



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

BT's response to
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BT would welcome comments on this response. Comments should be addressed by e-mail to Michael Doodson at michael.doodson@bt.com

This response is available electronically at <http://www.btplc.com/responses>.

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Executive Summary

This consultation examines some complex and far-reaching issues, most of which are not susceptible to simple fact-based analysis and conclusions. We believe that there is a risk that Ofcom may reach conclusions that adversely impact incentives to invest, as a result of taking a series of apparently rational individual decisions, which together have a cumulative chilling impact. As a consequence, BT may be less willing to invest in the access network, due to curtailed returns and increased regulatory uncertainty, and the markets may be less willing to invest in BT as a result of perceived expropriation of shareholder value by Ofcom, based on insufficiently robust evidence or analysis. These are significant concerns for BT and its shareholders, and we would urge Ofcom to consider them in its deliberations.

That said, we welcome the opportunity to examine how real options might be taken into account to reward risky investments more fairly, but a mechanistic approach is not likely to be feasible or appropriate. Finally, we do not believe that the conclusions Ofcom appear to be proposing in relation to Equity Risk Premium (ERP) and disaggregation of the cost of capital are justified on the basis of the evidence. Analysis by Professor Ian Cooper of the London Business School (presented in Annexes 1 and 2) provides strong support for our views.

BT's position is as follows:

- **Equity Risk Premium (ERP):** An ERP of 5.0% should continue to be used in assessing BT's overall cost of capital. There is no evidence to support a change from the 5.0% that Ofcom used in the Partial Private Circuits (PPC) determination in September 2004. Indeed, Ofcom has not taken account of a substantial body of evidence supporting a higher rate, while not presenting any new evidence justifying a reduction in the rate.
- **Disaggregation of cost of capital:** 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. Notwithstanding this view, if Ofcom insists on setting different rates for different parts of BT we do not believe it would be appropriate to distinguish between more than two parts (e.g. local copper access network and the rest of BT), and the difference in rates should be small.
- **Recognition of risk:** We agree that different levels of risk should be taken into account in considering forward-looking projects. The appropriate adjustment to convert the overall cost of capital into a project-specific rate may, for risky projects, be very significant indeed. However, it is probably not practicable to develop a generic regulatory approach to how such risk should be taken into account in setting prices. The need to take risk into account, and the means to do so, should be assessed on a case-by-case basis, although this must not result in intrusive micro-regulation. Ofcom should develop *ex ante* rules to provide predictability for investors. For example, it may be possible to predetermine general approaches on the basis of the type of investment, and this would be desirable to minimise regulatory uncertainty. The regulatory approach must offer the right incentives

to BT both to invest and to be efficient, to third parties to make sensible build-or-buy decisions, and needs to ensure appropriate protection for customers.

- **Recognition of real options:** Real options arise when management are able to control an investment decision in its timing or extent, in response to uncertainties. Such flexibility can have considerable financial value in the assessment of investment proposals, since the ability to defer investment may result in higher expected returns. It is important to recognise the fact that investments in a regulated environment may be made or timed in response to regulation itself, rather than normal commercial incentives. In such cases the regulatory regime may effectively expropriate the real option value that BT would otherwise be able to take into account in its investment decisions. Such real options arise in competitive markets, and should therefore be taken into account in a regulatory regime that aims to provide a proxy for competitive outcomes. Although it is unlikely in most situations that it will be possible to quantify the value that has effectively been transferred from BT to other operators, Ofcom should take the fact that such value transfer has occurred into account in determining policy and pricing. The size of a premium might be difficult to determine, but it is likely to be significant, and the direction of such an adjustment is unambiguous.
- **The Telecommunications Industry needs discretionary investment:** Both Oftel and Ofcom previously recognised that the telecommunications industry is different from regulated utilities: there is a need for considerable discretionary investment to develop the technological capabilities of the network. In order to reward properly such investments, and avoid the possibility of under-investment - which could have serious implications for the development of telecommunications - it is far better to err on the upside when assessing the cost of capital.
- **Ofcom should consider adopting a pragmatic solution:** A pragmatic approach to the issues of risk and real options and the lack of hard data may be - where uncertainty prevails - to adopt values for the parameters used in determining the cost of capital that are at the upper end of the ranges.

Overview

Available evidence continues to support an ERP of 5.0% or higher - nothing has happened since the PPC review to justify a reduction

No evidence has been presented to justify a change to the ERP from that used in the PPC review. It appears that all the evidence presented by Ofcom in fact pre-dates the PPC review, and as such surely should not be used to justify any changes at this time. Moving away from the value determined as recently as September 2004 would amount to an inconsistency in Ofcom's approach over time and introduce unwelcome regulatory uncertainty. Indeed, evidence that has arisen since the PPC review reinforces the setting of an ERP of 5%.¹

We are disappointed that Ofcom appears to have given little weight to a substantial and significant range of material from leading academics and finance specialists which supports a higher value. In addition, some of Ofcom's interpretation of evidence is, we believe, incorrect - in particular the use of geometric means and the impact of the risk-free rate and adjustments to historical data appear to have been incorrectly applied.

Further, Ofcom's proposed range is inconsistent with recent decisions by Ofwat and Ofgem, both of whom adopted the approach advocated in the paper on behalf of the joint regulators' group by Wright, Mason and Miles². Adjusting to an underlying risk free rate, both Ofwat and Ofgem used ERP rates equivalent to between 5.6% and 5.8%³. It is difficult to understand why Ofcom appears to be proposing a lower rate when other UK regulators have raised their estimates.

BT's overall WACC should continue to be used as the single rate for all regulated activities in BT - there is no objective way of determining disaggregated rates

BT would assert that there is no objective or reliable way of determining the relative risk levels of different parts of BT, because there are no suitable external comparator firms that could be used to impute relative risk levels, and there is no firm evidence for any particular level of risk for component parts of BT's overall structure.

Comparisons of BT's copper access activities with UK regulated utilities or US telecommunications companies are invalid for a variety of reasons - the evidence from the US is ambiguous, and in any event, the differences between BT and these companies are sufficient that any evidence from them has no relevance. Empirical evidence indicates that BT's underlying asset beta is likely to be higher than those for either UK regulated utilities or US telecommunications companies, due to differences in the nature and mix of their activities, the type and impact of regulatory regimes, and the underlying uncertainties of future revenues.

Ofcom has made it clear that it wishes to reduce charges for services that use the access network, but it is essential that the evidence supports such an outcome: any difference in the appropriate return on capital employed attaching to any part of BT must be based on objective evidence about actual relative levels of risk.

In practice, BT does not use different discount rates for projects in different parts of the company, because there is no direct evidence that different activities within the group have different levels of risk. Indirect evidence of different levels of risk is weak and the

¹ Note that the published Bloomberg UK ERP figure on 21st March 2005 was 4.94%.

² "A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K." Stephen Wright, Robin Mason and David Miles, February 2003

³ See analysis of recent regulatory determinations in Annex 1 by Professor Ian Cooper

implications are difficult to quantify. BT sees the prime determinant of risk levels as the industry in which BT operates, and it is common practice for firms active in predominantly one industry to use a common hurdle rate for this reason.

In the absence of reliable and objective evidence, any determination of different rates would be arbitrary and subjective, and as such would be inappropriate for an evidence-based regulatory regime. Any such determination would risk distorting both investment incentives and management behaviour, which might have unwelcome implications for customer choice and economic development.

Such an outcome would introduce unwelcome regulatory uncertainty, at a critical time for investment in the industry.

Setting a separate cost of capital for the copper access network activities is, in our view, not statistically supportable, but further splitting of the cost of capital for the remaining parts of BT (for example into "other regulated" and the "rest" as per Figure 11) is even more difficult to justify on the evidence. Therefore, if Ofcom were to insist on disaggregating BT's cost of capital, despite the lack of hard evidence to support this, there appears to be little reason to justify separation into any more than two parts - the local copper-based access network and the rest of BT (including regulated and non-regulated activities). Non-expert observers may intuitively expect the local access network to be lower risk than the rest of BT's operations, although the evidence is not, in our opinion, sufficiently robust to quantify such a difference in risk levels. Any difference in the disaggregated cost of capital rates for these two parts of BT should therefore be very small.

Higher risk projects should be permitted higher returns

The consultation document also raises the fact that some projects do indeed have higher specific risk than others. The specific risk of projects should be recognised in designed regulatory prices. In relation to truly discretionary investment BT has a responsibility to consider both the value of partial or complete deferral (for example, to gain valuable information) and the project specific risks, as well as a management responsibility to judge the extent to which projections of costs and revenues have any bias (optimistic or pessimistic). Capital market disciplines require BT to manage such issues efficiently and effectively.

BT believes that the future is very different from the period since privatisation, and necessitates a different approach. For example in the past it was very unlikely that alternative technologies could result in economically viable alternatives to the copper access network, whereas now the impact of wireless technologies seems likely to be significant in the near future.⁴

Two material examples facing BT at present are access fibre and Next Generation Networks (known in BT terms as the 21st Century Network project, or 21CN). In both cases there is a considerable amount of technological risk and the potential for material uncertainties in forecasting of costs, take-up levels and the parallel development of alternative technologies that may render the technology adopted obsolete or severely impair the economics of the investments. However, in both cases the investment may not be entirely discretionary - successful investment in access fibre and 21CN could have a major impact on the UK economy, and there is a strong desire from third parties for BT to make such investment.

⁴ Since copper access network assets have an accounting life of 15 years or more it seems likely that Wi-Max or some development of this technology will have a significant impact on the economics of the local access network - stranding and write-down of assets may result. This real downside risk has not been taken into account in access pricing.

Up to now there has been no regulatory or governmental requirement for BT to make these investments, and the investment decisions lie with BT management. It may be in the interests of the UK economy for BT to make these investments, but predictable regulatory responses (e.g. regulatory forbearance or "loose" controls, well-understood and stable criteria for potential subsequent regulatory intervention/withdrawal) along with appropriately augmented allowed rates of return may be needed to accelerate investment and commit BT funds.

It is also important that Ofcom recognises the asymmetric risk that BT faces, both on new and existing investments: when returns over and above the regulatory cost of capital have been achieved the regime has tended to act to reduce returns, whereas regulated prices have not recognised the potential for technological advances to reduce the value of the investment, thus preventing BT from recovering the cost of its investment. This may mean that the rate of return on capital employed in regulated prices (and hence prices themselves) might need to be higher at the outset in those cases where there is a risk of forecasting error (for example as a result of over-optimism) or technological downside.

It would be highly illogical to attempt to increase the unit price for a product by the time that demand starts to decline (as it will if a new technology makes the service unattractive - e.g. the success of broadband over Asymmetric Digital Subscriber Line (ADSL) has caused a major - probably permanent - decline in demand for dial-up internet access⁵). Historical data typically has a bias in favour of successful investments, but this should not be used to justify ignoring the real risks of premature obsolescence or stranding.

The role of real options

We welcome Ofcom's willingness to consider new approaches to taking account of the underlying economics and risks inherent in the regulatory regime. However, the quantification and implications of real options are complex, and the discussion raises some important issues:

- The regulatory regime may act in a way that may benefit consumers (e.g. increasing choice, accelerating investment in new technologies) but at the same time stop BT from exercising full commercial freedom of choice in its investments - this will restrict BT's ability to manage or avoid risk and, at the extreme, increase the risk of failure or unavoidable redundancy⁶, and in the long term may therefore act to consumers disbenefit.
- Recognition of real options would enable BT to be properly rewarded for being obliged to take financial and operational risk that other network operators are able to avoid by buying wholesale services from BT at regulated prices and advantageous contract terms.
- The regulatory regime should recognise both real options values and the risk of failure. These are separate but equally important issues.
- Although real options may be difficult to value, the need for an upward adjustment to prices to take them into account is unambiguous in the event that regulatory action effectively forces BT to give up its real options. To ignore this would prevent BT's investment from delivering a fair return. Although a second-best approach, rather than attempting to quantify real options values, a pragmatic solution may be to use a cost of capital figure that is at the upper end of the range of values.

⁵ "Internet Connectivity January 2005" First Release Report by the office of National Statistics, 17th March 2005 - the number of dial-up connections fell during the year to January 2005 by 22.4%, whereas broadband and other permanent connection numbers rose by 86.2% over the same period.

⁶ Any investment in an integrated Internet Protocol (IP)-based network (such as is proposed for BT's 21st Century Network investments) is exposed to the risk that an alternative standard emerges that renders IP obsolete or marginal.

The issue of real options is highly relevant to many of the investments BT makes, both those that might be considered 'discretionary' and others that are essentially obligatory. Real options offer a mechanism by which some of the well-known weaknesses with Long-Run Incremental Cost (LRIC)-based pricing - which may fail to reward properly even efficiently incurred investment - can be at least partially overcome.

It is vital to consider the possibility that investments may be stranded by, for example, unpredictable disruptive technologies that make the service unattractive or uneconomic for customers. This is especially important for investments in telecommunications, when the rate of progress is so fast that the true economic life of investments is subject to disruptive innovations (e.g. dial-up internet access being superseded by broadband access - which has already happened, copper access being superseded by wireless - which has already happened to a material extent for voice and may well happen for data in due course).

Real options are not directly related to the cost of capital, since they represent an opportunity cost foregone rather than an additional element of systematic risk. Real options can arise from specific risks that would not affect the cost of capital derived using the Capital Asset Pricing Model (CAPM). An alternative approach may be to permit a premium representing real options value in the price stack for regulated products, calculated on a case-by-case basis, using an objective mechanism for determining the option foregone due to regulation (e.g. because of a Universal Service Obligation) for various classes of asset according to risks and irreversibility. This is likely to be complex in practice, but we would urge Ofcom to undertake a more detailed programme of work to develop appropriate mechanisms.

We recognise that there are number of practical problems with real options - both in relation to calculating an appropriate value and regarding how to take the value into account in the regulatory process. Adding a special 'premium' to the regulated cost of capital to reflect the real options value would appear to be a pragmatic approach, although we recognise that this may not be easy in practice, unless a relatively subjective increment was added. This approach was taken by the Competition Commission in 2002 in the case of BAA's investment in Heathrow Airport Terminal 5, whereby BAA were allowed an additional 0.25% in their overall cost of capital to reflect the impact of the investment.

Amendment to cost of capital rate if valuation of assets departs from pure Current Cost Accounting (CCA) basis

Subsequent to the publication of this current consultation document, Ofcom published Part 2 of its consultation on the valuation of BT's copper access network. This indicates that the regulatory basis of valuation may be varied from a pure CCA approach.

The WACC determined using CAPM should be applied to an asset valuation that reflects the economic value of the assets. CCA values have been used as a reasonable proxy for economic values of BT's regulated assets, and using pure CCA is consistent with using LRIC in setting regulated prices. Altering the basis of valuation, for example by valuing some or all of the assets on a Historical Cost Accounting (HCA) basis would require an adjustment to be made to the cost of capital rate, in order that prices deliver an appropriate return to shareholders. Such an adjustment may be substantial depending on the difference between HCA net book values and CCA net replacement costs.

Until Ofcom's proposals for valuing the copper access network assets are made clearer, it is not possible to assess the implications for allowed rates of return. In the event that a return to HCA is imposed, the adjustment to the WACC should be calculated in line with principles such as those outlined in various academic literature.

Ofcom needs to deliver a regulatory framework that reduces uncertainty

Ofcom makes it clear that the current consultation document deliberately focuses on a narrow set of issues, and will lead in due course to a determination of appropriate rate or rates to be used in relation to the regulation of BT. It is, however, very important that Ofcom should also ensure that there is broad, sustainable certainty regarding the way in which cost of capital is determined and used in regulating BT, including:

- How frequently the rate or rates should be reviewed - for example, whether the rate(s) should be reviewed only every four or five years, in order to give certainty and avoid unnecessarily intrusive regulation.
- Whether any changes in external factors can ever justify re-opening the calculation on an *ad hoc* basis.
- How the cost of capital should be used in relation to low-capital activities (e.g. where a product or service is essentially a retail operation, taking inputs from elsewhere) - whether alternatives to Return on Capital Employed are needed in such situations.

We would be happy to discuss these issues with Ofcom to drive towards a sustainable framework that minimises uncertainty.

Responses to specific questions

Question 1: Do you agree that 2% to 5% represents a reasonable range of values for the ERP? Within this range, do you agree that Ofcom should revise its central estimate downwards from 5% to 4.0% or 4.5%? Which of these is the most appropriate?

BT does not accept that the evidence presented by Ofcom justifies a movement from the rate used by them in the PPC review during 2004⁷. Ofcom appears to have been selective in the evidence it has emphasised in the current consultation document, skewing the apparent result towards a lower rate. All of this evidence was available to Ofcom at the time of the PPC review, yet the conclusion at the time was that the appropriate rate was 5.0%. The evidence referred to by Ofcom *all* pre-dates the PPC conclusions and there is no reason to believe that academic or market views have moved since then. BT's view is that the evidence available, which includes the published Bloomberg UK ERP of 4.94% on 21st March 2005, continues to support a value for the Equity Risk Premium of at least 5.0%.

Professor Ian Cooper of the London Business School has prepared a survey of available evidence (see Annex 1) that shows Ofcom has not referred to a considerable body of highly respected evidence. Professor Cooper's independent analysis is, in our view, very persuasive and highlights shortcomings in the conclusions reached by Ofcom. When *all* these sources of reputable evidence are taken into account and interpreted appropriately and consistently, the range of plausible rates is higher than that concluded by Ofcom, with a somewhat higher mid-point. Contrary to the assertion in the consultation document, Ofcom's revised view of the appropriate rate of the ERP is not consistent with that used by other UK regulators. The ranges summarised by Ofcom in Figure 6 need to be carefully interpreted and adjusted to put them on a consistent basis. Some regulators actually used rates at the high end of the ranges shown, and some used risk-free rates higher than the prevailing market rates. After taking proper account of the rates actually used in other regulators' determinations and correcting so that they are consistent with market risk-free rates it is clear that the comparable rates are far higher than Ofcom has implied. A more appropriate range for use in the way that Ofcom applies the ERP (i.e. using an actual risk-free rate as opposed to an "underlying" rate) would be 4.2% to 5.8%, with a noticeable upward recent trend.

Ofcom states that it "remain[s] of the view" that "the downside risk associated with taking too low a value for the ERP"⁸ is undesirable. However, the approach Ofcom has taken to selecting and interpreting evidence is inconsistent with this - there appears to be a bias in the conclusions Ofcom has reached in favour of values at the low end of the range of reputable independent experts' views. The risks associated with setting a rate that is unnecessarily low remain: a return on capital employed that falls short of the true cost of capital will dull investment incentives and distort management behaviour.

Question 2: Do respondents think that if projects with different risk profiles are to be rewarded differently, this should be through the cost of capital or the cash flows or should it depend on the types of risks involved? How would such extra (or reduced) rewards be treated in future financial analysis (e.g. at future charge control reviews)?

In principle we accept that more risky standalone projects should be rewarded with higher returns - this is consistent with a higher hurdle rate being used, in addition to other assessment criteria. We do not believe it is likely to be feasible for the broad sweep of the regulatory regime, due to the difficulty in determining risk levels for broad ranges of products

⁷ "Partial Private Circuits Charge Control Final Statement", 30 September 2004, para D.31

⁸ Para 1.13 of the consultation document

or divisions of BT. This approach might be relevant to specific investments that can be considered on a standalone basis, although it is likely to be very difficult to judge in any objective way the level of risk associated with each project.

Depending on the nature of the investment, regulatory forbearance (reduced or absent regulatory constraints) might be an alternative to adjusting either rates of return or cashflows, as this would allow the regulated firm to take the risks on commercial terms and benefit if successful. It does not seem appropriate to uplift the regulatory asset base (as suggested in paragraph 5.7) instead of adjusting the allowed rate of return, since this would distort the basis of accounting for fixed assets, and is not consistent with the incentive mechanism under periodic price controls. It is important that the regulatory asset base, which we strongly believe should be valued using a CCA basis, is valued on a consistent basis.

In setting the regulated price, adjustments should be made to account for risks expected to be relevant in the price control period (i.e. risks relevant to the period up to the next scheduled price control review). This is effectively "business as usual" - this is the way a rational and balanced regulatory regime works. Subsequent reviews would re-assess risk levels in the light of the state of the market and technologies at the time. Risk levels might have increased (for example if the regulated product was nearing the end of its life due to technological advances and alternatives) or decreased (for example if the product was now mature and the market stable for the foreseeable future). Arguably a project with particularly high risk should be reviewed after a shorter period of time than a low risk project, in order to ensure that the risk premium was appropriate. We believe longer periods between reviews are generally desirable, but where circumstances have changed that materially alter the risk faced by BT it may be desirable to conduct an interim review, possibly initiated by either BT or Ofcom.

However, the current regulatory regime is inherently asymmetric: it caps returns (e.g. by using CAPM to set target returns and periodic price cap reviews to reinforce and maintain downward pressure) but fails to incorporate the potential for failed or stranded investments. The issue of asymmetry was identified by the National Audit Office⁹ in their review of the regulation of network industries in 2002, in which it said (section 4.2.2): *"If the effect of asymmetric regulatory interventions produces an expected return which is less than the actual cost of capital, companies will not invest. This means that the regulatory regime must adjust to these circumstances. This can either be done by removing the regulatory risk, or by promoting another source of returns, e.g. by increasing the parameters in the CAPM, by increasing the operating expenditure allowance, or through retention of higher profits from cost savings"*

The risk of failure or stranding of assets should be taken into account when setting prices. Using best estimates of the probabilities of a range of outcomes, the price should be set in a way that the investment should deliver a reasonable rate of return - this might mean that the price implies a higher rate of return than if there was no expected risk.

Whatever approach is taken, it must be consistent over time, meaning that actions of the regulator that are reasonably expected by the market on the basis of its earlier analysis and judgements are actually carried through at a later date. In any case there should be no retrospective adjustment if the returns were higher than anticipated - the strength of the incentives that periodic price reviews deliver should not be lost. We believe this approach is consistent with periodic price control reviews and the need to recognise forward-looking risk, and should not significantly increase regulatory complexity.

⁹ "Pipes and Wires", NAO, April 2002

Although we believe such an approach to cashflow risks is workable for individual products or specific investment programmes, we remain sceptical that reflecting risk levels for wider business units or divisions of BT is feasible in practice, since it will be very difficult to determine risk levels objectively.

Question 3: Do respondents think that projects or business units with different systematic risks should be rewarded differently? If so, is it possible to establish a robust methodology by means of which the systematic risk of these projects could be assessed and the adjustment to the reward determined?

We do not believe it is possible to develop sufficiently robust and/or objective means of rewarding different parts of BT according to their relative systematic risk levels - the application of such an approach in a regulatory context would require predictable, objective and evidence-based quantification of risk levels, and the ability to identify those risks that were genuinely beyond the managerial control of BT or the beyond the influence of Ofcom itself. Furthermore, we believe that the risks of various parts of BT share the same risk profile, being that of the telecommunications market, and the complex inter-relationships between various components and wholesale/retail products means that risk is spread and not meaningfully differentiated.

A range of factors generate a similar level of risk across BT as a whole, including the nature of sector-specific technological development, changes in demand for increasingly sophisticated telecommunications services, the scope of sector regulation and competition law, as well as commercial objectives, which all have to be balanced, and which lead to a difficulty in separating risk levels for parts of the company:

- BT is obliged to construct, extend and maintain much of its network to satisfy its Universal Service Obligation - this means that much of its investment is not entirely discretionary.
- BT seeks to invest in projects that give a return that, when taken altogether, will satisfy investors.
- BT is subject to *ex ante* regulation in many areas, but this regulation is not entirely certain as it may be challenged by third parties and reviewed by Ofcom on its own initiative, and the rate of return planned or achieved is a key part of these interventions.
- BT may be subject to *ex post* investigation under competition legislation, in which allegations of predatory or exploitative pricing, margin squeeze or unfair discrimination may be levelled at it. Care needs to be taken not to work on the basis of projected returns that are "too low" or "too high", since both of these might be taken as indicating anti-competitive intent.

In many areas market prices are, to complicate matters further, effectively set by BT's competitors or related products (thus prices may settle at "what the market will bear", which may not bear direct relation to underlying costs). As a consequence of these factors the regulatory cost of capital has to play a central role, whatever another firm might do in truly competitive circumstances. Considerable management time is spent ensuring that we meet our obligations whilst not under- or over-pricing.

Furthermore, firms may invest in individual projects that deliver returns lower than the company WACC if they contribute to a broader strategic or tactical objective, in the expectation that there will be an overall benefit to the firm even if one project is a "bad" project. BT does not currently enjoy the same level of freedom as most companies, due to the constraining effects of regulation (e.g. via margin-squeeze tests and *ex post* investigations).

Applying different hurdle rates for individual projects or groups of projects would only be valid if there was a way of determining, in a reasonably objective way, the relative levels of risk for different projects/groups. Although in principle different systematic risk levels should be rewarded by different rates of return, in practice it is difficult to establish a robust methodology. This is true of most firms, and as a consequence many firms (including many publicly quoted firms both in the UK and the US) do not use project- or division-specific hurdle rates, and those that do tend to be those that operate in several distinct sectors, applying sector-specific rates based on evidence from publicly traded companies operating in the same sectors. Many firms do use hurdle rates that are above their overall WACC, but usually the premium is highly subjective and not based on robust risk analysis. Companies also use a range of other measures to assess and manage risk, including scenario and sensitivity analysis and using other measures to complement Net Present Value (NPV), including payback period, internal rate of return (IRR), Economic Value Added (EVA^{®10}), and maximum funding requirements. The uncertainty of future cashflows may also lead to the NPV calculation being done for only a limited number of years - where there is considerable uncertainty shorter periods may be used. Real options may also be used in the assessments of projects (adding a "defer" scenario to compare with the "do nothing" and "do something" scenarios) - see elsewhere in this document BT's views on real options.

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?

As part of our response to the Ofcom Strategic Review of Telecommunications, BT has proposed that a new division (referred to in BT's response to Phase 2 of the Review as the Access Services Division (ASD)) might be set up to manage the 'equivalent' wholesale assets, concentrating on enduring bottlenecks. The form that AS might take if a regulatory settlement were agreed is still under discussion, and it is likely that the scope of the division will evolve over time as the scope of the enduring bottleneck assets change. In any case we do not believe it would be appropriate to consider what return on capital employed might be permitted in any eventual regulatory settlement before the conclusion of discussions concerning the ASD. It is only at that point that the relative risk levels might be objectively considered.

There is no evidence that any objective, evidence-based method of disaggregation of BT's equity beta can be justified in relation to BT's constituent parts. We have included at Annex 2 a paper by Professor Ian Cooper of the London Business School, which examines the validity of Ofcom's analysis and considers alternative approaches. This analysis concludes that available data cannot be unambiguously used to calculate or infer beta values for component parts of BT. Comparison with other regulated network businesses does not give meaningful data, because they are in completely different, diversified businesses with different levels of risk, and the data necessary to disaggregate their business is not available. Comparison with US telcos is inappropriate also, because the US telecommunications market has a different structure, most of the firms are not pure access or pure non-access companies, and they are regulated in very different ways. Further, the evidence presented by Ofcom does not support the thesis that BT's local access network activities are as low risk

¹⁰ EVA is a registered trademark of Stern Stewart & Co. Reference to EVA does not advocate or recommend its use. We refer to the technique merely as one of many used in assessing investments.

as those UK and US utility and telecommunications companies. These comparators are addressed below.

Comparison with other UK utilities

We believe that the extent to which the copper access network is less risky than other parts of BT is exaggerated, and Ofcom does not consider fully the risks facing BT at this time. The data relating to other UK utility companies in Figure 9 gives no evidence about the riskiness of BT's copper access network, nor indeed about the riskiness of those firms' distribution network businesses.

To compare the copper access network with other UK regulated distribution networks ignores the real uncertainties facing the copper access network that have no material parallel in other industries. Sources of uncertainty include the impact of competing networks and actual and emerging disruptive technologies, none of which are present in other network industries, and advances in affordable and practical technologies are adding considerable risk. The evidence is highly persuasive that all measures of risk - systematic, diversifiable and total - are higher for telecommunications than for the industries chosen by Ofcom as comparators.

Fixed voice telephony and data services face real competition from mobile telephony throughout the UK and cable TV companies in many areas, as well as the emerging threat of IP-based telephony over broadband connections. Although neither wireless local loop nor wireless broadband have yet to emerge as significant threats, they do add significant uncertainty. These factors are all likely to increase BT's exposure to market volatility, since they reduce the stability of network usage.

- In cities, competitive fibre-based access is a considerable factor, especially in the business sector, both for voice and data.
- Broadband services are generating innovative services that by-pass the traditional PSTN network. Furthermore, ADSL and fully unbundled Local Loop Unbundling (LLU) services bear none of the cost of the copper access network, thus giving these broadband-only users a 'free-ride' on the copper network, leading to a substantial risk relating to recovery of the cost of copper in the relatively short term and affects both capital costs and ongoing operating costs.
- Ofcom's fundamental review of regulation of telecommunications has not yet finished - the conclusions may have profound implications for the structure of the UK telecommunications industry and of BT itself. This is by far the most far-reaching review by any UK regulator, and whilst in due course it may result in a regulatory settlement that reduces uncertainty, in the coming months (and potentially years if there is an Enterprise Act investigation) there will be considerable uncertainty facing BT and its shareholders, especially in relation to the copper access network.

The observed equity/asset betas of the other listed UK utility companies are, in themselves of little relevance in any case. Since the restructuring of the gas, electricity and water industries, and the subsequent creation of pan-utility firms, these companies are largely diversified, and whatever their observed betas it is not possible to disaggregate them to give comparisons with their equivalents to BT's copper access network (e.g. electricity distribution networks).¹¹ All these firms have expanded their activities in vertically and/or horizontally related areas, in order to achieve various objectives, some of which may reduce the overall betas of the firms, others of which may increase the overall betas. It is simply not valid to draw any conclusions from the data in Figure 9, except that these firms have betas that vary considerably, for reasons that cannot be inferred or calculated. Whilst the median of the figures might well be 0.35 (as per paragraph 5.30) this is a meaningless observation, since it

¹¹ It is also noteworthy that many UK utility operations are no longer owned by UK-listed firms, and consequently there is far less market-based information to take account of.

cannot be used to derive any relevant measure in relation to either these firms or BT, and the selection of companies for inclusion in this table is necessarily a sample of potential companies. Nothing statistically valid can be drawn from this set of data.

Finally, there is nothing in this data to support the assertion in paragraph 5.31 that a beta of 1.3 "may not be appropriate in the context of BT's copper access network". We firmly believe that the data in Figure 9 should be disregarded as 'evidence' of anything relevant in this consultation.

Comparison with US telecoms operators

Many of the arguments against comparison with UK utilities apply equally to comparison with US telecoms operators. The nearest comparators to BT's copper access networks in the US are the Incumbent Local Exchange Carriers (ILECs), since these are the firms that own and operate the local network and lease services to other operators. However, finding meaningful data for ILECs is more or less impossible, since, as Ofcom identifies in paragraph 5.33, they are all owned by large multi-national, highly diversified firms, and any measure of beta for the owners of ILECs will tell us nothing directly about the riskiness of the ILEC operations themselves.

Furthermore, there is reputable empirical evidence that the beta of telecoms firms vary with the type of regulation applied and/or the principal country in which they operate. The study for the World Bank "Regulatory Structure and Risk and Infrastructure Firms - An International Comparison"¹² found that "high powered" regulatory regimes (such as *ex ante* price controls) tended to increase the observed beta. This research was updated in October 2002 by PriceWaterhouseCoopers (PwC), advised by Professor Julian Franks of the London Business School in a PwC paper for the Office of Government Commerce¹³, confirming these findings. US telecoms regulation, although similar in some respects to that applying in the UK has been far less interventionist and more liberal in a number of key respects, with the influence of rate of return regulation persisting.

Comparisons of BT as a whole with Sprint and AT&T (paragraph 5.36) are also flawed - the range of activities in these firms are, although superficially comparable, different in many ways. Factors that contribute to differences include: non-US activities, non-telecoms activities, wireless, the degree of vertical integration, the impact of regulation on various US and overseas activities and so on. This is, if it is evidence at all, circumstantial evidence at best, and little weight should be given to it. Furthermore, the beta of AT&T does not appear, even on Ofcom's evidence, to be significantly different from the local exchange companies with which it compares it.

Range of plausible beta estimates

In BT's view, therefore, the figures shown in Figure 11 are speculative and not evidence-based. Ofcom admits that it has to "rely on judgement to an extent" - but the entire basis of Figure 11 appears to be judgmental. We agree that the way the weightings work mean that there is a danger that the imputed beta for the non-regulated activities (in the "Rest beta" column of the table) will be unfeasibly high. Even using a beta for the copper access business of 1.0 results in a beta for the "Rest" of 1.69 which is high by any measure. Few if any of the companies operating in the range of telecommunications technology activities representing the "Rest" of BT's business have equity betas as high as 1.69. Ofcom has not given any evidence that this is a reasonable figure. Based on a range of beta data for a

¹² "Regulatory Structure and Risk and Infrastructure Firms - an international comparison", Ian Alexander, Colin Mayer, Helen Weeds - Policy Research Working Paper 1698 for The World Bank, December 1996

¹³ "Study into Rates of Return Bid on PFI Projects", PriceWaterhouseCoopers, commissioned by the Office of Government Commerce, October 2002 - see section 3.5

sample of potential comparator companies for "Rest" category activities, we believe a more appropriate range to be between 0.9 and 1.3, which is, according to Figure 11 in Ofcom's consultation document, consistent with a beta for BT's access activities of 1.3 or higher.

Notwithstanding the foregoing, we accept that non-expert observers would anticipate that BT's local access network activities would have a lower risk than the rest of BT's operations (e.g. on the basis that demand for copper-based telephony and data services is, to some extent, not dependent on the state of the market as a whole). There are superficial similarities with other 'utility' local distribution networks, although we do not believe these comparisons are wholly valid, as explained above. If Ofcom insists on disaggregating BT's cost of capital, we believe it would be least damaging to separate it into only two parts - the local access copper network and the rest of BT. Separation into the three parts suggested by Ofcom is simply not supportable by the evidence and any imposed rates would be arbitrary. The absence of objective quantification for different rates indicates that any difference in regulatory cost of capital should be very small - material differences may result in adverse impacts on incentives and unwarranted distortions in pricing and customer welfare.

Question 6: Do respondents agree that initial appraisals of projects with high specific risk tend to underestimate the true expected costs of the project? If so, how should the true expected cost of the project be assessed and any adjustment to the required reward determined.

It is unlikely that there is a generally predictable or systematic tendency to under- or over-estimate the costs of a project with high specific risk. The 'correct' forecasts of cash flows and asset values to use in any decision are the expected values based on probability-weighted outcomes. Any error in forecasts might arise from a variety of sources: over-optimism (e.g. undue faith in new technology), over-pessimism (e.g. undue financial prudence), failure to include all cash flows, inappropriate weighting given to certain outcomes, failure to take account of opportunity costs (e.g. of deferring investment).

Projected cash flows take into account prior experience in similar projects, so if anything, provided the nature and materiality of such risks is recognised early on, the project is more likely to take a cautious approach to projecting costs (and associated take-up and revenue streams) - and it is a firm's interests to avoid any "optimism bias". Whether out-turn costs are underestimated will depend on how prudent or cautious the project plan was and how well management were able to control and constrain costs in practice. High risk projects will also tend to include explicit risk analysis - aimed at quantifying the probability of adverse outcomes and setting out mitigation tactics and criteria for exiting if out-turn conditions identify that the project will never be a success. Capital market discipline and the need to compete for scarce capital with companies across the economy requires BT to adopt management structures and risk-management process to minimise any such systematic biases.

In telecommunications there are undoubtedly significant technological and implementation risks that need to be taken into account. These can, to some extent, be mitigated by prototyping, trailing and feasibility studies before a formal business case is prepared. Even so, it can be difficult to predict whether or when suppliers will deliver equipment that meets the technical specifications required. Furthermore the cost of production of new technology (and therefore input prices) has tended to reduce rapidly, as alternative suppliers develop cheaper and/or more efficient equipment, but the speed at which prices will reduce is very difficult to predict - a prudent view will normally be taken.

The risk of failure, obsolescence or stranding is particularly relevant to new investments in telecommunications, and if these risks are not properly accounted for in setting prices there

is, notwithstanding the caution based on prior experience, a real risk that the investment will not deliver adequate returns. A relatively small probability of technological obsolescence can have a very large impact on the expected cash flows. This can be taken into account by adjusting the allowed rate of return or by allowing the recovery of the investment over a shorter period. The key is to ensure that the expected return is aligned with the appropriate cost of capital.

These are not unique to a regulated situation. Responsibility for management of financial risks lies with BT, and in the normal course of events we would not expect Ofcom to play a part in setting mechanisms to take account of unanticipated costs at the start of the project. If Ofcom were investigating a product using their formal powers we would expect Ofcom to recognise that BT uses professional and rigorous methods to identify and manage risks, and that appropriately prudent allowances were made in the cost calculations, including an element of contingency - these are taken into account in pricing in order to recover likely costs. Companies in competitive markets behave in this way, and BT should not be penalised for being rational and cautious.

In setting price controls Ofcom should take a similarly prudent approach and take advice from BT and, if necessary, independent experts, as to how much contingency is appropriate in any particular case. This mechanism cannot be pre-determined since each case will present different risks and opportunities for mitigation through effective management. Contingency and prudent allowances should be allowed where risks are not controllable.

Notwithstanding the responsibility BT management has for managing controllable risks, if the regulatory regime itself introduces biases or uncontrollable risks, it may not be possible for BT to mitigate these risks through normal good management practices. The regulatory system should ensure that fair compensation is given for such risks.

Even when uncertainties appear to be resolved this should not necessarily mean that prices should immediately be reduced - prices should reflect the risk taken and reward that accordingly. In a competitive market prices may reduce, subject to other factors (such as competitor entry and prices), but this is not inevitable. Prices may be kept at levels necessary to appropriately recover initial investments, as well as taking account of continuing uncertainty, including potential stranding of investment by emerging (or yet to emerge) competing technologies - a real possibility in telecommunications.

Question 7: Do respondents agree with Ofcom's suggested assessment of the likely circumstances under which real option theory will be applicable in the context of regulation?

We believe that real option effects are highly relevant - they take account of a firm's ability to defer or modify investments in order to reduce risk or increase the probability of success. The analysis of real options considers the source and nature of these risks, the various cashflow possibilities and future decision points, and the way in which a firm's behaviour is rewarded in a competitive market. Firms typically may not explicitly quantify real options values, but they are an implicit factor in investment decisions for many (if not most) firms. Difficulties in quantification of real options should not justify ignoring their genuine economic and financial value.

It is important to recognise that real options affect decisions by BT, and by firms such as altnets that may face build-or-buy (or invest-or-lease) decisions. BT is highly constrained in what it can do, whereas its competitors are not. Regulatory compulsion (e.g. insisting that BT offers wholesale equivalent products) transfers real options to altnets without them paying for the costs of these options. This amounts in effect to the regulator tipping the playing field in favour of altnets - they face lower costs than if BT was not compelled to invest, and are

able to enter the market earlier and without taking any implementation risk. Regulation must not ignore the undoubted financial benefits that flow to non-infrastructure based altnets as a result. A policy of *ex ante* truncation of potential upside profits, which characterises the current price control-focus of regulation, will not support investment by BT or competitors in the long run.

To incentivise innovation, the regulatory regime must recognise uncertainty and decision flexibility when analysing the likely consequence of any proposed regulatory remedy. Real options should not be equated in value to the benefits of first mover advantages; they should instead be viewed as a proper reward for risk taking in competitive markets. Nor can they be assumed to exactly offset real options costs even if Ofcom is of the view that these advantages are somehow not important for innovation in telecommunications, and can therefore be denied infrastructure investors.

Problems with the current regulatory regime

It is useful at this point to consider a number of linked issues that are particular features of the way in which BT is regulated. These mean, in aggregate, that BT is likely to be materially under-rewarded for the things it invests in. Each of these issues relates to regulatory mechanisms that have evolved to address quite narrowly focussed problems - individually they have some validity, but collectively they are likely to fail to ensure that BT is properly rewarded.

- A. The regulator, by insisting on BT offering wholesale equivalent products is:
 - Preventing BT from exercising its real options, but not compensating BT through higher regulated prices from the outset. Such an increase in prices would compensate BT for the loss of the real option value, and thus BT would be indifferent financially to offering the wholesale equivalent product now or deferring a decision if doing so would give a higher NPV.
 - Preventing BT from gaining any first mover advantage from innovation that might accrue if the market was properly competitive. *Ex ante* regulated prices do not take account of compensation for loss of first mover advantage.
- B. The regulator prevents BT from committing customers to long contracts for regulated products. In a normal commercial market contract lengths are used to balance risk and reward - short term contracts usually attract higher prices, and vice versa. This exposes BT to risk regarding the scale of wholesale demand, increasing the need to maintain spare network capacity.
- C. *Ex ante* regulatory price caps do not take long term risks into account from the start, as discussed in our answer to Question 2 above. Ofcom could allow BT to advance recovery of investments (e.g. via front-loaded depreciation allowances or artificially shortened "regulatory" asset lives) where there is a risk of stranding due to emergent technologies. The current regime binds itself by only taking account of stranding when it has happened or is about to happen (e.g. FRIACO¹⁴ charges), making it impossible for regulated prices to rise to recover the full cost of investment at that stage. The risk of such outcomes should have been factored in from the outset.
- D. *Ex post*, regulatory price cap revisions have the effect of capping upsides (arguably in a similar manner to a competitive market, but subject to lag), but largely ignore emerging downsides due to changes in demand and technology. Even if *ex ante* regulation recognised these from the outset, subsequent reviews ignore the need to ensure a fair return is delivered over the full life of the investment.

¹⁴ FRIACO: Flat Rate Internet Access Call Origination

It is important to understand the potential impacts of regulation on the real options. If BT is prevented from exercising an option to defer (e.g. by being obliged to introduce a service in the face of a real option value that would imply deferral was a better commercial choice) without being able to recover the value of the real options, this value is handed to altnets, who may no longer need to consider their own option to build or wait and see (since the transfer of value from BT reduces or eliminates the value of the altnet's real option). BT is exposed to greater risk as it is unable to defer a decision until more information is available - and greater risks of asset stranding translate into a need to recover costs earlier in the asset life, as discussed above. This outcome would impair the incentives for BT to invest, as these effects would make it impossible to achieve a reasonable return on the investment. In broad terms these regulatory shortcomings are likely to result in economically inefficient investments and probable sub-optimal consumer welfare.

First mover advantage is often "regulated away"

Ofcom suggests that the costs of irreversibility might sometimes be mitigated by benefits of investment that are not captured in a traditional NPV calculation (paragraph 6.40). One of these is first mover advantage. It is suggested that the implicit cost caused by irreversibility might be offset by the unquantified benefit from having first mover advantage. But this logic is only valid if BT is actually able to take advantage of any first mover advantage - for example, if it is able to offer a retail/downstream product without having to also offer a wholesale equivalent product at the same time and if it is able to price the product in a way that seeks to recover the real options value foregone and future downside risks. In many areas BT is severely constrained in its ability to offer innovative retail/downstream products that might give it any first mover advantage.

Factors giving rise to real options

Real options are driven by factors that might materially change the probability of success (and increase in NPV) if the "go" decision is deferred, such as:

- A newer technology may be emerging which might make the technology under consideration obsolete.
- Entrants in non-competing related (or overseas) markets may be about to invest - it may be possible to learn from their mistakes and successes and reduce both the risks of failure and high development and implementation costs.
- Later entry may enable assets to be bought at lower prices, e.g. if the vendor has by then resolved early technical challenges, recovered their fixed development costs and can then achieve economies of scale.
- Technical standards for relevant technology are yet to be agreed or are likely to emerge after the early investor has made their investment - this might require early investors to write off their early investment or to make expensive modifications.
- Emergent demand for related products may confirm customer expectations (e.g. demanded features and capabilities, price points).
- Required assets have little or no resale value if they turn out to be uneconomic.
- Whether the firm can control the initial scale of a project - for example whether the extent of the investment can be constrained, or whether it is a 'fixed size' investment (e.g. a national integrated network).

Analysis of major investment areas for BT

The foregoing would suggest that real options are likely to be significant in a wide variety of situations, but primarily where technology (whether physical, logical or standards-based) is in relatively early stages of development and/or is untested on the scale being considered. For example:

- BT's proposed investment in Multi-Service Access Nodes (MSANs) as part of its 21CN programme;
- IP-based core networks (possibly including BT's proposed Metro Nodes and IP/Voice soft gateways);
- Fibre-to-the-kerb or fibre-to-the-premise investments;
- Wireless local access, including wireless end-user broadband e.g. using Wi-Max or other emerging standards.

Question 8: Do respondents have any views on how the value of real options might be taken into account in practice in a regulatory context?

In principle, taking account of real options in a regulatory context would require explicit modelling or other assessment *on a case-by-case basis*. As a first practical step, a qualitative assessment as suggested by Ofcom, and expanded upon in conjunction with BT to identify specific relevant investments, is likely to provide a sensible way forward. Ofcom should undertake a programme of work to explore practicable mechanisms that will be used to reflect properly the value of real options (e.g. if BT is prevented from exercising its options), curtailed first mover advantages and risks of stranding. This work should examine practical applications in other industries. Techniques used in industries such as pharmaceuticals, for example decision tree analysis and probability modelling, may be adapted to give meaningful quantification in relation to telecommunications.

However, the existence of significant options effects might suggest that regulation is inappropriate, since it would imply that the investment is risky, and that there is genuine value in considering the deferral of investment. Attempts to compute the "right" access price in such circumstances would, we believe, not only be unnecessary and against the interests of innovation and consumer welfare, but also practically impossible. In such a situation, where the cost benefit from regulation is likely to be negative, there may a strong case for complete or conditional regulatory forbearance as suggested by the Commission Guidelines and the Framework Directive.

Ofcom might also consider allowing more appropriate contractual terms, by which longer contract periods might attract lower prices and vice versa. This may increase longer term certainty and more closely reflect commercial practices in competitive markets.

The Annexes, as listed below, are in a separate Portable Document Format (PDF) file.

Annex 1: "The equity market risk premium" by Prof. Ian Cooper

Annex 2: "The risk of the copper access network" by Prof. Ian Cooper