to 6.0%, without, it says, providing appropriate justification. The respondent recommends an increase in the ERP range **[Confidential]**. The respondent's recommendation is based on an updated report by DMS using arithmetic averages and **[Confidential]**. The respondent submits that the use of geometric means is an inappropriate measure of forward-looking returns and arithmetic mean returns should be used exclusively over geometric averages.

3.48 The other respondent makes only a brief reference to the ERP, requesting evidence to support the recent increase in the ERP range. This respondent references data from the 2007 DMS report on total real returns to show that the average real returns in Ireland are historically below those of other countries,

[25] See Appendix B for further information on the terms geometric mean and arithmetic mean.

[26] In the last WACC review, the ERP was estimated to lie in the range of 5.0% to 7.0%. The upper end of this range, i.e. 7.0%, was used in the WACC estimation.

suggesting that Eircom could have a lower WACC than its industry counterparts in these countries.

ComReg's Position

3.49 Having considered respondents' views on the range estimation of the ERP and based on an updated assessment of this parameter value by Oxera, which incorporates data from the most recent DMS data set (2008), ComReg believes that Oxera's proposed range for the ERP (4.8% to 6.0%) is appropriate.

3.50 The proposed range of 4.8% to 6.0% includes both the latest estimates from the 2008 DMS dataset, based on both the arithmetic mean with respect to bills (5.9%) as well as the arithmetic mean with respect to bonds (5.1%). Hence, the proposed range is in line with the most recent data presented by DMS for arithmetic means. In addition, the original ERP estimated by Oxera already places a greater weight on arithmetic mean returns than returns calculated from the geometric mean, consistent with the academic literature and regulatory precedent. Academic literature suggests that an unbiased estimate of the true mean return lies somewhere between the arithmetic and geometric averages.

3.51 On the basis of Oxera's assessment, ComReg is of the view that there appears to be no robust evidence from regulatory determinations, academic literature or historical returns to suggest an increase in the ERP above the proposed range. For these reasons, the original ERP range of 4.8% to 6.0% will be maintained. However, it is important to consider the potential impact of the recent financial turmoil on the ERP. This is explored further in section 4.

Conclusion

3.52 **The original ERP range of 4.8% to 6.0% will be maintained as there appears to be no robust evidence from regulatory determinations, academic literature or historical returns to suggest an increase in the ERP above this range.**

The Risk Free Rate

3.53 Oxera estimated a range of 4.5% to 5.0% for the nominal Risk Free Rate ("RFR"). This range reflects current market evidence and recent regulatory precedent, while recognising the uncertainty regarding the future path of interest rates.

3.54 Oxera considered the historical nominal yields on both Irish and German government bonds across a range of maturities. The lower end of the proposed range (4.5%) was the spot yield (on 2 July 2007) on 10-year nominal Irish government bonds. While mean reversion of interest rates might take yields below current spot levels, yields could also continue to rise. Therefore, ComReg has taken a prudent approach to the current spot yield to take into account the possibility of further increases in the yield or the potential for mean reversion. To achieve this, an upper limit of 5.0%, in line with past regulatory determinations, seems reasonable.

Views of Respondents

3.55 One respondent states that the approach to the RFR adopted by Oxera is an improvement on the approach used in the previous WACC review because it uses long term (10 year) bond yields and includes Irish bonds. This respondent also agrees that it is prudent not to reduce the nominal RFR as the inflation risk is on the upside. The other respondent states that under the notional gearing scenario, the estimates for the RFR seem reasonable.

ComReg's Position

3.56 As neither respondent expressed views to the contrary, and having further considered the issue, ComReg intends to apply the range for the RFR as originally proposed, i.e. between 4.5% and 5.0%. The potential impact of the recent financial turmoil on the RFR is explored further in section 4.

Conclusion

3.57 **As neither respondent expressed views to the contrary, and having further considered the issue, the original RFR range of 4.5% to 5.0% will be maintained.**

The Debt Beta

3.58 Oxera estimated debt premium under notional and actual gearing assumptions.[27] Notional gearing is likely to be consistent with investment grade and a lower debt premium. This implies a low level of systematic risk of debt, which is consistent with the assumption of a zero debt beta.[28] Oxera also indicated that adoption of actual gearing for the purposes of WACC determination would require the assumption of a positive debt beta, in this case. This is due to the associated increase in systematic risk to debt holders with leverage. At high levels of gearing and debt premium, the effect of leverage on the cost of equity might be overestimated in the absence of a positive debt beta, which reflects a portion of debt premium associated with systematic risk. Overall, the use of actual gearing with a positive debt beta decreases the range for the WACC to between 7.68% and 10.49%, with a marginally lower mid point of 9.08%.

Views of Respondents

3.59 In addition to comments on approaches to gearing and taxation above, one respondent specifically commented on the use of debt premia under the various gearing approaches. Whilst supporting the use of a notional level of gearing one respondent questions the distinction between the use of a debt beta under assumptions of notional and actual gearing. This respondent argues that the use of a zero debt beta under a notional level of gearing may be inconsistent with the use

[27] The results of these calculations are set out in section 6 of Oxera's Report, pages 24 to 35.

[28] In footnote 28 on page 23 of Oxera's Report, Oxera reports sensitivity of beta estimates to the assumption of debt beta at notional gearing. The inclusion of a positive debt beta under notional gearing has a small impact on the asset beta.

of a positive beta in the actual gearing scenario. According to the respondent, the use of a debt beta with actual gearing suggests that a proportion of the debt premium is due to systematic risk, while with notional gearing, the debt premium is due entirely to unsystematic risk. This respondent also comments on the calculation of the debt beta under actual gearing. It disagrees with the use of an unsystematic portion of the debt premium, stating that if the whole premium were due to systematic risk, this would have a knock-on impact on the equity betas, thereby lowering the WACC.

ComReg's Position

3.60 The reasons for the application of a debt beta are set out in the Consultation and Oxera's Report. In addition, Oxera further examined the comments on the use and estimation of the debt beta. Oxera concludes that a debt beta under a notional level of gearing is likely to be very small or negligible (given different components of debt premium), and its estimate is unlikely to be accurate. Moreover, the analysis shows that the effect of the inclusion of a positive debt beta under notional gearing would result in a very small change to the WACC estimate (less than 10bp). Therefore, in line with regulatory precedent, it is reasonable to make the common assumption of a zero debt beta under this scenario. At the same time, at higher levels of gearing and debt premium, it is important to consider a non-zero debt beta, given the likely level of systematic risk of debt. The results of the analysis indicate that a reasonable estimate of debt beta at actual gearing would be approximately 0.33. Given the robustness of this analysis, there seems to be no reason to change the methodology for the calculation of the debt beta in the actual gearing scenario.

Sufficient Allowed WACC to Provide Investment Incentives

3.61 In the Consultation, ComReg was of the preliminary view that a WACC within the proposed range of 7.77% to 11.08%, is appropriate and that a WACC approximately in the mid-point of this range (9.43%) would constitute an adequate return on investment for Eircom. The proposed approach to gearing and taxation was used to increase the incentives on Eircom to innovate and invest in telecoms infrastructure on a forward-looking basis. Nevertheless, ComReg was mindful of the need to promote efficient and timely future investments (including NGN investment) and to stimulate innovation in telecommunications infrastructure and services.[29]

3.62 To that end, ComReg explored a number of potential incentive based measures that may be used to incentivise efficient investment in infrastructure going forward, if deemed necessary, such as the possible application of a split WACC and/or capex triggers. Respondents were asked whether they agreed that the proposed WACC range (from 7.77% to 11.08%) would support incentives for

[29] Setting a rate of return that is too low could make future investment unattractive to investors. Similarly, setting it too high would allow the regulated company to earn excessive returns at the expense of its wholesale and retail customers while also potentially distorting pricing signals to investors.

long-term investments in infrastructure assets and would provide an adequate allowance for bearing any associated systematic risks. In the event that this was not the case, ComReg requested views from respondents on ways to incentivise investments.

Views of Respondents

3.63 One respondent agrees that a WACC within the range identified would encourage investment and provide adequate returns for risk. This respondent agrees that the proposed decrease from the current WACC of 11.5% is appropriate for Eircom. Taking into account ComReg's approach to taxation and gearing, this respondent considers the WACC proposal is entirely sufficient to preserve Eircom's incentives to invest.

3.64 The other respondent disagrees with ComReg's proposals and submits that a WACC value of 11.5% could act as an incentive for long term investments in infrastructure assets. The respondent believes there is a danger that a WACC of 11.0% would be too low to attract equity and debt on the basis of increasing competition and technological uncertainty. The respondent submits that where long-term investments might involve greater risk there should be potential for a review of the WACC. **[Confidential]**.

ComReg's Position

3.65 ComReg recognises that the allowed cost of capital should be set in line with the required rate of return on investment (i.e. the actual cost of capital) in order to create appropriate incentives for investment. On that basis, Oxera's cost of capital assessment for Eircom's fixed-line, nominal pre-tax cost of capital is in the range of 7.77% to 11.08% with a mid point of 9.43%. On the basis of the responses to the Consultation, Oxera undertook a further review of key determinants of the WACC, including the ERP and beta, and determined that the proposed WACC estimate not only accurately reflected available evidence, but also erred on the side of caution by adopting a conservative approach. For the reasons set out above, ComReg considers that no persuasive arguments supported by robust evidence have been put forward by the respondents that would suggest a change in the estimated asset beta or ERP. The estimated overall WACC range should remain the same.

3.66 The range that was proposed for the WACC has already taken account of the fact that the detrimental effects of setting a cost of capital that is too low could outweigh the financial benefits to Eircom of a cost of capital that is too high. As noted above, ComReg considers that the proposed approach to gearing and taxation has the potential to incentivise Eircom to innovate and invest in telecoms infrastructure on a forward-looking basis. The approach maintains consistency and will allow Eircom to potentially retain tax benefits.

3.67 The Consultation and Oxera's Report clearly set out the basis for ComReg's preliminary view that the proposed WACC range of 7.77% to 11.08% is a reasonable range that sufficiently reflects the inherent uncertainties regarding the future development of competing technologies. In view of the respondents' comments and having considered this issue further, ComReg remains of the view

expressed in the Consultation that a WACC approximate to the mid-point of the proposed range, of 9.43%, adequately reflects Eircom's cost of capital and provides sufficient investment incentives for Eircom to innovate and invest in telecoms infrastructure.

Mechanisms to Incentivise Investments

3.68 In addition to the appropriate cost of capital estimate, ComReg explored other potential measures that might incentivise investment. A split or disaggregated WACC was considered as one such possible mechanism.[30] While a differentiated WACC has the potential to improve incentives for investment by providing closer alignment of incentives with the underlying business risks, ComReg was of the preliminary view that a disaggregated WACC approach should only be adopted if there is clear and compelling evidence of risk differentials either across business division or by investment type. This is because using a split WACC might also create wrong incentives if not supported by robust evidence on risk differentials. After undertaking an initial investigation, ComReg found that the evidence for clear risk differentials between Eircom's business divisions was inconclusive. As a result, ComReg takes the view that a disaggregated WACC is not appropriate at this time.

3.69 In addition, an analysis of Eircom's past and projected levels of capex did not appear to suggest that a disaggregated WACC on the basis of new versus old investments is warranted at this time. On the basis of data supplied by Eircom, the implied level of investment risks, associated with Eircom's new investments over the forthcoming review period, is not likely to materially differ from those faced by Eircom's existing investments. For these reasons, ComReg was of the preliminary view that the proposed single WACC is a reasonable measure of Eircom's investment/business risk profile at this time. However, ComReg recognises that in the event of a fundamental change in business circumstances, such as structural separation, it may become necessary to explore the issue of a disaggregated WACC in further detail.

3.70 ComReg also considered the possibility of setting a higher rate of return on new investment or particular types of investment, than the average for the Eircom group or company. For example, the use of capex triggers, whereby meeting pre-specified commitments to significant new investment projects could, if deemed appropriate and justified, result in an increase in the WACC. ComReg was of the preliminary view that such adjustments would need to be assessed on a case-by-case basis to estimate the degree of systematic risks faced by Eircom, if any, in each particular case. Moreover, given the appropriate level of the overall WACC, an introduction of a higher rate of return on some investments would imply a lower required rate of return on the remainder of the assets.

[30] Using a split WACC would mean setting different rates of return for existing investment versus new investment or setting different rates of return for different business divisions within Eircom (for instance between local access, core, wholesale or retail activities).

3.71 In relation to different ways to incentivise adequate investment, respondents were asked whether they agreed that a single WACC estimate, which takes into account the risk profile of Eircom's entire fixed-line business, is appropriate. Respondents were also asked whether they believed that further assessment of a disaggregated WACC by business division and/or investment type is warranted.

3.72 In addition to the question of a split WACC, ComReg also solicited views on whether or not the use of capex triggers and/or taxation policy are appropriate as means of incentivising investment.

Views of Respondents

3.73 Both respondents indicated that a split WACC would be premature, although they support in principle an estimation of a split WACC. One respondent argues that estimating a split WACC may provide greater business certainty for Eircom and other infrastructure providers in Ireland, yet a split WACC would not need to be applied until such time as Eircom separates. The other respondent echoed ComReg's concerns regarding the practical difficulties in applying different WACC estimates to different parts of the fixed line business and agreed that further analysis of Eircom's investment/business risk profile would be required to ensure confidence that accurate estimates can be obtained. This respondent suggests that this be taken into consideration as part of a separate review at a later stage.

3.74 In relation to the issue of a split WACC on the basis of investment/ infrastructure type, it is one respondent's view that new investments can have a higher risk profile than Eircom's legacy investments as a result of the uncertainty surrounding the take-up of these future product sets. This issue could be addressed either through the application of a specific risk-adjusted cost of capital for application to particular higher risk projects, or adjustments to the blended overall cost of capital to represent the changes in Eircom's overall risk profile as a result of these projects. Nevertheless, the respondent again believes that any further assessment of a disaggregated WACC by investment type should be taken into consideration outside of the current consultation process and a mechanism should be built in to the process to allow for such a review.

3.75 In relation to capex triggers one respondent indicated that it is not opposed to some flexibility in the application of the CAPM methodology, but suggests that this should be done in a 'careful if pragmatic fashion paying heed to the impacts on consumers and competitors'. It appreciates that the use of capex triggers might require the WACC to be flexed for product specific risks, whereby such risks could be broken down into systematic and unsystematic parts. This respondent also commented that this approach could potentially raise concerns of state aid, contrary to European Commission Directives. The other respondent noted that there are various definitions of capex triggers. It believes that capex triggers are probably more suitable for a monopoly provider, yet as Eircom does not have a legal monopoly this mechanism might not be the most appropriate. This respondent welcomes the recognition by ComReg of the possible need to adjust the WACC in the case of new investment that falls within regulated markets and has higher risk than current assets. However, the idea of a claw-back for something that has not materialised does not seem appropriate.

3.76 Regarding additional mechanisms that could be applied to drive efficient investment, one respondent indicates that the most commonly accepted and used mechanism to drive efficient investment is the CPI-X price cap mechanism. The respondent argues that a CPI-X price cap should be applied over as wide a range of services as possible in order to ensure that the proper price signals are sent to the marketplace, that Eircom is able to react dynamically to changes in the marketplace, and in order to incentivise efficient investment. The respondent also suggests regulatory forbearance as another possible incentive-compatible mechanism, citing the example of major telecommunications providers in the USA who have significantly increased their network investments since the FCC adopted a stance of more regulatory forbearance.

ComReg's Position

3.77 While it is recognised that further analysis of a split or disaggregated WACC may be of benefit, ComReg concludes that for the purposes of this cost of capital determination, the average WACC range is a reasonable measure of Eircom's investment/business risk profile in the absence of robust evidence of significant risk differentials between different parts of the regulated business, or between new NGN and other past regulated assets/ investments. ComReg believes that differentiated cost of capital estimates should only be applied where there is confidence that the available data allows for robust and accurate estimates to be obtained. ComReg notes the respondents' views in that regard.

3.78 In terms of relative risk differentials across different businesses, ComReg has found no robust evidence to suggest significant risk differentials between parts of Eircom's regulated businesses. In addition, the full extent of NGN/NGA investments is not yet clear, and actual committed NGN investment seems limited at this stage. Hence, the uncertainties around investment in NGN does not in ComReg's view represent a clear robust case that would allow for the conclusion that the risk associated with NGN is significantly different from the rest of the Eircom business. In light of the respondents' views and for the reasons set out in the Consultation and Oxera's Report, ComReg remains of the view that it would be premature to apply a disaggregated cost of capital at this time.

3.79 ComReg will, however, continue to monitor the competitive situation and the extent to which it is likely to impact on the systematic risk profile of the company over this review. Hence, ComReg may revisit this question as a separate work area, if deemed necessary in light of market and business conditions. ComReg will also continue to consider other ways for incentivising investment. ComReg indicated in the Consultation that were Eircom to come forward with definite capex plans in this regard, ComReg would consider the possibility of applying capex triggers as part of this WACC review. See section 4 below for further consideration by ComReg of this issue.

3.80 In response to comments from one respondent regarding the merits of a CPI-X price cap to provide the correct investment incentives to Eircom, ComReg recognised this when it set the Retail Price Cap in October 2007.[31]

Conclusion

3.81 **In light of the respondents' views and for the reasons set out in the Consultation and Oxera's Report, ComReg remains of the view that it would be premature to apply a disaggregated cost of capital at this time.**

Overall WACC Range and Potential Choice of Point Estimate

3.82 In light of the comprehensive analysis undertaken by Oxera in formulating the proposed WACC range of 7.77% to 11.08%, ComReg was of the preliminary view that a WACC around the mid-point of this range would constitute an adequate return on investment for Eircom. This implied that the appropriate WACC going forward is lower than the previous determination of 11.5%. ComReg solicited views on whether the proposed average fixed-line WACC in the range of 7.77% to 11.08% is considered reasonable and that a WACC approximately in the mid-point of this range would constitute an adequate return on investment for Eircom.

3.83 Views were also invited on what would be an appropriate value in the range that would encourage efficient investment in the network. This value should be such that it would not run the risk of stifling investment going forward and at the same time be commensurate to the level of systematic risk faced by Eircom, while not resulting in excessive returns accruing to Eircom at the cost of wholesale customers and end-users. ComReg noted that an approach of selecting parameter values approximate to the mid-points of each of the ranges for the different variables may be considered an appropriate decision, and one which provides balance to an overall WACC determination.

Views of Respondents

3.84 Views on the appropriateness of the proposed WACC range and a potential choice of a point estimate were mixed. One respondent agrees with the proposed cost of capital range, and agrees with Oxera's underlying estimates. However, while noting that the proposed overall WACC range for Eircom is appropriate, this respondent suggests that a final point estimate should not be set higher than the middle of the proposed range (9.43%), given the specific situation of Eircom as a highly geared company.

3.85 However, the other respondent does not support a WACC for Eircom set in the range 7.77% to 11.08%. According to this respondent, **[Confidential]**. It also argues that Eircom's existing WACC of 11.5% is actually below the EU average

[31] ComReg (2007) SMP Obligation: Retail Price Cap Remedy, Fixed Narrowband Access Markets, ComReg Document 07/76, Decision No. 03/07, 1 October.

according to a benchmarking analysis. This respondent examines an extended set of WACC determinations, which includes telecoms in Central and Eastern European countries. According to this respondent, comparing the average WACC calculated from the precedents included in the Consultation (10.3%), the addition of select Central and Eastern European countries, increases the average WACC of the sample to 11.6%. Hence, if ComReg were to increase Eircom's WACC to the high end of the proposed range (11.08%), it would fall down the league of European telecom regulators.

3.86 This respondent is of the view that there are investment and public policy reasons for not changing the current WACC of 11.5% and also points to the fact that the general economic environment is largely unchanged since ComReg's last review of the WACC. It considers that in setting a WACC, ComReg should err on the side of caution and choose a WACC from the higher level of any range given the difficulty in forecasting the future. On the basis of the above points, the same respondent concludes that the proposed range 7.77% to 11.08% underestimates the WACC required for investment in infrastructure in Ireland. It claims that the required WACC should be towards the upper end of the range **[Confidential]**. Because the current WACC of 11.5% falls within that range it is of the view that the WACC should remain unchanged. **[Confidential].**

3.87 The respondent also suggests possible adjustments to the overall WACC estimate resulting from company size and ownership structure. The same respondent suggests that academic literature supports their proposal in relation to a higher WACC for private over public companies and that this evidence is relevant for the cost of capital determination in the regulatory setting. Moreover, this respondent argues that regulatory precedent shows that adjustments to the cost of capital on the basis of company size, are appropriate and that such an adjustment would be relevant in the case of Eircom.

ComReg's Position

3.88 ComReg notes the respondents' views in relation to benchmarking and the potential for adjusting the overall WACC estimate resulting from company size. On the issue of regulatory precedent, while it is true that they represent a useful crosscheck on regulatory WACC estimates, it would be inappropriate to change WACC estimates due to regulatory precedents that are driven by factors that are not applicable in the case of Eircom, such as differences in inflation, corporate tax, and higher equity risk premia and default risk in Eastern European countries.

3.89 In relation to the possibility of adjustments to the overall WACC estimate, ComReg considers that such adjustments constitute departures from the CAPM model. As noted above, all respondents agreed with the use of the CAPM to estimate the WACC. In the event that it was acceptable to depart from the CAPM methodology, Oxera's analysis suggests that there is no strong argument for increasing Eircom's overall WACC to adjust for factors such as company size or Eircom's private status, for the following reasons.

- The evidence from European telecoms suggests no clear relationship between WACC and company size.

- Eircom is a large company by Irish standards according to various metrics.
- It is not appropriate to link regulatory cost of capital estimates to any particular financial structure adopted by the regulated company, especially if such a structure results in a higher cost of capital that might be available to the company under a more efficient financial structure.
- Eircom's status as a 'privately held' company might be seen as ambiguous, since its main shareholder is listed.

3.90 All views of respondents have been taken into account by ComReg in arriving at a conclusion in relation to an appropriate WACC for Eircom's regulated fixed line business, which is set out in Section 4 below.

Conclusion

3.91 **On the basis of Oxera's further review and assessment of the issues raised by the respondents above, ComReg concludes that the estimated overall WACC range of 7.77% to 11.08% should remain the same and that a WACC approximate to the mid-point of the proposed range, of 9.43%, would adequately reflect Eircom's cost of capital primarily for the following reasons:**

- **The asset beta range of 0.47 to 0.7, with a midpoint estimate of 0.57 should be retained in determining an overall WACC;**
- **For the reasons outlined above, the original ERP range of 4.8% to 6.0% will be maintained;**
- **In light of the respondents' views, it is appropriate to assume a notional level of gearing of 40% in combination with the current statutory tax rate of 12.5%; and**
- **A statutory tax rate in combination with a notional level of gearing is likely to give Eircom a higher pre-tax WACC than alternative approaches based on actual gearing and/or an effective tax rate. This is compatible with providing investment incentives to Eircom.**

4 ComReg's Decision on Eircom's WACC

Introduction

4.1 In light of the comprehensive analysis undertaken by Oxera in formulating the proposed WACC range of 7.77% to 11.08%, ComReg was of the preliminary view that a WACC approximately in the mid-point of this range (9.43%) would constitute an adequate return on investment for Eircom. ComReg noted that an approach of selecting parameter values approximate to the mid-points of each of the ranges for the different variables may be appropriate, and one which provides balance to an overall WACC determination. Selecting values approximate to the mid-points for each variable when combined with the assumption of notional gearing and provision for tax based on the statutory rate, gives an overall WACC estimate, approximately in the middle of the overall range, of 9.43%.

4.2 In light of the responses to the Consultation and taking into account the sensitivity of the overall WACC level to values of the individual parameters, Oxera further analysed the issues raised by the respondents. Taking the above factors into account, in particular, respondents' views on the asset beta, the ERP, updated market data and benchmarking, ComReg is satisfied that the appropriate WACC for Eircom's fixed-line business should be set in the original range of 7.77% to 11.08% over the forthcoming regulatory period. On the basis of Oxera's analysis of the responses received to the Consultation, ComReg is of the view that the arguments put forward by the parties are not sufficiently robust to suggest that a change in the estimated ranges for either the ERP or the asset beta would be justified. ComReg notes the consensus in support by the respondents for applying notional gearing and the statutory tax rate. Therefore, contrary to one respondent's belief that Oxera has underestimated the true WACC range for Eircom, ComReg concludes that the estimated overall WACC range should remain as originally proposed.

4.3 However, ComReg recognises that the cost of capital represents the forward-looking rate of return required by investors to commit capital and bear future financial and business risk. ComReg also recognises that in the cost of capital determination, a forward-looking perspective should be taken when calculating the component parameter values. ComReg recognises that there has been substantial volatility in capital markets since the summer of 2007. Hence, in addition to the assessment of the specific issues raised by respondents in response to the Consultation, ComReg asked Oxera to consider the extent of the potential impact (if any) of the ongoing financial turmoil on Eircom's WACC. Importantly, the estimated WACC range already takes into account a degree of forward-looking uncertainty with respect to individual cost of capital parameters.

Potential Impact of Financial Turmoil on Eircom's Cost of Capital

4.4 Given the significance and persistence of the current financial turmoil, ComReg, on the basis of Oxera's advice, considered it prudent to undertake an analysis of the potential impact this could have on Eircom's cost of capital. In this regard, Oxera has carried out an analysis of the potential impact of the financial turmoil

on the individual cost of capital parameter estimates to investigate whether an adjustment (if any) to the original estimates would be an appropriate course of action. It should be noted that neither of the two respondents raised this issue in their respective responses, but it is nonetheless a relevant issue for ComReg to consider.

4.5 Oxera's detailed assessment of the impact of the financial crisis on the cost of capital suggests that proxies for the RFR have decreased, while corporate debt spreads have increased. Combining these movements, the net effect is an increase at the midpoint of the estimated cost of debt. This is supported by evidence of the increase in yields on A and BBB rated corporate bonds since the summer of 2007. Overall, this evidence suggests that it is appropriate for ComReg to adopt the cost of debt at the upper end of the original range (6.9%) when determining a point estimate of the WACC.

4.6 Oxera also analysed the recent market evidence on the evolution of the components of the cost of equity, specifically the equity beta and the ERP. Changes in the volatility of equity returns are more likely to impact the ERP than equity betas, since beta is a relative concept, i.e. the market beta will always remain equal to one. In this context, analysis of comparator company equity betas since July 2007 shows no robust evidence of an increase. As such, ComReg will retain the proposed asset beta for Eircom of 0.57, as the preferred point estimate.

4.7 In considering the recent market evidence on the potential impact of the financial turmoil on the ERP, it was determined that the originally proposed range for this parameter was sufficient to accommodate potential variation in the ERP as a result of the financial turmoil. Oxera estimated the ERP to lie in the range of 4.8% to 6.0%. As a practical step and to allow for the possibility that turmoil persists, ComReg intends to apply the upper-end of the original ERP range (i.e. 6.0%) in the calculation of a point estimate of the WACC. The effect of using an ERP of 6.0% is an increase in the cost of equity and the overall WACC vis-à-vis the midpoint of the original range.

4.8 Table 2 below presents both the original proposal for Eircom's cost of capital under a notional level of gearing and highlights the updates that ComReg has made to the cost of debt and components of the cost of equity to account for changes in the estimates of the WACC parameter values due to the financial crisis. Taking the point estimates of the underling parameters as presented, Table 2 indicates that using the upper end estimate of the ERP (6.0%) results in an increase of 40bp to the cost of equity. This change, combined with the upper end value of the cost of debt (6.9%), results in a nominal pre-tax WACC figure of 10.21%, an increase of 78bp compared with the original proposed mid point estimate of 9.43%.

Table 2: WACC Calculation Including Point Estimate

	Low	Midpoint	High	Point Estimate
Cost of debt				
Nominal risk-free rate (%)	4.5	4.75	5.0	
Debt premium (bps)	120	155	190	
Nominal cost of debt (%)	5.7	6.3	6.9	6.9
Cost of equity				
Nominal risk-free rate (%)	4.5	4.75	5.0	4.75
Asset beta	0.45	0.57	0.7	0.57
Notional gearing (%)	30	40	50	40
Equity beta	0.64	1.02	1.39	1.02
Equity risk premium (%)	4.8	5.4	6.0	6.0
Statutory tax rate (%)	12.5	12.5	12.5	12.5
Post-tax cost of equity (%)	7.57	10.47	13.36	10.87
Nominal Pre-Tax WACC (at Notional Gearing)	**7.77%**	**9.43%**	**11.08%**	**10.21%**

Source: Oxera

4.9 The following section presents ComReg's decision in relation to the overall WACC range and the decision on the specific value as an appropriate WACC for Eircom's fixed-line business.

Decision on Point Estimate within the WACC Range

4.10 The Consultation and Oxera's Report clearly set out the basis for ComReg's preliminary view that the average WACC for Eircom's fixed-line business should be set within a range of 7.77% to 11.08% and that an average WACC at the mid-point of this range (9.43%) would constitute an adequate return on investment for Eircom. On the basis of Oxera's further review and assessment of the issues raised by the respondents above, and for the reasons already indicated, ComReg is satisfied that the appropriate WACC for Eircom's fixed-line business should be set in the range of 7.77% to 11.08% over the forthcoming regulatory period. Nevertheless, given the financial turmoil and the volatility in financial markets, which may affect the rates of return required by investors, ComReg believes that the latest market developments should be incorporated into the final cost of capital determination. ComReg reaffirms that a WACC in the range of 7.77% to 11.08% is entirely reasonable, however within this range a rate of 10.21% (0.78% above the mid-point) would now be prudent and appropriate.

4.11 For these reasons, ComReg concludes that the specific value for the cost of capital that is most appropriate for Eircom is 10.21%, which falls within the original proposed WACC range of 7.77% to 11.08%. The Decision Instrument formalising the WACC for Eircom's regulated fixed line activities is set out in Appendix A below.

Role of Regulation in Encouraging Investments

4.12 The issue of providing adequate investment incentives has been at the forefront of ComReg's review of Eircom's cost of capital. ComReg has responded to the need to incentivise investment in infrastructure through a variety of approaches:

- A statutory tax rate in combination with a notional level of gearing is likely to give Eircom a higher pre-tax WACC than alternative approaches based on actual gearing and/or an effective tax rate. This is consistent with providing investment incentives to Eircom.
- The estimates of the cost of capital parameters are based on a robust analysis that takes into account multiple sources of data and recognises uncertainty about individual parameter levels. In addition, the benchmarking analysis of betas takes into account the market data on comparator companies that are likely to face similar investment choices as Eircom.
- This approach is consistent with ComReg's regulatory objectives and the method adopted by ComReg at the last review, thereby providing a degree of regulatory consistency to Eircom's investors.
- Moving to a higher level of notional gearing has the potential to share a greater proportion of tax benefits with consumers than under the previous WACC review. This should ensure that the new WACC for Eircom does not provide incentives to adopt a capital structure that might potentially expose it to greater risk of financial distress.
- Recognising that the cost of capital represents the forward-looking rate of return required by investors to commit capital and bear future financial and business risk, ComReg has taken into account movements in Eircom's WACC parameters due to the ongoing financial turmoil and moved from the initial mid-point of 9.43% to set the WACC at 10.21%.

4.13 On the basis of the above analysis, ComReg believes that the allowed WACC of 10.21% adequately and appropriately reflects Eircom's true cost of capital and is, therefore, sufficient to provide adequate investment incentives. It is important to note that there is a distinction between next generation investments in core networks and those in NGA. Next generation is a term that can refer to either or both of two factors:

- Core network investments – to enable the ubiquitous use of internet protocol (IP) technology throughout the core network; and/or
- NGA network investments – to replace the copper wire traditionally used in the access network (i.e. those linking consumers' premises to the networks) with fibre optic cables.

4.14 In contrast to NGA investment, NGN investment in the core network is generally considered to be cost-reducing. Therefore, Eircom should have strong incentives

for investment in NGNs, provided it can retain at least some of the gains from the investment. Eircom has previously indicated its plans to invest in the core network using IP technology to increase capacity. Investment in access networks based on next generation technology (which would be fundamentally different from traditional PSTN networks) would enable significantly faster services to be provided to consumers. In general, a proposal that increases infrastructure investment is likely to be positive for consumers.[32] ComReg notes that the incentives to invest in NGA may depend not on cost saving that can be achieved, but on the additional returns that could be generated compared with the current position and there are a number of potential risks going forward. For example:

- Increasing penetration of alternative platforms/technologies (including mobile, cable and wireless technologies) providing competing telecom services over the period of this review;
- Uncertainty associated with consumers' willingness to pay for quality of service improvements that could be achieved through network enhancement projects;
- Uncertainties regarding the precise nature, composition, size, timing of NGN/NGA investments as well as the types or impact of any new services supplied prospectively over such infrastructure; and
- Financial turmoil.

4.15 Such uncertainty and risk are compounded when there are large, lumpy and irreversible capex programmes. In light of its objective to promote efficient and timely investment (including NGN investment) and to stimulate innovation in telecommunications infrastructure and services, in addition to setting the overall WACC, ComReg has explored a number of incentive mechanisms to facilitate the delivery of optimal investment and to provide adequate incentives for Eircom to undertake substantial investment in infrastructure.[33] ComReg considered the possibility of implementing an incentive-based mechanism(s) whereby a risky or capital-intensive project, which may be unanticipated at this time, but may emerge over the timeframe of this review, could be assessed on an individual basis. This would determine whether a modification of the average WACC for Eircom's overall fixed-line business might be appropriate for those particular projects/investments going forward.

4.16 One measure considered was a split WACC and the possibility of setting different rates of return for existing investment and new investment or setting different rates for different business divisions within Eircom. As noted above, ComReg concludes that for the purposes of this cost of capital determination, the average or aggregate WACC of 10.21% is a reasonable measure of Eircom's investment/business risk profile at this time. ComReg will, however, continue to

[32] For example the greater capacity facilitated by an NGN reduces both the incremental costs of transmission (generating cost efficiency for Eircom), and allows consumers access to new services (facilitating new products or services for them).

[33] Only efficient infrastructure investment should be considered so as to avoid "gold plating" which provides no net benefit to society.

monitor the competitive situation and the extent to which it is likely to impact on Eircom's systematic risk profile over this review. ComReg also considered the use of capex triggers, whereby pre-specified commitments to significant new investment projects could, if deemed appropriate and justified, result in a higher WACC. ComReg signalled in the Consultation that were Eircom to come forward with definite capex plans, ComReg would consider the possibility of applying capex triggers as part of this WACC review, and though Eircom has not currently taken this opportunity up, this approach can be further considered in receipt of clear and pre-committed investment plans from Eircom.

4.17 ComReg recognises that capex needs to be sufficient to meet a growing demand or to replace or upgrade existing infrastructures. These investments should be delivered efficiently and effectively. ComReg acknowledges that while capex triggers can provide a powerful mechanism to incentivise the right investment, they need to be designed carefully if they are to work reliably and are to be aligned with consumers' best interests. When introducing capex triggers in the regulatory process, if deemed necessary, their impact on Eircom's performance drivers such as the cost of capital and how the triggers interact with supplementary regulatory objectives has to be carefully evaluated.

4.18 Hence, ComReg will continue to monitor potential barriers to an optimal level of future investment, if any, and to assess the possibility of introducing capex trigger(s) and/or other appropriate incentive compatible mechanisms in the regulatory process as a way to incentivise investment based on an assessment of Eircom's situation. For instance, to incentivise new NGN/NGA specific capex, ComReg may consider whether an increase or uplift on the allowed WACC of 10.21% might be appropriate. It is important to note in this context that it might be appropriate to consider whether this would imply a lower required rate of return on other assets, given the robust estimate of the overall WACC.

4.19 At this stage, ComReg does not have robust evidence before it on the existence of risk differentials between NGN/NGA and the rest of Eircom's regulated assets. Moreover, Eircom has so far made no clear commitment to the characteristics and size of the potential capex programme in NGN/NGA. Therefore, given the current capex projections, no uplift has been applied at this time. ComReg may reassess this approach in light of any substantial new information submitted to it. In particular, ComReg may undertake a separate consultation at a future date to explore the interaction of optimal investment and capex triggers with any WACC modification.

Appendix A: Decision Instrument

1 STATUTORY POWERS

1.1 This Decision Instrument is made by the Commission for Communications Regulation ("ComReg"):

1. Under and having regard to its functions set out in s10 of the Communications Regulations Act 2002;

2. Under and having regard to Regulation 9 (1) and Regulations 14 (1) and 14 (2) of the European Communities (Electronic Communications Networks and Services) (Access) Regulations 2003[34];

3. Having regard to ComReg's statutory objectives, in particular those set out in s 12 (2) (a) (iii) and s 12 (3) of the Communications Regulations Act 2002;

4. Having taken in to account and complied with the Policy Direction of 2003[35] on industry sustainability and the General Policy Direction of 2004[36] on competition; and

5. Having taken in to account all representations made by respondents during consultation.

1.2 The reasoning, analysis an individual conclusions as set out in the body of the Decision Notice, shall where necessary be construed with and form part of this Decision Instrument.

2 DECISION

2.1 A nominal pre-tax weighted average cost of capital ("WACC") of 10.21% will be used for the purpose of Eircom's separated accounts; and as a basis for allowing Eircom an adequate rate of return for regulatory purposes, including the setting of Eircom's regulated wholesale prices.

2.2 The WACC of 10.21%, referred to in section 2.1 hereof, supersedes the WACC of 11.5%, as set out in Decision 4.3 of Decision Notice No. D3/03 (ComReg

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[34] According to Article 13 (1) of the Access Directive (2002/19/EC), National Regulatory Authorities ("NRAs") may impose price controls on operators with SMP, including obligations of cost orientation and cost accounting. NRAs are required to take into account the investment made by the operator and allow a reasonable rate of return on adequate capital employed, taking into account the risks involved.

[35] Policy Direction No. 4, made by the Minister for Communications, Marine and Natural Resources on 21 February, 2003.

[36] Policy Direction No. 1 made by the Minister for Communications, Marine and Natural Resources on 26 March, 2004.

Document No. 03/14) insofar as it pertains to Eircom's regulated wholesale prices.

2.3 Notwithstanding section 2.2 hereof, the WACC of 11.5% as set out in Decision 4.3 of Decision Notice No. D3/03 (ComReg Document No. 03/14) shall continue to apply to and continue to have full force and effect in relation to retail narrowband access prices, until such time ComReg decides otherwise.

3 STATUTORY POWERS NOT AFFECTED

3.1 Nothing in this Decision Instrument shall operate to limit ComReg in the exercise and performance of its statutory powers or duties under any primary or secondary legislation (in force prior to or after the effective date of this Decision Instrument) from time to time as the occasion requires.

4 EFFECTIVE DATE

4.1 This Decision Instrument shall be effective from the date of its publication until further notice by ComReg.

JOHN DOHERTY
CHAIRPERSON
THE COMMISSION FOR COMMUNICATIONS REGULATION
DATED THIS THE 22 DAY OF MAY, 2008

Appendix B: Key Components of the WACC

The cost of capital is a weighted average of two components: the cost of equity (r_e); and the cost of debt (r_d). The weightings are determined by the relative proportions of debt and equity held by the firm. A firm's cost of capital is calculated according to the following formula (on a pre-tax basis):

$$WACC = (r_d \times g) + [r_e \times (1-g)]/(1-t)$$

Where:

r_d = Cost of Debt = (Risk-Free Rate + Debt premium);
r_e = Cost of Equity = (r_f + β * Equity Risk Premium);

r_f = nominal Risk-Free Rate ("RFR");
dp = debt premium;
β = Beta;
g = gearing;
t = tax rate.

Estimating the Cost of Equity

The most common way of estimating the cost of equity is to use the Capital Asset Pricing Model ("CAPM"). The CAPM is a model used to value assets, where the required return on a given asset is determined by the relative contribution of that asset risk to the risk of the overall market portfolio. The central tenant of this model is that investors hold a broad portfolio of assets thereby removing, through diversification, the company-specific risk of each asset in the portfolio leaving only non-diversifiable or systematic risk. Investors are only remunerated for systematic risk as measured by the beta (β) value. The cost of equity is calculated as follows:

$$Cost\ of\ Equity \rightarrow E[r_e] = r_f + \beta * (E[r_m] - r_f)$$

Where:

$E[r_e]$ = Expected return on equity;
r_f = Risk-Free Rate ("RFR");
β = Beta;
$(E[r_m] - r_f)$ = Equity Risk Premium ("ERP").

The three main components of the cost of equity are the beta, the risk-free rate and the equity risk premium. Other factors are gearing and taxation.

Asset Beta

The only company-specific parameter in the CAPM is the beta. The beta (β) is the level of correlation of asset-specific returns with market returns. By definition, the market itself has an underlying beta of 1.0, and individual stocks are ranked according to how much they deviate from the macro market. A beta of 1.0 means a stock has about the same volatility as the overall market. A beta of 1.5 indicates that when the market has

historically risen by 1%, the stock has risen by 1.5%. Conversely, when the market has historically fallen 1%, the stock has fallen by 1.5%. According to the academic theory of capital markets, the higher the beta, the greater the risk and the greater the potential reward. Conversely, the lower the beta, the lower the risk and the lower the potential reward.

In general, the asset beta of a company can be defined as the weighted average of its *debt beta* and *equity beta*:

$$\beta_{asset} = g * \beta_{debt} + (1 - g) * \beta_{equity}$$

The equity beta recognises the systematic risk faced by equity investors, while the debt beta recognises the systematic risk faced by debt investors.

Conventionally, for low gearing and investment-grade debt, the debt beta is often assumed to be zero, since the systematic risk component of debt is assumed to be negligible. In cases where a company is highly geared, has sub-investment-grade debt and a high debt premium, a significant portion of the *debt premium* may be due to systematic risk; in this case, a non-zero debt beta is likely to be a more appropriate assumption.

Risk Free Rate

The Risk Free Rate ("RFR") on returns is a benchmark figure against which all investments can be measured. It reflects the return an investor would receive if investing in a risk-free asset. In theory the risk free asset should be an asset which displays zero covariance with the market portfolio, that is, an asset with a beta value of zero. However, in practice, a risk-free asset does not exist. The yield on government bonds over time and across different levels of maturity is generally used as the closest proxy to the return on a theoretical risk-free asset.

Equity Risk Premium

The Equity Risk Premium ("ERP") is the additional remuneration required by investors for holding equity as opposed to risk-free assets. It is calculated by subtracting an appropriate RFR from the expected returns in the market in question. The ERP is not directly observed, but may be estimated on the basis of ex ante or ex post evidence.

There are two common methods of presenting forward-looking returns used in the academic literature:

- The *arithmetic mean*, or simple average, is the sum of returns divided by their number; and
- The *geometric mean* is the *n*th root of the product of these returns.

It has been shown that both arithmetic and geometric means can introduce bias if used as estimators of the true forward-looking mean of returns. It has also been shown that unbiased estimators of the true mean return may lie at a point between the arithmetic and geometric mean values. Over short periods, such as that of a price control, the bias introduced by arithmetic returns may be less than that of geometric returns, therefore it is common in academic literature and regulatory precedent to place greater weight on

arithmetic mean returns. However, as neither measure is unbiased, it is preferable to take account of both geometric and arithmetic mean returns to estimate the ERP.

Gearing

Gearing refers to the degree to which a company finances its capital, either from debt or through shareholders. When calculating a WACC for a company, a regulator can use the actual gearing of the company or a notional level of gearing. The notional level of gearing is often based on the gearing that might be characteristic of a reasonably financed company carrying out the same operator as the company in question.

Taxation

The *statutory tax rate* is often used to gross up the post-tax cost of equity in the WACC calculation. However in some cases the firm in question may be paying less tax than the statutory tax rate. For instance a company that has high levels of gearing creates the potential for large tax shields. A tax shield is the reduction in incomes taxes that results from taking an allowable deduction from taxable income. As interest on debt is a tax-deductible expense, taking on debt can act as a tax shield. As a result, *effective tax rates* are often used in order to bring tax allowances closer to the actual taxes paid by the company and to claw back the benefits of debt tax shields.

Estimating the Cost of Debt

The cost of debt can be expressed as the sum of the risk free rate (as discussed above) and the company specific debt premium.

Debt premium

The debt premium is by definition a premium over the RFR. The debt premium is company specific and the premium for debt investors is driven by a combination of financial and business-related risks associated with a company. As such, the debt premium reflects the risk to lending institutions of advancing capital to the company in question compared with a risk free investment.

The debt premium chosen for the WACC calculation must be consistent with the gearing assumption. For *actual* gearing, this would be consistent with taking an estimate of the actual debt level that a company is likely to pay over the course of the price control. In the case of the *notional* level of gearing, the relevant debt premium may be approximated by the debt premia on comparator companies with a level of gearing similar to the assumed notional level of gearing

Since debt is traded, it is possible to associate a particular credit rating with a specific range for the debt premium.