



Ofcom's LLU and WLR Charge Controls Proposals

A REPORT PREPARED FOR SKY AND TALKTALK

October 2013

Ofcom's LLU and WLR Charge Controls Proposals

Introduction	1
2 Base Year costs	3
<i>Summary</i>	3
<i>The unexplained increase in forecast costs since the last control may indicate inefficient costs</i>	4
<i>Current fault rates appear to be inefficiently high</i>	6
<i>Treatment of NGA costs in the RFS</i>	24
3 Differentials between MPF and WLR/WLR+SMPF	27
<i>Summary</i>	27
<i>The price differential between WLR and LLU has important implications for competition</i>	28
<i>Approach taken by Ofcom</i>	28
<i>Assessment of Ofcom's approach</i>	30
<i>Conclusion on the appropriate weight to be given to different efficiency considerations</i>	36
<i>Assessment of the cost differentials for MPF, WLR and SMPF rentals</i>	39
4 Inflation	45
<i>Summary</i>	45
<i>The choice of CPI for charge control indexation</i>	46
<i>Ofcom's approach to operating cost inflation</i>	53
<i>Ofcom's approach to capital cost revaluation</i>	58
5 Modelling issues	61
<i>Net Current Assets</i>	61
<i>Holding Gains on Disposals</i>	61

Ofcom's LLU and WLR Charge Controls Proposals

Figure 1. Reconciliation of proposals to previous model	5
Figure 2. Trend in faults	7
Figure 3. Comparison of rainfall and reported faults	9
Figure 4. Monthly Openreach faults	11
Figure 5. Broadband penetration	12
Figure 6. BT NGA roll out	13
Figure 7. Volume of faults completed	14
Figure 8. Capital spend on copper and duct (nominal prices) and trends	16
Figure 9. Copper capital spend compared with CCA depreciation (£m) (2005/06 - 2011/12)	17
Figure 10. Duct capital spend compared with CCA depreciation (£m) (2005/06 - 2011/12)	18
Figure 11. Implied CAPEX spend on copper network before and after NGA roll out	19
Figure 12. Openreach employees	20
Figure 13. BT OPEX spend on Agency and Contractors	21
Figure 14. Comparison of actual and efficient fault levels	23
Figure 15. Illustrative example of impact of regulating local access and intermediate wholesale products	33
Figure 16. Fixed broadband connections: 2007-2012 (excl. cable)	35
Figure 17. The size of the price differential between MPF and WLR given different efficiency considerations	37
Figure 18. The appropriate range to set the price differential to maximise efficiency	38
Figure 19. Assurance costs from the RFS	43
Figure 20. Illustration of price indexation on OPEX costs	47

Figure 21. Impact of different charge control index	50
Figure 22. Earnings inflation and price inflation (RPI and CPI)	56
Figure 23. Illustrative example of the effect of Ofcom error on asset values	62
Table 1. The contribution of rainfall to fault rates	10
Table 2. Contribution of faults to prices	24
Table 3. 2016/17 FAC of WLR and LLU rental services	40
Table 4. Ofcom's FAC differentials by cost component (2016/17) (£ p/a)	40
Table 5. Operational expenditure inflation assumptions	53
Table 6. Ofcom inflation rate assumptions (%) (May publication)	54
Table 7. Valuation of capital assets	59

Introduction

- 1.1 Frontier Economics has been engaged by British Sky Broadcasting Limited (“Sky”) and the TalkTalk Telecom Group PLC (“TalkTalk”) to review certain aspects of Ofcom’s proposals for the LLU and WLR charge controls from 2014 – 2017 contained in its recent consultation, the Fixed access market review: approach to setting LLU and WLR charge controls (the “July Consultation”). This report summarises the results of that review.
- 1.2 The report covers the following areas:
- the appropriate level of costs to use as the basis for forecasting service costs (Section 2);
 - the methodology and assumptions used to determine the price differential between rental services (Section 3);
 - the assumptions used to adjusted forecast costs for inflation (section 4); and
 - specific issues in how the forecast methodology has been implemented in the spread sheet model (Section 5).

2 Base Year costs

Summary

- 2.1 Ofcom sets the charge controls such that prices converge to the cost forecasts (including an allowance for Openreach’s cost of capital) for the relevant services in the final year of the control (2016/17). The model forecasts these costs by projecting costs forwards from a base year. As a result, if the base year costs are inappropriate, the cost forecasts and the resulting price controls will also be inappropriate.
- 2.2 Ofcom has used 2011/12 as the base year in the forecasts underlying its proposals. The input cost data is based on intermediate results drawn from the system used to compile BT’s Regulatory Financial Statements (“RFS”)¹. We consider that using the 2011/12 RFS data in this way risks over-stating the level of costs that Ofcom considers are relevant for the charge controls. This is because Ofcom requires the proposed charge controls to adopt an ‘anchor pricing’ approach such that the underlying forecast model should attempt to reflect the costs of a hypothetical efficient copper-only operator i.e. an efficient operator that has not, and is not, rolling out and operating a Next Generation Access (“NGA”) network.
- 2.3 However, BT was not an “efficient copper only” operator in 2011/12, not least because it was in the process of rolling out its NGA network. It appears that Ofcom has not carried out a thorough investigation of whether the RFS based cost inputs are appropriate given its proposed anchor pricing approach. Ofcom’s qualitative analysis² concentrates on the allocation of assets between copper and fibre but does not fully address the level of operational expenditure or the allocation of this expenditure between copper and fibre networks.
- 2.4 The use of these unadjusted costs from BT’s RFS may not provide an appropriate level for a number of reasons including that:
- a) Openreach’s current costs are inefficiently higher than the hypothetical efficient provider operating at the efficiency frontier³. This could, for

¹ The final service unit service costs for the base year differ from those in the RFS due to a number of methodological differences. Most notable, are (i) the Regulatory Asset Valuation (“RAV”) adjustment applied to the capital costs of duct and copper cable and (ii) differences in the final allocation of component costs to services.

² See for example the July Consultation paragraph 6.66 to 6.74.

³ Ofcom’s efficiency assumption is supposed to ensure that the projected change in costs declines in line with the efficiency “frontier shift” over the course of the control (i.e. the rate of improvement of efficient benchmarks) plus “catch up” efficiency (i.e. efficiency improvements to bring Openreach’s costs in line with efficient benchmarks).

example, be due to inefficient labour or management practices (i.e. X-inefficiency⁴). Alternatively Ofcom’s estimate of the costs of a hypothetical copper-only operator, based on the RFS, could include irrelevant costs;

- b) Openreach’s costs may be above the efficient level for a hypothetical copper-only operator because it has diverted financial and operational resources to other activities leading to fault rates which are above an efficient level; and
- c) the allocation of costs between WLR/LLU and other services (in particular Generic Ethernet Access, “GEA”) is distorted in the RFS and, hence, in inputs to the charge control model, resulting in an over-allocation of costs to MPF, WLR and SMPF.

2.5 This section addresses these points.

The unexplained increase in forecast costs since the last control may indicate inefficient or irrelevant costs

2.6 In the previous charge control, as set out in Ofcom’s March 2012 Charge Control Review for LLU and WLR Services Statement (“the March 2012 Statement”), Ofcom forecast the efficient level of costs for delivering WLR and MPF for the period up to 2013/14. The base year data used for this model was drawn from the year 2009/10⁵, when NGA roll out was limited, so should reflect a “copper only” operator. Given that it is only 16 months between that forecast and the forecast in the July Consultation), we would expect differences, once adjusted for known methodological changes, to be small.

2.7 Table 6.11 of the July Consultation (summarised in **Figure 1**) attempts to reconcile the difference between the current estimate of 2013/14 costs with the estimate set out in Ofcom’s March 2012 Statement. Ofcom notes that Openreach “*achieved a greater efficiency than forecast*” in the period between the March 2012 Statement and its July Consultation (as can be seen in **Figure 1**, this

⁴ “X-inefficiency” describes where a firm’s costs are higher than the efficient level. Despite the fact that monopolists face incentives to operate at the productively efficient level, it is observed that they have higher costs than the efficient level. The difference (i.e. the “X-inefficiency”) can be due to the fact that managers’ incentives are not perfectly aligned with shareholders’: such that managers have insufficient incentives to manage costs, or employ the optimal mix of inputs, or set wages in the efficient way. Where there is evidence that a regulated firm’s costs are “inefficient” it could be appropriate for a regulator to make an adjustment to the firm’s costs to “catch-up” with the hypothetical efficient benchmark’s costs (i.e. a “catch-up” efficiency assumption).

⁵ Some BT management information for 2010/11 was used to inform the forecasting from this base year.

Base Year costs

amounted to £0.70 for MPF, £0.60 for WLR and £0.10 for SMPF). However, it also notes that the reconciliation, once known differences in methodology are taken into account, includes an apparent balancing item (“Other”) of £3.35 for MPF rental. This suggests that the actual level of costs forecast in the new model is significantly above that forecast in March 2012.

Figure 1. Reconciliation of proposals to previous model

Unit cost (£)	MPF Rental	WLR Rental	SMPF Rental
2013/14 Price as set in March 2012 Statement	85.04	94.75	10.40
KAV unwind	5.00	5.00	-
Achieving greater efficiency than forecast	-0.70	-0.60	-0.10
Higher service centre cost	+0.60	-	-
Other	+3.35	+2.47	+0.04
2013/14 FAC per Cost Model	91.91	93.31	9.90

Source: Ofcom

Source: Table 6.11

- 2.8 Ofcom has not explained this significant discrepancy nor the source of the adjustment. Moreover, the net effect of the “greater efficiency” and “Other” lines still indicate that forecast costs are now significantly above the level that was previously forecast. In the absence of any explanation, it would appear that either (i) the current forecasts show BT operating less efficiently than forecast by Ofcom in March 2012, or (ii) alternatively, that the current estimate of costs does not reflect the costs of a hypothetical efficient copper-only operator (for example, because they partly reflect the costs of rolling out NGA) .
- 2.9 There is a clear risk that unadjusted cost data sourced directly from BT’s RFS will reflect an inappropriate level of costs to be used as the base for an anchor pricing approach. At present, there is a significant, unexplained increase in costs between a forecast based on a base year where BT was largely copper-only (2009/10) and a forecast, such as that set out in the July Consultation, where NGA was being actively rolled out and provisioned by BT (i.e. in 2011/12).
- 2.10 In the sections below, we examine two factors which could explain the increased level of forecast costs for 2013/14:
 1. an inefficient fault rate; and

2. an excessive allocation of common costs to Current Generation Access (“CGA”) services and / or costs that are incremental to NGA have been classified as CGA⁶.

Current fault rates appear to be inefficiently high

- 2.11 The cost of repairing faults is a significant proportion of the cost of providing WLR, MPF and SMPF rental services. Ofcom notes that “*the cost of repairing faults represents 16% of the MPF cost stack, 14% of the WLR Basic cost stack and 27% of the SMPF cost stack.*”⁷ Fault rates have increased which, in turn, increases the costs for Openreach to investigate and repair these faults. If the increases in fault rates were solely due to exogenous factors then the resulting increases in costs could reflect “efficient” costs in accordance with Ofcom’s anchor pricing approach whereby it models the costs of an efficient hypothetical copper-only network.
- 2.12 However, if the base year’s costs reflected inefficient levels of faults, then it may not be appropriate for the consequential costs to be reflected in the regulated prices (as they would not constitute the costs of a network that Ofcom is seeking to model).
- 2.13 There are two key reasons why including the inefficient level of costs within the charge controls would result in consumer welfare loss:
1. to do so, would lead to lower take-up of broadband and voice services;
 2. it would incentivise Openreach to be more inefficient because it would be able to recover the resultant higher costs in subsequent charge controls.
- 2.14 In the sections below, we:
- explain how, since 2009, Openreach’s level of faults has increased significantly after a long period of decline;
 - note that there does not appear to be any strong evidence to suggest that exogenous factors explain the recent increase in fault rates; and
 - observe that there is evidence that the increase is, at least partly, explained by the reduction in investments in the copper network and by Openreach re-focusing staffing resources onto its NGA network.

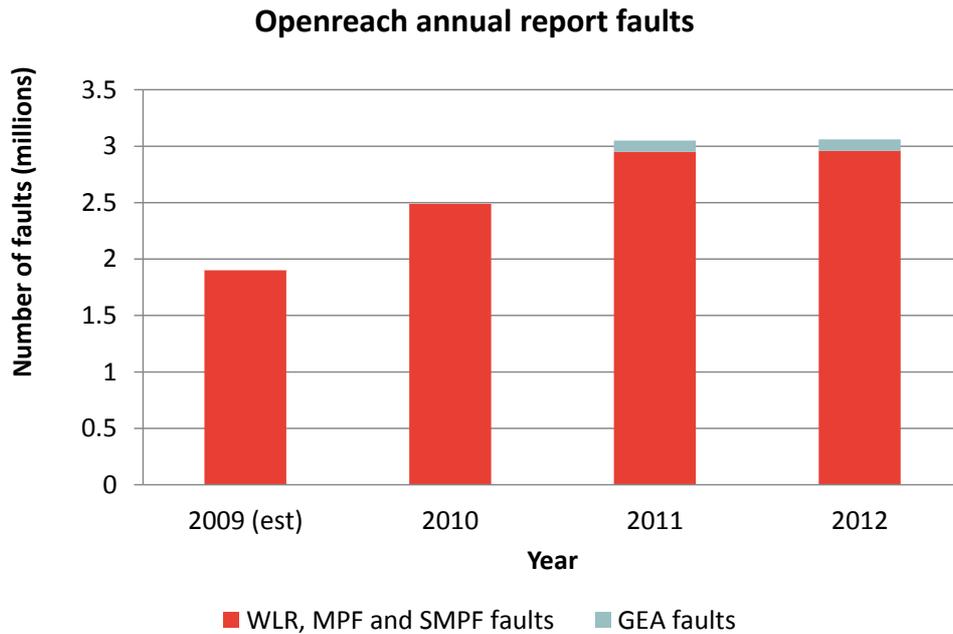
⁶ CGA services are copper-only services.

⁷ The July Consultation paragraph 5.23.

Recent fault rate performance

2.15 The data published in Ofcom’s Fixed access market reviews⁸ (“the FAMR Consultation”) shows there has been a significant increase in fault rates since 2009 as shown in the chart below.

Figure 2. Trend in faults



Source: Figure A10.5 FAMR Consultation

This significant increase in faults from 2009, follows a period up to 2009 where BT managed to significantly reduce the level of faults over time:

“Based on BT data, we understand that Network and Exchange fault rates had fallen from approximately 3.5m in 2001 to 2.3m in 2009 [sic]. This 5% per annum improvement was driven by capital spend and operational spend on fault reduction programmes”⁹

⁸ Ofcom (2013) Fixed access market reviews :wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 Consultation on the proposed markets, market power determinations and remedies.

⁹ Ofcom: A New Pricing Framework for Openreach Second Consultation paragraph A10.36.

- 2.16 BT itself highlighted the benefits to consumers of reducing fault rates in its annual report: *‘Three years ago you could expect a fault on your telephone line once every nine years. That’s now improved to once every 13 years.’*¹⁰
- 2.17 The elevated fault rate in 2011/12 will feed through into a higher level of reported costs in the base year, due to the costs of clearing the additional faults. Ofcom’s approach to the charge controls is to recover the costs that arise from faults from LLU and WLR rentals. By understanding the factors driving the rapid deterioration in BT’s service levels it is possible to determine whether or not the current, heightened fault rates are consistent with Ofcom’s anchor pricing approach.
- 2.18 While in general charge controls should provide an incentive for regulated companies to reduce costs, in the case of preventative maintenance, these incentives may be weak¹¹. Reducing investment within the charge control period will provide an immediate cash saving, while the costs due to higher fault rates will be incurred in later years and may be passed on to customers through higher regulated charges in the future. This risk of sub-optimal investment may be higher in periods where the regulated company prioritises cash generation¹².

Exogenous factors do not explain the increased fault rates

- 2.19 The level of reported faults on a copper access network could be dependent on a range of exogenous factors (i.e. factors beyond Openreach’s control). For example Openreach¹³ has noted that a number of factors affect faults including:
- factors such as the weather, vandalism and cable theft; or
 - changes in the propensity of customers to report faults.

Weather does not explain the increase in fault rates

- 2.20 Ofcom’s analysis of the relationship between increased faults and rainfall focussed on a specific period in April 2011 to February 2013¹⁴, where BT argued

¹⁰ Chief Executive’s Statement BT Group plc Annual Report & Form 20-F 2009.

¹¹ Even where charge controls incentivise cost minimisation, this may not lead to an efficient fault rate in terms of overall welfare maximisation. When considering costs, the regulated company will not take account of the wider impact of fault interruption on customers or the costs of reporting and clearing faults borne by its wholesale customers.

¹² See paragraph 2.35 for further discussion on its strategic priorities to generate and preserve cash in its copper access network business in the context making cash significant investments in other areas.

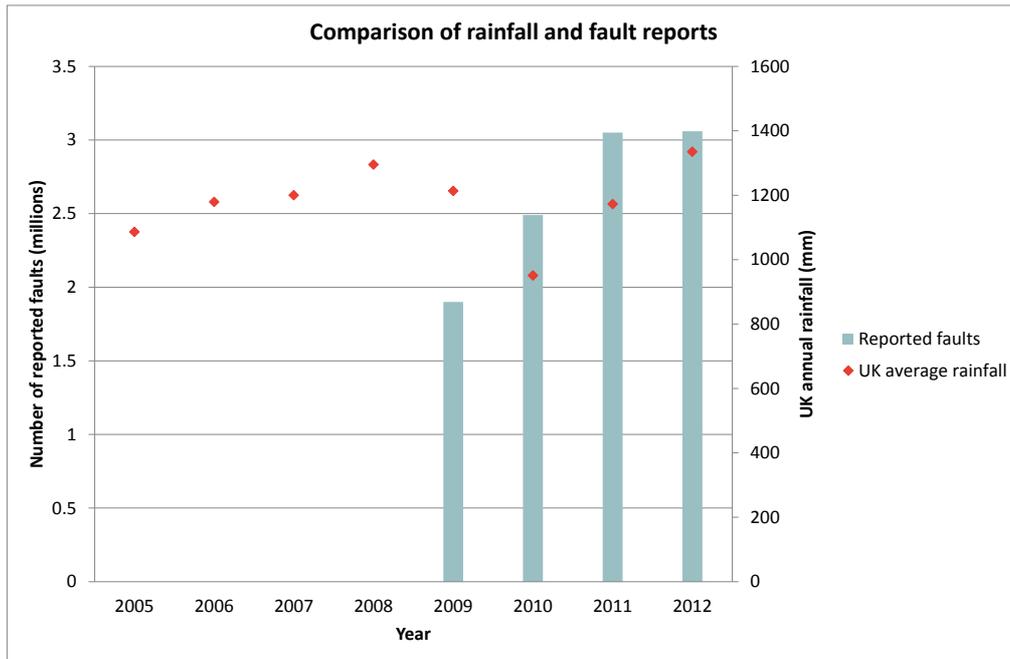
¹³ FAMR Consultation paragraphs A10.4 - A10.8.

¹⁴ FAMR Consultation paragraphs A10.66 – A10.68.

Base Year costs

that increases in fault rates were influenced by higher rainfall. However, as can be seen from **Figure 3**, the recent increase in fault rates began in 2010, a year in which rainfall was abnormally low. The increase in faults in the following year also cannot be explained by rainfall increases as the level of faults in 2011 was 50% higher than in 2009, despite rainfall in 2011 being lower than in 2009.

Figure 3. Comparison of rainfall and reported faults



Source: UK Met Office and FAMR Consultation Figure A10.5

- 2.21 Ofcom has attempted to estimate the impact that rainfall had on BT’s reported level of faults by estimating the relationship between rainfall and faults. It concluded that *“there is clearly a relationship between rainfall and fault report volumes”*¹⁵. According to Ofcom, a 100mm increase in monthly rainfall could be expected to lead to an increase of 50k faults¹⁶.
- 2.22 Were this estimate to be reasonably accurate, then the contribution that recent changes in rainfall have made to the increase in fault rates would be a relatively small. **Table 1** shows the increase in faults and rainfall between 2009 and 2012. Over the period, rainfall increased by 121 mm which, according to Ofcom’s calculation, would imply increases in fault rates of about 61k. When compared

¹⁵ FAMR Consultation paragraphs A10.66 to A10.68.

¹⁶ FAMR Consultation paragraph A10.68.

with the actual increase in fault rates over the same period, this means that rainfall contributed just 6% of the increase in faults between 2009 and 2012.

Table 1. The contribution of rainfall to fault rates

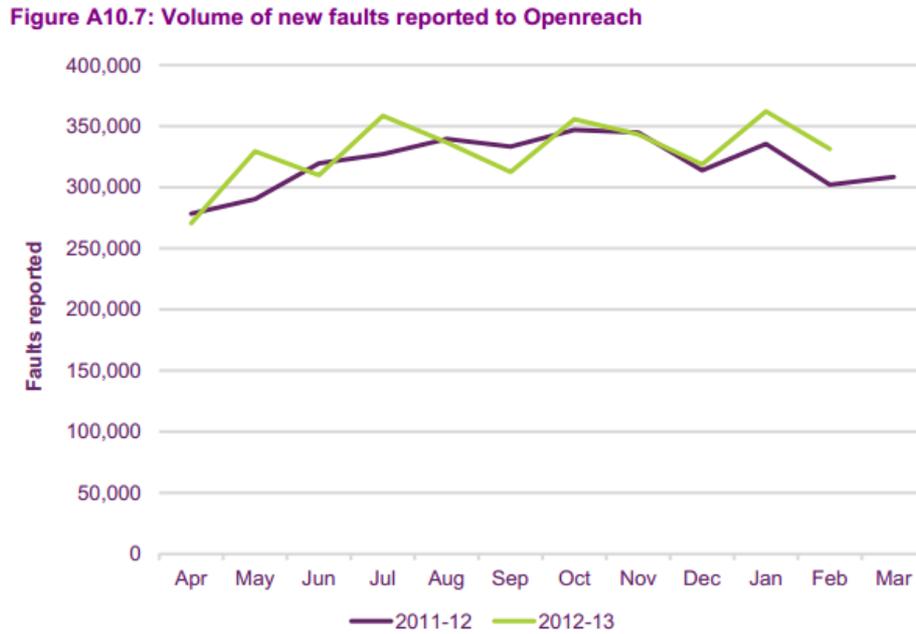
	2009 – 2012
Increase in rain (mm)	121.5
Implied increase in faults	60,750
Actual increase in faults	1,060,000
Unexplained increase in faults	999,250
The proportion of the increase in faults which are explained by rain	6%

Source: UK Met Office and FAMR consultation Figure A10.5. Faults exclude GEA faults.

2.23

As can be seen from **Figure 4**, BT data on monthly reported faults also shows little variation in the seasonal pattern from year to year in the last two years, also suggesting that the elevated fault rate in these two years does not reflect particular extreme weather events, which would be expected to lead to significant short term departures from the seasonal trend.

Figure 4. Monthly Openreach faults

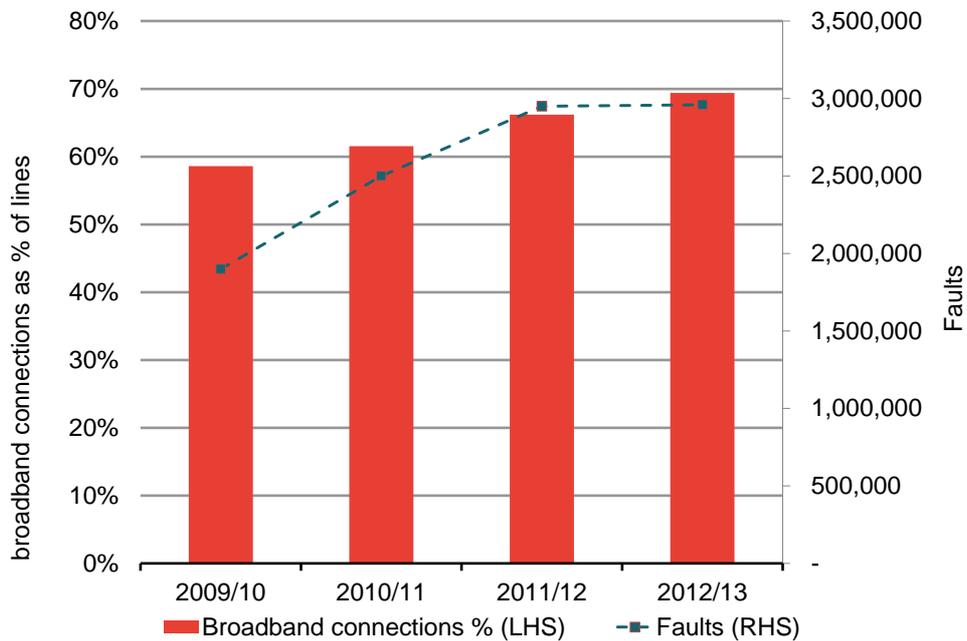


Source: FAMR Consultation

2.24 The data demonstrates that rainfall can only explain a small proportion of the increase in fault rates. BT has not provided any evidence that other exogenous factors have led to the rapid increase in fault rate. Therefore it is likely that the vast majority of the increase in fault rates is due to other factors.

Propensity of different types of customers to report faults does not explain the increase in faults

2.25 BT has argued, without compelling evidence, that customers who use ADSL services on a line have a greater propensity to report faults than those customers who solely use voice services. Even if this were the case, this would not fully explain the increase in faults from 2009, as the penetration of broadband in the customer base rose relatively slowly from 2009 to 2012 as shown in the chart below.

Figure 5. Broadband penetration

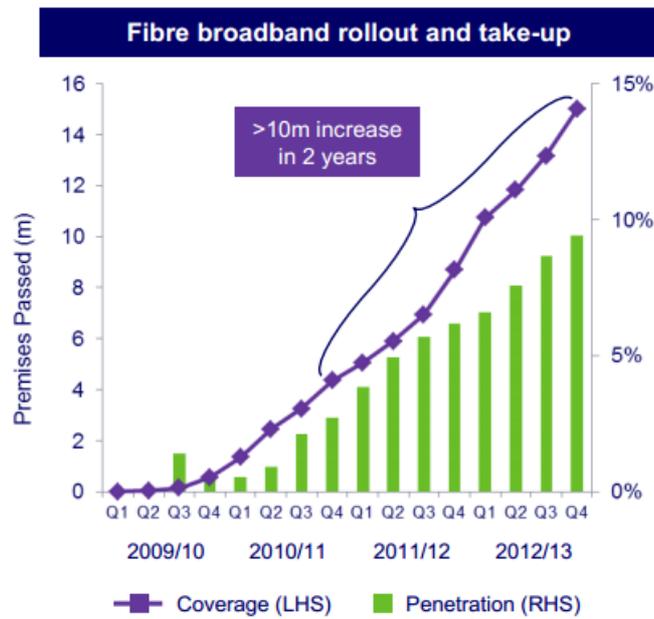
Source: Ofcom Demand Module

- 2.26 Even if broadband customers (based on either MPF or on WLR+SMPF) had a 10% greater propensity to report faults than WLR-only customers, this would have only increased the fault rate by 1% over the period 2009/10 to 2012/13 compared to the more than 50% increase in faults reported by BT.
- 2.27 The limited effect of increased broadband take-up on fault rates can also be seen in BT's performance between 2001 and 2009, when, despite significant increases in broadband penetration, BT was able to reduce fault rates by 5% a year on average (according to Ofcom it decreased faults from 3.5m by 34% to 2.1m over the period¹⁷).
- Endogenous factors such as a reduction in investment in the copper network and increased NGA activity are likely to explain the increase in fault rates**
- 2.28 In the absence of any exogenous factors to explain the recent trends in fault rates, it appears more likely that endogenous factors are the cause.

¹⁷ Ofcom: A New Pricing Framework for Openreach Second Consultation paragraph A10.36.

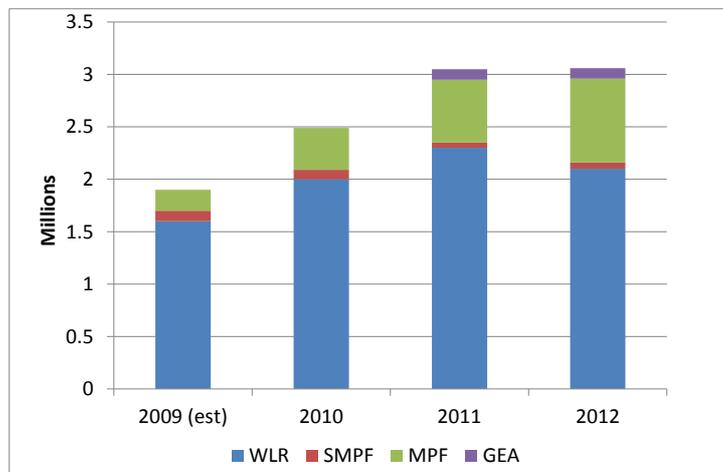
2.29 As can be seen in **Figure 6** below, Openreach’s roll out of NGA services began in earnest at the end of 2009/10. This coincides with the increase in fault rates from 2010 onwards.

Figure 6. BT NGA roll out



BT Group PLC Q4/full year 2012/13 results and business update – Part 2 10 May 2013

2.30 The rapid roll out of fibre since 2009 can be compared to the significant (61%) increase in the volume of faults over the same period.

Figure 7. Volume of faults completed

Source: FAMR Consultation Figure A10.5: Volume of faults completed

2.31 There are a number of potential mechanisms through which the roll out of NGA could lead to higher fault rates for WLR and MPF services¹⁸.

- First, the roll out of NGA services could lead to an increase in fault rates as BT has diverted investment from maintaining the copper network to the roll out and provisioning of the NGA network.
- Second, given the significant resources that have been diverted to support the NGA roll out, there is less expertise and experience available to maintain the copper network than previously, as the most skilled engineers are diverted to NGA activities. Therefore the quality of the resources used to maintain the copper network is declining over time.
- Finally, the increased activity in the access network could lead indirectly to faults on other lines. For example, clearing ducts to lay fibre to connect fibre to cabinets could disturb existing copper cables, leading to a higher probability of faults on these cables. Also intervention in street cabinets housing primary cross-connection points (PCPs), either to connect the PCP's to the cabinet housing the mini-DSLAM or to provision GEA

¹⁸ In addition the lower tolerances acceptable for VDSL on the shared copper line from the cabinet to the customer network termination point may lead to increase faults which may be attributed to WLR or MPF. Only the costs of repair of VDSL specific equipment appear to be attributed to the GEA service in BT's regulatory accounting system.

services, could lead to increased fault rates for the lines connected to the PCP.

- 2.32 Below we present evidence that the level of capital expenditure on the copper network has declined in recent years and resources may have been diverted to the roll out of the NGA network. This coincides with the rapid increase in reported faults.

NGA investment appears to be related to the increase in fault rates

- 2.33 Continued investment in the access network can reduce the forward looking fault rate, as well as playing a role in mitigating the impact of exogenous factors, as recognised by BT:

“Achieving a step improvement in service performance was dependent upon reducing volatility and input volumes. Through flexible resourcing and processes, Openreach stabilised and improved levels of service, enabling it to cope with unexpected events, such as the floods experienced in the summer of 2007.

Service involves more than just reactive provision and repair activity; it also includes the process of reinvigorating the access network infrastructure through investment in the local network –which leads to improved reliability, enhanced service standards and reduced cost. In 2008, Openreach invested around £35 million in a proactive maintenance programme, which reduced the number of access network faults by 10%. At the same time, the number of high-bandwidth services carried rose by around 20%.”¹⁹

- 2.34 However, the recent increases in fault rates have occurred at a time of significant reductions in capital expenditure on the copper and duct network. Increases in fault rates are likely to be partly explained by lower levels of investment and maintenance in the access network.
- 2.35 There are a number of reasons why Openreach may have chosen to reduce investment in its copper network. Openreach may be deliberately pursuing a strategy to sweat its copper assets (despite increased unreliability and lower quality for its customers) as it attempts to maximise cash generated. Such an approach would be consistent with BT’s strategic objectives of maximising cash flow in order to meet specific strategic goals which include:

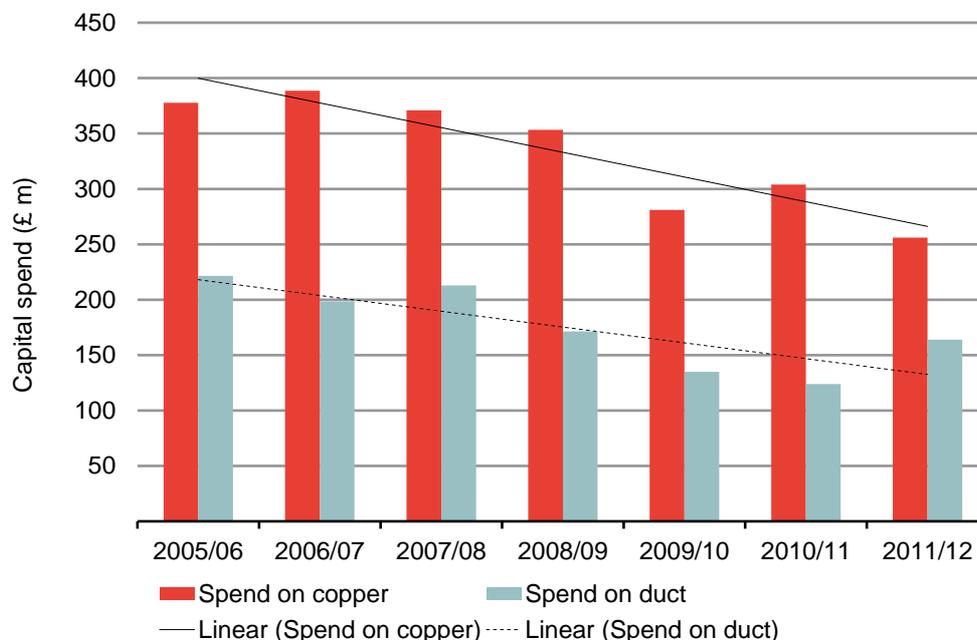
- expenditure of £2.5bn over five years on its fibre investment programme;

¹⁹ See: BT Group PLC Annual Report 2008 - Report of the Directors - Business review - Openreach and the UK access network Openreach and the Access Network.
<http://www.btplc.com/report/Report08/Reportofthedirectors/Businessreview/openreachandtheukaccessnetwork.htm>

- expenditure of a reported £1bn²⁰ on its new BT Sport TV channel;
- a significant pension deficit which it is required to fund (for example it made a £2bn deficit repair payment made in March 2012²¹); and
- a commitment which BT has actively communicated to the markets to reduce its net debt²².

2.36 **Figure 8** below sets out the capital spend on copper and duct and shows the declining trend in capital spend in each category. As line volumes were broadly stable during this period, the declines in capital expenditure are greater than can be explained by volume effects.

Figure 8. Capital spend on copper and duct (nominal prices) and trends



Source: Ofcom model

2.37 Notably, current capital expenditure is significantly below the corresponding CCA depreciation charges for these two categories (duct and copper) as can be seen in **Figure 9** and **Figure 10**. In the case of copper investment the level of CAPEX has been below CCA depreciation since 2009/10, whereas in the case of

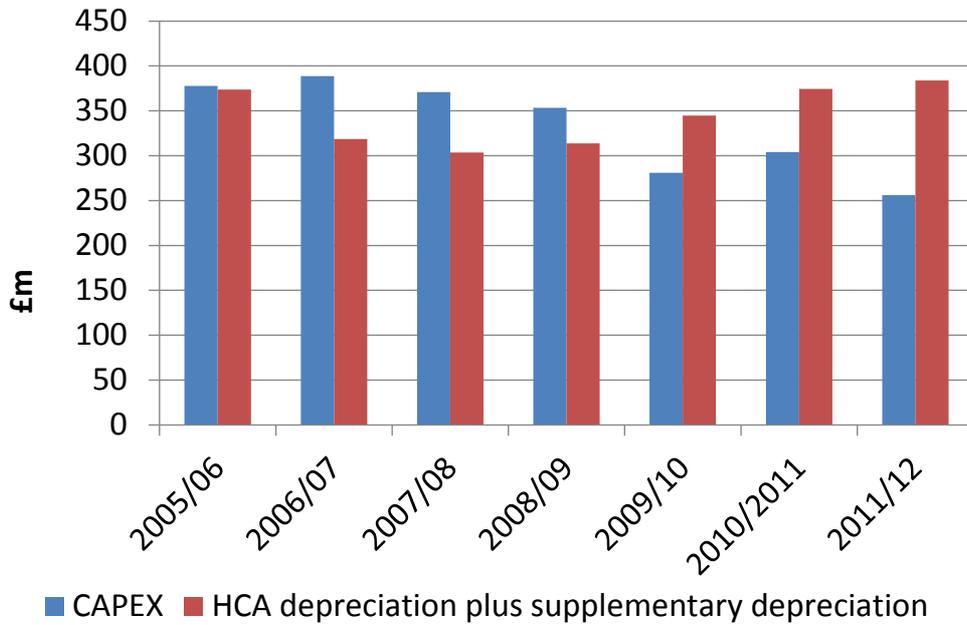
²⁰ <http://www.theguardian.com/football/2013/jul/31/bt-sport-launch>

²¹ BT Annual Report 2013 page 52.

²² <http://www.btplc.com/Sharesandperformance/AGMs/AGM2013/slides.pdf>

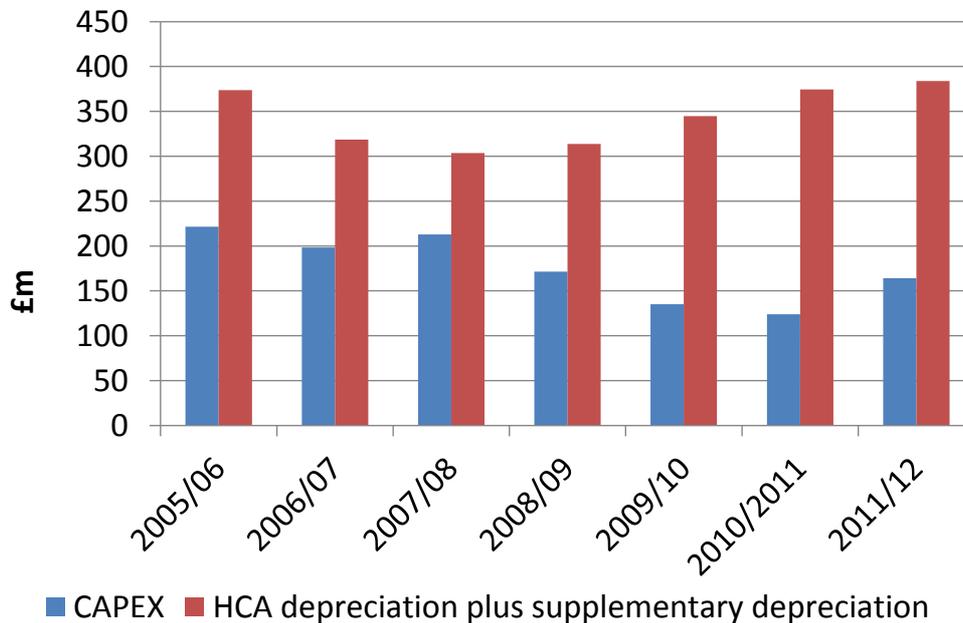
duct CAPEX has been below CCA depreciation since 2005/06. However, the mean level of expenditure required to maintain the network in a steady state would be expected to be broadly the same as CCA depreciation charges.

Figure 9. Copper capital spend compared with CCA depreciation (£m) (2005/06 - 2011/12)



Source: Ofcom model

Figure 10. Duct capital spend compared with CCA depreciation (£m) (2005/06 - 2011/12)



Source: Ofcom model

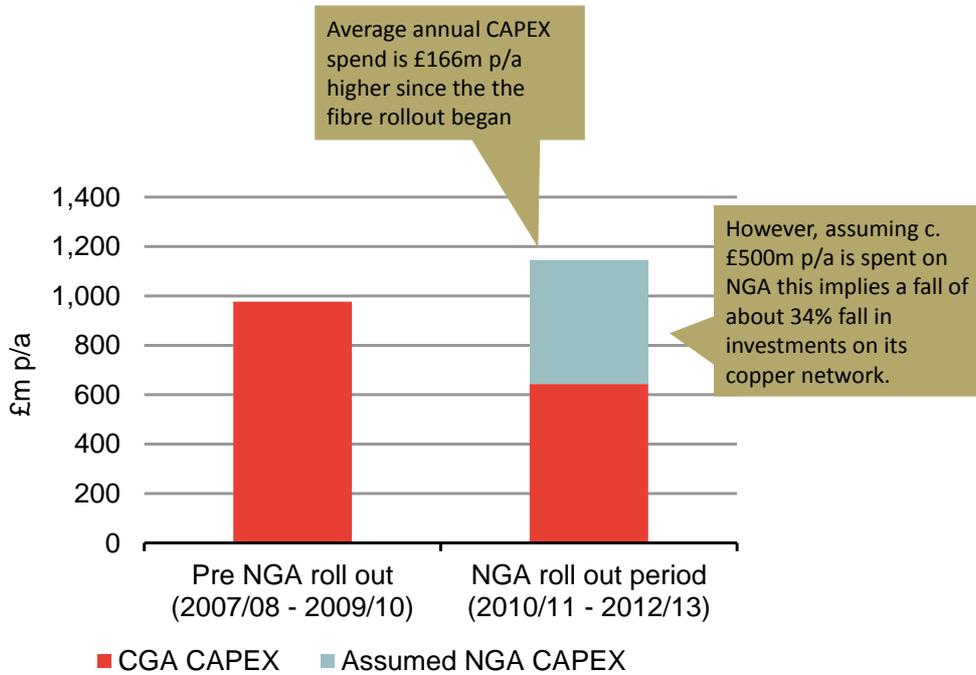
- 2.38 The reductions in investment in its copper network appear to be at least partly driven by the investments it is making in its NGA network. BT has communicated that it has invested £2.5bn in rolling out NGA which began in earnest in 2010/11²³ and is due to be completed in Spring 2014²⁴.
- 2.39 Therefore, a simple comparison of Openreach's average annual CAPEX spend before and after NGA roll out began illustrates how investment in fibre has crowded out investments on its copper network. **Figure 11** compares average CAPEX per annum in the period 2007/08 – 2009/10 (assuming no NGA

²³ The actual profile of Openreach's fibre investments are not public. But BT's annual reports suggest the investments were concentrated in the financial years 2010/11 to 2013/14. BT's 2010 Annual Report noted only a small level of spend on its fibre investment: "Capital expenditure decreased by 5% in 2010 to £907m (...), with the investment in our super-fast fibre access network being more than offset by lower own work capitalised". Whereas BT's 2011 Annual Report noted capital spend had increased significantly as a result of the fibre investments: "Capital expenditure increased by 20% (2010: 5% decrease) due to the investment in our super-fast fibre-based broadband network and the increase in CP's infrastructure build and provision activities."

²⁴ Source: BT and fibre – a history of developing the future "Currently, BT is investing £2.5bn to roll-out fibre broadband to around two-thirds of homes and businesses in the UK, which will be completed during the spring of 2014." See: <http://www.btplc.com/Innovation/Innovationnews/historyoffibre/index.htm>

investment) with average CAPEX p/a in the period 2010/11 – 2012/13 assuming a conservative £500m p/a investments in NGA²⁵.

Figure 11. Implied CAPEX spend on copper network before and after NGA roll out



Resources available for maintenance of the copper network have fallen

2.40 It is clear that BT’s focus on its fibre investments has diverted its engineering resources away from maintaining its copper network to building out its new fibre network. BT has estimated that NGA roll out will require 25 million man hours²⁶, roughly equivalent to 20,000 man years, or an average of 4,000 FTEs a year over four years²⁷. However, Openreach’s total number of employees has fallen since 2009.

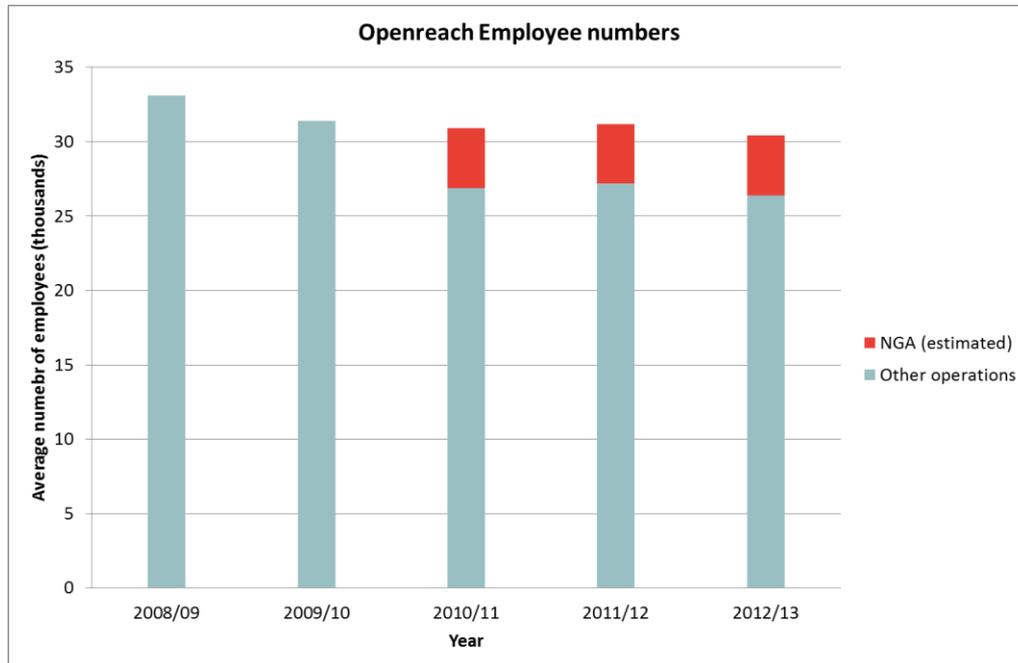
²⁵ Given that BT rolled out the investments earlier than expected, its £2.5bn investments may have been concentrated in the period in the period 2010/11 – 2012/13 implying an annual investment of much more than £500m per year.

²⁶ See for example: Openreach (2012) Developing advanced information and communications infrastructure in support of a fast growing economy, Dr George Williamson, Director Strategic Network Design, Chief Engineer, Openreach, slide 5. ([http://theukice.com/admin/admin_web/ckeditor/ckfinder/userfiles/files/day2/D2%201500%20\(Panelist\)%20George%20Williamson.pptx](http://theukice.com/admin/admin_web/ckeditor/ckfinder/userfiles/files/day2/D2%201500%20(Panelist)%20George%20Williamson.pptx)).

²⁷ Additional support staff may be indirectly required to support those working directly on the roll out.

- 2.41 As a result, the resources available to maintain the existing network and provision and manage existing services have fallen rapidly as shown in **Figure 12** below.

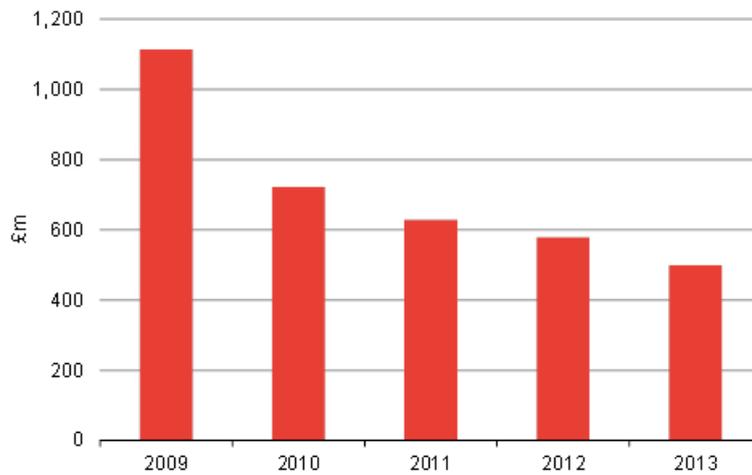
Figure 12. Openreach employees



Source: BT Annual Reports and Frontier estimates

- 2.42 We note the reduction in BT's internal labour force has not been offset by increases in contractors or other indirect labour as shown in **Figure 13**.

Base Year costs

Figure 13. BT OPEX spend on Agency and Contractors

Source: BT Annual Reports 2011 and 2013

- 2.43 The hypothesis that it is a reduction in the available engineering resources for maintenance of the CGA network that led to degradation in service quality for non-NGA services is consistent with the widespread service degradation seen in other activities such as provisioning and fault repair.

Conclusion and proposed approach to modelling efficiently incurred costs related to fault rates

- 2.44 The explanation that poor weather in 2012 has led to the current high fault rates appears to be a canard as (a) the increase in fault rates began in 2010 before the weather worsened and (b) the magnitude of the increase in fault rates since is simply too great to be explained solely by weather. Even taking Ofcom's analysis of faults over a 23 month period at face value²⁸, the increase in rainfall can only explain around 6% of the increase in faults between 2009 and 2012. The increase in fault rates is also clearly orders of magnitude greater than could possibly be explained by broadband customers' greater propensity to report faults.

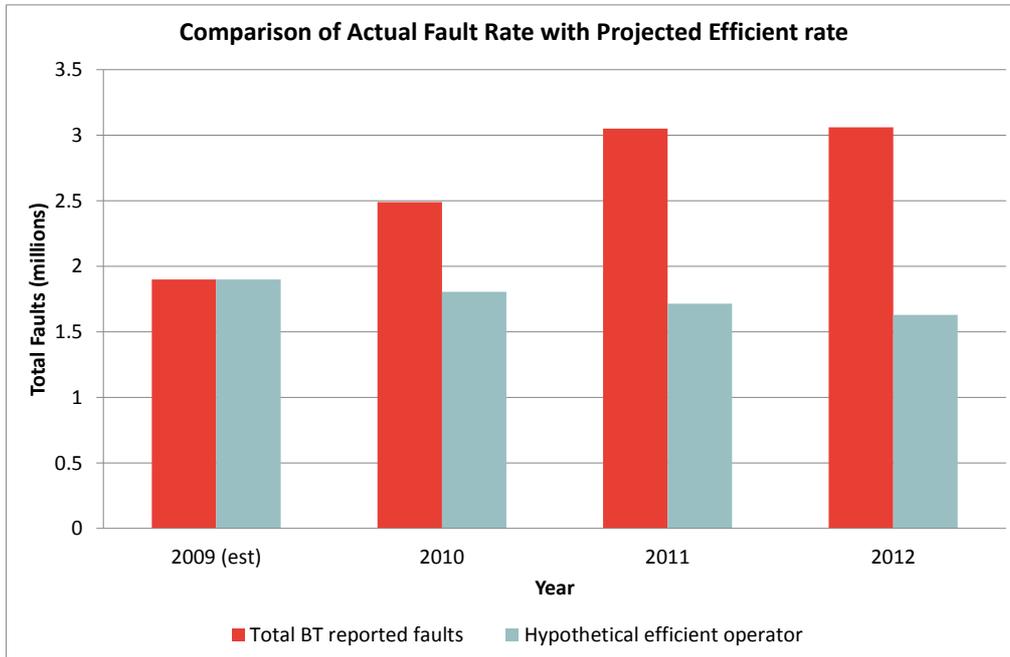
²⁸ Ofcom compared Openreach fault data with Met Office rain data for April 2011 to Feb 2013. (See FAMR Consultation paragraphs A10.66 – A10.68). It estimated the correlation between the two variables and considered how they varied in relation to each other. Ofcom found that the “increase in the volume of faults reported to Openreach between a dry period (defined as a rainfall of around 50mm in a month) and a particularly wet period (defined as a rainfall of around 150mm in a month) would be of the order of 50,000 faults or 15%.” However, Ofcom did not attempt to control for other factors that might affect variation in fault rates (for example seasonal effects related to moving house or returning from holiday), and its period of analysis focused on what Ofcom has admitted is an abnormal period for rainfall.

- 2.45 The increased fault rate from 2010 onwards exactly coincides with the start of the significant roll out of NGA by BT. There are two potential mechanisms through which NGA roll out could lead to increased fault rates and the need for Ofcom to adjust for these effects has been highlighted in previous submissions to Ofcom²⁹.
- 2.46 A hypothetical operator who had not rolled out an NGA network could be expected to have a markedly lower fault rate than that reported by BT in 2011/12 - 2012/13. A reasonable estimate of the fault rate for such a hypothetical operator would start with the 2009 level of faults and project them forwards assuming a reduction in faults of approximately 5% a year (similar to that achieved by BT in the period up to 2009³⁰). This is illustrated below, which shows that in 2012 the fault rate for a hypothetical efficient copper-only operator would be 47% below that reported by BT.

²⁹ For example pages 7 and 8 of a Frontier note on Treatment of NGA costs submitted in October 2011 Charge control review for LLU and WLR services.

³⁰ This is conservative given that the 5% annual reduction was achieved over a period when the rate of increase in broadband take-up was significantly higher.

Figure 14. Comparison of actual and efficient fault levels



Source: Frontier calculation

Note: the efficient level of faults is estimated by applying a constant 5% p/a reduction in fault rates, consistent with the level of reduction observed in the period 2001 - 2009.

2.47

Given Ofcom’s proposed anchor pricing approach, it would be appropriate to apply an adjustment to repair costs to reflect the fact that the current fault rate is above the efficient level of an efficient hypothetical copper-only operator. Based on the above projection of an efficient fault rate, a reduction of 47% in the allocated costs of repair would be appropriate which would imply the following adjustment in prices (based on a 47% reduction in allocated repair costs in 2016/17 prices).

Table 2. Contribution of faults to prices

	MPF	WLR	SMPF
2016/17 proposed charge based on actual faults	88.25	89.90	8.25
Fault contribution to charge	14.12	12.59	2.23
Implied adjustment for efficient fault rate	6.64	5.92	1.05
Implied charge adjusted for efficient fault rate	81.61	83.98	7.20

Notes: July Consultation paragraph 5.23 “the cost of repairing faults represents 16% of the MPF cost stack, 14% of the WLR Basic cost stack and 27% of the SMPF cost stack.”

- 2.48 If the elevated fault rate is due to under-investment in the network, it is likely to require significant investments in the future to return fault rates to an efficient level³¹. Should the forward looking cost base used to set the charge control take into account this level of additional expenditure required to reduce BT’s fault rate to an efficient level, then BT may be incentivised to under-invest in its network in the future because future charge controls would allow it to recover these costs of additional efficiency investments³².

Treatment of NGA costs in the RFS

- 2.49 Ofcom’s approach requires it to exclude NGA costs from its estimation of Openreach’s costs, however, there is evidence that this has not been done for some categories of costs.
- 2.50 Ofcom’s approach to setting prices for LLU, WLR and SMPF in the context of technological change is to use an anchor pricing approach. It describes anchor pricing as meaning that “*regulated charges for current generation access services (i.e. MPF, SMPF and WLR) are set as if there were no deployment and take-up of NGA (in particular FTTP) services.*”³³
- 2.51 As a result of the anchor pricing approach, Ofcom bases prices on “*the efficient ongoing costs of providing services over a copper network, ensuring all incremental fibre costs are*

³¹ The overall level of expenditure may be higher in total than if BT had continued to invest in preventative maintenance over the whole period to maintain fault rates at the efficient level.

³² A more appropriate approach, consistent with Ofcom’s anchor pricing principle, would be to forecast both fault rates and capital expenditure from a 2009 base year.

³³ The July Consultation paragraph 3.39.

Base Year costs

*excluded from the base year (and forecast) costs. As a result, it is necessary to ensure that the input data used in the Cost Model does not include costs associated with fibre.*³⁴ If costs were to include costs related to NGA investments, then it is possible that prices for CGA services could be too high (and demand for broadband could be too low), and that incentives for operators to choose between different inputs, or to invest in new technologies could be inefficiently distorted.

- 2.52 As BT's wholesale NGA service ("GEA") is not charge controlled or required to be cost oriented, BT has a strong incentive to minimise the costs allocated to the GEA services so as to maximise the reported FAC costs of other Openreach services which are charge controlled. Where cost causality is indirect there will be a degree of uncertainty and/or subjectivity in the allocations between services. In these cases, BT can propose cost allocation bases which reduce the cost allocated to GEA services below a true incremental cost level.
- 2.53 There are two clear examples in 2011/12 where BT has chosen allocation bases which are inconsistent with the approaches used for other services and which aim to allocate costs away from NGA services³⁵:
- the treatment of overhead costs; and
 - the treatment of repair costs.
- 2.54 Details of these allocation bases are given below.

Overhead costs

- 2.55 Typically it is difficult to ascertain cost causality for certain activities, commonly referred to as overheads, either because the activities are truly fixed and common or because cost causality is indirect. One of the allocation bases used in preparing the RFS is "NGAOHEAD", which appears to alter the recovery of overhead costs from components by excluding certain NGA components from the allocation of certain overhead costs.

The BT Detailed Attribution Methods³⁶ ("the DAM") states that the reason for not allocating overhead costs proportionately to NGA is: *"NGA is a relatively new platform so we do not allocate such overheads to activities that do not lead to cash."*³⁷

³⁴ The July Consultation paragraph 6.63.

³⁵ In addition, in 2012/13 RFS BT introduced revised allocation bases which appear to aim to allocate more costs to LLU and WLR services, which would lead to further increased costs if these were used as the basis for setting the final charge controls.

³⁶ Available at:
http://www.btplc.com/Thegroup/RegulatoryandPublicaffairs/Financialstatements/2012/DAM_2012.pdf

³⁷ BT 2012 DAM page 87.

- 2.56 The use of this allocation basis could lead to the mis-attribution of indirect costs. While some of these overheads may be truly fixed (and common) costs, some management costs will be incremental to the roll out of NGA services, i.e. these costs would not be incurred if the NGA roll out was not taking place and/or if a large number of Openreach staff engaged on the NGA roll out were no longer employed by BT.
- 2.57 By not attributing these incremental costs to NGA components and eventually to NGA services, some NGA incremental costs will be incorrectly allocated to MPF and WLR services.
- 2.58 It is worth noting that in analogous cases where new services were introduced and were not cash generative, for example during the introduction of LLU services or AISBO services, BT does not appear to have adopted similar adjustments to allocation bases.

Repair costs

- 2.59 BT allocates repair costs for the D-side copper network and drop wire across WLR, MPF and WLR+SMPF services in proportion to estimates of the fault rate for each type of line. However, BT does not appear to have extended this approach to lines used to deliver GEA services. As a result if GEA lines have a higher reported fault rate than other lines (which may be expected given the need to intervene in the PCP to provision these services, or because VDSL early adopters have a higher propensity to report faults or VDSL is more prone to faults), the costs of repairing these incremental faults will be wrongly attributed to WLR/LLU services.
- 2.60 The repair costs attributed to GEA services appear to relate solely to the costs of repairing GEA specific equipment. As noted, the roll out and provisioning of GEA services is likely to lead to an increase in fault rates in the access network more generally. This increase is incremental to the provision of GEA services and should be attributed to GEA services.
- 2.61 A correctly implemented anchor pricing approach, adjusting the RFS results based on a projection of an efficient level of faults on the copper access network, would ensure that the cost of FTTC incremental faults is excluded from the results.

Base Year costs

3 Differentials between MPF and WLR/WLR+SMPF

Summary

- 3.1 Ofcom's approach to common cost recovery is that all relevant common costs³⁸ should be recovered equally from WLR and MPF lines. Thus, the price difference in 2016/17 between WLR and MPF should equal the LRIC cost difference. This approach is based purely on productive efficiency grounds and places no weight on allocative or dynamic efficiency considerations. This is inconsistent with Ofcom's stated view that LLU-based competition brings dynamic efficiency benefits over WLR³⁹. This indicates that in principle Ofcom's approach could result in a sub-optimal outcome, as it implies a higher MPF price that forgoes benefits in terms of dynamic efficiency which would outweigh the marginal losses in productive efficiency.
- 3.2 In practice, there is uncertainty as to the optimal differential due to a lack of accurate information on the impact on downstream markets and consumers. However, similar uncertainty also applies to the cost information, supplied by BT, used to estimate the level of incremental costs for the different services. For example, there appears to be considerable uncertainty over the level of differential fault rates on different types of line⁴⁰ and hence the incremental cost of fault repairs for different services.
- 3.3 Given this combination of uncertainty over the true LRIC differentials and theoretical support for a price differential greater than the LRIC differential, Ofcom, as a minimum, should seek to set a differential such that it is at the upper end of the potential range of LRIC estimates. To achieve this outcome, Ofcom should critically review the differential for each cost component at a FAC level, in particular where BT asserts that MPF has a higher incremental cost than WLR, for example in the case of fault repair costs, to ensure that the differential is justified.
- 3.4 Setting the differential below LRIC would result in a clearly inefficient outcome even if no weight is assigned to dynamic efficiency considerations. We have reviewed the cost stacks shown in the July Consultation and find that the proposed cost allocation clearly underestimates the LRIC differential between MPF and WLR.

³⁸ Specifically this relates to common costs that are relevant to the key rental and migration products.

³⁹ See paragraphs 3.25 to 3.29 below for discussion of Ofcom's preference for intervening upstream (such as LLU) than downstream (such as WLR).

⁴⁰ The July Consultation paragraph 5.31.

The price differential between WLR and LLU has important implications for competition

- 3.5 When determining the corresponding charge controls, Ofcom sets price caps which are consistent with cost recovery by the end of the charge control period. As a proportion of costs are common to a number of services, there can be range of prices which satisfy the condition that BT recovers its efficiently incurred costs. When setting the charge controls Ofcom must choose the appropriate methodology to recover fixed and common costs from different services.
- 3.6 The differentials between WLR, SMPF and MPF resulting from Ofcom's chosen methodology will have important implications on competition in downstream markets, where the services are used as substitutable inputs in the provision of voice and broadband services. Competitive providers wishing to enter or expand in the market must make a decision whether to use either MPF, WLR or WLR+SMPF and will base their decisions on the forward looking prices of these wholesale inputs (among other factors).
- 3.7 Alternative approaches to recovering common costs can be considered taking into account:
- **Productive efficiency:** that a given level of output is produced at the lowest possible overall cost. If prices are constrained to cost, consumers benefit from services which are produced at the lowest possible cost.
 - **Allocative efficiency:** that prices are set in a way which maximises output. Consumers benefit as more are able to consume for a given set of prices.
 - **Dynamic efficiency:** that prices are set such that competition evolves to ensure that firms are incentivised to make investments which enable them to innovate and differentiate the products they offer. In dynamically efficient markets, consumers benefit when firms are able compete strongly in terms of product characteristics, quality or pricing.
- 3.8 In practice when setting charge controls, regulators will have to trade off the potential benefits and costs of these different forms of efficiency given their overall objectives.
- 3.9 In the section below, we review Ofcom's approach to setting prices of MPF, SMPF and WLR. We then propose an alternative approach which will better achieve Ofcom's objectives of delivering efficient outcomes.

Approach taken by Ofcom

- 3.10 Ofcom has chosen to set the price differential between WLR and MPF, and between WLR + SMPF and MPF equal to the estimated difference in the LRIC

Differentials between MPF and WLR/WLR+SMPF

costs of those services. This implies that an equal amount of common costs are recovered from each line: whether WLR, WLR+SMPF or MPF, regardless of differences in the LRIC of those services.

- 3.11 Ofcom's decision reflected its assessment of the efficiency implications of its approach and the weight it attached to different forms of efficiency.
- 3.12 First it considered whether prices could or should be set to maximise **allocative efficiency**⁴¹. Ofcom recognised three types of consumer (voice only, current generation broadband customers and superfast broadband customers), and it noted that in principle *“to maximise static economic efficiency while also recovering common costs, we could recover proportionally more common costs from services that have relatively inelastic demand (i.e. not very responsive to increasing prices). Such an approach is often described as Ramsey pricing”*.
- 3.13 Despite its acknowledgement of potential efficiency gains as a result of Ramsey pricing, (i.e. output could be expanded) Ofcom has chosen not to promote (or allow for) allocative efficiency when setting prices as it does not have *“robust information on elasticities, which are essential for Ramsey pricing”*⁴². Ofcom considers that, absent robust information, there could be a risk of inefficient output or inefficient investment incentives. Ofcom's approach here stands in contrast to its approach on regulating other prices⁴³ where it allows Openreach considerable price flexibility reflecting allocative efficiency considerations, even though Openreach does not appear to have price elasticity data either.
- 3.14 Ofcom also noted its position in the last market review where it stated that, where wholesale inputs are used as substitutes in downstream markets, then attempts to price discriminate at the end user level (using Ramsey prices) *“would, to a considerable extent, be undermined by arbitrage, especially in the longer term”*⁴⁴.
- 3.15 Ofcom considered **dynamic efficiency** noting how prices could affect incentives to invest in infrastructure⁴⁵. It also referred⁴⁶ to its proposals on the pricing of GEA where dynamic efficiency considerations were key to its decision not to impose a specific charge control and instead to use an “anchor pricing”

⁴¹ See Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 Call for inputs paragraph 6.27 – 6.28.

⁴² The July Consultation paragraph 3.80.

⁴³ For example in the July Consultation, one of Ofcom's justifications for giving BT flexibility to set prices of some services within a control on a basket of services rather than a control on each individual service is that *“[w]here relative prices can be set to reflect the way demand responds to price changes, this pricing freedom may be more likely to result in charges that recover costs, particularly fixed and common costs, in an efficient way.”* The July Consultation paragraph 4.19.

⁴⁴ Ofcom March 2012 Statement paragraph 7.11.

⁴⁵ See the July Consultation paragraph 3.80.

⁴⁶ See the July Consultation footnote 58.

approach to regulate the prices of current generation access services⁴⁷. In contrast, Ofcom did not place significant weight on such dynamic efficiency considerations with respect to its proposals on WLR, SMPF and MPF differentials.

- 3.16 Instead Ofcom's approach is solely based on **productive efficiency considerations**. Ofcom noted that, given services provided using the different regulated products were substitutes⁴⁸, the price differential of the MPF and WLR products "*should ideally be equal to incremental cost differences so that purchasers are given incentives to use the service which minimises total costs*"⁴⁹.

Assessment of Ofcom's approach

- 3.17 We agree with Ofcom that its decision on the appropriate approach to pricing services should reflect efficiency considerations. However, in doing so it should have regard both to static allocative and productive efficiency as well as to longer term dynamic efficiencies. Where it uses judgement to balance different conflicting efficiency goals, its reasoning should be well founded and well evidenced. We assess Ofcom's approach to assessing allocative, productive and dynamic efficiency below.

Productive efficiency goals are important but are not the sole consideration

- 3.18 Ofcom places most, if not all, weight on promoting productive efficiency. It considers that, since MPF and WLR+SMPF could be substitute inputs in downstream markets, that in order to incentivise productive efficiency (i.e. overall cost minimisation) the difference in price should be set equal to the absolute difference in the LRIC of each of MPF and WLR + SMPF. However, it has not attempted to quantify the potential overall efficiency gains that might be realised by setting the differentials between MPF and WLR+SMPF (or MPF and WLR) at the LRIC differential, compared with using alternative approaches which might have the effect of increasing output and increasing allocative efficiency or in order to give weight to dynamic efficiency arguments.

⁴⁷ See Ofcom (2013) FAMR consultation paragraphs 11.131 – 11.142.

⁴⁸ That is to say WLR or MPF are potential substitutes; WLR+SMPF and MPF are potential substitutes; or MPF/WLR+GEA and either WLR+SMPF and MPF are potential substitutes.

⁴⁹ The July Consultation paragraph 3.65.

Differentials between MPF and WLR/WLR+SMPF

Ofcom's assessment of allocative efficiency is incomplete

- 3.19 Ofcom's assessment of the appropriate approach to recovering common costs begins with an assessment of the different groups of customer that use LLU and WLR services⁵⁰, i.e. users of:
- voice only services;
 - current generation broadband services; and
 - superfast broadband services.
- 3.20 Despite acknowledging the allocative efficiencies that could arise by adopting a Ramsey approach to recovering costs from the different groups, Ofcom simply states that it does not have robust information on the elasticities between the different groups (which take into account cross-price elasticities of demand). In order to meet its objectives, Ofcom should first review available quantitative and qualitative information on the price elasticities of different groups before considering the implications for the most allocatively efficient allocation of common costs, even if this information is uncertain.
- 3.21 There is circumstantial evidence that the elasticity for voice-only services is relatively low. For example, there is a very limited number of households who do not take any voice service (either fixed or mobile) while the elasticity for broadband services is likely to be higher, given that penetration is significantly lower (indicating that customers are still making an active consumption decision based to some degree on price)⁵¹. Thus, an increase in WLR prices may not lead to a large percentage reduction in demand for voice services (although there could be substitution to lower cost mobile services) while a similar increase in MPF or SMPF prices could lead to a bigger percentage reduction in broadband penetration.

Ofcom should consider dynamic efficiencies when considering the appropriate differential

- 3.22 Dynamic considerations are important when regulating telecoms networks. If regulatory remedies were based solely on static considerations then over the medium term operators may not have incentives to innovate and consumers would be harmed as a result of a narrower range and variety of services, and a lack of service and product innovation and less intense competition.

⁵⁰ Ofcom (2012) Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 Call for inputs paragraph 6.26.

⁵¹ According to the Ofcom Communications Market Report (2013) 94% of households have a mobile phone and 84% have a fixed phone, whereas 75% have either mobile or fixed broadband.

3.23 In the context of regulating LLU and WLR services, dynamic considerations are particularly important for two reasons.

- First, Ofcom recognises that, all other factors being equal, consumers will benefit from policies which enable competition further upstream in the value chain such as MPF. These benefits will remain important as some consumers migrate to NGA services.
- Second, Ofcom notes that dynamic competition in the CGA segment of the broadband market is central to its regulation of NGA⁵².

3.24 We explore these issues below and consider the implications for its regulation of LLU and WLR.

MPF-based competition benefits consumers as it takes place further up the value chain

3.25 Ofcom's analysis, which treats MPF and WLR (or MPF and WLR+SMPF) as completely equivalent inputs, ignores the dynamic efficiency benefits that result from investments in LLU over WLR. In other statements, Ofcom recognises and accepts that consumers benefit from policies which promote competition higher up the value chain. This was illustrated by Ofcom in its recent Fixed access market reviews where Ofcom noted:

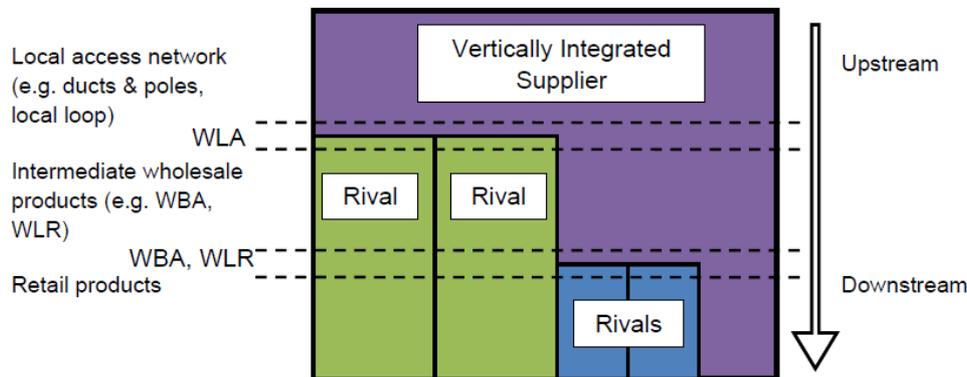
“Overall approach – the preference for intervening upstream [Figure 15 below] illustrates how regulation at the different levels of the market can, when there would otherwise be a single vertically integrated supplier, produce a downstream competitive market. [...] Where possible, our approach has historically been to intervene upstream in order to facilitate competitive downstream markets. [...] As such, our approach to these reviews, consistent with the approach in the EC regulatory framework (and our approach in previous reviews), can be summarised as follows. Having provisionally identified that, absent regulation, SMP exists at the retail level, we look to propose access remedies at an upstream level to facilitate greater competition. We do this at the most upstream level that we believe will result in effective and sustainable competition.”⁵³

3.26 Ofcom illustrated how it prefers to intervene higher up the value chain such as at the level of the local loop, than at lower levels such as WLR, or at the retail level of the market in **Figure 15** below.

⁵² See paragraphs 3.30 - 3.35 below for discussion.

⁵³ FAMR Consultation Paragraphs 2.8, 2.9 and 2.15.

Figure 15. Illustrative example of impact of regulating local access and intermediate wholesale products



Source: Ofcom (2013) Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 Consultation Figure 2.1.

3.27 The benefits of intervention higher up the value chain are well understood. There are more competitors over a greater proportion of the cost stack increasing scope for cost efficiencies; intervention higher up the value chain offers more opportunity to innovate in the products offered to consumers; and it provides greater pricing flexibility as operators have greater control over their cost base.

3.28 Where competition is enabled further upstream, consumers will benefit as entrants are able to offer more innovative service, price and product offerings. Entrants have much greater control over the products that they offer and will be able to more effectively challenge the incumbent for example by targeting certain customer segments. Consumers would benefit from a wider range of products and services on offer, and from more intense competition which leads to lower prices. Ofcom highlighted these benefits in its 2007 review of Communications Markets when it noted that:

“[a] major driver of recent falls in the cost of telecoms services has been the accelerated rate of exchange unbundling. [...] unbundling exchanges gives operators control over more of the value chain and access to economies of scale not available when using BT wholesale tariffs. ... LLU has opened up the retail market by allowing operators to offer differentiated services by installing their own equipment in exchanges [emphasis added]”⁵⁴.

3.29 Given the well-established and accepted benefits that will accrue to consumers where competition is enabled further upstream (such as MPF), Ofcom should

⁵⁴ Ofcom Communications Market Report (2007) section 4.1.3.

give due weight to such dynamic efficiency benefits in formalising its proposals for regulation of LLU and WLR. In particular, even though LLU and WLR can be both used to deliver retail broadband services, they are not completely equivalent inputs: LLU-based competition enables greater dynamic benefits to consumers than WLR.

Dynamic competition in the CGA segment of the market remains important during the migration to NGA

3.30 LLU-based competition remains important during the transition to NGA-based services for three reasons:

- A significant proportion of customers will continue to be reliant on CGA based services for the foreseeable future, (to illustrate, by the end of 2012 only 6% of Openreach's 17m lines were based on fibre)⁵⁵. These customers will benefit directly from the competition and innovation resulting from MPF based competition.
- During the period of migration, CGA services will play a key dynamic role ensuring efficient competition and prices. Ofcom has said that CGA services will play a key role in constraining prices of NGA services (which are not charge controlled)⁵⁶.
- MPF-based competition may provide a migration path to competition at deeper levels of the network, for example through sub-loop unbundling.

3.31 The importance of enabling innovation and investment at higher levels of the value chain is particularly important at a time where consumers are migrating to fibre based products. Ofcom notes that increasing numbers of customers are switching to new fibre-based products. From a standing start in 2010, FTTx connections (excluding cable) now account for 1.7 million connections⁵⁷ of which the majority are retailed by BT. Take-up of NGA services is likely to grow as penetration of bandwidth hungry household devices, such as tablets, smartphones and smart TVs, grows⁵⁸.

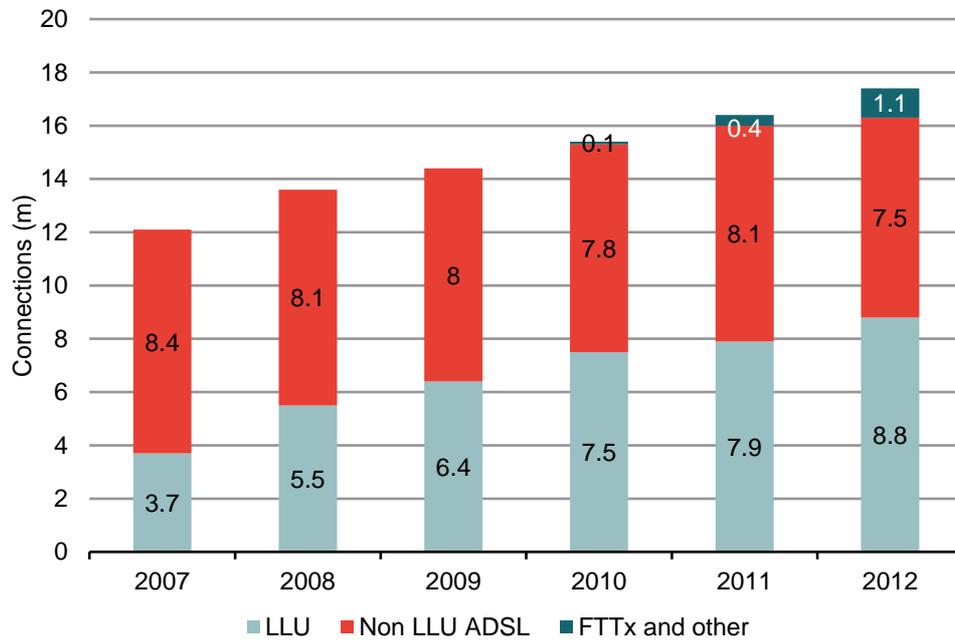
⁵⁵ Ofcom Communications Market Report (2013) figure 5.33.

⁵⁶ See paragraphs 3.32 - 3.33 below.

⁵⁷ See BT 2013 Q1 results. http://www.btplc.com/News/ResultsPDF/q113_release.pdf

⁵⁸ According to Ofcom "Tablet computer ownership more than doubled between 2012 and 2013 and a quarter (24%) of households now own at least one of these devices, ... Seven per cent of UK households had a smart TV in Q1 2013, a two percentage point increase on the previous year." Ofcom Communications Market Report 2007 section 1.5 and 2.2.1.

Figure 16. Fixed broadband connections: 2007-2012 (excl. cable)



Source: Ofcom Communications Market Report (2013) figure 5.33.

- 3.32 A flourishing and vibrant CGA sector is particularly important as penetration of NGA connections grows because Ofcom’s “anchor pricing” approach to regulation of NGA services is predicated on strong competition from CGA services. Therefore, absent this strong competition, BT would be able to set higher prices, and take-up of NGA services will be lower.
- 3.33 In its regulation of NGA wholesale products, Ofcom explicitly gave Openreach flexibility in how it prices its NGA rental services. Ofcom recognised that its decision was reflective of dynamic efficiency considerations to ensure that BT had appropriate incentives to invest in its fibre network and earn a “*fair return on investment*”⁵⁹. But it also noted that CGA services would play a key role in exerting “*a considerable constraint*”⁶⁰ on the price that BT could charge for its NGA services. For example in explaining why it would continue not to impose price regulation on BT’s NGA services Ofcom noted “*the prices of [NGA] services will be constrained by the availability of current generation broadband services*”⁶¹
- 3.34 Furthermore, MPF providers may play an important role in the evolution of the next generation of broadband products for example by using sub-loop

⁵⁹ FAMR Consultation paragraph 11.142-143.

⁶⁰ FAMR Consultation paragraph 11.140.

⁶¹ FAMR Consultation paragraph 11.139.

unbundling. MPF providers who already have a presence in local exchanges to compete in the provision of voice and broadband services will be able to invest further upstream in order to compete using sub-loop unbundling. Ofcom should be conscious not to set prices which force broadband suppliers to move further downstream and invest less (by buying WLR + GEA products) as consumers migrate to NGA. Such an approach would forego potential dynamic efficiencies realised by operators who could otherwise invest deeper in the network (e.g. at the sub-loop level). NGA consumers would be denied dynamic efficiency benefits of greater competition, product differentiation, and innovation over NGA broadband products.

- 3.35 In summary, when considering how to balance different efficiency considerations Ofcom should recognise the importance that LLU continues to play in its approach to NGA regulation. Competition from MPF-based providers is likely to place a greater competitive constraint on BT's FTTC services than competition from WLR or from WLR+SMPF. This is because, as set out above, MPF-based competition takes place further upstream and it therefore gives providers greater control over the prices and services that they offer and provides a greater incentive to invest in their networks to compete strongly with NGA services. By contrast WLR services are controlled by Openreach who may not have as strong an incentive to provide WLR services which compete closely with BT's NGA products because Openreach (and BT in the retail market) will have a strong incentive to migrate consumers onto Openreach's fibre products.

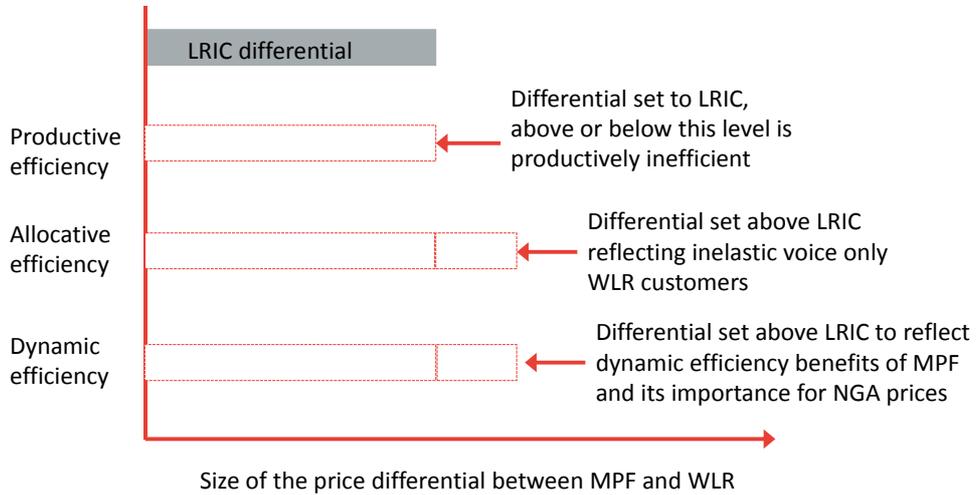
Conclusion on the appropriate weight to be given to different efficiency considerations

- 3.36 We recognise that different efficiency considerations can imply different recovery of common costs:
- Ofcom argues that productive efficiency implies the same absolute level of common cost mark-up per line between LLU and WLR products;
 - allocative efficiency considerations may imply higher mark-ups on WLR services compared with MPF if we considered that, on average, price elasticity was lower for WLR retail customers than for MPF retail customers;
 - Ofcom recognises that deeper levels of competition bring greater benefits to consumers, which would indicate that the mark-up on LLU services should be less than on WLR; and
 - Ofcom's regulatory policies to promote efficient investment and take-up of NGA services are dependent on a vibrant, competitive LLU segment of the market which would imply a lower mark-up on MPF services.

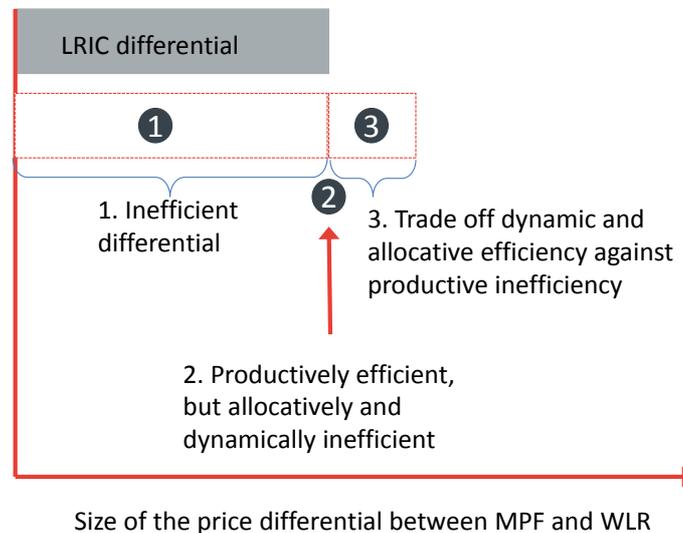
Differentials between MPF and WLR/WLR+SMPF

3.37 This is illustrated in **Figure 17** below.

Figure 17. The size of the price differential between MPF and WLR given different efficiency considerations



3.38 It is clear that a price differential which was less than the LRIC differential would be inefficient (see area 1 in **Figure 18** below). Ofcom has set its differential to be equal exactly to its estimate of the LRIC differential in 2016/17 basing its decision solely on productive efficiency grounds and ignoring potential allocative or dynamic concerns (see position 2 in **Figure 18** below).

Figure 18. The appropriate range to set the price differential to maximise efficiency

- 3.39 Only if no weight is given to dynamic and allocative efficiency considerations would a LRIC differential be expected to result in an efficient outcome. While uncertainties in the estimation of allocative and dynamic efficiency effects make it difficult to quantify the optimal differential, Ofcom should pay due regard to the existence of these factors when exercising judgement on the appropriate level of the differential. It should therefore aim to set differentials in area 3 of **Figure 18**.
- 3.40 In practice there will be some uncertainty over the estimate of the LRIC differentials, for example the size and impact of fault rates on costs or whether certain overheads are truly common or whether indirect causality means they are incremental.
- 3.41 Given the uncertainty in estimating the LRIC, it is likely that the “true” (unobservable) LRIC will lie either above or below Ofcom’s LRIC estimate. Therefore, applying Ofcom’s approach of setting the price differential at a central estimate of LRIC differences means that there is a strong risk that the differential will in practice be below the true (unobservable) LRIC differential. While the risk of the true (unobservable) LRIC lying above or below Ofcom’s estimate is symmetric, the impact of an estimation error is not symmetric. If the estimate of the differential lies below the true differential then resulting prices would unquestionably be inefficient as it would lead to a productively inefficient outcome, as well as dynamic and allocative inefficiencies (area 1 of **Figure 18**). Whereas if the estimate of the differential lies above the true differential productive dynamic and allocative efficiencies would be traded-off against productive efficiencies.
- 3.42 A degree of judgement will be required to estimate the LRIC of MPF and WLR/SMPF as many categories of costs are not clearly observable. When

Differentials between MPF and WLR/WLR+SMPF

exercising this judgement, Ofcom should also give some weight to potential allocative and dynamic considerations by choosing approaches which lead to higher differentials i.e. ‘aim up’ in order to take advantage of allocative and dynamic efficiencies. In taking this approach it is more likely to set prices which are efficient.

Assessment of the cost differentials for MPF, WLR and SMPF rentals

- 3.43 Ofcom uses a three-stage process to estimate unit costs with LRIC differentials:
- FAC values for the relevant services are calculated;
 - LRIC estimates for the relevant services are calculated by applying estimates of LRIC:FAC ratios for each service; and
 - the remaining common costs (i.e. FAC minus LRIC) are allocated equally across services.
- 3.44 This approach means that it is not possible to determine directly the components of the LRIC differential, as this differential is a combination of the FAC differentials and any differential in LRIC:FAC ratios between services.
- 3.45 There is little visibility in how BT and/or Ofcom has estimated FAC:LRIC differentials, although as the resulting LRIC differentials are close to the input FAC differentials it suggests that the approach is reasonable.
- 3.46 This section considers whether the approach adopted by Ofcom understates the true LRIC differential by using inappropriate FAC cost stacks.

Ofcom’s assessment of the cost stack

- 3.47 According to Ofcom the differential between MPF and either WLR or WLR+SMP has narrowed significantly since the last review. This narrowing is not solely due to changes in underlying costs but also reflects decisions Ofcom has made on cost recovery and potentially changes to the methodologies used by BT to allocate costs between services. According to Ofcom, the 2013/14 FAC differential between WLR+SMPF and MPF has declined from £16.09 (as forecast in the March 2012 Statement) to £11.30⁶². The difference reflects a number of changes in methodology to estimating costs for MPF, SMPF and WLR services, for example the removal of adjustments to take account of differential line length.
- 3.48 The current estimated FAC costs for 2016/17 are set out below.

⁶² The July Consultation Annex Table A6.1.

Table 3. 2016/17 FAC of WLR and LLU rental services

Cost component (£)	MPF Rental	WLR Rental	SMPF Rental
E-side copper capital	7.14	7.14	0.00
E-side copper current	2.09	1.91	0.32
D-side copper capital	38.41	38.41	0.00
D-side copper current	6.67	6.09	1.02
Local exchanges general frames capital	3.41	1.71	1.71
Local exchanges general frames current	2.13	1.01	1.07
PSTN line test equipment	0.15	0.15	0.00
Dropwire capital & PSTN NTE	17.25	17.25	0.00
PSTN drop maintenance	4.19	3.98	0.00
PSTN linecards	0.00	10.36	0.00
Pair Gain	0.00	0.01	0.00
Broadband line testing systems	3.77	0.00	3.77
Combi card voice	0.00	0.16	0.00
Service centre – assurance	2.09	0.68	0.38
Sales and product management	0.15	0.14	0.04
Directories	0.00	0.00	0.00
LLU systems developments	0.12	0.00	0.12
DSLAM capital/maintenance	0.00	0.00	1.06
Fully Allocated Cost	87.57	88.98	9.49

The July Consultation Table 6.8.

3.49 This gives the following differentials:

Table 4. Ofcom's FAC differentials by cost component (2016/17) (£ p/a)

	MPF / WLR differential (i.e. MPF – WLR)	MPF / WLR+SMPF differential (i.e. MPF – (WLR + SMPF))
E-side copper capital	0.00	0.00
E-side copper current	0.18	-0.14
D-side copper capital	0.00	0.00
D-side copper current	0.58	-0.44
Local exchanges general frames capital	1.70	-0.01
Local exchanges general frames current	1.12	0.05
PSTN line test equipment	0.00	0.00
Dropwire capital & PSTN NTE	0.00	0.00
PSTN drop maintenance	0.21	0.21
PSTN linecards	-10.36	-10.36
Pair Gain	-0.01	-0.01
Broadband line testing systems	3.77	0.00
Combi card voice	-0.16	-0.16
Service centre – assurance	1.41	1.03
Sales and product management	0.01	-0.03

Differentials between MPF and WLR/WLR+SMPF

Directories	0.00	0.00
LLU systems developments	0.12	0.00
DSLAM capital/maintenance	0.00	-1.06
Fully Allocated Cost	-1.41	-10.90

The July Consultation Table 6.8 . Frontier Economics analysis.

- 3.50 The key elements of the differentials are:
- frame costs (current and capital) due to MPF's and WLR+SMPF's higher usage of frames (double jumpering);
 - higher maintenance costs (E-side current, D-side current and PSTN Drop Maintenance) driven by assumptions of higher fault rates and Care Levels for LLU;
 - PSTN line cards (including combi-cards);
 - testing equipment; and
 - service centre assurance costs.
- 3.51 In addition, Ofcom is proposing to remove the cost of distributing directories from the WLR cost stack, reducing further the differential between MPF and WLR.
- 3.52 We discuss each of these in turn (though there may be other factors which also affect the differential such as the distribution of Cumulo costs which are not discussed in this note).

Frame costs

- 3.53 Under the current double-jumpering regime⁶³, MPF and WLR+SMPF makes proportionately greater use of frames than WLR. It is reasonable to assume that frames are relatively scalable in the long run (i.e. have a high CVE) and as such this is likely to be reflected in higher incremental costs for MPF and WLR. As such, under the current regime, the FAC allocation approach appears reasonable.

Maintenance and fault repair costs

- 3.54 BT has not been able to provide robust evidence that demonstrates that MPF lines have higher fault rates than WLR-only lines for the period before NGA roll out began, particularly once failures in the period immediately after installation ('early life failures') are taken into account. More recent data on fault rates will be distorted by the impact of NGA roll out and provisioning on fault rates (as set

⁶³ We understand that the appropriate jumpering approach is the subject of dispute between BT and TalkTalk (Dispute between TalkTalk and Openreach related to single jumpered MPF - case CW/01109/06/13).

out in Section 1). In view of this, an approach which disproportionately allocates the costs of fault repair to MPF does not seem justified by the available evidence.

PSTN line cards

- 3.55 There is limited visibility of the evidence used by Ofcom to determine the appropriate cost of line cards.

Testing equipment

- 3.56 Ofcom has not been able to estimate satisfactorily the costs of evoTAMs for WLR+SMPF⁶⁴ lines or TAMs for MPF lines. Therefore, it has proposed estimating the costs on a per line basis with costs spread equally across all MPF and SMPF lines.
- 3.57 Under such circumstances, Ofcom's approach of essentially recovering the same amount of broadband testing costs from each of MPF and WLR services may be appropriate. One benefit of this approach is that, equalising the cost of broadband testing across MPF and SMPF lines provides BT/Openreach with further incentives to ensure that the cost of MPF broadband testing is minimised. If TAM costs were solely recovered from MPF lines, BT's cost minimisation incentives would be countered by its incentive to maximise the profits of its retail arm by raising the costs of its (MPF-based) competitors.

Service assurance costs

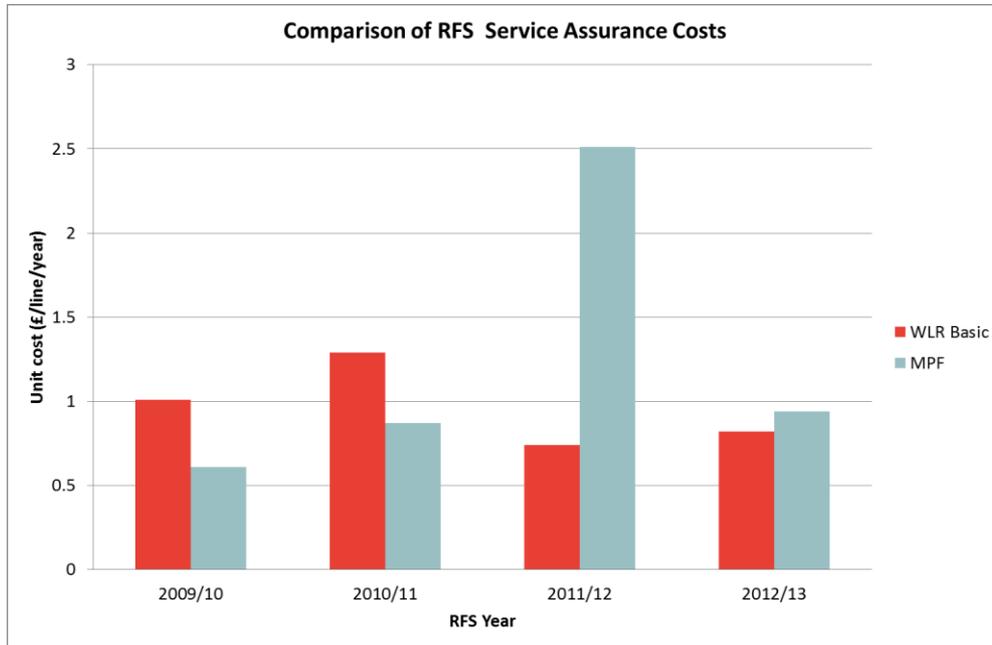
- 3.58 The charge controls model, reflecting the 2011/12 RFS, shows a large difference in the unit costs of Service Assurance allocated to MPF and WLR.
- 3.59 Service Assurance costs are primarily call centre based, with staff supporting the provisioning and repair of Openreach services. There appears to be no underlying reason why these costs should be significantly greater for MPF than for WLR.
- 3.60 The chart below shows that in other years, service unit assurance costs for MPF were far closer to the WLR values with the 2011/12 MPF unit cost being an outlier⁶⁵.

⁶⁴ Only '21CN' SMPF lines use EvoTAMs.

⁶⁵ Around 2011, BT changed the process by which CP and BT retail provisioning and fault repair orders are dealt with. The treatment of the costs of this transition may explain the difference in 2011/12. See BT Group plc: Cost Transformation Teach-in, 5 December 2011 (http://www.btplc.com/Sharesandperformance/Presentations/downloads/Cost_transformation_051211.pdf).

Differentials between MPF and WLR/WLR+SMPF

Figure 19. Assurance costs from the RFS



Source: BT RFS 2010-2013

3.61 As the value in 2011/12 appears to be outlier, a reasonable approach would be to equalise the unit FAC costs for assurance in the forecast.

Directories

3.62 BT is contractually required to provide WLR providers with directories. Whereas no provision exists in MPF contracts. This creates an anomaly where “charges for one regulated service (i.e. WLR) contribute to the costs of an unregulated service (i.e. provision of printed directories), when charges for a competing regulated service (MPF) do not.” Therefore Ofcom proposes removing directories costs from WLR costs. This reduces 2013/14 WLR costs by £2.23⁶⁶.

Conclusion

3.63 The FAC differentials, and hence the LRIC differentials, estimated by Ofcom are likely to underestimate the true LRIC differential between MPF and WLR and MPF and WLR+SMPF. The costs of Service Assurance for MPF are likely to be over-estimated and there is no robust evidence to suggest that the long term fault rates on MPF lines are higher than on WLR lines.

⁶⁶ The July Consultation footnote 72.

4 Inflation

Summary

- 4.1 This chapter sets out our views on the Ofcom’s proposed approach to indexation within the charge controls formulae and to estimating and forecasting inflation.
- 4.2 Ofcom’s approach differs in some respects from its approach in previous charge controls in that:
- Ofcom proposes to use the CPI for indexation of the price control rather than the RPI; and
 - there is greater variation in approaches to estimating and forecasting inflation between cost categories.
- 4.3 The change from RPI to CPI as the index used within the charge controls formulae is reasonable. The practical implications of this change, in terms of the expected level of charges, should be immaterial and there are some methodological and presentational advantages to the use of the CPI.
- 4.4 In previous charge controls Ofcom generally used inflation estimates and forecasts consistent with RPI, with a small number of exceptions where there was evidence that “general inflation”⁶⁷ was not appropriate. The exceptions typically used forecasts which were equal to the RPI forecast plus or minus a fixed differential. The use of a common underlying forecast of inflation for both indexation and OPEX inflation meant that the absolute forecast of inflation was less critical, as the impact of changes to forecast inflation “netted out” to a large extent when estimating “X”.
- 4.5 Ofcom’s proposed approach, where the forecast OPEX inflation differs more often from the forecast index used in the price control formulae, means that greater care is needed to ensure that the different forecasts are both robust and internally consistent. Ofcom’s current approach for operational expenditure is to use specific forecasts of the absolute level of inflation, distinguishing between pay and non-pay expenditure. We have concerns about the level of the specific forecast used, which do not appear to be based soundly on evidence or consistent with trends in general inflation, as measured by the CPI. As one of the reasons for moving to the CPI was that it would be expected to be more closely correlated with changes in cost inputs, it would seem reasonable for movements in the cost forecasts to be more closely aligned with movements in the CPI.

⁶⁷ By “general inflation” we mean the change in the average price level faced by all consumers. This is typically estimated by assessing the change in prices of a representative basket of goods and services bought by consumers. “General inflation” can be contrasted with price inflation of subsets of consumers goods or price inflation of intermediate products and services (i.e. producer prices).

- 4.6 Ofcom proposes to continue to use the RPI to index the value of duct when constructing the Regulatory Asset Value (“RAV”) for duct and as the inflation forecast for access network assets. As the choice of price index used to estimate the RAV is to a large degree one of convention and there are significant benefits to maintaining a consistent approach, there is little reason for Ofcom to depart from this approach.
- 4.7 The remainder of this section covers:
- a review of Ofcom’s proposal to use the CPI to index the charge control;
 - an assessment of Ofcom’s proposals for forecasting inflation in operational expenditure inputs; and
 - a review of Ofcom’s proposals for asset revaluation.

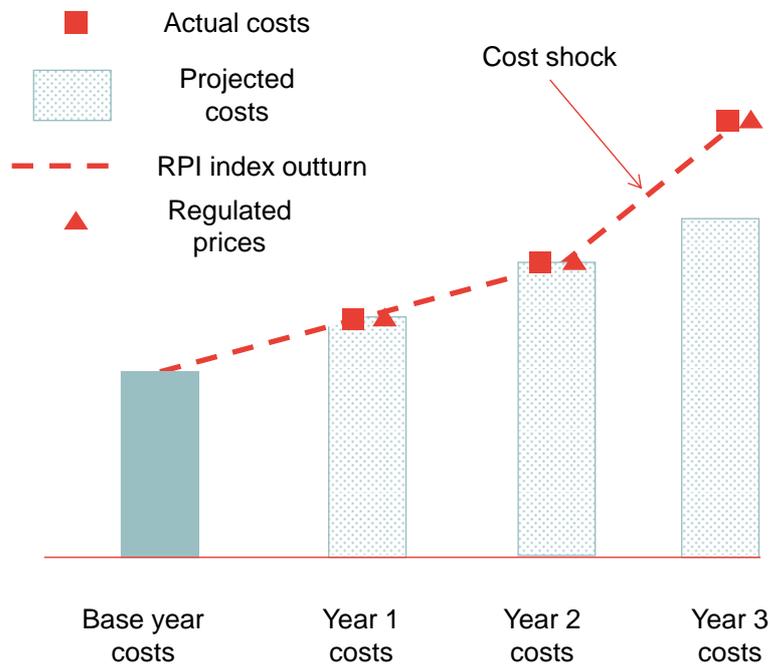
The choice of CPI for charge control indexation

- 4.8 Price indexation describes how the prices of the regulated firm will evolve over the course of a control given unforeseen variations in inflation. When setting *ex ante* charge controls regulators base the controls on projected estimates of inflation. The regulator therefore can design a charge control which protects both customers and the regulated firm from unforeseen variations in inflation. Ofcom does this by linking the prices that the regulated firm can charge to a price index. Ofcom notes that:

“[if] inflation rises by more than forecast the RPI-X or CPI-X formula protects the firm from the cap becoming tighter than intended. Similarly, if inflation rises by less than forecast, the annual updating of the cap for inflation ensures that customers do not pay more than necessary to compensate the firm for general inflationary pressures.”⁶⁸

- 4.9 This is illustrated in **Figure 20** below. In **Figure 20** we assume that a price control is set at $RPI - 0$. The figure illustrates the impact of an inflation shock in year three which means that actual costs are greater than projected costs. If the *ex ante* price control was based only on projected costs, the regulated firm would under-recover costs in year three. However, in the example, as the inflation shock is perfectly correlated with the RPI index and the control is set at $RPI - 0$ then the regulated price perfectly reflects the costs.

⁶⁸ The July Consultation paragraph 3.157.

Figure 20. Illustration of price indexation on OPEX costs

Note: for simplicity the figure illustrates the impact of a cost shock on OPEX and regulated prices. Where a cost shock affects CAPEX values the impact on prices will be more complex: depending on the regulator's approach to allowed returns on capital and holding gains or losses as a result of changes in capital valuations.

- 4.10 The more that a price index correlates with the changes in the firm's costs the greater likelihood that the regulated firm will not over or under recover costs during the course of the control due to unforeseen variations in inflation.
- 4.11 Ofcom considers that a number of factors are important when considering which price index is appropriate for a charge control. These are:
- Is there a systematic forecast bias in the index?
 - Cost causality. To what extent do the firm's costs move in line with the index?
 - Exogeneity. Is the index outside the control of the firm?
 - Availability of independent forecasts covering the charge control period.
 - Regulatory predictability.

Systematic forecast bias

ONS review of RPI

- 4.12 In reaching its preliminary decision on how it uses inflation indices in the LLU and WLR charge controls, Ofcom has taken account of the recent publications and findings of the Office of National Statistics (ONS). In January 2013, following a review of the price indices, the National Statistician, Jil Matheson, “concluded that the formula used to produce the RPI does not meet international standards and recommended that a new index be published.”⁶⁹
- 4.13 There are a number of differences between the RPI and CPI, such as:
- The formula used to estimate the index. The RPI relies on the “Carli” formula whereas the CPI uses the “Jevons” formula⁷⁰.
 - The basket of goods used to measure the changes in prices. For example the CPI excludes housing (mortgage) costs, whereas they are included in the RPI formula.
- 4.14 The main concern raised by the ONS related to the formula used to derive the index. The ONS posited a number of tests which could be used to measure the appropriateness of an indexing formula⁷¹. According to the ONS “*the Jevons index [used in the CPI] seems to be the index with the best properties and the Carli [used in the RPI] the weakest.*”⁷² Furthermore according to the ONS “*the fundamental problem of the Carli [...] is its propensity to have an upward bias.*” Ofcom noted that the Carli

⁶⁹ ONS (2013) National Statistician announces outcome of consultation on RPI, News Release 10 January 2013.

⁷⁰ The Carli formula relies on an arithmetic mean to calculate the average change in prices, whereas the Jevons formula relies on a geometric mean.

⁷¹ According to the ONS “[a] list of tests is drawn up, each test requiring an index to possess a certain property or satisfy a certain axiom. An index number may then be chosen on the basis of the number of tests satisfied.” The tests include the “**time reversal test** where if all the data for the two periods are interchanged, then the resulting price index should equal the reciprocal of the original price index [...] **the proportionality test** where if all prices are \times times the prices in the price reference period, the index should equal \times [...] **The transitivity test** [...] where an index that is produced by building a chain from the base month to a reference month, by using changes between the months in the chain, gives the same result as one that is produced by comparing the base month directly with the reference month... [The] **changes in the units of measurement test** where the price index should not change if the quantity units in which the products are measured are changed (for example, if the prices are expressed per litre rather than per pint).” See: ONS (2012) National Statistician’s consultation on options for improving the Retail Prices Index Consultation paragraph 38 and table 2.

⁷² The weaknesses of the Carli index are that it fails the time reversal and transitivity tests, has an upward bias and is susceptible to “price bouncing”. See: ONS consultation paragraph 39 ONS (2012) National Statistician’s consultation on options for improving the Retail Prices Index Consultation. Table 2.

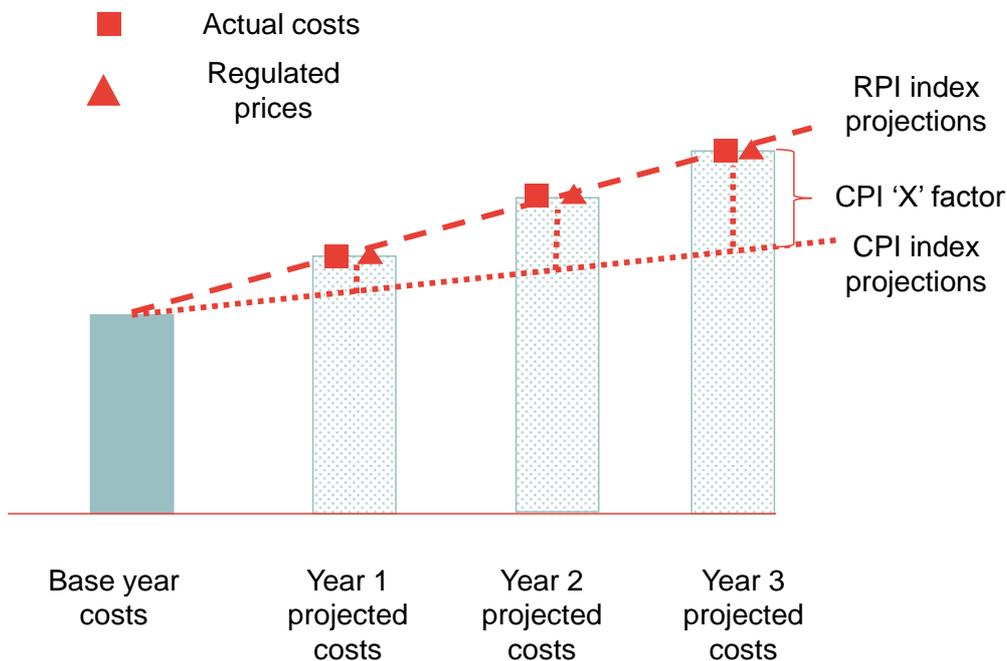
formula effect contributes around 0.5% to 1% p/a (more recently nearer 1% p/a) of the difference between RPI and CPI⁷³.

Evidence of forecast bias

- 4.15 The ONS review identifies that the RPI is a biased **measure** of general inflation. Ofcom rightly notes that when choosing between two indices which are equally correlated with movements in the regulated firm's costs then, provided that there is no systematic forecast bias in either index, both indices can equally be used to index prices⁷⁴. An index is said to have no forecast bias where the forecast estimates of the index, on average, equals the outturn of the index. The indices may be different (as is the case of RPI and CPI for example), however while this would affect the value of the X-factor used in the charge control, it would not affect the likelihood that the regulated firm over or under recovers its costs. There is no reason to believe that there is a systematic forecast bias in either the RPI or CPI index.
- 4.16 For example, in the illustration below we assume that RPI and CPI are both perfectly correlated with the regulated firm's costs. Therefore the change in either index can be used to set the control. In this illustration for example year 3 of the control could be expressed as RPI – 0 or CPI + 3.
- 4.17 While there is a systematic bias in the level of the RPI, to the degree that this bias is well understood, there should be no reason why forecasts of the level of RPI should be biased.

⁷³ The July Consultation paragraph 3.163.

⁷⁴ Ofcom notes: “Before considering the choice between RPI and CPI, we note that in principle the choice of an RPI-X or a CPI-X glide path should not matter in terms of the end point for nominal charges. In expected terms either an RPI-X or a CPI-X cap should move charges from the starting level (in this case prices in 2013/14) to the final year level (in this case prices in 2016/17), where the latter are based on forecast costs. The end charges would be the same in both cases, but the X would vary depending on the measure of inflation.” The July Consultation paragraph 3.168.

Figure 21. Impact of different charge control index

Cost causality

4.18 As set out above an index is used to control regulated prices to ensure that regulated prices can reflect unforeseen changes in inflation. Ofcom therefore notes that “*the choice of index should be reasonably reflective of the input prices affecting the regulated service.*”⁷⁵ By this, Ofcom means that there should be a high degree of correlation between unforeseen changes in the price index used and unforeseen changes in input costs. This is because if a percentage change in the price index is perfectly mirrored by the same percentage change in the efficient costs, then there will be no scope to over or under recover costs as a result of unforeseen changes in costs. Whereas if there is no correlation between the price index or the cost index, then a variation in either from the expected levels will lead to an over or under recovery of costs.

4.19 Ofcom notes that changes in the value of different categories of costs can be best proxied by a range of different indices or assumptions. It therefore considered whether RPI or CPI better reflects changes in the underlying costs.

⁷⁵ The July Consultation paragraph 3.173.

- For **operating costs** (e.g. pay costs, accommodation costs and Cumulo costs) Ofcom concluded that it is indeterminate whether CPI or RPI better reflects changes in operating costs. Though it noted that initial Cumulo payments are initially directly linked to RPI however, Ofcom noted that “*they are also subject to rebates if BT is able to successfully appeal the basis of calculation. Therefore, while the actual liability will reflect an uplift for RPI, the total liability in a given year may be affected by significantly more than this*”.⁷⁶
- In the case of **capital costs** (in particular, costs of copper and duct which make up 87% of mean capital employed for LLU and WLR services⁷⁷), Ofcom concluded that RPI is more consistent with how it has “*typically forecast nominal [capital] costs*”⁷⁸. However, Ofcom did not explicitly choose RPI over CPI when choosing how to forecast costs but rather it was based on an assumption that at the time it believed that the RPI was a reasonable measure of “general inflation”.
- Ofcom notes that its estimate of BT’s nominal **cost of capital** is based on the real risk free rate derived from RPI index linked gilts. Therefore the projections of BT’s cost of capital during the charge control period should also reflect an RPI measure of inflation. However, it is not clear that the actual out-turn cost of capital will be more closely correlated with the RPI than the CPI.

4.20 When considering which index will more closely reflect unforeseen changes in costs, it would seem reasonable to place more weight on the correlation between the index and OPEX than on the correlation with asset values. OPEX feeds directly into the regulated cost base while the link between changes in asset valuation is more complex. In particular changes to the asset prices lead to holding gains or losses which are negatively correlated with price changes, offsetting the positively correlated changes in depreciation and cost of capital. As a result, even if the index used to set the price control was perfectly correlated with asset price changes, the index would not be perfectly correlated with the resulting costs corresponding to these assets.

4.21 We note that there is a strong level of correlation between the two series (CPI and RPI) such that a general inflation shock that affects one series would also generally affect the other. However, the magnitude of the inflation shock could be different between the two series.

⁷⁶ The July Consultation paragraph 3.176.

⁷⁷ The July Consultation paragraph 3.180.

⁷⁸ The July Consultation paragraph 3.182.

- 4.22 RPI appears to show greater volatility over time, with much of this volatility due to the treatment of owner-occupied housing costs (i.e. mortgage payments), whereas CPI excludes certain categories of costs including owner-occupier housing costs which may be less relevant to BT's cost base. While changes to these housing costs might be correlated to changes to general commercial accommodation costs to some extent, increases in BT's accommodation costs have been fixed in nominal terms (due to its contract with Telereal Trillium). Thus there will be no correlation between housing cost inflation and BT's accommodation costs. Under the terms of its agreement with Telereal Trillium, BT pays an annual fee for the majority of its accommodation costs which was fixed in 2002 and is increased annually at a fixed rate of 3%⁷⁹. Therefore it appears preferable to use an index which excludes housing costs.

Exogeneity

- 4.23 Ofcom notes that BT is unable to influence either of the RPI or CPI of the measures used, therefore it cannot influence the returns it makes by manipulating the value of its costs.

Availability of independent forecasts

- 4.24 Ofcom notes that suitable and robust independent forecasts are available for both CPI and RPI.

Regulatory predictability

- 4.25 Ofcom notes that regulatory predictability does not require that the regulator does the same thing at each market review. Rather it means that regulatory decisions are "*clearly reasoned, consulted on, and that stakeholders are given sufficient notice of regulatory changes.*"⁸⁰ Thus, the fact that Ofcom (and Oftel) used RPI previously does not in itself mean that a change to a more suitable alternative should not be made.

Ofcom's conclusions

- 4.26 It is not clear how Ofcom weighs the different factors that it has considered in making its decision.
- 4.27 Both CPI and RPI indices perform well on most of the factors taking into account:
- there are no forecast biases in either;
 - both indices are exogenous to BT; and

⁷⁹ See: http://www.btplc.com/report/financial_fixedassets.shtml.

⁸⁰ The July Consultation paragraph 3.188.

Inflation

- there are independent forecasts available for both.

4.28 Therefore, the choice of index to set prices should be based on the index which is more likely to reflect changes in costs (and in particular changes in operating costs) throughout the charge control period. Here, the CPI is preferable.

4.29 We therefore agree with Ofcom that there are good reasons for preferring CPI to RPI given that it is more likely to reflect unforeseen changes in costs caused by changes in the general price level.

Ofcom’s approach to operating cost inflation

4.30 In the sections below we review Ofcom’s reasoning for its approach to projecting the value of costs over the charge control period. In order to set prices which reflect future costs Ofcom needs to forecast how costs will change over the course of the charge control. Ofcom expenditure forecasts take into account a combination of changes due to changes in volume, efficiency improvements and cost inflation. Ofcom has projected costs of various capital and operational expenditure items in order to set prices over the course of the charge control. Table 3 summarises Ofcom’s assumptions used to project inflation in OPEX over the charge control period.

Table 5. Operational expenditure inflation assumptions

Item	P/a increase current proposal	Source	Previous charge control assumption
Pay	2.8% p/a	Consistent with BT’s most recent pay award (April 2013 to April 2014), and mid-point between forecast CPI and RPI	Forecast RPI (3% 2012/13)
Non-pay	3% p/a	Based on terms of its accommodation agreement with Telereal Trillium,	Forecast RPI (3% 2012/13)

4.31 Both these assumptions are above forecasts of general inflation as measured by the CPI. Ofcom has used comparison of independent forecasts as published by the Bank of England to forecast general inflation.

Table 6. Ofcom inflation rate assumptions (%) (May publication)

	2013	2014	2015	2016	2017	5 year arith- metic mean	5 year geo- metric mean
CPI	2.8	2.3	2.2	2.2	2.2	2.3	2.3
RPI	3.3	2.9	3.2	3.4	3.6	3.3	3.3

See: The July Consultation Footnote 104. Based new medium-term projections of RPI and CPI. Source: Bank of England Forecasts for the UK economy May 2013.

4.32 While the RPI forecasts show a higher level of change, this will be due in part to the known upward bias in RPI. Increases in the later years, presumably reflecting potential base rate rises, which will feed into the housing cost element of the CPI. Given the knowledge that the RPI is a biased measure we would expect, in the absence of other evidence, for input costs to be more closely correlated to the CPI than the RPI.

4.33 In the sections below we consider first, Ofcom’s approach for projecting pay costs, then non-pay costs over the charge control period.

Assessment of Ofcom’s approach to pay inflation

4.34 Ofcom has assumed that pay costs will increase at 2.8% per year throughout the course of the charge control. Ofcom based its assessment on the most recent pay deal struck between BT and the Communications Workers Union (“CWU”) which was 2.8% for the period April 2013 to April 2014.

4.35 Ofcom’s preliminary conclusion was that:

*“given expected uncertainty in the wider economy over this period and the uncertain relationship between wages and inflation in the historic period, we propose to use the latest available pay deal (of 2.8%) to forecast nominal wage inflation to 2016/17.”*⁸¹

4.36 It notes that it “propose[s] to use the latest pay deal which lies mid-way between the forecast of CPI and RPP”⁸².

4.37 We believe that Ofcom is right to note that there is some uncertainty over the actual path of pay inflation over the charge control period. However this in itself is not a reason to depart from the use of the CPI as the default measure of general inflation and to use a higher forecast in its place.

⁸¹ The July Consultation paragraph 6.124

⁸² The July Consultation footnote 343.

4.38 An assumption of flat 2.8% p/a growth could over-state the future level of pay inflation because:

- basing the forecast on a single pay agreement is unreliable;
- CPI is more closely correlated with pay costs than the RPI and the inflation measured by the CPI is forecast to fall over the forecast period; and
- the implicit assumption of real increases in unit labour costs is inconsistent with the evidence.

4.39 We discuss each of these issues below.⁸³

Ofcom's use of a single pay agreement is not robust

4.40 Ofcom's reliance on a single data point, the most recent pay agreement, is fundamentally unreliable. The level of the pay agreement could be affected by a range of one-off factors that are only relevant to that agreement.

4.41 There is anecdotal evidence that the current pay deal is at the upper end of an expected range. For example the CWU who negotiated the deal noted that:

“The CWU is in no doubt therefore that this is the best offer we can secure through negotiation. The only other option available to us is to ballot for industrial action which would have seen the offer withdrawn and would not have guaranteed us success in the current climate.”⁸⁴

4.42 The use of a single nominal forecast also leads to difficulties if general inflation expectations change during the administrative process. The more recent independent forecasts of RPI⁸⁵ are lower than those in the May 2013 report⁸⁶ referred to in Ofcom's July Consultation. It is not clear how this change would be reflected in a constant forecast benchmarked on a single data point.

⁸³ This note does not take into account issues relating to whether the level of pay for BT is at an efficient level. We therefore base the analysis on changes in the level of pay costs that would be expected for an efficient operator. If BT's pay were not at an efficient level the rate of change in pay may be lower as BT moves into line with an efficient level of pay.

⁸⁴ CWU (2013) BT Pay 2013 – Information for Members. See: http://www.cwu.org/assets/files/documents/may_13/cwu_1369390789_BT_Pay_2013_FAQ.pdf

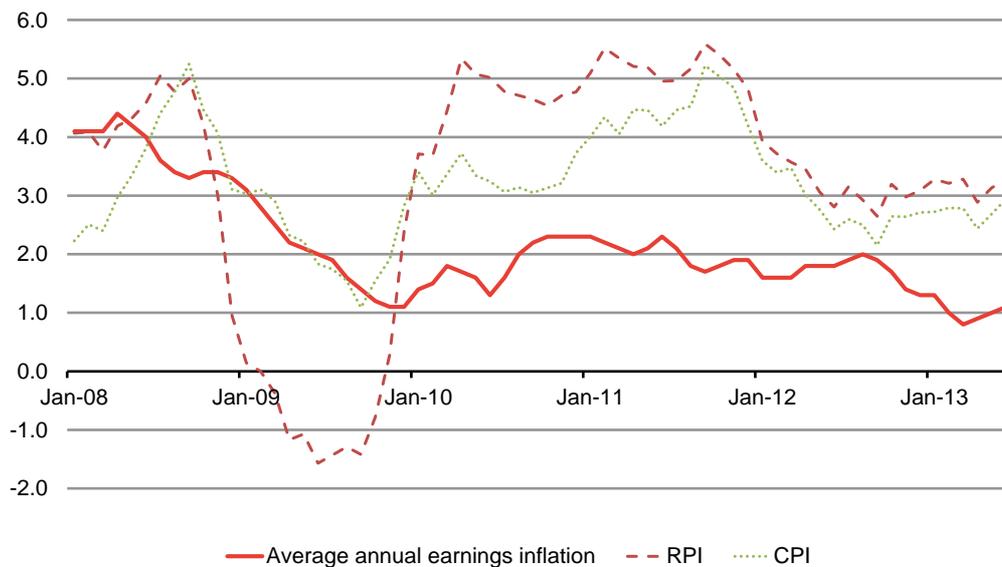
⁸⁵ Bank of England (2013) Forecasts for the UK economy: a comparison of independent forecasts August 2013.

⁸⁶ Bank of England (2013) Forecasts for the UK economy: a comparison of independent forecasts May 2013.

Forecast pay costs should reflect the downward trend in forecast CPI

- 4.43 The current BT pay deal is in line with forecast CPI in 2013 (2.8%). Over the forecast period the CPI falls, while Ofcom is forecasting pay increases to remain at the same level, justifying this by stating that the assumption lies somewhere between the forecasts for RPI and CPI.
- 4.44 In recent years, average earnings appear to have been more closely correlated with changes in CPI than the RPI, particularly during the 2008 to 2009 period when changes in base rates resulted in negative inflation as measured by the RPI. As base rates rise to more normal levels, it would be reasonable to assume that this rise would not be correlated with increases in pay costs (in the same way that the reduction in the RPI in 2008/09 was not correlated with pay costs).

Figure 22. Earnings inflation and price inflation (RPI and CPI)



Source: EARN01 Average Weekly Earnings - regular pay ONS, Frontier Economics Analysis

- 4.45 The CPI has effectively replaced the RPI as the headline measure of general inflation. We would expect future pay negotiations to increasingly reference the CPI⁸⁷ rather than the RPI and so going forwards there is even more reason to expect pay costs to move in line with the CPI.

⁸⁷ Or potentially RPIJ, a Retail Prices Index (RPI) based measure that will use a geometric (Jevons) formula in place of one type of arithmetic formula (Carli).if it gains official status.

Ofcom's implied assumption of a real increase in pay is inconsistent with other evidence

- 4.46 Ofcom's assumption on pay inflation assumes a real increase in pay, relative to the CPI. This is in contrast to earnings measures in the wider economy which suggest that, rather than real increases in pay, across the whole economy workers have suffered real pay decreases:
- ONS reports that average earnings growth over the last five years has been 1.7%⁸⁸. As can be seen from **Figure 22** average earnings inflation excluding bonuses has been in the range 1-2% over the last four years and does not show signs of recovering to levels of 2.8% or even above the forecast level of CPI of 2.3%.
 - Likewise, Income Data Services report that average pay settlements across the economy have been 2.4% (with the weighted average 2.0%)⁸⁹. We would expect that this relatively slack labour market would continue to apply downward pressure to pay costs, including BT's.
- 4.47 Ofcom's analysis of average pay of BT employees since 2007⁹⁰ shows increases at the rate of 1.6-1.7% p/a compared with inflation measures such as CPI (3.3% p/a) or RPI (3.4% p/a) over the same period.

Conclusion

- 4.48 We recognise that forecasting pay inflation of an efficient operator over the course of the charge control is subject to uncertainty. However, it is not clear that this uncertainty is relatively greater than for other variables. Nonetheless, Ofcom's proposed forecasts appear flawed, being based on a single data point, being independent of future general inflation forecast and ignoring the evidence that indicates that unit labour costs are falling in real terms⁹¹.
- 4.49 A more robust approach would appear to be to forecast future pay costs consistent with the forecast of CPI used for setting the charge controls with a differential to take account of likely differences in wage inflation compared to general inflation.
- 4.50 Recent history suggests that average earnings pay inflation will continue to lie below general price inflation for some time. We therefore conclude that pay inflation will lie some way below forecast general inflation of 2.3%. A reasonable

⁸⁸ EARN01 Average Weekly Earnings - regular pay1, seasonally adjusted June 2008 to June 2013.

⁸⁹ See: <http://www.incomesdata.co.uk/news/press-releases/paysettlements1111.pdf>

⁹⁰ For example in figure 3.2 of the July Consultation.

⁹¹ When compared to the CPI as an unbiased measure of general inflation.

assumption is that BT pay inflation will be 0.5% below general inflation (i.e. 1.8% on average over the charge control period).

Non pay inflation

- 4.51 Ofcom has assumed that non-pay inflation increases at a rate of 3%. This was because the largest single item of non-pay costs is accommodation⁹² (though it does not state what proportion of non-pay cost are accommodation) and that BT has contracted for accommodation costs to increase at a fixed rate of 3% p/a. It has explicitly assumed that other costs also increase at a rate of 3%. However, there is no reason to assume that other non-pay OPEX costs will increase faster than general inflation (as measured by CPI).
- 4.52 The most appropriate approach would be to forecast inflation as a weighted average of the 3% for accommodation costs and the forecast growth in the CPI, which is 2.3% (five year average 2013-2017). TalkTalk estimated that the proportion of non-pay OPEX costs which are reflected by the Telereal Trillium contract was 60%⁹³. On this basis therefore, the true non-pay inflation assumption should be no higher than 2.75%⁹⁴.

Ofcom's approach to capital cost revaluation

- 4.53 In this section we consider Ofcom's approach to its estimate of capital costs over the control. The current value of Openreach's capital asset base and the unit cost of inputs must be forecast in order to determine the appropriate level of costs and hence the charge control. The main assets feeding into the charge control are copper cable and duct. The methodology used by Ofcom to estimate the value of these assets differs depending on whether the assets are pre-1997 or post 1997. Ofcom has not changed its general approach to valuing assets since its last review. **Table 7** describes how capital assets are valued for the purposes of the charge control.

⁹² The July Consultation paragraph 6.128.

⁹³ TalkTalk Group response to Ofcom consultation on Charge Control for LLU/WLR Services July 2011.

⁹⁴ 2.75% equates to 60%*3% + 40%*2.3%.

Table 7. Valuation of capital assets

Item	Opening value	Projected value
CAPEX - pre 1997	RAV methodology: HCA value in 2004/05 indexed by RPI	
Post 1997 CAPEX - duct	CCA (actual expenditure indexed by RPI)	Indexed by RPI
Post 1997 CAPEX - copper	Absolute valuation - CCA	Indexed by RPI
Other assets (motor transport, intangibles, land and buildings)	HCA	Assumed to remain constant in nominal terms

4.54 ‘Other assets’, which exclude duct, copper cable and drop wire, are valued at HCA in BT’s accounts and, as such, the approach adopted in the model, assuming unit costs remain fixed in nominal terms, is appropriate.

4.55 Below we assess whether the use of RPI for the other assets is appropriate.

Ofcom’s approach to valuing pre-1997 assets

4.56 In making its assessment of the appropriate methodology to use to estimate the opening value of pre-1997 assets Ofcom came to three key conclusions:

- Using a RAV adjustment based on the HCA value in 2004/5 is justified over a CCA approach on efficiency grounds⁹⁵.
- A key justification for using the RAV approach was **to avoid over-recovery of costs**⁹⁶. It further noted that, for the purpose of the upcoming charge controls, *“the RAV adjustment is necessary in order to avoid over-recovery of the costs of pre-1997 local access assets in the charge control to apply from 1 April 2014.”*⁹⁷
- A RAV adjustment was consistent with its statutory duties⁹⁸ (promoting efficiency, promoting sustainable competition and conferring the greatest possible benefits on the end-users of public electronic communications services). Whereas other approaches (such as CCA) could enable BT to recover more than its efficiently incurred costs.

⁹⁵ The July Consultation Annex paragraphs A5.14 – 20.

⁹⁶ The July Consultation Annex paragraph A5.21.

⁹⁷ The July Consultation Annex paragraph A5.30.

⁹⁸ The July Consultation Annex paragraphs A5.42 – 44.

- 4.57 Ofcom made clear that the purpose of using RPI to index the value of the asset on a forward looking basis was not to proxy the value of the asset but instead to ensure that its **real value** was maintained over the course of future controls. RPI was considered by Ofcom at the time to proxy for “*a general measure of inflation*”⁹⁹.
- 4.58 Ofcom considered that a general measure of inflation was the appropriate approach to index the value of the RAV, as opposed to indexes which attempted to proxy for the actual value of the assets (such as copper price indexes or labour cost indexes). Ofcom noted that “*Ofcom believes the use of RPI to index the RAV is most appropriate as, once created, the RAV is a financial concept rather than the value of physical assets.*”¹⁰⁰
- 4.59 For the reasons set out above, RPI has disadvantages as a measure of general inflation. However, for the purposes of setting the RAV which Ofcom describes as a financial concept, rather than an economic concept, it is reasonable to continue to use RPI to index the value of the RAV. While the bias of RPI as a measure of general inflation may mean there is some drift over time in the real value of assets, there is little evidence that this drift will result in inefficiency. A move to an alternative index for updating the RAV in the future would reduce regulatory consistency over time with little obvious benefit.

Ofcom’s approach to valuing post-1997 copper and duct assets

- 4.60 In theory, the valuation of post-1997 assets should aim to estimate the net replacement cost of these assets. However, given the difficulties of directly estimating the net replacement cost (“NRC”) for duct, Ofcom has previously adopted an indexation approach to duct valuation.
- 4.61 As noted above, the economic efficiency benefits of accurately estimating the replacement costs of the access network are likely to be relatively small. As such, financial and regulatory consistency considerations can be given a relatively high weight. This would indicate that the continued use of RPI for revaluation purposes is appropriate, even though RPI is no longer considered to be an accurate measure of general inflation.

⁹⁹ Ofcom (2005) Valuing copper access Supplement to Part 2 – Proposals consultation. Paragraph 4.21.

¹⁰⁰ Ofcom (2005) “Valuing copper access Final statement” paragraph 4.100.

5 Modelling issues

- 5.1 We have reviewed the public version of the charge controls model¹⁰¹ that has been made available by Ofcom. While in general the model methodology appears to be fit-for-purpose, we have identified two areas where the model methodology results in estimates which are clearly wrong.

Net Current Assets

- 5.2 There are negative net current assets (“NCA”) allocated to services overall (i.e. current liabilities exceed current assets). This reduces the overall level of assets and, hence, lowers the cost of capital such that overall costs are reduced by 0.3%.
- 5.3 In the model, NCA are allocated across components according to a routing table designed to allocate the costs of network components taking into account the volume of services, with the allocation of NCA taking no account of either the volume of services or the costs/cash flows associated with each component¹⁰². As a result, a component used by a large number of services will have a higher allocation independently of the volume of services using the component or the cost of the component. For example, around a third of NCA are allocated to “CP502 Sales product management”, despite this accounting for only 0.2% of the overall cost base in the model.
- 5.4 This approach does not seem to reflect cost causality. A more appropriate approach would be to adjust for NCA as a (negative) mark-up on overall costs (both operational expenditure and capital costs). This would be expected to reduce the cost of the largest cost components (i.e. duct and cable), although with offsetting increases for some other components.

Holding Gains on Disposals

- 5.5 Under CCA, as assets are written-out at the end of their assumed economic lives, the sum of the acquisition cost of the asset and the total accumulated holding gain on the asset over its working life should be subtracted from the total gross replacement cost (“GRC”) of assets and also from the corresponding accumulated depreciation (“AD”)¹⁰³.

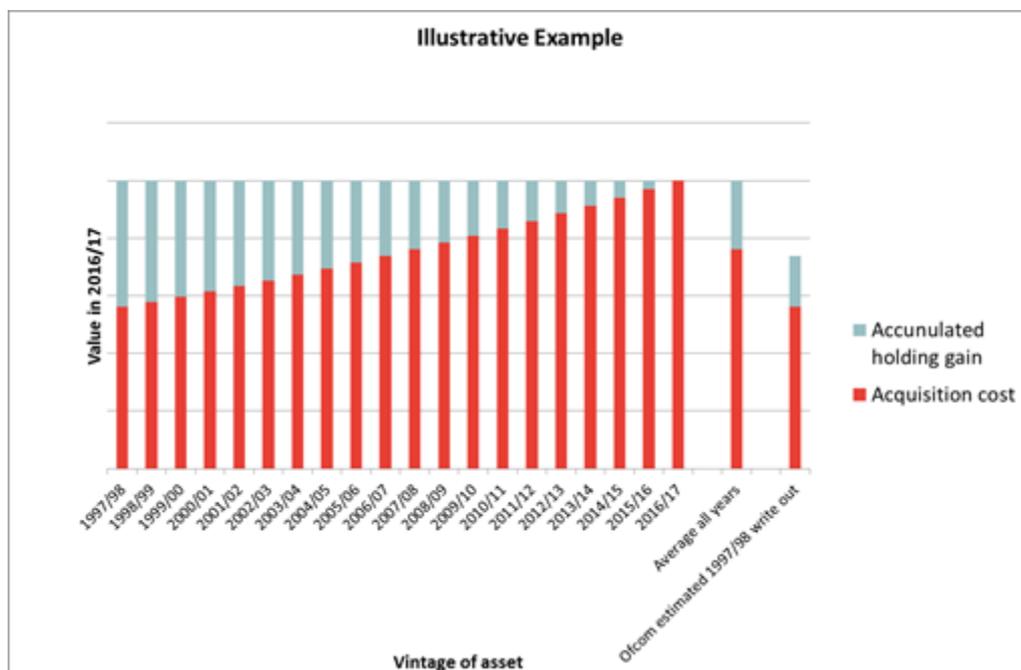
¹⁰¹ The model is are found at: <http://stakeholders.ofcom.org.uk/consultations/llu-wlr-cc-13/>

¹⁰² See calculation in rows 352 to 376 of the tab “Capital costs 11-12” in the “LLU WLR model v13 Redacted” workbook.

¹⁰³ The same amount is subtracted from both GRC and AD lines as the asset is, by definition, fully depreciated at the end of its life so that accumulated depreciation of the written-out assets equals the value of the assets.

- 5.6 However, the formula used to estimate the value of the accumulated holding gains for written-out copper assets in the RAV model is incorrect¹⁰⁴. The formula assumes that the ratio of GRC/GBV¹⁰⁵ for the asset being written out is equal to the average ratio of GRC/GBV for the total asset base. As the assets being written out are the oldest in the asset base, greater accumulated inflation, and hence holding gains, is likely to mean that the ratio GRC/GBV is higher for these assets. This is illustrated in **Figure 23** below which shows the impact of applying the average ratio across all assets to estimate the holding gains associated with the oldest vintage.

Figure 23. Illustrative example of the effect of Ofcom error on asset values



Source: Frontier

- 5.7 By underestimating the GRC of the write-outs, the forecast estimate of total GRC of the remaining asset base is too high which, in turn, leads to future CCA estimates (valuations and depreciation charges) to be overstated (this error, in part, explains the failure of the RAV-adjusted asset valuation to converge to unadjusted CCA valuation in 2015/16 in the model)¹⁰⁶.

¹⁰⁴ See cells Q12:AP12 of the “Copper_CCA_Piper” tab of the “FAMR LLU WLR 2013 RAV” model workbook.

¹⁰⁵ Gross Book Value.

¹⁰⁶ In the model, Ofcom appears to have put in place an ad hoc series of “other holding gains/losses” in order to ensure the RAV and CCA values roughly converge for copper cables as the remaining pre-August 1997 assets are written-out. This has resulted in the significant “RAV Unwind”

- 5.8 In order to correct for this error, the accumulated holding gains on write-outs need to be estimated based on the total percentage holding gains since the assets were acquired. A rough approximation is that the GRC/GBV ratio for assets being written-out is the average GRC/GBV ratio across all assets to the power of 2 (as the oldest assets have been gaining value for approximately double the average time).

component in the reconciliation at Table 6.11 between the cost stacks in the July 2013 consultation and the cost stack in the March 2012 Statement.

Frontier Economics Limited in Europe is a member of the Frontier Economics network, which consists of separate companies based in Europe (Brussels, Cologne, London & Madrid) and Australia (Melbourne & Sydney). The companies are independently owned, and legal commitments entered into by any one company do not impose any obligations on other companies in the network. All views expressed in this document are the views of Frontier Economics Limited.

FRONTIER ECONOMICS EUROPE

BRUSSELS | COLOGNE | LONDON | MADRID

Frontier Economics Ltd 71 High Holborn London WC1V 6DA
Tel. +44 (0)20 7031 7000 Fax. +44 (0)20 7031 7001 www.frontier-economics.com