Response to Ofcom's WACC proposals for the WLA charge controls

Prepared for
Openreach

12 June 2017

Non-confidential

(With revisions in Tables 4.2 and 4.3)

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1 Introduction

In the Wholesale Local Access (WLA) market review,[1] Ofcom has laid out its initial proposals for the forward-looking pre-tax nominal weighted average cost of capital (WACC) for the years 2019/20 and 2020/21.

As part of its WACC proposals, Ofcom has chosen to deviate from its methodological approach in estimating the WACC from that adopted in previous charge control decisions. The revised methodology and updates to its parametric estimates imply significant reductions to the allowed WACC since Ofcom's last review in 2016 in the context of the Business Connectivity Market Review (BCMR).[2]

Table 1.1 Comparison of Ofcom's current WACC proposals

	BT Group	Openreach copper access	Other UK Telecoms	Rest of BT
BCMR (2016)	9.9%	8.8%	9.8%	12.4%
WLA (2017)	9.6%	8.0%	9.4%	11.8%
Change (bp)	-30	-80	-40	-60

Note: All WACC numbers are in pre-tax nominal terms; bp, basis points.

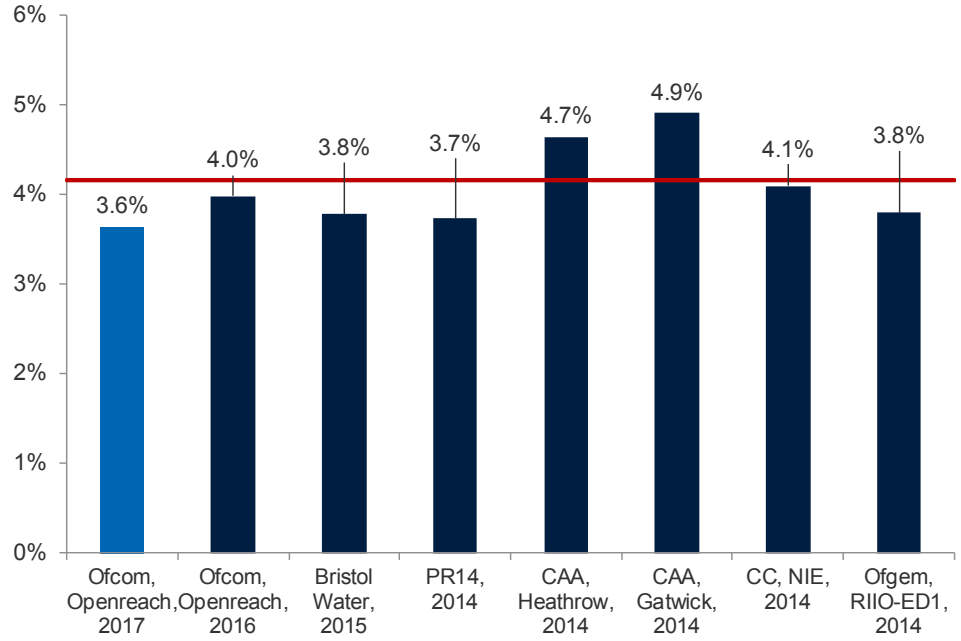
Source: Ofcom's regulatory determinations.

As demonstrated above, the impact of Ofcom's revised proposals since the BCMR concluded 12 months ago is particularly significant for the regulated copper access business.

In real vanilla terms (i.e. ignoring any implications of changes to tax and inflation assumptions), the WACC for Openreach has declined from 4.0% in the BCMR (2016) to 3.6% (as per the WLA market review proposals). As shown in Figure 1.1 below, the proposed allowed rate of return sets a new lower bound (in real vanilla terms) among the prevailing determinations of all the other economic regulators in the UK.[3]

[1] Ofcom (2017). 'Wholesale Local Access Market Review – Annexes', 31 March.
[2] Ofcom (2016). 'Business Connectivity Market Review – Annexes', 28 April.
[3] As the real vanilla WACC ignores inflation and tax considerations, it presents a suitable metric to compare the regulatory determinations of the WACC across sectors.

Figure 1.1 Real vanilla WACC allowances by UK regulators



Note: The red line in the figure above represents the average of real vanilla WACC allowances by UK regulators. Ofcom's BCMR (2016) decision and 2017 WLA proposals are not included in the average regulatory determination presented here. Where regulators do not publish real vanilla WACC determinations, Oxera has estimated these. The determinations above are set out in reverse chronological order.

Source: Oxera analysis based on regulatory documents.

In particular, whereas last year Ofcom estimated the Openreach WACC as higher than that for a water company, the initial proposal is for a lower WACC than that for a water company. Ofcom has previously recognised that telecoms businesses are more risky than other traditional utilities (e.g. water and energy sectors):

> levels of demand for pure utility services (i.e. water, electricity etc.) which are considered 'essentials' by consumers tend to be very robust, and relatively impervious to changes in GDP levels. We consider that demand for telecommunications network services is also fairly robust. However, **we do not think it is obvious that this demand is as certain as the products provided by the pure utility operators**.[4] [emphasis added]

Hence, the significantly lower allowance from Ofcom for the Openreach cost of capital relative to other utilities appears contradictory and out of line.

Importantly, there has been no major regulatory decision in the UK since Ofcom's decision for the BCMR in 2016. This implies that any changes in Ofcom's current proposals (in relation to its previous decision) are primarily driven by observed movements in capital market data over a relatively brief time period and/or a change in Ofcom's methodology.

In light of this, BT has asked Oxera to review Ofcom's approach to estimating the WACC parameters and resulting allowed rate of return. This report, prepared by a team of Oxera consultants with the support of Professor Ian Dobbs, contains Oxera's comments on Ofcom's proposals. Our analysis suggests the following:

[4] Ofcom (2011), 'WBA Charge Control', 20 July, para. 6.222.

- **Ofcom appears to have placed excessive weight on short-term movements in government and corporate bond yields since the EU membership referendum**, and appears to ignore the simultaneous increase in capital market volatility and evidence from regulatory precedents. This has an impact on the allowed WACC proposals for all of BT's business divisions.
- **Estimates of BT's gearing as proposed by Ofcom are overstated**, and there is no justification for the inclusion of BT's pension deficit in estimating BT's WACC. The impact of this is most pronounced for the 'Other UK Telecoms' part of BT's business.

Specifically, we propose that:

- **the parameter estimates for the market returns, cost of debt and forward-looking gearing be retained from the BCMR 2016 decision**. This would constitute a reasonable approach to estimating the allowed WACC for BT Group and its constituent business divisions;
- **any impact of pension deficits be excluded when estimating BT's gearing**, consistent with Ofcom's decision in 2010 (i.e. the last time Ofcom consulted and subsequently decided to exclude the impact of BT's pension deficit). Furthermore, **BT's historical gearing for estimating the group asset beta needs to be estimated based on net debt, not total debt**.

The adjustments described above would lead to a real vanilla WACC of 4% for Openreach, in line with the BCMR 2016 decision.

In the remainder of this report, we elaborate on the key findings of our review.

2 Market returns and cost of debt

This section focuses on two specific aspects of Ofcom's proposals for the BT WACC and discusses several corrections to the proposals to ensure that the resulting WACC estimate is appropriate for the WLA charge controls:

- total market returns (TMR) and the risk-free rate (RfR);
- the cost of debt.

The cumulative impact of revising these parameter estimates (all else being equal) is as follows:

- an increase of c.30bp to the WACC of BT Group;
- an increase of c.40bp[5] to the WACC of Openreach copper access;
- an increase of c.30bp[6] to the WACC of Other UK Telecoms;
- an increase of c.20bp to the WACC of 'Rest of BT'.

2.1 Total market returns and the risk-free rate

Ofcom's proposals for setting a 6.0% allowance for real TMR (the sum of the RfR and the Equity Risk Premium) set a new lower bound for allowed equity returns to investors in the context of UK regulatory determinations across all sectors. This is also lower than its BCMR (2016) determination for the allowed real TMR (6.1%).

Academic evidence suggests that the TMR is relatively stable over time. Based on empirical evidence, according to Wright and Smithers (2013):

> real stock returns have shown a remarkable degree of stability over more than two centuries. This is consistent … with the average *expected* return having been stable.[7]

While Ofcom appears to recognise the stability in the TMR, it then proposes a TMR allowance that is 10bp lower than the determination it made last year. It bases its proposal on the following statement:

> This reflects our consideration that the relationship between the TMR and ERP may not be one-for-one. In particular, as the real RFR reduces, this could imply a reduced TMR, even if there were an increased ERP.[8]

However, Ofcom does not provide any evidence to justify the existence of such a relationship between the TMR and the equity risk premium (ERP). Moreover, the assertion does not appear to be well founded. In fact, Wright and Smithers (2013) appear to contradict Ofcom's proposition that a reduction in the real RfR could imply a fall in the TMR:[9]

> both historical and more recent evidence point to the same conclusion: in contrast to the stock return there is no evidence of stability in the risk-free rate, at any maturity. As a direct implication, there is no evidence of stability of the market equity premium.

[5] Based on Ofcom's point estimate of 8.0% for the proposed WACC for copper access, the increase would be c.50bp. Oxera's analysis of Ofcom's WACC parameters indicates a WACC of 8.1%.
[6] Based on Ofcom's point estimate of 9.4% for the proposed WACC for copper access, the increase would be c.40bp. Oxera's analysis of Ofcom's WACC parameters indicates a WACC of 9.5%.
[7] Wright, S. and Smithers, A. (2013), 'The Cost of Equity Capital for Regulated Companies: A Review for Ofgem', p. 14.
[8] Ofcom (2017). 'Wholesale Local Access Market Review – Annexes', 31 March, para. A16.75.
[9] Wright and Smithers (2013) refers to ERP as 'market equity premium' and TMR as 'expected market returns'.

> Without such evidence, there is no empirical basis for the assumption that falls in risk-free rates should translate to falls in expected market returns.[10]

Therefore, a reduction in the real RfR would not necessarily translate into a fall in the TMR, as a reduction in the RfR could be offset by an increase in the ERP.

This suggests that, at the very least, Ofcom ought to maintain the allowed TMR at the same level as in the BCMR (2016) decision.

Below, we examine Ofcom's proposal to reduce the RfR allowance.

2.1.1 An RfR allowance of 0.5% is an excessively large reduction and is out of line with most UK regulatory precedents

Examining Ofcom's approach, the lower proposal for the TMR is driven by a decrease in the allowance for the RfR.

As part of the BCMR (2016) review, Ofcom determined an RfR allowance of 1.0% based on analysis considering data up to November 2015. Between November 2015 and the EU referendum in June 2016, yields for UK government bonds were broadly stable. However, immediately after the referendum result, spot yields for UK government bonds declined sharply. Ofcom has recognised this pattern in government bond yields:

> Since we reduced our estimate of the RFR to 1% in 2015, spot rates were initially stable for a period before falling following the EU referendum.[11]

However, Ofcom then proceeds to incorporate this observed short-term fall in yields in revising its RfR estimate to 0.5%:

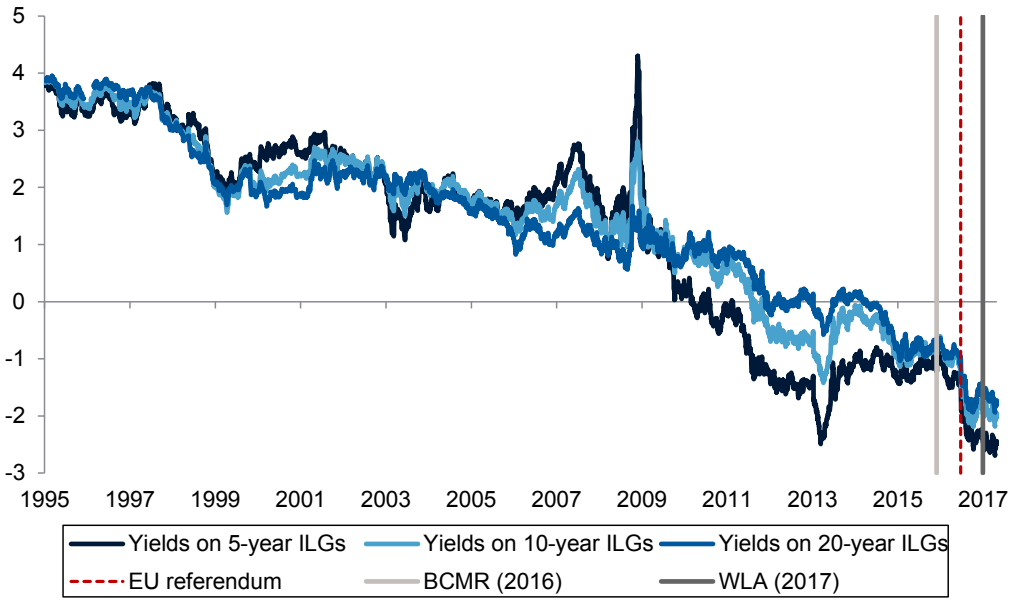
> Given the continued reduction in yields on index-linked gilts, but taking account of the fact that yields are typically positive over most averaging periods for the last century or more, we propose a reduction in our estimate of the real RFR from 1.0% to 0.5%.[12]

Based on Ofcom's reasoning set out above, its proposals appear to be driven almost entirely by the observed movement in yields over a six-month timeframe following the EU referendum result.[13]

The decline in government yields since the referendum result has led to the lowest level of real yields observed over the last two decades, as illustrated in Figure 2.1 below.

[10] Wright, S. and Smithers, A. (2013), 'The Cost of Equity Capital for Regulated Companies: A Review for Ofgem', p. 15.
[11] Ofcom (2017). 'Wholesale Local Access Market Review – Annexes', 31 March, para. A16.24.
[12] Ofcom (2017). 'Wholesale Local Access Market Review – Annexes', 31 March, para. A16.25.
[13] Ofcom's cut-off date for its analysis underlying its proposals was the end of 2016.

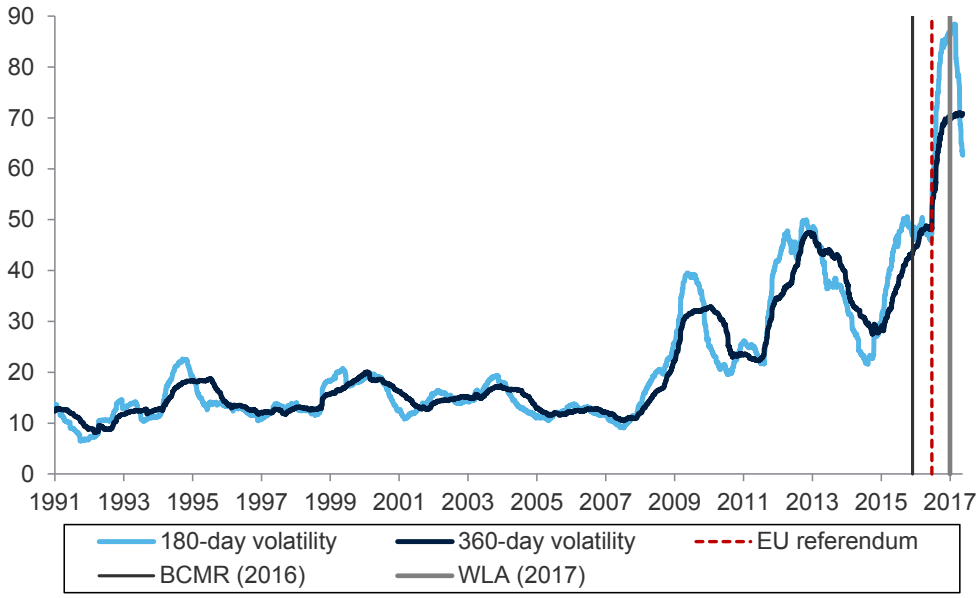
Figure 2.1 Evolution in index-linked gilt (ILG) yields



Source: Oxera, based on data from the Bank of England.

Ofcom has not considered the evidence on the volatility of government yields. As illustrated in Figure 2.2, in the period after the referendum result, the volatility of government bond yields increased sharply and it is now at historically high levels.

Figure 2.2 Evolution in the volatility of UK government bond yields



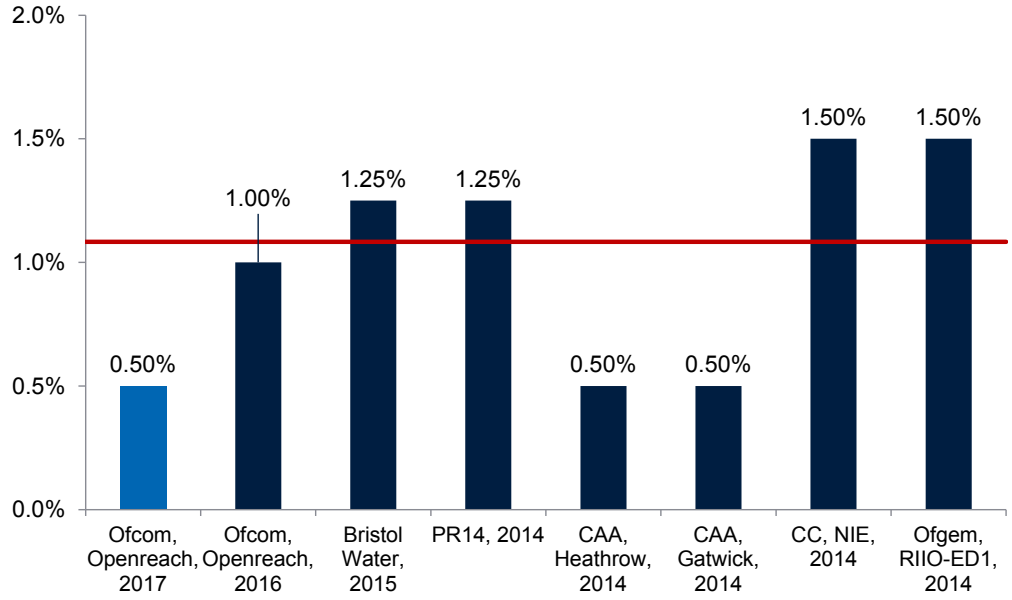
Note: Volatility refers to annualised volatility of log changes in yields.

Source: Oxera analysis, based on data from Bloomberg.

Given the sharp increase in observed volatility of gilt yields, any short-term movements in yields need to be treated with caution. It would not be advisable to make large adjustments to key parameters on the basis of this data, especially when setting a forward-looking price control.

As shown in Figure 2.3, Ofcom's proposals also significantly diverge from the majority of recent UK regulatory determinations.

Figure 2.3 Real risk-free rate allowances by UK regulators



Note: The red line in the figure above represents the average of real risk-free rate allowances by UK regulators. Ofcom's BCMR (2016) decision and 2017 WLA proposals are not included in the average regulatory determination presented here. The determinations above are set out in reverse chronological order.

Source: Oxera analysis based on regulatory documents.

In the aviation sector, although the Civil Aviation Authority (CAA) set an RfR of 0.5% in 2014 as part of the Q6 price controls for the airports sector, this was coupled with a higher ERP of 5.75%.[14] Furthermore, the CAA's subsequent determination for NATS in 2015 set a higher allowance of 0.75%.[15]

2.1.2 Oxera response on the RfR and TMR

All of the evidence examined in section 2.1.1 suggests that Ofcom's proposal for revising the RfR estimate from 1.0% in the BCMR to 0.5% for the WLA charge controls, i.e. within the space of 12 months, appears excessive. In particular, placing weight on market data over a short time period characterised by high uncertainty is inappropriate.

In addition to reducing the RfR allowance, Ofcom's proposal to lower the TMR by 10bp does not appear to be well justified. As discussed above, a reduction in the real RfR would not necessarily translate into a fall in the TMR, as a reduction in the RfR could be offset by an increase in the ERP.

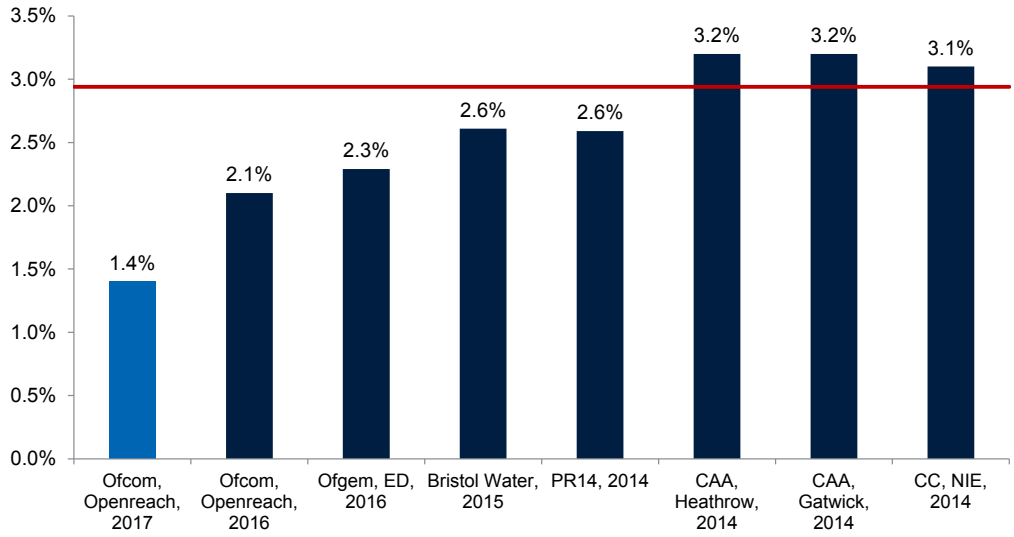
An estimate for the RfR that is more consistent with regulatory precedents and not unduly influenced by short-term market movements would be the BCMR (2016) decision—i.e. 1.0%. Furthermore, recognising the relative stability of the TMR over time would imply that the overall allowance for the real TMR also remains unchanged from last year's decision—i.e. 6.1%.

[14] Civil Aviation Authority (2014), 'Estimating the cost of capital: a technical appendix for the economic regulation of Heathrow and Gatwick from April 2014: Notices of the proposed licenses', p. 52.
[15] UK Civil Aviation Authority and Irish Aviation Authority Safety Regulation Division (2014), 'UK-Ireland RP2 Performance Plan – Supporting Document', p. 92.

2.2 Cost of debt

Ofcom's proposed cost of debt allowance for BT Openreach is more than 90bp below any other prevailing UK regulatory allowance for the cost of debt, and around 70bp below Ofcom's BCMR (2016) decision.[16] As with the TMR, Ofcom's proposal sets a new lower bound across all of the UK regulated sectors. Figure 2.4 compares Ofcom's proposals with allowances in other regulated sectors.

Figure 2.4 Real pre-tax cost of debt allowances by UK regulators



Note: The red line in the figure above represents the average of real pre-tax cost of debt allowances by UK regulators. Ofcom's BCMR (2016) decision and 2017 WLA proposals are not included in the average regulatory determination presented here. Where regulators do not publish real cost of debt determinations, these have been estimated by Oxera. The Ofgem ED bar refers to the latest published values of Ofgem's cost of debt indexation for electricity distribution.

Source: Oxera, based on regulatory documents.

Intuitively, Ofcom's proposal to allow BT a lower cost of debt allowance than other UK regulated entities does not appear to be reasonable.

BT's current credit rating is BBB+. While Ofcom does not target a particular credit rating as part of the regulatory framework, all other UK regulators set cost of debt allowances based on target credit ratings of BBB+ or higher.

Hence, the significantly lower allowance from Ofcom for the Openreach cost of debt relative to other utilities—particularly the water sector in the UK—appears contradictory and out of line.

2.2.3 The reduction in BT's cost of debt allowance is excessively large and not consistent with regulatory best practice

Ofcom states that its approach to estimating BT's cost of debt is to add an estimate of the debt premium to the RfR.

Examining Ofcom's approach to estimating the cost of debt, the lower proposal for the cost of debt is driven primarily by a decrease in the allowance for the RfR (see above for a discussion of the revision to the RfR).

[16] In real terms, ignoring any impact of inflation.

The remainder of this section focuses on examining whether there is merit in revising the debt premium as well.

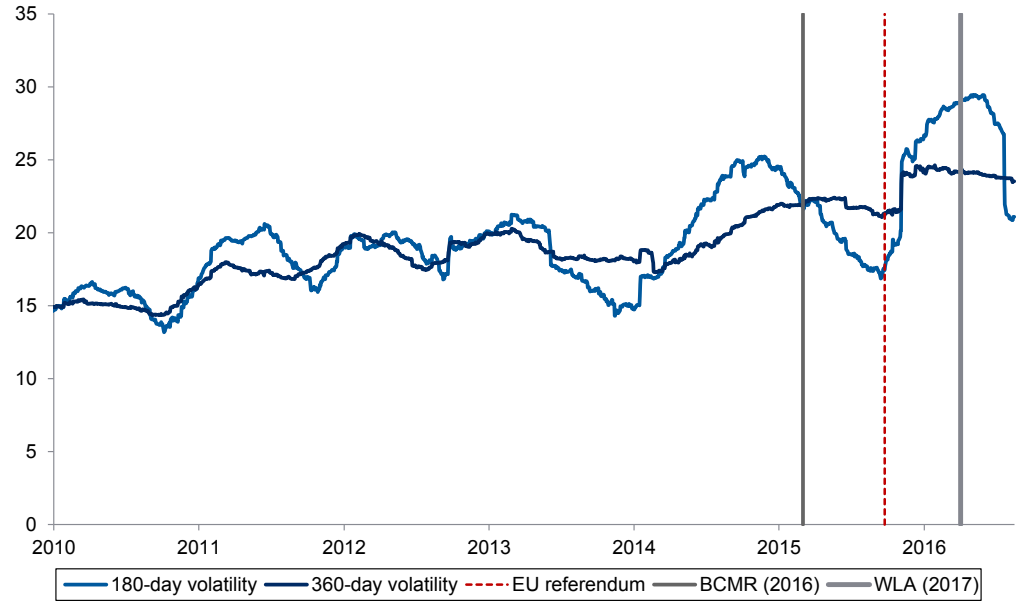
Ofcom estimates a debt premium of 1.0% for BT Group primarily by considering the observed interquartile spread (0.9–1.2%) of BT's sterling-denominated bond yields over a period of one and two years.[17] This drives a 20bp reduction in the debt premium since the BCMR (2016).

The drawback with this methodology is that any volatility in government bond yields or BT's corporate debt yields would result in spreads becoming volatile, which creates instability in the value determined for the debt premium. As discussed in section 2.1, government bond yields have seen unprecedentedly high levels of volatility.

As there is no specific index for BT's bonds, it is not possible to infer the overall volatility of BT's sterling bond yields. However, the volatility of the UK BBB corporate bond index should provide some insights into the market's perception of BT's bond yields.

Figure 2.5 below illustrates the historical volatility of yields on the sterling-denominated BBB corporate bond index with ratings similar to those of BT's debt. Volatility for BBB rated sterling-denominated corporate bonds increased considerably in the period after the EU referendum, as captured in Ofcom's analysis.

Figure 2.5 Historical volatility of the Bloomberg BBB bond index



Note: Volatility refers to annualised volatility of log returns. The chart presents the yields on the Bloomberg index of GBP-denominated bonds rated BBB.

Source: Oxera analysis, based on data from Bloomberg.

Given the heightened uncertainty in corporate bond yields over the period following the EU referendum result, it would not be advisable to place undue weight on recent and volatile data when estimating parameters for a charge control applicable in 2019/20 and 2020/21.

[17] Specifically, Ofcom considers the spread of BT's corporate bond yields over UK government bond yields of the same maturity.

Additionally, Ofcom's proposal appears to allow 10bp for issuance costs. In the past, other UK regulators have tended to provide higher allowances with respect to the costs of issuing new debt. For instance:

- the Competition Commission (now the CMA) included an additional allowance of 30bp on new debt to cover issue fees of 10bp and fees of 20bp for holding cash ahead of use (i.e. the cost of drawing down funds and holding them before they are needed);[18]
- the CAA allowance for fees was 15bp for Heathrow Airport Limited and 20bp for Gatwick Airport Limited.[19]

2.2.4 Oxera response on the cost of debt

Examining all of the evidence discussed above suggests that Ofcom's proposal for revising the parameter estimates of the cost of debt results in an overall cost of debt allowance that appears low compared with the allowances prevailing in other regulated sectors.

Ofcom's estimates for the debt premium are based on short-term market data. This data may be unreliable given the prevailing uncertainty in corporate bond markets.

In present circumstances, a more cautious approach to viewing recent market data and an overall real cost of debt allowance in line with the BCMR (2016) decision is more appropriate.

2.3 Conclusions

Overall, Ofcom's approach to updating the estimates for market returns and BT's cost of debt appears to incorporate highly volatile short-term market data, and significantly widens the gap between it and regulatory determinations in other sectors. Leaving these parameters unchanged from the BCMR (2016) decision is more appropriate.

[18] Competition Commission (2014), 'Northern Ireland Electricity price determination'.
[19] Civil Aviation Authority (2014), 'Estimating the cost of capital: a technical appendix for the economic regulation of Heathrow and Gatwick from April 2014: Notices of the proposed licences'.

3 Gearing and asset beta

Ofcom's approach to estimating BT's gearing appears to overstate the level of financial leverage. In particular, Ofcom:

- considers a portion of BT's pension deficit within its estimate of BT's gearing;
- estimates BT's debt on the basis of total debt, not net debt.

This section examines these two issues and their impact on BT's asset beta estimates.

The impact of our suggested revisions to Ofcom's gearing estimates is primarily relevant for the WACC of BT Group and the Other UK Telecoms business, and is estimated to increase their WACC by c.60bp and c.100bp,[20] respectively (all else equal).

3.1 Pension deficit and gearing

Ofcom conducted an extensive review in 2009/10 on the impact of BT's pension deficit on the WACC. Several stakeholders and academic experts submitted their views on the subject. After considering all of the evidence and arguments put forward, Ofcom noted:

> There is, in principle, a potential connection between the existence of a defined benefits pension scheme (such as that operated by BT) and the estimated cost of capital. However, Ofcom considers that there is insufficient justification and evidence to support the need to make an adjustment at this point.[21]

At the outset, Ofcom's current proposal to incorporate BT's pension deficit within the overall WACC framework creates regulatory inconsistency. Ofcom appears to recognise the need for regulatory consistency in its methodology pertaining to WACC,[22] but then breaches this principle.

However, a change in regulatory approach might be desirable if: the previous approach was incorrect, there has been a material change in circumstances, or new academic evidence offers a superior approach to estimating the WACC.

First, as no other UK regulator includes the impact of pension deficits in its assessment of WACC for regulatory purposes, precedent does not indicate that Ofcom's previous approach was incorrect. Second, since 2010, BT's pension deficit has remained broadly unchanged (in real terms).[23] In fact, as a proportion of the pension liabilities, the pension deficit has decreased from c.18% in 2010 to c.14.5% in 2017.[24] Hence, there does not appear to be any material change in the circumstances of BT's pension deficit that would merit a reconsideration of Ofcom's approach to the treatment of BT's pension deficit. Lastly, Ofcom has not cited any new academic evidence or justification to support this change in

[20] Based on Ofcom's point estimate of 9.4% for the proposed WACC for copper access, the increase would be c.110bp. Oxera's analysis of Ofcom's WACC parameters indicates a WACC of 9.5%.
[21] Ofcom (2010), 'Ofcom statement on pensions', 15 December, https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2010/ofcom-statement-on-bt-pensions, accessed 2 June 2017.
[22] Ofcom (2017). 'Wholesale Local Access Market Review – Annexes', 31 March, para. A16.27.
[23] Ofcom's estimate of BT's pension deficit in 2009 was £9.4 billion, Ofcom's current estimate of BT's pension deficit is £11.1 billion. If one adjusts for inflation over this period (CPI = 88 in December 2009, CPI = 102.5 in March 2017), then £11.1 billion today is equivalent to £9.5 billion in 2009 i.e. the claimed deficit is virtually identical to the deficit when Ofcom decided to make no adjustments to the WACC due to BT's pension deficit. See Ofcom (2009), 'Pensions Review', 1 December, p.18; ONS data and Ofcom (2017). 'Wholesale Local Access Market Review – Annexes', 31 March, para. A16.85.
[24] Based on data from BT's 2010 and 2017 annual reports.

approach. To the best of Oxera's knowledge, no new academic literature has been published on this matter that would merit a revised approach.

Ofcom's approach to incorporating pensions within its framework to estimating a regulatory WACC appears to be theoretically and empirically incorrect.

First, the impact of Ofcom's proposal to include pension deficit in estimating BT's gearing increases the gearing assumption, which lowers BT's allowed rate of return. Table 3.1 numerically explains the impact of Ofcom's approach to incorporating BT's pension deficit on BT's allowed cost of capital.

Table 3.1 Impact of the proposed inclusion of BT's pension deficit in estimating BT's WACC

Parameter	Implied Ofcom WLA (2017), excluding pension deficit		Ofcom WLA (2017), including pension deficit	Comments
RPI inflation	3.2%		3.2%	
Tax rate	17%		17%	
Risk-free rate (real)	0.5%		0.5%	
Risk-free rate (nominal)	3.7%		3.7%	
Nominal ERP	5.7%		5.7%	
Observed equity beta	1.02		1.02	
Debt beta	0.10		0.10	
Historical gearing	**22%[1]**	→	**27%**	including the impact of pension deficit
Asset beta	0.81[1]		0.76	
Forward-looking gearing	**30%[2]**	→	**35%**	including the impact of pension deficit
Re-levered equity beta	1.12		1.12	
Cost of equity, post-tax	10.1%		10.1%	
Cost of equity, pre-tax	12.2%		12.2%	
Debt premium	1.0%		1.0%	
Cost of debt, pre-tax	4.7%		4.7%	
WACC, vanilla (nominal)	**8.5%**	→	**8.2%[3]**	**WACC = 30 bp lower**
WACC, pre-tax (nominal)	**9.9%**	→	**9.6%[4]**	**WACC = 30 bp lower**

Note: [1] See Ofcom (2017). 'Wholesale Local Access Market Review – Annexes', 31 March, para. A16.88. [2] See Ofcom (2017). 'Wholesale Local Access Market Review – Annexes', 31 March, para. A16.92. [3] Based on the weighted average of pre-tax cost of debt and post-tax cost of equity. [4] Based on the weighted average of pre-tax cost of debt and pre-tax cost of equity.

Source: Oxera analysis based on Ofcom (2017). 'Wholesale Local Access Market Review – Annexes', 31 March.

As indicated above, Ofcom's approach to including BT's pension deficit in estimating BT's gearing results in a 30bp decrease in the vanilla nominal WACC (all else equal).[25] This is inconsistent with the Modigliani–Miller proposition,

[25] The vanilla WACC ignores any impact of taxes and is consistent with the assumptions underlying the Modigliani–Miller proposition.

which implies that a firm's capital structure should not affect its cost of capital.[26] The proposition simply states that when a firm uses more of the 'cheap' debt financing at higher gearing levels, both cost of equity and cost of debt rise such that the overall WACC is unchanged. This is because, as gearing increases, the cost of debt increases due to the greater default risk. At the same time, the cost of equity also increases as the returns to shareholders become more volatile. In this context, Ofcom has not explained the decline in the allowed WACC for BT in circumstances where gearing is increased.

Second, with respect to the empirical inconsistency, Oxera has collaborated with Professor Ian Dobbs and reviewed Ofcom's methodology in light of available academic evidence.[27] Based on the analysis presented in Dobbs (2010),[28] a key point that emerges is that, although Ofcom proposes to include BT's 'extended balance sheet' (i.e. BT's pension deficit) in assessing the cost of capital based on the capital asset pricing model (CAPM), in doing so, it implicitly assumes that the risk of the pension assets and liabilities is matched and equal to the Group debt beta. Ofcom have not attempted any estimation of the betas for BT's pension assets and liabilities and evidence suggests that their assumption is unlikely to hold—i.e., the beta of the pension assets and liabilities is likely to be significantly greater than the Group debt beta. For instance, Gallagher et al. (2011) estimated the asset beta of BT's pension liabilities to be in the range of 0.28–0.38,[29] which is significantly above Ofcom's debt beta assumption of 0.1.

In the absence of any compelling evidence or argument supporting Ofcom's methodological deviation, it would be inappropriate for Ofcom to adjust BT's WACC as result of its pension scheme. This would also be consistent with Ofcom's previous approach in this matter and with the approach adopted by other UK regulators.

3.2 Net debt and gearing

Ofcom's approach to estimating BT's gearing based on the sum of long- and short-term debt is inconsistent with regulatory precedent and industry best practice.

UK regulators appear to favour estimating a firm's gearing based on net debt, which nets out cash and cash equivalents from a firm's short- and long-term financial liabilities. For instance, in its 2014 decision for Northern Ireland Electricity, the CMA (then the Competition Commission) adopted a net debt approach.[30] This is consistent with the definition of gearing, as set out in the Office of Fair Trading's guidance on profitability analysis.[31]

[26] Modigliani, F. and Miller, M. (1958), 'The Cost of Capital, Corporation Finance and the Theory of Investment', *The American Economic Review*, **48**:3, pp. 261–97. The Modigliani–Miller proposition assumes no taxes, no costs associated with bankruptcy, no 'agency costs' and that investors are fully informed about companies' activities.
[27] Professor Ian Dobbs was one of the experts who presented evidence in 2010 when Ofcom last consulted on the pension deficit.
[28] See Dobbs. I (2010), 'Defined Benefit Pension Plans, the Cost of Capital and the Regulatory Allowed Rate of Return', 22 February.
[29] Gallagher, R., McKillop, D.G. and Pogue, M. (2011), 'The Influence of Pension Plan Risk on Equity Risk: A Study of FTSE100 Companies – 2002 to 2008', Review of the Regulatory Allowed Rate of Return of BT plc, Ofcom.
[30] Competition Commission (2014), 'Northern Ireland Electricity Limited price determination – Final Determination', 26 March, para. 13.178.
[31] Office of Fair Trading (2003), 'Assessing profitability in competition policy analysis; Economic Discussion Paper 6', A report prepared for the Office of Fair Trading by OXERA, July, http://www.oxera.com/Oxera/media/Oxera/downloads/reports/OFT-Assessing-profitability.pdf?ext=.pdf, accessed 2 June 2017.

In the England and Wales water sector, Ofwat also uses net debt to calculate gearing, and excludes pension deficit liabilities in its calculations.

> Regulatory gearing is the ratio of net debt for the appointed business to its regulatory capital value (RCV). Net debt excludes any pension deficit liability and mark-to-market accounting adjustments.[32]

The CAA also considers that net debt is generally appropriate for calculating the beta.

> One technical point worth further consideration … is whether gross debt or net debt should be used in the calculation of the beta. In theory a company needs access to either cash balances or an overdraft facility on demand. This means that net debt is probably the better measure. However, if a company is holding more cash than it needs to operate then this surplus cash should be ignored.[33]

Based on discussions with BT, Oxera understands that the cash on BT's balance sheet relates to its financing activities. [✂].[34] Therefore, the cash on BT's balance sheet should be netted off in the gearing calculation.

Given the size of BT's operations, the average cash balances over the last two years have been c.£2.5bn. Excluding this from BT's total debt estimates suggests that BT's two-year average historical gearing estimate is 17%.

3.3 Impact on the asset beta of BT Group and its constituent business divisions

Ofcom estimates BT's asset beta based on a two-year equity beta and an average gearing, and finds the two-year equity beta to be 1.02. Its estimates for BT's gearing (based on total debt), including and excluding pension deficit, are 32% and 22%, respectively. This results in an asset beta range of 0.72–0.81. Ofcom proposes to adopt the midpoint of the range (i.e. 0.76) as its estimate for the BT Group asset beta.

Taking Ofcom's estimate of BT's equity beta and applying Oxera's estimate of BT's historical gearing—i.e. 17% (using net debt)—results in an asset beta estimate of 0.86 for BT Group. This is significantly higher.

Translating this increase in BT's asset beta estimate to its constituent business divisions is not straightforward. Ofcom proposes to retain the asset beta estimates for Openreach Copper and Rest of BT from the BCMR (2016) decision. Therefore, the only business division likely to be affected by our revision in the Group asset beta is Other UK Telecoms. Assuming that Ofcom's weights for the various business divisions hold, this would imply an asset beta estimate of up to 0.90 for Other UK Telecoms, which is higher than Ofcom's estimate of 0.75.

3.4 Forward-looking gearing estimate

In the BCMR (2016) statement, Ofcom adopted a forward-looking gearing estimate of 30%.[35] In the current proposals, its estimate for the forward-looking

[32] Ofwat (2016), 'Monitoring financial resilience', November, p. 9.
[33] Civil Aviation Authority (2013), 'Estimating the cost of capital: a technical appendix to the CAA's Final Proposal for economic regulation of Heathrow and Gatwick after April 2014', para. 7.64. PwC (2014), 'Estimating the cost of capital for NERL: A report prepared for the Civil Aviation Authority (CAA)', February, p. 16.
[34] Redacted from public version.
[35] Ofcom (2016), 'Business Connectivity Market Review – Annex 30', March.

gearing is 35%. The additional 5% increase in gearing primarily appears to be driven by according some weight to the pension deficit based on the following:

> we propose to reflect some effect from a pension deficit in our gearing assumption, but recognise that the presence and size of this effect is uncertain.[36]

Given the discussion above about excluding the pension deficit when estimating the WACC, a forward-looking gearing estimate that is in line with the BCMR (2016) decision would be more appropriate—i.e. 30% for BT Group and all of its constituent business divisions.

[36] Ofcom (2017), 'Wholesale Local Access Market Review – Annexes', 31 March, para. A16.92.

4 Conclusions and revised WACC estimates

The analysis and responses presented in this report highlight the importance of Ofcom reconsidering the estimates for the following WACC parameters:

- the TMR (and the RfR estimate embedded in the TMR);
- the cost of debt;
- the historical gearing calculations underpinning the asset beta calculations.

While the impact of revisions to the TMR, RfR and cost of debt is relevant for the WACCs of all the BT Group constituent business divisions, the methodology used to estimate BT's gearing and the resulting impact on the asset beta are more relevant to Other UK Telecoms.

Below, we set out the revised WACCs based on the analysis presented in this report. These estimates do not reflect any higher allowance for issuance costs, which, as noted in section 2.2.3, other economic regulators have recognised.

Table 4.1 Revised WACC estimates (%)

	Ofcom (WLA 2017)	Revised
BT Group	9.6	10.5
Openreach copper access	8.0	8.5
Other UK Telecoms	9.4	10.8
Rest of BT	11.8	12.0

Note: All estimates are in pre-tax nominal terms.

Source: Oxera analysis based on Ofcom (2017), 'Wholesale Local Access Market Review – Annexes', 31 March.

Tables 4.2 to 4.5 below set out the calculations explaining the overall impact of these revisions to the WACC of the BT Group and its constituent business divisions.

Table 4.2 BT Group WACC—impact of the parameter revisions

Parameter	Ofcom WLA (2017)	Revised RfR and TMR	Revised Cost of debt	Revised Gearing
RPI inflation	3.2%	3.2%	3.2%	3.2%
Tax rate	17%	17%	17%	17%
Risk-free rate (real)	0.5%	**1.0%**[1]	**1.0%**	**1.0%**
Risk-free rate (nominal)	3.7%	4.2%	4.2%	4.2%
Nominal ERP	5.7%	5.3%[2]	5.3%	5.3%
Observed equity beta	1.02	1.02	1.02	1.02
Debt beta	0.10	0.10	0.10	0.10
Historical gearing	27%	27%	27%	**17%**[4]
Asset beta	0.76	0.76	0.76	0.86
Forward-looking gearing	35%	35%	35%	**30%**[5]
Re-levered equity beta	1.12	1.12	1.12	1.18
Cost of equity, post-tax	10.1%	10.2%	10.2%	10.5%
Cost of equity, pre-tax	12.2%	12.3%	12.3%	12.6%
Debt premium	1.0%	1.0%	**1.2%**[3]	**1.2%**
Cost of debt, pre-tax	4.7%	5.2%	5.4%	5.4%
WACC, pre-tax (nominal)	**9.6%**	**9.8%**	**9.9%**	**10.5%**

Note: All numbers except for asset beta estimates are rounded to one decimal place. [1] Based on the BCMR (2016) determination. [2] Holding the real TMR constant at 6.1% as per BCMR (2016). [3] Based on the BCMR (2016) determination. [4] Excluding the impact of pension deficit and using net debt to estimate gearing. [5] Excluding the impact of pension deficit.

Source: Oxera analysis based on Ofcom (2017), 'Wholesale Local Access Market Review – Annexes', 31 March.

Table 4.3 BT Openreach copper access—impact of the parameter revisions

Parameter	Ofcom WLA (2017)	Revised RfR and TMR	Revised Cost of debt	Revised Gearing
RPI inflation	3.2%	3.2%	3.2%	3.2%
Tax rate	17%	17%	17%	17%
Risk-free rate (real)	0.5%	→ **1.0%[1]**	**1.0%**	**1.0%**
Risk-free rate (nominal)	3.7%	4.2%	4.2%	4.2%
Nominal ERP	5.7%	5.3%[2]	5.3%	5.3%
Debt beta	0.10	0.10	0.10	0.10
Asset beta	0.55	0.55	0.55	0.55
Forward-looking gearing	35%	35%	35%	→ **30%[4]**
Re-levered equity beta	0.79	0.79	0.79	0.74
Cost of equity, post-tax	8.2%	8.4%	8.4%	8.2%
Cost of equity, pre-tax	9.9%	10.2%	10.2%	9.8%
Debt premium	0.9%	0.9%	→ **1.1%[3]**	**1.1%**
Cost of debt, pre-tax	4.6%	5.1%	5.3%	5.3%
WACC, pre-tax (nominal)	**8.1%***	**8.4%**	**8.5%**	**8.5%**

Note: All numbers except for asset beta estimates are rounded to one decimal place. * Ofcom's analysis indicates a WACC of 8.0%. Oxera has not been able to reconcile its calculations with Ofcom's as the regulator's approach to rounding up or down is not evident. [1] Based on the BCMR (2016) determination. [2] Holding the real TMR constant at 6.1% as per BCMR (2016). [3] Based on the BCMR (2016) determination. [4] Excluding the impact of pension deficit and using net debt to estimate gearing. [5] Excluding the impact of pension deficit.

Source: Oxera analysis based on Ofcom (2017), 'Wholesale Local Access Market Review – Annexes', 31 March.

Table 4.4 BT Other UK Telecoms—impact of the parameter revisions

Parameter	Ofcom WLA (2017)	Revised RfR and TMR	Revised Cost of debt	Revised Asset beta and gearing
RPI inflation	3.2%	3.2%	3.2%	3.2%
Tax rate	17%	17%	17%	17%
Risk-free rate (real)	0.5%	**1.0%[1]**	**1.0%**	**1.0%**
Risk-free rate (nominal)	3.7%	4.2%	4.2%	4.2%
Nominal ERP	5.7%	5.3%[2]	5.3%	5.3%
Debt beta	0.10	0.10	0.10	0.10
Asset beta	0.75	0.75	0.75	**0.90[4]**
Forward-looking gearing	35%	35%	35%	**30%[4]**
Re-levered equity beta	1.10	1.10	1.10	1.24
Cost of equity, post-tax	10.0%	10.1%	10.1%	10.8%
Cost of equity, pre-tax	12.0%	12.1%	12.1%	13.0%
Debt premium	1.0%	1.0%	**1.2%[3]**	**1.2%**
Cost of debt, pre-tax	4.7%	5.2%	5.4%	5.4%
WACC, pre-tax (nominal)	**9.5%***	**9.7%**	**9.8%**	**10.8%**

Note: All numbers except for asset beta estimates are rounded to one decimal place. * Ofcom's analysis indicates a WACC of 9.4%. Oxera has not been able to reconcile its calculations with Ofcom's as the regulator's approach to rounding up or down is not evident. [1] Based on the BCMR (2016) determination. [2] Holding the real TMR constant at 6.1% as per BCMR (2016). [3] Based on the BCMR (2016) determination. [4] In line with a Group asset beta estimate of 0.86, assuming that the weights of the various business divisions do not change. [5] Excluding the impact of pension deficit.

Source: Oxera analysis based on Ofcom (2017), 'Wholesale Local Access Market Review – Annexes', 31 March.

Table 4.5 Rest of BT—impact of the parameter revisions

Parameter	Ofcom WLA (2017)	Revised RfR and TMR	Revised Cost of debt	Revised Gearing
RPI inflation	3.2%	3.2%	3.2%	3.2%
Tax rate	17%	17%	17%	17%
Risk-free rate (real)	0.5%	**1.0%[1]**	**1.0%**	**1.0%**
Risk-free rate (nominal)	3.7%	4.2%	4.2%	4.2%
Nominal ERP	5.7%	5.3%[2]	5.3%	5.3%
Debt beta	0.10	0.10	0.10	0.10
Asset beta	1.08	1.08	1.08	1.08
Forward-looking gearing	35%	35%	35%	**30%[4]**
Re-levered equity beta	1.61	1.61	1.61	1.50
Cost of equity, post-tax	12.9%	12.8%	12.8%	12.2%
Cost of equity, pre-tax	15.5%	15.4%	15.4%	14.7%
Debt premium	1.1%	1.1%	**1.5%[3]**	**1.5%**
Cost of debt, pre-tax	4.8%	5.3%	5.7%	5.7%
WACC, pre-tax (nominal)	**11.8%**	**11.9%**	**12.0%**	**12.0%**

Note: All numbers except for asset beta estimates are rounded to one decimal place. [1] Based on the BCMR (2016) determination. [2] Holding the real TMR constant at 6.1% as per BCMR (2016). [3] Based on the BCMR (2016) determination. [4] Excluding the impact of pension deficit.

Source: Oxera analysis based on Ofcom (2017), 'Wholesale Local Access Market Review – Annexes', 31 March.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