Oxera

Assessment of Ofcom's analysis to set the efficiency target

Is the proposed 4–6% range consistent with the evidence?

Prepared for BT/Openreach

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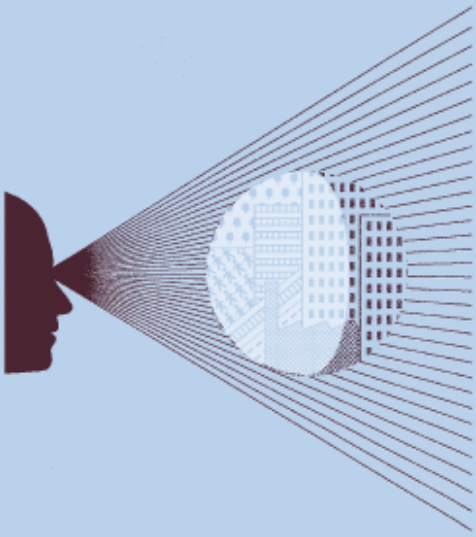

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1 Introduction

In the recently published local loop unbundling (LLU)/wholesale line rental (WLR) charge control consultation, Ofcom proposed an efficiency target of 5% per year on Openreach's costs, applied to both operating expenditure (OPEX) and capital expenditure (CAPEX).[1] This target is the midpoint of a range of 4–6% that Ofcom derived from an assessment of Openreach's achieved historical efficiency and its internal planning documents, and which it said was consistent with public statements on the scope for further cost reductions.

Openreach has asked Oxera to provide an assessment of Ofcom's analysis and justification for this efficiency range, as well as assess whether Ofcom's proposal to set the same efficiency target in the charge control for both OPEX and CAPEX is appropriate in these circumstances.

The report is structured as follows.

– Section 1.1 summarises the main findings of Oxera's analysis.

– Section 2 provides an overview of the evidence and analysis used by Ofcom to justify the 4–6% target efficiency range, as well as its justification for applying a single efficiency target for both OPEX and CAPEX.

– Section 3 considers whether Ofcom has correctly interpreted the PVEO (price-volume-efficiency-other) data received from Openreach, and whether it has used it in a manner consistent with the approach to forecasting costs in the charge control model.

– Section 4 considers whether Ofcom's analysis of cost trends in the wholesale local access (WLA) and wholesale fixed analogue exchange line (WFAEL) markets, as reported in BT's Regulatory Financial Statements (RFS), can provide a reliable estimate of achieved historical efficiency and future efficiency targets.

– Section 5 assesses Ofcom's approach of setting a combined efficiency target for OPEX and CAPEX, and, assuming that Ofcom will continue to do so, proposes relevant considerations for the choice of an efficiency target.

1.1 Summary of main findings

Section 3 (PVEO analysis for OPEX and CAPEX)

The way in which Openreach's PVEO analysis derives efficiency estimates is fundamentally different from the approach used by Ofcom to forecast costs in the charge control. In Openreach's PVEO, efficiency is the sum of cost savings delivered by 'transformation programmes' identified ex ante.

By contrast, Ofcom forecasts costs in the charge control model by applying an efficiency assumption as the 'balancing item' after taking account of volume effects, input price effects and one-off costs, but without any direct link to specific initiatives. This means that the efficiency estimates provided by Openreach cannot be used directly in the charge control model without further adjustments.

To address this, Oxera has made adjustments to Openreach's PVEO data to derive efficiency estimates which are consistent with the way Ofcom forecasts costs in the charge

[1] Ofcom (2013), 'Fixed access market reviews: Approach to setting LLU and WLR charge control', July 11th.

control model. This has involved estimating volume-related costs using component volume changes combined with cost–volume elasticities (CVEs) and asset–volume elasticities (AVEs), applying input price changes to all cost categories, and recording efficiency as a 'balancing item'. Oxera has focused primarily on Openreach's actual data (2011/12 and 2012/13), and on forecasts of current year (2013/14) costs, which reflects the data given greatest weight by Ofcom in the current and previous reviews.

After making these adjustments, we find that:

– achieved efficiency on a combined OPEX and CAPEX total cash basis was [✂] in 2011/12, and is forecast to be [✂] in 2012/13 and [✂] in 2013/14, which is equivalent to a combined [✂] per annum over the three-year period. The larger 2013/14 efficiency forecast is driven by a significant reduction in forecast CAPEX in that year (see Table 4.1 for further details);

– if greater weight is placed on actual data for 2011/12 and 2012/13, which would appear to be consistent with Ofcom's approach,[2] the adjusted results provide strong support for combined efficiency estimates in the [✂] range, largely driven by OPEX efficiency estimates in the [✂] range.

In either case, this observed range is considerably lower than the [✂] range from Ofcom's review of BT's past performance that Ofcom refers to in its consultation document, as well as the 4–6% proposed for the future efficiencies within the charge control period.

The adjusted PVEO analysis also shows that OPEX efficiency estimates are relatively stable and reliable, whereas CAPEX efficiency estimates exhibit sharp fluctuations. The unreliability of the CAPEX-based analysis is driven by the volatility of gross CAPEX trends and the use of a very short timeframe for examining such volatile costs. The volatility of CAPEX is a recognised issue in other regulated sectors, which has been reflected by Ofgem, for example, in the use of seven-year moving averages for the assessment of actual CAPEX efficiency.[3]

On the basis of the available data, it might therefore be appropriate for Ofcom to set separate OPEX and CAPEX targets to ensure that the OPEX figures are estimated reliably, not least because the OPEX target has the greatest overall impact on the value of X in the charge control. This is examined in further detail in section 5.

Section 4 (Ofcom's RFS analysis of OPEX)

Oxera's analysis of the RFS data shows that, under certain assumptions, it is possible to get close to Ofcom's finding of 6% per annum historic OPEX efficiency in WLA and WFAEL over the past three years (2009/10 to 2011/12). However, the pace of efficiency improvements appears to be on a downward trajectory, with this relatively high average explained by efficiencies achieved in the first two years—ie, in the period to 2010/11.

More importantly, however, the results of this analysis are considered to be unreliable for use on a top-down basis in the LLU/WLR charge control model, given that a significant proportion of the Openreach cost base is made up of common costs allocated to many products and services across a variety of RFS 'markets'. In these circumstances, it would be difficult at the level of an individual market to distinguish 'true' year-on-year efficiencies from cost reductions resulting from shifts in common costs across products and markets.

Ofcom has expressed similar concerns in the past. For example, in the recent Leased Lines charge control, Ofcom noted that obtaining a reliable estimate of historic efficiency for

[2] The PVEO analysis is based on Openreach Management Accounts information submitted by BT to Ofcom. This contains actual outturn cost figures for 2011/12, and a full-year forecast for 2012/13 derived from actual data for the first ten months.
[3] Ofgem (2012), 'RIIO-GD1: Final Proposals - Supporting document - Cost efficiency', December, para 4.4.

Ethernet products would not be possible due to changes in the relationship between cost components and the underlying services over the relevant time period.[4] On this basis, Ofcom concluded that it would be more appropriate to use an efficiency estimate derived from the Openreach level. Ofcom also indicated, as part of this analysis, that this approach would be consistent with the way the LLU/WLR charge control efficiency target has been set.[5]

Mindful of these issues, and to ensure consistency with the way Ofcom has set the efficiency target in previous LLU/WLR charge controls, Oxera undertook a PVEO analysis using RFS data at the Openreach level over the past three years (2009/10 to 2011/12) under two different scenarios for volume effects (rentals and components).

Oxera's analysis finds average OPEX efficiency savings of 4–5%, depending on the volume effect scenario, and that these are on a declining trend. Efficiency savings in the first two years are around 5–6%, and these fall considerably in 2011/12 to below 3%. The declining trend in efficiency was confirmed when the analysis included the most recently published RFS accounts for 2012/13, which also show an OPEX efficiency rate of less than 4% under both scenarios.

On the basis of these results, Oxera does not consider that Ofcom's finding of 6% efficiency on the basis of BT's RFS is a reliable estimate to inform the target efficiency range to be applied in the LLU/WLR charge control over the period 2014/15 to 2016/17.

Section 5 (OPEX/CAPEX efficiency target)

Given the way OPEX and CAPEX flow through the cost stack in the charge control (OPEX having a much more direct impact on allowed revenues and prices than CAPEX), when underlying rates of efficiency for each cost category are materially different, a single efficiency target combining the two will not lead to cost recovery.

The analysis in sections 3 and 4 provides support for OPEX efficiency rates in the [✂] range. In this context, a combined target of 5%, even if this can be justified on the basis of higher CAPEX rates, is likely to result in an under-recovery of costs. This would go against one of Ofcom's core principles for the charge control, and therefore separate targets for OPEX and CAPEX would be more appropriate.

Alternatively, if Ofcom considers that a single target is still appropriate for practical reasons, then to adhere to the principle of cost recovery a combined target would need to weigh up OPEX and CAPEX efficiency rates (with the latter calculated over a longer time period) by their respective contributions to the charge control cost stack. As a second-best solution, Oxera would consider that the single target would need to be drawn largely from the evidence on OPEX efficiency rates, due to the smaller effect of the CAPEX assumption on 'X' for the charge control period, as well as the difficulty in obtaining reliable CAPEX efficiency estimates from short-term data.

[4] Ofcom (2013), 'Business Connectivity Market Review', March 28th, para A12.99.

[5] Ibid., para A12.100.

2 Ofcom's arguments and evidence

As explained by Ofcom in Annex 7 of the LLU/WLR charge control consultation document, there are two key sources of evidence that Ofcom relies on to justify the 4–6% target efficiency range, and in particular the upper end of this range (5–6%):

1) **Openreach's most recent performance in 2011/12 as recorded in its management accounts**—Ofcom states that, after taking account of input price inflation and volume effects, this would suggest an efficiency rate of around [✂] for 2011/12 (see paragraphs A7.23 and A7.24);

2) **BT's Biannual Rolling Forecast (BRF2) for 2012/13 and 2013/14**—Ofcom states that, after accounting for input price inflation and volumes, this would suggest efficiency savings of around [✂] for the ten months of outturn data in 2012/13 and the 2013/14 forecast (see paragraphs A7.29 and A7.30).

In addition, Ofcom has undertaken an assessment of operating cost trends in WLA and WFAEL markets as recorded in BT's RFS, which Ofcom says can also provide as a useful reference point. After adjustments for volumes and input price inflation, Ofcom's analysis of this data would suggest efficiency savings of around 6% per annum over the past three years (see paragraph A7.26).

In relation to setting separate efficiency targets for OPEX and CAPEX, Ofcom stated that the application of the efficiency target to both OPEX and CAPEX in the charge control is 'consistent with the way it has been assessed' and that it was not persuaded by BT's observation that, as OPEX and CAPEX have different impacts on the cost stack, they should have separate efficiency rates (see paragraph A7.15).

Furthermore, Ofcom argues that BT's internal targets are set on a cash basis, and that the data provided by BT, which shows less variation in the overall cash efficiency rate than in the separate OPEX and CAPEX rates, seems to support this (paragraph A7.16).

Finally, Ofcom argues that there would be no benefit in increasing the complexity of the charge control by consulting on two separate rates (paragraph A7.17).

3 Has Ofcom interpreted BT's PVEO analysis correctly?

As explained in section 2, there are two key sources of evidence that Ofcom has relied on to justify the upper end of the efficiency range:

– Openreach's most recent efficiency performance recorded in its management accounts (2011/12);
– Openreach's forecast efficiency as recorded in its BRF2 for 2012/13 and 2013/14.

These efficiency estimates were contained in information submitted by BT to Ofcom in the form of a PVEO analysis, which aims to explain year-on-year cost movements through changes in four factors (price, volume, efficiency and other/one-off movements).

Oxera's reading of Annex 7 of the charge control consultation suggests that Ofcom has relied directly on the PVEO analysis submitted by BT and has undertaken limited adjustments (if any) to these numbers.

In Openreach's PVEO analysis, efficiency is calculated as the sum of cost savings delivered by 'transformation programmes' identified as such at the beginning of the year by Openreach management. Such an estimate could overstate the level of 'true efficiency', to the extent that it will not offset any additional costs incurred in delivering programmes, and will also include some cost reductions that are delivered as a result of volume reductions. At the same time, it will not include general productivity improvements that are not achieved through initiatives, in particular where this results from limiting the cost impact of higher volumes on certain services.

In contrast, Ofcom forecasts costs in the charge control model by applying an efficiency assumption as the 'balancing item' after taking account of volume effects, input price effects and one-off costs, but without any direct link to specific initiatives. This could result in an efficiency that is higher or lower than that calculated under Openreach's approach, although, as discussed below, the net effect within recent BT data is that this approach would result in a **lower** estimate of efficiency.

Hence, while Openreach's PVEO analysis *may* be appropriate as a means of measuring/monitoring the performance of Openreach managers against the cost-saving targets set by senior management against those programmes, this approach to measuring achieved efficiency is not consistent with how efficiency is reflected within Ofcom's charge control approach to forecasting costs.

Therefore, Oxera's review of the two approaches concludes that Ofcom should not rely directly on these results without making further adjustments to BT's data to bring it onto a 'like-for-like' basis with the charge control model. To address this, Oxera has made adjustments to Openreach's PVEO data to derive efficiency estimates that are consistent with the way Ofcom forecasts costs in the charge control model.

In particular, this has involved:

– **capturing input price effects**. Oxera has adjusted the level of input cost inflation assumed within Openreach's PVEO, to bring the calculation into a format comparable with the approach in Ofcom's charge control model;

– **measuring volume effects through CVEs and AVEs**. Oxera has adjusted the volume calculation in Openreach's PVEO so that it is comparable with the approach taken by Ofcom in the charge control model—ie, estimating volume effects using component

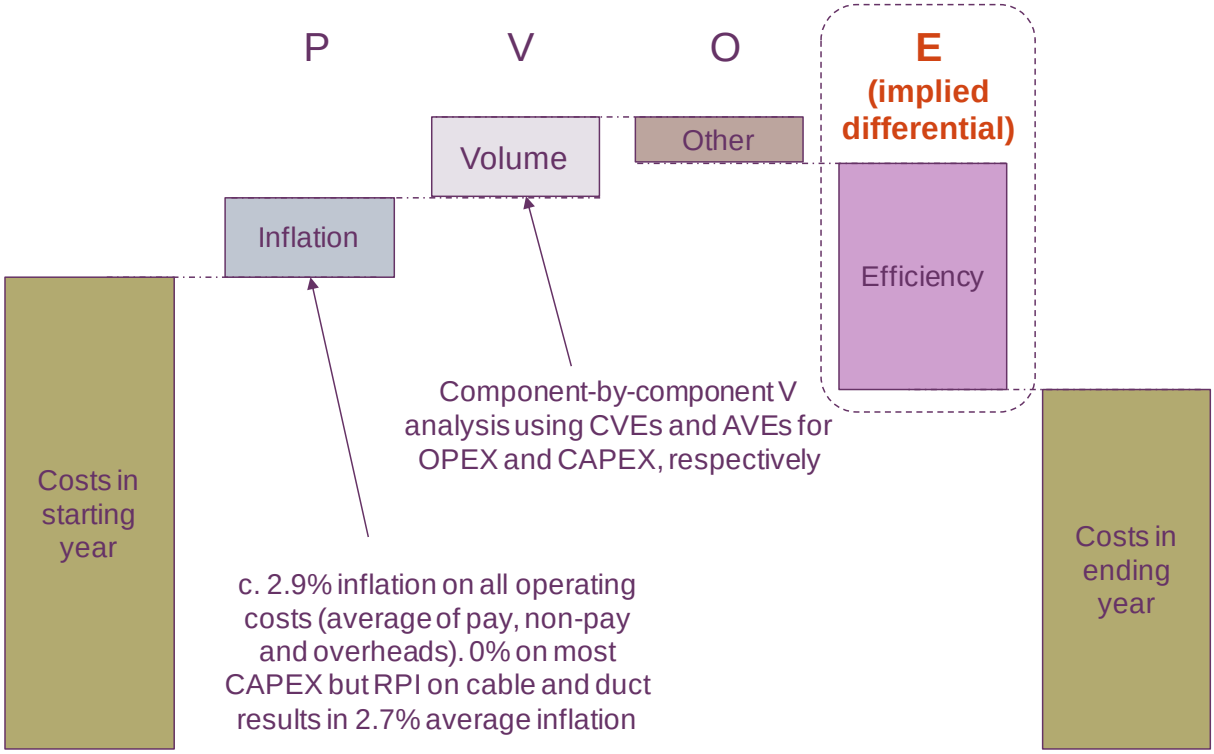
volume changes combined with cost–volume and asset–volume elasticities for OPEX and CAPEX, respectively.

Oxera has calculated volume effects based on information submitted by BT to Ofcom on WFAEL/WLA costs, volumes and CVEs/AVEs. In order to undertake the volume adjustment, the volume effect calculated for the WFAEL/WLA market has been applied to the whole of Openreach's costs. The implicit assumption in this approach is that the volume effect observed in WFAEL/WLA markets (which is the largest constituent of Openreach's costs and volumes) is a reasonable approximation of the average volume effect observed across the whole of Openreach. This assumption has been tested against wider Openreach volume data, and Oxera's analysis indicates that it is a reasonable assumption to make in the absence of a directly comparable breakdown of component volumes and AVE/CVE information for the whole portfolio of Openreach's products. Further details on the estimation of volume effects can be found in Appendix 1;

– **derived efficiency calculation**. Oxera has then recorded efficiency as the 'balancing item', consistent with the approach taken by Ofcom and regulators more generally.[6]

The approach followed by Oxera, based on Ofcom's approach to forecasting costs in the charge control, is illustrated in Figure 3.1 below.

Figure 3.1 Adjusted PVEO analysis based on Ofcom's approach to charge control modelling



Source: Oxera.

Ofcom applies the efficiency assumptions within its charge control model in a way that assumes that efficiency has been calculated on this basis. Therefore, before applying BT's efficiency calculations within Ofcom's charge control model, it is appropriate for adjustments to be made to BT's calculation of price and volume effects in order to bring the level of efficiency onto a comparable basis.

[6] Oxera has assumed the same approach to 'Other' costs as used by BT.

3.1 Results from the adjusted PVEO analysis based on Ofcom's approach

After making the adjustments explained above to Openreach's PVEO, it is found that:

– OPEX efficiency was [✂] in 2011/12, and is forecast to be around [✂] in 2012/13 and [✂] in 2013/14;

– CAPEX efficiency was around [✂] in 2011/12, and is forecast to be [✂] in 2012/13 and [✂] in 2013/14. The high 2013/14 result appears to be driven by a significantly large forecast reduction in gross CAPEX of around [✂];

– combining the CAPEX and OPEX results gives an achieved efficiency in 2011/12 on a total cash basis of [✂],[✂] in 2012/13, and [✂] in 2013/14. The relatively high 2013/14 forecast efficiency is explained largely by the high projected CAPEX savings.

These efficiency rates are considerably lower than the estimates based on Openreach's approach to the PVEO analysis, which Ofcom relied on to set the efficiency target in the charge control model. This is illustrated in Table 3.1 below.

Table 3.1 OPEX and CAPEX efficiency estimates based on PVEO analysis of Openreach management accounts (%)

	2011/12 (actual)	2012/13 (actual)[1]	2013/14 (forecast)
OPEX efficiency			
Openreach approach[1]	[✂]	[✂]	[✂]
After adjustments[2]	[✂]	[✂]	[✂]
Difference	[✂]	[✂]	[✂]
CAPEX efficiency	[✂]	[✂]	[✂]
Openreach approach[1]	[✂]	[✂]	[✂]
After adjustments[2]	[✂]	[✂]	[✂]
Difference	[✂]	[✂]	[✂]
Combined (total) efficiency	[✂]	[✂]	[✂]
Openreach approach[1]	[✂]	[✂]	[✂]
After adjustments[2]	[✂]	[✂]	[✂]
Difference	[✂]	[✂]	[✂]

Notes: [1] These are the efficiency estimates provided by Openreach to Ofcom based on the PVEO analysis submitted in response to a formal information request under section 135 of the Communications Act 2003. [2] This refers to Oxera's adjustments to Openreach's PVEO to ensure consistency with Ofcom's approach to forecasting costs in the charge control model, as explained above.
Source: Oxera analysis of Openreach management accounts data.

3.2 Implications of these results for the efficiency target

Regardless of the exact reasons behind the different results, a robust conclusion from this analysis is that including the efficiency estimates from Openreach's PVEO directly into Ofcom's charge control is likely to overestimate the likely level of efficiency gains that Openreach can reasonably expect to achieve over the forthcoming period. This is due, in part, to Ofcom not removing scale effects and implementation costs. In other words, based on the evidence that Ofcom has itself used, Ofcom's target of 5%, based on a range of 4–6%, is too high.

A more appropriate target, based on the results of the adjusted PVEO shown above and placing greater weight on the results for the more recent years considered by Ofcom, as these are based on actual cost data,[7] would be a combined OPEX and CAPEX efficiency estimate in the [✂] range (this is based on the combined efficiency estimate after adjustments for 2011/12 and 2012/13, as shown in Table 3.1).

Another important finding of our results is that the OPEX efficiency estimates are considerably more stable and reliable than the CAPEX estimates, and are less affected by sharp changes in gross cost forecasts. This can be seen in Table 3.1, where the OPEX efficiency estimate fluctuates between [✂] and [✂], including in the 2013/14 forecast year. The difference between these estimates and Openreach's PVEO results are also smaller. In contrast, the CAPEX efficiency estimates fluctuate between [✂] and [✂].

Based on this finding alone, Oxera suggests that it may be more appropriate for Ofcom to set separate OPEX and CAPEX targets to ensure that the OPEX figures are estimated reliably, not least because it is the OPEX efficiency target that has the greatest overall impact on the value of X in the charge control (see section 5 for further explanation of this). For CAPEX, a longer-term analysis may be required, as CAPEX over a short time horizon would be generally expected to be more volatile than OPEX. For example, Ofgem assesses CAPEX efficiency over a seven-year horizon to account for this volatility.[8]

The question of separate efficiency targets for OPEX and CAPEX is discussed further in section 5.

[7] As described above, 2011/12 cost figures are actual outturn data, whereas 2012/13 cost figures are based on a full-year forecast derived from actual data for the first ten months.

[8] As discussed in Ofgem (2012), 'RIIO-GD1: Final Proposals - Supporting document - Cost efficiency', December, para 4.4.

4 Does Ofcom's RFS analysis provide a reliable data point for the efficiency range?

As explained in section 2, Ofcom provides the results of an analysis of cost trends in BT's RFS over the last three years in WLA and WFAEL markets (2009/10 to 2011/12) as an additional reference point. Ofcom's analysis suggests that Openreach achieved OPEX efficiency savings in WLA and WFAEL markets of around 6% per year over the last three years, after taking account of price and volume effects.

Oxera's analysis of the RFS data shows that, under certain assumptions, it is indeed possible to get close to Ofcom's finding of 6% per annum historic efficiency in WLA and WFAEL (Oxera's assumptions include input price inflation of 2.9%, rental volumes combined with weighted average CVEs to estimate volume effects, and adjustment for changes in cumulo rates methodology in 2010/11).

However, the pace of efficiency improvements appears to be slowing, with the relatively high average explained by efficiencies achieved in the first two years—ie, up to 2010/11. This is illustrated by Table 4.1, which shows an efficiency of around 6.7% for three years in WFAEL and WLA, driven by large efficiencies in 2009/10 and 2010/11. In the most recent years (2011/12 and 2012/13), the WFAEL and WLA markets appear to have experienced inefficiencies of 1.3% and 3.4%, respectively.

Table 4.1 WFAEL/WLA and Openreach efficiencies, consistent with Ofcom's stated methodology for 2009–12 (%)

	2009/10	2010/11	2011/12	Three-year average	2012/13
WFAEL/WLA	–12.0	–9.3	1.3	**–6.7**	3.4
Openreach	–5.7	–5.0	–1.2	**–4.0**	–3.9

Note: Positive numbers represent negative efficiencies (ie, inefficiency).
Source: Oxera analysis of BT RFS data.

More importantly, however, the results of this analysis are considered to be unreliable for use on a top-down basis in the LLU/WLR charge control model given that a significant proportion of the Openreach cost base is made up of common costs 'consumed' by many products spread across a variety of markets. In these circumstances, it would be difficult at the level of an individual market (WFAEL and/or WLA) to distinguish 'true' year-on-year efficiencies from cost reductions resulting from shifts in common costs across products and markets as a result of changes in the product mix or cost allocation methodologies.

Estimates of efficiency obtained from an analysis of cost trends at the level of Openreach would therefore be considerably more reliable than granular assessments of efficiency at a market level. This is supported by the analysis in Table 4.1, which illustrates very sharp swings in efficiency estimates between individual years for the WFAEL/WLA markets combined, driven by steep changes in recorded costs.[9] The Openreach efficiency estimates, on the other hand, while exhibiting a similar downward trend, are considerably more stable and less volatile.

[9] While some of these swings can be traced to specific factors, such as changes in Other operating income, Oxera's in-depth review indicates that there are a number of changes in annual data, relating to either cost allocation issues and/or 'one-off' changes in costs in the relevant markets, which would need to be assessed on a case-by-case basis to produce a reliable estimate.

Ofcom has expressed similar concerns in the past. For example, in the recent Leased Lines charge control, Ofcom noted that obtaining a reliable estimate of efficiency for Ethernet products would not be possible due to changes in the relationship between cost components and the underlying services over the relevant time period.[10] On this basis, Ofcom concluded that it would be more appropriate to use an efficiency estimate derived from the Openreach level, which would also be consistent with the way the LLU/WLR charge control efficiency target is set.[11]

4.1 Assessment of efficiency based on Openreach RFS cost data

Mindful of the issues identified above, and to ensure consistency with the way Ofcom has set the efficiency target in previous LLU/WLR charge controls, Oxera undertook a PVEO analysis using RFS data at the Openreach level over the past three years (2009/10 to 2011/12). Two scenarios were run for volume effects:

– **Scenario 1**—using total rentals (ie, Ofcom's stated approach when assessing cost trends using the RFS data);

– **Scenario 2**—using component volumes and CVEs/AVEs (consistent with Ofcom's approach in the charge control model).

As in the case of the adjusted PVEO analysis presented in section 3, the volume effect is based on information from WFAEL/WLA markets, which has been extrapolated to the whole of Openreach. The implicit assumption in this approach is that the volume effect observed in WFAEL/WLA markets is a reasonable approximation of the average volume effect that would be expected across the whole of Openreach's costs. Appendix 1 provides further details on this calculation and why it is considered to be a reasonable assumption.

The results of this analysis are summarised in Table 4.2 below.

Table 4.2 OPEX efficiency estimates based on PVEO analysis of Openreach RFS cost trends (%)

	2009/10	2010/11	2011/12	Three-year average (2009–12)	2012/13 (recently published)
Scenario 1 (total rentals)[1]	–5.7	–5.0	**–1.2**	–4.0	**–3.9**
Scenario 2 (component volumes)[2]	–6.2	–6.3	**–3.5**	–5.3	**–3.3**

Notes: [1] This scenario includes an adjustment to account for a one-off change in cumulo rates in 2010/11. Input price effects are assumed to be 2.9% per annum applied to all costs. This is the same scenario for which the results are shown in Table 4.1 above for Openreach. [2] In this scenario, in addition to the cumulo rate adjustment, Oxera made an adjustment to exclude 'Other operating income' from the cost base (to ensure consistency with BT's management accounts and the costs used in the charge model).
Source: Oxera analysis of Openreach RFS costs.

As can be seen above, Oxera's analysis shows that the average OPEX efficiency achieved by Openreach between 2009/10 and 2011/12 was around 4.0% and 5.3% in scenarios 1 and 2, respectively. In both cases, efficiency appears to be on a declining trend, as the rate in 2011/12 was considerably lower than in earlier years. This trend was confirmed when the most recently published RFS accounts for 2012/13 were included, which show an OPEX efficiency rate of 3.9% and 3.3%, respectively (see last column of Table 4.2).

[10] Ofcom (2013), 'Business Connectivity Market Review', March 28th, para A12.99.
[11] Ofcom (2013), op. cit., para A12.100.

4.2 Implications of these results for the efficiency target

Oxera has been able to broadly replicate Ofcom's RFS analysis at the level of WFAEL/WLA. This shows an efficiency improvement of around 6.7%. However, this efficiency saving is considerably higher than that observed using a directly comparable calculation at the Openreach level.

Given the large amount of common costs shared across Openreach products, it is difficult to determine, without further detailed analysis, whether cost trends in a particular submarket represent 'true' efficiency improvements. In the context of setting an efficiency target for the LLU/WLR charge control, this is one of the reasons why Ofcom has previously relied on estimates obtained from Openreach as a whole to assess historic rates of efficiency.

Overall, Oxera would therefore expect that, if RFS data is to be used, the Openreach results would be a better source of analysis, and more consistent with the approach taken by Ofcom in previous LLU/WLR charge controls. If this were the case, as has been shown above, the Openreach results would be consistent with the findings in section 3.

On the basis of these results, Oxera does not consider that Ofcom's finding of 6% efficiency on the basis of BT's RFS is a reliable estimate to inform the efficiency range to be applied in the forthcoming LLU/WLR charge control.

5 Should the efficiency targets on OPEX and CAPEX be the same?

This section considers the appropriate treatment of the efficiency target for OPEX and CAPEX in the LLU/WLR charge control model. As explained in section 2, Ofcom makes three arguments in favour of a combined target and against the proposal to apply different efficiency rates for OPEX and CAPEX:

a) BT's observation that OPEX and CAPEX have different impacts on the cost stack does not imply that different efficiency rates should be applied to them;

b) the overall cash efficiency rate shows less variation than the separate OPEX and CAPEX rates;

c) there is no further benefit in increasing the complexity of the model by consulting on two separate rates.

These arguments are considered in turn below.

5.1 Assessment of Ofcom's arguments for a combined efficiency target

Argument 1: the fact that OPEX and CAPEX have different impacts on the cost stack is not a good reason to have separate efficiency targets

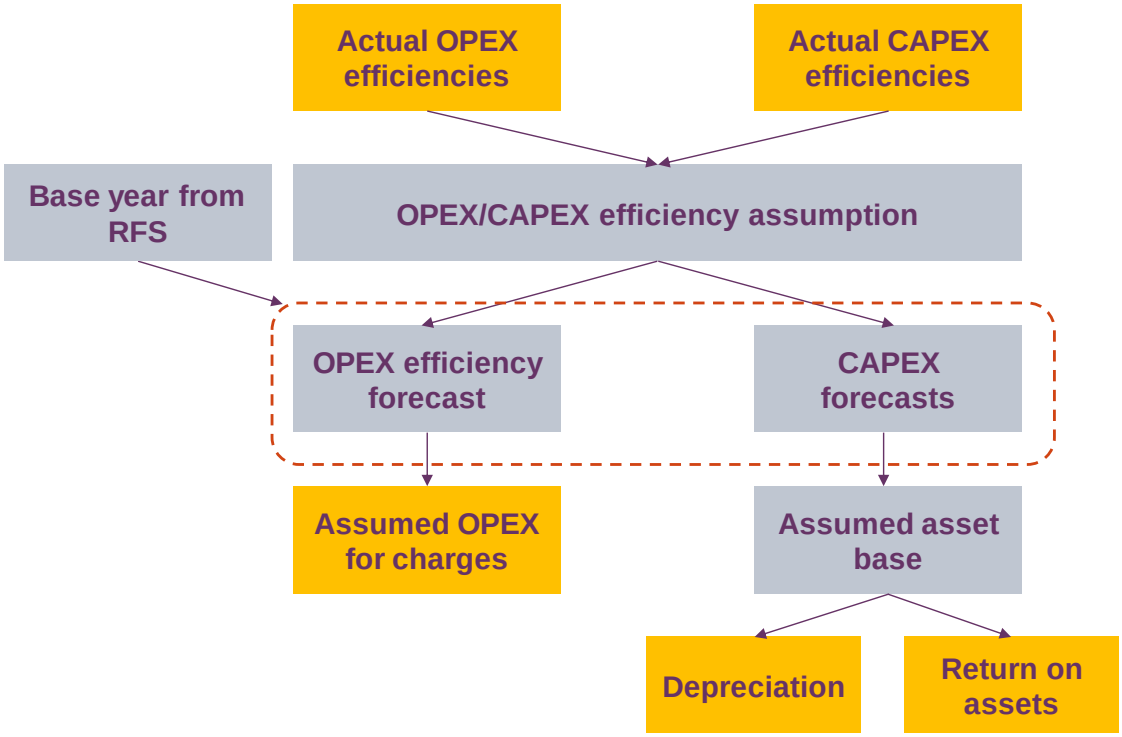
An important objective in Ofcom's charge control is that it should allow BT the opportunity to recover all of its efficiently incurred costs. The assumption on the efficiency rate plays a key role in achieving this objective, as acknowledged by Ofcom (see para A7.18).

In this context, Oxera considers that BT's observation that OPEX and CAPEX have different impacts on the cost stack is of crucial importance.

Ofcom's approach to OPEX and CAPEX is illustrated in Figure 5.1 below. Broadly, the approach is as follows:

– Ofcom identifies a relevant cost base for the base year (largely drawing on RFS data);
– Ofcom defines a forward-looking estimate of achievable efficiency improvements, calculated as a combined target for OPEX and CAPEX;
– Ofcom feeds this combined estimate into the financial model. The model then provides a forecast of costs for LLU/WLR services, derived from a separate forecast for OPEX costs, and the impact of CAPEX forecasts on depreciation and return on capital.

Figure 5.1 Overview of Ofcom's approach to charge control modelling



Source: Oxera.

As a result, the choice of OPEX and CAPEX efficiency targets flows through the cost stack in different ways:

– in the case of OPEX, efficiency results directly in a forecast of lower costs (ie, 1% greater efficiency results in 1% lower OPEX within the costs assumed over the period to 2016/17), and this flows directly into allowed revenues and prices;

– in the case of CAPEX, on the other hand, the efficiency rate is assumed to result in lower investment costs, and does not translate directly into lower ongoing costs but into a lower capital base. In the context of forecast costs within the charge control, this results in lower depreciation, lower return on capital, and smaller holding gains/losses. The impact on prices within the regulatory period will therefore be considerably lower than the comparable OPEX efficiency target.

This has fundamental implications for the efficiency target that should be applied to OPEX and CAPEX in the charge control model. For example, if Ofcom sets 5% as a target for total cash efficiency, which is derived from a higher CAPEX rate of 7.5–10% offset by an OPEX rate of 3–4%, allowed revenues in the charge control model would be lower than costs.

This is illustrated in the context of the LLU/WLR charge control model in Table 5.1 below, which considers the impact on X of combining different efficiency rates for CAPEX and OPEX into a single cash efficiency target.

Table 5.1 Implied X factors from different underlying OPEX/CAPEX efficiency rates (%)

Efficiency assumptions	WLR external rentals		MPF migrations	
Ofcom case	Implied X	Difference to proposed X	Implied X	Difference to proposed X
OPEX efficiency 5%, CAPEX efficiency 5%	–3.8	–	–4.7	–
OPEX efficiency 4%, CAPEX efficiency 7.5%	–3.3	0.5	–3.2	1.5
OPEX efficiency 3%, CAPEX efficiency 10%	–2.9	0.9	–1.8	2.9

Note: Analysis is based on a combination of the published LLU/WLR charge control model and an overlay of actual BT data (ie, replacing the cost data in Ofcom's public model with actual data from BT). MPF, Metallic Path Facility.
Source: Oxera analysis of FAMR financial model.

In summary, if Ofcom sets 5% as a target for cash efficiency, but in practice this reflects a higher CAPEX target of 7.5–10% offset by an OPEX target of 3–4%, then trends in actual costs would be 0.5–0.9% higher than trends in the allowed revenues for WLR rentals, and trends in costs would be around 1.5–2.9% higher than trends in allowed revenues for MPF migrations.[12]

Argument 2: variability in separate OPEX/CAPEX efficiency rates suggests that a combined target is more appropriate

Ofcom's second argument is that combined total cash efficiency rates are more stable than the separate OPEX and CAPEX efficiency rates, which is consistent with the way BT sets its internal targets.

This could also be perceived to be consistent with other regulators—for example, Ofwat and Ofgem have moved to a single TOTEX (total expenditure) target, largely due to overlapping and substitutable areas of cost between OPEX and CAPEX.

However, Oxera's adjusted PVEO analysis in section 3 found that OPEX efficiency is, in fact, considerably more stable and reliable than CAPEX efficiency or the level of efficiency of OPEX and CAPEX combined. This finding is consistent with what has been observed in other regulated sectors. As discussed in section 3, Ofgem, for example, examines CAPEX efficiency trends on a seven-year rolling average to smooth out variability often observed in yearly estimates.

Oxera's analysis therefore concludes that Ofcom's argument in favour of a combined efficiency target derived from its apparently greater stability is not consistent with the evidence examined.

Argument 3: there is no further benefit from adding complexity

Ofcom's third argument is that there would be no further benefits of adding complexity by consulting on two separate efficiency targets.

However, Oxera's analysis suggests that there would be substantial benefits in using two separate estimates. This is particularly the case when ensuring that the charge control is built in a way that ensures BT will have the opportunity to recover its efficiently incurred costs. As the illustration in Table 5.1 above has shown, when the combined target is built up by two separate rates at materially different levels, there is a high likelihood that cost recovery cannot be guaranteed.

[12] A similar scale of effect is observed for other rental and migration products.

5.2 Implications of this assessment for the efficiency target

As explained above, Oxera does not consider that Ofcom has provided sufficiently strong arguments to set a combined efficiency target for OPEX and CAPEX. On the contrary, on the basis of the analysis presented in sections 3 and 4 showing that OPEX efficiency rates are in the [✂] range, Ofcom's 5% assumption is likely to result in an under-recovery of costs. This would be the case even if the 5% target could be justified on the basis of higher CAPEX rates given the different ways in which OPEX and CAPEX flow through the charge control cost stack. This would go against one of Ofcom's core principles for the charge control, and separate targets for OPEX and CAPEX would therefore be more appropriate.

Alternatively, if Ofcom considers that a single target is still appropriate for practical reasons, then, to adhere to the principle of cost recovery, a combined target would need to weigh up OPEX and CAPEX efficiency rates (with the latter calculated over a longer time period) by their respective contributions to the charge control cost stack. As a second-best solution, any single target would need to be drawn largely from evidence on OPEX efficiency rates, given:

– the difficulty of measuring CAPEX efficiency based on short-term trends;

– that OPEX efficiency is the dominating factor in determining allowed revenues in the charge control.

A1 Calculation of volume effects for the adjusted PVEO and RFS analyses

This section provides further details of Oxera's calculation of the volume effect that was used to derive the efficiency estimates in sections 3 and 4. It also considers whether the volume effect calculated in the manner described below (ie, based on cost, volume and AVE/CVE data from the WFAEL and WLA markets) is a reasonable approximation of the volume effect that could be expected across the whole of Openreach over the period of analysis.

A1.1 Methodology used to estimate the volume effect for the adjusted PVEO analysis in section 3

The adjusted PVEO analysis that Oxera has undertaken is based on the estimation of price and volume effects applied to Openreach's management accounting data, in a manner consistent with the way that Ofcom forecasts costs in the charge control model.

In the charge control model, product volumes are multiplied by the product usage factors (ie, each unit of product uses a specified quantity of components) to obtain component volumes. Changes in component volumes are then multiplied by the AVEs and CVEs to generate the forecast additional CAPEX and OPEX costs, respectively.

The purpose of Oxera's analysis of the charge control model was to obtain a volume impact for the years 2011/12, 2012/13 and 2013/14, consistent with Ofcom's charge control methodology. The approach was to replace the model's input data such that the base year was set to 2010/11, and observe the year-on-year change in cost due to volume effects only.

This approach required several adjustments to the model. In order to set the base year to 2010/11, the product volumes on 'Data ref sheet 1a' and 'Data ref sheet 1b' were lagged by one year. The base year capital costs (gross replacement cost, net replacement cost, holding losses or gains, and depreciation adjustments) on sheet 'Data ref sheet 2' were replaced with 2010/11 data supplied by BT. Similarly, the net current asset (NCA) data on sheet 'Data ref sheet 3' was replaced with 2010/11 data supplied by BT. All of these adjustments are necessary to set the correct starting point and hence the denominator for a volume impact specific to CAPEX.[13]

Oxera's analysis also required changes specific to OPEX. The component-level unit OPEX for the base year was set to 2010/11 on sheet 'Data ref sheet 4' using data supplied by BT. In order to make cost predictions consistent with the chosen base year, the usage factors on sheet 'Data ref sheet 7' were replaced with the values from 'Data ref sheet 6' (ie, the usage factors known for 2010/11 were used). Similarly, Oxera's analysis replaces the base year AVEs and CVEs in 'Data ref sheet 10' with the 2010/11 values supplied in the model. The CVEs that are applied to cost forecasts in sheet 'CVE scenarios' for 2011/12 and beyond are assumed to be the 2011/12 actual values, since these are known at that point in time, and they are also the forecast values contained in Ofcom's model.

In order to obtain the volume impact, Oxera's analysis obtains the additional volume-related CAPEX and OPEX forecasts calculated from the model. To exclude the impact of inflation (including factor price changes) and any efficiency assumption, these inputs are set to zero in the 'Inflation' and 'Parameters' sheets respectively. This means that all of the changes in

[13] The Ofcom charge control model also makes some RAV adjustments that affect the base year capital costs. Oxera has verified that the impact of making base year changes to this section of the model has a negligible effect on the volume impact, and has omitted this modification in the analysis.

cost are due to volume changes. The volume effect is obtained by calculating the difference between predicted costs for a given year and the starting level of costs, divided by the starting level of costs. This resulted in the volume impacts presented in Table A1.1 below.

Table A1.1 OPEX and CAPEX volume impacts as per Ofcom charge control model

	2010/11	2011/12	2012/13	2013/14
OPEX (£m)	1,225.11	1,242.96	1,250.22	1,260.02
OPEX year-on-year change (£m)		17.85	7.26	9.80
OPEX volume effect (%)		**1.46**	**0.58**	**0.78**
CAPEX (£m)	990.87	954.48	959.55	972.78
Additional CAPEX (£m)		–36.03	–30.96	–17.73
CAPEX volume effect (%)		**–3.64**	**–3.24**	**–1.85**

Source: Oxera analysis of Ofcom charge control model.

Note that the 2011/12 volume impact on OPEX appears to be considerably larger than those for subsequent years. This appears to be driven by a large increase in volume of the 'Local Loop Unbundling tie cables' component in 2011/12 (692% year-on-year growth). This appears to be due to a change in the definition and recording of volumes of the related MPF tie cable product. Oxera has not removed or attempted to correct this anomaly, as doing so would have required further adjustments to other components used by the MPF tie cable product. This suggests that the OPEX volume impact for 2011/12 (and therefore the efficiency estimate derived from this) could be overestimated.

Together with the volume adjustment, Oxera calculated a price adjustment that is comparable to that applied by Ofcom. For OPEX, Oxera applied 2.9%, this being the average of the inflation assumptions for pay and non-pay applied by Ofcom. For CAPEX, Oxera followed Ofcom's approach of assuming RPI inflation for changes in the cost of cable and duct, and assuming 0% inflation for other asset classes. This results in assumed input price effects of approximately 2.7% per annum over the three-year period. Oxera did not adjust BT's calculations of one-off effects in its submissions to Ofcom.

Table A1.2 provides further detail of the 'PVEO breakdown' used to calculate the efficiency estimates reported in Table 3.1, using actual cost data from BT's management accounts together with price and volume effects calculated in accordance with the methodology outlined in this note.

Table A1.2 OPEX and CAPEX efficiency estimates based on PVEO analysis of Openreach management accounts

	Opening level	P	V	E	O	Closing level	Efficiency estimate (%)
OPEX							
2011/12	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
2012/13	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
2013/14	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CAPEX	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
2011/12	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
2012/13	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
2013/14	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total (OPEX+CAPEX)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
2011/12	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
2012/13	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
2013/14	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Note: These calculations refer to Oxera's adjustments to Openreach's PVEO to ensure consistency with Ofcom's approach to forecasting costs in the charge control model, as explained above.
Source: Oxera analysis of Openreach management accounts data.

A1.2 Methodology used to estimate the volume effect for the RFS data (section 4)

For the efficiency estimate based on component volumes in section 4 (Table 4.2, scenario 2), Oxera uses the same volume effect as shown in Table A1.1 above for the years 2011/12 and 2012/13. To obtain the volume impact for 2010/11, a method consistent with the Ofcom model is applied to component volume and CVE data supplied by BT. This takes the change in component volumes in 2010/11 and multiplies it by the respective CVEs in that year and the base level of OPEX. This results in a volume effect of 0.7%.

Comparable product and component volume change data for 2009/10 was not available (this was because Oxera used the same information provided by BT to Ofcom, which did not contain the 2008/09 base data needed to calculate the percentage change for 2009/10). Therefore, the volume effect for 2009/10 has been assumed to be the same as for 2010/11 (ie, 0.7%).

For the estimation of rental volume effects, which are used to derive the results in Table 4.1 and scenario 1 in Table 4.2, Oxera used the following approach.

1) Calculate the percentage change of total rental volumes of WLR, MPF and SMPF (Shared Metallic Path Facility). For SMPF volumes, this consists of external volumes only, to ensure consistency with the cost data contained in BT's RFS.

2) Calculate a weighted average CVE to be applied to the percentage rental volume change, where the weights correspond to each component's contribution to overall OPEX. The component CVEs used for this calculation were the same as those used in the adjusted approach described above.

3) The volume effect is then given by the product of the percentage rental volume change and the weighted average CVE for the specific year.

Table A1.3 below contains a summary of the component and rental volume effect calculations.

Table A1.3 OPEX volume impacts by product rentals, RFS analysis

	2009/10	2010/11	2011/12	2012/13
WLA + WFAEL product volume change (%)	–1.14	–1.43	–2.40	0.16
OPEX-weighted CVE	0.86	0.83	0.82	0.83
Product (rentals) volume effect (%)	**–0.98**	**–1.18**	**–1.97**	**0.13**

Source: Oxera analysis of data supplied by BT.

This volume analysis was then applied to BT's RFS data in a comparable manner to the approach in the previous section, using a comparable inflation adjustment. The only adjustment assumed was the cumulo rates adjustment explicitly acknowledged by Ofcom.

Table A1.4 provides further detail of the 'PVEO breakdown' of the efficiency estimates reported in Table 4.1, using a similar format to the calculation within section 3, but applied to RFS data rather than the management accounting data used in BT's PVEO analysis.

Table A1.4 OPEX efficiency estimates based on BT's RFS

	Opening level	P	V	E	O	Closing level	Efficiency estimate (%)
WFAEL+WLA[1]							
2009/10	1,551	45	–15	–186	0	1,395	–12.0
2010/11	1,395	40	–17	–130	0	1,289	–9.3
2011/12	1,289	37	–25	17	0	1,318	1.3
2012/13	1,347	39	2	46	0	1,434	3.4
Openreach (comparable basis)[1]							
2009/10	2,627	76	–26	–150	0	2,527	–5.7
2010/11	2,527	73	–30	–127	0	2,443	–5.0
2011/12	2,443	71	–48	–30	0	2,436	–1.2
2012/13	2,447	71	3	–96	0	2,425	–3.9
Openreach (component volume and 'other operating income' adjustments)[1, 2]							
2009/10	2,740	79	19	–169	0	2,670	–6.2
2010/11	2,670	77	19	–168	0	2,598	–6.3
2011/12	2,598	75	38	–91	11	2,631	–3.5
2012/13	2,642	77	15	–88	–52	2,594	–3.3

Note: [1] Opening and closing OPEX levels were directly adjusted by a cumulo rate cost change of –£64m from 2010/11 onwards. The data on the cumulo rate adjustment was provided by BT. [2] Opening and closing OPEX levels were directly adjusted to remove Other Operating Income, and one-off adjustments to Other costs were applied in 2011/12 and 2012/13 for consistency with BT's Management Accounts. Closing balances for 2011/12 and opening balances for 2012/13 do not agree due to RFS restatements.
Source: Oxera analysis of BT's RFS.

A1.3 Sensitivity analysis of volume effect

As explained above, the estimated volume effect is based on information from the WFAEL and WLA markets. This volume effect was then applied in the adjusted PVEO and RFS analyses of sections 3 and 4. The implicit assumption in this approach is that the volume effect observed in WFAEL/WLA markets (which is the largest constituent of Openreach's costs and volumes) is a reasonable approximation of the average volume effect observed across the whole of Openreach. This section explains why this assumption is considered to be appropriate.

WFAEL and WLA market costs represent 50–60% of overall Openreach costs as recorded in the RFS, and make up the vast majority of the stock of Openreach volumes. A volume effect calculated at this level could therefore be said to be broadly representative of the volume effect of Openreach as a whole.

In addition, the level of relevant costs within WFAEL/WLA, as a share of total like-for-like Openreach costs, has increased over the period. Therefore, in the absence of sharp differences in the pace of efficiency improvements, the average volume effect across WFAEL/WLA would be expected to be greater than that within Openreach as a whole, and therefore applying this rate across Openreach should, if anything, overstate the level of efficiency achieved.

At the same time, however, there are a number of fast-growing products in Openreach's portfolio (eg, high-bandwidth alternative interface symmetric broadband origination (AISBO), and generic Ethernet access (GEA)). The volume effect for these products is therefore likely to be higher than the corresponding WFAEL and WLA effect. However, these services represent a relatively small proportion of overall costs and revenues of Openreach, and at the level of Openreach this effect is offset by falls in the volumes of some products within the WBA range and other services such as ePPCs.

To calculate a volume effect for Openreach as a whole would require accessing detailed information on product volumes and costs across all of Openreach, as well as a matrix of usage factors to derive component volumes on an equivalent basis to the analysis undertaken for WFAEL and WLA products.

A further critical issue to consider is what assumptions should be made for the CVEs for products outside the WFAEL/WLA markets, particularly those exhibiting significant growth. Where WFAEL and WLA products are mature and exhibit relatively small volume fluctuations over time, using CVEs derived from LRIC-to-FAC ratios would seem to be a reasonable approach to capture volume effects. However, LRIC-to-FAC ratios are unlikely to be well suited to capturing the responsiveness of costs for products that are in a growth phase, such as AISBO and GEA, if these are to be used for assessing achieved efficiency rather than for forecasting future longer-term cost trends.

Oxera has performed a high-level bottom-up analysis that indicates that these effects should be broadly offsetting. There are some data limitations, as the analysis requires some assumptions for the appropriate choice of CVE for the subset of fast-growing products. However, the evidence assessed provided a range for the level of CVE that would need to be applied to these fast-growing products to ensure that the volume effect and the efficiency calculation at the Openreach level would be broadly unaffected.

Subject to these caveats, the analysis indicates that the implied CVE ranges appear reasonable and consistent with previous evidence on shorter-term volume effects. There is therefore no evidence of any significant divergence in volume effects between the different products, which would bring into question the use of WFAEL/WLA volume effects to estimate efficiency at the Openreach level.

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