openreach

Openreach's supplementary response to Ofcom's consultation

"Wholesale Local Access Market Review – Volume 2
Consultation on proposed charge control designs and implementation"

Ofcom's efficiency assumptions

Non- Confidential version

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Table of contents

Contents

Foreword

On 31 March 2017, Ofcom published a consultation on proposed charge controls for wholesale standard and superfast broadband as part of its Wholesale Local Access (WLA) Market Review. On 14 September 2017, Ofcom published a further consultation on proposed charge controls for wholesale standard and superfast broadband as part of its Wholesale Local Access (WLA) Market Review.

This submission is provided by Openreach, a functionally separate line of business within British Telecommunications plc ("BT").[1] This submission sets out Openreach's further comments on Ofcom's efficiency proposals in the WLA Charge Control.

Any comments on this submission should be sent to Mark Shurmer, Managing Director Regulatory Affairs, Openreach, at mark.2.shurmer@openreach.co.uk.

[1] As part of BT's implementation of its formal notification dated 10 March 2017 under section 89C of the Communications Act 2003 ("the Act"), the Openreach business will be operated by Openreach Limited, which was incorporated as a separate legal entity on 24 March 2017, following the fulfilment of certain conditions set out in the notification.

1 Executive Summary

1. This paper sets out additional information relating to the level of efficiency that Ofcom use as input to its top-down charge control model, which in turn, derives the level of prices for Copper services over the period of the charge control.[2]

2. This paper describes why it is more appropriate to use the following levels of efficiency in the WLA charge control model:

   a. 2.5% efficiency for operating costs (i.e. and not 5.5%); and

   b. 1% efficiency for capital costs (i.e. and not 3%).

3. These targets, in combination with Ofcom's assumptions for input prices and scale economies, would result in annual cost reductions of 6% per annum during the charge control period, as opposed to the c.11% currently forecast using Ofcom's assumptions. This 6% annual reduction in total costs represents an achievable yet challenging target.

Our concerns about Ofcom's assessment

4. Ofcom's assessment of efficiency is focused primarily on historic levels of efficiency using BT's regulatory accounts and internal management accounts. Ofcom justifies its reliance on these sources on the basis that they are consistent with the cost equations used to forecast service costs in Ofcom's CPI-X model.

5. However, in adopting this approach, there is a risk of undue reliance on one source of data, i.e. the historic regulatory cost data. The over-reliance on historic regulatory data means that Ofcom takes insufficient account of economy-wide efficiency information and BT-specific internal studies on its potential to deliver cost savings during the course of the charge control (i.e. BT's current transformation programme, Project ✂)).

6. In addition to the cost reductions from these general efficiency assumptions on opex (5.5%) and capex (3%), Ofcom assumes further savings will be achieved through Openreach's Fault Volume Reduction (FVR) programme. These assumptions are unrealistic because it would require a level of operating cost efficiency in excess of 9% per annum, which is significantly above our historic achieved efficiency and indeed does not take into account that BT's forward-looking cost savings already include FVR benefits.

Our estimated efficiency levels

7. Against this background, we believe our 2.5% opex and 1% capex efficiency estimates are more appropriate as efficiency targets because they:

   a. are forward-looking rather than relying unduly on historical trends which can be a poor predictor of the future;

   b. appropriately reflect longer term sector trends;

   c. have been independently assessed; and

   d. represent targets which are achievable yet challenging.

8. Even if efficiency targets were set by reference to historic achievements, we believe that the level Ofcom has calculated is too high. In relation to opex efficiency, we set out a number of adjustments to Ofcom's analysis which we believe are necessary. These result in annual unit opex cost reductions between 3.4% and 3.9% (with a midpoint of 3.7%), compared to the 4.4% to 6.7% range (with a midpoint of 5.5%) that Ofcom proposed in the March Consultation.

9. In relation to capex efficiency, the combined impact of Ofcom's assumptions is a total real cost reduction of 3% to 8%. This is based on: (i) the 1% to 5% efficiency savings (with a midpoint of 3%); and (ii) the 2% to 3%

[2] This submission should be considered alongside evidence Openreach is submitting on BT's ongoing transformation programme (Project ✂.)

annual real price reduction. We consider this is counter the evidence we present below that; sub-contractor efficiency should be zero; pay inflation for capex and opex should be modelled consistently and; the expected increase in civil engineering costs.

10. Given the significant impact that efficiency assumptions have on the charge control, it is essential they accurately reflect the efficiencies that can realistically be achieved during the charge control period. We look forward to continuing to engage with Ofcom to ensure that the efficiency assumptions are realistic, yet challenging and consistent with Ofcom's legal obligations and policy objectives.

2 Overall context of Ofcom's efficiency analysis

11. In the table below, we summarise Ofcom's cost forecasts[3] and distinguish between the cost projections resulting from the different assumptions. Our focus here is on the costs associated with the copper products within the WLA and WFAEL markets, since the fibre-based products are forecast using the bottom-up model.

Figure 1: Ofcom's cost forecasts and sources of cost savings

	2018/19	***2019/20***	***2020/21***	***Average***
	£m	£m	£m	£m
Total costs (excl. Cumulo & SLG)	✂	✂	✂	✂
Total opex forecast	✂	✂	✂	✂
Opex efficiency	✂	✂	✂	✂
Input price change	✂	✂	✂	✂
FVR uplift	✂	✂	✂	✂
FVR benefit	✂	✂	✂	✂
Scale economies (CVEs)	✂	✂	✂	✂
Total opex impact	✂	✂	✂	✂
% of Opex forecast	✂	✂	✂	✂
Total capital cost forecast	✂	✂	✂	✂
Capex efficiency	✂	✂	✂	✂
Input price change	✂	✂	✂	✂
Scale economies (AVEs)	✂	✂	✂	✂
Total capital cost impact	✂	✂	✂	✂
% of Capital cost forecasts	✂	✂	✂	✂
% of Total cost forecasts	**-8.5%**	**-10.6%**	**-13.3%**	**-10.8%**

Source: Openreach analysis of Ofcom's cost model

12. Ofcom set an X that implies Openreach can achieve a greater level of efficiency than the economy in general. In assessing this question, however, Ofcom has relied unduly on historic trends in Openreach costs as reported in the RFS. Ofcom should also cross check whether its estimates are reasonable as compared to productivity measures for the economy and for the sector.

13. Efficiency and cost savings can be achieved in different ways, which in turn translates into the level of X in the CPI-X formula.

    a. Sourcing of inputs – "buying things cheaper". All else being equal, if Openreach is able to source its inputs cheaper than in previous years, then in a competitive market this would be passed on to customers in the form of lower prices.

    b. Scale economies – "doing more of the same". Each additional unit costs less than the previous unit (as fixed costs are spread over a larger base), and the reduction in unit costs flows through to lower unit prices.

    c. Productivity – "doing things quicker". Less engineering time spent on given tasks reduces the engineering manpower needed for those tasks, resulting in reduced pay opex or capitalised labour. Increased productivity could also result from changes in the underlying assets, allowing more to be done for the same cost.

    d. Service-related, e.g. having fewer fault visits. A targeted programme may reduce the future likelihood of faults and save on costs that would otherwise be incurred.

14. General technological progress on an economy wide basis, or total factor productivity (TFP), can contribute to efficiency savings under one or more of these categories. In practice, although there may

[3] These exclude Cumulo and SLG as they are forecast separately and entered as inputs in Ofcom's CPI-X model.

be practical issues with isolating the contributions from each of these, the overall TFP growth estimates are relatively standardised and commonly used by national statistics agencies around the world.

15. We provide the latest evidence on these external measures and find that total factor productivity growth and labour productivity growth rates have been hovering around 0% for both the economy in general and for the information and communications sector. Ofcom's estimate for Openreach of high and growing opex efficiency (2.5% to 5.5%) looks very high in comparison and the justification for the difference is unclear.
16. When all the different aspects of the cost forecasts are considered, the total impact of Ofcom's assumptions is an annual cost reduction of over 10%. In the following sections we set out in detail our assessment of these cost trends based on the latest available evidence.
17. In Annex 1 we explore in further detail the link between Ofcom's efficiency assumptions and general productivity improvements across the wider sector and economy as a whole, and how that relates to the CPI-X incentive regulation framework. In Annex 2 a spreadsheet is appended with Openreach's workings regarding adjustments to Ofcom's pairwise analysis.

3 Ofcom's assessment of historic efficiency

18. Ofcom's assumption of 5.5% operating costs efficiency in its top-down model removes c.£670m over the three years of the charge control period (in addition to c.£170m from 2016/17 to 2017/18 - prior to the start of the charge control).

19. In order to derive this base assumption, Ofcom conducts an assessment of:

    a. Historic performance on efficiency, using pairwise analysis and management account information;

    b. Third party assessment of BT's efficiency; and

    c. Future scope for efficiency.

20. This section sets out our comments on Ofcom's assessment.

Historic performance – pairwise analysis

21. To assess historic performance, Ofcom places heavy reliance on its pairwise analysis, which looks at the changes in unit costs for the specific cost components between adjacent years of the RFS, specifically 2012/13 v 2013/14, 2013/14 v 2014/15 and 2014/15 v 2015/16. Ofcom then compares these results against a separate assessment of BT's management account information and a discussion of relevant third party analyses.

22. In this section we show how a number of adjustments to Ofcom's methodology are needed to ensure that changes in unit costs are compared on a like-for-like basis. Ofcom's omission of these adjustments makes its analysis unreliable and overstate the implied historic efficiencies. We also briefly discuss some of the shortcomings in the points that Ofcom has made to support the findings in its pairwise analysis.

23. We believe that the pairwise analysis can provide a useful indicator of the rate of change in costs over time. However, it is critical that the component costs being assessed between two years are fully comparable on a like-for-like basis.

24. We conclude, based on an analysis which makes the appropriate adjustments that an examination of historic trends would suggest a range of between 3.4% and 3.9% with a midpoint of 3.7%.

25. To help Ofcom understand the specifics of how Openreach has applied these adjustments we append at Annex 2 a spreadsheet containing our workings.

26. The basic premise of our calculations is that the previous year [x-1] costs are adjusted to give an expected cost. This is then compared to the actual costs in base year [x]. In other words 'efficiency' is the residual cost ("residual") after adjusting the previous year's costs for the changes that are expected, i.e:

    - Residual or Efficiency = Expected costs [adj x-1] – Actual costs [x]
    - Expected costs = Actual costs [x-1]*(1+Volume Growth*Cost Volume Elasticity)*(1+Price Inflation)

    Where:

    - Cost Volume Elasticity (CVE) – determined using LRIC/FAC ratios for each component in RFS
    - Volume Growth – Calculated using relative component volumes in the RFS for the current and previous years
    - Price Inflation – Split pay / non pay using Ofcom assessed actuals

27. The residual between 2014/15 and 2015/16 calculated by Ofcom suggests that Openreach has achieved over 12% efficiency for the copper-based services in the WLA and WFAEL markets. We do not believe this to be an accurate like-for-like representation of what the business achieved from 2014/15 to 2015/16. We believe that the cost bases which have been compared are not consistent. Where the residual cost is used to calculate a level of efficiency, it is vital that the cost bases compared are entirely consistent. We have made key adjustments to align the cost bases below. Importantly, the 12%

efficiency calculated by Ofcom is not realistic and is not supported by any BT internal analysis or reporting (e.g., PVEOs[4]).

28. The efficiency estimates produced by Ofcom's pairwise methodology demonstrate some of the shortcomings of relying on this type of information for assessing efficiency. In particular, we believe that Ofcom's analysis does not isolate efficiency from the effects of changes in allocation methodology. We have identified the following adjustments, which we describe below, that should be applied to Ofcom's analysis.

    a. Inclusion of administrative component costs previously excluded from Ofcom's analysis but are included in Ofcom's CPI-X model;

    b. Adjustments to reflect inconsistencies between the cost bases of the years assessed, including:

        i. CCN adjustment, to ensure that all the CCN adjustments made in the published 2015/16 RFS are also applied consistently to the restated 2014/15 costs;

        ii. Self-installation adjustment applied in the same way as in the CPI-X model; and

    c. Correction to the published 2015/16 and restated 2014/15 components in order to capture component costs in aggregate, and not WLA/WFAEL in isolation.

29. We then set out some concerns about relying on component volumes as cost drivers in assessing efficiency.

The exclusion of non-assessed component costs in Ofcom's analysis

30. In its pairwise analysis, Ofcom excludes a material portion of the component costs on the basis that BT has stated that "*It is not possible to derive meaningful component unit costs as the component is comprised of a number of services, each with different units of measure*."[5]

31. The exclusion of these material costs has a significant impact on Ofcom's calculated efficiency estimates and is inconsistent with the principle that efficiency should be assessed across the entire relevant market. For example, the component 'Openreach sales product management (CP502)' increased in cost from £✂m in 2014/15 to £✂m in 2015/16. In assessing efficiency, it is not appropriate to discount a significant increase in costs in the market.

32. We recognise that Ofcom needs some basis for adjusting the non-assessed component costs for changes in price and volume growth, and we believe a reasonable assumption is to use the weighted average amounts for the components that Ofcom has assessed to derive appropriate inflation, CVE and growth rate assumptions.[6] Using these inputs is appropriate as it is consistent with the way Ofcom adjusts these component costs for volume effects in the top-down model. In our analysis, we apply this adjustment across all the years covered by the pairwise analysis. The results in Figure 2 below show the impact this would have if these weighted average values are applied to the non-assessed component costs in the relevant markets.[7]

Figure 2: Calculated efficiency for assessed costs, excluded costs and aggregated total efficiencies

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[4] These are Openreach's internal analyses that breaks down forecast annual movements of costs into changes due to Price (inflation), Volume effects, Efficiency (or cost transformation) and Other.

[5] BT response to 7th WLA s135 request, 12 August 2016

[6] Weighting performed on basis of current year costs as per Ofcom general approach to efficiency

[7] Please note that both time related charges and SLG costs are not included for this analysis, as we recognise that to do so would be inappropriate

Source: Openreach analysis of Ofcom's cost model

33. Figure2 demonstrates that, in all years, including the relevant component costs that have been excluded in Ofcom's analysis would result in a lower efficiency compared to those reported by Ofcom. The tables below set out in more detail how we have performed this calculation and what we believe the re-calculated total efficiency should be in each period when we make this adjustment.

Figure 3: Detailed calculations of efficiency across all costs

13/14 efficiency	Assessed	Excluded	Total
12/13 R cost (£)	✂	179,668,411	✂
Vol growth (weighted avg)	✂	✂	
CVE (weighted avg)	✂	✂	
Inflation (weighted avg)	✂	✂	
13/14 exp (£)	✂	✂	✂
13/14 Pub cost (£)	✂	✂	✂
Calculated efficiency (%)	✂	✂	-7.1%

14/15 efficiency	Assessed	Excluded	Total
13/14 R cost (£)	✂	✂	✂
Vol growth (weighted avg)	✂	✂	
CVE (weighted avg)	✂	✂	
Inflation (weighted avg)	✂	✂	
14/15 exp (£)	✂	✂	✂
14/15 Pub cost (£)	✂	✂	✂
Calculated efficiency (%)	✂	✂	-0.8%

15/16 efficiency	Assessed	Excluded	Total
14/15 R cost (£)	✂	✂	✂
Vol growth (weighted avg)	✂	✂	
CVE (weighted avg)	✂	✂	
Inflation (weighted avg)	✂	✂	
15/16 exp (£)	✂	✂	✂
15/16 Pub cost (£)	✂	✂	✂
Calculated efficiency (%)	-12.2%	-4.9%	-10.9%

Source: Openreach analysis

34. Combining these costs across the three years in the pairwise analysis gives the results shown in Figure 4 below.

***Figure 4:* Comparison of efficiency estimates**

	13/14	14/15	15/16	Average	Range		Midpoint
Original	8.0%	1.0%	12.2%	7.0%	4.5%	6.6%	5.5%
Excluded costs adjustment	7.1%	0.8%	10.9%	6.3%	3.9%	5.8%	4.9%

Source: Openreach analysis

35. Using the same principle as outlined in the March WLA Consultation (averaging the first two sets of years and the last two) would give a revised range of 3.9% to 5.8%, with a mid-point of 4.9% as per Figure 4.

Inconsistencies between the cost bases of the two years assessed

CCN Adjustments

36. As noted by Ofcom in the WLA Consultation,[8] when compiling the 2015/16 RFS, BT applied the methodology changes notified to Ofcom in the 2016 Change Control Notification ("CCN") to the 2015/16 financials. However, not all of these methodology changes were applied to the restated 2014/15 financial information.

37. Only material methodology changes from the CCN were applied to 2014/15 financials. This has resulted in an overstatement of costs in the total SMP Markets analysed by Ofcom (including the Fixed Access markets) in 2014/15 (when compared to the adjustments made in 2015/16, which captured all methodology changes). However, the combination of the other CCN changes that were not applied have an impact on the residual that Ofcom estimates in the pairwise analysis. For example, we understand that Ofcom has adjusted the restated 2014/15 costs relating to "lung provision",[9] but this appears to be the only adjustment made in the pairwise analysis. As such the implied absolute efficiency between 2014/15 and 2015/16 will be overstated, and our estimate of the overstatement is around £✂m[10] for the Fixed Access markets as a whole. Efficiency has not been isolated from the effects of the allocation changes because Ofcom has selectively chosen to only make the lung provision CCN adjustment.

38. We welcome that Ofcom will seek to adjust for the impact of non-processed CCN adjustments on the restated 2014/15 costs.[11] However, we are concerned that Ofcom consider this is conditional on the availability of component level data to make such adjustments. Without re-running the 2015/16 RFS methodology for 2014/15 data to apply all the CCN methodology changes having immaterial effects (and all the associated allocation models), we cannot be certain which components are affected. Given the complexity associated with allocating the immaterial methodology changes at a granular level in the RFS and the significant resource and time this exercise would require, we would suggest that, as an alternative, the £✂m[12] is weighted on cost across the 2014/15 fixed access market components, before the weighted average price inflation, growth and CVEs from the components are applied. This would allow Ofcom to arrive at a proxy of restated 2014/15 costs across the Fixed Access markets prepared using the same methodologies as the published 2015/16 costs.

39. The CCN adjustment has the effect of reducing the 2015/16 implied efficiency estimate by 2.2 percentage points. In Figure 5, in our conclusions on pairwise analysis, we show the combined impact of the adjustments that we propose i.e: excluded costs adjustment; CCN adjustment; self-installation adjustment; correct Component costs adjustment.

Self-installation capitalisation adjustment

40. In the 2015/16 RFS there was an inconsistency between the allocation of a manual capitalisation credit relating to self-installation costs and where the original costs were posted.[13] Ofcom adjusted for this in its Base Year Model based on information provided by Openreach,[14] moving the capitalisation credit into the

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[8] Paragraph A15.116, WLA CC Consultation

[9] Under the CCN these costs were correctly reallocated to retail residual in BT's 2015/16 RFS.

[10] Our estimate of £✂m is net of Ofcom's adjustment to the restated 2014/15 costs relating to the lung provision. In our underlying workbook, when attempting to replicate Ofcom's pairwise analysis, we did not separately identify the lung provision. Therefore, our CCN adjustment within the workbook totals £✂m.

[11] See email sent by ✂ (Ofcom) to ✂ (Openreach) on 27 September 2017.

[12] CCN adjustments including lung provision

[13] This was communicated in our response dated 20 February 2017 to question 9c) in the 24th WLA s135 and highlighted in the 2017 Change Control Notification, published on 31 March 2017.

[14] See response dated 20 February 2017 to question 10b in the 24th WLA s135.

GEA FTTC Provisions component (i.e. reducing costs in this component) out of the other (copper) components (i.e. increasing costs in these components).

41. Ofcom's pairwise calculation does not make this adjustment, nor does it include the fibre-based components, as fibre-based services are forecast using its bottom-up LRIC model. As it includes a number of the other components affected by this adjustment, the 2015/16 costs would be understated when compared against 2014/15 data. Ofcom's justification for not making the adjustment is that "the complexity of the exercise would risk introducing errors" into its analysis,[15] and that it would not be "proportionate" to make the adjustment. In further discussions, Ofcom has stated that the adjustment was not made because BT was unable to provide the required data.[16] By not making the self-installation capitalisation adjustment, non-efficiency related factors are not appropriately isolated and included in the analysis.

42. We are concerned that not applying this adjustment in the pairwise analysis leads to overstatement of the implied efficiency that Ofcom has estimated in 2015/16. Firstly, we note that BT's response to Ofcom stated that it was unable to provide an accurate split of the impact that the methodology change had between the cost headings 'Pay' and 'Non-pay', as Ofcom had requested. Subsequently Ofcom allocated the adjustments in the Base Year Model within the charge control by splitting them in proportion to the reported pay and non-pay opex. We consider it would be more consistent with the way that efficiency is applied in the CPI-X model to make the same adjustment in the pairwise analysis (Ofcom did not make the same adjustment in its pairwise analysis). It would be more appropriate to apply the Base Year Model pay and non-pay split for the self-installation credit adjustment than to ignore the adjustment entirely. We calculate that if the self-installation capitalisation adjustment was applied it would have the effect of reducing efficiency for 2015/16 by 2.1 percentage points.

Other

43. There are other examples where the residual cost reductions calculated in the pairwise efficiency analysis does not isolate the impact of efficiency from non-efficiency related factors. Although we haven't adjusted for the factors outlined below (the quantum of costs is relatively small) we consider these support our view that our restatement of Ofcom's pairwise analysis is conservative. For example:

    a. The 'Ofcom licence fee' component was introduced in the 2015/16 accounts[17]. This was one of the components excluded from Ofcom's pairwise analysis. In previous years, the licence fee would have been allocated across all services and therefore components. Under Ofcom's approach, it would appear that there had been an efficiency saving of around £4m when comparing the 2015/16 to the 2014/15 data that is included in the overall efficiency improvement estimate. These costs would have been spread across other components in 2014/15, leading to Ofcom incorrectly calculating this as an efficiency under its approach.

    b. The costs and assets in activity groups AG401 to AG410 are attributed to plant groups (and subsequently components) based on pay, asset values and/or the cost of capital of a specific Line of Business (LoB) or other organisational unit. In 2015/16, there were increases in NGA component costs and volumes, and corresponding reductions in the costs allocated from these activity groups to the copper components that are assessed in Ofcom's pairwise efficiency analysis. For example, activity group AG408 captures non-specific Openreach development costs which are attributed based on Openreach's non-current asset Net Book Values (NBVs). Ofcom's analysis captures the impact of this redistribution of costs.

44. As outlined above, in both cases, the changes in cost cannot be attributed to efficiency improvements, but rather reflect non-efficiency related factors, specifically changes in allocation methodology.

Correction of component cost data

45. Ofcom's pairwise analysis has used the published 2015/16 and the restated 2014/15 component cost information which we provided in our response to the 20th WLA Section 135 Notice ("s135"). As explained in a follow-up response dated 31st July 2017 to the 29th WLA s135, we highlighted that in our

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[15] A15.120, WLA CC Consultation

[16] See email sent by ✂ (Ofcom) to ✂ (BT Group) dated 16 October 2017.

[17] Paragraph 377 of our response to the March 2017 WLA consultation.

response to the 20th WLA s135 we had provided only the costs that were attributed to the WLA and WFAEL markets. Therefore, it is not correct to only take a percentage of these costs for some components within the pairwise calculation when calculating efficiency across the WLA and WFAEL markets.

46. If the 20th WLA s135 2015/16 published and 2014/15 comparative component cost data is replaced with the component cost data provided in our response to the 29th WLA s135, the calculated 2015/16 efficiency decreases by 0.6 percentage points. This is shown in Figure 5, along with the impacts of the other adjustments highlighted in this section.

The use of component volumes as costs drivers in assessing efficiency

47. RFS component volumes are key to the top-down model and the way that Ofcom assesses efficiency. Component volumes are calculated as the volumes derived when the service volumes are multiplied by the usage factors that are used to allocate costs from the component in question to services that use the component.

48. Ofcom prefers to use a pairwise analysis to assess historic efficiency levels, because it:

    a. derives efficiency at the component level, which is consistent with the structure of the top-down model; and

    b. provides an indication of the scope of efficiencies achieved within the relevant markets.

    Whilst we understand why Ofcom places heavy reliance on its pairwise analysis for assessing efficiency we think its use should be moderated because component volumes are not precise driving factors of historic cost movements.

49. Where costs are common, different usage factors are used to attribute costs to individual services. These usage factors are subjective parameters i.e. generally if there was a strict causal relationship the cost would not be common. The result is that not only cost movements, but relative weighted service volume movements also impact the level of assessed costs in Ofcom's analysis. It is therefore not possible using component volume analysis to isolate only the pure cost impact rather than increases or decreases in cost that are related to the changes in services volumes. At best the analysis provides an indication of achieved efficiency.

50. We appreciate the reasons why this construct is used in Ofcom's modelling; essentially the purpose is to conduct the efficiency analysis using the same basis of data Ofcom uses to forecast. For the reasons outlined above, Ofcom should be cautious relying too heavily on this analysis. Instead of solely relying on its pairwise analysis Ofcom should give more weight to management studies and plans, and more generally available assessments of economy wide efficiency.

Conclusion on pairwise analysis

51. In summary, we have identified the following adjustments we believe should be made in order to ensure that the results of the pairwise analysis reflects, as closely as possible, the true underlying efficiencies that Openreach has been able to achieve, thereby providing more robust guidance on what it is reasonable to expect can be delivered over the next few years. The key adjustments we have identified are:

    a. Inclusion of administrative component costs previously excluded from Ofcom's analysis but are included in Ofcom's CPI-X model;

    b. Adjustments to reflect inconsistencies between the cost bases of the years assessed, including:

        i. CCN adjustment, to ensure that all the CCN adjustments made in the published 2015/16 RFS are also applied consistently to the restated 2014/15 costs;

    c. Self-installation adjustment applied in the same way as in the CPI-X model; and

    d. Correction to the published 2015/16 and restated 2014/15 components in order to capture component costs in aggregate, and not WLA/WFAEL in isolation.

52. Figure 5 shows how making these adjustments to the pairwise analysis reduces Ofcom's calculated mid-point efficiency from 5.5% to 3.7% across the four years in question.

Figure 5: Pairwise cost adjustments

Assessed efficiency % (post adjustments)

	13/14	14/15	15/16	Average	Range		Midpoint
Original	**8.0%**	**1.0%**	**12.2%**	**7.0%**	**4.5%**	**6.6%**	**5.5%**
Excluded costs adjustment	7.1%	0.8%	10.9%	6.3%	3.9%	5.8%	4.9%
CCN adjustment	7.1%	0.8%	8.7%	5.5%	3.9%	4.7%	4.3%
Self-installation adjustment	7.1%	0.8%	6.6%	4.8%	3.9%	3.7%	3.8%
Correct Component costs adjustment	**7.1%**	**0.8%**	**6.0%**	**4.6%**	**3.9%**	**3.4%**	**3.7%**

Specific % impact of each adjustment

	13/14	14/15	15/16	Average
Original	**8.0%**	**1.0%**	**12.2%**	**7.0%**
Excluded costs adjustment	-0.9%	-0.2%	-1.3%	-0.8%
CCN adjustment	-	-	-2.2%	-0.7%
Self-installation adjustment	-	-	-2.1%	-0.7%
Correct Component costs adjustment	-	-	-0.6%	-0.2%
Final - BT adjusted	**7.1%**	**0.8%**	**6.0%**	**4.6%**

Source: Openreach analysis

53. These results demonstrate how it is essential that Ofcom's analysis is updated to incorporate these adjustments. Moreover, Ofcom should recognise that the estimates themselves come with a confidence interval, not least because some of the comparability issues we identify have not been applied. For example, the residuals are calculated using CVE and price inflation assumptions, which themselves have a standard error and a confidence interval around them.

54. Whilst we believe the Openreach analysis provides a more reasonable view of the historic efficiency that BT has been able to deliver in these markets, this does not necessarily provide a reliable indication of the level of efficiency that we will be able to achieve in the future, especially when the following factors are taken into account:

    a. The need to deliver increasingly stringent service standards;

    b. The fact that the benefits of fault volume efficiency are assumed in addition to this historic level, rather than as part of the historic trends;

    c. Industry metrics and third-party analysis which suggest a continuing decline in the level of efficiency improvement that can be achieved in the future; and

    d. A trend towards more absolute capex than opex efficiency (as evidenced in Openreach's management plans).

Historic performance – management account analysis

55. Using a combination of management and regulatory account information, Ofcom undertakes its own PVEO analysis to determine both historic and future efficiency. The output is used as a cross check and Ofcom concludes that the results support, and are aligned, with its pairwise analysis. Ofcom separately calculates P (price) and V (volume), so the remainder is both E (efficiency) and O (Other), although Ofcom implicitly assumes that the latter is zero. [18]

[18] Note – we have reviewed Ofcom's management account analysis to the extent published in the consultation i.e. we have.followed the high level logic of what has been completed.

56. We note that the adjustments we make above for the pairwise analysis are also required to address the same issues in Ofcom's management account analysis.

Volume calculation

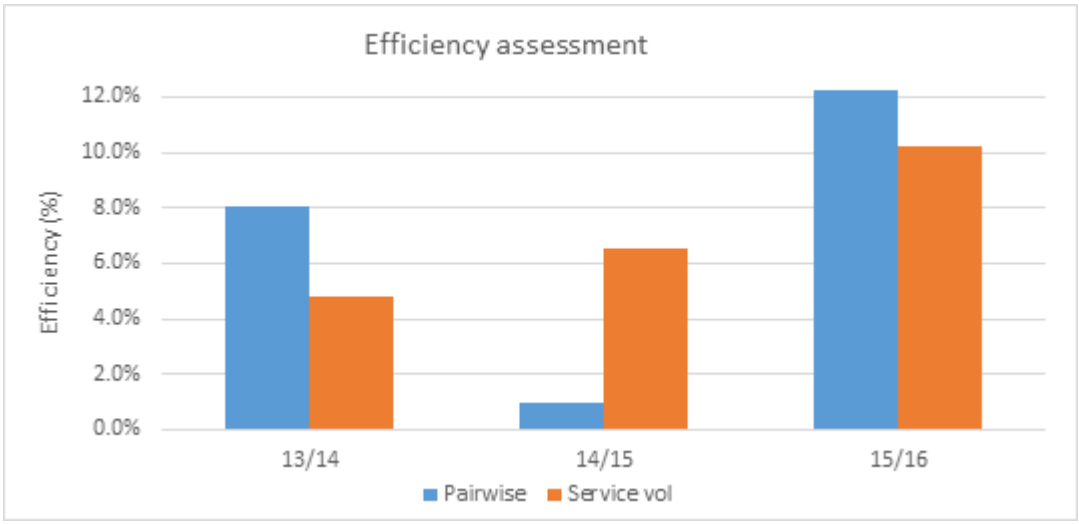
57. In its WLA charge control consultation (dated 31 March 2017) Ofcom states that, "*It is important that we reflect the effect of changes in volumes in a way that is consistent with our overall modelling approach when we estimate historical and forecast cost savings or efficiencies from every evidence*"[19]. However, we believe that Ofcom's estimate of the volume growth used in their assessment of management account efficiency is inconsistent with the overall top-down modelling approach. .

58. Using service revenues from the RFS as a proxy for annual volume growth rates is one way of estimating an aggregate growth rate. This approach places the highest weighting to the service with the highest price.

59. Service revenue growth rates are a not a good proxy for component volume growth. Our analysis shows a significant difference in the volume growth between component volumes (used in the pairwise analysis) and service volumes (used as a cross check to management accounts information) for the period 2012/13 to 2015/16, the period that Ofcom uses to assess historic efficiency.

60. To demonstrate that services volumes are not a good proxy for component volumes we replaced component volumes with service volume in our calculation of the pairwise comparison. It can be seen in Figure 6 below, the estimated efficiency is very different in each year.

Figure 6: Comparison of efficiency assessments produced using component and service volumes



Source: Openreach analysis

[19] Annex 15, A15.148, Wholesale local access market review: Consultation: Wholesale Local Access Market Review Volume 2 ("WLA CC Consultation"), 31 March 2017. https://www.ofcom.org.uk/consultations-and-statements/category-1/wholesale-local-access-market-review

61. Given these differences, we do not consider it is reasonable to conclude that the outcome of Ofcom's cross check substantiates the pairwise analysis as it is clearly not consistent with the top-down modelling approach and the two analyses (Pairwise and PVEO) are not performed on an equivalent basis.

Price calculation

62. Where possible, prices are aligned to the assumptions in the top down model, however, Ofcom concedes that there may be an issue with its methodology which results from the complexity of BT's internal trading.

Third party assessment of BT's efficiency

63. As set out in Openreach's response to the March 2017 WLA consultation, Ofcom's level of efficiency is derived from its taking out of context a report by EY, which Openreach commissioned for an entirely different purpose. At Annex 2 of our response to the March 2017 WLA consultation, we provided a further report from EY in which they set out the purpose of the earlier report and how Ofcom had misinterpreted it.[20]

64. This report explained that the analysis underlying the earlier EY report had been designed to apply to all of BT's costs and not solely costs related to charge controlled copper services. EY also stated that it was not their view that BT had outperformed the targets which had historically been set by Ofcom in the context of its charge controls. In view of this, we do not believe that Ofcom has provided sufficient evidence to show that their level of calculated historic efficiency is supported by any third party material.

Future scope for efficiency – Fault Volume Reduction (FVR) programmes

65. We have concerns over Ofcom's assumption that FVR programmes will deliver further benefits over and above the base level of efficiency when they are fundamental to Openreach delivering operating cost reductions.

66. Ofcom models the impact of FVR separately when assessing the scope for future efficiency savings. This creates an inherent risk of double-counting. As stated in our response to question 3.3 of the WLA charge control reconsultation published in September 2017, the impact of Ofcom's FVR adjustment is a reduction of c.4% of our operating cost base. Taken together with the assumed 5.5% per annum efficiency adjustment, this results in a target operating cost efficiency average across the charge control years in excess of 9%.

67. We believe that FVR is a critical enabler for the delivery of our future efficiency plans, of which the combined impact is estimated to be less per annum than the 5.5% efficiency assumption that Ofcom have modelled excluding any benefits of FVR programmes. This is also made clear in the recent assessment for the potential scope of cost reductions in the business as part of BT group transformation programme (Project ✂), as presented to Ofcom on 6th November 2017, for which FVR is identified as one of the key enablers for delivery of a total level of efficiency of c.2.2% per annum over the charge control period.

Future scope for efficiency – scope for capital efficiency savings

68. We believe that Ofcom has assumed too high a level of forecast capex efficiency, even when considering historical evidence only. In this section we discuss:

    a. The relationship between asset price inflation and efficiency;

    b. An assessment of Ofcom's historic analysis; and

    c. Third party evidence on a reasonable level of capital efficiency.

[20] "BT's Efficiency – Clarifications in respect of the "simple counter-factual" analysis regarding BT's Regulatory Profitability", EY, June 2017

69. Taking into account these factors, and the way in which Ofcom's charge control model is constructed, our assessment is that it would be more appropriate for Ofcom to use a 1% level of capex efficiency in its WLA charge control model.

Relationship between asset price inflation and efficiency

70. Openreach can deliver cost savings on its capital programmes in three ways, by:

    a. Purchasing the assets at prices that have risen by less than the rate of inflation prevailing in the in the economy;

    b. Making better use of the assets, either through technical progress where the assets have improved, for example line cards with higher capacity than previous models, or through better use of existing asset stock through consolidation and rationalisation; and

    c. Installing and using assets at lower cost, which could either be captured through the asset prices and labour costs assumptions.

71. It is important to remember that under a price cap regime, the counterfactual is a competitive market operating within the wider economy. The X is set such that, if the regulated firm is:

    a. more productive; and/or

    b. can achieve lower input prices than the rest of the economy,

    then this should be passed on to customers through lower prices compared to the general inflationary increase[21]. As such, when thinking about input price inflation assumptions it is necessary to use the economy-wide inflation as a point of reference, and the difference between the two is one way of achieving cost savings.

<u>Asset price inflation</u>

72. The issue of the consistency between asset price inflation and efficiency assumptions was raised in the 2016 BCMR. In response to BT's submission, Ofcom disagreed that it had double counted the scope for capex efficiencies "*through the efficiency assumption and again through asset price changes*", although it recognised "*the importance of adopting a consistent approach*" [22]. It argued that:

    a. the use of 0% asset price inflation for most assets was consistent with the approach used in the RFS as well as the base year Net Replacement Cost (NRC) in the top-down models; and

    b. in order to ensure consistency between the pay opex efficiency, pay opex inflation, asset price inflation and capex efficiency on capitalised pay, that "*the net effect of this inconsistency is like to be small and is hard to estimate with any precision*". In the WLA Consultation Ofcom explains that this is calculated by "*taking the difference between the operating cost pay assumption and the asset price inflation assumption in that year*"[23] and that this reduction is "*by c.1% per annum*".

73. We agree with Ofcom's assumptions on asset price inflation and its consistency with BT's treatment of these assets in its RFS, i.e. copper and duct are valued at current cost and all other assets at historic cost. However, Ofcom is incorrect in stating that savings are "*not in the asset price inflation assumption*" and therefore they have to "*include it within the efficiency assumption*"[24]. The ongoing valuation of these assets, old and any new capex, is captured in the 1 + IPC(t) term of the forecast equations[25] where assets are "revalued" at previous years' levels. This means that prices based on the use of these assets

[21] Bernstein & Sappington (2000), How to determine the X in RPI-X regulation: a user's guide. In its simplest form, the X for a regulated firm would be (Productivity of regulated firm – Productivity of economy) – (Input price change of regulated firm – input price change of economy).

[22] A29.256, 2016 BCMR Statement

[23] Footnote 655, WLA CC Consultation

[24] A29.257, 2016 BCMR Statement

[25] Table A11.7, WLA CC Consultation

will increase at a slower rate than general inflation. Whilst this does not result from active cost saving initiatives, it nonetheless leads to a reduction in costs that flows through to lower prices.

Assessment of Ofcom's historic analysis

74. In generating its assumptions for estimating capex efficiency, Ofcom considers the likely efficiency gains across the main type of spend, and then weights these efficiencies to produce a range of efficiency levels and a mid-point of 3% which are used the charge control models.

75. The areas of capital spend that Ofcom considers are:

    a. Capitalised pay;

    b. Sub-contractors;

    c. Civil engineering; and

    d. Stores.

    We set out our observations on these areas below.

Capitalised pay

76. When Ofcom assesses the rate of efficiency gain on capital expenditure, it assumes that part of the capital expenditure relates to capitalisation of pay costs, amounting to "*30-40% in the years 2013/14 to 2015/16 of capex*"[26] and therefore applies the labour efficiency assumption on this proportion of the capital expenditure.

77. Ofcom describes capitalised pay as pay costs that "*cover work on a range of different assets*" and the asset price inflation should reflect those underlying assets rather than pay opex inflation of 3.1%. We disagree with this. Had these costs not been capitalised they would have appeared under operating costs: it is irrelevant what type of assets were worked on. There are two ways of correctly accounting for this, either of which would be acceptable:

    a. Adjust the asset price inflation assumption to 3.1% when estimating capitalised labour costs. However, this would require a breakdown of the component capital costs (such as GRC, NRC etc) into capitalised pay and other.

    b. Subtract from the overall efficiency the differential between the inflation assumptions, e.g. if we assumed opex efficiency at 5.5% (capitalised labour), pay opex inflation at 3.1% and asset price inflation of 0.1%, the capex efficiency assumption for this part of the capital expenditure would be 2.5%[27]. The net inflation figure for both types of costs will then be the same (whether the costs is capitalised or not).

Sub-contractor efficiency

78. When considering the level of achievable efficiency for sub-contractors, two scenarios are proposed:

    a. zero efficiency; and

    b. the same level of efficiency as that assumed for BT capitalised pay.

    These are used to create upper and lower ranges.

79. Ofcom's assumption that sub-contractor efficiency is the same as pay is not realistic. Openreach's subcontractor resource is paid on a completion basis irrelevant of the time and effort spent on completing the task. Therefore, all of this spend should be considered as having zero efficiency.

80. Whilst in theory it might be possible to deliver efficiency through negotiating lower prices from our suppliers, such an outcome is implausible. For example, suppliers expect there to be labour shortages

[26] A15.228, WLA CC Consultation

[27] 2.5% = 5.5% opex efficiency – (3.1% pay opex inflation – 0.1% asset price inflation)

(fewer workers from the EU) as a result of Brexit. Prices are likely to increase rather than decrease as a result of future negotiations.

81. This would mean that the bottom row of Table A15.24 in March 2017 WLA consultation, reproduced at Figure 7 below, is not relevant in assessing the level of capital efficiency. Openreach has not been able to replicate Ofcom's values in the table. The range appears at odds with Ofcom's assumption that civil engineering costs will rise by between 0% and 40% from 2015/16 onwards.

Figure 7: Ofcom's capex efficiency estimates

Using efficiency estimates and weighting data >>>	From 2012/13-2015/16	From 2015/16-2017/18
Efficiency per annum - Sub-Contractor efficiency assumed Zero	1.0% pa	2.6% pa
Efficiency per annum - Sub-Contractor efficiency assumed same as Pay)	3.6% pa	3.7% pa

Source: Table A15.24, WLA CC Consultation

Civil engineering capex efficiency

82. Based on Openreach data, Ofcom estimates that the costs associated with civil engineering works will rise by 0-20% over the forecast period, representing negative efficiencies, and this is a result of contract renegotiations. Again, this illustrates the interchangeability between cost savings arising from price changes versus efficiency: costs are rising not necessarily because the engineers are becoming less efficient, but because the underlying costs are increasing. We believe it is important to consider the two together when assessing overall cost savings.

83. In summary:

    a. Sub-contractor efficiency should be zero, and based on Ofcom's approach that would result in total aggregate assessed efficiency being 1%;

    b. Ofcom's assessed level of efficiency would be even lower if the impacts of pay inflation for capex and opex were modelled consistently; and

    c. Ofcom's range of efficiency is at odds with the assumed increase in civil engineering costs.

4 Scope for further cost efficiency savings

84. Openreach considers Ofcom should update its efficiency target to be more in line with Openreach's management plan and should adjust its non-pay inflation assumption to 3.3%.

Openreach's management plans

85. As outlined in our October response to Ofcom September re-consultation, Openreach is currently carrying out a detailed transformation programme review (Project ✂) which focuses on strategy, structure and performance. The findings to date support much lower levels of forecast efficiency than those currently assumed by Ofcom. We presented these findings to Ofcom on 6th November 2017.

86. Openreach has shared the current management plan based on the outputs of this work and is responding to Ofcom queries regarding these plans. Openreach would request that Ofcom's proposals are updated to reflect these plans which support much lower levels of forecast efficiency than those currently assumed by Ofcom.

Openreach's assessment of forecast non-pay inflation

87. In addition to providing this detailed assessment of the efficiency used in Ofcom's modelling, we set out in this section our own detailed calculation of the forecast non-pay inflation assumption that we believe Ofcom should use in its top-down model. This was not covered in Ofcom's WLA Charge Control Reconsultation published in September 2017.

88. Ofcom uses both pay and non-pay inflation assumptions together with component growth and CVE assumptions to model how the cost base of the relevant services in the top-down model would change year-on-year.

89. In assessing the correct level of the non-pay inflation assumption to use for modelling purposes, Ofcom uses three main inflation inputs and then weights these inputs based on the proportion of costs in the base year (in this case 2015/16) that each represents. The three main inflation inputs used are:

    a. Energy – proposed value of 7.0% using the Department of Energy and Climate Change (DECC) as source;

    b. Accommodation – proposed value of 3.0% using Telereal contractual rate as source; and

    c. All other non-pay costs – proposed value of 2.0% using CPI forecast as source.

90. These assumptions are then used together with a weighting percentage for both the relevant copper services and GEA services, for both of which Ofcom calculates a weighted average of 2.4%. This is summarised in table A15.7 in Ofcom's March 2017 WLA charge control document, reproduced at Figure 8 below.

Figure 8: Ofcom's non-pay inflation assumption

Table A15.7 Summary of non-pay inflation assumptions

Type of cost	Assumption basis	Inflation proposal	Weighting	
			Relevant Services	GEA Relevant Services
Energy	DECC	7.0%	[✂] (~0-10%)	[✂] (~0-10%)
Other Accommodation Costs	Telereal Trillium Contractual rate	3.0%	[✂] (~0-10%)	[✂] (~0-10%)
All other non-pay costs	CPI	2.0%	[✂] (~80-100%)	[✂] (~80-100%)
Weighted average			2.4%	2.4%

Source: Ofcom analysis.[496]

Source: Table A15.7, WLA CC Consultation

91. Ofcom states that it based the weighting information on BT's response dated 17 November to Question A1 of the 20th WLA s135 request. We assume that Ofcom meant to refer to Question D1 as the data source, and we have used our response to question D1 in the analysis below.

92. We believe that Ofcom may have included depreciation costs in the 'All other non-pay costs' category. Depreciation costs should be excluded from calculating this value as these costs are non-compressible and Ofcom applies the price adjustments to operating costs excluding depreciation costs in the top-down model. The tables below compare Ofcom's results including depreciation costs against Openreach's analysis and shows that the non-pay inflation assumption should be 3.3% across relevant services and 3.1% across the whole fixed access market.

Figure 9: Openreach's assessment of non-pay inflation

		Costs (incl. depreciation)		Weighting (incl. depreciation)		
Type of cost	**Inflation proposal**	**Relevant Services**	**GEA Relevant Services**	**Relevant Services**	**GEA Relevant Services**	**Total**
Energy	✂	✂	✂	✂	✂	✂
Other Accommodation costs	✂	✂	✂	✂	✂	✂
All other non-pay costs	✂	✂	✂	✂	✂	✂
Weighted Average				**2.4%**	**2.4%**	**2.4%**

		Costs (excl. depreciation)		Weighting (excl. depreciation)		
Type of cost	**Inflation proposal**	**Relevant Services**	**GEA Relevant Services**	**Relevant Services**	**GEA Relevant Services**	**Total**
Energy	✂	✂	✂	✂	✂	✂
Other Accommodation costs	✂	✂	✂	✂	✂	✂
All other non-pay costs	✂	✂	✂	✂	✂	✂
Weighted Average				**3.3%**	**2.7%**	**3.1%**

Source: Openreach analysis

93. As a result of the above, we believe that Ofcom should use an assumption of 3.3% against the relevant services in the top-down model.

Annex 1: Regulatory approach to efficiency, productivity and incentives

Relationship between efficiency, productivity and incentives

1. Under the CPI-X price cap regime, the choice of the X is set to mimic the operations of a competitive market: the regulated firm makes efficiencies in its operations and passes that on through its prices. The X should be sufficient to ensure a fair return and avoid excess profits being earned, but also demonstrate a sufficient challenge that the firm would need to achieve if it was operating in a competitive environment.

2. As set out in Bernstein & Sappington (2000),[28] "*competitive forces compel firms to realise productivity gains and to pass these gains on to their customers in the form of lower prices, after accounting for unavoidable increases in input prices*". In an economy where all industries are competitive:

   Growth in output prices = Growth rate of input prices – Productivity growth rate

3. The overall growth in output prices across the whole economy is typically summarised as CPI inflation. The X factor should then reflect the extent to which:

   - *the regulated industry is capable of increasing its productivity more rapidly than other sectors of the economy; and*
   - *the prices of inputs employed in the regulated industry grow less rapidly than do the input prices faced by other sectors of the economy*[29]

4. Given this link, it is reasonable to consider the industry- and economy-wide rates of productivity growth as the benchmark when assessing the appropriate level of efficiency challenge for Openreach over the three years of the next charge control period.

5. In response to previous Ofcom consultations, BT and Openreach have made representations on the connection between the efficiency assumption and the role of incentives,[30] and in particular the ratchet effect associated with setting future targets based on past performance achievements.[31] Nonetheless, Ofcom places greatest weight on BT's past performance (and less to future plans for efficiency improvements). On opex, Ofcom has increased its efficiency assumptions to 5% for numerous charge controls since 2009,[32] and now raising the target higher to 5.5% and then adding on top its expectations on FVR savings. Using the residuals of a unit cost trend analysis as a measure of efficiency and productivity growth requires a cross-check that it is consistent with general observations across the economy.

6. In the remainder of this section we explore Ofcom's approach to efficiency in its cost forecast model, and we make the link between its efficiency assumption and the concept of partial and total factor productivity (TFP) measures. We then provide most recent updates to labour productivity growth, as well as total factor productivity growth estimates for the UK.

Ofcom's approach to efficiency in a regulatory setting

7. Ofcom's approach to forecasting the future total cost stack for the copper-based WLA and WFAEL services consists of the following elements:

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[28] Bernstein & Sappington (2000), op. cit.

[29] For example if Openreach is able to achieve 3% productivity growth whilst the rest of the economy achieved 0% even though it faced the same input prices, then its costs would be 3% less than it otherwise would be. This would be passed on through lower prices, i.e. CPI-3%, where prices in the rest of the economy would increase at CPI. If instead, Openreach faced input prices that grew at 2% versus 1% elsewhere in the economy, overall CPI would be (1% – 0%), and the X would be (3% Openreach productivity – 0%) + (1% -– 2% Openreach input price growth) = 2%. Openreach prices would reduce at 1% per annum in nominal terms.

[30] For example, in response to BT's response to Ofcom's consultation document "Business Connectivity Market Review: Leased lines charge controls and dark fibre pricing", 14 August 2015 ("BT BCMR Response"), and Openreach's WLA Response.

[31] See Annexes E and G of BT BCMR Response.

[32] For example, 2.5% on TI services and 2.8% for Ethernet services in the 2009 Leased Lines Charge Control, followed by 1.5% on TI and 4.5% on Ethernet in 2013 BCMR, 5% in 2014 Fixed Access Market Review, and 4.5% for TI and 5% for Ethernet in 2016 BCMR.

a. Operating costs, separate into pay and non-pay, with their own assumptions regarding input price trends, scale economies, improvements in operating cost efficiency, benefits from FVR, and uplifts for higher Quality of Service (QoS) levels;

b. Depreciation, which depend on the asset price inflation assumption, scale economies, improvements in capital efficiency, and asset lives.

c. Return on capital, which is determined by the Weighted Average Cost of Capital (WACC) and the Net Replacement Cost (NRC), which is in turn driven by the same factors that drive depreciation.

8. Ofcom states its view of BT's efficiency/total factor productivity measure[33] as being "*the potential for cost savings across all factors of production, capital and labour*", that they "*apply the efficiency assumptions separately to operating costs (excluding depreciation) and to capital expenditure… [and] do not apply the assumption to all capital costs*", and as such "*evidence that is based on analysis of changes to wider measure of capital costs will therefore be less relevant*". Ofcom also believes that the efficiency rate "*needs to be consistent with its application within the formulae within the charge control model*"[34].

9. Given that Ofcom applies scale economies, input prices and FVR benefits separately in its cost forecasting model, the remainder of the efficiency improvement is essentially TFP growth, as Ofcom has stated previously.[35] This efficiency improvement captures both labour productivity (i.e. when it is applied to pay opex), capital productivity (i.e. when applied to capital expenditure), and general productivity (e.g. on non-pay opex).

10. We note that the capital efficiency assumption affects depreciation and net replacement cost: higher capex efficiency lowers the capital spend and therefore depreciation and NRC. Depreciation is merely an annualised view of capital stock that is aimed at smoothing the price profile when they are set with reference to costs. Although standard TFP studies typically use total capital stock[36] (similar to the measure of NRC in this context), our focus here is the rate of growth assumption and how it relates to Ofcom's capex efficiency assumption.

11. On opex efficiency, "*doing things.. more quickly (e.g. through reduced task times)"*[37] is akin to labour productivity, which is typically measured as the ratio of an output measure divided by a labour measure, usually hours, jobs or workers. The other sources of opex efficiency are neatly captured elsewhere,[38] so it is possible to draw on other available data on general trends in productivity. However, Ofcom's narrow interpretation that the efficiency data source has to be consistent with the way it is applied in its cost model and reflect the relevant costs modelled means that it largely relies on the analysis of BT's own costs from the regulatory financial statements and its internal management accounts.

12. Together with the principle that the setting of X is about relative differentials in productivity growth and input price growth, we can draw on the available evidence as representing the average efficiency improvement we can expect Openreach to achieve. Any improvements it achieves beyond that would result in lower prices being passed onto consumers when the charges are reset in the next review period.

Recent evidence

13. The Office of National Statistics (ONS) is a recognised national statistical institute of the UK, and produces a wealth of productivity estimates based on the data it collects on a regular basis. It conforms to international reporting standards so that comparisons can be made between different countries.

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[33] Paragraph A15.100, WLA CC Consultation.

[34] Paragraph A29.25, "Business Connectivity Market Review – Volume II. Statement" ("BCMR Statement"), 28 April 2016.

[35] Paragraph A29.27, BCMR Statement

[36] Note that the ONS uses a definition of "net capital stocks" as the "*market value of fixed assets… [accounting] for depreciation in assets*", similar to the notion of Net Replacement Cost (NRC).

[37] Paragraph A15.96, WLA CC Consultation.

[38] For example, 'doing things less often' is captured by the benefits derived from FVR, as well as scale economies where, for small increases in volumes do not require the same proportionate increase in tasks; and 'sourcing things cheaper' is captured through the opex price trend assumptions.

14. We note that estimates of the long term trend in productivity growth rates are similar to the notion of a "frontier shift", where general technological advances help to reduce unit costs on an ongoing basis. There are well-established methods to try and extract this from the year-on-year calculations of productivity growth, from using simple moving-averages to more statistically advanced technic advanced techniques[39] to abstract the noise from the trend, and provides confidence intervals around the point estimates. The trend provides a view of the average rate of efficiency improvement that might be expected: one which likely to be achieved (as it is the average over a long time horizon) but still challenging (because the outturn of operating conditions has shown that growth is just as likely to dip below the average).

Efficiency on operating expenditure

15. The ONS estimates that over the period between 1998 and 2015, the information and communications sector has experienced the highest growth rate when compared against the rest of the economy. The UK experienced and average annual growth in total factor productivity of 0.98% over this period, with labour productivity contributing to 0.8% of this growth. In contract, the information and communications sector (Sector J)[40] saw TFP growth of 4.08%, of which 3.59% is due to labour productivity growth.

Figure A1: Decomposition of average labour productivity growth, 1998 to 2015[41]

16. The story of growth is somewhat different when we consider the trend over this period. The latest bulletin published by the ONS shows sluggish growth in the UK productivity over the last decade.[42] This is based on the whole economy and on a range of industries, and shows that, overall, labour productivity growth has remained relatively constant over the last decade whilst labour costs have grown, resulting in unit labour cost growth.

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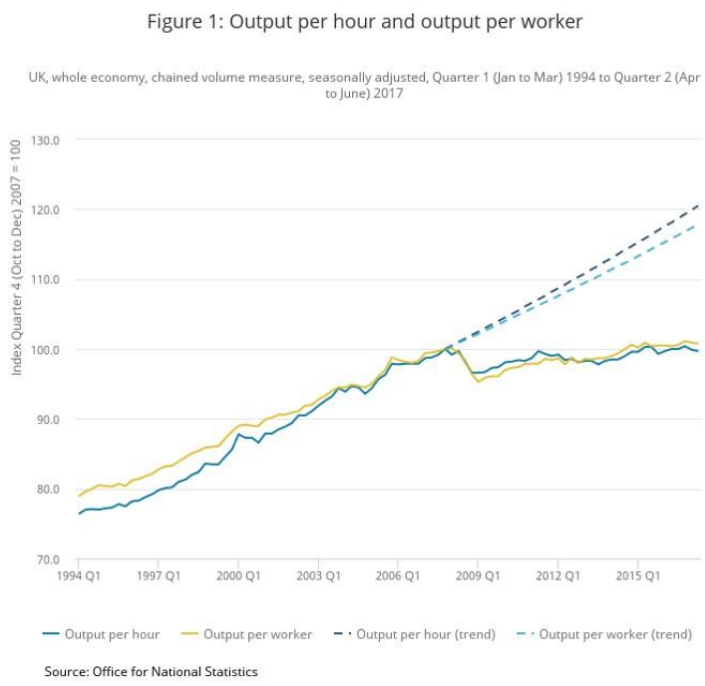
[39] For example using econometric techniques such as the Kalman filter.

[40] Sector J is defined as "Information and communication", and covers telecommunications, publishing activities, motion pictures, video and TV programming and broadcasting activities.

[41] "Multi-factor productivity estimates: Experimental estimates to 2015", Office of National Statistics, April 2017. https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/multifactorproductivityestimates/experimentalestimatesto2015

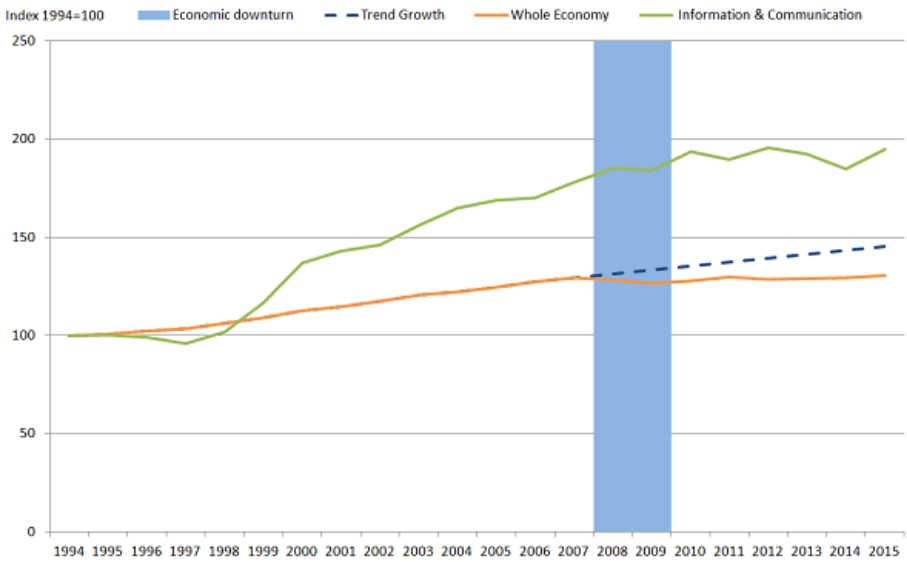
[42] Labour productivity: April to June 2017, 6 October 2017. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/bulletins/labourproductivity/apriltojune2017

Figure A2: Labour productivity in the UK



17. The picture of productivity growth varies significantly across the different sectors. The diagram below shows that productivity has increased significantly for the ICT services as a whole (Sector J) up until the economic downturn of 2008-2010. However, this has slowed down in the recent years as had the overall trend across the UK economy.

Figure A3: Productivity growth rates between telecommunications and the UK economy[43]



18. In the recent past total factor productivity growth and labour productivity growth rates have been hovering around 0%. This does not appear to fit with Ofcom's assumptions of the high and growing opex efficiency assumption over this period from 2.5% to 5.5%. The ONS analysis shows that <u>at the very top</u>

[43] "Measuring output in the Information Communication and Telecommunications industries: 2016", Office of National Statistics, 6 October 2016. https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/measuringoutputintheinformationcommunicationandtelecommunicationsindustries/2016

end, we might expect a total factor productivity growth of 4% for the telecommunications sector, and a labour productivity growth of 3.6%. However, this would be based on a long term trend that is not reflective of recent trends (0%). Furthermore, when faced with higher service standards, it would be unusual to expect task times to reduce, especially in the short term. We have already seen this impact in 2016/17 as per our response to the March WLA Consultation.[44]

[44] Fig 31, Openreach's Vol 2 Response, shows task time increase of 7.4% in 2016/17 compared to 2015/16

Annex 2: Openreach workings - adjustments to Ofcom's pairwise analysis

1. In section 3 we outline a number of concerns with Ofcom's pairwise analysis.
2. Attached to this response is a spreadsheet where we lay out the adjustment Openreach considers are required to Ofcom's pair-wise analysis. The work books contain Openreach's calculations relating to the following adjustments:
    a. Inclusion of administrative component costs previously excluded from Ofcom's analysis but are included in Ofcom's CPI-X model;
    b. CCN adjustment, to ensure that all the CCN adjustments made in the published 2015/16 RFS are also applied consistently to the restated 2014/15 costs;
    c. Self-installation adjustment applied in the same way as in the CPI-X model;
    d. Correction to the published 2015/16 and restated 2014/15 components in order to capture component costs in aggregate, and not WLA/WFAEL in isolation.