



# **Incorporating BT's pension deficit in the cost of capital calculation**

A report prepared for Ofcom

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## 1. Introduction

This work is undertaken in the context of the Office of Communications' (Ofcom) review of the Wholesale Local Access (WLA) market for the period April 2018 to March 2021. Ofcom is required to undertake reviews of various communications markets every three years under the Communications Act 2003, which implements the EU regulatory framework for electronic communications. The process is designed to assess the existence of competitive pressures in the various market segments. If Ofcom finds evidence that competitive constraints are insufficient, it has the power to impose remedies such as ex ante regulation in the form of price controls.

In this context, Ofcom has asked NERA Economic Consulting (NERA) to assess its proposed treatment of BT's pension deficit when determining the regulatory cost of capital and to reply to comments received in the consultation phase. More precisely, Ofcom has asked us for advice on the following main questions:

- To what extent do pension liabilities/deficits have the characteristics of debt?
- How should the pension deficit be taken into account when estimating gearing?
- What are the implications for the asset beta when accounting for the pension deficit in de-levering the observed equity beta?
- What options are there for estimating gearing and the asset beta of the BT Group and would accounting for pension schemes affect asset betas of comparators?
- Would an approach to gearing that included pension liabilities/deficits have any implications for the cost of debt?

In order to respond to Ofcom's questions and for presenting further findings we consider relevant in the present context, this report is structured as follows:

- Section 2 provides context regarding BT's pension plan and explains how Ofcom has treated the pension deficit in previous cost of capital determinations. In addition, we highlight issues arising from stakeholder comments regarding the pension deficit and its potential impact on the cost of capital.
- Section 3 reviews the case for a pension deficit adjustment to the cost of capital in principle. We analyse practitioners' and academics' views on the pension deficit potentially sharing debt characteristics and the ensuing repercussions for defining gearing.
- In section 4, we assess how Ofcom's treatment of the pension deficit from 2010 and the current approach take the pension deficit into account. In addition, we discuss some key issues to consider regarding Ofcom's current approach before discussing a possible impact of the pension deficit on the cost of debt.
- Section 5 concludes.

The appendices provide supporting information on the topics developed in the main body.

## 2. Background

### 2.1. BT's pension deficit

BT operates a defined benefit pension scheme.<sup>1</sup> Under actuarial assumptions regarding e.g. inflation and longevity these defined benefits constitute a schedule of future cash outflows. The sum of discounted cash outflows equals the pension liability. There are three main approaches to measuring the pension liability, and in turn the pension deficit:

- An accounting valuation as defined by IAS 19 is required in every statement of financial position.<sup>2</sup> It is conducted by the company's finance department. Inflation and longevity are determined according to expectations, whereas the discount rate reflects market yields on high quality corporate and government bonds.<sup>3</sup> To cover future payments to pensioners, BT holds pension assets. These are valued at their market value.<sup>4</sup> The difference between the value of the liabilities and the assets constitutes the pension deficit under IAS 19. Average accounting values of pension assets (£ 43,798m) and pension liabilities (£ 50,780m) over 2015 and 2016 exceeded debt (£ 12,019m) and the market value of equity (£ 39,217m) resulting in an average accounting deficit of £ 6,983m.<sup>5</sup> More recent estimates of the accounting value of the deficit are even larger, with Ofcom using a deficit of £ 11,100m in its March 2017 WLA consultation for some calculations.<sup>6</sup>
- The accounting value of the pension deficit may differ from the actuarial value of the pension deficit. A full actuarial valuation of the pension scheme has to be carried out at least every three years, commissioned by the trustees. The actuary makes assumptions about longevity, inflation and discount rates to determine the value of liabilities and compares them to existing assets at market value. The most recent actuarial valuation amounted to a deficit of £7,000m (2014).
- To derive the best estimate of BT's pension deficit, pension liabilities are discounted at the expected return of pension assets. This discount rate is likely to exceed high class corporate bond yields leading to a smaller pension liability. Again, pension assets are measured at their market value to derive the pension deficit or surplus. BT's best estimate indicates that its pension plan was in surplus from 2011 until the end of 2014.<sup>7</sup>

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<sup>1</sup> BT's defined benefit pension scheme is called the BT Pension Scheme and this was closed to new members in 2001. BT also operates defined contribution pension schemes.

<sup>2</sup> IAS 19 (2011), 63

<sup>3</sup> IAS 19 (2011), 75-83

<sup>4</sup> See BT Group: Q1 2016/17 results -investor meeting slide pack August &September 2016, slide 128.

<sup>5</sup> In this report we use 2015/2016 data. Average accounting values over 2016 and 2017 are £ 47,540m for pension assets and £ 55,275m for pension liabilities, again exceeding debt (£ 13,737m) and the market value of equity (£ 45,790) and resulting in an average accounting pension deficit of £ 7,735m.

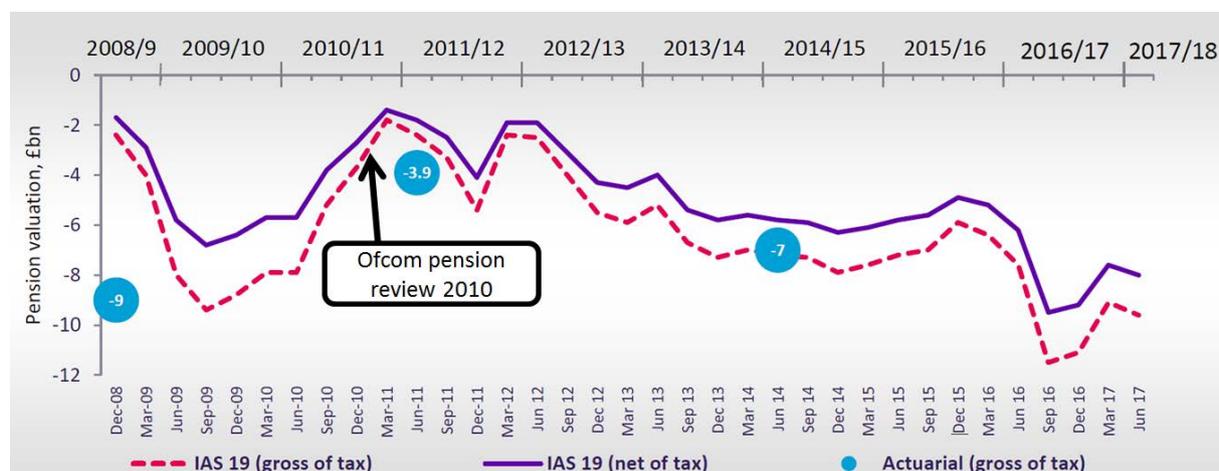
NERA analysis of Bloomberg data and BT Group (2017): Annual Report & Form 20-F 2016.

<sup>6</sup> Equal to the accounting value of the deficit as at BT's Q3 2017 results.

<sup>7</sup> BT Group (2016): Q2 2016/17 results -investor meeting slide pack, slide 126. BT has not published more recent estimates of its best estimate.

BT's pension plan is significant relative to the size of the company. Figure 2.1 shows the evolution of the accounting value of the pension deficit and actuarial valuations when available.

**Figure 2.1**  
**BT's pension deficit (accounting and actuarial values)**



Source: BT Group: Q1 2017/18 -investor meeting slide pack, slide 47.

The decrease of interest rates used to discount future cash outflows has led to an increase of the accounting value of the pension liability and deficit.<sup>8</sup> As the figure above shows, BT's last actuarial valuation was in line with the IAS 19 valuations. However, the actuarial valuations before show that significant differences between actuarial and accounting valuations may occur. In general, the accounting valuation is moving with market interest rates, as it is tied to yields on high quality corporate bonds. Overall, the differences between these methods demonstrate the difficulty of determining a fair value for pension deficits.

## 2.2. Ofcom's Approach to the deficit: past and present

In 2010, Ofcom considered how to take account of BT's defined benefit pension's scheme when setting charge controls. This included a consideration of whether to allow deficit repair payments and whether it was necessary to adjust the cost of capital.<sup>9</sup> To support its work on the cost of capital, Ofcom commissioned two reports from Professor Ian Cooper mainly discussing the applicability of a conceptual framework developed by Jin, Merton and Bodie

<sup>8</sup> See Mercer (2017): Discount rate for IFRS/US-GAAP/HGB valuations, <https://www.mercer.de/our-thinking/discount-rate-for-ifrs-us-gAAP-hgb-valuations.html> [18.09.2017] as an illustration of how discount rates evolved.

<sup>9</sup> Ofcom (2010): Pensions review.

(in short: “JMB”) in this context.<sup>10</sup> In his second report, Cooper concluded that any adjustment based on the JMB framework would inevitably involve a significant degree of judgement.<sup>11</sup>

On behalf of BT, Professor Ian Dobbs submitted a further report discussing the suitability of the JMB framework confirming Cooper’s concerns with a mechanical JMB adjustment.<sup>12</sup> In addition, Ofcom commissioned Gallagher et al. to empirically test the JMB framework on UK data.<sup>13</sup>

Ofcom concluded that it did not believe an adjustment to the BT Group asset beta for the defined benefit pension plan was appropriate.<sup>14</sup> Ofcom partly based its conclusion on the view that Ofcom’s exclusion of deficit repair payments from the 2009-2013 LLU charge control meant that it implicitly accepted that the risks associated with the pension deficit sat with shareholders and that it would therefore be inconsistent to exclude the attendant risks of the scheme from the asset beta and the cost of capital.<sup>15</sup>

Although refraining from the formal JMB framework, Ofcom’s approach to setting the cost of equity confirmed by the 2010 pension review has reflected equity risk introduced by the pension plan. This is the case because Ofcom has set the cost of equity based on BT Group’s observed equity beta. If equity markets reflect the risk associated with pension deficits, BT Group’s observed equity beta (and therefore the cost of equity) will have been different from that of a hypothetical company which is just like BT Group but without a defined benefit pension plan.<sup>16</sup> Ofcom did not adjust the capital structure for the presence of the deficit.

In the March 2017 WLA consultation, Ofcom has proposed to include 50% of the accounting value of the pension deficit (gross of tax) in the gearing measure in deriving the asset beta for BT. The consultation argues that the pension deficit can affect the financial risk faced by investors in a way much like debt.<sup>17</sup> However, the March 2017 WLA consultation argues that it is unclear which measure of the pension deficit investors take into account, which is behind Ofcom’s proposal not to include the full accounting deficit.<sup>18</sup> By proposing to treat the deficit

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<sup>10</sup> Cooper (2010): COMMENT ON RESPONSES TO THE REPORT: The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies: A report for Ofcom.

Cooper (2009): The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies.

See Jin et al. (2006): Do a firm’s equity returns reflect the risk of its pension plan.

<sup>11</sup> Cooper (2010): COMMENT ON RESPONSES TO THE REPORT: The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies: A report for Ofcom, p. 30.

<sup>12</sup> Dobbs (2010): Defined Benefit Pension Plans, the Cost of Capital and the Regulatory Allowed Rate of Return.

<sup>13</sup> Gallagher et al. (2011): The Influence of Pension Plan Risk on Equity Risk: A Study of FTSE100 Companies – 2002 to 2008.

<sup>14</sup> Ofcom (2010): Pensions Review, 7.63.

<sup>15</sup> Ofcom (2010): Pensions Review, 7.61.

<sup>16</sup> How the pension deficit affects equity and asset beta risk crucially depends on the size of the pension scheme, and on the risk of the pension assets and liabilities. For a discussion see Cooper (2009) and Dobbs (2010).

<sup>17</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.81.

<sup>18</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.84-A16.90.

as debt and include it in the capital structure, the March 2017 WLA consultation recognises the fact that the deficit (potentially) affects the perception of the degree to which equity has been “leveraged”.<sup>19</sup> The March 2017 WLA consultation also (implicitly) assumes that capital “earmarked” for closing the pension deficit is available at the cost of debt. We discuss the validity of these assumptions in more detail in chapter 4.

In the March 2017 WLA consultation, Ofcom estimates an asset beta of 0.72 for the case where investors take account of the full accounting value of the pension deficit. Ofcom’s corresponding estimate for investors assuming the pension scheme not to be in deficit (consistent with BT’s last published best estimate) is 0.81.<sup>20</sup> In light of the uncertainty about the “correct” measure of the pension deficit, Ofcom proposes an asset beta of 0.76 which corresponds to including 50% of the accounting value of the pension deficit when calculating gearing.<sup>21</sup>

### 2.3. Responses from stakeholders

Ofcom asked us to consider responses to its proposed treatment of the BT pension deficit from OXERA, on behalf of Openreach, and TalkTalk. Below we reproduce the key points of these responses before responding to them in the chapters below.

#### *OXERA on behalf of Openreach*

In its critique of Ofcom’s approach, OXERA (2017) initially question the rationale for a change in practice relative to prior reviews, which OXERA claim would be viewed as creating regulatory inconsistency.<sup>22</sup> OXERA support this point with three observations:

- No other regulator uses a comparable adjustment;
- BT’s pension deficit has actually shrunk in relative terms since the 2010 review; and
- Ofcom has not cited any new academic evidence.

OXERA then proceeds to arguing that “*Ofcom’s approach to incorporating pensions within its framework to estimating a regulatory WACC appears to be theoretically and empirically incorrect.*”<sup>23</sup>

OXERA’s theoretical criticism appears to rest on the notion that it would be inconsistent with the Modigliani-Miller theorem for an increase in gearing to lead to a lower WACC. OXERA proceeds to argue that Ofcom’s approach implicitly assumes that  $\beta_D = \beta_{PL} = \beta_{PA} = 0.1$  which OXERA working with Prof. Dobbs claim to be inconsistent

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<sup>19</sup> It is worth noting that the value of the pension deficit is substantially more uncertain than the value of conventional debt, and can vary much more than the value of conventional debt (also see Appendix A).

<sup>20</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.89.

<sup>21</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.90.

<sup>22</sup> Oxera (2017), Response to Ofcom’s WACC proposals for the WLA charge controls.

<sup>23</sup> Oxera (2017), Response to Ofcom’s WACC proposals for the WLA charge controls, p. 12.

with empirical evidence.<sup>24</sup> OXERA does not comment on Ofcom's proposal to include only half of the accounting value of the pension deficit in its gearing measure.

### *Openreach*

Openreach criticises Ofcom's treatment of BT's pension deficit for four main reasons:

- **No supporting evidence:** Openreach claims that Ofcom did not offer any evidence or theoretical justification for investors placing weight on the accounting or actuarial value of the pension deficit.<sup>25</sup>
- **Unjustified beta assumption for pension assets and liabilities:** Like OXERA, Openreach points out that Ofcom's treatment of the pension deficit implies  $\beta_{PL} = 0.1$  and  $\beta_{PA} = 0.1$  under the JMB framework. Openreach states there is no basis for these assumptions.<sup>26</sup>
- **Regulatory inconsistency:** Openreach argues that Ofcom's proposed treatment of the pension deficit was inconsistent with its views from 2010 on the exclusion of deficit repair payments from charge controls. Moreover, Openreach considers the change in Ofcom's treatment of the pension deficit to be inconsistent over time.<sup>27</sup>
- **Lack of robustness:** Openreach quotes Ofcom's 2010 pension review where Ofcom decided against the use of the JMB adjustment because of doubts regarding accurate estimation of the adjustment and because the appropriate adjustment could actually be zero. Openreach refers to Professor Cooper who commented in 2010 that his best guess for the adjustment was highly uncertain and not robust. In addition, Openreach argues that the accounting value of the pension deficit has historically been volatile meaning an adjustment based on the accounting value would make the forward-looking cost of capital estimate subject to short-term fluctuations.<sup>28</sup>

### *TalkTalk*<sup>29</sup>

TalkTalk submitted a response to Oxera's paper on the WACC proposals. TalkTalk argues that none of OXERA's above arguments was meaningfully relevant to Ofcom's decision regarding the treatment of BT's pension deficit for the reasons summarised below<sup>30</sup>:

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<sup>24</sup> Oxera (2017), Response to Ofcom's WACC proposals for the WLA charge controls, p. 13.

<sup>25</sup> Openreach (2017): Response to Ofcom's Consultation on proposed charge control designs and implementation – Volume 2, paragraph 187.

<sup>26</sup> Openreach (2017): Response to Ofcom's Consultation on proposed charge control designs and implementation – Volume 2, paragraph 188.

<sup>27</sup> Openreach (2017): Response to Ofcom's Consultation on proposed charge control designs and implementation – Volume 2, paragraphs 191-196.

<sup>28</sup> Openreach (2017): Response to Ofcom's Consultation on proposed charge control designs and implementation – Volume 2, paragraphs 197-201.

<sup>29</sup> TalkTalk (2017): TalkTalk response to Oxera paper on WACC proposals.  
[https://www.ofcom.org.uk/\\_\\_data/assets/pdf\\_file/0023/107474/TalkTalk-Oxera-fair-bet-WACC-proposals.pdf](https://www.ofcom.org.uk/__data/assets/pdf_file/0023/107474/TalkTalk-Oxera-fair-bet-WACC-proposals.pdf)

- In contrast to other UK regulators, Ofcom does not have a financeability duty meaning that Ofcom can adopt a forward-looking approach to regulation. Pension deficits are backward-looking and current users should not pay for BT's past decisions regarding the pension fund.
- It is unclear why the size of the pension deficit has to change for Ofcom to change its view on the treatment of the pension deficit.
- Ofcom can change its regulatory position in the absence of new academic evidence which represents only one form of evidence. In any case, Ofcom can change its position without any new evidence.

TalkTalk further argues that financial market analysts take BT's pension deficit into account and treat it like additional debt.<sup>31</sup> In addition, TalkTalk quotes Oxera itself arguing that companies with a large defined-benefit pension scheme should be treated as companies having higher gearing.<sup>32</sup>

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<sup>30</sup> TalkTalk (2017): TalkTalk response to Oxera paper on WACC proposals, paragraph 5.3

<sup>31</sup> TalkTalk (2017): TalkTalk response to Oxera paper on WACC proposals, paragraph 5.4.

<sup>32</sup> OXERA (2009): Defined-benefit pension plans: defining the cost.

### 3. The case for taking account of the deficit in principle

#### 3.1. March 2017 WLA consultation rationale for including the deficit as “debt”

In its March 2017 WLA consultation Ofcom proposed to treat the deficit as a prior claim that should be (partially) considered when determining BT’s cost of capital (see chapter 2.2). Ofcom argues that it is uncertain which measure of the pension deficit is taken into account by investors:

*“Defined benefit pension deficits can be estimated in several ways and it is uncertain how an investor would value the deficit for the purposes of assessing the impact on financial gearing.”<sup>33</sup>*

However, Ofcom’s view in the March 2017 WLA consultation is that the pension deficit adds to financial risk in principle:

*“While in principle we consider that pension deficits are likely to add to financial risk, this is only likely to be a material consideration in estimating the risk faced by investors if the deficit is large.”<sup>34</sup>*

The view that the pension deficit can affect financial risk is broadly in line with the methods of equity analysts and rating agencies as discussed in chapter 3.2. We discuss relevant academic literature in chapter 3.3 before evaluating different options for taking account of the deficit in regulatory practice in chapter 3.4.

#### 3.2. Practitioners’ approaches

In order to assess actual equity market practice with regard to the treatment of the pension deficit as a prior claim, we have collected analyst reports for BT and other comparators, including other companies with relatively large pension liabilities. These reports play an important role in evaluating how many institutional investors make their investment decisions. While not all market participants rely on equity analyst reports, a survey conducted among private equity firms by Jones et al. (2005) confirms that private equity firms more generally consider pension deficits as debt.<sup>35</sup>

We find that equity analysts in all BT reports that we have reviewed (Royal Bank of Canada, Deutsche Bank, JP Morgan) emphasise the importance of BT’s pension liabilities for their valuation.<sup>36</sup> The target equity price in these analyst reports is based on target free cash flows that are adjusted for gross pension payments. For future periods the estimates of these payments vary widely. To calculate the final value, pension deficits are subtracted at their

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<sup>33</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.84.

<sup>34</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.83.

<sup>35</sup> Jones et al. (2005): The Market Value of Pension Liabilities.

<sup>36</sup> See RBC Capital Markets (2017): BT Group PLC, p.2; Deutsche Bank – Markets Research (2017): BT Group PLC - Company Update, p.1; J.P. Morgan Cazenove (2017), BT Group, p.8

estimated value from the amount of total assets, which constitutes a treatment comparable to debt.<sup>37</sup> It is also worth noting that while the JMB framework is well known to practitioners<sup>38</sup> there are no publicly available analyst reports we are aware of where analysts explicitly adjust discount rates for DB pension plans when calculating discount rates for firms with significant DB pension plans.

In addition, rating agencies take account of the funding status of a firm's pension plan albeit using slightly different methods of making adjustments for pension deficits: Standard & Poor's add unfunded post retirement employee benefits to reported debt and derive financial ratios upon the adjusted financial statement components. Catch-up contributions are identified and treated as financial instead of operating cash flows.<sup>39</sup> Based on the contractual nature of pension obligations, Moody's proceeds equivalently.<sup>40</sup> However, while Standard & Poor's aggregates all defined benefit plans and adjusts the deficit by the respective deferred tax asset, Moody's only reports gross pension plan-related deficits as debt.

Fitch uses a different methodology: pension schemes are acknowledged as long-term financial obligations but are not classified as debt obligations, due to their long-term nature and uncertain timing. Adjusted metrics including net pension obligations are available in addition to the standard set of credit metrics. However, Fitch emphasises the importance for cash-flow modelling, especially if increasing gross pension payments are expected for the following years.<sup>41</sup> Moody's and Fitch base their assessment on reported accounting values<sup>42</sup>, with Moody's additionally verifying whether employed discount rates are sensible.<sup>43</sup>

### 3.3. Insights from the academic literature

In addition to the methods used by equity analysts and rating agencies, the academic literature provides insights about whether stock prices or bond spreads reflect the funding status of a firm's pension plan. Early research suggests that stock market valuations reflect the pension funding situation of a firm. For example, Bulow et al. (1987) present empirical analysis that finds that stock markets do accurately reflect pension funding situations of firms.<sup>44</sup> Their finding broadly confirms Feldstein and Morck (1983) and Oldfield (1977).<sup>45</sup>

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<sup>37</sup> See Deutsche Bank – Markets Research (2017): BT Group PLC - Company Update, figure 21., J.P, Morgan Cazenove (2017), BT Group, p.8, RBC Capital Markets (2017): BT Group PLC, Exhibit 6, p.10

<sup>38</sup> See Society of Actuaries (2015): Corporate Pension Risk Management and Corporate Finance: Bridging the Gap between Theory and Practice in Pension Risk Management.

See Morgan Stanley (2010): Pensions in Practice - How Corporate Pension Plans Impact Stock Prices.

<sup>39</sup> S&P Corporate Methodology: Ratios And Adjustments, November 2013, p.26

<sup>40</sup> Moody's Global Standard Adjustments in the Analysis of Financial Statements for Non-Financial Corporations, December 2010, p.6

<sup>41</sup> Fitch Ratings (2017): Corporate Rating Criteria, August 2017, p.21

<sup>42</sup> Moody's investors service: Moody's changes outlook on BT from positive to stable, 14 September 2012, p.1; Fitch Ratings Corporate Rating Criteria, 7 August 2017, p.20,

<sup>43</sup> Moody's Global Standard Adjustments in the Analysis of Financial Statements for Non-Financial Corporations, December 2010, p.6

<sup>44</sup> Bulow et al. (1987): How Does the Market Value Unfunded Pension Liabilities?.

<sup>45</sup> Feldstein and Morck (1983): Pension funding interest rate assumptions, and share prices.

Carroll and Niehaus (1998) also show a relationship between the funding of pension plans and corporate debt ratings.<sup>46</sup>

Jin, Merton and Bodie (JMB, 2006) develop a conceptual framework to discuss the empirical question whether equity betas reflect the risk of their pension plans.<sup>47</sup> Based on US data for the period 1993 to 1998, their empirical findings confirm the hypothesis that equity risk does reflect the risk related to firms' pension plans suggesting informational efficiency of equity markets.

During Ofcom's last pension review in 2010, discussions centred on the JMB framework and the impact of the pension deficit on equity risk. Under the assumption that market participants consider the augmented balance sheet of a firm including pension assets and pension liabilities when valuing the equity of a firm, JMB show that the following formula should be used to derive the beta of the operating assets:

$$\beta_{OA} = \frac{E}{OA} * \beta_E + \frac{D}{OA} * \beta_D - \left( \frac{PA}{OA} * \beta_{PA} - \frac{PL}{OA} * \beta_{PL} \right).$$

In this representation,  $E$ ,  $D$ ,  $PA$ ,  $PL$  and  $OA$  abbreviate equity, debt, pension assets, pension liabilities and operating assets, respectively. The pension deficit affects the asset beta in two ways according to JMB:

- The JMB framework adds the right hand side term in brackets, which can be either negative or positive. The importance of this term increases with the size of the pension assets compared to the overall assets. The likelihood of a negative adjustment to the asset beta increases with an increase in the difference between  $\beta_{PA}$  and  $\beta_{PL}$ , i.e. the systematic risk of the pension assets compared to the liabilities;<sup>48</sup> while it decreases with an increase in the deficit level.
- Secondly, for a company with a pension deficit, the denominator  $OA = E + D + PL - PA$  is larger than the denominator  $E + D$  that is used in the "classic" asset beta calculation. Hence while the first effect can either increase or decrease the asset beta the second will always reduce the asset beta compared to a "no adjustment" case with the overall impact of the two effects being ambiguous.

The conceptual JMB framework was a relevant factor for Ofcom in 2010 when it commissioned work by Prof Ian Cooper (2009, 2010).<sup>49</sup> Cooper looked at the applicability of

Oldfield (1977): Financial aspects of the private pension system.

<sup>46</sup> Carroll and Niehaus (1998): Pension Plan Funding and Corporate Debt Ratings.

<sup>47</sup> Jin et al. (2006): Do a firm's equity returns reflect the risk of its pension plan, *Journal of Financial Economics* 81 (2006) 1–26.

<sup>48</sup> In the remainder of this report  $\beta_{PA}$  and  $\beta_{PL}$  are jointly referred to as pension plan betas.  $\beta_{PA}$  reflects the systematic risk of the assets the pension plan is invested in.  $\beta_{PL}$  represents the systematic risk of the total pension liabilities of the firm, i.e. the extent to which the current value of final payments to pensioners in future reacts to current stock market fluctuations.

<sup>49</sup> Cooper (2010): COMMENT ON RESPONSES TO THE REPORT: The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies: A report for Ofcom.

the JMB framework to the UK regulated sector. Cooper concluded that while the JMB approach had theoretical appeal there was no robust way of implementing the approach in practice for the following main reasons:

- Changes in the surplus or deficit of the pension plan may not entirely belong to the financial investors in the firm. Instead, pensioners may share some of the risk associated with the pension plan. For example, the defined benefits may be renegotiated in case of a significant pension deficit. This potential risk sharing between pensioners and financial claimholders has the effect of increasing  $\beta_{PL}$  and reducing the mechanical JMB adjustment.<sup>50</sup>
- The risk of the pension plan may also be shared with tax authorities since the current liability will in part be offset by lower tax payments in future. The pension liability as measured by accounting values thus overestimates the additional prior claim on the firm's assets from the equity holder's point of view.
- The risk of the pension plan could be shared with regulators. This could for example be the case if the regulator allowed passing on cash flows into the pension plan paid by the firm to consumers. Ofcom has not allowed this to date.
- The risk of operating assets may not be independent of a firm's pension plan. The balance of a pension plan and other features such as pension insurance could affect wage bargaining, job decisions by employees, pension plan investment policy and other corporate decisions. This means that the specifics of a pension plan can change the behaviour of a firm.

In addition to these conceptual objections, Cooper doubts the immediate reflection of changes in the balance of pension plans in stock prices which he identifies as a necessary assumption to hold for the full validity of the JMB framework.<sup>51</sup> Cooper also argues share prices did not fully reflect the pension deficit or surplus.<sup>52</sup>

Based on some sample calculations for UK regulated firms, Cooper concluded that while the approach had theoretical appeal there was no robust way of implementing the approach in practice because (at the time) it led to implausibly large adjustments to the asset beta.<sup>53</sup> He therefore concluded that any adjustment would be a matter of regulatory judgement.<sup>54</sup>

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Cooper (2009): The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies.

<sup>50</sup> Below we occasionally distinguish between "renegotiable" and "non-renegotiable" parts of the deficit.

<sup>51</sup> Cooper (2009): The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies, p. 17.

<sup>52</sup> Cooper (2009): The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies, p. 17.

<sup>53</sup> Cooper (2009): The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies, p. 31.

<sup>54</sup> Cooper (2009): The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies, p. 3.

Subsequent literature adopted and extended JMB's conceptual framework. Notably, Gallagher et al. (2011) show a link between pension plan risk and equity risk for UK firms when applying the JMB framework to those FTSE100 companies that operate a defined benefits pension scheme.<sup>55</sup> Their analysis covers the years 2002 to 2008. The authors find that the one-to-one relationship between pension plan risk and equity risk as suggested by JMB does not fully hold in UK stock market prices. Instead, they find that the impact of additional pension plan risk on equity risk is attenuated significantly. The exact degree of attenuation varies across different model specifications and is about sixty to seventy percent in the model specification quoted by Cooper (2010).<sup>56</sup>

Recent work by Chapman and Naughton (2016) extends JMB's conceptual framework separately considering the impact of risk arising from the investment strategy of the pension plan and the risk arising from the funding status of the pension plan.<sup>57</sup> While confirming JMB's conceptual framework, the authors cast doubt on JMB's empirical finding of equity returns reflecting pension plan risk from 1993 to 1998 and show that for US companies risk arising from the pension plan has only been reflected in equity betas after the introduction of accounting rules in 2006, according to which firms have to disclose the funded position of their pension plans on their balance sheets.<sup>58</sup> Chapman and Naughton explain JMB's contrasting findings with i) JMB erroneously including defined contribution pension plans, ii) JMB excluding certain asset categories from pension assets and iii) JMB not consolidating pension plans to the firm level.<sup>59</sup> Chapman and Naughton's point estimate of the impact pension plan risk has on the equity beta implies attenuation of about sixteen percent suggesting that a one-to-one relationship between pension plan risk and equity risk does not hold.<sup>60</sup>

The work by Gallagher et al. (2011) and Chapman and Naughton (2016), which most directly tests whether pension deficits affect equity risk, finds pension risk to be reflected in overall equity risk but with a degree of attenuation. Additional research discussing related questions finds partly different results. For example, Campbell (2011) finds "*no statistical association between mandatory pension contributions and firms' cost of equity for investment-grade debt issues*" suggesting that the size of a pension plan or its funding status may not have a significant impact on the cost of equity albeit when using a more indirect measure

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<sup>55</sup> Gallagher et al. (2011): The Influence of Pension Plan Risk on Equity Risk: A Study of FTSE100 Companies – 2002 to 2008.

<sup>56</sup> This means that the estimated coefficient on Gallagher's PR3-variable (i.e. the beta of the pension deficit) equals 0.3 to 0.4 in the multivariate analysis using clustered standard errors (Rogers) and pension liability betas of 0.28 and 0.30. If the JMB framework fully held, the estimated coefficient on the PR3-variable would equal one. See Cooper (2010): COMMENT ON RESPONSES TO THE REPORT: The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies: A report for Ofcom, page 29.

<sup>57</sup> Chapman and Naughton (2016): Pension Risk and Equity Returns.

<sup>58</sup> Chapman and Naughton built on JMB's conceptual framework and reconcile their finding of no pension plan risk reflection in equity returns pre-2006 with data issues. JMB's empirical analysis found pension plan risk reflection in equity returns pre-2006.

<sup>59</sup> Chapman and Naughton (2016): Pension Risk and Equity Returns, p. 30.

<sup>60</sup> More technically, in the JMB equation  $\beta_{OA} = \frac{E}{OA} * \beta_E + \frac{D}{OA} * \beta_D - \left( \frac{PA}{OA} * \beta_{PA} - \frac{PL}{OA} * \beta_{PL} \right)$  the estimated coefficient on the last term in brackets is estimated to equal 0.84 instead of 1.00.

(mandatory deficit payments rather than the actual size of the deficit).<sup>61</sup> In contrast, Lay (2016) shows that for tax and regulatory reasons as well as principal-agent problems unfunded pension liabilities raise firms' bond spreads more heavily than increases in standard leverage.<sup>62</sup>

In summary, we find that equity markets do reflect pension plan risk to an extent. However, the one-to-one relationship between pension plan risk and equity risk as hypothesised by JMB does not seem to hold – neither for the US (Chapman and Naughton, 2016) nor for the UK (Gallagher et al., 2011). All papers that we reviewed imply that a mechanical application of the JMB formula including 100% of BT's accounting deficit would overstate the degree to which equity markets take pension plan risk into account, leaving significant uncertainty about the share of the full accounting deficit that should be treated as “debt-like”.

Moreover, some academic literature suggests that pension deficits may actually raise the cost of financial debt by more than actual financial debt calling into question whether a pension deficit constitutes a liability with a risk profile comparable to debt (an issue we return to in chapter 4.3).

### 3.4. Key issues in relation to the case for taking the deficit into account when estimating the WACC

While practitioners such as equity analysts and rating agencies often treat pension deficits as prior claims (cf. chapter 3.2), Prof. Cooper in his recommendations for Ofcom identified a number of reasons (incl. risk sharing with pensioners, tax authorities, regulators,...) why pension deficits may only partly constitute a prior claim. While some of these risk sharing mechanisms appear to be of limited relevance in the case of BT<sup>63</sup> others continue to have merit.<sup>64</sup> Less than full pass-through is also supported by the empirical literature (see chapter 3.3). Consequently, the strength and direction of the link depends on a number of assumptions / modelling choices for many of which there is only limited empirical evidence.

Ofcom has previously used an approach that incorporates the pension deficit risk into the calculation of the **asset beta** by using BT Group's unadjusted beta as the starting point for its regulatory beta calculations. By relying on the market valuation of BT Group Ofcom avoids the need to make its own assumptions about the risk associated with the pension scheme (see chapter 4.1 for more detail).

In its March 2017 WLA consultation Ofcom additionally treats the deficit as a prior claim that should be (partially) considered when determining BT's capital structure (see chapter

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<sup>61</sup> Rauh shows the non-linear relationship between the funding status of a firm's pension plan and the mandatory contribution for US legislation. See Rauh (2006): Investment and Financing Constraints: Evidence from the Funding of Corporate Pension Plans, *Journal of Finance*, Vol. LXI, No. 1, page 39.

<sup>62</sup> Lay (2016): Pension Obligations and the Cost of Corporate Debt.

<sup>63</sup> E.g. unlike other regulators Ofcom has not allowed for recovery of pension deficits, which limits the degree of risk sharing with customers.

<sup>64</sup> E.g. i) the tax treatment of the pension deficit means that investors may be more likely to take into account the *net* effect of the pension deficit only and ii) there may be a degree of risk sharing with pensioners.

2.2). In order for Ofcom to also consider a pension-deficit adjustment to the **capital structure**, there has to be a case for treating the pension deficit as i) a prior claim on company cash flows and ii) an additional source of capital that can be raised at the cost of debt.

There are significant uncertainties regarding both these conditions:

- Ofcom has already identified that there is uncertainty about whether practitioners treat the full accounting deficit as a prior claim and that the exact share of the deficit considered is uncertain. Moreover, even if Ofcom were to establish the share of the deficit reflected in valuations with certainty, there is still uncertainty about the risk contribution of that pension deficit (or surplus) to the extent that it depends on the risk (betas) of the pension assets and liabilities, which are contentious (see Appendix A and Appendix B).
- There is no evidence that the pension deficit represents an actual source of capital, let alone one that can be raised at the cost of debt. Indeed, the academic literature suggests that pension deficits can actually raise funding costs by *more* than financial debt.

Consequently, when analysing observed equity betas of firms with significant pension plan deficits, there is a case for carrying out such analysis under the presumption that the observed market equity beta will be affected by the pension deficit while the case for a capital structure adjustment is less clear. Chapter 4 discusses in more detail the mechanics of and justification for different approaches for taking account of the pension deficit.

## 4. Taking account of the deficit's impact on different WACC components

The academic literature and the methodologies of business analysts and rating agencies indicate that pension plans do affect the risk various stakeholders attach to a company (see sections 3.2 and 3.3). There will inevitably be uncertainty about the degree to which financial markets take account of BT's pension deficit and which components of the cost of capital will be affected.

Moreover, the fact that other UK regulators do not explicitly account for pension deficits in the WACC should not imply that Ofcom should proceed in the same way. This is the case because other regulated firms such as energy networks and water utilities tend to have significantly lower pension deficits<sup>65</sup> and because, unlike Ofcom, some regulators allow firms to recover deficit repair payments from customers.<sup>66</sup>

In the remainder of this section, we discuss the implications of the above for adjusting individual components of the WACC in response to the existence of a pension deficit.

- Section 4.1 explains how Ofcom treated the impact of BT's pension deficit on the asset beta when calculating the cost of capital in 2010;
- Section 4.2 explains how Ofcom's treatment of the pension deficit as a capital structure issue in the March 2017 WLA consultation is different from the previous approach and places it in the context of the theoretical literature;
- Section 4.3 identifies key issues to consider when deciding for or against Ofcom's proposed approach; and
- Section 4.4 discusses the impact of the pension deficit on the cost of debt.

### 4.1. Ofcom's previous approach to the asset beta in light of the pension deficit

Ofcom has previously included the impact of the pension deficit on the asset beta in the cost of capital estimate for the regulated parts of BT by using the observed equity beta of BT Group as a starting point for the asset beta calculation and not adjusting it for the pension deficit in any way.<sup>67</sup> The observed equity beta for BT Group will reflect the market view of the impact of the pension deficit on the risk faced by the shareholders of BT Group. By (historically) not adjusting the capital structure Ofcom retained the impact of this additional "leverage" in the asset beta estimate. This result is consistent with the fact that this risk remains with the firm under Ofcom's policy of not allowing for deficit repair payments to be

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<sup>65</sup> For UK utilities, see Table B.2

<sup>66</sup> See e.g. Ofgem (2017): Impact Assessment Form - Ofgem's policy for funding Network Operators' Pension Scheme Established Deficits and Ofcom (2010): Pension Review where Ofcom discusses the Competition Commission's decision on Ofwat's treatment of Bristol Water's deficit repair payments.

<sup>67</sup> See Appendix B

passed on to consumers. Hence, Ofcom's cost of equity allowance has reflected the risk introduced by the pension plan that is borne by shareholders.

Ofcom's approach from 2010 may no longer be appropriate if Ofcom were to change its treatment of deficit repair payments. Ofcom also needs to consider the suitability of its approach from 2010 when using comparator companies that do not have a deficit (e.g. for part of the Openreach estimate) as these will not reflect pension risk<sup>68</sup> (also see Appendix B).

#### **4.2. Ofcom's "practitioners' adjustment" to the capital structure in the March 2017 WLA consultation**

In the March 2017 WLA consultation Ofcom proposed to alter its approach by also treating (a share of) the pension deficit as "debt" in the regulatory capital structure. In doing so Ofcom did not explicitly reference the JMB framework described in chapter 3.3 but proposed to treat the pension deficit as 'debt like' in a similar way to equity analysts and rating agencies (i.e. practitioners). Ofcom estimated an asset beta for BT Group as of December 2016 of 0.81 if the accounting value of the pension deficit is ignored and of 0.72 if the full accounting value of the pension deficit is included in its gearing estimate.<sup>69</sup> Given the uncertainty about the magnitude of the pension deficit taken into account by market participants Ofcom proposed an asset beta of 0.76. Effectively, Ofcom's March 2017 WLA consultation proposal is to add half the pension deficit as valued under IAS 19 into the regulatory capital structure as conventional financial debt.

Ofcom only included 50% of the accounting deficit because of uncertainty about the size of the deficit taken into account by investors: IAS 19 requires BT to discount the pension liabilities at the yield of a high quality corporate bond. Ofcom stated that it is unclear whether the accounting value is relevant in the present context.<sup>70</sup> It may also be the case that investors base their assessment of BT's pension plan on the best estimate where the defined benefits are discounted at the expected return of the pension assets and according to which BT's pension plan could be in surplus. In their analyst reports on BT, Deutsche Bank and RBC take estimates based on the actuarial value of the pension deficit into account when calculating the value of equity. Deutsche Bank and J.P. Morgan underpin their analyses with considerations of both the actuarial and the accounting value.<sup>71</sup>

Table 4.1 shows the WACC, cost of equity and operating asset beta impacts of not including, partially including or fully including the accounting value of the pension deficit. Note that we have not adjusted the gearing levels but instead simply assumed that the historic 2-year average levels of gearing (when including different shares of the pension deficit) will

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<sup>68</sup> This problem may be partly offset by the fact that Ofcom gives weight to BT in the Openreach calculation and ensures that the weighted average of the individual division betas sums to the BT Group beta which reflects the pension plan risk.

<sup>69</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.89 and A16.90.

<sup>70</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.84.

<sup>71</sup> See RBC Capital Markets (2017): BT Group PLC; Deutsche Bank – Markets Research (2017): BT Group PLC - Company Update; J.P. Morgan Cazenove (2017), BT Group

continue to apply going forward. Bearing this approach in mind the estimates for the cost of equity are not directly comparable as they apply at different levels of leverage.

**Table 4.1**  
**The WACC for BT Group using Ofcom's March 2017 WLA consultation approach with different assumptions about the size of the deficit treated as "debt"**

	Pension plan not included	Ofcom's practitioners' approach (50% of pension deficit included)	Alternative approach (100% of pension deficit included)
<i>Capital values (in m£)</i>			
Financial debt	12,019	12,019	12,019
Equity	39,217	39,217	39,217
Pension deficit		3,491	6,983
Adjusted debt	12,019	15,510	19,001
Operating assets	51,236	54,727	58,218
<i>Betas</i>			
Adjusted debt	0.10	0.10	0.10
Equity	1.02	1.02	1.02
Asset	0.80	0.76	0.72
<i>Gearing</i>			
Actual	23%	28%	33%
<i>Cost of equity (nom., pre-tax, act. gearing)</i>			
	11.46%	11.46%	11.46%
<i>WACC (nom., pre-tax, act. gearing)</i>			
	9.88%	9.55%	9.26%

Source: BT annual accounts, Bloomberg, NERA analysis.

Table 4.1 illustrates that the size of BT's asset beta is negatively related to the portion of the pension deficit considered as "debt". If the pension plan is not included, the operating asset beta is calculated as 0.80 whereas partial inclusion reduces the calculated operating assets beta to 0.76.<sup>72</sup> Including the whole accounting value of the pension deficit has the effect of decreasing the calculated operating assets beta to 0.72.

The table also highlights a number of other findings:

- Any adjustment (JMB or Ofcom's practitioner's adjustment) only affects the **headline cost of equity** if there is a difference in the capital structure used to de-lever and re-lever the original equity beta (albeit this headline cost of equity will apply at a different level of assumed gearing); while
- Ofcom's proposed adjustment creates a difference of c. 60 basis points in the **WACC** depending on whether the pension deficit is included in gearing or not while leaving all other WACC parameters unchanged. Including half of the pension deficit reduces the WACC by c. 30 basis points. The effect on the WACC is driven by the assumption of an unchanged cost of debt getting a higher weighting.

<sup>72</sup> The partial addition to debt might be intended to account for the pension deficit not sharing all features of financial debt. However, it might be considered inconsistent to assign the same beta for the pension plan and debt while at the same time acknowledging differences.

We now show that there are both conceptual and empirical issues with a pensions-based capital structure adjustment.

### **4.3. Issues with Ofcom's capital structure adjustment proposed in March 2017**

From a conceptual point of view, BT is responsible for closing the pension deficit under Ofcom's regulatory framework. Under the presumption that BT cannot (completely) renegotiate pension payments and pass through deficit repair payments to customers, BT may therefore have to redirect cash that would otherwise flow to shareholders to pension asset acquisition.<sup>73</sup> Ofcom's 2010 approach therefore correctly uses a starting point (namely BT Group's equity beta) that does not remove the pension plan risk from the regulatory cost of equity allowance.

Starting from this point of view it is important to be clear on the exact nature of the liability the deficit imposes. In practice the pension deficit is similar to an operating liability (such as e.g. decommissioning liabilities for oil & gas rigs) in that future obligations are known and committed, but do not themselves constitute a source of funds.<sup>74</sup> In so far as such obligations are "unfunded", it is equity investors that are responsible for funding them going forward.

Consequently, the deficit adds to the operational gearing of the firm much like any other fixed expenditure. This additional operational gearing affects the volatility of returns to shareholders, which in turn affects the cost of equity via the equity beta. In that regard it shares the characteristics of debt, like any fixed obligation does. However, to the extent the deficit does represent an integral part of the efficient operations of the business<sup>75</sup> rather than a source of finance, good regulation requires for it to be recognised either as an expensable item (i.e. by allowing pension deficit repair payment) or through the cost of equity impact it imposes.

On the other hand, Ofcom's 2017 proposals essentially assume that there is a funding source other than equity for money "earmarked" to eventually close the deficit by only allowing BT's regulated entities to earn the cost of debt allowance on an equivalent portion of the assets. There does not appear to be any evidence that the share of the deficit treated as a prior claim also brings with it a way of obtaining cheap finance. In fact, Lay (2016) seems to suggest that the pension deficit actually has a stronger impact on the cost of other sources of financing than financial debt (see chapter 3.3). In the absence of any evidence of the existence of such cheap financing Ofcom should continue to use its preMarch 2017 WLA consultation approach that recognises the risk impact of the prior claim presented by the

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<sup>73</sup> Of course, this does not have to be the case and could be circumvented by an increase in interest rates or pension asset returns. Nonetheless, the pension deficit poses a risk to shareholders for which the regulatory cost of equity should compensate them.

<sup>74</sup> In addition the size of the pension deficit may fluctuate more sharply than other liabilities due to its long-term nature and the uncertainty of both future returns and cash-out requirements.

<sup>75</sup> This is correct as long as it is not judged to be inefficient to operate (or have operated – as the scheme is now closed to new members) such a scheme.

deficit without treating it as a source of cheap financing as the financing obligation eventually falls on the equity holders.

Further capital structure adjustments may be appropriate in the following cases:

- If Ofcom started allowing for deficit repair payments in charge controls, shareholders should not be compensated for the potential risk impact of the pension plan. In that case, it may actually be appropriate to de-lever the observed equity beta relying on the JMB framework, but this would be associated with some challenges as pointed out by Cooper and Dobbs (see above) and re-levering the operating asset beta using the “classical” approach. By doing so, the pension plan risk included in the observed equity beta would be taken out of the forward-looking equity beta.
- If Ofcom derived the asset beta based on comparators without a pension deficit, Ofcom should ensure that the risk associated with the pension deficit was included when re-levering to the equity beta. To do so, Ofcom would either have to employ the JMB framework or otherwise include a “margin” when calculating the weighted average between BT Group and the comparators (also see Appendix B).<sup>76</sup>

In addition to the conceptual issue of introducing a source of cheap financing to the regulatory capital structure that is not actually backed by a corresponding financing source in the actual capital structure, the March 2017 WLA consultation proposals encounter some empirical difficulties. As pointed out by various respondents there is substantial uncertainty about the correct values for any adjustment. First, BT may be able to pass on some of its risk to the tax authorities and pensioners such that shareholders do not bear the risk of BT having to reduce dividend payments to cover the deficit. Ofcom proposed to account for these issues by only including 50% of the deficit as a prior claim. Uncertainty around whether this is the right percentage to include remains. Varying the share of the pension deficit included as debt when calculating the gearing measure has a non-trivial impact on the WACC as shown in Table 4.1.

Moreover, while Ofcom does not in any way link its proposed capital structure adjustment to the JMB framework, its chosen approach is numerically equivalent to a specific case of the JMB framework<sup>77</sup>: In treating some of the pension deficit as “conventional” debt and thus applying a debt beta of 0.1 to it, Ofcom essentially assumes a “narrowed” down version of the JMB equation reported below where

$$\beta_{OA} = \frac{E}{OA} * \beta_E + \frac{D}{OA} * \beta_D - \left( \frac{PA}{OA} * \beta_{PA} - \frac{PL}{OA} * \beta_{PL} \right)$$

becomes

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<sup>76</sup> Note that this problem may be partly offset by the fact that Ofcom proposes to give weight to BT in the Openreach calculation and ensure that the weighted average of the individual division betas sums to the BT Group beta which reflects the pension plan risk. In addition there are a number of practical difficulties with implementing the JMB framework as shown in Appendix B.

<sup>77</sup> We reference back to the JMB framework at this point because it remains the only theoretical framework used in the academic literature.

$$\beta_{OA} = \frac{E}{OA} * \beta_E + \frac{D}{OA} * \beta_D + \frac{PL - PA}{OA} * \beta_D .^{78}$$

In making this simplification Ofcom's approach implicitly assumes  $\beta_D = \beta_{PA} = \beta_{PL} = 0.1$  as OXERA and Openreach have pointed out in their responses to the March 2017 WLA consultation. As shown in Appendix A these assumptions are not borne out by the evidence.

In summary, under Ofcom's 2010 approach, where pension deficit risk is at least partially borne by equity holders, the equity beta should reflect the risk of the pension scheme, including any effect due to a pension deficit that is reflected in the observed equity beta. Ofcom's 2010 approach, which did not adjust (or de-lever) the observed equity beta to try to separate out pension risk, is better suited for calculating a cost of equity that does reflect the pension risk. This is because the 2010 approach effectively leaves in whatever risk of the pension deficit is reflected into the actual observed equity beta. On the other hand, the March 2017 WLA consultation capital structure adjustment introduces the additional assumption that funding for the closure of the pension deficit can be obtained at preferential ("cost of debt") terms, and that a portion of the equity risk can be explained by the pension deficit risk, assumed to share the same risk features as traditional financial debt. This assumption is not consistent with the financial literature (which stipulates that the pension assets and liabilities have much higher betas, and are therefore more risky, than traditional debt) and implies that the pension deficit is as risky as traditional debt, and can be funded at the existing cost of debt.. In addition, any empirical implementation of the March 2017 proposals would be subject to significant uncertainty. We recommend that Ofcom should therefore refrain from using the proposed adjustment.

Unless Ofcom has changed its approach to pension deficit risks by assuming eg. that pension deficit repair costs can be recovered (eg. in full) going forwards, we believe that accounting for the pension deficit as financial debt is unjustified.

#### 4.4. Impact of the deficit on the cost of debt

Below we briefly consider whether there is an additional impact of the pension deficit on the appropriate cost of debt allowance. Given that rating agencies treat the pension deficit as a prior claim that increases the risk associated with the debt of a company (see section 3.2), we assess the extent to which we need to specifically account for the pension deficit in the cost of debt allowance.

Ofcom's analysis of BT's cost of debt in its March 2017 proposals for the next regulatory period mostly focusses on BT's own cost of debt spread over the last one to two years (giving more weight to more recent data) combined with an estimate of the forward-looking risk-free rate. Ofcom also considers yields on a BBB index.<sup>79</sup> Ofcom's analysis does not explicitly discuss the impact of increased gearing (financial or pension deficit) on the cost of debt and

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<sup>78</sup> To the extent that Ofcom assumes that only part of the deficit is considered debt-like "OA" is now defined as containing only the "debt-like" part of the pension deficit.

<sup>79</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, paragraphs A 16.51 and A 16.52.

whether a higher gearing going forward may affect future rating and spreads. Ofcom proposed to use a forward-looking level of gearing chosen to be consistent with the historically observed level of gearing. Ofcom also discusses but does not implement a possible increase in the debt beta due to taking account of the pension deficit in debt.<sup>80</sup>

As discussed in chapter 3.2, rating agencies take the pension deficit into account when deriving financial metrics underlying their credit ratings and hence there is merit in cross checking whether the credit rating implied by the forward-looking level of prior claims (financial and pension deficit) is consistent with the credit rating the reference issuers had over the period that Ofcom is drawing on for the cost of its debt estimate.

As Ofcom is estimating the cost of debt based on BT's actual financing cost, it is capturing any impact of the pension deficit over the last two years. Hence there is no need to change the estimates of the cost of debt for the presence of a pension deficit (because it was already present in the historic data).

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<sup>80</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, paragraphs A 16.86 to A 16.90.

## 5. Conclusion

BT operates a defined benefit pension scheme that is substantially in deficit under IAS 19 accounting rules. In the past Ofcom has taken account of the impact of the pension deficit on the cost of debt and equity by using the observed BT Group equity beta and bond yields as the starting points of its analysis. These starting points reflect the market view of the impact of the pension deficit on the cost of debt and equity.

In contrast to previous treatment of BT's pension deficit, the March 2017 WLA consultation proposes to additionally include 50% of the accounting value of BT's pension deficit (£ 11,100m in January 2017) as part of the gearing measure used to derive the asset beta for BT Group. The March 2017 WLA consultation has also proposed to use the adjusted gearing measure to weight the cost of equity and cost of debt when calculating the WACC.

In chapter 4 we considered whether there are arguments for considering the pension deficit when determining:

- The asset beta;
- The capital structure; and
- The cost of debt.

Since shareholders bear the risks associated with the pension deficit under Ofcom's current regulatory framework, the regulatory cost of equity allowance has to compensate them for that risk. When determining the **asset beta** Ofcom has previously used the BT Group observed equity beta (which reflects the market view of the deficit as a prior claim that affects equity risk) as a starting point for its cost of equity estimate. In our view, this approach remains valid today.<sup>81</sup>

Under Ofcom's 2010 approach, where pension deficit risk is at least partially borne by equity holders, the equity beta should reflect the risk of the pension scheme, including any risk due to a pension deficit that is reflected in the observed equity beta. Ofcom's 2010 approach, which did not adjust (or de-lever) the observed equity beta to try to separate out pension risk, is better suited for calculating a cost of equity that does reflect the pension risk. This is because the 2010 approach effectively leaves in whatever risk of the pension deficit is reflected into the actual observed equity beta. On the other hand, the March 2017 WLA consultation capital structure adjustment introduces the additional assumption that funding for the closure of the pension deficit can be obtained at preferential ("cost of debt") terms, and that a portion of the equity risk can be explained by the pension deficit risk, assumed to share the same risk features as traditional financial debt. This assumption is neither consistent with the financial literature (which stipulates that the pension assets and liabilities have much higher betas, and are therefore more risky, than traditional debt) and implies that the pension

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<sup>81</sup> Because Ofcom intends to use forward-looking gearing close to actual gearing and market data is available on how the stock market views BT's pension deficit, Ofcom does not need to undertake any specific pension deficit adjustment when estimating the cost of equity for BT. Also see the previous reports by Cooper that discuss the difficulties associated with any such adjustment. In addition see Appendix B for a possible adjustment of comparator betas when determining the asset beta for Openreach.

deficit is as risky as traditional debt, and can be funded at the existing cost of debt.). In addition any empirical implementation of the framework would be subject to significant uncertainty.

In summary, we find that the pension deficit does not represent a source of financial leverage or funding and should not therefore be included in measures of financial gearing. As a result, the asset beta, unlevered using financial debt only, will include pension deficit risk, which is appropriate when the pension scheme is viewed as an integral part of the operation of the business in question.

We recommend that Ofcom should therefore refrain from using the proposed adjustment in its final WLA Market Review statement.

Unless Ofcom has changed its approach to pension deficit risks by assuming (eg. that pension deficit repair costs can be recovered going forwards), we believe that accounting for the pension deficit as debt is unjustified.

Thus, while Ofcom is right to recognise the fact that the deficit represents a prior claim when the market determines the equity beta for BT Group, it does not follow that Ofcom should adjust the capital structure such that it treats the deficit as gearing, because BT's shareholders are *still* required to provide the equity capital necessary to close the deficit. In practice the pension deficit is similar to an operating liability (such as e.g. decommissioning liabilities for oil & gas rigs) in that future obligations are known and committed, but do not themselves constitute a source of funds. In so far as such obligations are "unfunded", it is equity investors that are responsible for funding them going forward.

To the extent the deficit does represent an integral part of the efficient operations of the business<sup>82</sup> rather than a source of finance, good regulation requires for it to be recognised either as an expensable item (i.e. by allowing pension deficit repair payment) or through the cost of equity impact it imposes. Consequently, the cost of capital is required to attract both the equity required to close the deficit and the equity required for the "normal" operation of the business. This finding does not in any way contradict the equity analyst / rating agency practice of subtracting the value of the deficit from the value of equity available to shareholders.

Ofcom's approach to estimating the **cost of debt** appropriately captures the impact of the pension deficit on the cost of debt by considering BT Group's actual debt costs (e.g. via the spreads on BT's debt).

To summarise: (at least some part of) the deficit constitutes a prior claim that affects risk and therefore needs to be considered as a risk factor when determining both the cost of equity and the cost of debt. It will affect BT's equity beta, although the size and direction of the effect depends on the size and riskiness of the pension scheme (both its assets and liabilities). The market view of what constitutes the "non-renegotiable" part of the deficit will be reflected in

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<sup>82</sup> This is correct as long as it is not judged to be inefficient to operate such a scheme (or have operated – as the scheme is now closed to new members).

the observed equity beta and cost of debt for BT and thus carried into Ofcom's regulatory cost of debt and equity allowances with the "renegotiable" part of the deficit duly excluded from consideration.

However, the "non-renegotiable" part of the pension deficit and / or funds "earmarked" to eventually close the deficit do not constitute (lower cost) debt capital as the firm's shareholders are required to eventually close the "non-renegotiable" part using the returns otherwise due to equity. An adjustment of the capital structure to reflect the "non-renegotiable" part of the deficit is therefore neither necessary nor justified.

## Appendix A. Evidence on pension plan betas

As pointed out by BT and OXERA, if we take the full JMB framework, in its March 2017 WLA consultation Ofcom implicitly treats both the beta of pension assets and pension liabilities to be equal to the assumed debt beta of 0.1. A review of the academic literature suggests that neither of these assumptions would be appropriate within the JMB framework, which remains the central theoretical reference point, even if the pure version of the formulation has been challenged (by Cooper (2009, 2010) as well as others).

Our review of the academic literature does indeed suggest the pension plan betas (for both assets and liabilities) are likely to be higher than the beta for financial debt although there is significant uncertainty about their precise values. In fact, the assumptions regarding  $\beta_{PA}$  and  $\beta_{PL}$  were heavily discussed in the context of Ofcom's 2010 pension review. For instance, the uncertainty about  $\beta_{PL}$  was one of Cooper's main concerns with the JMB framework.<sup>83</sup>

In any case,  $\beta_{PA}$  is likely to be higher than the beta of investment grade debt as most pension funds will hold more diversified and more risky portfolios than simply high grade corporate debt.<sup>84</sup> Dobbs' estimate is  $\beta_{PA} = 0.42$  for 2008 which is significantly above Ofcom's assumed debt beta.<sup>85</sup> In a response to Ofcom's 2010 pension consultation, PWC on behalf of Sky and TalkTalk estimated a pension asset beta of 0.53 given the asset composition in BT's pension scheme.<sup>86</sup>

The beta of pension liabilities is most commonly thought of as closer to the debt beta<sup>87</sup> but most estimates also exceed 0.1. E.g. OXERA quotes Gallagher et al. (2011) who base their estimate of the asset beta of BT's pension liabilities on government debt and find it to be in the range of 0.28–0.38. JMB initially suggested a range from 0.18 to 0.46 for  $\beta_{PL}$ .<sup>88</sup> Dobbs argues that the asset beta of pension liabilities may be higher than that because the liability depended on cyclical factors such as real wage growth and longevity. Dobbs suggests a reasonable value may be as high as 0.38 or even 0.48.

Using estimates of  $\beta_{PA}$  and  $\beta_{PL}$  that are consistent with the beta of the assets in which the pension fund is invested in (i.e. setting both  $\beta_{PA}$  and  $\beta_{PL}$  at or above 0.4) may also be more in line with a "best estimate" of the deficit that discounts the liabilities at a rate that is closer to the expected return on the investment portfolio of the fund. Similarly, when including the full accounting deficit as a prior claim, it may be more consistent to use a  $\beta_{PA}$  and  $\beta_{PL}$  that is consistent with the risk of high rated bonds. However, the academic literature reviewed in

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<sup>83</sup> Cooper (2010): COMMENT ON RESPONSES TO THE REPORT: The effect of defined benefit pension plans on measurement of the cost of capital for UK regulated companies: A report for Ofcom, p. 3.

<sup>84</sup> See e.g. Jin et al. (2006): Do a firm's equity returns reflect the risk of its pension plan, *Journal of Financial Economics* 81 (2006) 1–26, page 5.

<sup>85</sup> Dobbs (2010): Defined Benefit Pension Plans, the Cost of Capital and the Regulatory Allowed Rate of Return, p. 16.

<sup>86</sup> PWC (2010): Ofcom Pension Review - Adjusting BT's beta to account for pension risk, page 4.

<sup>87</sup> Jin et al. (2006): Do a firm's equity returns reflect the risk of its pension plan, *Journal of Financial Economics* 81 (2006) 1–26, page 5.

<sup>88</sup> Jin et al. (2006): Do a firm's equity returns reflect the risk of its pension plan, *Journal of Financial Economics* 81 (2006) 1–26, page 10.

chapter 3.3 would suggest that in practice less than the full accounting deficit is taken into account when market participants determine the impact of the deficit on the cost of equity.

Therefore, with the above in mind, the use of a  $\beta_{PA}$  and  $\beta_{PL}$  equal to 0.1 within a JMB framework does not appear to be borne out by the academic literature.

## Appendix B. Betas for different branches of BT Group

### B.1. Ofcom's proposed approach in the March 2017 WLA consultation to estimating the betas for different branches of the BT Group

Ofcom's March 2017 WLA consultation proposed to split BT Group into three branches with different asset betas: Openreach copper access, Other UK telecoms and Rest of BT (RoBT, which largely incorporates BT's unregulated ICT activities). The weights and asset betas underlying the consultation document are listed in the below table.

**Table B.1**  
**Asset betas of BT Group branches**

	Asset beta	Weight
Openreach copper access	0.55	20%
Other UK telecoms	0.75	65%
RoBT	1.08	15%
<b>BT Group</b>	<b>0.76</b>	<b>100%</b>

*Source: Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.137*

Ofcom derives the asset beta for Openreach copper access by reference to the BT Group asset beta and samples of UK network utilities and UK fixed telecom operators.<sup>89</sup> Ofcom looks at asset betas of UK and European telecoms operators to determine the asset beta for Other UK telecoms.<sup>90</sup> The asset beta for RoBT is informed by asset betas for ICT companies and from the asset betas and weights for Openreach and Other UK telecoms such that the weighted average asset beta of all three branches adds up to the value for the BT Group as a whole.<sup>91</sup>

### B.2. Incomplete accounting for pension risk under Ofcom's 2010 approach

Not all of the comparators included in the samples above have pension deficits themselves. E.g. Ofcom identified five utilities as suitable comparator companies for Openreach as it is expected to face lower systematic risk than BT Group as a whole.<sup>92</sup> We reviewed the annual reports to identify whether the comparators employ pension schemes of a similar size as BT as shown in the table below.

<sup>89</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.106 to A16.109.

<sup>90</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.112.

<sup>91</sup> Ofcom (March 2017): Wholesale Local Access Market Review Consultation – Annexes, A16.137.

<sup>92</sup> Ofcom (March 2017), Wholesale Local Access Market Review Consultation – Annexes, A16.107.

**Table B.2**  
**Pension deficits of comparators**

<b>Comparator</b>	<b>Pension deficit (IAS 19)</b>	<b>Total Assets</b>	<b>Pension liabilities</b>	<b>Ratio of liabilities to operating assets</b>
BT Group	11,100	40,837	60,200	1.47
National Grid	1,933	65,840	25,890	0.39
Severn Trent	584	9,008	2,873	0.32
Pennon Group	68	3,495	956	0.27
United Utilities	-248	13,852	3,616	0.26
SSE	36	23,391	4,386	0.19

*Source: NERA analysis of annual accounts.<sup>93</sup> All values in million pounds.*

With a ratio of 1.47 BT Group's pension liabilities exceed the amount of total assets.<sup>94</sup> For all of the comparators the size of future retirement obligations is far below their total assets, with the respective ratios ranging from 0.19 to 0.39.<sup>95</sup> Hence none of the companies run pension deficit risks similar to BT.

Consequently, any estimate of the asset beta for a division of the BT Group that does not only rely on the BT Group asset beta will not fully capture the risk of the BT Group pension scheme.<sup>96</sup> See Table B.3 below for an illustration of the fact that this risk can be positive or negative depending on the assumptions one takes in relation to the relative riskiness of pension assets and liabilities.

### **B.3. Fully addressing pension risks under Ofcom's 2010 approach**

Below we discuss two options for appropriately accounting for this issue.

The first approach would be to simply include a margin for the pension risk when estimating asset betas; for example, in the averaging between the BT Group and "other utilities" when setting the asset beta for Openreach copper access.

<sup>93</sup> BT Group: pension deficit (IAS 19) from BT Group: Q3 2016/17 results, page 29 and total assets and pension liabilities from annual report 2017, pages 100 and 206; National Grid: annual report 2017, pages 89, 132 and 163; Severn Trent: annual report 2017, pages 46 and 133; Pennon Group: annual report 2017, pages 45, 130 and 151; United Utilities: annual report 2017, pages 34, 56 and 81; SSE: annual report 2017, pages 108 and 154.

<sup>94</sup> Ratio refers to the pension liabilities of BT Group (BTPS, EEPS, other plans). Considering only BTPS liabilities (£ 58,649mn) yields a ratio of 1.44. Annual Account of BT Group, p.205, as of 03/17

<sup>95</sup> Annual Accounts of SSE, Severn Trent, United Utilities, National Grid, Pennon Group, as of 03/17, total assets excl. pension assets.

<sup>96</sup> This problem may be partly offset by the fact that Ofcom gives weight to BT in the Openreach calculation and ensures that the weighted average of the individual division betas sums to the BT Group beta which reflects the pension plan risk.

A second approach would be to introduce the pension plan risk into the comparator asset betas using the JMB framework. Below we illustrate how this could be done using two illustrative combinations of  $\beta_{PA}$  and  $\beta_{PL}$ .

- **Alternative JMB (1):** We set  $\beta_{PA} = 0.42$  and  $\beta_{PL} = 0.33$ . The pension assets beta is based on Dobbs’ estimate for 2008. The pension liabilities beta is the midpoint of the range suggested by Gallagher et al. (2011). These assumptions are consistent with the pension deficits widening in economic downturns.
- **Alternative JMB (2):** We set  $\beta_{PA} = 0.4$  and  $\beta_{PL} = 0.4$ . The reduction of the pension asset beta could potentially be motivated with further de-risking of BT’s pension scheme after 2008. The relatively high value for the pension liabilities beta goes back to Dobbs. These assumptions imply that the pension assets and liabilities have the same risk characteristics. The pension deficit will not widen in a downturn.

Given capital values<sup>97</sup> and debt and equity betas, the magnitude of the operating asset beta depends on the term in brackets of the JMB equation reproduced below:

$$\beta_{OA} = \frac{E}{OA} * \beta_E + \frac{D}{OA} * \beta_D - \left( \frac{PA}{OA} * \beta_{PA} - \frac{PL}{OA} * \beta_{PL} \right).$$

Table B.3 shows the results of re-levering an asset beta of 0.46 that was derived from companies that do not have a significant pension deficit under different sets of assumptions regarding the betas of the pension plan.

For illustrative purposes we re-lever the asset beta of 0.46<sup>98</sup> using the JMB formula<sup>99</sup> and assuming a forward looking capital structure where 50% of BT’s current accounting deficit and financial debt have a joint share of 35% in operating assets. In practice Ofcom would look to weight the evidence on the utilities beta and the BT Group beta (as well as comparisons with other UK telcos) before calculating any WACC or cost of equity estimates. The below numbers are illustrative and should not be interpreted as a recommendation on the asset beta for Openreach. To complete the comparisons we have used the other parameter values underpinning the Openreach WACC proposed in the March 2017 WLA consultation.

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<sup>97</sup> In the remainder of this report, we consider only half of the accounting value of the pension deficit by adjusting the pension liabilities accordingly.

<sup>98</sup> Average two-year asset beta for five UK network utilities, taken from: (March 2017) Wholesale Local Access Market Review Consultation – Annexes, Ofcom, p. 290.

<sup>99</sup>  $\beta_{E, re-levered} = \frac{0.46 * OA - \beta_D * D_{ad} - \beta_{PL} * PL + \beta_{PA} * PA}{E_{ad}} = \frac{0.46 * OA - 0.1 * 15,633 - \beta_{PL} * 47,289 + \beta_{PA} * 43,798}{35,572}$ . The asset beta of 0.46 is equal to the average 2-year asset beta for UK utilities in Table A16.21 of the March 2017 WLA consultation.

**Table B.3**  
**Impact of pension plan betas – re-levering of a third party asset beta**

	Ofcom consultation approach	Alternative JMB (1)	Alternative JMB (2)	Pension plan omitted
<b>Capital values (in m£)</b>				
Financial debt'	15,663	15,663	15,663	17,932
Equity'	35,572	35,572	35,572	33,303
Pension assets	43,798	43,798	43,798	
Pension liabilities	47,289	47,289	47,289	
Pension deficit	3,491	3,491	3,491	
Operating assets	54,727	54,727	54,727	51,236
<b>Gearing</b>				
Forward looking	35%	35%	35%	35%
<b>Betas</b>				
Operating assets (UK utilities)	0.46	0.46	0.46	0.46
Financial debt	0.10	0.10	0.10	0.10
Pension assets	0.10	0.42	0.40	
Pension liabilities	0.10	0.33	0.40	
Equity (re-levered)	0.65	0.74	0.62	0.65
<b>Cost of equity (nom., pre-tax)</b>	8.95%	9.55%	8.75%	8.95%
<b>WACC (nom., pre-tax)</b>	7.43%	7.82%	7.29%	7.43%

Source: NERA analysis, BT annual accounts, Bloomberg

Table B.3 shows that the re-levered equity beta is highest under the scenario “Alternative JMB (1)”<sup>100</sup> and lower than under Ofcom’s proposed approach when using a JMB adjustment where  $\beta_{PL} = \beta_{PA} > 0.1$ . Note that when re-levering the asset beta derived from a third party, omitting the pension plan and the March 2017 WLA consultation approach lead to the same equity beta. This is because the March 2017 WLA consultation approach effectively treats the pension deficit as debt and the forward looking capital structure is 35% debt (pension deficit or financial debt) in both cases. The above table also highlights the issue that depending on which assumptions are taken for  $\beta_{PA}$  and  $\beta_{PL}$  the March 2017 WLA consultation approach may over- or understate the resultant cost of capital.

<sup>100</sup> Under “Alternative JMB (1)”:  $\beta_{PA} = 0.42$  and  $\beta_{PL} = 0.33$ .

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