Ofcom's approach to risk in the assessment of the cost of capital

Second consultation in relation to BT's equity beta

Consultation

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Section 1

Executive summary

Introduction

1.1 Ofcom's consultation document, Ofcom's approach to risk in the assessment of the cost of capital (http://www.ofcom.org.uk/consult/condocs/cost_capital/condoc.pdf, "the first consultation") was published on 26th January 2005.

1.2 This document ("the second consultation") asks for further views of stakeholders in relation to a subset of the areas discussed in the first consultation. Ofcom has gathered further evidence and carried out further analysis in these areas, and considers it important to seek the views of stakeholders before finalising its decision via a published statement.

1.3 The first consultation discussed Ofcom's approach to estimating companies' Weighted Average Cost of Capital ("WACC") and the relevance of real option theory in the assessment of risk associated with new services. These factors can directly affect financial outcomes for firms in the industries that Ofcom regulates, being key inputs used by Ofcom in its analysis relating to, for example:

- setting charge controls and price caps;
- conducting competition analysis, e.g. predation and margin squeeze tests; and
- valuing the future cash flows that are associated with, for example, licence applications.

1.4 In each of these cases, Ofcom is required to assess what a reasonable rate of return is, an assessment which may have a significant financial implication for the firms concerned.

1.5 Further, in the Strategic Review of Telecoms ("the telecoms review") Ofcom proposed the principle that it had a duty to promote a climate for efficient investment.

1.6 As outlined in the first consultation, there are a number of key considerations that Ofcom is obliged to take into account when calculating a reasonable rate of return. The most important of these considerations (which may at times be in conflict with each other) are:

- the impact on incentives for companies to invest. Where investments are risky, it is important that regulated returns reflect the degree of risk that companies faces at the time that they make investments;
- the scope for investment by competing network providers. If there is a prospect of effective competition as a result of investment by competing providers, it is important that regulation does not harm such prospects; and
- the need to protect consumers from excessive charging for services provided in markets in which there are enduring economic bottlenecks.

1.7 Section 3 and Section 4 of this second consultation discuss issues relating to beta estimation in the context of BT, and are therefore of particular relevance to BT and its direct competitors. Ofcom's intention, however, is that a comparable analytical approach outlined in this consultation may apply equally to all the sectors that it regulates, including mobile communications and the audio-visual and audio broadcasting industries (where similar economic and policy considerations apply, subject to the availability of a comparable standard of evidence).

Key proposals in the first consultation

1.8 The first consultation included the following key proposals:

- a suggested range of 4.0% to 5.0% as a reasonable range for the equity risk premium ("ERP");
- Ofcom should, in certain circumstances, reflect differences in risk between projects in its financial analysis, with differences in systematic risk modelled via cost of capital estimates, and differences in specific risk reflected in cash flow estimates;
- Ofcom should calculate a distinct equity beta for BT's copper access business (suggested beta values being between 0.9 and 1.2, compared to a BT group average of 1.3); and
- real options theory is applicable to regulation in certain circumstances, and the financial analysis carried out by Ofcom should reflect the value of real options in such cases.

1.9 The closing date for responses to the first consultation was 5th April 2005. Ofcom received responses from a number of stakeholders in relation to all of these proposals. Whilst a number of responses were supportive of Ofcom's proposed approach, some others questioned the validity of some of the evidence used by Ofcom in the first consultation, particularly in relation to BT's equity beta.

1.10 Based on these responses, in this second consultation Ofcom presents further evidence and analysis regarding BT's equity beta only. Based on this further evidence, this second consultation makes further proposals in relation to BT's equity beta, in terms of both the group estimate and the appropriate level of disaggregation, and asks for stakeholder comments. The central values within Ofcom's proposed ranges are 1.1 for BT's group beta, and 0.9 for the beta of BT's copper access business.

Key proposals in this second consultation – estimating BT's equity beta

BT's group equity beta

1.11 Under the Capital Asset Pricing Model ("CAPM"), a company's equity beta reflects the systematic risk that it faces relative to the average company in the market. In the first consultation, Ofcom based its analysis in relation to disaggregating BT's beta on a group equity beta estimate for BT of 1.3. In their responses to the first consultation, some of the companies that depend on BT for wholesale inputs argued that the use of this figure was inappropriate, based on an analysis of more recent evidence in this area, and that Ofcom should revisit its estimate of this parameter.

1.12 Having considered these responses, and surveyed the available evidence, Ofcom proposes that a group equity beta of 1.1 represents an appropriate value for BT, and in this second consultation seeks the views of all stakeholders including BT in relation to this issue. This view is discussed in more detail in Section 3 of this document.

Disaggregating BT's group equity beta

1.13 Ofcom and, previously, Oftel have traditionally assessed the cost of capital at a company-wide level (with some exceptions, for example in the past Oftel made adjustments to BT's group equity beta in order to strip out the impact some of its higher risk activities, notably its (now divested) mobile network business Cellnet/O2). However, companies commonly make investment decisions at a project or activity level, and reflect variations in systematic risk between different activities.

1.14 In the first consultation, Ofcom proposed that it should reflect some of the most important of these variations in systematic risk its financial analysis. In particular, Ofcom proposed disaggregating its estimate of BT's equity beta in order to reflect Ofcom's view of the differing levels of systematic risk faced by different parts of BT's business. Stakeholder responses to this proposal were divided. A number of firms, particularly those that have invested in the furthest-reaching network infrastructure, were opposed to assessing risk at a project level, with BT and the cable companies particularly opposed to estimating the risk of BT's copper access business on a standalone basis. Competitors and customers of the incumbents were, broadly speaking, in favour of assessing risk at a disaggregated level and therefore estimating a distinct equity beta for BT's copper access business.

1.15 The argument most widely cited by stakeholders against estimating an equity beta for BT's copper access business was that, in the absence of pure play comparators (i.e. companies that only offered copper access services), a beta for BT's copper access business could not be estimated with any reliability. In their responses to the first consultation, some stakeholders, notably BT, argued that each of the pieces of evidence used by Ofcom to assess the level of systematic risk faced by BT's copper access business were flawed, and that this meant that the use of a single group estimate was preferable.

1.16 Having assessed stakeholder responses, Ofcom remains of the view that it is appropriate to propose a disaggregated approach to beta estimation in relation to BT's copper access business. In this second consultation, Ofcom addresses the specific criticisms levelled at the analysis outlined in the first consultation by BT and the cable companies. Additionally, it describes the results of additional research carried out on behalf of Ofcom by PwC. The results of this analysis provide further support for the use of a disaggregated approach.

Section 2

Introduction

Cost of capital estimation and Ofcom's duties

2.1 The text below, reproduced from the first consultation, outlines the importance of cost of capital estimation to Ofcom's duties.

2.2 In carrying out its functions to regulate the communications industry, Ofcom has to, amongst other things, make ex ante decisions over the appropriate level of charges for services in those parts of the sector where enduring bottlenecks that prevent the development of competition exist.

2.3 In addition, Ofcom has responsibility for ex post regulation of the sector (under its Communications Act/Competition Act/Enterprise Act powers) to address complaints relating to issues such as excessive or predatory pricing.

2.4 Ofcom has to make decisions relating to charges in a way that prevents excessive pricing by dominant firms, but that also allows companies to earn a reasonable return on their investments. A dominant firm's WACC typically forms the basis for calculating charges that permit the earning of a "reasonable" return, i.e. one that is sufficient to reward investors but that does not include monopoly profits.

2.5 The cost of capital is also the rate at which firms substitute between present and future value. This means that it is the appropriate discount rate to be used in NPV calculations when comparing company cash-flows over time. NPV calculations are widely used in a range of regulatory contexts, being relevant to both ex ante charge setting and ex post analysis such as margin squeeze tests.

2.6 Section 3(1) of the Communications Act ("The Act") sets out Ofcom's principal duty, namely to further the interests of citizens in relation to communications matters; and to further the interests of consumers in relevant markets, where appropriate by promoting competition. Section 3(2), of The Act sets out a number of specific objectives that Ofcom is required to secure in carrying out its functions (focusing on goals that are specific to each of the sectors that Ofcom regulates). Section 3(3) of The Act requires Ofcom to, in all cases, have regard to the principles that regulatory activities should be transparent, accountable, proportionate, targeted, and consistent, and to otherwise reflect "best regulatory practice" as appropriate. Section 3(4) of The Act sets out certain matters to which Ofcom must have regard in performing its duties. Section 4 of The Act sets out Ofcom's duties for fulfilling Community obligations applies to certain functions of Ofcom, notably its functions under Chapter 1 of Part 2 of The Act. In particular, Section 4(3) outlines Ofcom's duty to promote competition.

2.7 In the context of Ofcom's approach to risk and return, these duties are of particular importance in those areas where a large element of uncertainty is involved regarding the most appropriate means of estimation, since Ofcom must exercise its judgement in such cases. In the analysis outlined in this second consultation document, Ofcom is obliged to make such judgements in two areas, namely, firstly, estimating BT's group equity beta, and, secondly, determining the correct approach to beta disaggregation. In these cases, Ofcom is on occasion obliged to rely on a degree of judgement, and in making its decisions will have regard to its duties under The Act.

2.8 The matters in Section 3(4) of The Act, including the desirability of promoting competition in relevant markets, and the interests of consumers in respect of choice, price, quality of service and value for money, as required by Section 3(5) of The Act, are also relevant to the approach taken by Ofcom to estimating BT's equity beta.

2.9 Ofcom considers that the analysis and arguments outlined in this document are consistent with its obligations under The Act.

2.10 Ofcom's view is that a more robust approach to modelling the relationship between risk and return will bring about significant welfare improvements. It has, however, considered its initial views on the issues discussed in this document in the context of its duties under The Act. The discussions of Ofcom's duties under Sections 3 and 4 of The Act carried out in relation to each of the specific proposals in sections 4, 5, and 6 of this consultation, when read in conjunction with the rest of this document, represents a Regulatory Impact Assessment (RIA), as defined by section 7 of the Communications Act 2003. Stakeholders should send any comments on this aspect of Ofcom's analysis by the closing date for this consultation. Ofcom will consider all such comments before deciding whether to implement its proposals.

2.11 Impact assessments provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making and are commonly used by other regulators. This is reflected in Section 7 of The Act, which means that generally Ofcom has to carry out RIAs in relation to proposals that would be likely to have a significant effect on businesses or the general public, or when there is a major change in Ofcom's activities. In accordance with section 7 of The Act, in producing the RIA in this document Ofcom has had regard to such general guidance as it considers appropriate, including related Cabinet Office guidance.

2.12 Ofcom's recent consultation, *Better Policy Making: Ofcom's approach to Impact Assessments*, (http://www.ofcom.org.uk/consult/condocs/ia_guidelines, "Ofcom's impact assessment guidelines"), sets out Ofcom's proposed guidelines to making impact assessments. Ofcom is of the view that the assessment contained within this second consultation is consistent with the approach outlined in Ofcom's proposed impact assessment guidelines.

Ofcom's objectives

2.13 As outlined in the first consultation, in the second Consultation Document of the Telecoms Review (http://www.ofcom.org.uk/consult/condocs/telecoms_p2/), Ofcom proposed seven regulatory principles, suggesting that Ofcom should:

i. focus regulation on the deepest levels of infrastructure where competition will be effective and sustainable;

ii. ensure equality of access at those levels;

iii. as soon as competitive conditions allow, withdraw from regulation at other levels;

iv. promote a favourable climate for efficient and timely investment and stimulate innovation, in particular by ensuring a consistent and transparent regulatory approach;

v. accommodate varying regulatory solutions for different products, and where appropriate different geographies;

vi. create scope for market entry that could, over time, remove economic bottlenecks; and

vii. in the wider communications value chain, unless there are enduring economic bottlenecks, adopt light touch economic regulation based on competition law (i.e. regulate on an ex post basis) and the promotion of interoperability.

2.14 The approach adopted by Ofcom in determining the relationship between risk and return can play a key part in the translation of these proposed principles into regulatory policy.

2.15 In addition to its ongoing review of the telecommunications sector, this year Ofcom will make a number of decisions that will require judgements about the cost of capital in relation to a number of communications markets. For example:

- in the cost of copper review, Ofcom aims to set out a list of principles designed to enable altnets to compete on an equal basis with BT in the provision of services that depend on the access network, in which enduring bottlenecks exist. The level of access charges is a key element of enabling competition in downstream markets; and
- in the network charge control, Ofcom will consider setting BT's charges for a number of wholesale products, giving consideration to a number of issues including the impact of the introduction of "next generation" technology on BT's cost base.

2.16 The issues covered by this second consultation will have a direct impact on these reviews, by influencing Ofcom's estimate of BT's equity beta, and hence its cost of capital.

The first consultation

2.17 The first consultation document was published by Ofcom on 26th January 2005. The structure of the first consultation was as follows:

- a brief overview of the theory of risk and return (Section 3 of the first consultation);
- an appropriate value for the ERP (Section 4 of the first consultation);
- a discussion of variations in risk within the firm (Section 5 of the first consultation); and
- a discussion of the significance of real options theory in the context of regulation (Section 6 of the first consultation).

2.18 The first consultation asked for stakeholder views in each of these areas. The key questions that were asked can be divided into the following categories:

- "methodological" questions, i.e. ones not immediately concerned with any particular calculation or parameter values, in relation to Ofcom's approach to assessing risk at both a project and firm specific level (questions 2, 3, and 6 of the first consultation);
- an appropriate value for the ERP (question 1 of the first consultation);

- questions relating to Ofcom's approach in relation to assessing variations in systematic risk within BT, with a particular focus on the equity beta of BT's copper access network (questions 4 and 5 of the first consultation); and
- questions relating to the applicability of real options theory to regulation (questions 7 and 8 of the first consultation).

2.19 At a summary level, the key proposals in the first consultation were:

- a suggested range of 4.0% to 5.0% as a reasonable range for the equity risk premium ("ERP");
- Ofcom should, in certain circumstances, reflect differences in risk between projects in its financial analysis, with differences in systematic risk modelled via cost of capital estimates, and differences in specific risk reflected in cash flow estimates;
- Ofcom should calculate a distinct equity beta for BT's copper access business (suggested beta values being between 0.9 and 1.2, compared to a BT group average of 1.3); and
- real options theory is applicable to regulation in certain circumstances, and the financial analysis carried out by Ofcom should reflect the value of real options in such cases.

2.20 The next subsection contains a brief outline of those parts of stakeholder responses that related to the particular issues covered by this second consultation, i.e. group beta estimation and beta disaggregation.

2.21 Ofcom's views in relation to the other issues consulted on in the first consultation will be set out in the statement that follows this consultation exercise.

Responses to the first consultation

2.22 The closing date for responses to the first consultation was 5th April 2005. Ofcom received a number of responses to the first consultation, from the following stakeholder groups:

- "Incumbents", i.e. firms that have an obligation to offer network access on cost orientated terms:
  - BT;
  - Crown Castle;
  - NTL broadcast;
  - Kingston; and
  - the mobile networks.
- competitors/customers of the incumbents:
  - BBC;
  - C&W;

  - Easynet;
  - UKCTA; and
  - Wanadoo
- cable companies:
  - NTL; and
  - Telewest
- a number of individuals/academics

2.23 This second consultation document focuses on stakeholder responses, and Ofcom's view of these, in relation to estimating BT's equity beta. A full discussion of the other issues consulted on in the first consultation will be set out in the statement that will follow this consultation exercise.

2.24 The views of stakeholders in relation to the key proposals outlined in the first consultation can, broadly speaking, be summarised as follows:

- incumbents argued in favour of higher values for the ERP, whilst competitors argued in favour of lower values;
- most of the incumbents were opposed to assessing risk at a project level. BT, and the cable companies, were particularly opposed to estimating the risk of BT's copper access business on a standalone basis. Competitors and customers of the incumbents (other than the cable companies) were, broadly speaking, in favour of assessing risk at a disaggregated level; and
- incumbents tended to be in favour of the use of real options theory in regulation, whilst competitors were opposed.

2.25 Additionally, the alternative fixed operators argued that Ofcom should revise its estimate of BT's group equity beta downwards, based on the new available evidence in this area.

2.26 As explained in the executive summary, this consultation only asks for stakeholder responses in relation to, firstly, estimating the level of BT's group equity beta, and, secondly, Ofcom's approach to disaggregating BT's equity beta. Ofcom intends to publish a statement in relation to all of the issues discussed in the first and second consultations in August this year. This statement will outline Ofcom's views in relation to, amongst other things, the ERP, the relevance of real option theory to regulation, and the other methodological issues discussed in the first consultation.

2.27 Stakeholder responses in relation to BT's equity beta are summarised in more detail in sections 3 and 4 of this second consultation document.

This second consultation

2.28 Following stakeholder responses to the first consultation, Ofcom has carried out further analysis regarding BT Group's equity beta, reflecting all of the available evidence. Additionally, it has gathered further evidence in relation to its proposals in relation to beta disaggregation. With these factors in mind, Ofcom is minded to carry out a shorter second consultation in order to give stakeholders the opportunity to comment on this extra analysis before Ofcom publishes a statement on these issues.

2.29 The structure of the remainder of this second consultation is as follows:

- a discussion of the appropriate value for BT Group's equity beta , and Ofcom's proposed range of values for this parameter (Section 3); and
- following on from Section 3, a summary of stakeholder responses, and Ofcom's revised proposals following these, in relation to disaggregating BT's equity beta (Section 4).

Responses falling outside the scope of this review – other aspects of BT's cost of capital

2.30 As explained in paragraph 1.10 of the first consultation, the scope of this review is relatively narrow, and is not intended, for example, to discuss a number of issues that are relevant to estimating the cost of capital such as the risk free rate, inflation risk premium, optimal gearing, taxation adjustments, or detailed estimation techniques for the company's beta.

2.31 However, in their responses to the first consultation, a number of stakeholders made arguments in relation to wider issues regarding cost of capital estimation, and to Ofcom's fundamental approach to setting price controls. Since this document concludes with a set of estimates of BT's WACC, it is useful, in the remainder of this introduction, to provide a brief summary of stakeholder responses relating to other aspects of BT's cost of capital, and outline Ofcom's view on each of these.

Stakeholder responses

2.32 A number of stakeholders argued that it would have been appropriate for them to have been given an opportunity to comment on all aspects of Ofcom's approach to cost of capital estimation during this review. Specifically, a number of stakeholders argued that the review should have given stakeholders an opportunity to comment on Ofcom's approach to estimating:

- the risk free rate; and
- BT's debt premium – some stakeholders argued that recent debt issues by other companies in the industry meant that Ofcom should revise its view of BT's debt premium (estimated to be 1.0 in Ofcom's *Partial Private Circuits Charge Control - Final Statement,* published 30th September 2004 (http://www.ofcom.org.uk/consult/condocs/ppc_charge_control/, "the PPC charge control").

2.33 Some stakeholders argued in favour of a greater precision in Ofcom's cost of capital estimation techniques, since successive rounding-up of a number of both individual parameters and calculated values could distort cost of capital estimates.

2.34 Stakeholders also commented on the fact that industry analysts frequently use lower parameter values than the ones used by Ofcom when estimating BT's cost of capital.

Ofcom’s view

Stability of parameter estimates

2.35 Before setting out Ofcom’s detailed view on the stakeholder responses set out above, it is worth briefly discussing the issue of parameter instability, which is an relevant to a number of the parameter values estimated by Ofcom.

2.36 Depending on the exact estimation method used (in most cases, estimates based on both short- and long-run data could be used to estimate any parameter), some of the parameters used in cost of capital estimation may exhibit significant instability over time. For example:

- estimates of the risk free rate and corporate debt premia that are based on current market rates can exhibit significant fluctuations within a short space time (e.g. within the 3 months from 10th March 2005 to 10th June 2005, the spot rate on 5-year gilts fell from 4.79% to 4.16%); and
- estimates of a firm’s equity beta that are calculated using a relatively short data window can sometimes exhibit significant volatility (see Section 3 of this document for an example based on daily beta estimates for BT measured against the FTSE All-Share index).

2.37 Other parameters may be more stable over relatively short periods of time (e.g. a year or less), whilst exhibiting some less significant fluctuations. For example, unless a firm’s market capitalisation or level of debt changes significantly, its gearing ratio will be broadly constant from year to year.

2.38 As explained in the PPC charge control document, Ofcom’s preferred approach to estimating the parameters in cost of capital estimation is to primarily base estimates on recent market data, whilst analysing data over a sufficiently wide period to avoid the instability caused by very short-run fluctuations.

2.39 In some cases, it may additionally be appropriate to use a longer-run perspective as a cross-check. A number of other UK regulators have placed significant weight on long-run estimates of various parameters, e.g. in its March 2004 publication *Electricity Distribution Price Control Review - Background information on the cost of capital*, Ofgem proposed a range of 2.25% to 3.0% for the real risk free rate despite the fact that, at the time, the yield on index linked gilts of a relevant maturity was below 2.0%, and a range for the debt premium of 1% to 1.8%, despite the fact that, at the time, the average yield on the relevant corporate debt was below 1%.

2.40 Over the last two or so years, the yields on corporate bonds have fallen fairly sharply. Additionally, the yields on government bonds have for some time been lower than in most of the 1990s (this is particularly true as of mid 2005). The Bank of England’s *Inflation Report*, May 2005 (http://www.bankofengland.co.uk/publications/inflationreport/ir05may4.xls) provides an outline of, and some candidate explanations for, both of these trends, and discusses whether current low yields are likely to persist.

2.41 The remainder of this section sets out Ofcom’s estimates of the risk free rate, and of BT’s debt premium. Ofcom’s proposed estimate of BTs Group equity beta is set out in Section 3 of this document. All of these estimates represent an update of the estimates set out in the charge control, based on more recent market data. In each case, Ofcom is faced with a choice between:

- only putting weight on very latest market information (e.g. spot rates for the risk free rate and beta estimates based on one year of daily data);
- only putting weight on longer-term, more stable, estimates (e.g. a "long run" estimate of the risk free rate, or beta estimates based on five years of data); or
- putting weight on both types of estimate.

2.42 The first of these approaches will tend to lead to lower parameter estimates than the second, since:

- as described below, the yields on both government and corporate debt are currently at relatively low levels; and
- a "long run" beta estimate, e.g. one based on 5 years of data (daily, monthly, or weekly) will lead to higher estimates than one based on a short data window, since, firstly, the early part of the 5 year data set will cover the latter stages of the TMT bubble, and, secondly, as outlined in Section 3 of this document, having remained stable for a short period after the TMT bubble, BT's beta has fallen still further within the past year or so.

2.43 Ofcom prefers the third of the three approaches outlined above, i.e. it bases parameter estimates on current market data, but also puts some weight on other recent values. This approach provides stability from a regulatory perspective, and avoids putting undue weight on short-term fluctuations. This preferred approach is reflected in the estimates set out in the remainder of this document.

The risk free rate

2.44 As explained in, for example, the PPC charge control, the risk free rate of interest is an input into the calculation of both the cost of debt and the cost of equity. For an investment to be truly free of risk, the risk of default needs to be zero, and additionally there must be no reinvestment risk. The first condition can be approximately satisfied by using the yields on UK government debt, where the risk of default can be taken to be negligible. Strictly speaking, to satisfy the second condition, risk free rates should be estimated based on a series of short run risk free investments. This second condition is difficult to satisfy in practice, meaning that the nominal risk free rate is usually proxied by the yield on fixed term government debt of certain maturity. There is a range of maturities on government debt that could be used as the basis for an estimate of the risk free rate. These maturities range from less than 1 year to over 30 years.

2.45 There are arguments in favour of both short and long-term gilts as the best estimate of the risk free rate for the purposes of the proposed charge control. For example:

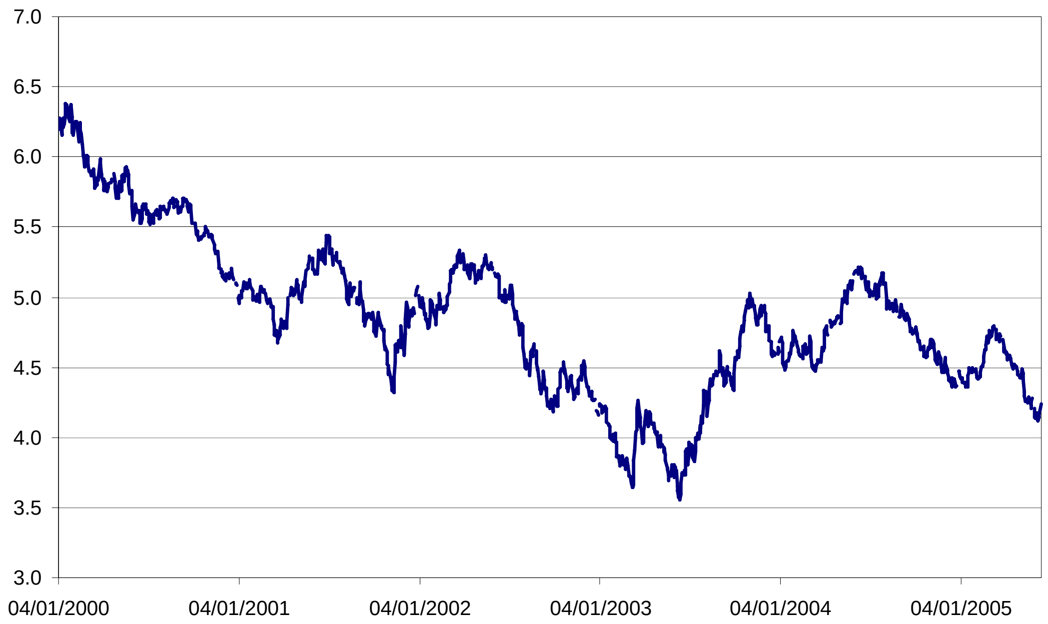
- a maturity relevant to the duration of a particular charge control may be appropriate (e.g. if a review relates to a 3-year charge control, a 3-year gilt may be appropriate); and
- BT is required to make investments (for example regarding network infrastructure) that will have economic lifetimes in excess of a typical charge control period, and hence a longer-term gilt may be appropriate.

2.46 Ofcom's preferred approach is to give weight to both of the above considerations. In calculating a risk-free rate to be applied to BT, its view is that 5-year gilts represent a reasonable compromise between the above two arguments (although, for example, it may adopt a different approach in estimating a cost of capital for other stakeholders in cases where a longer or shorter duration is more relevant). The yield curve is not currently upward-sloping, meaning that using the yield on longer term gilts would not, as has often been the case historically, lead to higher estimates.

2.47 As explained in, for example, the PPC charge control, Ofcom's preferred approach is to base estimates on current market yields of bonds of an appropriate maturity, but analysing returns over a sufficiently long period of time to avoid allowing very short run fluctuations to have an impact on its regulatory estimates. As described in previous Ofcom publications, Ofcom base future estimates of the risk free rate on prevailing market rates at the time of publication (using a number of months' data in order to avoid very short-term fluctuations), but taking other factors into account if it considers that current rates may not be a reliable proxy for future rates (see the Bank of England's inflation report, May 2005).

2.48 In the PPC charge control statement, Ofcom used a value of 5% for the nominal risk free rate which reflected a 3 month average of the then most recently available data for 5-year gilts, and at the same time was reasonably aligned with a view of the longer term rate for 5-year gilts. As Figure 1 below shows, the nominal rate for 5-year gilts has fallen over the last year and mechanistically applying a 3 month average of the most recent data would lead to a risk free rate of 4.5% or less. Such an estimate would, however, be low by historic standards, and Ofcom believes that some weight should be given to a longer-term perspective, suggesting that the use of a slightly higher risk free rate would be more appropriate. Taking account of both the most recent and longer-term evidence, Ofcom proposes to use a value of 4.7% for the nominal risk free rate, which is consistent with a real risk free rate of about 2.0% and a rate of inflation of about 2.6-2.7%.

Figure 1- UK nominal spot rate, 2000-2005



Source: Bank of England

BT’s debt premium

2.49 In relation to BT’s debt premium, Ofcom notes that the yield on some corporate bonds has declined in recent years (although, particularly for lower-rated investment grade bonds, corporate bond spreads have increased somewhat since the first months of 2005). BT’s credit rating is currently A-. Based on data obtained from Bloomberg the benchmark yield for A- corporate debt was:

- 1.03% at the end of June 2003;
- 0.74% at the end of June 2004; and
- 0.64% in mid June 2005.

2.50 Ofcom’s view is that a debt premium of 1.0%, as used in the PPC charge control, represents a reasonable value for BT’s debt premium. Both the risk free rate and promised yields on corporate debt are both currently low relative to recent historical values, Ofcom’s view is that it would not be appropriate for Ofcom to base its estimates of both parameters on (low) current market values.

2.51 It is also worth noting that the view that Ofcom should lower its estimate of BT’s debt premium was not universally held by stakeholders- one of BT’s competitors, C&W, also used a debt premium of 1.0% in its response to the first consultation.

Other comments

2.52 Ofcom agrees that it should exercise caution in rounding parameter values if doing so might distort the results of its cost of capital estimates. Ofcom’s view is that the estimates outlined at the end of this second consultation document are consistent with a sensible approach to rounding.

2.53 Ofcom notes that many industry analyst estimates of BT group’s WACC may be lower than the values used by Ofcom. Ofcom does not, however, consider this to be a key consideration. Ofcom’s objectives, and hence the methods that it uses, in, notably, estimating values for the ERP and BT’s equity beta, are significantly different from those of most industry analysts. As explained by Ofcom in both this document and the first consultation, its aims of consumer protection and encouraging efficient investment, both play a part in its estimation of parameter values in cases where more than one credible estimate is available. Industry analysts have a different set of objectives in calculating company estimates of the cost of capital.

Section 3

BT group equity beta

Introduction

3.1 The first consultation focused on a number of issues relating to Ofcom's treatment of risk and return. Section 5 of the first consultation, which discussed variations in risk within the firm, ended with an analysis of the possible variations in risk across BT Group, concluding by suggesting a range of reasonable equity beta estimates for various parts of BT Group, assuming an overall group average of 1.3. Some of the companies that depend on BT for wholesale inputs (e.g. C&W and Orange) argued that the use of BT group beta estimate of 1.3 was inappropriate (based on an analysis of more recent evidence in this area), and argued that Ofcom should revisit its estimate of this parameter. This section outlines Ofcom's current view in relation to an equity beta estimate for BT's group beta, and asks for comments from stakeholders.

3.2 This review deals with issues of considerable importance for the telecommunications industry. Ofcom's estimate of BT group's equity beta, and hence its cost of capital could have far-reaching implications for competition and investment within the industry. Ofcom's view is therefore that, given the further evidence that has become available in relation to BT's equity beta, it would not be appropriate for it to conclude its analysis in relation to the risk of BT's copper access business and the rest of BT without giving stakeholders an opportunity to comment on the new data and of the implications of the data for the estimation of beta.

Background

3.3 Before beginning a discussion of an appropriate value for BT's group beta, it is useful to recap the two most recent beta values for BT used in recent Ofcom and Oftel decisions.

3.4 In February 2001, in Oftel's *Proposals for Network Charge and Retail Price Controls from 2001*, Oftel used a single central beta estimate of 1.3 at a central optimal gearing of 30%. This estimate was based primarily on values obtained from the London Business School Risk Measurement Service ("LBS RMS").

3.5 When Ofcom set BT's PPC charges in September 2004 (i.e. in the PPC charge control), Ofcom revised its estimate of BT's WACC since, since the most recent available estimate was at the time over three years old. Ofcom undertook a review of all of the parameters used in its WACC calculation, and settled on an equity beta estimate of 1.3 at 35% gearing. Ofcom arrived at this estimate having put weight on a number of different estimation methods, namely:

- the LBS RMS beta (calculated, in line with the standard RMS methodology, using five years of monthly data and a Bayesian adjustment); and
- beta estimates calculated on Ofcom's behalf by The Brattle Group in 2004, using a range of different assumptions, and based on the results of a range of statistical tests. The two key estimates were calculated using one year of daily data against UK and world indices.

3.6 The beta estimate used in the PPC charge control statement and consultation was based on data up to the end of 2003. Following the end of the Telecoms, Media and Technology ("TMT") bubble in the late 1990s and early 2000s, at the end of 2003 it appeared that BT group's equity beta, when calculated using daily data against a UK index, had stabilised at around 1.3.

3.7 The question of whether to revise Ofcom's view of BT's beta was therefore not addressed in the first consultation. However, as stated above, responses submitted to the first consultation in April 2005 argued that Ofcom should have revised its estimate in the light of more recent evidence on BT's group beta. For example, analysis carried out by JP Morgan on behalf of C&W as a part of its response to the first consultation suggested that, having remained broadly constant from the twelve months ending November 2002 to the twelve months ending January 2004, BT Group's beta, when calculated using one year of daily data against the FTSE 100 index, had fallen considerably.

3.8 In the light of these responses, Ofcom commissioned an update of the work on beta estimation previously carried out on its behalf by The Brattle Group (*Beta Analysis Of British Telecommunications: Update*, June 2005). This analysis showed a similar trend (see below, and note that BT's market capitalisation and debt levels, and hence its gearing ratio, have remained broadly constant over this period) to that described by the altnets, i.e. one of a declining equity beta.

Figure 2- BT's equity beta, 2000 to 2005

Source: The Brattle Group

Beta estimation

Introduction

3.9 The value of a company's equity beta reflects movements in returns to shareholders (as measured by the sum of dividends and capital appreciation) from its shares relative to movements in the return from the equity market as a whole. It increases with a company's debt to equity ratio (gearing), since a higher level of gearing implies higher volatility in the returns to shareholders

3.10 Equity beta estimation is usually carried out in order to estimate what the relationship between a firm's returns and those of the market will be on a forward-looking basis. Expectations of this sort are very difficult to measure though, so equity beta values for a company are typically calculated by regressing data on past returns against the past returns associated with an appropriate market index.

3.11 In using historical data to estimate a company's beta on a forward-looking basis, there are a number of potentially contentious issues to consider in appraising the usefulness of beta estimates (aside from the issue of estimating the risk of individual projects within a company, which was discussed at some length in the first consultation). These issues must sometimes be traded off against each other, since no single estimate will typically score highly against all criteria. Contentious issues include the following:

- the statistical properties of estimates, for example:
- reliability of estimates (e.g. lower standard errors can be obtained by, for example, using a sample containing more data points via higher frequency data or longer data windows, and estimates calculated using monthly data can be susceptible to significant variations depending on which day of the month is used for beta estimation);
- parameter stability – if beta estimates change over time, then it may not be appropriate to use estimation methods that rely on long run historical data windows. This will be particularly true if, for example, data windows span important events such as major acquisitions and divestments; and
- other technical issues (these include heteroscedasticity, autocorrelation, and asynchronous trading bias – see *Issues in Beta Estimation for UK Mobile Operators*, The Brattle Group, July 2002 for details)
- the need to measure risk relative to an appropriate index (e.g. domestic or international).
- other issues that are relevant from a policymaker's point of view, e.g.:
- issues relating to the stability of estimates (e.g. if some estimation methods provide results that are very unstable over time, then putting a relatively large amount of weight on estimation methods that provide more stable results may be desirable in order to provide a stable climate for investment); and
- the usefulness of relying on, well known, published, data sources (such as the LBS RMS data or similar).

3.12 Taken together, these issues mean that a wide range of estimation methods may be used in beta estimation. Ofcom's preferred approach is to give weight to a number of different estimation techniques, which, it believes, strike an appropriate balance amongst the issues outlined above.

3.13 Some of the key practical estimation issues that arise based on the objectives identified above are:

- choice of data frequency (daily , weekly, or monthly);

- estimation period (how many years' worth of data to use, and over which period); and
- the need to measure risk relative to an appropriate index (i.e. regressing company returns against either a domestic or international market index).

3.14 Each of these issues is discussed in the context of the available evidence on BT group's equity beta in the text below.

Data frequency

3.15 A key issue in beta estimation is the frequency of data to be used. Either daily or monthly (or indeed weekly) returns are commonly used to calculate equity beta estimates. The relative merits of these estimation techniques are summarised in the Competition Commission's 2003 report on mobile call termination (http://www.ofcom.org.uk/static/archive/oftel/publications/mobile/ctm_2003/index.htm), and discussed at some length in a paper written by The Brattle Group on behalf of Oftel, Issues in Beta Estimation for UK Mobile Operators, The Brattle Group, July 2002.

3.16 Advantages of using daily data in beta estimation include:

- obtaining greater statistical accuracy (shown by lower standard errors);
- the option of using shorter data windows in cases where parameters appear to be unstable; and
- the fact that beta estimates based on monthly returns are often sensitive to the day of the month on which data points are taken (e.g. in the PPC consultation Ofcom set out evidence showing that beta estimates for BT fluctuate widely across values depending on which day of the month is used).

3.17 Disadvantages of using daily data in beta estimation include:

- statistical problems that may result from using daily data, notably "non synchronous trading bias" (see the Brattle Group's 2002 paper for details). However, these problems can be mitigated by the use of statistical corrections, e.g. a "Dimson adjustment" (including additional lag and lead terms in regression analysis); and
- the fact there is no widely recognised published source of beta estimates using daily data (such as the LBS RMS beta which is based on monthly data).

3.18 Given the degree of uncertainty involved (caused, for example, by being unable to isolate the relevant components of BT's overall activities, and ensuing difficulties in interpreting statistical tests), a degree of judgement is required in deciding how to arrive at a single estimate or range of estimates for beta. Ofcom's view is that a prudent approach is to place a degree of weight on both daily and monthly estimation techniques, subject to statistical robustness of estimates, particularly given that published sources tend to focus on the latter estimation method. The most appropriate estimation method will be dependent on the statistical properties of the data set used, and may depend (see below) on the data window used – in cases where a short data window is preferable, the use of monthly data will not be appropriate, since there will be insufficient data points available for calculating robust estimates.

Data window

3.19 An issue closely related to that of data frequency is the appropriate data window to use for estimation. For example, the published LBS RMS beta estimates are calculated, using monthly observations, using 5 years of data, whereas - using data of a higher frequency - it is possible to obtain robust estimate betas based on a single year's worth of data (or perhaps less).

- The trade-off involved in selecting the appropriate data window is between:
- the need to reflect the most recent possible data in order to obtain a proxy for future values (which favours the use of shorter estimation periods); and
- the desirability of obtaining low standard errors of estimation by including many observations (which favours the use of longer estimation periods).

3.20 Ofcom's view is that, (at least when using daily data) it is appropriate at present to use a relatively short window. This is because the beta for BT has appeared to be unstable in recent years. This is illustrated in Figure 2 above.

Appropriate index

3.21 In traditional cost of capital analysis the risk of a stock has been estimated relative to its domestic market. However, given the increasing prevalence of non-UK investment within the portfolios of UK investors, there may be increasingly strong grounds for estimating risk relative to an international portfolio (see Issues in *Beta Estimation for UK Mobile Operators*, The Brattle Group, July 2002). Ofcom's view is that some weight should therefore be given to beta estimates measured against international indices in addition to domestic ones.

Summary of the evidence

The estimates

3.22 The table below reproduces the estimates used by Ofcom in arriving at an estimate of 1.3 in September 2004. Note that the Brattle Group found that Dimson adjustments were not significant based on this data window.

Figure 3- The beta estimates considered by Ofcom in setting the PPC charge control

Estimated by/ description	Data Frequency	Index	Period	Estimate (middle of range)
The Brattle Group	Daily	UK	2002-03	1.29
The Brattle Group	Daily (+ Dimson adjustment)	UK	2002-03	1.29
LBS RMS	Monthly	UK	1998-2003	1.51
The Brattle Group	Daily	World	2002-03	0.89

3.23 The table below shows the equivalent estimates if re-calculated up to the end of the early part of April 2005.

Figure 4- Updated beta estimates (based on data windows ending April 2005)

Estimated by/ description	Data Frequency	Index	Period	Estimate (middle of range))
The Brattle Group	Daily	UK	2004-05	1.0
The Brattle Group	Daily (+ Dimson adjustment)	UK	2004-05	0.6
LBS RMS	Monthly	UK	2000-2005	1.4
The Brattle Group	Daily	World	2004-05	c. 0.5

Interpreting the evidence

3.24 Figure 4 shows that the available evidence points to a wide range of credible alternative estimates of BT Group's equity beta. This means that there are a number of values that Ofcom could adopt as "reasonable" values.

3.25 As explained in the first consultation, when faced with significant uncertainty regarding parameter estimation, the key issue for Ofcom in choosing an appropriate parameter estimate (in this case BT's group equity beta) from within a range of plausible estimates is to balance the relative risks of setting a cost of capital that is too high with one that is too low. In assessing these risks, Ofcom must take into account both the short and long term impacts on consumers and firms.

3.26 In following its statutory duties, Ofcom has considered the impact of under- or overstating the level of risk inherent in equity investments (and hence an appropriate for BT's group equity beta).

3.27 Excessive rewards may lead to consumers paying prices that are above the competitive level, leading to an overall welfare loss, and to investments that are not fully justified by consumer demand being made (and, possibly, investments in other areas that are justified by consumer demand not being made as a result).

3.28 However, while setting rewards too low will lead to consumers benefiting from lower prices in the short run; it may also lead to discretionary investment being discouraged, meaning that the levels of infrastructure-based competition and innovation are at a sub-optimal level. In dynamic markets, there may also be a negative impact on incentives to innovate.

3.29 Given the duties and objectives outlined above, Ofcom believes that the costs associated with setting too low a cost of capital are greater than those associated with setting it too high. This has been taken into account in the arguments outlined in its discussion of interpreting the available evidence regarding BT's group equity beta.

3.30 A comparison of Figure 3 and Figure 4 shows that, according to all of the estimation methods used by Ofcom in the September 2004 statement, BT's equity beta has fallen, the extent of this fall varying depending on which estimation technique is used. If, for example, Ofcom were to attach roughly the weights to each of the estimates in Figure 4 (i.e. the 2005 update) as it did in September 2004, this would suggest a group equity beta for BT of about 1.3 based on the September values, and, using the current values, suggest a beta of below 1.0. Ofcom's view, however, is that the use of such a mechanical approach to beta estimation in a regulatory context would not be appropriate. A strong element of judgement is required in assessing the different available estimates. Ofcom proposes that, in the interests of regulatory stability, it should put a significant amount of weight on its most recently used published figure in addition to recent estimates based on further evidence (see the Brattle Group's paper for a discussion of recent changes in BT's beta).

3.31 Ofcom therefore faces a trade-off between:

- making use of the most up-to-date evidence, i.e. making a downward revision to its view of BT group's equity beta; and
- using an estimate that is consistent with data from a slightly longer data window, and with providing more stability and continuity relative to previous regulatory decisions by Ofcom.

3.32 Based on these considerations, Ofcom proposes that a range of 1.0 to 1.2 represents a reasonable range for the equity beta of BT group at current gearing levels. Given that most of the estimates shown in Figure 4 are towards, or in some cases below, the lower end of this range, the chief justification for using values at the upper end of this range would be arguing in favour of the "status quo", i.e. using previous published estimates, or putting a large amount of weight on published estimates, despite the associated statistical shortcomings of these.

3.33 Whilst Ofcom's preferred approach is to put significant weight on previous estimates, it does appear that an estimate of 1.2 (or higher) would not be in line with the available evidence. Overall, Ofcom proposes that an estimate for the equity beta of BT group of 1.1 would strike an appropriate balance between the factors outlined above.

3.34 Section 2 of this document provides a brief overview of some of Ofcom's key duties under Sections 3 and 4 of the Communications Act. In proposing the most appropriate values from within this range, Ofcom has, amongst other things, had regard to Section 3(4)(d) of the Communications Act 2003; i.e. to have regard to the desirability of encouraging investment and innovation in relevant markets when exercising its duties. Ofcom's duty to promote competition under Section 4 of The Act is also an important factor to consider. Where infrastructure-based competition is feasible, then, other things being equal, higher beta estimates will tend to encourage this type of competition, but, in markets where downstream competitors are obliged to rely on BT for wholesale inputs, lower beta estimates will promote competition downstream.

3.35 In determining a value for BT's group equity beta, Ofcom's aim is to ensure that companies are provided with incentives to invest, and to engage in infrastructure-based competition where this is feasible. However, too high a value could lead to inefficient entry, and to consumers paying prices that are too high. In proposing its range of estimates for BT's group equity beta, Ofcom has also had regard to its Section 3(5) requirement in performing its duty to have regard to the interests of consumers in respect of choice, price, quality of service and value for money, and to its Section 4 duties, since setting regulated access charges at a reasonable level will encourage competition at a downstream level.

***Question 9**: Do stakeholders agree that Ofcom should revise its central estimate of BT's equity beta downwards from 1.3 to 1.0, 1.1, or 1.2? Which of these figures is the most appropriate?*

Section 4

Disaggregation and BT's copper access beta

Introduction

The first consultation

4.1 Questions 4 and 5 of the first consultation discussed the application of this approach to BT, discussing whether or not it would be appropriate to use a disaggregated approach in relation to BT, particularly in the context of its copper access network which, in Ofcom's view, was subject to less systematic risk than BT Group as a whole.

Question 4: *Do respondents agree that it is appropriate for Ofcom to disaggregate its estimate of BT's equity beta, and in particular to estimate a distinct equity beta for BT's copper access network?*

Question 5: *Do respondents agree with Ofcom's approach to assessing possible values for the equity beta of BT's copper access network, and its suggested range of values?*

4.2 The first consultation asked stakeholders whether they agreed with a proposed approach whereby Ofcom would depart from the use of a single group equity beta estimate in the context of BT's copper access business. Ofcom consulted on, based on a BT group beta estimate of 1.3, a range of values for the copper access business ranging from 0.9 to 1.2. As discussed in Section 5 (and see also Figure 11) of the first consultation, Ofcom proposed that a BT group beta estimate of 1.3 would apply to other regulated products, whilst a beta in the range of 1.4 to 1.8 would be used for the rest of BT.

4.3 In the first consultation, Ofcom set out some empirical evidence suggesting that BT's copper access business was likely to face less systematic risk than the rest of BT using three types of empirical analysis. These were:

- benchmarking the asset betas of the UK's largest utility companies – Ofcom argued that there were important similarities between the risk characteristics of these companies and BT's copper access business, and hence that their asset betas provided a useful benchmark;
- benchmarking against the equity betas of US telecoms companies – Ofcom noted that, firstly, the asset betas of local exchange carriers (LECs) in the US were lower than those of BT, and, secondly - and probably more significantly - the asset betas of the US LECs were lower than those of long-distance carriers in the US; and
- comparing, based on previously conducted studies, estimates of the income elasticity of demand for access services with that of other telecoms services (calls) – Ofcom noted that the former were lower, consistent with lower asset betas.

4.4 The sections below summarise the responses of stakeholders in relation to questions 4 and 5, including their comments on the three types of analysis listed above. This chapter also sets out Ofcom's revised proposals in the light of stakeholder comments. Since questions 4 and 5 in the first consultation were closely related, responses to both questions are discussed together. BT's response was the most substantial of the submissions received by Ofcom. Because of this, it is discussed in a separate subsection of this chapter. The structure of the remainder of this chapter (following a brief outline of some comments made by BT in relation to arguments previously made by Ofcom in the telecoms review) is therefore as follows:

a. a brief recap of some of the analysis relating to BT's copper access network that had been set out in the telecoms review;

b. a summary of responses received by Ofcom from stakeholders other than BT in relation to this issue;

c. Ofcom's view on the submissions referred to in (b);

d. a discussion of BT's response, and Ofcom's view of it;

e. a brief overview of the further research in this area carried out by on behalf of Ofcom by PwC; and

f. Ofcom's proposals

The telecoms review and BT's copper access network

4.5 Before a fuller discussion of stakeholder responses, for clarification it is worth covering a set of arguments made by BT in an annex to its response to the first consultation, reproduced in full below:

Ofcom has not previously used different required rates of return for different parts of BT. Rather, it has used the BT Group cost of capital for all regulated activities of BT, on the grounds that there is no reliable evidence on which to base estimates of disaggregated betas. In 2004 Ofcom foreshadowed the possibility of using a different rate of return for the copper access network. According to Ofcom at that time, there were three characteristics of the copper access assets that made it worth considering whether their risk differs from the other regulated assets. These were:

- *the copper access network is already in the ground,*

- *little new investment is required in the copper access network,*

- *the copper access network is not contestable by competition.*

*A different reason is now given for using a lower risk for the copper access network. It is that the copper access revenues come from mature, "essential" products, whose returns are not closely correlated with fluctuations in aggregate demand. It is not clear whether Ofcom views the earlier reasons as still relevant. They are discussed in the Appendix. None of them is a reason to use a lower beta for the copper a*ccess assets.

4.6 Ofcom disagrees with BT's interpretation of this part of the telecoms review consultation document. It is worth reproducing the original telecoms review referred to by BT in its response:

7.15 The considerations concerning the regulated returns that BT should be permitted to earn from its current access network are very different from those concerning the core network.

7.16 The relative importance of incentives to invest is low. It is important that BT is not disincentivised from investing in next generation access networks, and we consider this below. But the current generation copper access network is already in the ground, and little new investment beyond incremental investment for new-build properties is in prospect.

7.17 Much of the copper access network is not contestable by competing network providers, and as a result there is a strong need for direct consumer protection. The market reviews completed by Oftel and Ofcom found that competition in access networks from mobile and cable does not constitute effective competition to BT in many markets. Therefore in these markets, direct regulation on the return that BT is permitted to make on its assets is the principal means of consumer protection.

4.7 Contrary to the suggestion made in BT's response, in the telecoms review Ofcom did not make any link between the factors listed above and the degree of risk (systematic or specific) faced by BT's copper access business. Rather, the above factors were cited by Ofcom as reasons why BT's copper access network represents an enduring economic bottleneck. The first two factors listed by BT may, however, also be relevant to the degree of systematic risk faced by BT's copper access business since the greater the extent to which the costs of a project are sunk, the lower its degree of operational leverage will be. In Ofcom's view, the third factor listed by BT, i.e. the limited prospect of infrastructure-based competition in current generation access networks, is unlikely to be a key determinant of the level of systematic risk that a project faces.

4.8 The level of competition facing various parts of BT's business is relevant to Ofcom's cost of capital estimation. This is because, other things being equal, where there are enduring economic bottlenecks (subject to BT still being able to return a reasonable return on its investment), Ofcom may be less likely to err on the side of high parameter estimates, since doing so will not have an impact on the extent of infrastructure-based competition. The extent of competition is not, however, a key factor in determining the level of systematic risk faced by different projects. Ofcom's view is that, as explained in the telecoms review, BT's copper access business represents an enduring economic bottleneck, and, as outlined in the first consultation, it also faces less systematic risk than BT as a whole.

Summary of responses (excluding BT's)

4.9 Stakeholders were divided as to the appropriateness of the use by Ofcom of a distinct equity beta for BT's copper access network.

4.10 A number of stakeholders argued in favour of Ofcom's proposals, notably the fixed-line communications providers, both in their collective and individual responses.

4.11 These stakeholders were broadly supportive of Ofcom's view that there was a difference between the level of systematic risk faced by BT's copper access business and the rest of the firm (the former facing less risk), but a number of stakeholders additionally argued in favour of the use of a lower group beta figure in order to reflect more recent evidence, specifically regression analysis carried out on behalf of C&W using data relating to 2004.

4.12 Vodafone argued that the high fixed costs associated with the provision of copper access lines might mean that Ofcom's arguments had understated the level of systematic risk faced by BT's copper access business relative to that faced by BT group as a whole.

4.13 Vodafone also argued for caution in the estimation of disaggregated betas since figures estimated on this basis will tend not to be based on regression analysis, meaning that the statistical properties of estimates will not be known.

4.14 In estimating disaggregated project betas, it is necessary to calculate a set of weights to be applied to the betas in order to ensure that, when aggregated together, the summation of the betas of different projects corresponds to the group total. In its response to the first consultation Vodafone highlighted the difficulties inherent in calculating appropriate weights that are based on the NPV of forecast future cash flows. Vodafone argued that, following beta disaggregation, the NPV of the cash flows those parts of the business with lower betas, and hence lower discount rates, would be higher due to future profits being discounted less heavily.

4.15 Vodafone argued that there is an "asymmetric loss principle", under which the consequences of under-investment, if the cost of capital is set too low are significantly more damaging than the outcomes associated with setting the cost of capital too high. Vodafone argued that this meant that Ofcom should consider, for example, making upwards adjustments to central parameter estimates (e.g. adding one or more standard errors to central equity beta estimates). Based on this principle, and the other factors outlined above, Vodafone argued that Ofcom should not assume that the disaggregated beta of an individual part of a company is below that of the company as a whole.

4.16 NTL argued that a movement towards lower returns on BT's copper access network, and hence, ultimately, lower prices at the retail level, would damage incentives for, firstly, investment in current generation access networks by alternative providers, and, secondly, investment in next generation access networks. This argument was echoed by Telewest. NTL also argued that Ofcom's proposed choice of a disaggregation between copper access and the rest of BT was arbitrary, and that, for example, a disaggregation along geographic lines would be equally valid and appropriate.

4.17 Telewest pointed out that, given the absence of pure-play comparators, disaggregating BT's equity beta is a difficult exercise, and it therefore advocated either the use of a single group beta estimate to be applied to all BT investments, or a very limited disaggregation.

4.18 Telewest argued that the utility equity beta estimates presented by Ofcom understated the true risk faced by utility companies, since these figures were estimated using a data set that partly spanned the Telecoms- Media-Technology bubble (i.e. the very late years of the 20th Century and the very early years of the 21st), a period during which TMT company betas were biased upwards and those of other companies, particularly utilities, were biased downwards. In relation to the evidence provided by Ofcom in relation to US telecoms companies, Telewest argued that the comparisons made by Ofcom were distorted by differences in the level of regulation faced by the companies in Ofcom's sample (see the discussion of BT's response below for Ofcom's view of this argument).

4.19 Telewest also argued that Ofcom's analysis of income elasticities was flawed because it did not take account of the fact that some recent academic studies have shown that the demand for second lines is significantly more elastic with regard to income than that for first lines.

4.20 An additional view expressed by a number of respondents, including UKCTA, was that first consultation's proposals in relation to disaggregation did not go far enough, and that variations in systematic risk within a company should also be reflected by means of project specific gearing ratios. This suggestion reflects standard finance theory and the available empirical evidence (e.g. see Chapter 5 of *The Real Cost of Capital* by Ogier et al for details). A firm with stable cash flows, i.e. one that faces low levels of systematic risk, will be more likely to take advantage of the tax advantages of debt. It will be in a position to commit to making more fixed payments to debtholders, since the probability of it being unable to make these payments is lower than would be the case for a firm with less stable cash flows.

Ofcom's views of the responses (excluding BT's)

4.21 In response to Vodafone's comment, Ofcom agrees that its analysis would arguably be more complete if it included a full assessment of the operational leverage of BT's copper access business relative to that of BT group as a whole. However, such an exercise would be difficult given that many assets in BT's network are used to support a number of services, and given the difficulty in accurately predicting the impact of changing volumes of access lines on BT's cost base. It is additionally important to note that many of the "fixed" costs associated with the access network are sunk, meaning that the proportion of future cash flows that are fixed with respect to volume may be relatively low (the same is not true of BT's costs when calculated on an accounting basis, but it is future cash flows, rather than accounting returns, that are important in determining shareholder value). It is not clear to Ofcom whether, relative to other parts of BT's network businesses, BT's copper access business should have more or less operational leverage in a cash flow sense.

4.22 Ofcom agrees that estimating beta values on a disaggregated basis will typically mean that statistical information, such as the standard error of estimates, will not be available. Ofcom does not, however, consider this to be a reason not to carry out a disaggregated analysis. Ofcom's preferred approach to the estimation of betas at a company level, as described in Section 3 of this document, is to obtain estimates calculated using a number of different estimation methods, and to give weight to each of them in arriving at a best estimate. This means that estimates are not weighted in a precise fashion, and the standard error of the final value used by Ofcom cannot be calculated. Ofcom believes that a similar approach to beta disaggregation is appropriate, and hence that an analysis of individual standard error estimates need not be a key part of its approach to beta disaggregation.

4.23 Ofcom's view is that Vodafone's comment regarding the weights on different parts of BT's business does not represent a valid criticism of Ofcom's approach. The calculation of weights for different divisions within BT is not a precise science given the uncertainty regarding the extent to which BT's current stock market value is based on the value of uncertain growth opportunities. Additionally, Vodafone's criticism ignores the fact that lowering the beta for BT's copper access business would, in addition to lowering the discount rate that should be applied to the relevant cash flows, reduce the cash flows themselves earned on the copper access business, diminishing or mitigating the effect described by Vodafone in its response.

4.24 In response to Vodafone's arguments regarding an asymmetric loss principle, Ofcom notes that it is difficult to provide direct empirical evidence to show the long-term benefits to consumers brought about by allowing higher returns, whereas the short-term increase in consumer surplus associated with tighter price controls is relatively straightforward to quantify. Ofcom agrees though, in principle, that the consequences of under-investment if the cost of capital is set too low may be more damaging than the outcomes associated with setting the cost of capital too high. This view was expressed on a number of occasions in the first consultation.

4.25 Typically, the uncertainty surrounding individual parameter values is not confined to statistical uncertainty, i.e. cases where the appropriate data source and estimation method are agreed upon, enabling central parameter values to be calculated, with the standard errors around these estimates reflecting uncertainty regarding the parameter's true value. More often, a wide range of estimates is available, many of which use different data sources. In such circumstances, the key uncertainty is the appropriate weighting of each of the estimates obtained from these data sources, and the use of a "rule of thumb" such as Vodafone's suggestion of adding one or two standard errors to point estimates (if such a rule were considered to be desirable) is not possible. For example, there is necessarily an element of subjectivity in deciding the appropriate level of weight to put on, when estimating BT's group equity beta, estimates calculated using daily data versus estimates calculated using other techniques.

4.26 In line with its Section 3(1) duty, Ofcom believes that consumer interests are best served by effective competition (at the appropriate level, e.g. infrastructure-based competition may not be feasible where there are enduring economic bottlenecks). Where the prospects for competition are limited, Ofcom's duty is to protect consumers by making sure that incumbents price at a competitive (wholesale or retail) level, whilst ensuring that they earn a fair return on investments. This may mean that, in cases where there are enduring economic bottlenecks, Ofcom puts more weight than would otherwise be the case on ensuring consumer protection in the short to medium term.

4.27 Vodafone argued in its response that, based on an asymmetric loss principle, "Ofcom should never assume that the disaggregated asset Beta of an individual part of a company is lower than the asset Beta estimated for the company as a whole, estimated from historical share price data". Ofcom agrees that, in general, the risks associated with setting access charges too low outweigh those associated with setting access charges too high, but disagrees with a "mechanistic" approach such as that advocated by Vodafone. For example, in relation to products where there is little scope for infrastructure-based competition or innovation, the downside associated with low access charges is somewhat lower. As described in Section 3, in the case of BT there is currently no single obvious best estimate of BT's group equity beta, and Ofcom is obliged to exercise judgement in determining a central value for BT's equity beta. Based on this uncertainty, Ofcom proposes that, under certain circumstances (e.g. where there is good evidence to suggest that risks differ across projects, and there is a readily identifiable gain to consumers from following a disaggregated approach), it will be appropriate to set a project group beta below its central estimate of the beta of the group, provided that disaggregated estimates fall within, or very narrowly outside of, a range of reasonable estimates for the group as a whole.

4.28 Ofcom disagrees that the arguments made by NTL and Telewest regarding incentives for investment in current generation access networks invalidate the approach proposed in the first consultation. Ofcom notes that allowing a lower return on BT's copper access network may discourage investment in alternative current generation access networks. However, as argued in, for example, the Telecoms Review, Ofcom's view is that the status of current generation access networks as an enduring economic bottleneck has key implications for Ofcom's regulatory policy in this area. This means that, when assessing the trade-off between the benefits to consumers brought about by lowering the cost of access to BT's access network against the disadvantages associated with any reduced incentives to invest at the access level, Ofcom is inclined to take the view that the first consideration is of key importance.

4.29 Ofcom disagrees that the arguments made by NTL and Telewest regarding incentives for investment in next generation access networks should be viewed as key factors in arriving at a beta estimate for BT's copper access business. The business case for investment in next generation access will depend critically on this technology, relative to current generation access, having a "unique selling point", i.e. allowing firms to offer services that, firstly, customers will have a high willingness to pay for, and, secondly, cannot be offered over current generation access technology. Ofcom agrees that there may be a degree of substitutability between current generation and next generation access (albeit of an asymmetric nature). It is important to stress, though, that Ofcom's aim is not to encourage investment in next generation access per se, but, rather, to obtain the benefits that next generation access networks will bring relative to current generation access priced at a fair level. Ofcom does not consider that making a small downward adjustment to its equity beta estimate for BT to reflect the lower systematic risk faced by BT's copper access business is inconsistent with this aim.

4.30 As outlined above, in its response NTL argued that a disaggregation carried out along, for example, a geographic or business/residential basis would be as valid as the approach proposed by Ofcom in the first consultation. Ofcom disagrees with this view. Ofcom's preferred approach is only to use a disaggregated analysis in cases where, inter alia, robust evidence that can be used to assess variations in risk is available, and where correctly identifying variations in risk is likely to bring about significant gains for consumers.

4.31 Ofcom is not aware of any obvious reason why (controlling for the business/residential distinction and the fact that, for example, central business districts will have higher concentration of leading edge services sold to corporate customers, which are more likely to be subject to significant systematic risk), BT should face different levels of systematic risk in different geographic areas. It is also worth noting that any such theory would be impossible to test in practice, since it would not, for example, be possible to use benchmarking data to make inferences about the level of systematic risk faced by a company operating in a particular geographic area within the UK.

4.32 A "business-residential" split might be more appropriate, but, for example, varying BT's wholesale charges for both wholesale access lines and voice services that are charged on a per-minute basis depending on whether the volumes in question related to business or residential end customers would be very problematic in practice. Additionally, unlike in the "access-rest" consideration, Ofcom has no comparable specific policy objectives relating to economic bottlenecks that are specific to either residential or business customers.

4.33 Ofcom disagrees with Telewest's argument that the use of 5-year LBS RMS betas in the first consultation invalidates Ofcom's comparison of utility equity betas with those of BT Group. Ofcom has re-calculated the estimates set out in Figure 9 of the first consultation below, replacing the LBS RMS betas with alternative estimates calculated on behalf of Ofgem by Smithers & Co (http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/6580_Beta_Estimates_for_O fgem_Final.pdf). In this report, Smithers calculated beta estimates using a wide range of data frequencies and data windows, taking full account of parameter instability, and based on this analysis recommended equity beta values for each of the companies. Based on these recommended values, Ofcom has obtained results that are very similar to those set out in the first consultation. The simple average of the adjusted equity betas in the final column of the figure below is 0.55. If they are weighted according to the market capitalisation of firms, the average is 0.62. This supports Ofcom's earlier proposition that the betas of the UK utilities are lower than that of BT group.

Figure 5- Equity and asset beta benchmarks – UK utilities

Company	Sector	Equity beta	Market value of equity (£bn)	Book value of debt (£bn)	Gearing ratio [(D/(D+E)]	Asset beta	Equity beta at BT's gearing level (35%)
National Grid Transco	Multi Utility	0.60	14.7	12.6	46%	0.32	0.50
Centrica	Various	0.75	8.7	0.1	1%	0.75	1.15
Scottish power	Electric	0.60	7.4	3.7	34%	0.40	0.61
Scottish & Southern Energy	Multi Utility	0.40	7.1	1.4	17%	0.33	0.51
United Utilities	Multi Utility	0.60	3.5	3.4	50%	0.30	0.46
Severn Trent	Water	0.44	3.3	2.7	45%	0.24	0.37
Kelda Group	Water	0.30	2.2	1.7	44%	0.17	0.26

4.34 As stated above, Telewest highlighted that some recent academic studies have shown that the demand for second lines is more elastic than that for first lines. Ofcom agrees that this factor may have some, albeit limited, implications for its analysis, but considers that this factor is not sufficiently important to change the finding that the income elasticity of demand for lines is lower than that for calls.

4.35 The demand for second phone lines in the UK is relatively small. The study quoted by Telewest suggests that, "as many as 20% of UK households own more than one phone line". Going forward, however, Ofcom would expect the figure to be much smaller since, in the past, the key driver of widespread consumer second line take-up was freeing up a dedicated line for the use of dial-up Internet (and possibly, to a lesser extent, fax), a service which is currently in decline as the take-up of broadband access becomes more widespread. This fact was highlighted by research previously carried out by Oftel in July 2003 (http://www.ofcom.org.uk/static/archive/oftel/publications/research/2003/q13intr0703.htm):

> *In total 14% of PSTN Internet homes have a second phone line, broadly similar to results last quarter (16%). Just over half of these (8%) have a second line*

specifically for Internet access, in other words they have one line purely to make calls and one line purely for Internet access

4.36 There remain relatively few publicly available estimates regarding the income elasticity of the demand for second lines. Telewest's submission highlights the following sources:

- one study relating to the income elasticity of demand for the total number of second lines – which suggests that the income elasticity of demand for second lines was 0.33, compared with what Telewest terms, "standard assessments of the income elasticity of demand for access that are often lower than 0.1", and, "conventional income elasticities for calls in the region of 0.4–0.6";
- one study relating to the income elasticity of the demand for "net new lines", which produces a high estimate of 1.25; and
- one study in relation to price elasticity of demand for second lines, which does not reveal anything about income elasticities.

4.37 The only estimate quoted by Telewest that is comparable with the majority of published evidence in this area suggests that the income elasticity of demand for second lines is roughly halfway between conventional estimates for first lines and conventional estimates for calls. However, using Telewest's figures, if 20% of all consumers had a second line, i.e. one in every six lines was a second line, then a crude estimate of a residential income elasticity of demand for all lines, first and second, might be estimated as , $(\frac{1}{6} \times 0.33) + (\frac{5}{6} \times 0.1)$ i.e. 0.14, which is some way below the range of estimates of income elasticities for calls of 0.4 to 0.6 quoted by Telewest. Additionally, as outlined above, Ofcom's view is that, going forward, increased take-up of broadband will mean that considerably fewer than 20% of households will have a second line (e.g. Oftel's July 2003 data suggested that the figure was declining, and that it only amounted to 14% of Internet homes, i.e. less than 7% of all homes).

4.38 In the light of these factors, Ofcom is of the view that evidence concerning consumers using more than one line does not undermine its analysis of income elasticities. Ofcom notes that the other fixed line communications providers were supportive of Ofcom's analysis in this area, e.g. Easynet quoted additional studies in this area that produced the same findings, and argued that, "Access has an almost negligible income elasticity of demand and is therefore subject to little systematic risk as returns from the access business are almost unaffected by the sources of such risk".

4.39 Ofcom does not propose to vary model variations in systematic risk across project by means of varying project gearing ratios. Ofcom agrees that such an approach might be appropriate in theory. For example, a firm might, relative to existing proportions within the company as a whole, use a smaller proportion of debt relative to equity in financing a new project that involved more systematic risk than the company as a whole. Viewing a company as an aggregation of individual projects, one would expect the project gearing ratio for low-risk projects to be higher, and hence, other things being equal, the project cost of capital lower.

4.40 There are, however, a number of drawbacks associated with such an approach. Whilst it is empirically observed that firms with relatively low asset betas tend to raise capital using a relatively high proportion of debt, as opposed to equity, finance, Ofcom is not aware of any established formulaic or mechanical relationship between the two, and systematic risk may be only one of the factors that determines the optimal gearing ratio for a firm or project.

4.41 As is argued earlier in this section and in subsequent sections, Ofcom's preferred approach is to err on the side of caution in assessing risk at a project-specific level, only varying project betas in instances where, as outlined above, the case for doing so is particularly compelling, and, even in these cases, to only assume relatively modest variations in the level of risk faced by different divisions within a company. In Ofcom's view, it would not be prudent for it to, for example, translate a small difference between the equity betas of two different projects into a particular difference in optimal gearing. Such an approach would require a detailed analysis of the market's view of the debt capacity of different parts of BT's business that is beyond the scope of this view. Ofcom therefore does not propose to use project specific gearing ratios for different parts of BT's business.

4.42 Since BT's level of net debt and market capitalisation have remained broadly constant since the September 2004 PPC Statement, Ofcom remains of the view that 30-35% represents a reasonable range of estimates for BT's gearing ratio.

BT's response and Ofcom's view of BT's response

4.43 BT's response in relation to the estimation of a distinct beta for its copper access business was largely based on a report written on its behalf by Professor Ian Cooper of London Business School. In his report, Professor Cooper argued that, since there are no "pure play" listed copper access businesses upon which to base benchmark beta estimates, there is no reliable evidence on which to carry out a disaggregation. Professor Cooper provided specific criticisms of each of the three pieces of evidence provided by Ofcom to justify its proposed approach.

4.44 BT (during the remainder of this chapter, the term "BT" is used to refer to both arguments made in the main BT response and the annex written on its behalf by Professor Cooper) argued that the shortcomings of each of Ofcom's pieces of evidence, and the difficulty of obtaining reliable further supporting evidence, meant that the continued use of a single beta estimate for BT group was appropriate:

> *There is no objective evidence of sufficient statistical reliability to justify setting different rates of return for different parts of BT. The overall cost of capital should not be disaggregated. BT believes that the evidence set out by Ofcom is insufficient to prove that the access network activities are materially less risky than the rest of BT.*

4.45 BT additionally argued that Ofcom's proposal to divide BT's business into three risk categories for the purposes of its analysis was inappropriate, having being done on an arbitrary basis. BT's view, notwithstanding its opposition to the use of disaggregation, was that a more appropriate split would be into only two categories, namely copper access (lower risk), and the rest of BT (higher risk).

4.46 The following sections discuss the arguments made by BT, and Ofcom's view in the light of these arguments, in relation to the following aspects of the disaggregation of BT's equity beta, i.e.:

- the level at which Ofcom's analysis should disaggregate BT's business according to variations in risk, i.e. how many risk categories Ofcom should identify (e.g. "lower risk, "average risk, "higher risk", and so on);

- the individual strands of evidence used by Ofcom in support of its view in relation to the level of risk associated with BT's copper access business; and
- based on the available evidence taken as a whole, the pros and cons of adopting a disaggregated approach.

Scope of disaggregation – copper access business vs. rest of BT

4.47 The next sections of this chapter focus on the arguments made by BT in relation to the appropriateness of carrying out beta disaggregation, and in particular on the analysis carried out by Ofcom to test its view.

4.48 Before these discussions though, it is important first to consider the appropriate scope of disaggregation. As noted above, in its response to the first consultation BT argued that, notwithstanding its opposition to the use of disaggregation, that a more appropriate split would be into only two categories, namely copper access (lower risk), and the rest of BT (higher risk).

4.49 Both BT and the fixed communications providers commented on the approach set out by Ofcom in the first consultation. Under this approach, a low equity beta for BT's copper access business could imply that other BT activities would have an unrealistically high equity beta. Both BT and the fixed line communications providers criticised this aspect of Ofcom's analysis, but had different interpretations:

- the fixed communications providers argued that the fact that Ofcom's implied "rest beta" of 1.7 was so high indicated that the overall group beta of 1.3 used by Ofcom was too high (there is some support for this view, e.g. an analysis carried out by Ofcom of the LBS RMS publication for April – June 2005 showed that only 8 out of over 2000 listed UK companies had betas of 1.7 or greater); and
- BT argued that:
    - o whilst there might be some basis for a split between BT's copper access and the rest of BT (although BT was opposed to this approach in general), Ofcom's proposal to distinguish between "other regulated" and "rest" categories was not supported by any substantial evidence or reasoning; and
    - o the magnitude of the implied "rest beta" of 1.7 calculated by Ofcom was such that it suggested that Ofcom's proposal to disaggregate BTs equity beta was inappropriate.

4.50 Ofcom's view on these arguments is outlined below.[1]

4.51 As outlined in Section 3 of this document, Ofcom has carried out further analysis of BT's group equity beta, and proposed that the use of a revised group estimate of 1.1 is appropriate. Using this new group beta, the approach outlined in the first consultation would imply following beta figures as set out in the table below.

[1] Note that the estimates in this publication were calculated using a Bayesian adjustment (see pages 54 to 55 of Ogier et al for an explanation]).

Figure 6- sample equity beta values

Copper access beta	"Other regulated" beta	Rest beta
40%	30%	30%
0.7	1.1	1.6
0.8	1.1	1.5
0.9	1.1	1.4
1.0	1.1	1.2
1.1	1.1	1.1
1.2	1.1	1.0
1.3	1.1	0.8

4.52 The table above shows that, if, for example, BT's copper access beta was assumed to be equal to 0.9, the implied "rest beta" would be equal to 1.4, not an implausible figure but arguably one towards the upper end of a reasonable range of values.

4.53 In assessing whether the two, three (or perhaps more) risk categories should be used in Ofcom's analysis, the single key factor that it is most important to consider is whether "other regulated" activities (e.g. fixed geographic termination) are more or less risky than BT Group as a whole, and whether this view is supported by the available evidence. Ofcom's view is that some of the mature, well-established products that would fall into an "other regulated" category probably do face less systematic risk than BT group as a whole, but recognises that there may be some exceptions to this, and that this proposition is difficult to test empirically, since a number of the sources of evidence used by Ofcom in the case of BT's copper access business would not be available in this case. Deciding whether a certain product should fall into the "middle risk" or "high risk" category would involve a significant amount of subjectivity.

4.54 Another important factor to consider is, as explained in the first consultation, the plausibility of the higher "rest beta" estimates which would be implied under the "three categories" method (and see above).

4.55 Ofcom's view is that, on balance, these arguments support the view that, if a disaggregated analysis is to be undertaken, the riskiness of BT's business should only be assessed by means of two broad categories. Ofcom could make a judgement on this issue, but proposes that a three-way split would be an inappropriate attempt at precision given the lack of data available in this area. Ofcom's view is that the most appropriate categories are BT's:

- (lower risk) copper access business; and
- (higher risk) remainder of the company.

4.56 The following subsections, which discuss the evidence and arguments that are relevant to an assessment of whether there are significant variations in risk across BT group, assume, where relevant, that a disaggregation of the risk faced by BT into two categories.

Whether to disaggregate - the evidence used in the first consultation

Introduction

4.57 As described above, in the first consultation Ofcom undertook an analysis intended to provide a preliminary assessment of whether the available empirical evidence supported its view regarding the relative riskiness of different parts of BT's business. This analysis focused on the following areas:

- benchmarking the equity betas of the UK's largest utility companies;
- benchmarking against the equity betas of US telecoms companies; and
- using previously conducted studies to compare estimates of the income elasticity of demand for access services with that of other telecoms services (calls).

4.58 The subsections that follow set out the arguments made by BT in relation to the validity of each of these three pieces of analysis as a means of assessing Ofcom's view that the level of risk faced by BT's copper access business is less than that that which it faces in relation to other businesses.

UK utility benchmarks

4.59 BT argued that Ofcom's observation that the asset betas of the UK utilities are lower than that of BT group is not relevant to assessing the riskiness of BT's copper access network because there are too many differences between the UK utilities and BT. BT highlighted that a survey carried out by PwC and Franks in 2002 had stated that, "The risk of telecommunications is significantly higher than the risks of gas, electricity and water in all countries where such a comparison is possible[2]."

4.60 Ofcom agrees that, at a group level, telecommunications companies have historically been shown to face more risk than utility companies. However, Ofcom does not consider that this factor has any key implications for the analysis set out in the first consultation, which was only concerned with the beta of what, in Ofcom's view, is the least risky parts of BT's business. Ofcom's group equity beta estimates are consistent with, as highlighted by BT, telecoms companies facing a higher level of systematic risk than utilities at a group level.

The impact of regulation on US comparisons

4.61 BT (Telewest also made a similar argument, but for simplicity all such comments are attributed to "BT" in the following paragraphs) argued that Ofcom's comparisons of the equity beta of the US LECs with those of the US long-distance carriers, and with that of BT Group, were flawed because they ignored the impact on betas of the different regulatory regimes faced by the three types of company. BT argued that the competitiveness of the market in which a firm operates, and also the regulatory regime that it faces, are key determinants of the level of systematic risk that a firm faces, and hence its equity beta. Specifically, BT argues that equity beta estimates tend to be:

- high in competitive markets;
- low in unregulated monopoly markets; and

[2] PwC and Franks, Julian R, 2002, Study into rates of return bid on PFI projects, Office of Government Commerce.

- variable in regulated monopoly markets, depending on the type of regulation that is in place. BT argues that "high powered" regulatory regimes, e.g. ones in which a price capping approach to regulation is used, give rise to high betas.

4.62 Based on these factors, BT argued that Ofcom had overstated the size of the gap (or, perhaps, that it had erred in inferring that any gap existed) in systematic risk faced by the lower-risk US LECs relative to the higher-risk US long-distance carriers and/or BT.

4.63 Ofcom disagrees with this view. BT itself, in Professor Cooper's submission, acknowledges the lack of consensus amongst academics and practitioners about whether market competitiveness, or indeed regulation, has an influence on betas. The main source of evidence used by BT to support its view on the relationship between the level of competition, regulation, and systematic risk was a paper written on behalf of the World Bank by Alexander, Mayer, and Weeds ("AMW") in 1996.

4.64 The rationale supplied by BT for this relationship between competitiveness and systematic risk is captured by the following quote (reproduced by BT in its discussion of whether enduring economic bottlenecks necessarily lead to lower betas – BT argued that the case is, "by no means clear"):

> *The degree of market risk involved in holding a company's shares is likely to be influenced by the level of competition in the relevant industry. A monopolistic firm has more power than a competitive company to pass unavoidable cost changes on to consumers and it is therefore less exposed to business risks. It would therefore be expected that a monopoly firm would have a lower beta coefficient than a competitive firm operating under otherwise similar circumstances.*

4.65 This line of reasoning arguably supports the idea that part of differences between the betas of telecoms companies might be explained by the level of competition that they face. But it is not clear what is meant by a "competitive company" in this statement – for example, in a model of Bertrand competition, all firms would price at marginal cost, and, following a shock to marginal costs, all firms would change their prices accordingly, i.e. all of the cost changes would be passed on (whilst a monopolist would only pass on some of the cost increase). A firm-specific cost increase would not be passed on, but the risk of such increases would be diversifiable, and as such not relevant to the level of systematic risk faced by the firm.

4.66 Additionally, Ofcom's view is that telecoms companies also face risk as a result of non-diversifiable/systematic demand shocks as well as the systematic cost shocks referred to by AMW. In the face of non-diversifiable demand uncertainty, a monopolist might arguably face more systematic risk than a competitive firm - for example, following an unanticipated increase in demand within a particular industry, a "textbook" monopolist that prices by equating marginal cost and marginal revenue will experience a significant upturn in returns, due to increased volumes and increased prices, whereas a "textbook" price taker with constant marginal cost that prices at marginal cost will not experience any improvement in returns, since the extra units that it sells will all be priced at marginal cost, which remains unchanged.

4.67 Accordingly, Ofcom does not believe that it is possible to predict the relationship between (types of) regulation and systematic risk with any certainty. The AMW paper quoted by BT is itself not unequivocal on this issue, providing a number of caveats, including the following:

> *…UK utilities tend to be large relative to the market as a whole, whereas US utilities are regionally based and may be quite small. For this reason, estimated beta values could be expected to overstate the degree of market risk borne by UK utilities while the risk incurred by US utilities is understated. The much-quoted difference between US and UK utility betas, usually attributed to differences in regulatory risk, may simply reflect the systematic interval effect biases that are present in these estimates.*

4.68 More generally, Ofcom is not aware of any consensus in the available literature with regard this point. For example, on this subject the 2002 National Audit Office/NERA report Pipes and Wires reviewed a number of studies examining the impact of price cap regulation on systematic risk, including the AMW study quoted by BT, and concluded that:

> *Overall, whilst the conventional wisdom may say that price regulation reduces the market risk to which a utility is exposed, recent literature on regulatory risk exposes such factors as regulatory lag, imperfect price adjustment mechanisms, imperfect information and inconsistency that it is argued can actually increase the cost of capital for regulated utilities above that which would be observed in competitive conditions.*

4.69 This quote reveals a lack of a consensus regarding the relationship between the impact of price cap regulation and systematic risk.

4.70 Chapter 6 of WM&M's 2003 report, *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the UK*, developed a theoretical model for assessing the impact of price cap regulation on systematic risk. This report concluded that, whilst it was possible to set out a theoretical framework under which price cap regulation might have an impact on company betas, that the exact impact (i.e. whether regulation would tend to increase or lower betas) depends on the type of systematic risk faced by the firm, since there were two effects that ran in opposite directions:

> *If uncertainty occurs on the cost side of a firm, then price cap regulation increases the firm's beta; if there is demand uncertainty, the regulation decreases the beta*

4.71 This means that there may be two effects moving in opposite directions, since price capping may:

- increase a firm's exposure to systematic cost risk by preventing it (until the next price control review) from passing on cost increases; and
- decrease a firm's exposure to systematic demand risk by preventing it from raising its prices in order to profit maximise following increases in demand.

4.72 Taking the arguments in relation to competitiveness and regulation together, and, as argued above, Ofcom's view is that its analysis relating to the betas of US LECs is not invalidated by differences in regulation and the level of competition faced by companies within the sample. This is because, whilst these factors may have some impact, Ofcom does not consider that the available evidence strongly points towards higher levels of competition and regulation leading towards more systematic risk.

Other issues relating to Ofcom's sample of US telecoms companies

4.73 BT argued that Ofcom's split of US telecoms companies into, "local exchange carriers" and "long distance carriers" is flawed, since:

- Verizon, which Ofcom classifies as a local exchange carrier, has significant long-distance operations;
- the ownership of telecoms companies in the US is fluid (e.g. holding groups that predominately offer long-distance services may buy companies that specialise in local exchange carriage, and vice versa), meaning that any attempt to divide them into "local exchange carriers" and "long distance carriers" is inherently problematic; and
- the difference between the asset betas of the firms categorised as LECs and long-distance carriers by Ofcom largely results from the beta of the long-distance carrier Sprint being an outlier (significantly higher than the rest of the sample), and otherwise is not significant.

4.74 Ofcom disagrees that BT's criticisms invalidate Ofcom's use of the US betas.

4.75 In the first consultation, Ofcom recognised that many of the US telecoms companies offer both local exchange and long-distance services, and as such focused its analysis on companies that were close to being "pure play" LEC or long-distance carrier. Ofcom's classification of Verizon as a LEC was based on the 2003/04 FCC Statistics of Common Carriers, which reported that, in the year to December 2003, only 6% of the Verizon holding group's common carrier revenues came from companies listed as "inter-exchange carriers", with the remainder coming from local "telephone" companies. The relatively modest contribution of Verizon's long-distance operations are borne out by more recent evidence. For example, Table 3 of UBS Investment Research's Wireline Telecom Play Book, 13th April 2005, shows that, of Verizon's wireline operations activities:

- in Q1 2003, long-distance revenues accounted for 9% of revenues, whereas local and access revenues collectively accounted for 83%
- in Q4 2004, long-distance revenues accounted for 11% revenues, whereas local and access revenues collectively accounted for 79%; and
- UBS forecasts for 2006 suggested that long-distance will account for 12% of revenues, with access and local services making up 79%.

4.76 Given that local exchange carriage accounts for such a large proportion of Verizon's activities, it is clear that, even given recent increases in the extent of its long-distance activities, Verizon should not be classified as a long-distance carrier. There may, however, be a (relatively weak) argument for removing Verizon from Ofcom's sample altogether. This would not have any significant upward impact on Ofcom's estimate of an average LEC equity beta, since Verizon's asset beta was approximately equal to the average asset beta of the three LECs identified by Ofcom.

4.77 Ofcom disagrees with BT's view that the magnitude of the difference in beta between the LECs and the long-distance carriers is insufficient to support Ofcom's view that the risks of the two divisions of BT are unequal based on Sprint being an "outlier", and AT&T having an asset beta that was not much higher than those of the LECs. The difference between the average equity betas of the LECs and those of the long-distance carriers in Ofcom's sample is of a comparable magnitude to the difference proposed by Ofcom in relation to BT's copper access network and the rest of its business – somewhat lower if Sprint is excluded as an outlier, and somewhat higher if Sprint is included. Ofcom has no reason to think that Sprint should be considered an outlier in the context of the sample group. It is also important to note that, during the early part of the estimation period for the US betas in Ofcom's sample, AT&T owned significant cable TV interests, which would tend to bias its group beta estimate downwards given the maturity and near-ubiquity of this service in the US (the equity betas of cable companies in the US tend to be around 1.0).

4.78 Ofcom considers that the evidence set out in the first consultation provided a moderate level of support for the proposition that the betas of the major US long-distance carriers are higher than those of the LECs. However, Ofcom recognises that this analysis has its limits, for example a small sample size, and the changing ownership and composition of the five holding companies in Ofcom's sample. With this in mind, the further research carried out on Ofcom's behalf by PwC includes a similar exercise using a much bigger sample of companies. This analysis, using a multiple regression approach, attempts to explain differences in beta estimates across a large cross-sectional sample of telecoms companies, based on a number of variables relating to the activity mix of each firm.

Income elasticities of demand and "fundamental analysis"

4.79 BT was critical of Ofcom's reliance on an analysis of the relative income elasticities of demand of calls and access services. This criticism was based on a number of concerns, e.g.:

- whilst the studies quoted by Ofcom did show a consistent pattern of income elasticities for access being lower than those for calls, these studies, taken as a whole, did not enable a reliable quantification of the difference between the two – and, even if they did, this would not permit a quantification of the difference between betas;
- the use of short run personal income/GDP elasticities is flawed, since weight should also be put on longer run elasticities, and also ones that reflect measures of income that are more closely related to stock market returns; and
- income elasticities of demand are only one of the factors that may determine asset betas (others including cost structures, firm size, book to market value, and so on).

4.80 BT also argued that the instability inherent in telecommunications, particularly that caused by the emergence of new technology, services, and regulation, means that attempting a "fundamental analysis", i.e. estimating a firm's beta based on an assessment of the underlying characteristics of firm, rather than on a regression analysis based on share price data, is difficult.

4.81 Whilst Ofcom accepts that its analysis of elasticities of demand does not, on its own, represent "incontrovertible" proof of a particular difference in the level of systematic risk faced by different parts of BT, it remains of the view that it, taken together with other evidence, is supportive of at least a conservative level of disaggregation. BT's argument that it does not enable a precise quantification of the differences in risk faced by different parts of BT's business is true, but, in Ofcom's view, this does not imply that a single group beta estimate should be used, if doing so would contradict the available directional evidence.

Conclusion

4.82 In the preceding subsections, Ofcom has set out the criticisms made by BT in relation to each of the sources of evidence used by Ofcom to test its view that, as described in the first consultation, BT's copper access business faces less systematic risk than BT group as a whole. As argued above, Ofcom's view is that BT's criticisms overstate the problems associated with each of the methods used by Ofcom. However, Ofcom has, as described in the next section ("Further evidence"), commissioned additional research by PwC to investigate this issue further. Ofcom finally sets out a discussion of the appropriate way in which to model possible variations in risk within BT's business when they cannot be quantified with absolute certainty.

Further evidence

4.83 In response to the first consultation, stakeholders did not produce any evidence to *contradict* Ofcom's proposition that BT's copper access business faces less risk than BT Group as a whole, and indeed in a number of cases agreed with Ofcom's proposition. Additionally, in Ofcom's view, they did not make any strong arguments as to why it might be the case that BT's copper access business faces as much risk as the group as a whole. However, the comments made by stakeholders, and BT in particular, focussed on the standard of evidence needed to adopt such an approach, and provided a useful appraisal of the evidence used by Ofcom in the first consultation. Ofcom recognises the need for its decision-making to be informed by the strongest evidence that it can obtain, and, based on this concern, it has commissioned extra research, carried out by PwC in order to investigate this issue further.

4.84 PwC's researched focused on the following areas:

- an intuitive "first principles" analysis of the degree of risk faced by BT's copper access business;
- an analysis of the regulatory precedents for the use of a disaggregated approach to quantifying risk at a project-specific level; and
- two types of quantitative regression analysis, namely:
  - a cross-sectional analysis of telecoms companies across the world, examining the relationship between companies' equity beta estimates and the proportion of their business that is accounted for by different types of activities, e.g. "information and communications technology" (ICT), and traditional fixed lines activities; and
  - a time series analysis of BT's equity beta, examining the relationship over time between its equity beta and the proportion of its business accounted for by different types of activity.

4.85 Based on these findings, PwC concluded:

> *We conclude that there is sufficient directional evidence for serious consideration to be given to applying disaggregated betas, with the strongest evidence suggesting that a distinction could be made between BT's information and communications technology (ICT) activities and the rest of BT's business.*

4.86 These findings provide support for Ofcom's proposal to disaggregate BT's beta. As explained in PwC's report, some of PwC's *findings point directly towards* access having a lower beta than BT Group as a whole, whilst some others are consistent with it, i.e. they point towards access being one of a number of products that have lower beta than BT Group as a whole. Taking this further evidence together with the initial analysis set out in the first consultation, Ofcom believes that this evidence supports a moderate disaggregation of BT's equity beta, as set out in the final subsections of this document.

Conclusion on disaggregating BT's equity beta

4.87 In its response to the first consultation, BT was not opposed to the principle of carrying out a beta disaggregation, subject to the availability of evidence of a sufficiently high standard. BT argued that such evidence is not available in this context, its argument being that:

- each of the individual pieces of evidence used by Ofcom to test its view on the riskiness of BT's copper access business is seriously flawed; and
- further analysis would be similarly flawed due to the absence of pure-play comparators to BT's copper access business.

4.88 In the previous section, Ofcom gave its view on BT's specific criticisms, and briefly summarised the further evidence arising from the work that PwC has carried out on Ofcom's behalf.

4.89 Additionally, though, it is important to explain Ofcom's approach to the interpretation of the available evidence. Ofcom recognises that, in the absence of pure-play comparators, it may not be possible to find any single piece of evidence to test definitively Ofcom's hypothesis regarding the riskiness of BT's copper access business relative to the rest of BT. However, Ofcom's view is that, when taken together, a number of pieces of indicative evidence pointing in the same direction (i.e. suggesting that BT's copper access business is less risky than BT group as a whole), together with Ofcom's *a priori* reasoning in support of these findings, suggest that beta disaggregation is appropriate.

4.90 Faced with what Ofcom views to be compelling, but not "unquestionable", evidence, and hence arguably an element of uncertainty as to whether systematic risk does vary significantly across BT's' business in a predictable fashion, Ofcom is faced with two choices, namely to:

a. to use a disaggregated approach in line with Ofcom's understanding of the market and the results of Ofcom's supporting evidence; or

b. contrary to Ofcom's a priori reasoning, and in contradiction of the available evidence, use a single group beta estimate in all cases based on the shortcomings of each of the individual pieces of evidence

4.91 Given the uncertainty involved here, there are four possible outcomes, namely, as shown in the Figure below.

Figure 7- Relative merits of disaggregated/single group beta approaches

Outcome	Is the risk of the copper access business really materially lower?	Approach followed by Ofcom given imperfect information	Implication of Ofcom's approach
(1)	Yes	Disaggregate betas	Correct approach
(2)	Yes	Use a single group beta	"Type I error"
(3)	No	Disaggregate betas	"Type II error"
(4)	No	Use a single group beta	Correct approach

4.92 As explained earlier in this section, Ofcom's preferred approach is to disaggregate BT's equity beta into two categories, namely, firstly, a copper access beta, which is lower than the group average, and, secondly, a rest beta that is above the group average. This means that, given the uncertainty involved, Ofcom is faced with two possible risks, namely:

- making a Type I error, i.e. incorrectly using a single group beta figure in its analysis:
  - allowing excessive returns on BT's copper access network &
  - allowing insufficient returns on the rest of BT's activities; and
- making a Type II error, i.e. i.e. incorrectly using a disaggregated approach to assessing risk:
  - allowing insufficient returns on BT's copper access network; &
  - allowing excessive returns on the rest of BT's activities

4.93 In assessing these risks, there are two relevant factors to consider, namely:

- the likelihood of making each type of error, i.e. whether it is more likely that the risks of BT's business to vary in the manner suggested by Ofcom; and
- the costs associated with each type of error.

4.94 In relation to the first of these considerations, Ofcom's view is that, on balance, the available evidence suggests that the likelihood of making a Type I error if the disaggregated approach is followed is much lower than that of making a Type II error if a "single group beta" approach is followed. This is because Ofcom's opinion is that, taken as a whole, the available evidence supports Ofcom's view that BT's copper access network is characterised by less risk than BT group as a whole.

4.95 In relation to the second of these considerations, it is more difficult to assess which of these outcomes, should they arise, is likely to be the most damaging to consumers. Ofcom's view is that a Type I error would be the most harmful to consumers, since an error of this sort would allow excessive returns on the part of BT where there are enduring bottlenecks to competition. It would also, by allowing BT excessive returns in other markets, risk of undermining competition in markets where there may be a prospect of competition by setting BT's returns at a level that is too low.

4.96 Ofcom's view is therefore is that both the likelihood of making an error, and the level of detriment should an error occur, is greater under a "single group beta" approach. Ofcom therefore remains of the view that a limited beta disaggregation is appropriate. Given the limitations of the evidence in this area, Ofcom believes that a conservative approach, i.e. one in which its estimate of the beta for BT's copper access business falls within, or very close to the lower end of, a reasonable range of values for BT's group beta, is appropriate.

4.97 The table below shows Ofcom's proposed range of values for the equity beta of BT's copper access business, assuming a central equity beta for BT group of 1.1 based on the proposed range at the end of Section 3. The values for the "rest beta" are based, as explained in the first consultation, on an assumption that BT's copper access business accounts for 40% of the value of BT's business (based on accounting data from BT's 2003/04 regulatory accounts), meaning that the rest of BT has a weight of 60%.

Figure 8- proposed equity beta values

Approach	Copper access beta (assuming group beta of 1.1)	Rest beta (assuming group beta of 1.1)
(a) widespread disaggregation – copper access beta 0.3 below group average	0.80	1.30
(b) "medium" level of disaggregation – copper access beta 0.2 below group average	0.90	1.23
(c) limited disaggregation – copper access beta 0.1 below group average	1.00	1.17
(d) No disaggregation	1.10	1.10

4.98 Ofcom's view is that, of the approaches shown in the table above, a value of 0.9, i.e. "approach (b)", 0.2 below its central estimate of BT Group's equity beta, represents a fairly conservative level of disaggregation. Ofcom's view is that this level of disaggregation is appropriate given the number of directional pointers towards copper access having a lower beta than BT group, but the absence of a method with which to quantify this difference reliably.

4.99 It is important to note that, as highlighted by some stakeholders, there is additionally an argument for the use of disaggregated project gearing ratios. Ofcom's decision not to adopt such an approach provides further justification for viewing its proposals in relation to beta disaggregation as being conservative. It should also be noted that the proposed estimate of the beta of 0.9 is only 0.1 below a beta of 1.0, i.e. the bottom of the range of values for BT's group equity beta identified in Section 3.

4.100 Section 2 of this document provides a brief overview of some of Ofcom's key duties under Sections 3 and 4 of the Communications Act. The discussion of BT's group equity beta outlined in Section 3 of this document outlined the importance of Ofcom's Section 3(1), Section 3 (4), Section 3 (5), and Section 4 duties in, where Ofcom's judgement must be used, balancing the short term interests of consumers (via lower parameter estimates) against the need to avoid discouraging efficient investment (via higher parameter estimates).

4.101 A similar set of considerations applies when deciding whether to reward projects with different systematic risks differently, since an element of judgement is required on

Ofcom's part. Departing from the use of a single beta estimate for BT would, by preventing excessive returns being earned with regard to low-risk products, improve consumer welfare with regard to such products, by promoting downstream competition. It will also discourage inefficient investment.

4.102 Another key consideration to consider in this context is whether, as is set out in Section 3(3) of The Act, rewarding projects with different levels of systematic risk differently is consistent with regulatory best practice. Ofcom's proposed view, based on the arguments outlined earlier in this Section, is that its approach is consistent with this duty, being in line with widely used financial theory and the approach taken by firms in a commercial context. Additionally, as outlined in the further research carried out on Ofcom's behalf by PwC, there are regulatory precedents supporting the use of a similar approach.

Question 10: *What is the view of respondents of the standard of evidence used by Ofcom in this second consultation, when added to that outlined in the first consultation?*

Question 11: *Based on the available evidence, what do respondents think would be an appropriate level of disaggregation for the equity beta of BT's copper access network? Which of the following levels would be most appropriate: (a) 0.3 points below the group average; (b) 0.2 points below the group average; (c) 0.1 points below the group average; (d) 0 points below the group average?*

Cost of capital estimates

4.103 The tables below set out the WACC estimates implied by the equity beta estimates described in this section.

4.104 As explained in Section 2, the value for the risk-free rate is based on considering both the current yield on government debt and evidence relating to longer-term rates.

4.105 The figures in the table below are based on a value for the ERP of 4.5%. This is the higher of the two estimates of 4.0% and 4.5% proposed as alternatives to the previous Ofcom estimate of 5.0% in the first consultation. As explained in the introductory section of this document, Ofcom, having taken account of stakeholder views, publish its views on ERP estimation in a statement due to be published later this year.

Figure 9- Estimates of pre-tax nominal WACC for BT's copper access business

	High gearing	**Low gearing**
	35%	**30%**
Risk-free rate	4.7	4.7
ERP	4.5	4.5
Equity beta	0.9	0.8
Cost of equity (post tax)	8.8	8.5
Debt premium	1.0	1.0
Cost of debt (pre tax)	5.7	5.7
Corporate tax rate	30%	30%
Cost of debt (post tax)	4.0	4.0
Gearing	35%	30%
WACC (post tax)	7.1%	7.1%
WACC (pre tax)	10.12%	10.17%

4.106 The data in Figure 9 suggests a value of 10.1% for the pre-tax nominal cost of capital for BT's copper access business.

Figure 10- Estimates of pre-tax nominal WACC for rest of BT

	High gearing	Low gearing
	35%	**30%**
Risk-free rate	4.70	4.7
ERP	4.5	4.5
Equity beta	1.23	1.14
Cost of equity (post tax)	10.2	9.8
Debt premium	1.0	1.0
Cost of debt (pre tax)	5.7	5.7
Corporate tax rate	30%	30%
Cost of debt (post tax)	4.0	4.0
Gearing	35%	30%
WACC (post tax)	8.0%	8.1%
WACC (pre tax)	11.50%	11.55%

4.107 The data in Figure 10 suggests a value of 11.5% for the pre-tax nominal cost of capital for the rest of BT.

Question 12: *What is the view of respondents on Ofcom's proposed estimates of the WACC for BT's copper access business and the rest of BT?*

Annex 1

Responding to this consultation

How to respond

A1.1 Ofcom invites written views and comments on the issues raised in this document, to be made by **5pm on 22 July 2005.**

A1.2 Ofcom strongly prefers to receive responses as e-mail attachments, in Microsoft Word format, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 2), among other things to indicate whether or not there are confidentiality issues. The cover sheet can be downloaded from the 'Consultations' section of our website.

A1.3 Please can you send your response to steve.armitage@ofcom.org.uk.

A1.4 Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Steve Armitage
Competition & Markets
Location 03:11
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7981 3990

A1.5 Note that we do not need a hard copy in addition to an electronic version. Also note that Ofcom will not routinely acknowledge receipt of responses.

A1.6 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 4. It would also help if you can explain why you hold your views, and how Ofcom's proposals would impact on you.

Further information

A1.7 If you have any want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please contact Steve Armitage on 020 7783 4341.

Confidentiality

A1.8 Ofcom thinks it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk. We will do this on receipt of responses, unless respondents request otherwise on their response cover sheet.

A1.9 All comments will be treated as non-confidential unless respondents specify that part or all of the response is confidential and should not be disclosed. Please place any confidential parts of a response in a separate annex, so that non-confidential parts may be published along with the respondent's identity.

Ofcom reserves its power to disclose any information it receives where this is required to carry out its functions. Ofcom will exercise due regard to the confidentiality of information supplied.

A1.10 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use, to meet its legal requirements. Ofcom's approach on intellectual property rights is explained further on its website, at www.ofcom.org.uk/about_ofcom/gov_accountability/disclaimer.

Next steps

A1.11 Following the end of the consultation period, Ofcom intends to publish a statement in late August 2005.

A1.12 Please note that you can register to get automatic notifications of when Ofcom documents are published, at http://www.ofcom.org.uk/static/subscribe/select_list.htm.

Ofcom's consultation processes

A1.13 Ofcom is keen to make responding to consultations easy, and has published some consultation principles (see Annex 1) which it seeks to follow, including on the length of consultations.

A1.14 This consultation is shorter than Ofcom's standard 10 week period because it only relates to two discrete areas of Ofcom's approach to estimating the cost of capital, and, following the first consultation, most key stakeholders will be sufficiently familiar with most of the main issues to enable them to respond quickly.

A1.15 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at consult@ofcom.org.uk. We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, whose views are less likely to be obtained in a formal consultation.

A1.16 If you would like to discuss these issues, or Ofcom's consultation processes more generally, you can alternatively contact Tony Stoller, External Relations Director, who is Ofcom's consultation champion:

Tony Stoller
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA
Tel: 020 7981 3550
E-mail: tony.stoller@ofcom.org.uk

Annex 2

Ofcom's consultation principles

Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

A2.1 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

A2.2 We will be clear about who we are consulting, why, on what questions and for how long.

A2.3 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened version for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A2.4 We will normally allow ten weeks for responses to consultations on issues of general interest.

A2.5 There will be a person within Ofcom who will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. This individual (who we call the consultation champion) will also be the main person to contact with views on the way we run our consultations.

A2.6 If we are not able to follow one of these principles, we will explain why. This may be because a particular issue is urgent. If we need to reduce the amount of time we have set aside for a consultation, we will let those concerned know beforehand that this is a 'red flag consultation' which needs their urgent attention.

After the consultation

A2.7 We will look at each response carefully and with an open mind. We will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex 3

Consultation response cover sheet

A3.1 In the interests of transparency, we will publish all consultation responses in full on our website, www.ofcom.org.uk, unless a respondent specifies that all or part of their response is confidential. We will also refer to the contents of a response when explaining our decision, without disclosing the specific information that you wish to remain confidential.

A3.2 We have produced a cover sheet for responses (see below) and would be very grateful if you could send one with your response. This will speed up our processing of responses, and help to maintain confidentiality by allowing you to state very clearly what you don't want to be published. We will keep your completed cover sheets confidential.

A3.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their cover sheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.

A3.4 We strongly prefer to receive responses in the form of a Microsoft Word attachment to an email. Our website therefore includes an electronic copy of this cover sheet, which you can download from the 'Consultations' section of our website.

A3.5 Please put any confidential parts of your response in a separate annex to your response, so that they are clearly identified. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your cover sheet only so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

What do you want Ofcom to keep confidential?

Nothing	☐	Name/contact details/job title	☐
Whole response	☐	Organisation	☐
Part of the response	☐	If there is no separate annex, which parts?	

If you want part of your response, your name or your organisation to be confidential, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response. It can be published in full on Ofcom's website, unless otherwise specified on this cover sheet, and I authorise Ofcom to make use of the information in this response to meet its legal requirements. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here. ☐

Name   Signed (if hard copy)

Annex 4

Consultation questions

***Question 9**: Do stakeholders agree that Ofcom should revise its central estimate of BT's equity beta downwards from 1.3 to 1.0, 1.1, or 1.2? Which of these figures is the most appropriate?*

***Question 10:** What is the view of respondents of the standard of evidence used by Ofcom in this second consultation, when added to that outlined in the first consultation?*

***Question 11:** Based on the available evidence, what do respondents think would be an appropriate level of disaggregation for the equity beta of BT's copper access network? Which of the following levels would be most appropriate: (a) 0.3 points below the group average; (b) 0.2 points below the group average; (c) 0.1 points below the group average; (d) 0 points below the group average?*

***Question 12:** What is the view of respondents on Ofcom's proposed estimates of the WACC for BT's copper access business and the rest of BT?*

Annex 5

Glossary

A5.1 This document contains a number of terms that may be unfamiliar to non-specialists. In most cases, a short definition is provided at the first instance of each term within the main body of the document, but for reference purposes a short glossary of specialist terms is provided below.

Asset beta: A company's asset beta reflects the operational risk associated with a firm's underlying assets. Unlike a firm's equity beta, it does not take account of financial leverage. Asset betas are genuinely unobservable, and have to be calculated by taking an equity beta estimate for a particular company and adjusting for its gearing.

Bayesian adjustment: When equity betas are calculated based on historic data, estimates are subject to a degree of error, since regressions will be based on a limited number of observations. A Bayesian adjustment attempts to offset this inherent problem by weighting betas towards an estimate of 1, i.e. towards, in the absence of a fully reliable estimate, assuming that the company faces the same amount of systematic risk as the average firm in the market.

Capital Asset Pricing Model (CAPM): The CAPM is a model that is widely used to estimate the level of systematic risk faced by a company. It models systematic risk a function of the correlation between the returns to the firm and the returns to the stock market. Although it remains the most widely used of the asset pricing models, empirical tests of the CAPM carried out in recent years have in some cases called the robustness into question.

Cost of capital: See WACC.

Debt Premium: A company's debt premium measures the company specific risk premium for corporate debt above the risk free rate.

Dimson adjustment: Equity beta estimates are typically calculated by regressing a company's past returns against those of the market in order to measure the historical covariance between two. When high frequency (e.g. daily) historical data is used, regression analysis may be distorted by various factors, including the institutional micro-structures of high frequency stock trading. A Dimson adjustment is an adjustment procedure that can be used to mitigate such distortions.

Diversification: Diversification is the means by which investors can reduce the level of risk that they are exposed to by distributing investment assets among a variety of different securities.

Equity beta: Under the CAPM, a company's equity beta reflects the systematic risk that it faces relative to the average company in the market as a whole. Equity betas reflect the uncertainty faced by equity investors due to the effects of both operational risk and financial leverage, i.e. commitments to make fixed payments to the company's debtholders.

Equity Risk Premium (ERP): The ERP is a parameter that, under the CAPM, reflects the extra return that investors require in return for investing in equities rather than a risk free asset. It is a market, rather than company-specific, factor.

Gearing: The gearing level of an investment reflects the proportion of its total financing that is made up by debt, rather than equity.

Real options: A "real option" is the term given to a possibility to modify a project at a future point. The first consultation included a detailed discussion of the option for a firm that faces significant demand uncertainty to "wait and see" how the demand or technology for a new product will evolve before making an investment.

Risk free rate: The risk free rate is the expected rate of return on a risk free investment.

Specific risk: Risk that is specific to a given company or project, and that can be diversified away by an investor holding a balanced portfolio of stocks.

Systematic risk: Risk that which can not be diversified away by investors, e.g. the risk associated with fluctuations in GDP growth (such as a recession or boom), oil prices, and interest rates.

Weighted Average Cost of Capital (WACC): A company's WACC measures the rate of return that a firm needs to earn in order to reward its investors. It is an average representing the expected return on all of its securities, including both equity and debt.

Yield Curve: Risk free rates vary with maturity (e.g. the annual return on a 10-year government bond might be higher than the annual return on a 5-year government bond, because of the extra uncertainty associated with years 6 to 10, which are further in the future. A yield curve is a plotted graph that shows the relationship between yield and maturity. If a yield curve slopes upwards (downwards), this means that the return associated with longer-term debt is greater (less) than that associated with shorter-term debt.