

ESTIMATES OF BETA FOR BT GROUP'S REGULATED PRODUCTS

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1 Executive Summary

Our findings

VodafoneThree has engaged Frontier Economics to review Ofcom's proposals on the asset betas used in the cost of capital calculations for products subject to cost-based charge controls. Ofcom made these proposals in March 2025 as part of the Telecoms Access Review (TAR) consultation. VodafoneThree has also asked Frontier Economics to: (a) review BT Group's response to Ofcom's asset beta proposals, and (b) provide a view on the appropriate asset beta for calculating cost-based charge controls.

Ofcom proposes a BT Group asset beta of 0.46, and BT Group since argued for an asset beta of 0.50. This report proposes an asset beta range of 0.36 to 0.42. This implies a mid-point estimate of 0.39. This report contextualises our proposal by identifying serious flaws in both Ofcom's and BT Group's approaches to asset beta estimation:

- The estimation methodology used by Ofcom's consultants departs from precedent and is flawed from statistical perspective.¹ In effect, the methodology disregards half of the available information from the past 5 years. This includes the most recent information, which is the most relevant for a forward-looking asset beta estimate.
- BT Group argues that the market has mispriced its shares. BT Group is effectively asking Ofcom to substitute the market's view of BT Group's valuation with that of BT Group management, when determining the cost of capital. Doing so would be an extraordinary approach for a UK economic regulator.

The specific asset betas that Ofcom use in cost-based charge controls are derived from the BT Group asset beta. Ofcom proposes two derived asset betas: one for active products and another for passive products. **We propose that Ofcom calculates a single adjusted asset beta for all cost-based charge control products**, noting that today there is little rationale for the historical distinction in cost of capital estimates between active and passive regulated products.

Background

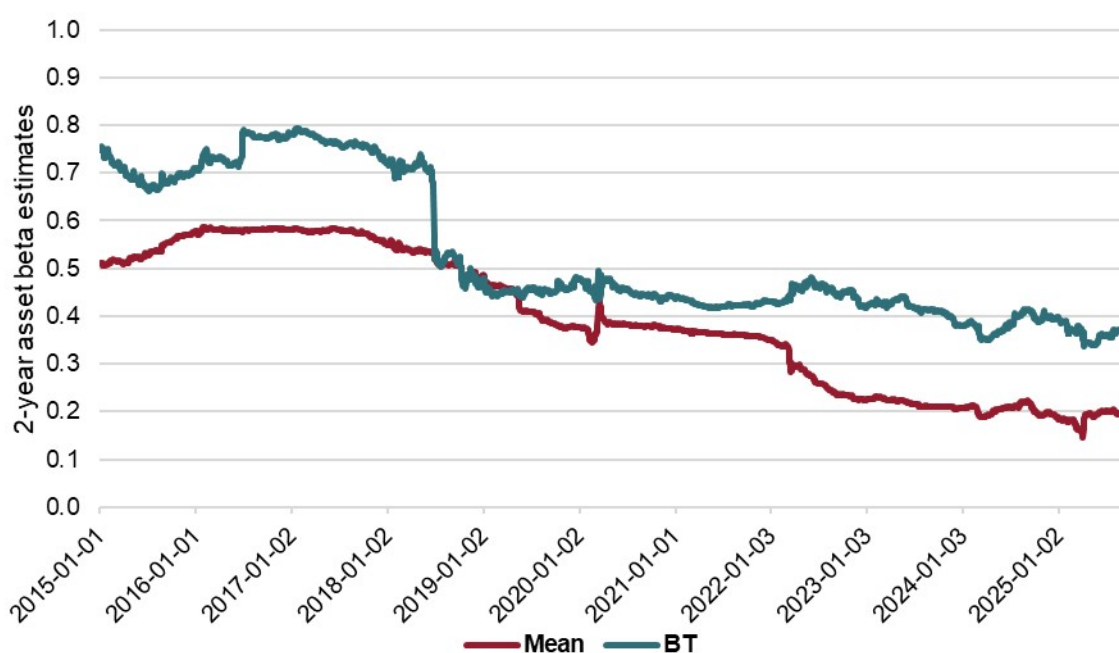
Ofcom's determination of an appropriate rate of return for BT Group assets is a key input to cost-based charge controls. This return determination should reflect information on the expected return investors would require if they were to invest in the BT Group assets subject to cost-based charged controls, i.e., the cost of capital of these assets. One key element of this expectation is investors' views of the systematic, or non-diversifiable, risk associated with

¹ We also note that Ofcom's consultants adopted a markedly different approach when estimating NBNCo's asset beta for the ACCC. Under that methodology, Ofcom's consultant's estimate of NBNCo's asset beta was 0.35.

these assets. The asset beta is an estimate that proxies the systematic risk of an asset. Robust asset beta estimates are therefore important for cost-based charge controls.

The empirical evidence is clear that, in recent years, investors consider that there has been a significant reduction in the systematic risk associated with telecommunications companies, informed by evidence of the degree to which operators' returns vary due to macro-economic factors. Figure 1 shows the reductions in asset beta estimates for BT Group and across the industry for a set of comparable operators.

Figure 1 Telecommunications asset betas have trended downwards over the last 10 years



Source: Frontier Economics analysis based on LSEG data

It is impossible to definitively determine the drivers of this reduction in systematic risk. Nonetheless, the centrality of connectivity to society and the economy today has likely increased the certainty of the forward-looking returns generated from telecommunications assets.

Ofcom's cost of capital proposals do not adequately capture the evidence of investors' current views of the forward-looking systematic risk associated with telecommunications assets. The result is that Ofcom's proposed asset beta and hence the cost of capital are inflated. This upward bias is because Ofcom's consultants have adopted an approach based on historical evidence of investors' perception of systematic risk in the telecommunication sector and which discards the most recent evidence. The approach adopted by Ofcom's consultants has no basis in either theory or regulatory precedent and departs from the approach adopted in the WFTMR in 2021, with no apparent justification.

BT Group, in its response to Ofcom's proposals, suggests effectively ignoring the recent empirical evidence of investors' perception of BT Group's systematic risk and substituting this with BT Group's own views. BT Group argues that investors are mispricing its shares. BT Group's response ignores the evidence from the wider industry which shows that the reduction in perceived systematic risk is not specific to BT Group. An approach which places more weight in BT Group's management view of risk than evidence from BT Group's investors would be inconsistent with regulatory precedent and increase regulatory uncertainty.

Ofcom should base its determination of BT Group's overall asset beta on the latest spot estimates of BT Group's asset beta as it did in the WFTMR 2021. This would suggest a range between 0.42 based on the asset beta estimated using a 5-year window and 0.36 based on the asset beta estimated using a 1-year window, with a mid-point of 0.39.

When Ofcom then sets asset betas for the cost-based charge controls products, Ofcom should take account of the evidence that these services have materially lower systematic risk profile than BT Group as a whole. Products subject to cost-based charge controls (CBCCs) are:

- often purchased on multi-year (typically 5- and 7-year) contracts, compared to a maximum of two year contracts for consumer retail products. This means that demand for CBCC products will not fluctuate to the same extent as other BT Group products.²
- largely upstream inputs to other competing operators' networks. As such CBCC products are less exposed to short term fluctuations in end user demand than is the case for products which are the cost of sales for services delivered to individual customers.
- bought by competing operators who will have made sunk investments associated with the CBCC product. These investments would be stranded if the CBCC products are no longer purchased, providing a strong incentive to continue purchasing the products.
- provided based on Openreach's / BT Group's own existing sunk assets. This means they are not subject to supply side risks associated with less capital intensive services or BT Group's continuing roll out of FTTP.

These four factors suggest that the asset beta for the cost-based charge control products should reflect a materially lower systematic risk than implied by the asset beta for BT Group as a whole. This should be reflected in a downward adjustment applied to the asset beta determined for BT Group. This downward adjustment should be informed both by evidence from UK utilities, but also by the evidence from other European telecommunications network operators whose asset betas are not influenced by BT Group specific factors. These factors include BT Group's FTTP roll out and its pension obligations, and are not relevant to the products charge controlled according to cost.

² Openreach's CBCC products are not available on an IRU (indefeasible right of use) basis. However, we understand from Vodafone, that some equivalent non-Openreach products (when available) are typically procured on an IRU basis. This indicates that demand for at least some Openreach CBCC's products is even more stable than the typical CBCC product contract duration implies.

This suggests that an appropriate asset beta for these products would be 0.36. This is:

- the bottom of the range for BT Group;
- broadly in line with asset betas used for other UK utilities; and
- significantly at the upper end of the range of average asset betas for comparable European operators.

Ofcom is proposing distinct asset betas between 'active' and 'passive' products subject to cost-based charge controls. There appears to be no clear rationale for this distinction any more. Both types of product have similar characteristics and hence a similar systematic risk profile.

For the other purposes, where Ofcom requires a cost of capital assumption but this is not critical, using an appropriate asset beta estimate for BT Group could be appropriate. An example of a non-critical use of a cost of capital assumption is the cross checks that WLA charge controls under a pricing continuity approach are above forecast costs.

Structure of this report

In this report:

- Section 2 sets out the context in which Ofcom uses asset betas;
- Section 3 sets out up-to-date evidence on trends in investors' perception of the systematic risk associated with telecommunications assets;
- Section 4 reviews Ofcom and its consultants proposed approach to determining the asset beta for BT Group;
- Section 5 considers the adjustments that should be applied to the BT Group asset beta estimate to determine the appropriate asset beta for the products subject to cost-based charge controls; and
- Section 6 set outs our conclusions on the appropriate asset beta for the cost-based charge controls.

2 Ofcom's approach to returns in cost-based charge controls

2.1 WACC to set regulated returns

Prior to 2019, Ofcom set charge controls for most products based on CPI-X charge controls. Ofcom designed these charge controls such that prices would be expected to converge to costs over the duration of the charge control. Starting from the Business Connectivity Market Review in 2019, Ofcom set some charge controls on a 'pricing continuity' basis, with a price cap that increased in line with CPI inflation (i.e., CPI-0). In the WFTMR, this approach was extended to a number of services including Wholesale Local Access rental services. Under the pricing continuity approach, the charge control is independent of the level of costs, albeit with an expectation that the level of prices will be higher than costs and so returns will be in excess of Ofcom's determinations on the appropriate level of returns.

However, in the Telecoms Access Review (TAR) consultation, Ofcom proposed to charge control a subset of regulated products based on forecast costs of production at the end of the charge control period, i.e. the financial year 2030/2031. The cost forecast is calculated on a cost plus basis consisting of an attribution of operational expenditure and depreciation *plus* a regulated return, calculated as a return on capital employed.

In line with other UK regulators, Ofcom sets the return on capital employed equal to the weighted average cost of capital (WACC), with the cost of equity calculation based upon the capital asset pricing model (CAPM). One of the key inputs to the CAPM is the asset beta, which reflects the degree to which investors consider that returns for a company are correlated with returns for the overall market. A higher beta implies that investors consider that the systematic (or non-diversifiable) risk in investing in the company is higher and so will require higher expected returns.

As the charge controls are set based on forecast 'cost plus' at the end of the charge control period (i.e., 2030/31), the return should also be a forward-looking forecast of the required return, in turn based on forward-looking parameters, including the asset beta.

Ofcom also uses estimates of the cost of capital for other purposes including cross checks on the impact of the pricing continuity approach on those services and for a notional RAB calculation for certain services, but this does not directly feed into the prices of these services.

2.2 Ofcom's approach to disaggregating the cost of capital

BT Group's cost of capital is effectively a weighted average of the cost of capital across BT Group's underlying assets. The level of systematic risk, and thus cost of equity and WACC, may vary across the assets of a single business. But asset betas are not directly observable at the sub-company level.

Compared to a number of other regulated sectors, a relatively large part of the telecommunications market is contestable and competition has increased over time, allowing Ofcom to remove price regulation from a number of services. In particular, retail services are no longer price controlled and only a very small proportion of mobile services are regulated.

In 2005, following the creation of the Openreach division of BT Group (and now a separate subsidiary), Ofcom determined that the appropriate regulated return for local loop unbundling services provided by Openreach was lower than the appropriate regulated return for BT Group as a whole. The BT Group return was used until that point for the regulation of all products including retail products. This 'Openreach' cost of capital was set by reference to the cost of capital for BT Group and a set of utility comparators.

In later charge control decisions, Ofcom first calculated a cost of capital for BT Group as a whole and then 'de-averaged' this cost of capital into three components:

- An estimate for 'Openreach'³ used for services associated with lower systematic risk than BT group overall. This category includes access to copper lines (i.e., MPF and WLR) and FTTC lines, PIA, DFA and DFX services.^{4,5}
- An estimate for 'Other UK Telecoms', used for all remaining services (e.g. FTTP, cross market ancillaries). Ofcom proposes to set this in line with the estimated cost of capital for BT Group as a whole.^{6,7}
- A residual/balancing item, 'Rest of BT' used as a sense check.

Ofcom sets the 'Openreach' cost of capital on the assumption that asset beta for this set of services lies between that for BT Group as a whole and a set of comparator utilities.

In terms of the products subject to cost-based charge controls:

- The 'Openreach' cost of capital is used to regulate prices for passive services, i.e. PIA, DFA and DFX
- The 'Other UK Telecoms' cost of capital is used to regulate prices for active services, i.e. LLA and active IEC services.⁸

³ The services regulated using the 'Openreach' cost of capital no longer aligns directly with the scope of Openreach the division in that much of the output of Openreach is now unregulated or regulated on a 'pricing continuity' basis which is not directly dependent on the estimated level of WACC and the services regulated using the 'Other UK Telecoms' WACC are supplied by Openreach.

⁴ Section A20.5, p.233, Annex 20, Telecoms Access Review, Ofcom.

⁵ MPF: Metallic Path Facility; WLR: Wholesale Line Rental; FTTC: Fibre to the Cabinet; PIA: Physical Infrastructure Access; DFA: Dark Fibre Access; DFX: Dark Fibre for inter-exchange connectivity.

⁶ Source: Annex A20, section A20.8, p.234, Annex 1-22, Telecoms Access Review, Ofcom.

⁷ FTTP: Fibre To The Premises.

⁸ LLA: Leased Lines Access; IEC: Inter-Exchange Connectivity.

3 Trends in telecommunications asset betas

3.1 There is strong empirical evidence of a downward trend in asset beta

3.1.1 Telecommunications asset betas are unlikely to be stable

Asset betas for industries and individual companies can be expected to change over time. This is because investors continually reassess the systematic risk associated with industries and individual companies. This reassessment may reflect both subjective judgements about risk, but also new information that comes to light on the correlation between returns for individual companies and factors which move the overall market.

Asset betas for an industry such as telecommunications, where there have been significant changes on both the supply side and the demand side in recent years, are likely to be more subject to change than regulated industries where technological change is slower, such as the water industry. Given that Ofcom is estimating a forward-looking cost of capital, this suggests that where there is evidence of material changes in asset beta over time, Ofcom should give greater weight to more recent information.

3.1.2 There has been a strong downward trend in asset beta across the telecommunications industry

BT Group's asset beta has fallen steadily in the last five years

There is general acceptance that BT Group's asset beta has been on a downward trend. This can be seen clearly when looking at the change in estimates of BT Group's asset betas over time (Figure 2).

Figure 2 BT Group asset beta estimates

Source: Frontier Economics analysis based on LSEG data.

Note: First observation belongs to 30th September 2009, in line with CEPA's Figure 4.1.

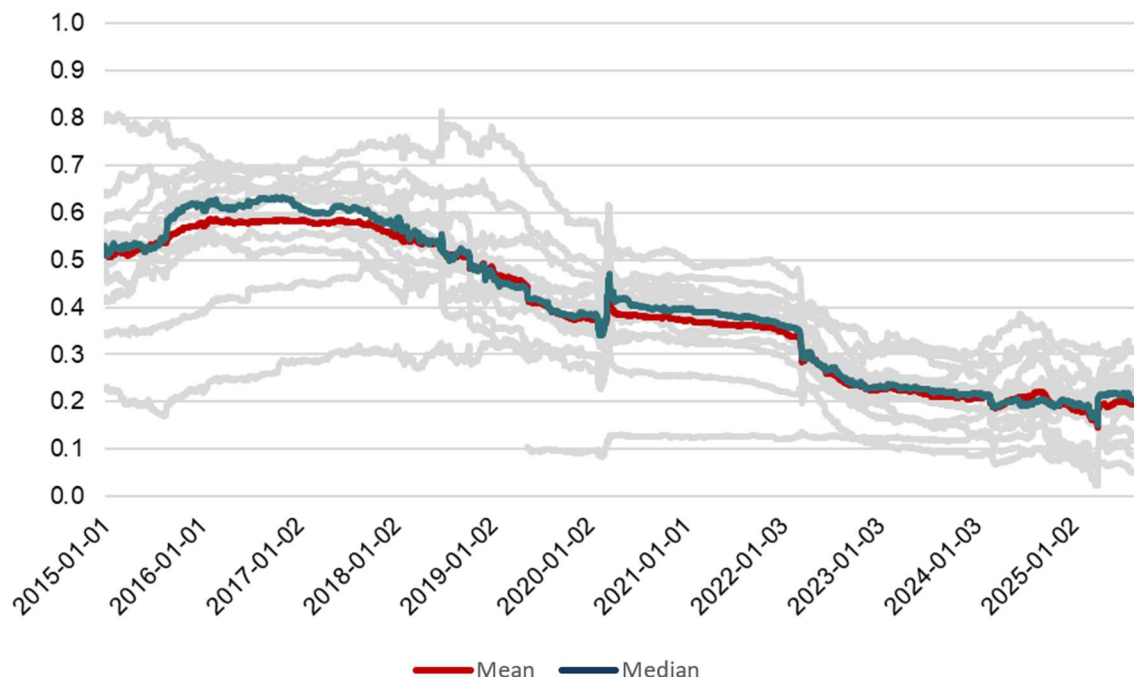
This trend was recognised by Ofcom's consultants, CEPA:

*'BT Group's asset betas have declined over the last decade.'*⁹

The downward trend is replicated across comparator sets

The downward trend in BT Group's asset beta is not company specific. Similar trends can be seen across the industry as shown in Figure 3 below:

⁹ Source: Section 4.1, p.11, Cost of Capital: Beta and Gearing for TAR 2026, CEPA.

Figure 3 Mean and median asset beta estimates for BT Group comparators

Source: Frontier Economics analysis based on LSEG data.

Note: Our asset beta estimates vary from BEREC's results due to differences in methodology. Figure 3 is consistent with CEPA's methodology, which means differences in reference indexes used, estimation window (2-year vs 5-year for BEREC), daily betas vs weekly betas for BEREC, debt beta assumption (0.075 vs 0.1 for BEREC) and debt considered for gearing (gross vs net for BEREC).

The downward trend is relatively consistent, except for the impact of the COVID-19 pandemic, which appears to have increased asset beta estimates which include the period at the start of the pandemic, when there was a high degree of market turbulence. As this period fell out of the estimation window, asset betas fell again and have stabilised in the last two years.

We use the same comparator sample as BEREC's WACC Parameters Report 2025.¹⁰ This includes 14 European telecommunications operators: Deutsche Telekom AG, DIGI Communications N.V., Elisa Oyj, Koninklijke KPN N.V., NOS, Orange S.A., Proximus S.A., Tele 2 AB, Telecom Italia, Telefónica, Telekom Austria AG, Telenor, Telia Company AB, Vodafone Group plc. This peer group is defined by those companies that fit the European Commission criteria.^{11,12}

¹⁰ Source: BEREC Report on WACC parameter calculations according to the European Commission's WACC Notice of 6th November 2019 (WACC Parameters Report 2025).

¹¹ The set of criteria the companies must fulfil is the following: (i) listed on a stock exchange and have liquidly traded shares; (ii) own and invest in electronic communications infrastructure; (iii) have their main operations located in the European Union; (iv) have an investment grade (credit rating BBB/Baa3 or above); and (v) are not, or have not been recently, involved in any substantial mergers and acquisitions.

¹² As set in the "Commission Notice on the calculation of the cost of capital for legacy infrastructure in the context of the Commission's review of national notifications in the EU electronic communications sector".

Again, this trend was recognised by CEPA:

*'Asset beta estimates for European telecoms companies have displayed a relatively consistent downward trend over the last decade.'*¹³

*'Equity betas and asset betas for European Telecoms comparators display a similar sustained downward trend over the past decade.'*¹⁴

*'Vodafone's beta estimates feature a strong downward trend since June 2018.'*¹⁵

This result is replicated in the BEREC analysis which CEPA recognises in its report:

*'The BEREC reports are produced annually. These demonstrate a significant fall in the asset beta since 2020, driven by a fall in the equity beta and increase in gearing.'*¹⁶

3.1.3 Conclusion

There is strong evidence that investors have assessed that the systematic risk associated with telecommunication operators has fallen significantly in the last decade. This is reflected in BT Group's asset beta, but also those of other comparators. This shows that the fall in BT Group's asset beta is not solely due to BT Group specific factors or an artefact due to random sampling variation. The fall is part of a consistent industry wide trend.

3.2 There are multiple potential reasons for this reduction in asset beta

It is sensible to exercise a degree of caution when interpreting changes in asset beta estimates over time. There is a complex relationship between factors which may affect overall market returns and those which may affect future cash flows generated by a specific asset. However, changes which will tend to dampen the degree to which profits fluctuate during economic cycles will tend to reduce asset betas.

A reasonable hypothesis is that the evolution of the demand side of the telecommunications industry in the past decade has lowered the degree to which industry revenues are correlated with economic cycles:

- The centrality of digital services, which require broadband access, in economic and social life mean that the income elasticity of telecommunications services is likely to be lower than has previously been the case. That is, the tendency of consumers to reduce demand for telecommunication services when their income declines is likely to be lower today than in the recent past. For example, giving up fixed broadband services would impact households' ability to access streaming television services, to work or study from home or to use the wide range of other applications delivered over broadband.

¹³ Source: Section 4.3, p.16, Cost of Capital: Beta and Gearing for TAR 2026, CEPA.

¹⁴ Source: Section 5.2.3, p.27, Cost of Capital: Beta and Gearing for TAR 2026, CEPA.

¹⁵ Source: Section 4.4, p.17, Cost of Capital: Beta and Gearing for TAR 2026, CEPA.

¹⁶ Source: Appendix E.4, p.58, Cost of Capital: Beta and Gearing for TAR 2026, CEPA.

- There has been a shift in the structure of retail prices for both fixed and mobile services. An increasing proportion of revenues comes from periodic subscriptions charges, and a lower proportion comes from usage charges (e.g., calls charged on a per minute basis). This will further reduce income elasticity as while users may change usage habits in order to reduce spend or because of lower business activity, this will not affect subscription charges.

There may also be changes on the supply side which could reduce asset betas, in particular the reduction in the operating costs of full fibre networks which could reduce the volatility of returns.

3.3 BT Group's assertion that the trend in BT Group's asset beta is due to FTTP roll out is inconsistent with the empirical evidence and is conceptually flawed

In its TAR consultation response, BT Group effectively argues that the downward trend in BT Group's asset beta is due to an undervaluation of BT Group by the market and an accompanying increase in the gearing of BT Group. According to BT Group, these dynamics are driven by the '*short-term phenomenon*' of Openreach's FTTP roll out, and should not inform Ofcom's asset beta determination.

As a preliminary point, BT Group's argument that the reduction in BT Group's asset beta is driven by the FTTP roll out is counter intuitive. There is a widely held expectation (shared by Ofcom and BT Group) that FTTP roll out carries higher risk than BT Group's 'legacy' business. If BT Group's overall cost of capital were higher due to FTTP roll out, there is no reason why such an FTTP risk premia should spill over into the products regulated at cost which are not dependent on the FTTP roll out. If anything, BT Group's argument would support a downward adjustment to a cost of capital calculated at a BT Group level, when setting the appropriate return for non-FTTP services.

BT Group's argument that the FTTP roll out has, counter-intuitively in BT's view, led to a lower observed asset beta seems to rest on a number of assumptions and assertions:

- the BT Group share price is currently mis-priced by the market and is artificially low due to the relatively lower cash flow generated by BT Group during the roll out by Openreach of FTTP networks;
- this reduction in the share price has resulted in an increase in gearing;
- this increase in gearing is the reason why BT Group's asset beta has declined; and
- as BT Group's cash flow improves at the end of the FTTP roll out, the share price will recover leading to leverage reducing and the asset beta increasing.

These assumptions and assertions do not have a robust basis either conceptually or empirically.

3.3.1 Adopting BT Group's proposals would undermine regulatory certainty

BT Group assert that the decline in BT Group's share price in recent years is due to investors mis-pricing its shares. Taking a subjective view that the market as a whole is mis-pricing BT Group's shares would require Ofcom to effectively substitute the market's view of BT Group's valuation with the views of BT Group management. This would be an extraordinary approach for a UK economic regulator and if implemented would raise doubts about the overall approach to setting regulated returns. Regulators have consistently determined that information from markets, within the CAPM framework, provide the most appropriate basis for determining the returns investors require. Departure from this principle would increase regulatory uncertainty.

BT Group appears to go further in stating that the CAPM is not an appropriate model:

*'This can be viewed as a fundamental flaw in the capital asset pricing model (CAPM), and it's one that Ofcom needs to recognise and address.'*¹⁷

However, if Ofcom were to 'recognize' that the CAPM has a 'fundamental flaw' then it is not clear that changing a single parameter in BT Group's favour would be sufficient, given that the whole framework is based on the CAPM.

BT Group's assertion that CAPM has a 'fundamental flaw' is at odds with the UK Regulators Network's (UKRN) recommendations on determining the cost of capital. The UKRN recommends that:

*'Since the cost of equity is not directly observable, it must be estimated using a widely accepted method. Regulators should continue to use the capital asset pricing model (CAPM) as their primary approach for estimating the cost of equity.'*¹⁸

3.3.2 BT Group's assertion that investors are mis-pricing BT Group's shares is based on a biased interpretation of the evidence

BT Group bases its assertion that the BT Group share price is undervalued on three pieces of evidence:

- that the investment required by BT Group to roll out Openreach's FTTP network has resulted in lower free cash flow;
- some of BT Group's investors, as evidenced by analyst reports, model the enterprise valuation and hence the value of shares based on short term expectations; and
- there is some correlation between the BT Group share price and BT Group's free cash flow.

¹⁷ Source: Section A1.17, p. 7, Annex 1: Submission to Ofcom on proposals for BT Group's cost of capital, BT (12th June 2025).

¹⁸ Source: Executive Summary, p. 4, UKRN guidance for regulators on the methodology for setting the cost of capital, UKRN.

It is uncontroversial that an increase in capital expenditure will reduce free cash flow during this period, all else being equal. In its response BT provide some information drawn from analysts' reports (largely redacted) which it suggests implies that investors are myopic and determine BT Group's share price only on short term cash flows. However, BT Group's shares are highly liquid and BT Group itself provides extensive forward guidance about expected future cash flow, stating that net cash flows is expected to reach c. £3.0 bn by the end of the decade.¹⁹ Any mispricing by a subset of investors who ignore BT Group's guidance on future cash flows, would be quickly exploited by more sophisticated investors who understand that the enterprise value is the present value of all future cash flows.

BT Group also show a chart which purports to show a correlation between free cash flow and BT Group's share price.²⁰ However, the majority of the fall in BT Group's share price took place between 2015 and 2018. This is before BT Group's mass FTTP roll out began and is a period of stability its free cash flow. Since then, the share price has fallen slightly at the same time as the cash flows have reduced significantly. This shows that there is not a direct correlation between the reported free cash flow and the share price. Even if the correlation were stronger, this would not indicate a causal relationship.

3.3.3 The increase in gearing is, to a significant degree, a choice by BT Group's management

BT Group implicitly assume that a decline in the share price will automatically increase gearing. However, to a significant degree the capital structure of BT Group over the medium term is a choice made by BT Group's management rather than a mechanistic outcome of the change in the share price. For example, BT Group could de-leverage by raising cash to pay down debt in a number of ways:

- by reducing dividend payments;
- by carving out certain assets, such as infrastructure, and selling shares to third parties (as a number of European operators have); or
- by having a rights issue.

Given these options it is reasonable to assume that BT Group's management considers that the current capital structure is optimal. Remarks by BT Group's CFO at its FY25 results presentation validate this assumption:

¹⁹ For example, 'BT Investor Relations Factsheet as at March 2025'.

²⁰ Source: Figure A1.6, Section A, p. 8, Annex 1: Submission to Ofcom on proposals for BT Group's cost of capital, BT (12th June 2025).

*'[W]e will **maintain our strong balance sheet**. We're committed to a BBB floor and a BBB+ through-the-cycle credit rating target. We think that this **delivers the optimal cost of capital** and assured access to competitive funding.'* [Emphasis added]²¹

BT Group also assume that the level of gearing would be expected to reduce in the future due to improved cash flow, leading to an increase in the share price. But, again, the future capital structure is a decision for BT Group's management rather than a mechanistic outcome. BT Group could use the increased cash flow to distribute cash to shareholders in the form of dividends or share purchases, rather than paying down debt.

3.3.4 BT Group misunderstand the relationship between the asset beta and the equity beta

BT Group implicitly assume that the equity beta is stable over time and that as leverage changes the asset beta will systematically adjust:

*'The increase in capex has compressed our free cash flow (FCF), raised our debt, and contributed to a decline in our share price. Under Ofcom's approach, this has increased our gearing ratio and decreased our asset beta.'*²²

However, this is a misunderstanding of the theory behind the CAPM and the relationship between the equity beta and the asset beta. Under the CAPM, the asset beta reflects the systematic risk associated with the underlying assets. The equity beta is then a function of the asset beta, gearing and debt beta. As gearing increases, volatility in the cash flows generated by the assets is magnified for shareholders, as the residual claimants, once payments to debt holders have been made.

The evidence from comparators is clear: investors consider telecommunications assets to have become less risky and this has led to a reduction in the asset beta. In the comparator set of European operators this has led to a reduction in the average equity beta, partially offset by an increase in gearing over time, i.e., it is not solely a function of a change in gearing.

For BT Group, this decrease in asset beta has been almost exactly offset by an increase in gearing, resulting in the equity beta remaining stable over time (and at a level around 1). This relative stability in the equity beta is a coincidence due to two offsetting effects in the past and does not indicate, as BT Group appear to believe, that the equity beta will remain stable in the future. For the equity beta to be stable independently of the level of gearing would require investors to price shares ignoring the impact of financial gearing on the volatility of returns to shareholders. Again, this would imply investors were consistently mis-pricing BT Group's shares – in this case in terms of short-term changes rather than the long term level.

²¹ Source: Section 'Optimise the business portfolio and capital allocation', p. 12, BT Group FY25 Results Presentation, BT Group.

²² Source: Section A1.16, p. 6, Annex 1: Submission to Ofcom on proposals for BT Group's cost of capital, BT (12th June 2025).

3.4 Implications for Ofcom

There has been a sustained industry wide reduction in asset betas from around 2017 as shown by the comparators. This reduction has been reflected in a reduction in BT Group's asset beta in the same period.

The evidence that this is an industry wide trend shows that BT Group's assumption that BT Group's falling asset beta is simply the result of changes in its financial structure due to the investments in FTTP roll out is incorrect. Adopting BT Group's approach would require Ofcom to ignore the wider empirical evidence and would undermine regulatory certainty by departing from a working assumption that the market prices of shares are efficient.

4 Critique of the CEPA report

4.1 CEPA uses historical data despite the evidence that telecommunication asset betas have fallen over time

CEPA has set the range over which it estimates asset betas to include the whole period from immediately after the Brexit referendum to date, e.g. from 23rd June 2016²³ onwards. No explanation is given as to why such a long time period is appropriate for estimating a forward-looking asset beta estimate for 2030/31. In particular this contrasts with the approach in the WFTMR where more weight was given to spot beta estimates, with greatest weight given to an estimate based on the most recent 5 years.

For other industries the null hypothesis may be that the asset beta is stable over time, i.e., is stationary. For these industries, estimating the asset beta using a long time series, e.g., a 10-year window, can increase the robustness of the estimate by reducing sampling variability. However, as set out in the previous chapter, a priori this would not be expected to be the case for the telecommunications industry. There is also strong empirical evidence that this has not been the case for either BT Group or the telecommunications industry as a whole.

There is also little reason to believe that the asset beta will be mean reverting, i.e., that it would be likely to tend towards a long-term average during the next charge control period as the reduction in asset beta appears likely to be the result of secular trends in the industry across Europe, rather than cyclical effects such as business cycles.²⁴

Considering the downward trend in asset betas across the industry, a conservative hypothesis is that the latest value is the best forecast of future asset betas²⁵ rather than an assumption that the current trend is to continue. Under this conservative assumption, CEPA's use of the distribution of estimated beta over a long time series to forecast the future asset beta will then bias forecasts upwards by taking account of periods where investors considered the systematic risk for the telecommunications industry to be significantly higher.

CEPA itself acknowledges that shifts in sector risk, which are not the result of a temporary shock, justify the use of more recent data:

'There may be times when more recent data is more suitable (for example, if there has been a material shift in sector risk); there may also be times when longer-term data is more

²³ Note that CEPA's first 2-year daily beta estimate dates from 24th June 2018 as this is the first 2-year daily beta estimate to exclude data from before the Brexit referendum from the estimation sample.

²⁴ BT hypothesised in its response to the 2020 WFTMR consultation that the then reduction in asset beta was due to business cycle effects but appears to have abandoned this hypothesis.

²⁵ i.e. the time series is a martingale.

*informative (for example, if there has been a recent shock event that is unlikely to reflect future conditions)*²⁶

While there have been multiple recent economic shocks, including the effects of the COVID-19 pandemic and the war in Ukraine, the downward trend in asset betas began before these events and continued after. The evidence from the European comparators suggests that including the period in 2020 when the COVID-19 pandemic began, increased the estimated asset beta for telecommunications operators – suggesting that using shorter time periods which exclude this period may be appropriate.

4.2 CEPA uses statistically flawed approaches to summarise BT Group asset beta estimates

CEPA produces estimates of asset betas based on 1-, 2- and 5-year windows and then summarises these estimates over time in two ways:

- 'Rolling' averages of these 'spot' asset betas over time (a so-called 'lookback period') which are presented for information;
- The interquartile range of the spot betas over time, used to produce the recommended range for Ofcom.

Neither of these approaches appear statistically robust. If the assumption is that the asset beta is stationary, then an OLS estimate over a long time period will reduce sampling errors. The two approaches used by CEPA give lower weight to some observations (in the case of rolling averages) or discard information (in the case of interquartile ranges) and will be less accurate than a spot estimate calculated over the same time period.

If, as in the case here, there is a clear trend in the data, both of the CEPA approaches will underweight the most recent observations:

- Under the rolling average approach, the very earliest and very latest observations have lower weight than those in the middle of the period, e.g., the very last observation is only included in one of the spot estimates that make up the average;
- With the downward trend, the latest spot estimates are likely to be in the lower quartile and will effectively be discarded when determining the interquartile range.

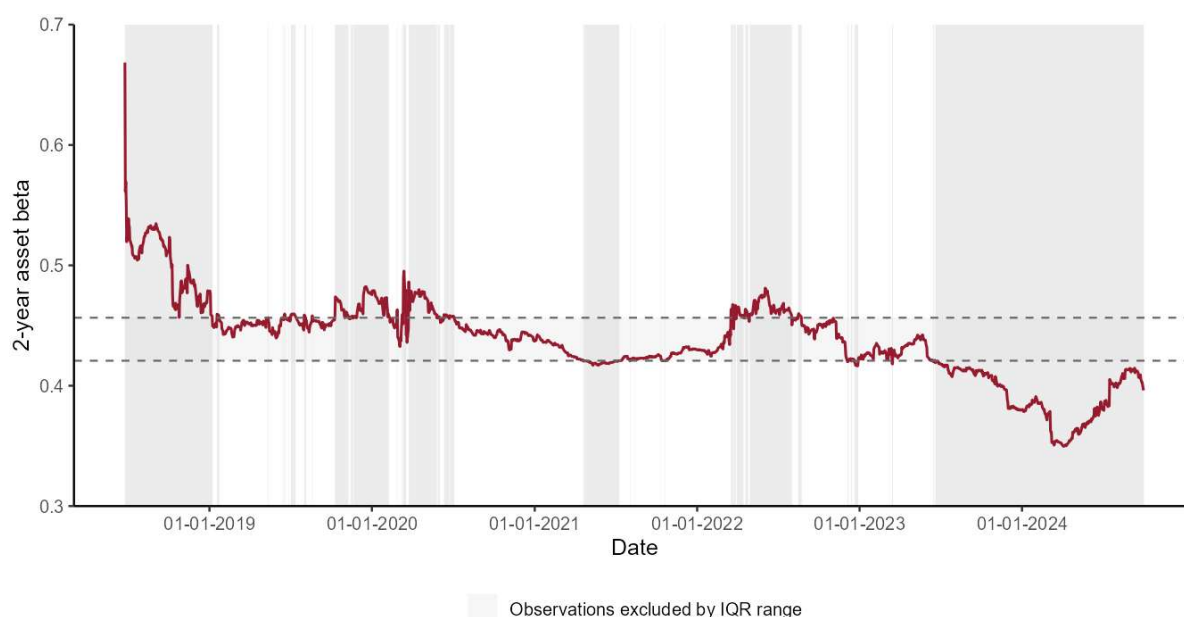
This systematic discarding/underweighting of the most recent data is clearly sub-optimal when estimating a forward-looking asset beta where, if anything, more weight should be given to more recent information.

Figure 4 below illustrates that CEPA's methodology disregards the most up-to-date estimates of the BT Group asset beta. The figure shows 2-year daily asset beta estimates between 24 June 2018 and 30 September 2024 (i.e., the lookback period preferred by CEPA). CEPA uses

²⁶ Source: Executive Summary, p.3, Cost of Capital: Beta and Gearing for TAR 2026, CEPA.

the interquartile range of these estimates to produce its 'mechanistic range' for the BT Group asset beta (0.42 to 0.48). Figure 4 uses a shaded background to highlight which estimates within the lookback period are outside of the interquartile range and thus disregarded by CEPA. **It is clear that CEPA's methodology leads to a systematic exclusion of the most up-to-date data and asset beta estimates.** This is evident from the shaded region beginning 15 June 2023 and ending 30 September 2024.

Figure 4 CEPA's preferred lookback period for BT Group and the impact of setting the mechanistic range equal to the interquartile range



Source: Frontier Economics analysis based on LSEG data.

Note: The dashed lines represent the IQR of asset beta estimates over CEPA's preferred lookback period for BT Group (24th June 2018 – 30th September 2025).

4.2.1 Regulatory precedent

We are not aware of any other economic regulator using the interquartile range of a time series of asset beta estimates to determine the asset beta.²⁷ While regulators have applied judgement on the approach around exceptional events such as the COVID-19 pandemic or the Brexit referendum, they have not applied approaches which mechanistically discard the tails of the distribution of spot estimates.

CEPA's report does not explain why mechanistically disregarding the spot estimate distribution tails is appropriate, even though this is not a feature of Brattle's approach at

²⁷ It is particularly relevant to consider the precedent set by WFTMR 2021, where the 5-year spot beta was used.

WFTMR 2021. CEPA's report merely refers to CEPA's unsupported view *'that the interquartile range of daily beta estimates is a balanced summary'*.²⁸

Economic regulators, including Ofgem in earlier charge controls and Ofwat in the latest price control (based on a report by CEPA) have used rolling averages. However, Ofgem now relies on the latest spot estimates. And in the re-determination of the water charge controls, the CMA used spot estimates noting that:

*'Averages of rolling betas offer a way to mitigate the tendency of spot betas to be disproportionately influenced by outliers but underweight the periods at the start and the end of the data sample. For this reason, we consider that using spot betas is generally more appropriate (in line with the approach adopted by all parties), however, we find rolling beta estimates useful to identify any trends.'*²⁹

Table 1 below outlines the recent regulatory precedent. It describes asset beta estimates and methodologies for five recent regulatory determinations (excluding Ofcom's TAR consultation proposals) across the water, energy, aviation and telecoms sectors. It shows that:

- In none of these recent determinations did the economic regulator define the asset beta range based on an interquartile range of an underlying distribution of asset beta estimates.
- While older determinations did make use of rolling averages for cross-check purposes, more recent determinations (i.e., from 2025) avoid the use of rolling averages.

²⁸ Source: Section E.3., p.56, Annex E. Cost of Capital: Beta and Gearing for TAR 2026, CEPA.

²⁹ Source: Para 7.307, Water PR24 References : Provisional Determinations Volume 4, CMA.

Table 1 Recent regulatory precedent from UK regulators

Regulator	CMA	Ofgem	CAA	CAA	Ofcom
Sector	Water & Wastewater	Electricity and gas transmission, and gas distribution	National Air Traffic Services	Heathrow airport	Telecommunications
Decision	PR24 Provisional (re)determination	R1103 T&GD Draft determination	NR23 Final determination	H7 Final determination	WFTMR Final
Decision date	October 2025	July 2025	October 2023	March 2023	March 2021
Period	2025 to 2030	2026 to 2031	2023 to 2027	2022 to 2026	2021 to 2026
Asset beta range (point estimate)	0.36 to 0.37 (0.36)	0.30 to 0.45 (0.375)	0.52 to 0.70 (0.61)	0.44 to 0.62 (0.53)	0.46 to 0.60 (0.60)
Construction of asset beta range	Simple average across two comparator companies of 3-year daily spot estimates (upper-end) or 5-year daily spot estimates (lower-end)	10-year daily spot beta estimates calculated for eight comparators. Range based on approximate range of estimates across comparators	6.2-year daily spot beta is the main reference. The CAA produce a 0.50-0.62 baseline range with a dataset based on 80% pre-Covid observations and 20% post-Covid. The CAA include a Covid uplift of 0.02-0.08 resulting in the reported range	2-and 5-year spot beta estimates using daily data with an explicit COVID uplift and Traffic Risk Sharing reduction. 2- and 5-year rolling averages used as a cross-check.	5-year spot beta prioritised, but shorter windows (1- and 2-year spot betas) are used as cross checks. Rolling averages over the same windows also estimated by Ofcom's consultants.
Notes	CMA 'consider[s] that using spot betas is generally more appropriate' as rolling betas 'underweight the periods at the start and the end of the data sample'	Ofgem did not use rolling betas as 'this approach can overweight certain parts of the data, providing an inappropriately skewed assessment of the beta over the period'	As a cross-check, the CAA also look at 1.2 years rolling average of 5-year daily betas and a 0.2 years rolling average of 1-year daily betas	Three-stage approach: The CAA start from a pre-pandemic asset beta of 0.50, add the pandemic impact evidenced from comparator airports (0.02-0.11) and any narrowing of comparator risk differential (up to 0.10), then subtract Traffic Risk Sharing mitigation (-0.09 to -0.08).	Estimated daily OLS spot betas over 1-, 2- and 5-year windows for BT and European telecoms comparators. Then two different betas are set for 'Other UK telecoms' and 'Openreach'.

Source: Frontier Economics analysis based on a review of the determination documentation.

4.3 CEPA use of comparator data is flawed

4.3.1 CEPA's selection of comparators is flawed

Use of comparator data brings two potential benefits:

- Beta estimates based on a single company have relatively high standard errors due to sampling variation. Looking at a wider sample can increase the precision of the beta estimate; and
- The beta for a single firm may be driven by sources of firm specific factors that are not related to the regulated services. This is more likely for a company such as BT Group, where the vast majority of its output is no longer regulated. Looking at a wider range of comparators can allow regulators to control for such firm specific factors.

CEPA's approach to the selection of European telecommunications operators is overly simplistic and does not necessarily capture relevant comparators:

- Although CEPA state that an investment grade rating is one of the criteria for selection, Freenet AG, 1&1 AG and United Internet AG are included even though they do not appear to have an investment grade credit rating.³⁰
- CEPA has included subsidiaries of other companies in the comparator set which are consolidated in the results of the parent company. This both means that the assets of these firms are overweight in the comparator set and also calls into question the liquidity of the shares (i.e., the free float of Telefonica Deutschland is less than 5% of the share capital):
 - Deutsche Telekom is a 53.5% shareholder of Hellenic Telecommunications Organization SA;³¹
 - Telefonica is a 96.8% shareholder of Telefonica Deutschland; and³²
 - United Internet AG is a 86.5% shareholder of 1&1 AG.³³
- CEPA has carried out no additional checks to ascertain that the long list of companies is comparable to the regulated wholesale network services provided by BT Group/Openreach. For example Freenet AG is a reseller of retail mobile services in Germany and specifically notes *'[u]nlike mobile network operators (MNOs), the company is able to do business without operating an expensive and capital-intensive mobile*

³⁰ The column in Table C.3 of the CEPA report is blank for these three companies.

³¹ Source: https://www.cosmote.gr/static/otegroup/en/page/omilos_ote [Accessed 24/10/2025].

³² Source: <https://www.telefonica.de/investor-relations-en/share/shareholder-structure.html> [Accessed 24/10/2025].

³³ Source: <https://www.1und1.ag/investor-relations-en> [Accessed 24/10/2025].

network.³⁴ The systematic risks associated with Freenet would appear to have little in common with the provision of regulated fixed wholesale network services.

It is notable that the companies likely to be excluded if CEPA had imposed stricter criteria to select the comparators tend to have significantly higher asset betas than other former incumbent operators, who have business and financial structures closer to BT Group.

4.3.2 CEPA uses the same extended time period to produce ranges as for BT

Although CEPA notes that the equity and asset betas of the European telecommunications companies have been falling over time in the same way as BT Group's, CEPA again uses a long time period when producing ranges for the European comparators. This will tend to bias the range upwards compared to the current level of asset beta, in the same way as it does for BT Group.

4.3.3 CEPA's approach to summarising the comparator data is statistically flawed

CEPA uses interquartile ranges to summarise the data on comparators. However, compared to the use of interquartile ranges in summarising the beta estimates for BT Group, the use of interquartile ranges on a comparator set raises an additional issue:

- as with BT Group there is significant variation in observations over time **within** each comparator due to the secular trend; and
- **in addition**, there is variation **between** the beta estimates for the comparators.

Using interquartile ranges to summarise the data will both tend to exclude data points at the beginning and the end of the period because of the secular trend, but also comparators with relatively high or relatively low asset betas. While in some cases, comparators with extreme betas may be outliers (for example due to the issues in CEPA's comparator selection outlined above), discarding information mechanistically will lead to less robust results.

4.3.4 CEPA's cross check of the BT Group asset beta is uninformative

CEPA's purported cross check of the range of asset betas determined for BT Group was based on whether this range overlapped with the range calculated for the European comparators. This is not an informative check:

- both ranges used the same underlying methodology and time period and as a result suffer from the same upward bias, when estimating the forward-looking asset beta;

³⁴ Source: <https://www.freenet.ag/en/company/index.html> [Accessed 24/10/2025].

- both interquartile ranges are relatively wide due to the secular trend in the time period considered, meaning the range over time will be large. In addition the range for the comparators will reflect differences in assets between firms in the sample; and
- the comparison ignores information on the direction by which asset betas differ for the comparators, with the range for the comparators largely below that for BT Group.

4.3.5 Other regulatory decisions use lower estimates than CEPA's estimate for Ofcom

BEREC

BEREC produce an annual report on WACC parameters to inform EU NRAs when setting the cost of capital. This includes results for asset betas for a set comparable network operators to BT Group. The asset betas are based on weekly observations over 5 years, with an assumed debt beta of 0.1.

For both 2024 and 2025, the resulting mean asset beta (both a simple average and weighted by market capitalisation) has been 0.36, below the range adopted by CEPA.

CEPA for the ACCC

Ofcom's consultants CEPA produced a report for the ACCC to be used to set the regulated return for the NBNCo in Australia based on a set of telecommunications operators across the globe.³⁵

Looking at the results for all comparators (CEPA also provides estimates for subsets of companies by type of operation), the 5 year asset beta ranges between 0.34 and 0.36, depending on whether monthly, weekly or daily samples were used, with CEPA recommending a point estimate for NBN of 0.35. In its report for ACCC, CEPA places most weight on spot asset beta estimates rather than '*recommending the use of a longer-term average beta*'³⁶ (i.e., rather than averaging asset beta estimates over a lookback period). Consistent with its focus on spot betas, CEPA's ACCC report does not apply the interquartile range filter described earlier in this chapter. In short, the methodologies in CEPA's reports for the Australian and UK regulator are markedly different.

4.4 Conclusion

Despite recognising that telecommunication asset betas have been falling over time, CEPA used a long time series to estimate asset betas and constructed a range using an approach

³⁵ Source: <https://www.accc.gov.au/system/files/cepa-draft-report-wacc-methodology.pdf>.

³⁶ Source: Section 4.1.3., p.59. WACC Methodology for ACCC, CEPA (2025).

which effectively discarded the most recent information. This range was then cross checked against a range based on a wider comparator set which suffered from the same biases.

Comparison of the range recommended by CEPA for Ofcom against comparable estimates produced for or by other regulators, including by CEPA for the ACCC, shows that the range is significantly higher than estimates used elsewhere.

5 Asset beta for regulated services

The empirical evidence on a business's asset beta is effectively a weighted average of the asset beta of the assets within the business. The products that Ofcom proposes to apply a cost-based charge control constitute a small proportion of BT Group's overall output. Even the wider set of regulated services, e.g., where BT Group has been determined to have SMP, constitutes a minority of BT Group's output.

This then raises the question as to the degree to which the weighted average asset beta for BT Group as a whole is likely to be representative of the systematic risk associated with the subset of regulated services. In previous decisions Ofcom has determined that certain services are likely to have lower systematic risk associated with them than BT Group as a whole and has applied the 'Openreach' cost of capital based on a reduced asset beta assumption. Ofcom has proposed to adopt this approach for the next five year period.

5.1 There appears to be little rationale to separate the returns for dark fibre products and the equivalent active products

Ofcom applies the 'Openreach' cost of capital to DFA and DFX services, but the higher 'UK Telecoms' cost of capital to leased line services including the IEC services for which the DFX service provides the underling connection.

There appears to be little reason to consider that the systematic risk of the services will be different. Between the services, there is a high degree of:

- demand side substitution, with Ofcom expecting demand to migrate from the active services to dark fibre services during the charge control; and
- commonality in terms of the underlying assets, with active and passive equivalents using the same fibre cables to provide connectivity.

Given this high degree of commonality, it is not clear what the benefits of setting differing levels of returns for these services may be.

5.2 All of the services regulated with cost-based charge controls are likely to have relatively low systematic risk

There is a high degree of commonality across the services which are charge controlled according to cost. The services are often used by competing network operators as part of their networks where buying a wholesale service from Openreach is more efficient than building own networks:

- PIA is used extensively to roll out fibre networks serving residential users, business users and providing connectivity within other networks (e.g., for mobile backhaul);

- IEC services, both DFX and active services, are used to carry traffic from BT exchanges back to the points of presence of other network operators; and
- DFA and LLA services are increasingly used for mobile backhaul as well as business connectivity.

This means that these services are likely to have a lower systematic risk than other services delivered by BT Group, in particular as demand is unlikely to vary to the same degree due to macro-economic fluctuations:

- These wholesale services tend to be bought under longer contract durations, for active services typically 5 and 7 years, compared to consumer services where the minimum contract length is 2 years or WLA services which typically have minimum contract length of 12 months. This means demand is less likely to vary due to short term macro-economic effects;
- Network operators using Openreach services for connectivity within their networks will have sunk assets which would be stranded if they ceased to continue to purchase the wholesale services. This will make demand less volatile by creating a barrier to exit. For example, if LLA services used to provide mobile backhaul were disconnected the investments made in the site and the ongoing liability to continue paying for site rental would be stranded. Similarly, PIA charges can only be avoided by removing cables and other equipment from the Openreach infrastructure. When purchased in competitive markets, passive infrastructure and dark fibre is often sold as indefeasible rights of use (IRUs), which recognises that passive assets will be required for the foreseeable future.

5.3 Conclusion

Ofcom's proposed division of services into those regulated according to a lower 'Openreach' cost of capital and those regulated based on the estimated cost of capital of BT Group as a whole (i.e., the 'Other UK Telecoms' cost of capital) does not appear to be well founded.

Given the characteristics of those services where Ofcom is proposing to set charge controls based on cost, It is reasonable to assume that the level of asset beta is lower for these services than for BT as a whole. This is consistent with the regulatory precedent since 2005, where Ofcom has determined a lower cost of capital for subsets of services.

6 Conclusions and recommendations

6.1 Ofcom should start with an estimate of BT Group's asset beta which is based on recent information

Ofcom should adopt an approach where it relies on the latest spot asset beta estimates to set the forward-looking asset beta.

The following table provides our asset beta estimates as of 30 September 2025.

Table 2 Spot estimates of BT Group asset beta (30 September 2025)

Window	Asset beta for BT Group
1-year	0.36
2-year	0.37
5-year	0.42

Source: Frontier Economics analysis based on LSEG data.

In WFTMR, Ofcom gave the greatest weight to 5-year asset beta spot estimates. While this has some benefits, both in terms of regulatory precedent, aligning with the market review cycle and smoothing out volatility, there are some factors which suggest that this may not be the most appropriate estimate in this market review:

- the secular downward trend is clearer now than it was in 2021, with the result that there is more reason to believe that longer term estimates are biased upwards; and
- a 5-year estimate still includes part of 2020, where estimates may have been adversely affected by the impact of the COVID-19 pandemic.

As such it is reasonable to give some weight to the estimates calculated over a shorter time period. We consider it would be appropriate to use a mid-point of the range (0.36 – 0.42) for a point estimate for BT Group of 0.39.

6.2 Asset beta for services regulated at cost

Ofcom has previously set the cost of capital for certain services to be lower than for BT Group overall. This reflects factors that meant the systematic risk associated with these services is lower than BT Group in aggregate. This adjustment has been based on comparison with the asset beta for UK utilities which exhibited lower systematic risk, and hence lower asset betas, than telecommunication companies.

The empirical data now suggests that the range of similar European telecommunications operators asset betas have asset betas which are comparable with UK utilities and in some cases are significantly lower. However, the central estimate of BT Group's asset beta presented above is higher than both UK utilities and its European peers. It is unclear why BT's asset beta is elevated compared to its European peers. If it is due to factors which are unrelated to the delivery of the relevant services, such as the FTTP roll out, then it would be appropriate to make a downward adjustment to BT Group's asset beta to strip out these factors.

While it is not possible to make a mechanistic adjustment, overall a value at the bottom end of the range suggested above, i.e., 0.36, would be consistent with recent regulatory determinations in UK utilities, e.g. 0.35 from Ofgem's 2022 determination on electricity distribution, 0.33 from Ofwat's 2024 final determination on water and 0.36 from CMA's 2025 provisional re-determination on water. It would also be significant above the mean spot 2-year asset beta from the BEREK comparator set of 0.20.

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