

**Anticipated joint
venture between
Liberty Global Plc
and Telefónica S.A.
Final report**

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The Competition and Markets Authority has excluded from this published version of the report information which the Inquiry Group considers should be excluded having regard to the three considerations set out in section 244 of the Enterprise Act 2002 (specified information: considerations relevant to disclosure). The omissions are indicated by [X]. Some numbers have been replaced by a range. These are shown in square brackets.

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Glossary

Summary

Introduction

1. The Competition and Markets Authority (CMA) found that the anticipated joint venture (JV) between Liberty Global plc (Liberty Global) and Telefónica S.A. (Telefónica) to merge their operating businesses in the United Kingdom (UK), that is Virgin Media Inc. (Virgin) and O2 Holdings Limited (O2) respectively (the Proposed Merger), was not expected to result in a substantial lessening of competition (SLC) within any market or markets in the United Kingdom, including as a result of vertical effects in the supply of:
 - (a) Wholesale leased lines to mobile network operators (MNOs), at each of the access and aggregation layers on a local basis and
 - (b) Wholesale mobile services to mobile virtual network operators (MVNOs) in the UK.

Background

The reference

2. On 11 December 2020, the CMA, in exercise of its duty under section 33(1) of the Enterprise Act 2002 (the Act), referred the Proposed Merger for further investigation and report by a group of CMA panel members (the Inquiry Group). The CMA's Phase 1 investigation followed the European Commission's decision to refer the case to the United Kingdom under Article 9(3)(b) of the EC Merger Regulation. At Phase 1, following a request by the Parties for a fast track reference of the Proposed Merger to an in-depth Phase 2 investigation, the CMA concluded there was a realistic prospect that the merger would result in a SLC and it was appropriate to proceed with a fast track reference to Phase 2 .
3. In exercise of its duty under section 36(1) of the Act, the CMA must decide:
 - (a) whether arrangements are in progress or in contemplation which, if carried into effect, will result in the creation of a relevant merger situation (RMS); and
 - (b) if so, whether the creation of that RMS may be expected to result in a SLC within any market or markets in the UK for goods or services.

Industry background

Fixed communications networks

4. Fixed communications networks provide retail services including telephony and broadband access and wholesale services including leased lines and mobile backhaul.
5. At both the retail and wholesale level, traffic on fixed networks is growing, driven by growing consumption of data on retail broadband services and by wholesale demand for networks for mobile and other uses. In contrast, use of fixed networks for telephony has been declining.
6. Mobile backhaul uses fibre leased lines to connect an MNO's radio base station to its core network nodes. MNOs can self-supply their own backhaul or can source wholesale leased lines from providers such as Openreach, Virgin or CityFibre.
7. Mobile backhaul can be provided using 'active' leased lines, or 'passive' leased lines:
 - (a) Active leased lines (optical access and Ethernet products) are where the physical line is supplied with electronic equipment. The provider installs and uses its own electronic equipment at the ends of the leased line and configures this to meet the needs of the MNO.
 - (b) Passive leased lines are also commonly referred to as 'dark fibre'. These involve the supply of unlit fibre to the MNO which then installs and manages its own electronic equipment at both ends of the leased line.
8. BT has the largest fixed network with almost ubiquitous UK coverage. Most wholesale leased lines are supplied by Openreach, a wholly-owned subsidiary of BT, which is functionally and legally separate from it. Openreach is required by Ofcom regulation to offer wholesale services to other fixed telecom providers that do not have the same level of network coverage in the UK. BT also provides wholesale leased line services, including to MNOs, on a commercial basis through its BT Enterprise business which use inputs from Openreach.
9. Virgin has the second largest fixed network in the UK, passing over 16 million UK households. Virgin provides mobile backhaul to MNOs in the form of either active leased lines and/or passive leased lines.

Mobile communications

10. There are four MNOs in the UK: O2, EE, Vodafone and Three. These supply around 90% of the retail mobile customers in the UK, with the remainder being supplied by around 150 MVNOs, including Virgin Mobile and Sky Mobile.
11. Ofcom research shows that demand for mobile data is increasing, while use of traditional mobile messaging and voice services are falling, as customers substitute instant messaging and video calling using apps on their smartphones.
12. All UK MNOs now offer 5G services. 5G is the latest generation of wireless technology and delivers faster and more reliable mobile services and may enable innovative new services in multiple industry sectors.

Fixed mobile convergence

13. Telecoms providers bundle services including mobile, fixed voice, broadband and pay-TV for UK consumers. However, these are generally cross-sold and still provided under separate contracts.
14. Ofcom data indicates that in 2020 14% of fixed broadband subscribers had purchased their mobile and broadband services from the same provider.

The Parties

15. Liberty Global is an international video, broadband and communications company. It has consolidated operations in the UK, Ireland, Belgium, Switzerland, Poland and Slovakia and owns 50% of the Vodafone Ziggo joint venture in The Netherlands. Liberty Global is a publicly traded company, listed on the NASDAQ Global Select Market in the US.
16. In the UK, Liberty Global owns Virgin which provides retail fixed telecommunications services (specifically fixed voice and fixed broadband), pay-TV and business to business wholesale fixed telecommunications services. Virgin also provides retail mobile services with Virgin Mobile, an MVNO.
17. The turnover of Liberty Global in 2020 was approximately £10,450 million worldwide. Virgin had turnover of £4,730 million in the UK.
18. Telefónica is an international telecommunications company headquartered in Madrid, Spain. It is a publicly listed company on the Madrid, New York, Lima and Buenos Aires Stock Exchanges.

19. In the UK, Telefónica operates O2 as an MNO, offering retail mobile services to consumers and businesses as well as wholesale mobile services to MVNOs. O2 also provides certain fixed telephony retail services to business customers.
20. O2 owns giffgaff Limited (an MVNO) and has a shareholding in the Tesco Mobile joint venture (an MVNO); Cornerstone Telecommunications Infrastructure Ltd (CTIL), a mobile network-sharing joint venture with Vodafone; and Digital Mobile Spectrum Limited.
21. The turnover of Telefónica in 2020 was approximately £38,290 million worldwide and £5,962 million in the UK.

The transaction

22. On 7 May 2020, Telefónica and Liberty Global entered into a Contribution Agreement which proposed they would jointly acquire control of a newly incorporated entity, VMED O2 UK Ltd (the Merged Entity). Telefónica and Liberty Global would each be allotted 50% of the entire issued and outstanding share capital of VMED O2 UK Ltd.
23. Telefónica will contribute to the JV its wholly owned subsidiary O2 Holdings Limited and Liberty Global will contribute to the JV its wholly owned subsidiary Virgin Media Inc., which is the parent company of Virgin Media Ltd and Virgin Mobile Telecoms Ltd.
24. The other main businesses contributed by Telefónica will be:
 - (a) its shareholding in the Tesco Mobile joint venture, an MVNO;
 - (b) giffgaff Limited;
 - (c) CTIL. O2 has a 50% shareholding in CTIL which owns mobile passive infrastructure and operates a shared site portfolio such as base stations; and
 - (d) Digital Mobile Spectrum Limited, a joint venture in which O2, Three, EE and Vodafone each hold a 25% shareholding.
25. The Parties have agreed the form of the shareholders' agreement which governs how the JV will be owned, controlled, managed and financed, although this has not yet been executed.
26. The JV is intended to be jointly controlled by the Parties. The shareholders' agreement sets out that the board of directors of the JV will have eight directors: four each from Telefónica and Liberty Global.

27. The Parties have told us that the JV will be independently managed on an autonomous basis and will be provided with the necessary resources (finance, people and assets) to allow it to operate independently.

Findings

Counterfactual

28. To assess the effects of a merger on competition, we consider the prospects for competition with the merger against what would have been the competitive situation without the merger. This is called the 'counterfactual'.
29. Submissions and internal documents from Liberty Global and Telefónica indicate that both Parties, prior to agreeing the Proposed Merger, were exploring alternative strategic options in order to develop their respective businesses. These included potential alternative combinations, acquisitions or other M&A activity. However, the evidence indicates that these were not sufficiently certain to form part of any counterfactual.
30. We concluded that the 'prevailing conditions of competition', is the most likely counterfactual and, thus, the appropriate counterfactual to the Proposed Merger.

The relevant merger situation

31. We found that O2 and Virgin will cease to be distinct from each other and that the Parties together will enjoy common ownership and control of the proposed JV. Each Party will acquire at least material influence in (and cease to be distinct from) the business being contributed by the other.
32. Our view is therefore that arrangements are in progress or in contemplation which, if carried into effect, will result in two or more enterprises ceasing to be distinct and that the first limb of the RMS test is met.
33. We are satisfied that the combined UK turnover of the businesses that the Parties are transferring to the proposed JV exceeds £70 million and that the turnover test is satisfied. We also found that the Parties have overlapping activities in the UK, notably in respect of retail mobile services and that, in 2019, the Parties' combined share of the supply of these was in excess of 25%, with an increment.
34. We, therefore, found that the Proposed Merger, if carried into effect, will result in the creation of an RMS.

35. As a result, we considered whether the creation of that situation may be expected to result in an SLC within any market or markets in the UK for goods or services.

Introduction to the competitive assessment

36. Our investigation focussed on two vertical theories of harm. Vertical effects may arise when a merger involves firms at different levels of the supply chain, for example, a merger between an upstream supplier and a downstream customer or a downstream competitor of the supplier's customers.
37. Our assessment of both of these theories of harm was framed by reference to the following three questions. To reach an SLC finding, all three must be answered in the affirmative.
- (a) Ability: would the Merged Entity have the ability to harm rivals, through refusing to supply them, increasing prices or decreasing quality?
 - (b) Incentive: would it find it profitable to do so?
 - (c) Effect: would the effect of such action by the Merged Entity be sufficient to reduce competition to the extent that it gives rise to an SLC?
38. There are some horizontal overlaps between the Parties: in particular, the supply of retail mobile services to customers by O2 and Virgin. We noted in our Issues Statement that Virgin Mobile has a low and declining market share at retail level and that the Parties are not close competitors in retail mobile. We have not received submissions or evidence to contradict this initial view.
39. In addition, the Proposed Merger would create a horizontal overlap between the Parties' activities in supplying certain services to business customers, including fixed broadband, fixed voice services, business connectivity, internet hosting and certain IT services. We set out in our Issues Statement an initial view that the Proposed Merger would result in small increments and that the Parties do not compete closely in each of these areas. We have not received submissions or evidence to contradict this initial view.

Wholesale leased lines

Background

40. Virgin supplies wholesale leased lines to MNOs. MNOs use these leased lines as mobile backhaul, that is, to connect their radio base stations and their core network. Leased lines form part of the infrastructure required to provide

mobile telecommunications services and are therefore an important input for MNOs.

41. An MNO's mobile backhaul consists of three segments:
 - (a) To connect mobile base stations (that is, the antennas and electronic equipment that establish connections to individual mobile devices) to local exchanges, (the access layer);
 - (b) to connect the different local exchanges to aggregating nodes, (the aggregation layer);
 - (c) to connect aggregating nodes to core nodes, ('core connections').
42. Our investigation has not considered core connections as we understand from the Parties that all MNOs and fixed network operators operate their own core network.
43. We found that MNOs source mobile backhaul from multiple suppliers for both access and aggregation layers and use multiple different technologies and products.
44. MNOs told us that their choice of suppliers is determined by several factors, including the availability of their infrastructure, the type of leased line product they require and the cost and/or cost structure.
45. MNOs tend to agree long-term contracts for the supply of backhaul. Both Three and Vodafone have recent agreements with Virgin. Network sharing arrangements are also common: MBNL is a network sharing joint venture between BT and Three; Project Beacon is a network sharing arrangement between Vodafone and O2.
46. Openreach's position of incumbency and ubiquity has afforded it a large share of the supply of mobile backhaul in the UK. Ofcom imposes regulatory conditions on Openreach in terms of network access requirements, transparency requirements and some price caps on its provision of active leased lines.
47. Ofcom has also imposed a physical infrastructure access (PIA) remedy on Openreach which requires it, due to its strategic market position, to give other companies that wish to provide fibre networks access to its physical infrastructure.

Market definition

48. The focus of our analysis of the product market is on Virgin's provision of dark fibre for mobile backhaul. We therefore start our assessment of the product market using dark fibre for mobile backhaul as a focal product. This is the narrowest plausible candidate product market. We assessed whether there are demand- or supply-side constraints that suggest a broader market.
49. In terms of substitutability of active products for dark fibre in mobile backhaul, we have found that MNOs could, from a technical perspective, substitute active leased lines for dark fibre in order to meet their mobile backhaul requirements. But we note that some MNOs have a clear preference for dark fibre over active products.
50. We have assessed the cost difference between dark fibre and active leased lines. While inherently imprecise, our comparison indicates that the alternative active product from Openreach can, in some instances, be more expensive than dark fibre from Virgin.
51. Our competitive assessment focused on the extent to which active products are effective alternatives to dark fibre. The evidence suggested that users of dark fibre can switch to certain active products (and therefore that the market may be wider than dark fibre), but it does not enable us to define the precise boundaries of the market. Therefore, we left the precise definition of the relevant market open as it does not affect the outcome of our competitive assessment.
52. Regarding the substitutability of wholesale leased lines used for other purposes with dark fibre mobile backhaul, we considered supply-side substitutability and found that some providers submit that the products are interchangeable, while some MNOs state that this is not the case, due to their service-level requirements.
53. Our view is that, while there is evidence that MNOs' requirements can differ from those of other users of leased lines, it is unclear to what extent these differences represent an obstacle to supply-side substitutability.
54. Therefore, wholesale leased lines supplied to MNOs as mobile backhaul and wholesale leased lines used for other purposes are likely to be part of the same product market. While our competitive assessment therefore takes into account all suppliers of wholesale leased lines, we primarily consider those suppliers that currently supply mobile backhaul or have plans to start doing so.

55. We considered the distinction between the access and aggregation layers. We note that Ofcom considers these to be separate product markets and also that they are not substitutable from a demand-side perspective. While the Parties have submitted that these form part of a single product market, submissions from third parties suggest that they are separate.
56. Our view is that leased lines in the access layer and in the aggregation layer are not substitutable from a demand-side perspective or from a supply-side perspective.
57. In terms of geographic market, our view is that for both the access layer and the aggregation layer, this is likely to be local.

Competitive assessment

58. Virgin is the second largest supplier of leased lines in the UK. The Proposed Merger would combine Virgin with O2, an MNO and the largest supplier of retail mobile services in the UK. The theory of harm that we assessed is that as a result of the Proposed Merger, the Merged Entity could engage in an input foreclosure strategy to harm rival MNOs.
59. It could do this by, for example, increasing the price, decreasing the quality of its mobile backhaul offering (for example, by delaying dark fibre roll-out and/or by delaying repairs of connections) ('partial foreclosure'), or by withdrawal of supply ('total foreclosure').
60. We focused our assessment on the access layer because the extent to which the Proposed Merger could affect mobile backhaul costs in the aggregation layer is limited.

Ability

61. In assessing the Merged Entity's ability to engage in input foreclosure, we considered two main areas:
 - (a) Technical and cost differences between different types of leased lines and in particular the substitutability of Openreach's products for Virgin's dark fibre; and
 - (b) the cost of mobile backhaul as an input relative to MNOs' other costs.
62. In addition, we considered whether existing supply contracts between Virgin and MNOs and network sharing agreements between MNOs would provide protection from a potential foreclosure strategy.

63. Views on the benefits of dark fibre relative to active products are mixed: some third parties, including MNOs (and Ofcom) suggest that dark fibre has certain technical benefits as well as cost benefits, while the Parties and EE question some of these factors. We have found that some MNOs have a clear preference for dark fibre.
64. Overall, we found that, while dark fibre has some technical differences compared to active products, they are substitutable from a technical perspective and it is generally cost that underlies MNOs' preferences. Thus, not having access to dark fibre is unlikely to constitute a significant disadvantage for MNOs from a technical perspective.
65. Comparing the costs of dark fibre and active products is inherently imprecise but our comparison indicates that the alternative active product from Openreach can, in some instances, be more expensive than dark fibre from Virgin.
66. We found that mobile backhaul accounts for a relatively small proportion of the overall costs that MNOs incur, that mobile backhaul supplied by Virgin represents an even smaller proportion, and that the proportion is likely to remain small going forward. For this reason, we found that the cost difference between dark fibre and active products is not large enough for the Merged Entity to be able to significantly increase MNOs' costs.
67. Overall, we found that there are two overarching issues that limit the ability of the Merged Entity to harm rival MNOs through input foreclosure, namely:
 - (a) The ubiquitous presence of active leased lines supplied by Openreach and;
 - (b) The limited importance of MNOs' mobile backhaul costs in general and the limited exposure to Virgin specifically.
68. Virgin has contracts for mobile backhaul with Three, Vodafone and MBNL. O2 also has a network sharing agreement with Vodafone, Project Beacon.
69. We noted that, in practice, contracts between providers and their customers may not completely remove a provider's ability to harm its downstream rivals, given that certain rivals might not be covered by these contracts, the contracts might not prevent all ways in which the competitiveness of rivals could be harmed and the contracts may be of a limited duration. Moreover, over time contracts may be renegotiated or terminated, and firms may waive their rights to enforce any breaches in light of their overall bargaining position (reflecting the change in market structure brought about by a merger). In any event, contracts do not, of course, apply to potential market entrants.

70. However, we found that in this case the Merged Entity's contractual obligations and its network sharing arrangements do provide some protections for MNOs that may limit the Merged Entity's ability to engage in certain foreclosure strategies, although the contracts are not determinative.
71. Our finding is that the Merged Entity would not currently be able to engage in input foreclosure in the supply of mobile backhaul. We also found that, going forward, the Merged Entity's ability to engage in an input foreclosure strategy will be limited.

Incentive

72. In order to assess the Merged Entity's incentive to engage in foreclosure, we primarily relied on a quantitative analysis in the form of 'vertical arithmetic' to assess whether it would be profitable for the Merged Entity to withdraw supply of leased lines to MNOs altogether ('total foreclosure'); or to raise its prices ('partial foreclosure').
73. The vertical arithmetic analysis considers whether upstream losses for the Merged Entity from the loss of MNO revenue could be outweighed by downstream gains, if MNOs were forced by foreclosure to increase their retail prices and their customers switched to the Merged Entity.
74. We found that the increase in retail revenues, as a result of foreclosure, would not be sufficient to outweigh the loss of upstream revenues, so there would be no incentive for the Merged Entity to withdraw the supply of dark fibre.
75. Similarly, we found that there would be no incentive for the Merged Entity to engage in partial foreclosure by increasing the price of dark fibre as this would lead to upstream losses that would not be outweighed by downstream gains.

Effect

76. Given our views on the Merged Entity's ability and incentive to engage in an input foreclosure strategy in wholesale leased lines, we did not separately assess the effect that this would have on competition.

Wholesale mobile

Background

77. O2 supplies wholesale mobile access services to MVNOs, for whom these services are an essential input, enabling them to compete in the retail mobile market.

Market definition

78. For wholesale mobile, we assessed market definition in relation to:

- (a) The (upstream) supply of wholesale mobile services; and,
- (b) the (downstream) supply of retail fixed-mobile bundles.

Wholesale mobile services

79. The Parties and third parties agreed with our proposed candidate market of the wholesale supply by MNOs to MVNOs of network access and call origination on public mobile telephone networks.
80. We considered whether network access and call origination could be treated as separate product markets but found that MNOs and MVNOs see them as part of the same market.
81. We therefore consider that the relevant product market is the wholesale supply of network access services and call origination services on public telephone networks.
82. Noting in particular that MNOs are regulated by Ofcom to operate in the UK, we consider that the geographic market is the UK.
83. Our finding is that the appropriate market definition is the supply of wholesale mobile services in the UK.

Retail fixed-mobile bundles

84. We investigated the extent to which the supply of retail fixed-mobile bundles in the UK would be likely to form a single product market. We considered fixed-mobile bundles to comprise bundles supplied by the same provider but not necessarily under a single contract.
85. We found low take-up of fixed-mobile bundles in the UK relative to some European markets, and we found that customers can and would be likely to respond to a price increase or reduction in quality of the mobile aspect of a fixed-mobile bundle by unbundling and purchasing mobile services separately.
86. Our view is that there is not currently a separate market for fixed-mobile bundles. However, we considered the impact of future changes in the nature of demand for these services in our competitive assessment.

Competitive assessment

87. The Merged Entity will include the following:
- (a) O2, an MNO which supplies wholesale mobile services to four MVNOs: Sky Mobile, Lycamobile, Manx Telecom and Truphone.
 - (b) Virgin Mobile, an MVNO which is moving MNO host from EE to Vodafone.
88. Our assessment of the Proposed Merger focusses on the Merged Entity's ability and incentive to foreclose MVNOs. We have focussed particularly on the potential for input foreclosure of fixed-MVNOs because these are the segment of the market in which the Merged Entity's incentives may differ from O2's incentives prior to the Proposed Merger:
89. O2 currently supplies wholesale mobile services to fixed-MVNOs and it does not offer fixed-mobile bundles to retail customers to any significant extent, whereas post-merger, the Merged Entity will be able to offer fixed-mobile bundles and will therefore compete with fixed-MVNOs. These include Sky, which currently purchases wholesale mobile services from O2, and any other fixed-MVNOs that may wish to negotiate a wholesale mobile contract.
90. The Merged Entity would have the incentive to engage in a potential foreclosure strategy if a significant proportion of a fixed-MVNOs' customers switch their whole fixed-mobile bundle to the Merged Entity. If customers switch only the mobile component of their purchase, and retain their fixed services with their current provider, then the pre- and post-merger incentives of the Merged Entity would be broadly the same as the Merged Entity would only recapture mobile customers.
91. The Merged Entity could foreclose a fixed-MVNO by, for example, increasing the price or reducing the quality of its wholesale mobile services ('partial foreclosure'). Partial foreclosure could be directed towards existing fixed-MVNO customers within contract ('in-contract partial foreclosure') or towards potential fixed-MVNO customers by weaker bidding and offering worse terms at contract renewal or renegotiation.
92. The Merged Entity could also refuse to supply fixed-MVNOs altogether ('total foreclosure'), by not competing to supply them.

Ability

93. In assessing the Merged Entity's ability to harm rivals through foreclosure, we have considered the following areas.

- (a) We assessed the extent to which there would be competitive constraints from other MNOs post-Merger. This is because, if rival fixed-MVNOs can obtain competitive terms from rival MNOs, the Merged Entity will be unable to engage in a foreclosure strategy. We considered a wide range of evidence including submissions from MNOs and MVNOs, internal documents relating to recent fixed-MVNO tender processes and MNO strategies, as well as evidence relating to switching costs for MVNOs, and on the capacity and quality of MNOs' networks. We found that MNOs have a high level of participation in MVNO tenders and that all compete credibly in the supply of wholesale mobile services to MVNOs.
- (b) We considered the cost of wholesale mobile services relative to fixed-MVNOs' total costs. If the cost of wholesale mobile access accounts for only a small part of the total costs incurred, the Merged Entity will be less able to harm rival MVNOs' ability to compete for end customers in the retail market. We have found that the average cost of wholesale mobile services accounts for a low proportion of the average retail price of a fixed-mobile bundle. As such, the Merged Entity's ability to foreclose fixed-MVNOs would be limited.
- (c) We also assessed the ability of the Merged Entity to engage in partial foreclosure of Sky within its current contract with O2. As set out above, we generally do not consider that contracts can provide complete protection from foreclosure and this is also true in this case. However, having considered the details of the contract, we consider that the Merged Entity would have limited means to foreclose Sky within it.

94. We found that the Merged Entity will not have the ability to foreclose, partially or totally, fixed-MVNOs.

Incentive

95. To assess the Merged Entity's incentive to engage in a foreclosure strategy, we analysed the extent to which customers who buy fixed-mobile bundles would switch all of these services when faced with a reduction in quality or a price increase of the mobile aspect of the bundle.
96. The Parties told us that the Merged Entity will not have the incentive to foreclose Sky, or any other fixed-MVNOs, because it is not plausible that sufficient numbers of Sky's fixed customers would switch these services to the Merged Entity in response to a price increase or quality reduction in the mobile aspect of their fixed-mobile bundle in order to make this strategy profitable.

97. We considered the ease and likelihood of unbundling and found that customers of fixed-MVNOs can unbundle because they tend to purchase fixed and mobile services under separate contracts and can easily switch the mobile aspect of their bundle.
98. Furthermore, we noted customer preferences for the fixed services provided by a fixed-MVNO, and the fact that the choice of fixed services is seen as a household decision whilst choice of mobile services is an individual decision, that may lead to unbundling.
99. As such, we found that customers of fixed-MVNOs who experience a price increase or quality reduction in the mobile aspect of their fixed-mobile bundle are likely to retain their fixed services from the fixed-MVNO.
100. We considered whether the unbundling rate might change if take-up of fixed-mobile bundles increased, as expected by the Parties. The evidence indicates that the ease of unbundling is unlikely to significantly change in the foreseeable future. However, to the extent that providers introduce single contracts for fixed-mobile bundles or more compelling fixed-mobile propositions emerge, customers may be less likely to unbundle them.
101. However, our quantitative analysis suggests that foreclosure is not profitable even at very low levels of unbundling.
102. We also considered potential switching of Sky fixed-mobile customers to the Merged Entity. Estimates of this varied, but we concluded that diversion to the Merged Entity may be limited by the presence of other providers of fixed-mobile bundles and the fact that currently Virgin has a limited geographic footprint.
103. In relation to the future switching behaviour of customers, we found that the Merged Entity's incentive to foreclose in the future may increase with, for example, the expansion of Virgin's fixed network to cover a higher proportion of UK households, whilst other factors, such as the emergence of other providers of fixed-mobile bundles, may reduce its incentive.
104. We also considered, via a vertical arithmetic exercise, whether it would be profitable for the Merged Entity to engage in a partial or total foreclosure strategy at contract renewal: that is, whether the upstream losses that it would incur in wholesale revenues could be outweighed by downstream gains in the retail market if MVNO customers switched to its services.
105. Even taking some uncertainties of the parameters into account, a range of scenarios showed that neither total foreclosure nor partial foreclosure of Sky would be profitable for the Merged Entry.

106. We analysed the incentive of the Merged Entity to engage in partial foreclosure of Sky within its current contract. We considered that an in-contract foreclosure strategy may be more costly and provide less benefit to the Merged Entity, and we therefore found that the Merged Entity would not find it profitable to foreclose Sky in-contract.
107. We found that the Merged Entity will have no incentive to foreclose fixed-MVNOs.

Effect

108. Given our views on the Merged Entity's ability and incentive to engage in a foreclosure strategy, we have not separately assessed the effect that a foreclosure strategy of the Merged Entity would have on competition.

Our conclusion

109. We found that the Proposed Merger may not be expected to result in any SLC within any market or markets in the United Kingdom.

Decision

110. We found that the Proposed Merger may not be expected to result in an SLC within any market or markets in the United Kingdom.

Findings

1. The reference

- 1.1 On 11 December 2020, the Competition and Markets Authority (CMA), in exercise of its duty under section 33(1) of the Enterprise Act 2002 (the Act), referred the anticipated joint venture (JV) between Liberty Global plc (Liberty Global) and Telefónica S.A. (Telefónica) to merge their operating businesses in the United Kingdom (UK), that is Virgin Media Inc. (Virgin) and O2 Holdings Limited (O2) respectively (the Proposed Merger) for further investigation and report by a group of CMA panel members (the Inquiry Group). The CMA's Phase 1 investigation followed the European Commission's decision to refer the case to the United Kingdom under Article 9(3)(b) of the EC Merger Regulation. At Phase 1, following a request by the Parties for a fast track reference of the Proposed Merger to an in-depth Phase 2 investigation, the CMA concluded there was a realistic prospect that the merger would result in a SLC and it was appropriate to proceed with a fast track reference to Phase 2.
- 1.2 In exercise of its duty under section 36(1) of the Act, the CMA must decide:
- (a) Whether arrangements are in progress or in contemplation which, if carried into effect, will result in the creation of a relevant merger situation; and
 - (b) if so, whether the creation of that relevant merger situation may be expected to result in a substantial lessening of competition (SLC) within any market or markets in the UK for goods or services.
- 1.3 We are required to prepare and publish a final report by 27 May 2021.
- 1.4 Our terms of reference, along with information on the conduct of the inquiry, are set out in Appendix A. In our Issues Statement of 21 January 2021, we said that we would focus our investigation on the vertical relationships between the Parties where the CMA's phase 1 decision found that there may be potential for a reduction in competition.¹
- 1.5 This document, together with its appendices, constitutes the Inquiry Group's findings published and notified to Liberty Global and Telefónica (together, 'the

¹ CMA Phase 1 decision.

Parties') in line with the CMA's rules of procedure.² Further information can be found on our webpage.³

2. Industry background

Introduction

2.1 This section sets out relevant information on the telecommunications sector, in which the merging parties operate in the UK. The main areas of operation are:

(a) Fixed communications: services including voice calls, broadband and pay-TV provision. Also, the supply of wholesale leased lines to mobile network operators (MNOs) which is a focus of this inquiry; and

(b) mobile communications: services including voice, messaging and mobile internet. Also, the supply of wholesale mobile services to mobile virtual network operators (MVNOs) which is a focus of this inquiry.

Fixed telecoms

2.2 Fixed telecoms provide a connection to an end-user for voice calls and internet access.

Recent industry developments

2.3 Significant industry developments include those summarised in Table 2-1 below:

² [Rules of procedure for merger, market and special reference groups \(CMA17\)](#), paragraphs 11.1–11.7.

³ See CMA inquiry webpage: [Liberty Global plc/Telefónica S.A. merger inquiry](#).

Table 2-1: Significant industry developments in fixed telecoms

<i>Year</i>	<i>Development</i>
2002	BT launched its broadband product. (See BT website)
2006/7	Virgin merged with NTL:Telewest and rebranded to Virgin Media. (See Virgin Media press release, 28 February 2007)
2008	Openreach announced £1.5 billion superfast broadband roll-out. (See Openreach website) Virgin Media announced network upgrade to 50 Mbit/s. (See Virgin Media press release, 15 December 2008 , GlobeNewswire)
2011	CityFibre established. (See Cityfibre website news, 9 March 2011)
2012	Vodafone purchased Cable & Wireless Worldwide plc. (See Vodafone press release, 23 April 2012)
2013	Sky purchased Telefónica's (O2 and BE brand) consumer fixed telephony and consumer fixed broadband business (now retailed as Sky broadband). (See O2 press release, 1 March 2013) Virgin Media purchased by Liberty Global. (See Liberty Global press release, 5 February 2013)
2016	BT/EE merger completed following CMA merger inquiry. (See BT website)
2018	CityFibre project launched to connect up to 5 million homes and businesses to their 1Gbit/s fibre network (subsequently increased in 2020 to a target of 8 million homes and businesses). (See Cityfibre website)

Source: CMA analysis.

Recent industry developments at the retail level

2.4 Ofcom highlighted to us some key trends in the fixed telecoms sector at retail level:

- (a) Data usage over fixed connections continues to grow. Demand for data on the UK's fixed broadband networks continues to increase, with average monthly data usage increasing almost 80% in two years (2018-2020). It was 429 GB per connection in 2020, up from 315 GB in 2019 (itself up from 240 GB in 2018).⁴
- (b) Consumers are using broadband for data-heavy activities such as video streaming. In the third quarter of 2020, 60% of UK households were subscribers to video-on-demand services, with 17 million homes subscribing to at least one of Netflix, Amazon Prime Video, Disney+ or NOW TV.⁵

⁴ Ofcom Connected Nations 2020: UK report, page 26.

⁵ BARB Establishment Survey Q3 2020.

- (c) Consumers are continuing to upgrade to faster broadband speeds, utilising the rollout of next generation and gigabit infrastructure. The average achieved speed increased from around 54Mbit/s to 64Mbit/s in the year to November 2019.⁶ This trend is expected to continue, according to Ofcom forecasts.
- (d) Consumers' demand for mobile data has grown. This trend is expected to continue. Reflecting this, MNO's data transfer requirements (including mobile backhaul) are moving from 1 Gbit/s to 10 Gbit/s services.
- (e) Fixed call volumes have been falling consistently during the period 2013 to 2019.⁷

Fixed network wholesale services

2.5 In addition to fixed telecom networks being used to provide a variety of retail products, including fixed voice, broadband and leased lines (dedicated connections for business customers), they can also be used to provide wholesale products, including mobile backhaul, wholesale leased lines and local loop unbundling (LLU).⁸

2.6 Ofcom, in its 2020 Wholesale Fixed Telecoms Market Review (WFTMR) report, provides a stylised overview of the different connections within a fixed telecoms network that can be used to provide retail and wholesale products.⁹ Ofcom's diagram is reproduced in Figure 2-1 below and explains:¹⁰

- (a) Access connections are typically between end-user sites and an access aggregation node or, in some cases, between customer sites;
- (b) backhaul connections are between access and backhaul nodes, between backhaul nodes (not shown), and from a backhaul aggregation node to a core node;
- (c) core connections are between core nodes; and
- (d) leased lines may also be used by mobile network operators (MNOs) to connect their base stations, using access and backhaul connections, to

⁶ [Ofcom Communications Market Report 2020 summary](#), page 2.

⁷ [Ofcom UK Home Broadband Performance: measurement period November 2019](#), page 5

⁸ [Local loop unbundling \(LLU\)](#) is a remedy imposed by Ofcom on BT within the wholesale local access market and has been key to the development of the UK fixed voice and broadband markets.

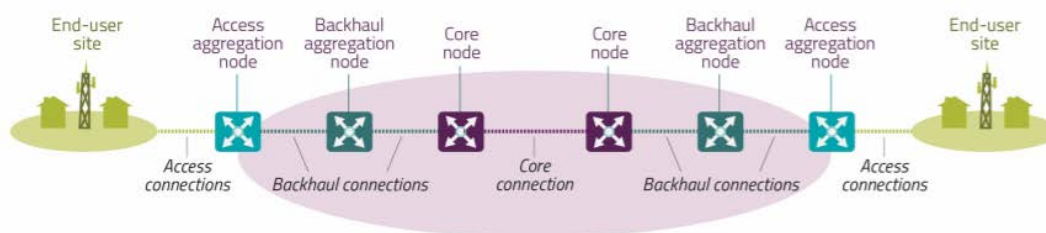
⁹ Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets, Volume 2: market analysis, SMP findings, and remedies for the [Business Connectivity Market Review \(BCMR\)](#), Ofcom 28 June 2019.

¹⁰ Ofcom January 2020, [WFTMR Consultation](#): Annexes, paragraph A6.32.

their core network nodes. The term ‘mobile backhaul’ is often used to refer to the combination of access and backhaul connections.¹¹

Figure 2-1: Stylised access, backhaul and core connections

Figure A6.7: Access, backhaul, and core connectivity



Source: Ofcom January 2020, WFTMR Consultation: Annexes, Figure A6.7

Mobile backhaul

- 2.7 Mobile backhaul is the network connectivity that connects an MNO’s radio base station to its core network nodes. This is provided in the form of fibre leased lines.
- 2.8 MNOs can self-supply their own backhaul or can source wholesale leased lines from other fixed providers, including Openreach, Virgin and CityFibre.
- 2.9 Mobile backhaul can also be provided by a Mobile Virtual Network Aggregator (MVNA). An MVNA does not require its own mobile spectrum or radio network infrastructure. It purchases wholesale access from an MNO and typically connects smaller MVNOs to the MNO (instead of a numerous smaller MVNOs connecting directly to the MNO). Examples of MVNAs in the UK include Transatel, AQA, TATA Communications, Cubic Telecom and X-Mobility.
- 2.10 Mobile backhaul can be provided using ‘active’ leased lines, or ‘passive’ leased lines:
 - (a) Active leased lines are optical access and Ethernet products where the physical line is supplied with electronic equipment.¹² The wholesale provider installs and uses its own electronic equipment at the ends of the leased line and configures this to meet the needs of the customer.
 - (b) Passive leased lines are also commonly referred to as ‘dark fibre’. This involves the wholesale provider supplying unlit fibre to a customer which

¹¹ Ofcom January 2020, WFTMR Consultation: Annexes, paragraph A6.40.

¹² Optical access refers to suppliers leasing, for fibre leased lines, the line together with electronic equipment that gives access to part of the optical spectrum of the fibre. Ethernet access refers to when suppliers lease the line with electronic equipment that supports a transmission protocol (predominantly, through Ethernet access).

then installs and manages its own electronic equipment at both ends of the leased line.

Fixed network providers

2.11 There are two main fixed networks providing services to residential and business customers across large parts of the UK: Openreach and Virgin. These networks also provide wholesale leased lines services, including mobile backhaul.

BT/Openreach

2.12 BT's fixed network is the largest in the UK and its network coverage is ubiquitous.¹³ It can supply fixed infrastructure, such as leased lines, to almost anywhere in the UK [✂].

2.13 Openreach is a wholly owned subsidiary of BT but is functionally and legally separated from the rest of the BT group. Openreach is required, by Ofcom regulation, to offer wholesale services to other fixed telecom providers that do not have the same level of network coverage in the UK. BT also provides wholesale leased line services, including to MNOs, on a commercial basis through its BT Enterprise business (which use inputs from Openreach).

Virgin

2.14 Virgin has the second largest fixed network in the UK covering over half of all households. In 2020 Virgin's network passed approximately 16.3 million homes in the UK and provided fixed services to approximately 6 million customers.¹⁴

2.15 Virgin Media provides mobile backhaul to MNOs in the form of either active leased lines and/or passive leased lines.

Other fixed providers

2.16 CityFibre considers itself to be 'the UK's third national digital infrastructure platform'.¹⁵ It offers full fibre broadband to residential and business customers and a range of wholesale services including active leased lines and passive leased lines and the provision of mobile backhaul to MNOs.

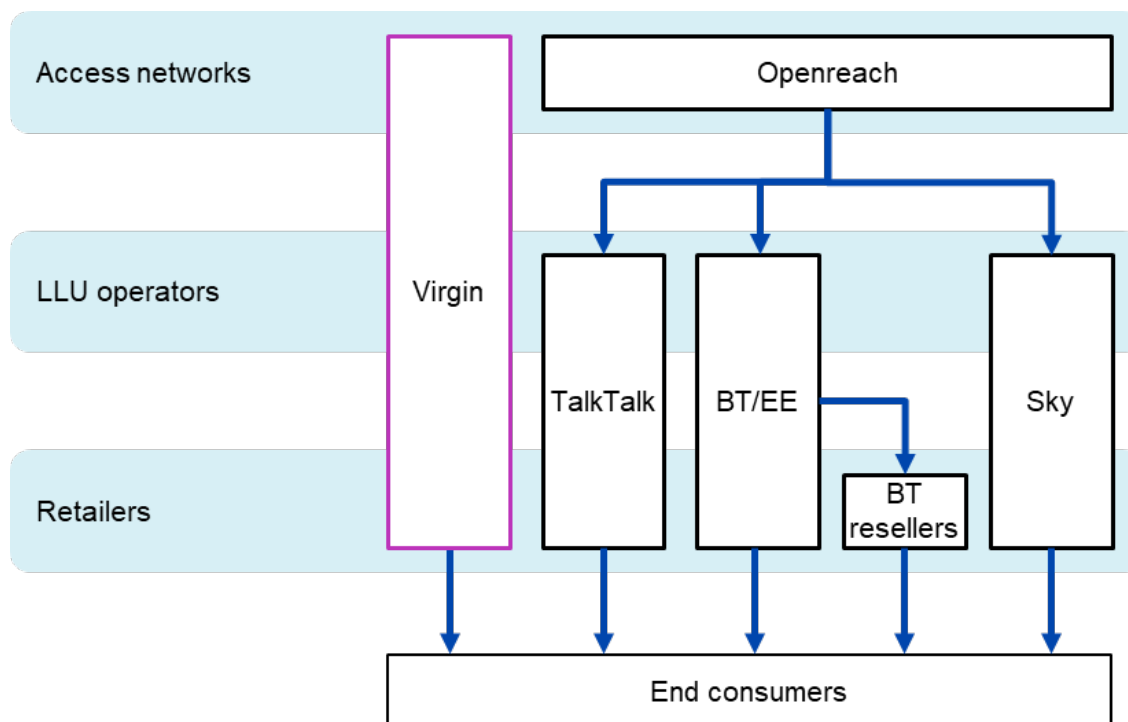
¹³ With the exception of the Hull area, where KCOM is the main provider of physical network.

¹⁴ [Virgin Media Fixed Income Q4 2020 release](#)

¹⁵ [CityFibre website](#), About us.

- 2.17 There are a number of smaller fixed providers which supply mobile backhaul, including Neos Networks (previously known as SSE Enterprise Telecoms), Colt, Zayo and euNetworks. We set out each of these suppliers in Appendix C.
- 2.18 Figure 2-2 shows a simplified and stylised configuration of the fixed network infrastructure for the main retail providers.

Figure 2-2: Stylised fixed network diagram including voice and broadband



Source: CMA.

Regulation of fixed telecoms

- 2.19 Communications networks and services are regulated in the UK by Ofcom.
- 2.20 Ofcom’s regulation of fixed telecoms markets initially focused on promoting competition at the retail level through enabling regulated access to Openreach’s ubiquitous network. After Ofcom’s 2016 Strategic Review of Digital Communications¹⁶ and recognising the importance of reliable, fast and widely available connectivity, it subsequently focused on promoting investment, and competition, in fibre networks. Virgin is not subject to network regulation equivalent to that imposed on Openreach.

¹⁶ Ofcom 2016 Digital Communications Review – Initial Conclusions.

Mobile telecoms

Recent industry developments

- 2.21 Mobile networks provide a common set of standards which enable services to be supported over a wide geographic area. Technologies have been developed in 'generations', for example 4G or 5G, to ensure a common baseline for interoperability between the network and devices. The common technical standards for each generation of technology are agreed by the International Telecommunication Union (ITU), whose members are comprised of the public sector representatives of 193 countries and private sector organisations.¹⁷
- 2.22 Significant industry developments include those described in Table 2-2 below:

¹⁷ ITU currently has a membership of 193 countries and over 700 private-sector entities and academic institutions. ITU is headquartered in Geneva, Switzerland, and has twelve regional and area offices around the world, ITU website.

Table 2-2: Significant industry developments in mobile telecoms

<i>Year</i>	<i>Development</i>
1999	Virgin Mobile launched (see Virgin website: Timeline)
2001/2	BT Cellnet demerged from BT, subsequently renamed O2 plc (see BT website, Our history, page 4)
2003	Three (using 3G technology) launched in UK (see Three website, About us)
2006	O2 purchased by Telefónica (see Telefónica Annual Report, 2006)
2010	Orange and T-Mobile merged to form EE (see EE Limited, financial statements for the year ended 31 December 2010)
2012	O2 and Vodafone created a new joint venture company 'Cornerstone' which consolidated their basic mobile infrastructure (see press release, 7 June 2012) EE 4G launched (see EE website, Newsroom, 2 October 2012)
2013	800MHz and 2.6GHz (4G) spectrum auction completed (see Ofcom press release: Winners of the 4G mobile auction, 20 February 2013) O2 launched 4G services (see O2 website, News: O2's 4G network to switch on from 29th August, 1 August 2013) Vodafone launched 4G services (see Vodafone website: Vodafone launches 4G in London, 29 August 2013)
2016	BT/EE merger completed following CMA merger inquiry (see BT Annual Report 2016) Three/O2 merger blocked by European Commission (see European Commission press release, 11 May 2016)
2019	EE, Vodafone, O2, Three and BT launch 5G services (see EE launching 5G, Vodafone - One year on from 5G launch, O2 launched 5G in London, Three 5G Coverage and BT launches 5G)
2020	Sky mobile and Tesco Mobile 5G services launched (see Sky Mobile 5G Coverage and Tesco Mobile 5G Coverage)

Source: CMA analysis.

Recent industry developments at retail level

2.23 Ofcom highlighted to us some key industry trends in the mobile telecoms sector.¹⁸

- (a) Increasing end-user demand for mobile data, which increased by 22% (to 3.6GB per month) between 2018 and 2019. By comparison, in 2013, the average monthly data volume usage was 0.5GB per month.¹⁹

¹⁸ More information can be found in Appendix B.

¹⁹ Ofcom [Communications Market Report 2020 – Interactive data](#), slide 16, Telecoms industry: mobile (Data/Messages, Average monthly data volumes by mobile data user (GB)).

- (b) Mobile retail revenues have fallen in real terms since 2012 with decreasing numbers of new customers and falling prices. Total UK retail mobile revenue decreased from £14.04 billion in 2018 to £13.43 billion in 2019.²⁰ The number of active mobile connections increased by 2.3% from 2018 to 2019.
- (c) Consumers are keeping their mobile devices for longer. Contracts which include a mobile device, accounted for less than half of all new pay-monthly contracts in 2019.
- (d) Pricing for mobile services has become more ‘commoditised’. There has been a shift toward SIM-only plans and a higher proportion of revenues derived from fixed fees.
- (e) Voice services and SMS text messages are increasingly being substituted by consumers with online services (such as WhatsApp and FaceTime), facilitated, but not provided, by mobile operators. The nature of this provision is often described as Over The Top (OTT).

Mobile network operators (MNOs)

- 2.24 There are four MNOs in the UK market: O2, EE, Vodafone and Three. These supply around 90% of the retail mobile market in the UK, with the remainder being supplied by MVNOs.²¹ MNOs are licenced and regulated by Ofcom.
- 2.25 Telefónica, through its subsidiary O2, is active in retail mobile in the UK as one of four MNOs. We describe Telefónica and O2 in Chapter 3, from paragraph 3.23.

MNO network coverage and topology

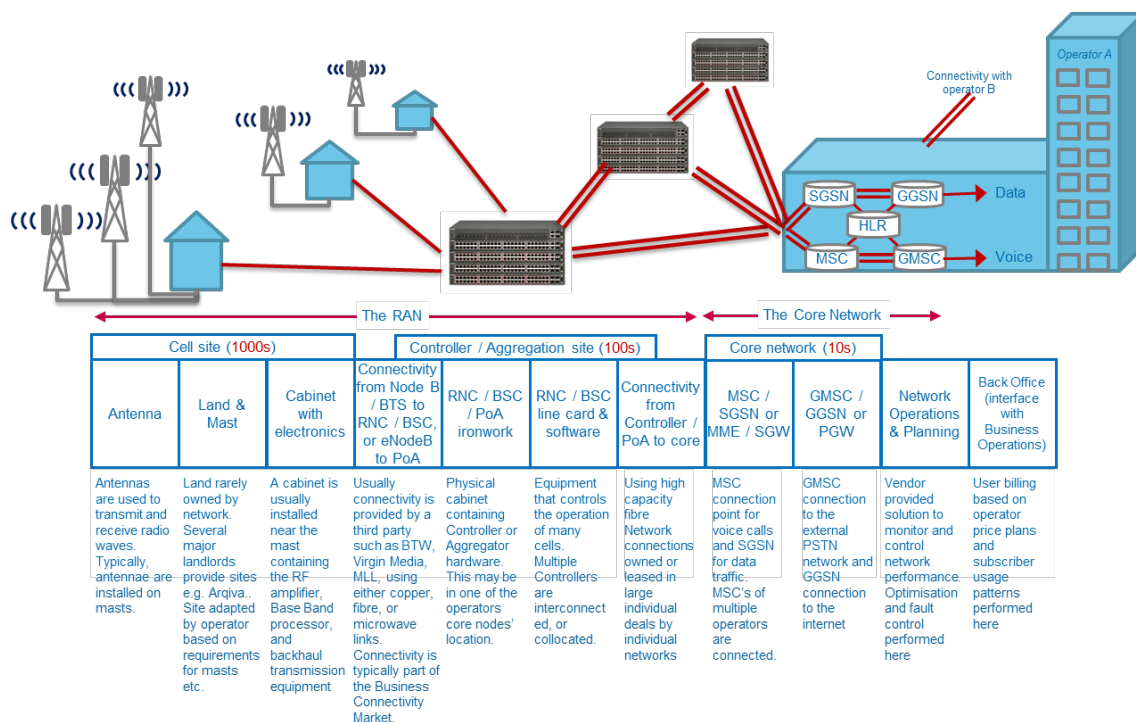
- 2.26 Ofcom reports²² that MNOs provide a high level of 4G coverage outside of premises, with coverage from each mobile network covering between 98-99% of premises. Indoor 4G coverage ranges between 90% and 95% of all premises. However, coverage levels remain lower in rural areas, and individual operator coverage ranges between 79% and 85% of all UK geography.
- 2.27 The topology (or structure) of a mobile network is show below in Figure 2-3.

²⁰ Ofcom [Communications Market Report 2020 – Interactive data](#), slide 14, Telecoms industry: overview (Revenue, Summary of UK telecoms revenues (£bn)).

²¹ Refer to Chapter 9, paragraph 9.36.

²² [Ofcom Connected Nations 2020](#), page 31.

Figure 2-3: Stylised network diagram of mobile network – radio sites, backhaul and core



Source: CMA.

MVNOs

- 2.28 Mobile Virtual Network Operators (MVNOs) are hosted on an MNO's network. They provide retail services to customers using commercially negotiated wholesale services provided by MNOs.
- 2.29 Around 150 MVNOs have launched in the UK in the last ten years, including Sky Mobile, iD Mobile, Virgin Mobile and Lycamobile.

Light and full MVNOs

- 2.30 A light MVNO delegates operational management of their network to the MNO, enabling the MVNO to focus on commercial activities, such as customer relations, sales and marketing. Asda mobile, iD Mobile and Lebara are examples of light MVNOs operating in the UK.
- 2.31 A full MVNO takes a more active role in managing the network infrastructure and is only dependent on the MNO for the network of antennas that deliver connectivity. Virgin Mobile and Sky Mobile are examples of full MVNOs.
- 2.32 A further distinction between full and light MVNOs may be their value proposition and target customer audience. A light MVNO may focus on leveraging its existing customer base, such as Asda, or on a particular

customer demographic, such as Lebara. In contrast, a full MVNO is likely to have a much wider target customer audience.

Development of 5G technology and services

- 2.33 5G is the new generation of wireless technology. It is expected to deliver faster and more reliable mobile broadband services (which provide internet access while you're on the move) to consumers and businesses, and to enable innovative new services in multiple industry sectors.
- 2.34 Ofcom concluded its spectrum auction of additional 5G frequencies (3.6-3.8 GHz) in April 2021.²³ Ofcom stated that the auction would increase the total amount of spectrum available for mobile in the UK by nearly a fifth (18%) bringing better and faster services to consumers and business and supporting the rollout of 5G.²⁴
- 2.35 All UK MNOs have launched 5G services. 5G services are currently available at circa 3,000 cell sites in the UK, of which most are located in more densely populated towns and cities. Of all 5G sites that have been deployed, 87% are in England, 7% in Scotland and 3% in both Wales and Northern Ireland. This split broadly reflects the national distribution of all mobile traffic across the UK.²⁵
- (a) EE launched its 5G service in May 2019 with c.1,500 sites covering c.15% of the UK's population. By January 2021, EE had launched 5G into c.112 cities and large towns.²⁶
 - (b) Vodafone launched its 5G service in the UK in July 2019 with an unlimited data speed tiering approach,²⁷ content options and no price premium.
 - (c) Three launched its 5G service in the UK in August 2019 with 'claims of building the fastest 5G network and no price premium'.
 - (d) O2 launched its 5G service in October 2019. O2 has plans to 'maintain a competitive network through investment and optimisation'.
- 2.36 5G is faster than previous generations of wireless technology, but it also offers greater capacity, meaning thousands of devices in a small area can be connected at the same time. As such, while 5G will improve how customers

²³ [Award of 700 MHz and 3.6-3.8 GHz spectrum by auction - Ofcom](#)

²⁴ [Ofcom press release, 3 August 2020.](#)

²⁵ [Ofcom Connected Nations 2020: UK report](#), page 5.

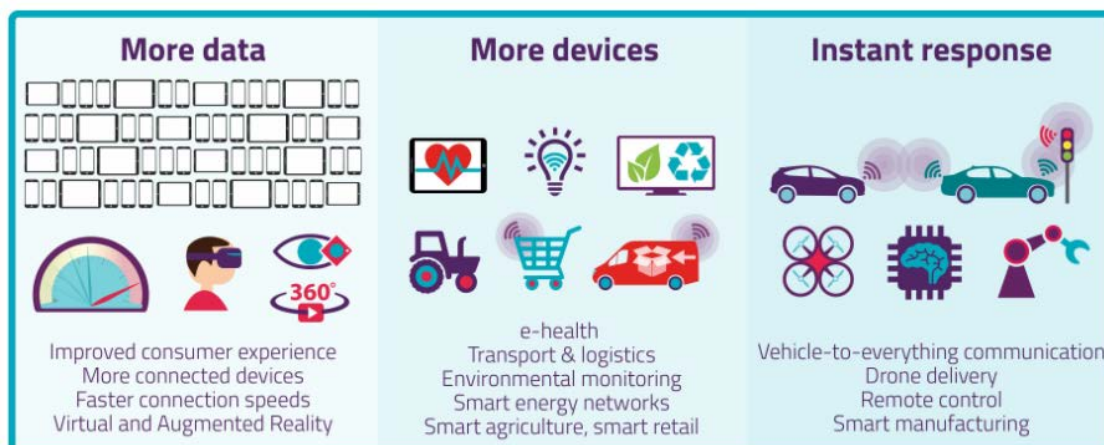
²⁶ [EE website: 5G in the UK | When Is 5G Coming To My Area? | EE.](#)

²⁷ Under this approach Vodafone will offers unlimited data at different download speeds: 2Mbit/s, 10Mbit and the fastest download speed available.

use smartphones or games consoles, it also provides potential for the connection of multiple devices and systems (such as the 'Internet of Things').

- 2.37 5G is expected to enable innovative, new services and technology for industry sectors, including manufacturing, transport, immersive technologies and healthcare.

Figure 2-4: How 5G could be used



Source: [What is 5G? - Ofcom](#)

Fixed-mobile convergence

- 2.38 The Department for Digital, Culture, Media and Sport, in its Future Telecoms Infrastructure Review report, stated that over the longer term, the government expected to see a more converged telecoms sector due to the technology synergies between 5G and fixed networks which were likely to create strategic advantages for FMC providers. It said these were likely to derive from economies of scope and higher utilisation of network capacity, and from the ability to bundle services and offer new products such as fixed wireless access.
- 2.39 Fixed-mobile convergence (FMC) takes a number of forms and each has different implications for the development of competition in communications markets. We consider that there may be three forms of convergence:
- (i) Service convergence – when services which have previously been seen as distinct are increasingly seen as interchangeable, for example voice calls on mobile and/or internet voice services may be substitutes for fixed calls. We note that whether or not services are in fact interchangeable will depend on a number of factors, including characteristics, price, and the way in which customers use a service;

- (ii) network convergence – when networks which were distinct, increasingly adopt common characteristics (and may start to share parts of the network infrastructure), for example Wi-Fi at home which is used for mobile data consumption;
 - (iii) retail/content bundling – where different services that were sold separately to consumers are sold together as part of a retail bundle, for example fixed services and mobile services. In this context a converged retail offer may provide the end-user with a single bill.
- 2.40 Telecoms providers are beginning to bundle, as single packages, services including mobile, fixed voice, broadband and pay-TV for end users.
- 2.41 Ofcom consumer survey data indicates that whilst it is common for customers to purchase fixed voice, broadband and Pay TV services from the same provider, it is less common for mobile services to be purchased as part of a bundle or package of services offered by a broadband provider. In 2020, 14% of fixed broadband subscribers surveyed by Ofcom had purchased their mobile and broadband products from the same provider. We set out more information on this in Appendix N.
- 2.42 In terms of the types of bundles that consumers may buy, industry terminology refers to:
- (a) Dual play which is any combination of two of the main services offered by a communications provider, comprising of mobile, fixed voice, broadband and pay-TV services;
 - (b) triple play which is any combination of three of the main services listed above in (a);
 - (c) quad play which is all of the four main services listed in (a); and
 - (d) fixed bundles which are any combination of the main services, excluding mobile services.

Providers' fixed-mobile bundles

- 2.43 Table 2-3 shows the main providers of fixed-mobile bundles at the retail level and the different combinations of products each offers.

Table 2-3: Types of fixed-mobile bundles offered by each provider²⁸

	<i>Virgin</i>	<i>BT/EE</i>	<i>Sky</i>	<i>Vodafone</i>	<i>Utility Warehouse</i>	<i>TalkTalk</i>
Dual – Mobile + Broadband	✓	✗	✗	✗	✓	✗
Dual – Mobile + Fixed Voice	✗	✓	✗	✗	✓	✗
Dual – Mobile + Pay-TV	✗	✗	✓	✗	✗	✗
Triple – Mobile, Broadband, Fixed Voice	✓	✓	✓	✓	✓	✓
Triple – Mobile, Pay-TV, Fixed Voice	✗	✗	✗	✗	✗	✗
Triple – Mobile, Pay-TV, Broadband	✓	✗	✗	✗	✗	✗
Quad – Mobile, Pay-TV, Fixed Voice, Broadband	✓	✓	✓	✗	✗	✓

Source: CMA analysis.

2.44 Based on the evidence (shown in Table 2-3) of the provider’s product offerings, we find that some product combinations are more common than others:

- (a) It is rare for providers to supply fixed voice and broadband separately;
- (b) no providers are currently offering bundled services which exclude broadband (with mobile and pay TV, or mobile, pay-TV and fixed voice);²⁹
- (c) all six providers currently offer mobile with broadband and fixed voice.

2.45 We have included a summary of fixed-mobile bundles currently available from three main providers of fixed-mobile bundles, BT, Virgin and Sky below:

- (a) BT offers bundles which can include landline phone, a variety of TV options and broadband. In addition, BT Halo offers a hybrid connection which connects customers to EE’s mobile network if the broadband service is unavailable.³⁰
- (b) Virgin Oomph bundles combine landline phone, TV, broadband and mobile. There are four Oomph packages available (Big, Bigger, Bigger + Sports and Ultimate) which can include BT Sport and Sky Sports, or customers are able to tailor their bundle to meet their needs.³¹
- (c) Sky offers TV and broadband bundles³², which include Netflix and Sky Pay as You Talk. Sky also offers customers the ability to customise their

²⁸ Certain providers may supply legacy customers with combinations of products marked with an ‘X,’ but these providers no longer sell these combinations to new customers. TalkTalk is also included as it previously sold mobile along with its broadband and pay-TV offerings however now it only supplies mobile through a reseller arrangement with O2. Three is not included because it does not provide a fixed-mobile bundle.

²⁹ There are some legacy customers with this combination, for example, around [X] Sky customers. Sky offers pay TV and mobile, without broadband/fixed voice.

³⁰ [BT \(retail\) website, Halo3 product, data extracted 26 March 2021.](#)

³¹ [Virgin \(retail\) website, oomph product, data extracted 26 March 2021.](#)

³² Sky offers all of its services to customers either: (i) individually; or (ii) in packages but under separate contracts for each service (which are not closely related or linked). For the purposes of this report, the CMA refers to “packages” offered by Sky as “bundles”.

package to add on extras such as Sky Sports, BT Sport, HD and Disney+.³³

3. The Parties and the transaction

The Parties

Liberty Global – Virgin

Background

- 3.1 Liberty Global plc is an international video, broadband and communications company. It has consolidated operations in the UK, Ireland, Belgium, Switzerland, Poland and Slovakia and owns 50% of the VodafoneZiggo joint venture in The Netherlands. Liberty Global is a publicly traded company, listed on the NASDAQ Global Select Market in the US.
- 3.2 Liberty Global's largest shareholder is John Malone, the Chairman of Liberty Global's Board, who as of 7 February 2020 was the beneficial owner of ordinary shares of Liberty Global representing approximately 30.5% of its aggregate voting power. The remainder of its shares are held by institutional and retail investors.³⁴
- 3.3 In the UK, Liberty Global owns Virgin which provides retail fixed telecommunications services (specifically fixed voice and fixed broadband), retail pay TV services and retail business to business (B2B) wholesale fixed telecommunications services. Virgin also provides retail mobile services, as a mobile virtual network operator (MVNO), through the Virgin Mobile brand.
- 3.4 At end December 2020, Virgin had approximately 12,000 employees in the UK.
- 3.5 At end December 2020, Virgin owned and operated networks that passed 16.3 million homes in the UK. It provided services to approximately 6 million fixed customers in the UK and had 3.5 million mobile customers. It said that 24% of its customers were 'fixed-mobile'; 20% were 'single play', 22% 'double play' and 57% triple-play.³⁵

³³ [Sky \(retail\) website, Sky Deals, data extracted 26 March 2021.](#)

³⁴ [NASDAQ website listing for Liberty Global plc.](#)

³⁵ [Virgin Media Fixed Income Q4 2020 release.](#)

Financial information

- 3.6 The turnover of Liberty Global for the financial year 2019 was approximately £10,450 million worldwide³⁶ and £4,730 million in the UK.
- 3.7 CMA analysis shows that Liberty Global had a debt to equity ratio of 1.10 in 2020 compared to an industry median³⁷ of 0.81.³⁸ Similarly, Liberty Global's long term debt as a percentage of its total capital of 49% was higher than the industry median of 36.5%.^{39,40}
- 3.8 Table 3-1 below shows Virgin's reported revenue in the UK for the period 2017 to 2020 inclusive and its forecast for 2021.

Table 3-1: Virgin: UK revenue

	2017	2018	2019	2020	2021F
Revenue (£m)	4,599	4,758	4,766	[REDACTED]	[REDACTED]
Year-on-year growth rate		3.5%	0.2%	[REDACTED]%	[REDACTED]%

Source: Liberty Global

- 3.9 Virgin's UK revenue increased by 3.5% between 2018 and 2017; however revenues were largely flat (increased by 0.2%) between 2018 and 2019 and decreased by [REDACTED]% between 2019 and 2020.
- 3.10 Virgin forecast UK revenues of £[REDACTED] in 2020 and £[REDACTED] in 2021, an increase of [REDACTED]% on 2020.
- 3.11 Virgin's financial performance in the period 2018 to 2020 inclusive, split by business area (Fixed Consumer, business to business (B2B), which includes its mobile backhaul business, and Consumer Mobile), is summarised at Table 3-2 below:

³⁶ Turnover figures converted from USD to GBP by Liberty Global based on [Bank of England](#) Spot exchange rate for 31 December 2020.

³⁷ Refinitiv peer group constituents as at 10/05/21: BT Group PLC, Swisscom AG, Vodafone Group PLC, Deutsche Telekom AG, Proximus NV, Koninklijke KPN NV, Telekom Austria AG..

³⁸ Refinitiv data extracted 10/05/21, Liberty Global PLC, Ratios – Key Metrics.

³⁹ Refinitiv data extracted 10/05/21 Liberty Global PLC, Annual Ratios – Key Metrics.

⁴⁰ The CMA understands that on 1 January 2019 Virgin adopted the new Accounting Standard Update (ASU) No. 2016-02, Leases (ASU 2016-02). The main impact of the adoption of ASU 2016-02 relates to the recognition of right of use assets and leases liabilities on Virgin's balance sheet.

Table 3-2: Virgin: Revenue by business area 2018 to 2020⁴¹

	£'000				
	2018	2019	2020	19 vs 18	20 vs 19
Fixed Consumer	[X]	[X]	[X]	[X]%	[X]%
B2B	[X]	[X]	[X]	[X]%	[X]%
Consumer Mobile	[X]	[X]	[X]	[X]%	[X]%

Source: Liberty Global.

3.12 As illustrated in Table 3-2:, the Fixed Consumer business comprised (in 2018-2020) [X]% of Virgin's total revenue, Business-to-Business (B2B) [X]% and Consumer Mobile [X]%.

Mobile backhaul financial data

3.13 Virgin supplies [X], with some of their mobile backhaul requirements. Virgin earned revenues of £[X] from supplying mobile backhaul in 2020, which it estimated accounted for [X]% of total UK mobile backhaul sales in 2020.⁴²

3.14 Table 3-3 below sets out a breakdown by MNO of the revenue Virgin generated from its mobile backhaul business in the period 2017 to 2019.

Table 3-3: Virgin mobile backhaul revenues by customer

	£ million			
	2017	2018	2019	2020
Vodafone	[X]	[X]	[X]	[X]
Three	[X]	[X]	[X]	[X]
O2	[X]	[X]	[X]	[X]
MBNL	[X]	[X]	[X]	[X]
EE	[X]	[X]	[X]	[X]
Total	[X]	[X]	[X]	[X]

Source: Liberty Global

3.15 The revenue Virgin generated from its mobile backhaul business represented [X]% of its total wholesale leased lines revenue in 2020, of £[X] million.

3.16 A breakdown of type of leased line supplied by Virgin is presented at Table 3-4 below:

⁴¹ 2018 figures calculated by the CMA based on 2019 full year movement from prior year.

⁴² [X].

Table 3-4: Virgin wholesale leased line revenues by type

	£ million	
	2019	2020
Ethernet	[REDACTED]	[REDACTED]
Optical High Capacity Services	[REDACTED]	[REDACTED]
Dark Fibre	[REDACTED]	[REDACTED]
Other eg dedicated internet access	[REDACTED]	[REDACTED]

Source: Liberty Global.

3.17 Virgin also provided us with the breakdown of revenues from MNOs for wholesale leased lines. These can be found below at Table 3-5.

Table 3-5: Virgin wholesale leased lines revenues from MNOs

		£ million	
		2019	2020
Backhaul	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]
Non-backhaul	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]
Total	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]

Source: Liberty Global.

3.18 At January 2021, Virgin had [REDACTED] mobile backhaul agreements in place with Vodafone and Three.

3.19 [REDACTED]

3.20 Liberty Global stated that its agreement with Three [REDACTED].

Telefónica – O2

Background

3.21 Telefónica is an international telecommunications company headquartered in Madrid, Spain. It is a publicly listed company on the Madrid, New York, Lima and Buenos Aires Stock Exchanges.

3.22 Telefónica operates through several subsidiaries in Europe and in South America. Telefónica states that there is no shareholder that directly or

indirectly exercises, or may exercise, control over Telefónica. Its shares are held by institutional and individual investors.⁴³

- 3.23 In the UK, Telefónica operates O2 as an MNO, offering retail mobile services to consumers and businesses as well as wholesale mobile services to MVNOs. O2 also owns giffgaff Limited (an MVNO) and has shareholdings in the Tesco Mobile joint venture (an MVNO), Cornerstone Telecommunications Infrastructure Ltd ('CTIL') (a mobile network-sharing joint venture with Vodafone) and Digital Mobile Spectrum Limited (DMSL).⁴⁴ O2 also provides certain fixed telephony retail services to business customers.

Financial information

- 3.24 The turnover of Telefónica in the financial year 2020 was approximately £38,290 million worldwide and £5,962 million in the UK.⁴⁵
- 3.25 Telefónica turnover decreased by 11% from 2019 to £38,290 million in 2020. However, net income increased by 39% from £1,001 million in 2019 to £1,397 million.⁴⁶ The CMA notes that Telefónica's provision for income taxes decreased by 41%, which may have been a contributing factor to its increase in net income in the context of a decrease in turnover.⁴⁷
- 3.26 CMA analysis shows that Telefónica was more highly geared in 2020 than its industry competitors⁴⁸ with a debt to equity ratio of 4.54, compared to an industry median of 1.81.⁴⁹ Similarly, Telefónica's long term debt as a percentage of its total capital of 60.9% was higher than the industry median of 40.2%.⁵⁰
- 3.27 In January 2021, Telefónica agreed to sell Telxius, its telecom tower unit,⁵¹ to American Tower⁵² for €7.7 billion.⁵³ The deal will decrease Telefónica's debt by €4.6 billion due to cash proceeds of €3.9 billion.

⁴³ [Telefónica investor relations website](#).

⁴⁴ DMSL was established in 2012 and is a joint venture in which O2, Three, EE and Vodafone each own a 25% share. DMSL supports the UK mobile network operators' interference free use of radio spectrum in the UK.

⁴⁵ Turnover figures converted from EUR to GBP based on [Bank of England](#) average exchange rate for 2019.

⁴⁶ Net income has been converted to GBP from EUR based on [Bank of England](#) average exchange rate for 2020.

⁴⁷ [Financial Times, Markets, Telefónica S.A.](#)

⁴⁸ Telefónica peer group constituents as at 13/01/21: BT Group PLC, Vodafone Group PLC, Orange SA, Cellnex Telecom SA, Telecom Italia SA, Bouygues SA, Euskaltel SA.

⁴⁹ Refinitiv data extracted 13/01/21, Telefónica S.A. Annual Ratios – Key Metrics.

⁵⁰ Refinitiv data extracted 13/01/21, Telefónica S.A. Annual Ratios – Key Metrics.

⁵¹ Co-owned with KKR. KKR & Co. Inc in an American global investment company that manages multiple alternative asset classes including private equity, energy, infrastructure, real estate, credit and hedge funds.

⁵² An American real estate investment trust, headquartered in Boston, Massachusetts. Owner and operator of wireless and broadcast communications infrastructure in multiple countries.

⁵³ [Telefónica website, News, 13 January 2021](#).

3.28 Table 3-6 below shows O2's total revenue and operating income before depreciation and amortisation ('OIBDA').

Table 3-6: O2: revenue and operating income (OIBDA) 2017 to 2019

	£ million				%		
	2017	2018	2019	2020	18 vs 17	19 vs 18	20 vs 19
Revenue	5,729	6,007	6,235	5,962	5%	4%	-4%
OIBDA	n/a	[X]	[X]	[X]			
Operating Income margin		[X]%	[X]%	[X]%			

Source: Telefónica

Note: 2017 figures as per O2 Holdings Limited Financials Statements, publicly available at [Companies House](#). OIBDA metric unavailable.

3.29 O2 told us that a change in accounting treatment for leases impacted comparison of some of its results between 2018 and 2019. It chose not to re-state its prior year comparatives⁵⁴ (2018) meaning that comparison between 2018 and 2019 OIBDA may not be on a like-for-like basis.

3.30 A breakdown of O2's financial performance in the period 2018 to 2020⁵⁵ inclusive has been summarised at Table 3-7 below:

Table 3-7: O2: Revenue by business area 2020

[X]

Source: Telefónica

3.31 Wholesale revenue is revenue received from MVNOs, including the Tesco Mobile 50:50 joint venture.

3.32 As illustrated in Table 3-7, revenue from its Retail business accounts for [X]% of O2's revenue.

Wholesale mobile financial data

3.33 Table 3-8 below sets out a breakdown (by MVNO) of the revenue O2 generated from its wholesale mobile business in the period 2017 to 2020.

⁵⁴ The modified retrospective transition method, whereby the cumulative effect from initial application is recognised as an adjustment to the opening balance of retained earnings at the date of application ie 1 January 2019.

⁵⁵ 2020 figures are forecast, based on O2's quarterly re-forecast.

Table 3-8: O2 MVNO customer revenues



Source: Telefónica

3.34 O2 also provides wholesale mobile services to around 11 business mobile resellers which serve small and medium business customers. Revenue from the top 10 small and medium businesses is set out at Table 3-9 below.

Table 3-9: O2 Small and medium business customer revenue

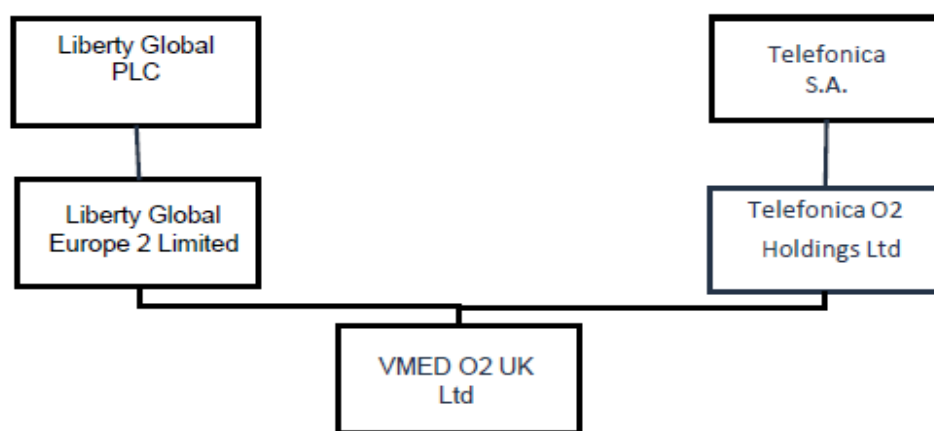


Source: Telefónica

The transaction

3.35 On 7 May 2020, Telefónica and Liberty Global entered into a Contribution Agreement which proposed they would jointly acquire control of a newly incorporated entity, VMED O2 UK Ltd. Telefónica and Liberty Global would each be allotted 50% of the entire issued and outstanding share capital of VMED O2 UK Ltd (the 'JV').

Figure 3-1: Ownership structure of VMED O2 UK Ltd (JV entity)



Source: Parties.

3.36 The proposed JV will combine the Parties' respective businesses in the UK under the ownership of VMED O2 UK Ltd. Telefónica will contribute to the JV its wholly owned subsidiary O2 Holdings Limited and Liberty Global will contribute to the JV its wholly owned subsidiary Virgin Media Inc., which is the parent company of Virgin Media Ltd (Virgin Media) and Virgin Mobile Telecoms Ltd (Virgin Mobile).

3.37 The businesses contributed by Liberty Global are:

(a) Virgin Media, a telecommunications company which provides retail fixed telecommunications services (specifically voice and broadband), as well as pay-TV services, through its own fixed network infrastructure. Virgin Media also supplies wholesale leased lines to MNOs;

(b) Virgin Mobile, an MVNO.

3.38 It is also contemplated that Liberty Global will contribute to the JV its 50% interest in MXLG Acquisitions Limited, a joint venture with MXC JV Limited established in 2017 to pursue opportunities in the business-to-business telecoms and IT services market.

3.39 Telefónica will contribute its O2 business which is one of the four existing MNOs in the UK. O2 provides mobile communication services.

3.40 The businesses contributed by Telefónica will also include its minority shareholdings and joint venture interests in the UK:

(a) Its shareholding in the Tesco mobile joint venture,⁵⁶ an MVNO;

(b) giffgaff Limited, an MVNO and wholly owned subsidiary which offers a hybrid online pay as you go/post-pay mobile service under the giffgaff brand.

(c) Cornerstone Telecommunications Infrastructure Ltd (CTIL), a mobile network-sharing joint venture with Vodafone. O2 has a 50% shareholding in CTIL. CTIL owns mobile passive infrastructure and operates the shared site portfolio (eg base stations).

(d) Digital Mobile Spectrum Limited, a joint venture in which O2, Three, EE and Vodafone each hold a 25% shareholding.

Figure 3-2: [REDACTED]

[REDACTED]

Source: [REDACTED]

3.41 On 7 May 2020, the Parties also agreed the form of the shareholders' agreement which governs how the JV will be owned, controlled, managed and financed. The shareholders' agreement has not yet been executed. There are additional supporting agreements which govern the provision of certain services that Liberty Global and Telefónica have agreed to provide to the JV,

⁵⁶ The joint venture is an MVNO which markets mobile services under the Tesco Mobile brand, using Tesco's distribution network and customer base and O2's mobile communications network and related services. Tesco Mobile is run at arms' length from O2 and Tesco plc.

brand licencing agreements and side letters which concern the re-organisation of entities and other matters required for completion to take place.

- 3.42 The shareholders' agreement sets out that the board of directors of the JV will have eight directors; four each from Telefónica and Liberty Global. [REDACTED].⁵⁷ This provides each of the Parties with a veto right over decisions and demonstrates that the JV is intended to be jointly controlled by the Parties.
- 3.43 The shareholders' agreement provides the right for each of the Parties to initiate an initial public offering of the JV after the third anniversary of completion of the Proposed Merger. After the fifth anniversary, each shareholder will be able to initiate a sale of the entire JV to a third party, subject to a right of first offer from the other shareholder.
- 3.44 The Parties state that the JV will be independently managed on an autonomous basis and will be provided with the necessary resources (finance, people, assets) to allow it to operate independently. The JV's executive management team will consist of a Chief Executive Officer, Chief Financial Officer, Chief Technical Officer and General Counsel. The Parties state that neither Telefónica nor Liberty Global will consolidate the JV (into their respective group financial reporting) after the completion of the Proposed Merger.⁵⁸
- 3.45 To effect completion of the Proposed Merger, prior to completion Liberty Global will contribute the shares of Virgin Media Inc.⁵⁹ to the JV (VMED O2 UK Ltd.), and the [REDACTED]. Upon completion, Telefónica will contribute the shares of O2 Holdings Limited to the JV, and the [REDACTED]. Liberty Global and Telefónica will each have an equal number of shares in the JV.
- 3.46 Upon completion, Liberty Global will pay to Telefónica consideration of £2.5 billion (GBP) to account for the difference in the calculated enterprise value of the O2 and Virgin businesses. [REDACTED]. The payment is due to Telefónica, primarily, because the O2 business will be transferred to the JV on a debt-free, cash-free basis. The Virgin business will be transferred with existing net debt and debt-like items of £11.3 billion.⁶⁰
- 3.47 The Telefónica Board presentation also states that [REDACTED].

⁵⁷ [REDACTED].

⁵⁸ [Liberty Global press release](#), 7 May 2020, page 3 (also published on [Telefónica website](#)).

⁵⁹ Prior to completion Liberty Global's Irish businesses will be transferred out of Virgin Media Inc. and into a Liberty Global company outside of the proposed JV.

⁶⁰ [Liberty Global press release](#), 7 May 2020 (also published on [Telefónica website](#)).

Events leading up to the transaction

- 3.48 Liberty Global told us that it [REDACTED].
- 3.49 The potential for the Proposed Merger was first presented to the Liberty Global Board at a Board meeting in [REDACTED]. [REDACTED]. The Liberty Global Board approved the Proposed Merger at a meeting on [REDACTED].
- 3.50 Telefónica told us that [REDACTED].
- 3.51 Telefónica told us [REDACTED].
- 3.52 Telefónica provided the same timeline information as Liberty Global, stating that negotiations between the Parties [REDACTED] and continued throughout the first quarter of 2020.

Rationale for the transaction

- 3.53 The Parties told us that the proposed JV 'will combine O2's and Virgin Media's complementary businesses and network assets, creating a highly competitive fixed and mobile communications operator with scale, expertise and state-of-the-art infrastructure'.
- 3.54 Further, the Parties stated that:
- (a) The enlarged customer base of the JV, combined with cost savings from the rationalisation of the combined operations, will increase the overall scale and operating efficiency of the JV compared to Virgin and O2 as standalone operators;
 - (b) Network synergies are expected to be achieved not only through avoidance of double marginalisation (in particular by internalising the margin previously paid to third-party MVNO hosts and backhaul providers) but also through better optimisation of the combined networks. The enlarged customer base of the JV and access to each other's networks will give greater scope for further investment in fixed and mobile networks; and
 - (c) Growth from fixed-mobile convergence (FMC) and improved business-to-business (B2B) presence: the JV will be able to cross-sell fixed-mobile converged products to O2's and Virgin's largely non-overlapping customer bases. By attracting further customers to FMC bundles the JV is expected to realise revenue synergies while offering customers discounts and additional services. The JV will also be better able to serve business

customers by broadening its product portfolio and combining sales capabilities.

- 3.55 Public statements made by the Parties⁶¹ from the time of the deal announcement in May 2020 emphasise the scale benefits achievable by combining their UK businesses and the complementary nature of those businesses.
- 3.56 The Proposed Merger combined business is forecast to generate annual revenues of £[REDACTED] in 2021 with operating income (OIBDA) of £[REDACTED], a margin of [REDACTED]%. This is broadly comparable to the expected pre-combination revenues of O2 and Virgin of c.£ [REDACTED] in 2020 and operating income of £[REDACTED]. Over the longer term and from 2021, growth is expected to be generated by revenue and cost synergies (set out below at paragraph 3.78).
- 3.57 The Parties told us that [REDACTED].
- 3.58 [REDACTED]

Liberty Global's rationale for the transaction

- 3.59 Liberty Global describes in Board documents and presentations from 2019 and 2020 that the Virgin business was [REDACTED].
- 3.60 Virgin Mobile is an MVNO. It has a relatively small market share of under 5%. In a presentation to the Liberty Global Board in March 2020, [REDACTED].
- 3.61 The same Board presentation states that Virgin Media [REDACTED].⁶²
- 3.62 The Board presentation also describes [REDACTED].
- 3.63 A presentation to the Liberty Global Board of Directors dated 5 May 2020 was the final approval stage for the Proposed Merger which was subsequently announced on 7 May 2020.
- 3.64 The presentation outlined the financial benefits of the Proposed Merger as being:
- (a) [REDACTED];
- (b) [REDACTED];

⁶¹ Liberty Global press release, 7 May 2020 (also published on [Telefónica website](#)).

⁶² In its 2020 Connected Nations report, Ofcom states that 'superfast' broadband (speed of more than 30 Mbit/s) was available to 96% of homes in the UK and approximately 60% of households had a superfast connection.

(c) [REDACTED]; and

(d) [REDACTED].

3.65 The Board presentation states that the key strategic rationale for Liberty Global is the [REDACTED].⁶³

3.66 In addition, the Board presentation stated that the Proposed Merger will:

(a) [REDACTED];

(b) [REDACTED];

(c) [REDACTED]; and

(d) [REDACTED].

3.67 Liberty Global told us that the Proposed Merger would bring together two complementary businesses and be 'pro-competitive' for the UK.

3.68 Liberty Global stated that the JV would be able to compete more effectively with other FMC players, including BT/EE, Vodafone and Sky.

3.69 Liberty Global told us that the JV would provide an opportunity to offer FMC products to Virgin and O2's largely non-overlapping customer bases, in particular by cross-selling Virgin's fixed telecommunications and TV services to O2's mobile customers and O2's mobile services to Virgin's customers.

3.70 In the B2B market, Liberty Global told us that the product portfolio of the JV would enable it to better serve the demand of B2B customers by combining O2's mobile products and digital services (such as security and cloud) with Virgin's fixed network. In particular, O2 will be able to offer improved connectivity services to its B2B customers using Virgin's fixed infrastructure, while Virgin's B2B customers will benefit from access to O2's digital services such as cybersecurity and cloud services (as well as an improved mobile offer).

Telefónica's rationale for the transaction

3.71 O2 has focused until now on a mobile-only strategy (with the exception of a fixed-line offering to B2B customers). O2 disposed of its fixed line business (consumer broadband and fixed-line telephony business) to Sky in 2013. At the time of the disposal, O2 said that its strategy would be focused on

⁶³ Net promoter score (NPS) is a measure of customer experience and is used to predict customer retention and business growth.

improving mobile connectivity and its newly launched 4G services.⁶⁴ [REDACTED]. O2 subsequently announced in July 2019⁶⁵ that it would be re-entering the fixed line market and was considering a number of strategic options in relation to this.

3.72 Telefónica told us that [REDACTED]. [REDACTED]:

(a) [REDACTED];

(b) [REDACTED];

(c) [REDACTED].

3.73 Telefónica told us that [REDACTED]. [REDACTED].

3.74 Telefónica told us that [REDACTED] and that Virgin was considered to be the preferred strategic option [REDACTED].

3.75 A presentation to the Telefónica Board of Directors in May 2020, which was part of its approval process for the Proposed Merger, stated that:

(a) The Proposed Merger would [REDACTED];⁶⁶

(b) The Proposed Merger would [REDACTED]; and

(c) The Proposed Merger would [REDACTED].

3.76 Telefónica told us that the Proposed Merger would accelerate the 'deployment of ultra-fast broadband' in the UK.

Synergies and operating efficiencies

3.77 The Parties expect the Proposed Merger to deliver revenue and cost synergies with a net present value of £[REDACTED].⁶⁷ The Parties' modelling estimates that the JV will generate synergies of £[REDACTED] on an annual operating free cashflow basis (OFCF) from [REDACTED].

3.78 The majority of the total estimated run-rate synergies relate to cost savings (including operating costs, network and IT costs and capital expenditure

⁶⁴ O2 press release, 1 March 2013.

⁶⁵ Financial Times interview with Mark Evans, CEO of O2, 25 July 2019.

⁶⁶ Based on number of subscribers.

⁶⁷ Parties' synergy model uses a [REDACTED] discount rate of [REDACTED]% and a terminal growth rate of [REDACTED]%. The Parties note that assumed phasing of synergies may change.

(capex) synergies), representing £[REDACTED] in net savings per year in run-rate terms from [REDACTED] onwards. The Parties told us that:

- (a) A significant element of the cost synergy is the [REDACTED];
- (b) Further cost savings would result from the self-supply of O2's mobile and fixed backhaul; and
- (c) Further cost savings would be driven by rationalisation of operations.

3.79 The Parties forecast revenue synergies of £[REDACTED] per year in run-rate terms from [REDACTED] onwards. This is expected to be delivered through the ability to cross-sell mobile services to fixed customers and fixed services to mobile customers, thereby creating converged FMC bundles.

Valuation

3.80 The Proposed Merger values O2 at £12.7 billion on an enterprise value (EV) basis. This represents an EV/2019 EBITDA multiple of 7.8x.

3.81 Virgin is valued at £18.7 billion EV, which includes £11.3 billion of net debt. This represents an EV/2019 EBITDA multiple of 9.3x.

Table 3-10: [REDACTED]

[REDACTED]

Source: [REDACTED]

3.82 The implied valuation multiples for each of the Parties are at the higher end of comparable transactions and current market values in this sector. Examples for comparison include:

- (a) BT/EE 2016 (completed): valued EE at £12.5 billion (EV), a multiple of 6x 2014 EBITDA.⁶⁸
- (b) Hutchison/O2 2015 (aborted): valued O2 at £10.25 billion (EV), a multiple of 7x EBITDA.

3.83 Liberty Global told us that 'the announced valuations of £18.7 billion for Virgin Media and £12.7 billion for O2 were [REDACTED] based [REDACTED]'.

3.84 Telefónica told us that the Parties [REDACTED]. The Parties then agreed the valuation for O2 and Virgin Media to be disclosed to the market, [REDACTED].

⁶⁸ [BT investor relations website](#).

4. Relevant merger situation

Introduction

- 4.1 In accordance with section 36 of the Act and pursuant to our terms of reference (see Appendix A) we are required to investigate and report on two statutory questions: (i) whether arrangements are in progress or in contemplation which, if carried into effect, will result in the creation of a relevant merger situation (RMS); and (ii) if so, whether the creation of that situation may be expected to result in an SLC within any market or markets in the UK for goods or services.
- 4.2 We address the first of the statutory questions in this chapter.
- 4.3 An RMS is created if: (a) two or more enterprises cease to be distinct; and (b) the value of the turnover in the UK of the enterprise being taken over exceeds £70 million (the turnover test) or the share of supply test is satisfied.

Enterprises ceasing to be distinct

- 4.4 The Act defines an ‘enterprise’ as ‘the activities or part of the activities of a business’.⁶⁹ A ‘business’ is defined as including ‘a professional practice and includes any other undertaking which is carried on for gain or reward or which is an undertaking in the course of which goods or services are supplied otherwise than free of charge’.⁷⁰ The CMA Jurisdictional Guidance⁷¹ explains that the enterprise in question need not be a separate legal entity.⁷²
- 4.5 As set out in more detail in Chapter 3, the Proposed Merger involves the creation of a joint venture to which Telefónica and Liberty Global will respectively contribute the O2 and the Virgin businesses in the UK.
- 4.6 Virgin (including various subsidiaries) and O2 (through various subsidiaries) are both active in the supply of various products and services in the UK, including the provision of retail mobile services, retail fixed telecommunications services and certain retail business services (both entities); the supply of wholesale leased lines (Virgin only); and the provision

⁶⁹ Section 129(1) of the Act.

⁷⁰ Section 129(1) of the Act.

⁷¹ CMA, Mergers: Guidance on the CMA’s jurisdiction and procedure, January 2014, [CMA2](#).

⁷² CMA Jurisdictional Guidance, paragraph 4.6. Nor is there a requirement that the transferred activities generate a profit or dividend for shareholders: indeed, the transferred activities may be loss-making or conducted on a not-for-profit basis.

of wholesale mobile services (O2 only). In the UK in 2019, Virgin generated turnover of £4,765.5 million⁷³ and O2 generated turnover of £6,235 million.⁷⁴

- 4.7 We are therefore satisfied that each of Virgin and O2 is a 'business' within the meaning of the Act and that, accordingly, the activities of each of Virgin and O2 are an 'enterprise' for the purposes of the Act.⁷⁵
- 4.8 Section 26 of the Act explains that enterprises cease to be distinct once they are brought under common ownership or common control.
- 4.9 Section 26 distinguishes three levels of control, in ascending order:
- (a) Material influence;⁷⁶
 - (b) De facto control;⁷⁷
 - (c) A controlling interest (also known as de jure (or legal) control).
- 4.10 Under Section 26(3) of the Act, a person or group of persons able directly or indirectly to control or materially to influence the policy of any person in carrying on an enterprise but without having a controlling interest in that enterprise will be treated as having control of it.
- 4.11 The CMA Jurisdictional Guidance recognises that material influence over policy is assessed on a case-by-case basis, focusing on the overall relationship between the acquirer and the target. The CMA Jurisdictional Guidance considers a number of (non-exhaustive) factors which may suggest that an acquisition of a minority shareholding confers material influence over policy on the holder, including the existence of any special voting or veto rights attached to the shareholding under consideration.⁷⁸
- 4.12 On completion of the Proposed Merger, each of Telefónica and Liberty Global will own 50% of the entire issued and outstanding share capital of the JV in return for the transfer of their businesses.

⁷³ [Virgin's Annual Report, December 31 2019](#).

⁷⁴ [O2's Annual Report and Financial Statements, December 31, 2019](#).

⁷⁵ For completeness, we consider that Liberty Global and Telefónica are also 'enterprises' for the purposes of the Act.

⁷⁶ Section 26(3) of the Act refers to the ability, directly or indirectly, materially to influence the policy of a body corporate, or the policy of any person in carrying on an enterprise.

⁷⁷ Section 26(3) of the Act refers to the ability, directly or indirectly, to control the policy of a body corporate, or the policy of any person in carrying on an enterprise.

⁷⁸ CMA Jurisdictional Guidance, paragraphs 4.14-4.27.

- 4.13 The board of directors of the JV (the 'Board') will have eight directors; each of Telefónica and Liberty Global will appoint four directors. [REDACTED].⁷⁹ [REDACTED].⁸⁰ [REDACTED].
- 4.14 [REDACTED], our conclusion is that both Parties will have the ability post-merger at least materially to influence the policy relevant to the behaviour of the JV in the marketplace.⁸¹
- 4.15 As a result, our conclusion is that O2 and Virgin will cease to be distinct from each other and the Parties together will enjoy common ownership and control of the JV. Each Party will acquire at least material influence in (and cease to be distinct from) the business being contributed by the other, ie Telefónica will acquire control over Virgin and Liberty Global will acquire control over O2.
- 4.16 Our view is therefore that arrangements are in progress or in contemplation which, if carried into effect, will result in two or more enterprises ceasing to be distinct and that the first limb of the RMS test is met.

Jurisdiction test

- 4.17 The second element of the jurisdictional test seeks to establish sufficient connection with the UK on a turnover or share of supply basis.

Turnover test

- 4.18 The turnover test is met where the value of the turnover in the UK of the 'enterprise being taken over'⁸² exceeds £70 million.⁸³
- 4.19 In a situation where two companies form a joint venture, each parent with control is considered as 'taking over' the target business contributed to the joint venture by the other parent. As the parent companies remain under the same ownership and control after the merger, their turnover must be deducted

⁷⁹ [REDACTED].

⁸⁰ [REDACTED].

⁸¹ [REDACTED].

⁸² Section 28 of the Act confirms that turnover for the purposes of section 23(1) is determined by taking the total value of the UK turnover of the enterprises which cease to be distinct.

⁸³ Section 23(1)(b) of the Act.

for the purpose of the turnover test. Accordingly, the relevant turnover is the sum of the turnover of each of the contributed businesses.⁸⁴

- 4.20 As indicated above, in the UK in 2019, Virgin generated turnover of £4,765.5 million⁸⁵ and O2 generated turnover of £6,235 million.⁸⁶ ⁸⁷ We are therefore satisfied that the combined UK turnover of the businesses that the Parties are transferring to the JV exceeds £70 million and that the turnover test is satisfied.

Share of supply test

- 4.21 As the turnover test is met, we are not required to consider whether the share of supply test is met. However, for completeness, we have considered whether the share of supply test in section 23 of the Act would also be met.
- 4.22 The share of supply test is satisfied where, as a result of enterprises ceasing to be distinct, the following condition prevails or prevails to a greater extent: at least one quarter of goods or services of any description which are supplied in the UK, or in a substantial part of the UK, are supplied either by or to one and the same person.⁸⁸ The requirement that the condition prevails or prevails to a greater extent means that the merger must result in the creation or increase in a share of supply of goods or services of a particular description and the resulting share must be 25% or more (ie there must be a relevant overlap in the Parties' activities).
- 4.23 The concept of goods or services of 'any description' is very broad. The description of goods or services identified for the purposes of the jurisdictional test does not have to correspond with the economic market definition / frame of reference adopted for the purposes of determining the SLC question. The CMA will have regard to any reasonable description of a set of goods or services to determine whether the share of supply test is met.
- 4.24 The Parties have overlapping activities in the UK, notably in respect of retail mobile services. We note that, in 2019, the Parties' combined share of the

⁸⁴ CMA Jurisdictional Guidance, paragraph 4.49.

⁸⁵ [Virgin's Annual Report, December 31 2019](#).

⁸⁶ [O2's Annual Report and Financial Statements, December 31, 2019](#).

⁸⁷ We consider that it is still appropriate to take into account 2019 turnover figures. We determine the question of whether a relevant merger situation has been created as at the date a reference is made (see section 23(9) of the Act). The turnover test applies to the turnover of the acquired enterprise that was generated in relation to customers within the UK in the business year preceding the date of the reference for a Phase 2 investigation (see CMA Jurisdictional Guidance, paragraph 4.51).

⁸⁸ Section 23(2), (3) and (4) of the Act. The reference to supply 'by' or 'to' one and the same person catches aggregations with regard to the supply or purchase of goods or services. The test is also met where at least one quarter of the goods or services is supplied by the persons by whom the enterprises concerned are carried on, or are supplied to or for those persons.

supply of overall retail mobile services⁸⁹ in the UK was in excess of 25%, with an increment.⁹⁰

Conclusions on relevant merger situation

4.25 Based on the assessment above, we found that the Proposed Merger, if carried into effect, will result in the creation of an RMS. As a result, we must consider whether the creation of that situation may be expected to result in an SLC within any market or markets in the UK for goods or services.

5. Counterfactual

The CMA's framework for assessment of the counterfactual

5.1 To assess the effects of a merger on competition, we consider the prospects for competition with the merger against what would have been the competitive situation without the merger. This is called the 'counterfactual'.⁹¹

5.2 The counterfactual is an analytical tool used to help answer the question of whether a merger has or may be expected to result in an SLC.⁹²

5.3 We will typically incorporate into the counterfactual only those aspects of scenarios that appear likely based on the facts available to us and the extent of our ability to foresee future developments.⁹³ The foreseeable period can sometimes be relatively short.⁹⁴ However, even if an event or its consequences are not sufficiently certain to include in the counterfactual they may be considered in the context of the competitive assessment.⁹⁵

5.4 To help make an overall judgement on the likely situation in the absence of the merger, we may examine several future scenarios, one of which may be the continuation of the pre-merger situation but ultimately, in a phase 2

⁸⁹ We consider 'retail mobile services' is a reasonable description of a set of goods or services, as the 'mobile services' sector is considered by Ofcom specifically within its quarterly 'Telecommunications Market Data Updates' (For example see [Ofcom's Telecommunications Market Data Update Q2 2020](#)).

⁹⁰ In their Form CO filed with the European Commission, the Parties submitted that their combined share in 2019 of the supply of overall retail mobile telecommunications in the UK was [30-40]% based on subscribers and [30-40]% based on revenues, with an increment of [0-5]% based on subscribers and [0-5]% based on revenues (the increment being represented by Virgin's share).

⁹¹ [Merger Assessment Guidelines \(CC2 revised\)](#) ('MAGs'), paragraph 4.3.1. This inquiry is operating under the 2010 MAGs because the anticipated joint venture was referred for phase 2 inquiry on 11 December 2020 before revised guidance was published.

⁹² MAGs, paragraph 4.3.1.

⁹³ MAGs, paragraph 4.3.6.

⁹⁴ MAGs, paragraph 4.3.6.

⁹⁵ MAGs, paragraph 4.3.2.

merger review, only the most likely scenario based on the facts of the case will be selected as the counterfactual scenario.⁹⁶

- 5.5 Depending on the evidence, the choice of the counterfactual could be a situation either more or less competitive than the competitive conditions prevailing prior to the Proposed Merger being contemplated by the Parties (the pre-Merger situation). Therefore, the selection of the appropriate counterfactual may increase or reduce the prospects of finding an SLC.⁹⁷
- 5.6 In reaching a view on the appropriate counterfactual, we must determine what future developments we foresee arising absent the Proposed Merger based on the totality of facts available to us. We seek to avoid importing into the assessment of the appropriate counterfactual any spurious claims to accurate prediction or foresight. Given that the counterfactual incorporates only those elements of scenarios that are foreseeable, it will not in general be necessary to make finely balanced judgements about what is and what is not included in the counterfactual.⁹⁸
- 5.7 Insofar as future events or circumstances are not certain or foreseeable enough to include in the counterfactual, our analysis of such events can take place in the assessment of competitive effects.⁹⁹

Views of the Parties and third parties on the counterfactual

- 5.8 Liberty Global and Telefónica have made separate submissions and we set out each Party's view separately below.

Liberty Global views and evidence

- 5.9 Liberty Global told us that it '[REDACTED]'.¹⁰⁰
- 5.10 Liberty Global also submitted that it [REDACTED].¹⁰⁰ For example, [REDACTED].
- 5.11 Liberty Global submitted that '[REDACTED]'.¹⁰⁰

⁹⁶ MAGs, paragraph 4.3.6.

⁹⁷ MAGs, paragraph 4.3.4.

⁹⁸ MAGs, paragraphs 4.3.2 and 4.3.6.

⁹⁹ The MAGs at footnote 39 give one such example of where this may happen, which states that: "the OFT, In its competitive effects analysis, ... might have regard to facts that are insufficient for it to adopt a counterfactual other than the pre-merger conditions (for example, by taking account of the reduced competitive impact of a firm in financial difficulties even though the conditions of the exiting firm scenario are not met)".

¹⁰⁰ Liberty Global also told us '[REDACTED]'.¹⁰⁰

5.12 Finally, Liberty Global told us that, absent the Proposed Merger, consideration of any other deal, and by implication any other counterfactual, would have been '[REDACTED]'.

5.13 We have seen evidence of Liberty Global's [REDACTED] considerations of potential combinations, acquisitions or other M&A activity in its internal documents, as set out below.

5.14 At a board meeting [REDACTED]:

(a) [REDACTED];

(b) [REDACTED];

(c) [REDACTED].¹⁰¹

5.15 Liberty Global told us that, [REDACTED].

5.16 [REDACTED]

5.17 At a Liberty Global board meeting [REDACTED]:

(a) [REDACTED]

(b) [REDACTED]

5.18 In our internal document review, we noted that [REDACTED].

5.19 We also noted that [REDACTED].

5.20 The evidence from internal documents supports Liberty Global's submission that [REDACTED].

Telefónica views and evidence

5.21 We received submissions from Telefónica on the counterfactual. Where relevant, we have also noted evidence from internal documents.

5.22 Telefónica told us that '[REDACTED]^{102,103}'.

5.23 [REDACTED].¹⁰⁴

¹⁰¹ [REDACTED].

¹⁰² [REDACTED].

¹⁰³ [REDACTED].

¹⁰⁴ [REDACTED].

- 5.24 Telefónica submitted that '[REDACTED]'.
- 5.25 Telefónica's internal documents [REDACTED]:
- (a) [REDACTED];
 - (b) [REDACTED]; and
 - (c) [REDACTED].
- 5.26 Telefónica noted that '[REDACTED]'.
- 5.27 Telefónica noted that '[REDACTED]'.
- 5.28 Telefónica submitted that '[REDACTED]'.
- 5.29 Telefónica told us that it had looked at a number of merger options, but that a deal with Liberty Global was the preferred route.

Our assessment

- 5.30 The submissions and evidence from the Parties suggest that both Liberty Global and Telefónica, prior to agreeing the Proposed Merger, had alternative strategic options available to them to develop their respective businesses. These included potential alternative combinations, acquisitions or other M&A activity.
- 5.31 For Liberty Global these [REDACTED]:
- (a) [REDACTED];
 - (b) [REDACTED]; and
 - (c) [REDACTED].
- 5.32 We note for Telefónica, that up to May 2016 it was progressing a potential merger with Three. That proposed merger was prohibited by the European Commission in 2016.^{105, 106}
- 5.33 Following this, Telefónica has considered other potential strategic options, in addition to the Proposed Merger. [REDACTED].

¹⁰⁵ [European Commission press release](#), 11 May 2016.

¹⁰⁶ Three subsequently appealed the European Commission's decision seeking annulment of the decision. In June 2020, the General Court of the European Union annulled the European Commission's decision. [General Court of the European Union press release](#), 28 May 2020.

- 5.34 Telefónica concluded that [X]. [X].
- 5.35 We note that, other than the potential Telefónica proposed merger with Three, [X].
- 5.36 Our assessment of the available evidence is that, although both Parties had been exploring alternative strategic options prior to the Proposed Merger, none of these was sufficiently likely or far advanced to form part of the relevant counterfactual.

Conclusion on the counterfactual

- 5.37 For the reasons set out above, we concluded that the ‘prevailing conditions of competition’, is the most likely counterfactual and, thus, the appropriate counterfactual to the Proposed Merger.

6. Introduction to the competitive assessment

- 6.1 In this chapter, we:
- (a) briefly set out the activities of the Parties which are relevant to our competitive assessment of the Proposed Merger;
 - (b) outline the theories of harm that we have considered and describe our approach to assessing these theories of harm;
 - (c) outline the evidence we have gathered on other horizontal overlaps and vertical relationships between the Parties;
 - (d) outline the other activities of the Parties which we have not considered as part of our assessment of the Proposed Merger.

Activities of the Parties and relationships between them

- 6.2 The Parties are active at multiple different levels of the supply chain. There are both horizontal overlaps and vertical relationships between them (see Table 6-1).

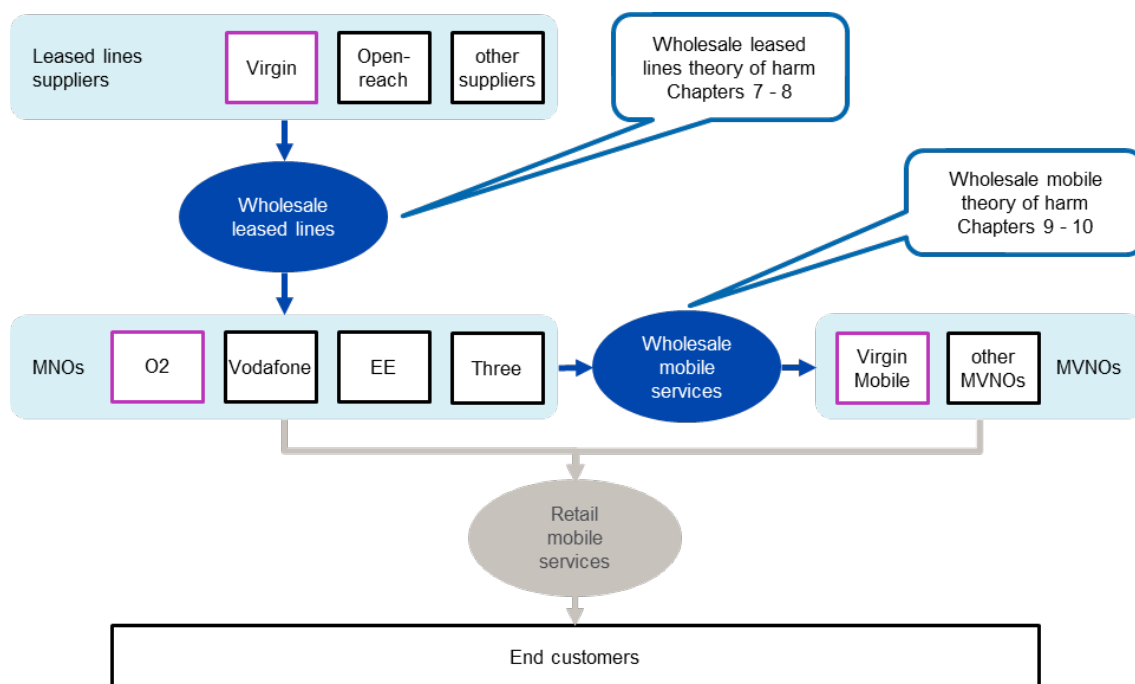
Table 6-1: Overview of the Parties' activities

	O2	Virgin
Wholesale leased lines		•
Wholesale mobile	•	
Retail mobile	• (MNO)	• (MVNO)
Retail fixed broadband	• (B2B only)	•
Retail fixed voice services	• (B2B only)	•
Retail business connectivity (broadband, voice, retail leased lines, VPN)	•	•
Retail internet hosting	• (B2B only)	•
IT services (security applications, consulting, maintenance)	•	•
Retail TV services		•
Wholesale TV and audio-visual content		•
International roaming	•	
Call termination	•	•
Termination and hosting of non-geographic numbers		•
Call origination at fixed locations		•
Domestic call transit on fixed networks		•
International carrier services		•

Source: CMA analysis. Highlighted rows are the focus of our investigation.

6.3 The Proposed Merger would combine Virgin, which, among other activities supplies wholesale leased lines and is active as an MVNO supplying retail mobile services to end customers and O2, an MNO which purchases services from leased lines suppliers and supplies wholesale mobile services to MVNOs (see Figure 6-1).

Figure 6-1: Stylised supply chain diagram of the Parties' activities



Source: CMA.

6.4 Our Issues Statement¹⁰⁷ stated that the focus of our investigation would be on two vertical relationships between the Parties:

- (a) Virgin's supply of wholesale leased lines to mobile network operators (MNOs); and
- (b) O2's supply of wholesale mobile services to operators of mobile virtual networks (MVNOs).

6.5 In both of these relationships, the Parties are active at different levels of the supply chain, and therefore the theories of harm we have considered are vertical ones.

6.6 Theories of harm provide the framework for assessing the effects of a merger and whether or not it could lead to an SLC. They describe possible changes arising from the merger, any impact on rivalry and expected harm to customers as compared with the situation likely to arise without the merger.¹⁰⁸

¹⁰⁷ CMA Liberty Global plc/Telefónica S.A. merger inquiry: Issues Statement of 21 January 2021.

¹⁰⁸ MAGs, paragraph 4.2.1.

- 6.7 As set out in our Merger Assessment Guidelines¹⁰⁹, our assessment of vertical theories of harm is framed by reference to the following three questions:
- (a) Ability: would the Merged Entity have the ability to harm rivals, through refusing to supply them, increasing prices or decreasing quality?
 - (b) Incentive: would it find it profitable to do so?
 - (c) Effect: would the effect of such action by the Merged Entity be sufficient to reduce competition to the extent that it gives rise to an SLC?
- 6.8 In practice, the analysis of these questions may overlap and many of the factors may affect more than one question. In order to reach an SLC finding, all three questions must be answered in the affirmative.¹¹⁰
- 6.9 We outline each of these vertical relationships and the associated theories of harm in the sections below.

Supply of wholesale leased lines to MNOs

- 6.10 Virgin supplies wholesale leased lines to MNOs. MNOs use these leased lines as mobile backhaul, that is, to connect their radio base stations and their core network. Leased lines form part of the infrastructure required to provide mobile telecommunications services in the retail mobile market and are therefore an important input for MNOs.
- 6.11 As is set out in more detail in Chapters 7 and 8, Virgin is the second largest supplier of leased lines in the UK, but has a smaller geographical footprint than Openreach (the largest supplier), which is available almost everywhere in the UK.
- 6.12 The Proposed Merger would combine Virgin with O2, the largest supplier of retail mobile services in the UK. Therefore, the theory of harm that we have investigated is whether, as a result of the Proposed Merger, the Merged Entity could engage in an input foreclosure strategy to harm rival MNOs. It could do this by, for example, increasing the price, reducing service quality, changing the offering (for example, by stopping or delaying the roll-out of particular

¹⁰⁹ MAGs, paragraph 5.6.6.

¹¹⁰ MAGs, paragraph 5.6.7.

leased lines products)¹¹¹ ('partial foreclosure'), or by withdrawal of supply ('total foreclosure').¹¹²

- 6.13 In assessing the Merged Entity's ability to harm rivals through the adoption of a foreclosure strategy, we have undertaken the following steps:
- (a) As the supply of leased lines comprises differentiated services, we have first assessed technical and cost differences between the different services available. Our focus has been on the substitutability between Virgin's leased lines offering and that of Openreach.
 - (b) Second, we have assessed the cost of leased lines as an input relative to different measures of MNOs' total costs. This is because, all else being equal, if the input accounts for only a small part of the total costs incurred, the merged firm will be less able to harm its rivals' ability to compete than if the input accounts for a greater part of the total costs.¹¹³
- 6.14 Additionally, we have assessed whether existing [redacted] supply contracts between Virgin and MNOs and network sharing agreements between MNOs provide protection from a foreclosure strategy that the Merged Entity could adopt, although neither is determinative in the context of a vertical foreclosure theory of harm.
- 6.15 To assess the Merged Entity's incentive to engage in a foreclosure strategy, we have considered the importance of its leased lines business with MNOs.
- 6.16 We have also undertaken a quantitative analysis in the form of a 'vertical arithmetic' to assess whether it would be profitable for the Merged Entity to withdraw supply of leased lines to MNOs altogether (that is, to engage in a 'total foreclosure' strategy) by comparing the upstream losses that it could incur from the supply of leased lines as a result of such strategies and the downstream gains in the retail mobile market that it would earn from end customers switching to its own services.
- 6.17 Our assessment is set out in detail in Chapter 8.

¹¹¹ As we set out in more detail in Chapter 7 below, suppliers of leased lines offer different products to MNOs. The main distinction for the purposes of this investigation is 'active' and 'passive' (referred to as 'dark fibre' below) products.

¹¹² Third parties made the following submissions in relation to the supply of wholesale leased lines to MNOs (more details are set out in Chapter 7, paragraph 7.154): [redacted] MNO raised concerns about an input foreclosure strategy. A number of market participants also mentioned that the Proposed Merger may have indirect effects of partial input foreclosure, for instance, a loss of competitive constraint on BT and a reduction in the number of customers for wholesale leased lines suppliers.

¹¹³ MAGs, paragraph 5.6.10.

Supply of wholesale mobile services to MVNOs

- 6.18 O2 supplies wholesale mobile access services to MVNOs. MVNOs rely on these services, which are provided by MNOs, so that their (retail) customers can make use of an MNO's radio access network (RAN). Wholesale mobile access is therefore an essential input enabling MVNOs to compete with MNOs (and with each other) for end consumers in the retail mobile market (see also Figure 6-1).
- 6.19 Our analysis has considered the extent to which the Merged Entity has the ability and incentive to harm mobile-only and fixed-MVNOs (ie, MVNOs that only have a mobile offering and MVNOs that also offer fixed line telephony, broadband, and/or pay-TV respectively) at the wholesale level.
- 6.20 In particular, we assess the extent to which the post-merger incentive differs from the pre-merger incentive. As we note in Chapter 9, Virgin has a small share of supply at the retail mobile level, and as such, the Merged Entity's incentives to foreclose mobile-only MVNOs is unlikely to be significantly different pre-merger and post-merger.
- 6.21 O2 currently supplies Lycamobile, a mobile-only MVNO. Evidence supplied by Lycamobile suggests that diversion of retail customers to Virgin Mobile is [✂]. Given that the likely diversion from Lycamobile to the Merged Entity will not change significantly post-merger, the Merged Entity's incentive to supply Lycamobile is not significantly different compared to the pre-merger situation.
- 6.22 Whilst we have focussed on Lycamobile, we consider that, given Virgin's low share of supply, diversion from other mobile-only MVNOs to Virgin will also likely be low, and as such the Merged Entity's incentives to supply other mobile-only MVNOs is also unlikely to be significantly different post-merger.
- 6.23 We have therefore focussed our assessment on the potential foreclosure of fixed-MVNOs.
- 6.24 O2 currently supplies wholesale mobile services to fixed-MVNOs, such as Sky, and it does not offer fixed-mobile bundles to retail customers to any significant extent. Post-merger, the combination of O2's mobile and Virgin's fixed services means that the Merged Entity will compete with Sky and other fixed-MVNOs in the supply of fixed-mobile bundles.
- 6.25 As such, we consider the Merged Entity's pre- and post-merger incentives to supply fixed-MVNOs may be different. The Merged Entity would have the incentive to engage in a potential foreclosure strategy if a significant proportion of a fixed-MVNO's customers switch their fixed-mobile bundle to the Merged Entity. If customers switch only the mobile component of their

purchase, and retain their fixed services with their current provider, then the pre- and post-merger incentives of the Merged Entity would broadly be the same (as the Merged Entity will only recapture mobile customers).

- 6.26 The fixed-MVNOs that could be affected by any foreclosure strategy would include:
- (a) Sky, a current customer of O2. Sky could be foreclosed at contract renewal or renegotiation, or during its contract with O2;
 - (b) fixed-MVNOs who are currently supplied by another MNO, such as Utility Warehouse. Utility Warehouse could be foreclosed when seeking a new contract; or
 - (c) providers who are currently fixed-only or mobile-only MVNOs that may become fixed-MVNOs in the future, which may occur if the demand for fixed-mobile bundles increases.
- 6.27 The Merged Entity could foreclose a fixed-MVNO by, for example, increasing the price or reducing the service quality of its wholesale mobile services ('partial foreclosure').
- 6.28 Partial foreclosure could be directed towards existing fixed-MVNO customers within contract ('in-contract partial foreclosure') or towards potential fixed-MVNO customers by weaker bidding and offering worse terms at contract renewal or renegotiation.
- 6.29 The Merged Entity could also refuse to supply fixed-MVNOs altogether ('total foreclosure'), by not competing to supply them.¹¹⁴
- 6.30 In assessing the Merged Entity's ability to harm rivals through the adoption of a foreclosure strategy, we have undertaken the following steps:
- (a) In relation to ability, we have first assessed the extent to which there are competitive constraints from the other MNOs post-merger. This is because, if downstream rival MVNOs can receive competitive terms from rival MNOs, the Merged Entity will be unable to engage in a foreclosure strategy.¹¹⁵ We have considered a number of sources of evidence,

¹¹⁴ Third parties made the following submissions in relation to the supply of wholesale mobile services to MVNOs: One MNO and one [redacted] raised concerns about an input foreclosure strategy. We consider the ability and incentive for O2 to engage in input foreclosure in Chapter 10. One MVNO raised concerns about the loss of Virgin as an independent MVNO. To the extent that we find that MNOs are, and will remain, willing hosts of MVNOs, there is no evidence that the loss of Virgin as a potential customer will lead to wholesale supply of MVNOs becoming unviable.

¹¹⁵ MAGs, paragraph 5.6.10.

including evidence from past tender processes, MNOs' strategies, their capacity to host MVNOs, and the quality of their networks.

(b) Second, we have considered the cost of wholesale mobile network access as an input relative to fixed-MVNOs' costs. If wholesale mobile access accounts for only a small part of the total costs incurred, the Merged Entity will be less able to harm rival MVNOs' ability to compete for end customers in the retail market.

(c) Third, we have also assessed the ability of the Merged Entity to engage in partial foreclosure of Sky within its current contract with O2.

6.31 To assess the Merged Entity's incentive to engage in a foreclosure strategy, we have analysed the extent to which customers who buy fixed-mobile bundles from a fixed-MVNO would switch all of these services when faced with a reduction in quality or a price increase of the mobile aspect of the bundle.

6.32 We have also undertaken quantitative analysis in the form of 'vertical arithmetic' to estimate whether it would be profitable for the Merged Entity to engage in a partial or total foreclosure strategy, by comparing the upstream losses that it would incur in the wholesale market as a result of such strategies and the downstream gains in the retail market that it would earn from customers switching to its own services.

6.33 In addition, we have analysed the incentive of the Merged Entity to engage in partial foreclosure of Sky within its current contract.

6.34 Our assessment is set out in detail in Chapter 10.

Horizontal overlaps

6.35 Table 6-1 above provides an overview of the Parties' horizontal overlaps.

Retail mobile services

6.36 Both O2 and Virgin (through Virgin Mobile) compete to supply retail mobile services to consumers. The Proposed Merger would therefore create a horizontal overlap between the Parties at the retail level.

6.37 We set out in our Issues Statement that the evidence initially seen suggested to us that Virgin Mobile has a low and declining market share at the retail level. The initial evidence also suggested that O2 and Virgin Mobile are not close competitors; in particular that Virgin focusses its mobile offering as an add-on to its fixed services.

- 6.38 During the course of this investigation and as part of our further evidence gathering, we have not found evidence to contradict this initial view.
- 6.39 We note that the CMA and the European Commission have previously found MVNOs, such as Virgin Mobile, do not act as a strong competitive constraint on MNOs (in particular due to an MVNO's lack of 'owner economics').^{116,117}
- 6.40 We therefore consider that this horizontal overlap is limited and it has not been a focus of our investigation.
- 6.41 In addition, we note that O2 is an MNO which owns radio spectrum and operates the necessary infrastructure to supply retail mobile services, whereas Virgin is an MVNO and relies on a wholesale relationship with an MNO to supply these services. Accordingly, the Proposed Merger would not reduce the number of MNOs in the UK.

Services to business customers

- 6.42 The Proposed Merger would also create a horizontal overlap between the Parties' activities in supplying certain services to business customers (including fixed broadband, fixed voice services, business connectivity, internet hosting and certain IT services).
- 6.43 We set out in our Issues Statement that the evidence we had seen showed that the Proposed Merger would result in small increments in each of these and that the Parties do not compete closely in these areas.
- 6.44 During the course of this investigation, we have not received evidence or submissions to contradict this view.
- 6.45 We therefore consider that this overlap is limited, and it has not been a focus of this investigation.
- 6.46 We also note that, in contrast to Virgin, O2 does not own fixed-line networks. It uses wholesale access to such networks when it supplies business customers. Accordingly, the Proposed Merger would not reduce the number of fixed-line network providers in the UK.

¹¹⁶ That is, their dependence on a wholesale contract, which implies higher costs per additional customer served, than is the case for MNOs who have higher fixed costs but lower variable costs.

¹¹⁷ See for example CMA report on the anticipated acquisition by BT Group plc of EE Limited, paragraph 14.197, and European Commission, Hutchison / Telefónica, 11 May 2016, paragraph 969.

Other vertical relationships

Customer foreclosure in relation to wholesale leased lines

- 6.47 In relation to the supply of wholesale leased lines to MNOs, one leased lines supplier submitted that [X] it did not raise concerns or provide evidence on a customer foreclosure theory of harm in the supply of wholesale leased lines.¹¹⁸
- 6.48 As set out in our Issues Statement¹¹⁹, we consider that suppliers of leased lines will continue to be able to sell leased lines to the remaining MNOs and, in the absence of evidence to the contrary, we have not considered a customer foreclosure theory of harm in our assessment.¹²⁰

Other activities

- 6.49 By virtue of their activities as mobile and fixed telecommunications providers, O2 and Virgin also supply a number of other services. These include:
- (a) International roaming services, which only O2 supplies to foreign mobile operators wishing to provide their customers with mobile services.¹²¹
 - (b) Call termination services¹²², which each of O2 and Virgin supply to other communication providers allowing them to connect voice calls to their mobile and fixed networks. The Proposed Merger would not create a horizontal overlap between the Parties as each network constitutes a separate market for which no substitute exists.¹²³
 - (c) The termination and hosting of non-geographic numbers, call origination at fixed locations, domestic call transit on fixed networks and international carrier services which only Virgin provides and where the Proposed Merger would not create horizontal overlaps.
- 6.50 Our Issues Statement indicated that the evidence we had seen showed that the Merged Entity would have no ability to foreclose these services, due to the

¹¹⁸ See also CMA Liberty Global plc/Telefónica S.A. merger inquiry: Issues Statement of 21 January 2021, paragraphs 34 and 39.

¹¹⁹ CMA Liberty Global plc/Telefónica S.A. merger inquiry: Issues Statement of 21 January 2021, paragraph 39.

¹²⁰ I.e., Three and Vodafone.

¹²¹ For completeness, (i) both O2 and Virgin act as buyers for their own mobile customers, each having different international roaming agreements enabling their UK mobile customers to access mobile services outside of the UK; and (ii) Telefónica supplies international roaming services in a number of other countries (including Spain and Germany).

¹²² Call termination is the service provided by one network operator to another network operator in order to allow a call originating on one network to be connected to a subscriber on the other network.

¹²³ See for instance: Case M.7018 – Telefónica Deutschland / E-Plus; recital 87. See also: Ofcom (2018) Mobile Call Termination Market Review 2018-2021; paragraphs 3.64-3.69.

presence of other significant rivals who could supply any customers that the Merged Entity would attempt to foreclose. We have not received representations on any of these activities during the course of this investigation and we have not found it necessary to consider these further in our assessment of the effects of the Proposed Merger.

7. Wholesale leased lines: market definition and background

7.1 This chapter provides an introduction to our assessment of input foreclosure in the supply of wholesale leased lines to MNOs (mobile backhaul). We set out:

- (a) Background information on wholesale leased lines in general and in mobile backhaul specifically;
- (b) Market definition; and
- (c) The theory of harm.

Background

7.2 In this section, we outline the following background information:

- (a) First, we provide an introduction to wholesale leased lines with respect to (i) their applications, (ii) the key technical provisions of wholesale leased lines, and (iii) recent and future developments.
- (b) Second, we set out both the supply and the demand side of mobile backhaul, including (i) who the main suppliers are, (ii) how MNOs procure mobile backhaul and (iii) the current supply relationships.
- (c) Finally, we outline the role of Ofcom's regulatory conditions.

Introduction to leased lines

Applications

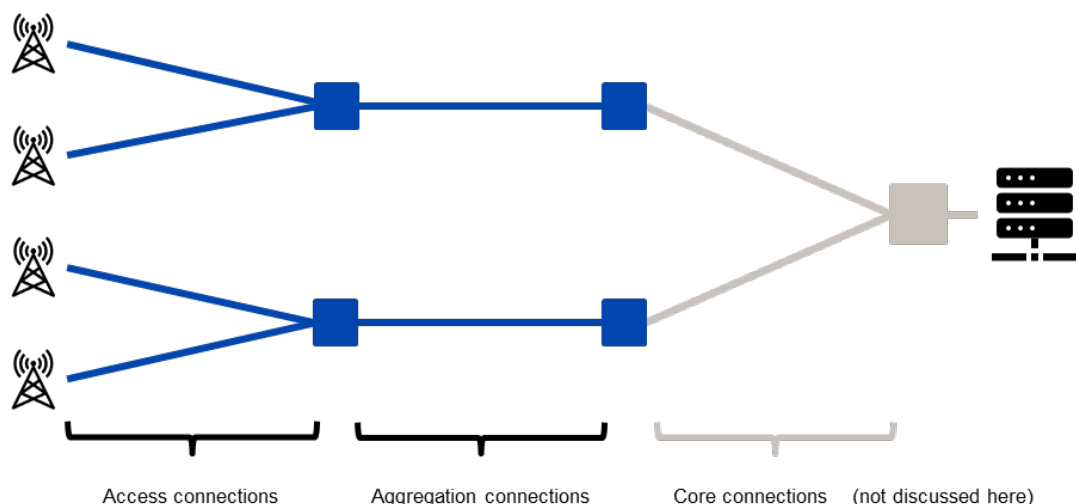
7.3 A leased line is a dedicated, fixed-bandwidth, symmetric (between up- and down-link) data connection, which is used to connect two locations together to allow the transmission of data between them. Leased lines are used in a variety of applications. Wholesale leased lines suppliers serve a range of customers with different requirements.

- 7.4 For example, businesses may use leased lines for the following purposes:¹²⁴
- (a) To connect sites (eg, offices, factories; or private connectivity to public infrastructure);
 - (b) to connect sites to a local exchange or a communications provider's point of presence;¹²⁵
 - (c) to connect to their data or cloud services provider within a data centre;
 - (d) to connect to the internet in the form of a dedicated internet access circuit;
 - (e) to underpin voice services.
- 7.5 Communication providers (including fixed telephony and broadband providers) may use leased lines for the following purposes:
- (a) To connect their customer locations to their networks in order to provide services such as Ethernet, internet protocol virtual private networks (IP VPN), internet and voice services;
 - (b) to create and/or expand their aggregation and core networks, in order to have a network footprint from which to serve customers.
- 7.6 MNOs may use leased lines to connect their radio base stations to their core network; that is, the connections between the sites that contain their computer systems and other equipment necessary for MNOs to provide mobile telecommunication services (servers, switching centres, etc).
- 7.7 An MNO's mobile backhaul consists of three segments that we refer to below as 'layers' (see Figure 7-1):
- (a) To connect mobile base stations (that is, the antennas and electronic equipment that establish connections to individual mobile devices) to local exchanges (the 'access layer');
 - (b) to connect the different local exchanges to aggregating nodes (the 'aggregation layer');
 - (c) to connect aggregating nodes to core nodes ('core connections').

¹²⁴ [X].

¹²⁵ When combined with core or backhaul services, and other networking protocols such as Ethernet or IP VPN, this enables the customer to form a private wide area network (WAN).

Figure 7-1: Mobile network connectivity



Source: CMA, based on Ofcom [BCMR, Volume 2](#), para. 3.10

7.8 We note that use of terminology differs slightly between market participants.

7.9 All of the different applications mentioned above use the same network infrastructure. The network is increasingly reliant on high-capacity fibre lines which are distributed throughout the UK.¹²⁶ The same fibre cable may carry mobile backhaul data, home and business broadband and other data.

7.10 Mobile backhaul constitutes a relatively small proportion of the use of leased lines. The Parties estimate that, in the wholesale leased lines market, [%] of revenues are attributable to mobile backhaul.

7.11 For the purposes of the assessment below, our focus is on leased lines for mobile backhaul and, within mobile backhaul, the focus is on access and aggregation connectivity. We do not consider core connections as we understand from the Parties that all MNOs and fixed network operators operate their own core network.

Technical provision

7.12 Mobile backhaul can be provided using three main transmission media: copper cables, fibre cables and wireless microwave links.

7.13 Our assessment focusses on fibre-based mobile backhaul. This is because fibre-optic transmission of data has largely replaced the less performant electrical transmission over copper cables. Wireless transmission over microwaves has limitations that make it a viable solution for mobile backhaul

¹²⁶ Ofcom, Statement: Promoting competition and investment in fibre networks – review of the physical infrastructure and business connectivity markets, 2 November 2018 [public document].

only when certain conditions are met (for example, demand below a certain bandwidth, distance, availability of a line of sight).¹²⁷

- 7.14 Fibre cables contain multiple strands of single fibres, each able to transmit light. For the transmission of data, technical equipment is necessary at each end of the fibre, for instance to convert electrical signals into optical signals and vice versa.
- 7.15 A provider of fibre-based leased lines may supply either only the physical line itself without any technical equipment (generally referred to as 'passive products' or 'dark fibre') or the leased line together with some or all of the necessary technical equipment and ancillary services (generally referred to as 'active products').
- 7.16 Dark fibre offers a dedicated, unmonitored, unlit point to point optical fibre line between two locations. MNOs install and maintain their own technical equipment necessary to transmit data. Dark fibre has (almost) unlimited capacity and is easily scalable, so allows MNOs to increase or decrease the bandwidth by selecting and configuring this equipment at either end of the dark fibre.
- 7.17 Access to dark fibre can be supplied on a sales-type lease basis, the term of which can extend up to [X] (which according to the Parties corresponds to the physical lifetime of a fibre cable).
- 7.18 The active products which are relevant for mobile backhaul are:
- (a) Wavelength-division multiplexing (WDM):¹²⁸ WDM is a technology which is used to offer high capacity services. It further allows multiple signals to be transmitted over a single fibre by using different wavelengths of light (that is, colours). WDM allows a single fibre to carry different transmission protocols and bandwidths. This technology enables bidirectional transmission and multiplies the capacity of a fibre, depending on the number of channels (that is, wavelengths) used. As a consequence, leased lines suppliers can offer different channels as separate dedicated leased lines over the same fibre (even to different customers). This technology requires several technical components at both ends of the fibre (for example, networking equipment that separates out the wavelengths).

¹²⁷ Ofcom did also not consider microwave could act as a substitute for leased line mobile backhaul services (see [BCMR, Volume 2, Annex 9](#), para A9.10 et seq. [public document]).

¹²⁸ WDM products may also be referred to as 'optical products' or 'optical access products'. We understand that for the purpose of our assessment, they can be used interchangeably. We will use the term WDM.

(b) Ethernet access: signals are transmitted over a fibre or an optical channel using certain communication protocols. The Ethernet protocol is described by a set of standards organised by the Institute of Electrical and Electronics Engineers (IEEE). Ethernet access can be likened to home broadband products (that is, different users' data is transmitted over the same connection) but in contrast to home broadband, Ethernet access provides a constant bandwidth that is not shared with other users. Ethernet access products are commonly offered at bandwidths between 1Mbit/s and 10Gbit/s. Changing the bandwidth of a leased line involves either changing or reconfiguring the technical components at both ends. If a customer requires bandwidth greater than 10Gbit/s, an additional connection is required.

- 7.19 As the end users of mobile backhaul, MNOs will always consume an 'active product' as the transmission of data over a leased line requires technical equipment and certain related services (for example, monitoring, maintenance). What differs between their use of active and passive products is whether the necessary technical equipment and ancillary services are provided by the leased line supplier (in the case of active products) or by the MNO (in the case of dark fibre).
- 7.20 We set out in detail the active and passive products for mobile backhaul supplied in the UK below. In addition to the technical differences between different products, there are different tariff structures, contract periods, and terms and conditions. For instance, it is necessary to distinguish between upfront costs (capital expenditure) and running costs (operating expenditure) in the tariff structures of some suppliers. Whilst some tariffs exhibit relatively flat payment profiles over the contract period, others – in particular long-term contracts for the supply of dark fibre – have high upfront costs and low recurring costs. We consider this further below.

Recent and future developments

- 7.21 The Parties and third parties told us that demand for mobile telecommunication services has been shifting from voice calls and SMS/MMS to mobile data.¹²⁹ Demand for data has increased significantly since the introduction of the fourth-generation technology standard (4G) for mobile telecommunications, for instance due to the ability to view online video on mobile devices.

¹²⁹ See also: Ofcom, [Communications Market Report 2020](#), 30 September 2020, pages 2-3 [public document].

- (a) As an example, an O2 internal document shows that mobile data traffic has increased by around [REDACTED]. In this document, O2 further estimates that the launch of unlimited tariffs and fifth-generation technology standard (5G) for mobile telecommunications will further increase mobile traffic and that in markets with early 5G deployment, data demand has increased by around [REDACTED]%.
- (b) Responses from third parties also indicate that they expect data demand to continue to increase in the future.

7.22 In addition, the rollout of 5G will have an impact on the mobile backhaul required by MNOs. This is because the minimum specifications for 5G mobile technology surpass preceding technologies in a number of aspects:¹³⁰

- (a) Data rates per cell increase;
- (b) User-experienced data rates increase;
- (c) User latency decreases; and
- (d) More devices can connect to a cell site.

7.23 Higher bandwidths and lower latency are partly achieved by using higher-frequency radio waves than previous technologies. These have a shorter physical range and require more antennas in a given area. Increasing data demand and these technological changes require MNOs to upgrade their backhaul networks to meet the demand for data, and to enable higher speeds and lower latency.

7.24 The Parties submitted that there is much uncertainty about future bandwidth demand and the time profile of that growth following 5G rollout:

- (a) They told us that [REDACTED].
- (b) The Parties consider that dark fibre and WDM services offer more bandwidth flexibility. WDM services can expand capacity without requiring additional lines and have a corresponding pricing flexibility. Dark fibre, when leased on the basis of long-term contracts with a high share of rent paid upfront,¹³¹ is more flexible in terms of payment terms, balance sheet risk, and transmission technology that can be implemented.

¹³⁰ International Telecommunication Union (ITU), [Minimum requirements related to technical performance for IMT-2020 radio interface\(s\)](#), 2017 [public document].

¹³¹ Virgin refers to this type of contract as 'IRU' (indefeasible right of use) dark fibre.

(c) The Parties submitted that MNOs do not currently require speeds above 10Gbit/s in the access layer [REDACTED].¹³²

(d) In addition, the Parties expect that MNOs will also procure additional mobile backhaul for small cell sites in urban areas. (That is, cells that support higher frequencies for higher bandwidths but have lower range.)

7.25 The feedback we received from third parties was consistent with the Parties' views on the developments in mobile backhaul technologies:

(a) Third parties anticipate a rise in demand for mobile backhaul over the next five years, mainly driven by higher demand for data and the roll-out of 5G mobile technology which requires mobile backhaul to meet higher transmission speeds and which requires a higher density of antennas than previous mobile technologies.¹³³

(b) MNOs told us that bandwidths of up to 1Gbit/s were standard for low capacity 4G radio access network (RAN) and that these are less suitable for advanced 4G and 5G access. They also considered that bandwidths of up to 10Gbit/s Ethernet services are suitable for 4G and standard 5G RAN sites but not for advanced 5G RAN configurations,¹³⁴ which may be deployed more frequently in the future and require bandwidths of at least 25Gbit/s.

(c) All market participants we contacted told us that dark fibre connections, due to their scalability, are suitable for access connections to 4G and 5G RAN sites, including advanced configurations of 5G.

7.26 Ofcom refers to connections with bandwidths above 1Gbit/s as very high bandwidth (VHB) connections. With respect to the access layer, Ofcom told us that VHB circuits only accounted for [REDACTED].

7.27 Ofcom gathered forecasts from MNOs of their leased line requirements. While it notes that these are subject to uncertainty and reflect each MNO's judgement, Ofcom submitted that [REDACTED].

¹³² In support of this view, the Parties noted that Virgin's dark fibre pricing to [REDACTED]. This contrasts with the aggregation layer, where [REDACTED].

¹³³ For example, Vodafone told us that 'mobile backhaul demand is set to dramatically increase with consumer capacity requirements [REDACTED] and the roll-out of 5G'. Other companies like Colt, Neos Networks and TalkTalk also indicated that they expect demand to increase.

¹³⁴ Currently a piece of equipment known as a baseband unit is located at mobile base stations. CRAN (Centralised RAN or Cloud RAN) involves moving this functionality to a smaller number of sites, deeper in the MNO's network. vRAN (Virtual RAN) involves running the baseband unit as software on generic hardware. These technologies potentially allow MNOs to reduce costs and improve performance. [Why do open RAN? | C-RAN, vRAN and open-RAN explained \(stlpartners.com\)](#)

- 7.28 The responses Ofcom received from MNOs do not consistently distinguish between (i) VHB access circuits above 1Gbit/s and smaller or equal to 10Gbit/s and (ii) VHB access circuits above 10Gbit/s. [REDACTED].
- 7.29 Each of the MNOs submitted forecasts to us on whether they require and/or plan to use circuits with a bandwidth above 10Gbit/s in the access layer:
- (a) Vodafone told us that within its [REDACTED] planning timeframe, it does not consider [REDACTED]. [REDACTED].
 - (b) Three told us that 10Gbit/s Ethernet products are technically suitable [REDACTED]. ([REDACTED].) However, Three stated that in the future it expects to require more than 10Gbit/s backhaul at some sites.¹³⁵ Three also submitted that, for more advanced RAN configurations, it will require higher bandwidths. Three said that it is currently deploying a traditional network architecture. It submitted that [REDACTED]. [REDACTED].
 - (c) BT submitted that its mobile backhaul needs will not exceed 10Gbit/s for the foreseeable future (and certainly for the next three years).
 - (d) O2 told us that it definitely does not see a need for bandwidths above 10Gbit/s [REDACTED].

Suppliers of mobile backhaul

- 7.30 There are a number of providers of leased lines for mobile backhaul in the UK.
- 7.31 They are all considered 'network operators' by Ofcom, meaning that they use their own networks to provide end-to-end connectivity services to customers. Ofcom further splits these into multi-service networks: networks that tend to have a large geographic availability and provide a wide range of services, that is leased lines and broadband; and leased lines-only networks: networks that tend to target large businesses and that are focused in areas with a high density of potential customers, such as business districts and business parks.
- 7.32 BT and Virgin are the largest network operators, and BT, Virgin and CityFibre are the main multi-service networks. In addition, there are several smaller suppliers.

¹³⁵ Three submitted that urban sites with all the available spectrum deployed will need more than 10Gbit/s of backhaul. Three also referred to 5G 'hub' sites that aggregate traffic from multiple other sites.

7.33 We consider these suppliers below, together with the role of aggregators and self-supply by MNOs.

BT

7.34 BT is the main supplier of mobile backhaul in the UK, either through Openreach (which is regulated) or BT Enterprise (which relies in part on regulated inputs from Openreach, but is itself generally unregulated).

7.35 According to Ofcom, BT has the only ubiquitous network in the UK,¹³⁶ and BT provides all of the MNOs with some form of mobile backhaul. This includes, as explained later in paragraph 7.75, [§] of the mobile backhaul requirements for EE.

Openreach

7.36 Openreach is a wholly owned subsidiary of BT but is functionally and legally separated from the rest of the company. As set out in further detail below (paragraphs 7.79 to 7.95), Openreach is subject to regulation by Ofcom.

7.37 Openreach offers all three of the types of leased line products (Ethernet, WDM and dark fibre services), although its dark fibre offering is limited to specific areas where it is required by regulation to offer such access.

(a) The main Ethernet product is Ethernet Access Direct (EAD), which provides services at bandwidths from 10Mbit/s to 10Gbit/s. Historically, EAD 1Gbit/s services were used for mobile backhaul, but mobile backhaul demand is now largely met by the highest bandwidth Ethernet product, that is EAD 10Gbit/s, or WDM services.

(b) In terms of WDM products, Openreach offers Optical Spectrum Access (OSA) products, which are used for mobile backhaul infrastructure (alongside EAD 10Gbit/s). In 2018, Openreach launched a product called OSA Filter Connect (OSA FC), which allows communication providers to incrementally increase bandwidth beyond 10Gbit/s at no extra charge from Openreach. This is an active product and includes a service-monitored 10Gbit/s wavelength as well as open line access to the passive optical block allowing the customers to light up to 15 other wavelengths at no further charge.

(c) Openreach only offers dark fibre when it is required to do so by regulation:

¹³⁶ Ofcom recognises that BT's otherwise ubiquitous network does not include the Hull area.

- (i) In the aggregation layer, Openreach is required to offer dark fibre between BT exchanges that have been designated by Ofcom as a 'BT Only DF exchange.' (These are BT exchanges where BT is the sole Principal Core Operator (PCO) and the nearest rival PCO network is more than 100 metres away.)¹³⁷
- (ii) In the access layer, Openreach is required to offer dark fibre in areas where there is unlikely to be material commercial deployment by rival networks to BT. (See section 'The role of Ofcom's regulatory conditions' below for details).^{138 139}

(d) [✂]

7.38 Openreach does not provide any end-to-end services to retail customers, instead providing wholesale inputs to downstream divisions of BT, such as BT Enterprise, as well as other communication providers.

BT Enterprise

7.39 BT Enterprise offers mobile backhaul services by sourcing regulated upstream mobile backhaul inputs from Openreach and adding an additional value-added layer and transmission.

7.40 Mobile backhaul from BT Enterprise is bought by customers who either do not have a direct relationship with Openreach or who want to take advantage of the aggregation network that BT operates.

7.41 BT Enterprise offers an Ethernet product, called Managed Ethernet Access Service (MEAS), and a WDM product, called Wholesale Mobile Connect. Both of these products offer different bandwidth options. BT Enterprise does not offer any dark fibre services.

Virgin

7.42 Virgin is the second largest supplier of leased lines for mobile backhaul after Openreach, with a network presence in around [✂]% of postcodes and [✂]%

¹³⁷ Of the two BT exchanges, only the 'upstream' B-end must be BT-only (see Openreach (2020) [DFX product description v2 Apr2020](#), page 7 [public document]).

¹³⁸ Ofcom, [2021 WFTMR Volume 3: Non-pricing remedies \(ofcom.org.uk\)](#), section 6 [public document].

¹³⁹ In the access layer, Openreach has only been required to offer dark fibre in areas where there is unlikely to be material commercial deployment by rival networks to BT since April 2021. Openreach told us that the implementation schedule is for a 'soft launch' in August 2021 with a full launch by June 2022.

of postcode sectors in the UK. Virgin's network passes about 16 million or [redacted] of UK homes.¹⁴⁰

- 7.43 Virgin offers all three types of leased line products (Ethernet, WDM, dark fibre) to MNOs, and unlike BT, its dark fibre offering is significant.
- 7.44 For mobile backhaul, Liberty Global submitted that Virgin's dark fibre is 'available for specific projects in access & aggregation'.
- 7.45 Dark fibre contributed around [redacted]% of Virgin's mobile backhaul revenues in 2020 (£[redacted] out of a total £[redacted]).¹⁴¹
- 7.46 Virgin's network is used for a number of purposes, including serving retail customers with fixed voice and broadband services. Liberty Global has stated that it does '[redacted]'.
- 7.47 At present Virgin has [redacted] mobile backhaul contracts.¹⁴² In 2019, it had revenues from the supply of mobile backhaul to MNOs under these contracts of £[redacted], which Virgin estimates to account for just [10-20]% of overall UK mobile backhaul revenues in 2019. [redacted] contracts are in [redacted], and the [redacted] contracts are in the access layer only.

Other suppliers of mobile backhaul

- 7.48 CityFibre is the other main multi-service network next to BT and Virgin. In addition, there are a number of smaller suppliers of mobile backhaul, including Neos Networks, Zayo, Colt and euNetworks. We describe each of these suppliers in Appendix C.
- 7.49 Evidence on these suppliers shows that their network coverage is more limited, and that they are usually focussed on specific geographic areas rather than having national coverage. This is also supported by the following:
- (a) Ofcom designates several smaller suppliers as 'leased lines-only networks' (including Colt and Zayo) and submitted that leased lines-only networks have a 'more limited' network reach and are only 'focussed in areas with high density of business'.¹⁴³

¹⁴⁰ [Virgin Media Fixed Income Q4 2020 release](#).

¹⁴¹ Also see Chapter 8, Table 8-12.

¹⁴² [redacted].

¹⁴³ Ofcom designate CityFibre as the smallest of the Multi-service networks, and all the other providers as Leased lines-only networks.

(b) The tender opportunities that MNOs have run highlight this, as these providers are often associated with a lack of scale.¹⁴⁴ The Parties told us that O2's [REDACTED]. [REDACTED].

7.50 While we understand that MNOs can and do procure mobile backhaul from multiple providers in different areas, we also note that Vodafone told us that it is more efficient and cost-effective to deal with a small number of mobile backhaul suppliers (see paragraphs 7.63 and 7.64).

7.51 However, we have found that the smaller suppliers are growing in size and competitive strength, and are making up an increasing proportion of orders, particularly in regard to dark fibre. This is also supported by the following:

(a) Ofcom submitted that these suppliers are 'increasingly looking to expand their footprints'.

(b) The Parties submitted that growing competition from other players exerts a significant and increasing additional constraint. The Parties further submitted that competitors can bid for an 'anchor tenant' to support build-out in areas where they are not currently present.

(c) BT told us that it was seeing 'increased competition' with 'six or seven providers of mobile backhaul in the market who are making progress'.

7.52 Expansion plans are particularly significant for CityFibre, with CityFibre submitting that its ambition is to create a footprint covering between 25-33% of all UK properties and Three forecasting that CityFibre will [REDACTED]. We describe the expansion plans of CityFibre and other suppliers in Appendix C.

7.53 For completeness, we note that, in addition to the suppliers mentioned above, there are several other suppliers of wholesale leased lines in the UK, including Lumen Technologies UK (previously known as CenturyLink Communications UK), Eir, [REDACTED] and [REDACTED]. However, these suppliers submitted that they do not supply or market mobile backhaul (and/or cannot identify whether their wholesale leased lines are used for mobile backhaul by customers).

The role of network aggregators

7.54 Network aggregators are defined by Ofcom as those who buy services from other network operators and sell them to customers. This often involves

¹⁴⁴ [REDACTED].

purchasing from a few different providers and offering a national service, like is seen with Neos Networks.

- 7.55 Neos Networks is considered by Ofcom to be a network aggregator as well as an operator. [REDACTED]. The Parties also told us [REDACTED].¹⁴⁵
- 7.56 Many of the other suppliers also engage in the resale of leased lines to some extent. The Parties noted that all suppliers ‘have the option of using regulated BT inputs’ and that they may use inputs from other fixed network operators.
- 7.57 However, the Parties told us that reselling is not so relevant for mobile backhaul because MNOs are sophisticated customers who can purchase Openreach’s leased lines to support their network, and there are sometimes restrictions on the resale of dark fibre. We found some evidence that reselling does occur for mobile backhaul, albeit to a small extent:
- (a) Ofcom suggested that in some instances the ‘end-user might not know which network operator is supplying the underlying leased line, as even network operators such as Virgin may use a mixture of their own and third-party access circuits’.
 - (b) Liberty Global submitted that it uses other operators’ leased lines, [REDACTED], when it supplies customers outside of its own footprint.¹⁴⁶ Liberty Global noted however that these resale activities account for less than [REDACTED]% of its total wholesale leased line sales in 2019.¹⁴⁷

Self-supply

- 7.58 MNOs may choose to meet part of their mobile backhaul needs through self-supply. This means that, rather than relying on a third-party supplier to provide network infrastructure, the MNO would deploy its own network.
- 7.59 The Parties submitted that while O2 self-supplies a proportion of its own backhaul arrangements, [REDACTED]. The Parties further submitted that they would expect self-supply to represent a material proportion of backhaul arrangements for EE and Vodafone. (The Parties submitted that Vodafone acquired Cable & Wireless Worldwide in 2012, which gave it ‘a ready-made network suitable for self-providing backhaul in many areas’.)

¹⁴⁵ [REDACTED].

¹⁴⁶ Liberty Global submits that Virgin is only available in [REDACTED]% of postcodes, [REDACTED]% of postcode sectors and for just over [REDACTED] of UK households.

¹⁴⁷ [REDACTED].

- 7.60 We asked each of Vodafone and Three to comment on the extent of their current self-supply and their future plans.
- (a) Vodafone submitted that [redacted]. [redacted] 'The role of Ofcom's regulatory conditions' [redacted].
 - (b) Vodafone submitted that [redacted].
 - (c) Vodafone further submitted that [redacted].
 - (d) Three submitted that in the UK, it is completely dependent on third party providers for leased lines and that it is not able to build its leased line network directly.
 - (e) Three further told us that [redacted]. [redacted]. It also noted that it does not have the expertise, the knowledge or the required skills.
 - (f) Three also told us that the physical infrastructure access (PIA) regulation helps smaller providers to deploy their own infrastructure using BT's ducts and poles, but that it does not change Three's approach to self-build.

How MNOs procure mobile backhaul

- 7.61 MNOs source mobile backhaul from multiple suppliers and use multiple different technologies and products.
- 7.62 Responses from MNOs indicate that the choice of alternative suppliers is determined by several factors, including the availability of their infrastructure, the type of leased line product they require and the cost and/or cost structure.
- 7.63 All MNOs buy from several suppliers. Vodafone told us that it is more efficient and cost-effective to deal with a small number of mobile backhaul suppliers because [redacted]. Vodafone further told us that it considers that suppliers need to have a large enough network footprint to be able to offer lower prices than Openreach charges for its regulated products.
- 7.64 In terms of choosing a supplier, Liberty Global submitted that BT has an incumbency advantage. In particular, Liberty Global submitted that Ofcom finds that for BT, 80-90% of customer sites are on-net, which means that no digging is required to connect the network, compared to only [redacted] % for a rival (mostly Virgin).¹⁴⁸

¹⁴⁸ Liberty Global provided the following source in its response: [2020 WFTMR Volume 2: Market assessment \(ofcom.org.uk\)](https://www.ofcom.org.uk/consult/condocs/wftmr/wftmr2020/wftmr2020_volume2_market_assessment/) Table 8.3. We note that in the WFTMR statement published since, the figures are slightly different,

- 7.65 MNOs do not commonly specify a particular type of product for their mobile backhaul when running a tender;¹⁴⁹ however, their final product choice is to some extent pre-determined by the capabilities (in particular bandwidth, see 'Technical provision' above) of certain technologies.
- 7.66 MNOs tend to agree [REDACTED] contracts.¹⁵⁰ Both Three and Vodafone have [REDACTED] with Virgin.
- 7.67 There are two sharing arrangements between MNOs that are relevant to the procurement of mobile backhaul: the MBNL network sharing joint venture; and the Beacon sharing arrangements.
- 7.68 MBNL is a network sharing joint venture between BT and Three.
- (a) BT and Three procure backhaul through MBNL but also procure backhaul unilaterally. Three submitted that its primary approach to new backhaul requirements is to procure unilaterally.
- (b) The Parties submitted that the MBNL partners agreed to procure backhaul jointly for 4G, but that they decided to procure 5G separately.
- (c) Three submitted that, since the acquisition of EE by BT, [REDACTED]. [REDACTED].
- 7.69 Project Beacon is a network sharing arrangement between Vodafone and O2.¹⁵¹
- (a) [REDACTED].
- (b) [REDACTED].¹⁵²

Current supply relationships

- 7.70 A key feature of the mobile backhaul market, as set out in paragraph 7.61, is that the MNOs tend to use leased lines from a number of different providers at once. This means that each MNO can at any one time have relationships with several different suppliers, either for the direct provision of a certain line or a framework agreement. These are described for each of the MNOs in turn below.

namely 81-90% for BT and 48% for competing networks. Figures relate to 'on-net (duct connected)' and 'Area 2'. Ofcom, [2021 WFTMR Volume 2: Market analysis \(ofcom.org.uk\)](#), Table 8.3.

¹⁴⁹ [REDACTED].

¹⁵⁰ [REDACTED].

¹⁵¹ Project Beacon is discussed in further detail in Chapter 8, section 'The role of the Beacon network sharing arrangements between O2 and Vodafone' and Appendix F.

¹⁵² [REDACTED].

Vodafone

7.71 Vodafone told us that its first preference for mobile backhaul is [REDACTED].¹⁵³ [REDACTED].

7.72 [REDACTED]

(a) [REDACTED]

(b) [REDACTED]¹⁵⁴

(c) [REDACTED]

Three

7.73 Three told us that it has mobile backhaul relationships with a large number of suppliers, listing BT ([REDACTED]), Virgin, CityFibre, Colt, Neos Networks and [REDACTED]. Three sources dark fibre from Virgin, CityFibre, Colt and Neos Networks, but not from BT and [REDACTED].

7.74 Three's main suppliers, measured by its expected annual outlays, [REDACTED].¹⁵⁵

EE

7.75 BT told us that it '[REDACTED]' in terms of sourcing backhaul for the EE mobile network, stating that it '[REDACTED]'. This means that EE [REDACTED].¹⁵⁶

7.76 The future plans for EE [REDACTED], and BT told us [REDACTED]. BT told us [REDACTED].

O2

7.77 Telefónica submitted that, in addition to self-supply, O2 procures mobile backhaul from third parties. O2 currently has procurement relationships with [REDACTED].

7.78 In October 2019, O2 invited a number of providers to tender for the supply of fibre links for its access and aggregation networks. [REDACTED].

¹⁵³ [REDACTED].

¹⁵⁴ [REDACTED].

¹⁵⁵ Three told us that [REDACTED].

¹⁵⁶ KCOM are a supplier of leased lines but we have not included them as alternatives given they are only operational in Hull – see [KCOM](#) | [KCOM](#).

The role of Ofcom's regulatory conditions

- 7.79 In this section, we summarise the regulatory conditions that Ofcom imposes on Openreach in the context of its supply of wholesale leased lines.
- 7.80 Ofcom set out the regulations for mobile backhaul (and wholesale leased lines more generally) in its Wholesale Fixed Telecoms Market Review (WFTMR), which was published in March 2021. The new obligations set out in the WFTMR came into effect from April 2021 and are intended to apply until March 2026.¹⁵⁷
- 7.81 Ofcom's previous market review was the Business Connectivity Market Review (BCMR) which was published in June 2019.¹⁵⁸

Summary of Ofcom's regulatory conditions

- 7.82 Table 7-1 summarises the scope of Ofcom's remedies as set out in the WFTMR in relation to (i) Openreach's active leased line services (Ethernet and WDM at all bandwidths) and (ii) the introduction of a dark fibre remedy. The table shows the remedies for the access and aggregation layer for the different geographic markets.
- 7.83 In the access layer, these different geographic markets are:
- (a) the Central London Area (CLA) where several suppliers are present;
 - (b) the HNR areas which are characterised by the presence of BT and more than one other operator;
 - (c) Area 2 (where there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks); and
 - (d) Area 3 (where there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks).¹⁵⁹
- 7.84 In the aggregation layer, these different geographic markets are:
- (a) BT-only exchanges;

¹⁵⁷ Ofcom, [WFTMR Statement](#), 18 March 2021.

¹⁵⁸ Ofcom, [BCMR Statement](#), 28 June 2019.

¹⁵⁹ [2021 WFTMR Volume 2: Market analysis \(ofcom.org.uk\)](#), paragraphs 7.7-7.9 [public document]. [Volume 2: market analysis, SMP findings, and remedies for the Business Connectivity Market Review \(BCMR\) \(ofcom.org.uk\)](#) paragraphs 5.2 and 5.3 [public document].

- (b) BT+1 exchanges (where BT and one other supplier is present); and
- (c) BT+2 exchanges (where BT and two or more other suppliers are present).¹⁶⁰

7.85 We describe these markets in ‘Market definition’ below.

Table 7-1: Summary of Ofcom’s regulatory conditions¹⁶¹

	Access layer geographic markets*			Aggregation layer geographic markets†	
	Area 3	Area 2	HNR Areas	BT-only exchanges	BT+1 exchanges
Network access‡	✓	✓	✓	✓	✓
Transparency	✓	✓	✓	✓	✓
EOI / Non-discrimination	✓	✓	✓	✓	✓
Charge control	Flat prices in real terms		Fair & reasonable	Flat prices in real terms	
Quality of Service Standards¶	✓	✓	✗	✓	✓
No geographic discounts	✗	New remedy	✗	✗	✗
Cost-based dark fibre obligation	✓ New remedy	✗	✗	✓#	✗

Source: *Ofcom, 2021 WFTMR Volume 1: Overview, summary and introduction (ofcom.org.uk)*

Note: Ofcom’s regulations under the WFTMR are broadly similar to the regulations under the BCMR, except for introducing two new remedies: a) prohibition of geographic discounts in Area 2; and b) dark fibre obligations in Area 3.

* High Network Reach (HNR) areas are characterised by the presence of BT and more than one other operator; Area 2 is where there is already some material commercial deployment by rival networks to BT or where this could be economic; and Area 3 is where there is unlikely to be material commercial deployment by rival networks to BT. Ofcom, *2021 WFTMR Volume 2: Market analysis (ofcom.org.uk)*, paragraph 7.26.

† In line with paragraph 7.37(c) above, when assessing the number of operators present at a BT exchange, Ofcom only counts Principal Core Operators (PCOs). Thus, in the context of the aggregation layer, references to BT+1 exchanges (for example) should be read as being BT exchanges where one PCO is present.

‡ There is a separate requirement for Openreach to have a Statement of Requirements (SoR) process under which access seekers can request new forms of access.

¶ As explained in footnote 168, in HNR areas there is only an obligation to publish KPIs.

From BT-only exchanges where the nearest rival network is more than 100m away.

7.86 We set out Ofcom’s regulations for active services before setting out dark fibre regulations.

Price regulations for active services

7.87 Under the WFTMR, Ofcom continues to require Openreach to provide active leased lines in all the relevant markets where BT was found to have significant market power (SMP):¹⁶²

- (a) In areas where BT is unlikely to face competition from rival networks (that is, Area 3 in the access layer and those BT-only exchanges in the

¹⁶⁰ [Volume 2: market analysis, SMP findings, and remedies for the Business Connectivity Market Review \(BCMR\) \(ofcom.org.uk\)](#) paragraph 8.77, and also [2021 WFTMR Volume 2: Market analysis \(ofcom.org.uk\)](#), paragraph 7.249 [public document].

¹⁶¹ Ofcom does not impose regulatory conditions in competitive areas (the CLA in the access layer and BT+2 exchanges in the aggregation layer). In addition, the table does not cover the Hull Area, where KCOM is the incumbent operator and Virgin is not present.

¹⁶² SMP is equivalent to the competition law concept of dominance.

aggregation layer where the nearest rival PCO network is more than 100 metres away), Ofcom requires Openreach to provide active leased lines with prices held constant in real terms and also requires Openreach to supply dark fibre at a cost-based price (see below). We note that Ofcom expects dark fibre access to become the primary leased line remedy over time in these areas.

- (b) In Area 2 in the access layer and the other parts of the aggregation layer where BT has SMP (namely the remaining BT-only exchange and BT+1 exchanges), Ofcom requires Openreach to provide active leased line services, with prices held constant in real terms.
- (c) In areas where BT faces competition from two or more rivals in the access layer (which Ofcom refers to as high network reach (HNR) areas), Ofcom requires Openreach to provide active leased line access services, with minimal price regulation (charges must be 'fair and reasonable'). Although these areas are not yet fully competitive, Ofcom found competition to be more developed and considers that there is the potential for them to emerge as fully competitive in the future.

7.88 Ofcom's price cap is set across a basket of products,¹⁶³ which gives Openreach some flexibility when setting prices for different services or geographic areas. Compliance requires that the weighted average of the percentage change in the price of the overall basket be no greater than inflation (measured by CPI). The weighted average is calculated over:

- (a) All Ethernet services in the basket: Ofcom imposed a broad basket of Ethernet services across all bandwidths including rental, connection and main link charges.¹⁶⁴ There are separate caps on each individual component of Openreach's WDM services.¹⁶⁵
- (b) Different segments and geographic markets: the weighted average is calculated to include volumes in all access and aggregation markets that are subject to the price cap (that is, Area 2, Area 3, BT-only and BT+1 exchanges).

7.89 In relation to Ofcom's 'fair and reasonable' charges obligation in HNR Areas, Ofcom interprets this to mean that BT should not set prices that would equate

¹⁶³ A charge control basket is defined as the group of services that are subject to a common charge control restriction. Combining services in a single basket means that the price cap (eg CPI-X) would apply to changes in the charges of all the services in the basket weighted by revenue.

¹⁶⁴ Main Link charges are subject to a CPI-0% sub-cap within the broader basket given its importance to connectivity and because it has a relatively low weighting in the basket.

¹⁶⁵ [Volume 4: Pricing remedies \(ofcom.org.uk\)](#), paragraph 6.111.

to a margin squeeze under ex post competition law for existing and new forms of network access.¹⁶⁶

Other regulations for active services

- 7.90 In addition, Ofcom imposed other general remedies in relation to all active services in both the access and aggregation layers.¹⁶⁷ These include:
- (a) Non-discrimination requirements to prevent potential discrimination, including in favour of BT's own downstream divisions (see more details below). In effect this means that all customers (including BT's downstream businesses) need to be treated the same.
 - (b) Transparency requirements to publish a reference offer, notify changes to charges and terms and conditions, and notify technical information.
 - (c) Specifying quality of service (QoS) standards and reporting requirements in relation to Openreach's QoS performance, except for HNR Areas.¹⁶⁸
- 7.91 Ofcom's non-discrimination obligation on Openreach is in the form of an Equivalence of Inputs (EOI) requirement and No Undue Discrimination (NUD) requirement.
- (a) EOI is a strict form of non-discrimination, that is, a complete prohibition of discrimination with no discretion. Openreach needs to supply exactly the same services to all telecoms providers (including its own downstream divisions) on the same timescales, terms and conditions (including price and service levels), by means of the same systems and processes and by providing the same information.
 - (b) Ofcom interprets undue discrimination to be when Openreach 'does not reflect relevant differences between (or does not reflect relevant similarities in) the circumstances of customers in the transaction conditions it offers, and where such behaviour could harm competition.'
- 7.92 The 'no undue discrimination' obligation and EOI requirement apply in respect of both active products and dark fibre, subject to some exceptions relating to

¹⁶⁶ Ofcom, [2021 WFTMR Volume 4: Pricing remedies \(ofcom.org.uk\)](#), footnote 1 [public document].

¹⁶⁷ Ofcom, [2021 WFTMR Volume 3: Non-pricing remedies \(ofcom.org.uk\)](#), table 3.1 [public document].

¹⁶⁸ Ofcom considered that there is less need for stringent QoS regulation in HNR areas. Ofcom requires the provision of specific KPIs on Openreach's performance against the QoS standards in the HNR areas. Ofcom has the option of amending the QoS Direction to extend the scope of the QoS standards to include HNR areas, should it observe a significant deterioration in Openreach's performance.

EOI requirements.¹⁶⁹ Services that are not subject to EOI are still protected by the no undue discrimination obligation, which limits BT's ability to favour its own downstream activities.

Dark fibre regulations

- 7.93 In the access layer, there had previously been no regulation that required Openreach to provide dark fibre. However, with the WFTMR, Ofcom introduced an obligation for BT to provide cost-based dark fibre. In the access layer this remedy is limited to areas where there is unlikely to be material commercial deployment by rival multi-service networks to BT (defined by Ofcom as 'Area 3'). Openreach is required to do a 'soft launch' of its dark fibre product in Area 3 by 17 August 2021 and a full launch by 1 June 2022.¹⁷⁰
- 7.94 Ofcom told us that this remedy is intended to address BT's SMP. Ofcom imposed a dark fibre remedy (rather than solely relying on a requirement to provide active leased lines) since it considers that this provides users with a more flexible input to the downstream services that they provide.
- 7.95 In the aggregation layer, Ofcom maintained its requirement that Openreach provides dark fibre at a regulated price between BT-only exchanges where the nearest rival PCO network is more than 100 metres away. This requirement applies to approximately two-thirds of BT exchanges.¹⁷¹

PIA

- 7.96 Ofcom defines a national upstream market for the supply of telecoms physical infrastructure (that is, underground ducts, telegraph poles etc which can be used to host elements of a telecoms network).
- 7.97 In the WFTMR, Ofcom found that BT has SMP in this market and, to address this SMP, Openreach is required to provide access to its physical infrastructure at a cost-based price (referred to as PIA). This effectively maintains the regulatory requirements that Ofcom introduced in 2019. PIA is intended to assist other companies that wish to deploy their own fibre networks.

¹⁶⁹ EOI exemptions: services which are not already supplied on an EOI basis; accommodation services other than in relation to the allocation of space and power; certain aspects of wholesale WDM circuits; BT's core network; dark fibre used by Openreach as an input to its active services; and such provision of network access as Ofcom may consent to in writing.

¹⁷⁰ Ofcom, [2021 WFTMR Volume 3: Non-pricing remedies \(ofcom.org.uk\)](#), Table 6.5.

¹⁷¹ Ofcom identified amongst a total of 5,569 BT exchanges that 4,275 were BT-only, 745 were BT+1 and 549 were BT+2 or more. Of the 4,275 BT-only exchanges, the dark fibre requirement applies to 3,763 of them. Ofcom, [Schedule 4: List of BT exchanges for the purpose of identifying interexchange connectivity markets](#).

- 7.98 In the WFTMR, Ofcom set out its assessment of the prospects of fixed network build including the potential use of PIA over the period from 2021 to 2026, noting that the evidence suggests that:
- (a) The re-use of existing physical infrastructure (almost always using PIA) is a significant factor in many network investment plans;
 - (b) the use of PIA will increase significantly over the period to 2026 to facilitate network rollout; and
 - (c) actual take-up of PIA remains in the early phases and Ofcom has yet to see the impact of large-scale use.¹⁷²

Market definition

- 7.99 In this section, we present our view of the relevant product and geographic market.
- 7.100 Market definition provides a framework for the analysis of the competitive effects of a merger. The relevant market (or markets) is the market within which the merger may give rise to an SLC and contains the most significant competitive alternatives available to the customers of the merged companies. Market definition is a useful analytical tool, but not an end in itself, and identifying the relevant market involves an element of judgement.¹⁷³
- 7.101 The boundaries of the market do not determine the outcome of our analysis of the competitive effects of a merger in any mechanistic way. In assessing whether a merger may be expected to give rise to an SLC, we may take into account constraints from outside the relevant market, segmentation within the relevant market, or other ways in which some constraints are more important than others.¹⁷⁴
- 7.102 In practice, the analysis underpinning the identification of the market or markets and the assessment of the competitive effects of a merger overlap, with many of the factors affecting market definition being relevant to the assessment of competitive effects and vice versa.¹⁷⁵
- 7.103 We assess market definition based on the evidence received.

¹⁷² Ofcom, [2021 WFTMR Annexes 1-26](#), paragraph A3.3.

¹⁷³ [MAGs](#), paragraphs 5.2.1–5.2.2.

¹⁷⁴ [MAGs](#), paragraph 5.2.2.

¹⁷⁵ [MAGs](#), paragraph 5.1.1.

Product market definition

7.104 The focus of analysis in this case is on Virgin's provision of dark fibre for mobile backhaul, see paragraph 7.159. We therefore start our assessment of the product market using dark fibre as a focal product. This is the narrowest plausible candidate product market.¹⁷⁶ We then assess whether there are demand or supply-side constraints that suggest that there could be a broader market.¹⁷⁷

7.105 In particular, we consider in turn the substitutability of:

- (a) Dark fibre mobile backhaul with mobile backhaul using active fibre leased line products; and
- (b) dark fibre mobile backhaul with other wholesale leased lines.

7.106 We also consider whether a distinction should be made between the access and the aggregation layers.

Substitutability of dark fibre mobile backhaul with mobile backhaul using active fibre leased lines

7.107 As set out above, mobile backhaul (and wholesale leased lines more generally) can be supplied either as passive infrastructure, where leased lines are provided as dark fibre on which the customer adds electronic equipment to 'light' the fibre, or as active infrastructure, where the provided leased lines include both the fibre infrastructure and some or all of the necessary electronic equipment.

7.108 The extent to which dark fibre mobile backhaul can be substituted with mobile backhaul using active fibre leased lines is central to the theory of harm and we set out the substitutability of dark fibre and active fibre leased lines in detail as part of our competitive assessment.

7.109 It is less critical to determine whether dark fibre and active fibre lines would formally be part of the same product market or form different product markets with well-defined boundaries, as we are not calculating market shares or other measures of concentration.

¹⁷⁶ MAGs, paragraph 5.2.11.

¹⁷⁷ MAGs, section 5.2.

7.110 We nonetheless consider some recent industry precedents and the relevant evidence that has emerged from our competitive assessment to inform a ‘hypothetical monopolist’ test.¹⁷⁸

7.111 Initially, we set out Ofcom’s view on market definition.

- (a) In its BCMR and WFTMR, Ofcom has considered that there is a single market for leased lines access services (that is, in the access layer), including active services and dark fibre.
- (b) Ofcom has also found in its BCMR and WFTMR that dark fibre is a supply-side substitute to active services for inter-exchange connectivity services (that is, in the aggregation layer).¹⁷⁹

7.112 We note that there are differences between the approach to market definition within Ofcom’s market reviews and the approach to market definition in our assessment. These include that:

- (a) Ofcom analyses market definition in relation to a hypothetical scenario where there are no ex-ante SMP remedies in the reference market (as opposed to taking into account the regulatory regime and how it may impact demand and supply-side substitutability);
- (b) Ofcom uses active products as a focal product,¹⁸⁰ while our focal product is dark fibre (given that the focus of the theory of harm is on Virgin’s provision of dark fibre);¹⁸¹ and
- (c) we are only required to define the relevant market for the purpose of assessing whether the Proposed Merger gives rise to an SLC within any market or markets in the UK for goods or services.

7.113 In terms of demand-side substitutability, the evidence we set out in our competitive assessment (Chapter 8) suggests that MNOs could, from a technical perspective, substitute active leased lines for dark fibre in order to meet their mobile backhaul requirements. However, the evidence also shows that some MNOs perceive that there are certain advantages to using dark fibre, with Three and Vodafone having an [✂].

¹⁷⁸ MAGs, section 5.2.

¹⁷⁹ We note that the BCMR uses the terminology contemporary interface (CI) access services and CI inter-exchange connectivity. [Volume 2: market analysis, SMP findings, and remedies for the Business Connectivity Market Review \(BCMR\) \(ofcom.org.uk\)](#) paragraphs 7.69-7.72; [2021 WFTMR Volume 2: Market analysis \(ofcom.org.uk\)](#) paragraphs 6.141 and 6.145.

¹⁸⁰ Ofcom, [2021 WFTMR Volume 2: Market analysis](#), paragraphs 3.15 – 3.23 [public document].

¹⁸¹ It is well-accepted that there is no one ‘correct’ market definition that applies in a given industry, and that it is possible to arrive at different market definitions in the same industry depending on the focal point.

- 7.114 We have further assessed the cost difference between dark fibre and active leased lines. However, there are inherent difficulties in assessing cost differences between using dark fibre and active leased lines. These relate to practical issues of comparing costs on a like-for-like basis (as set out in further detail in Chapter 8) but also because cost differences vary by customer and are sensitive to the precise active product used for the comparison). In addition, dark fibre and active leased lines are differentiated products, such that a comparison of price levels will not be informative on whether these are in the same market.
- 7.115 In terms of supply-side substitutability, we note that [✂].
- 7.116 Overall, we consider that the evidence on substitutability shows that there are alternative options for users of dark fibre that they can switch to, including at least certain types of active leased line products.
- 7.117 While this may mean that the relevant product market is wider than dark fibre only, the evidence we hold does not allow us to draw exact boundaries.
- 7.118 Whilst our analysis shows indications that the relevant market is broader than dark fibre, it is less critical to determine the precise boundaries of the market, or whether all active fibre products would formally be part of the relevant product market, as our competitive analysis captures the impact of the most relevant competitive constraints.
- 7.119 We have therefore left the market definition open as our view is that it does not change the outcome of our competitive assessment.

Substitutability of dark fibre mobile backhaul with wholesale leased lines used for other purposes

- 7.120 As set out above, wholesale leased lines are used by different types of customer for different purposes. Below, we set out our assessment of whether dark fibre supplied to MNOs as mobile backhaul and wholesale leased lines used for other purposes are part of the same product market or form different product markets.
- 7.121 Initially, we note that Ofcom concluded in both the BCMR and the WFTMR that mobile backhaul was part of the leased lines access services market (that is, the access layer), rather than a separate product market, on the basis of the homogeneity of competitive conditions.¹⁸² Ofcom further defined a product

¹⁸² We note that the BCMR uses the terminology CI access services. [BCMR Annexes 1-25 of 26](#), 28 June 2019, annex 9.3, [2021 WFTMR Volume 2: Market analysis \(ofcom.org.uk\)](#) paragraph 6.115.

market for inter-exchange connectivity services (that is, the aggregation layer) consisting of all inter-exchange services; that is, it did not make a distinction between mobile backhaul and other uses of wholesale leased lines.¹⁸³

- 7.122 We consider that whether dark fibre supplied to MNOs as mobile backhaul and wholesale leased lines used for other purposes are part of the same market is a question of supply-side substitutability.
- 7.123 The Parties submitted that suppliers of leased lines can and do equally supply leased lines for mobile backhaul, for fixed backhaul or for supply to business customers.
- 7.124 BT, Colt and Neos Networks submitted that mobile backhaul and wholesale leased lines supplied to other users are interchangeable, although Colt also told us that ‘the answer is more nuanced’, submitting that bandwidths, service level agreements and cost are not always aligned, but that wholesale leased lines for other uses can be used for mobile backhaul. Neos Networks further submitted that, while MNOs have a small number of industry specific technical requirements, most of these can be accommodated through standard leased lines.
- 7.125 Three submitted that mobile backhaul and wholesale leased lines supplied to other users may be, but are not necessarily, interchangeable, while CityFibre and Vodafone submitted that mobile backhaul and wholesale leased lines supplied to other users are not interchangeable. Three and CityFibre also submitted that MNOs have specific service level requirements, with Three submitting that not all leased line providers are able to provide these.¹⁸⁴ Three further submitted that a leased lines provider may not have the network topology to serve an MNO.¹⁸⁵
- 7.126 From the submissions of Three and City Fibre, it is unclear (i) how much of an obstacle specific service level requirements would be for a supplier of wholesale leased lines and (ii) to what extent they apply to the provision of dark fibre, where we understand that the provider merely supplies the physical infrastructure.
- 7.127 The largest suppliers of wholesale leased lines (BT and Virgin) as well as several smaller suppliers such as CityFibre, Colt and Neos Networks all supply mobile backhaul. However, there are also suppliers of wholesale

¹⁸³ We note that the BCMR uses the terminology CI inter-exchange connectivity services. [BCMR, Volume 2, 28 June 2019, paragraph 7.78 \[public document\]](#); [2021 WFTMR Volume 2: Market analysis \(ofcom.org.uk\)](#) paragraph 6.144.

¹⁸⁴ Three listed transport synchronisation and guaranteed latency, jitter, wander and packet loss levels [§].

¹⁸⁵ Three submitted that mobile sites are often located significant distances from areas typically served by leased line providers (ie business parks or city centres with large concentrations of businesses).

leased lines that have told us that they do not supply mobile backhaul and do not have plans to do so, including Eir, [REDACTED] and [REDACTED].

7.128 Our view is that, while we have received some evidence that MNOs' requirements can differ from other users of leased lines to some extent, wholesale leased lines supplied to MNOs as mobile backhaul and wholesale leased lines used for other purposes are likely to be part of the same product market.

7.129 While our competitive assessment therefore takes into account all suppliers of wholesale leased lines, we primarily consider those suppliers that are currently supplying mobile backhaul or have plans to start doing so.

Distinction between access and aggregation layer

7.130 As set out above, mobile backhaul consists of (i) an access layer, which are the leased lines typically connecting the MNO's radio base station to an access aggregation node and (ii) an aggregation layer, which is the leased lines connecting access aggregation nodes to backhaul aggregation nodes, backhaul aggregation nodes with each other, and backhaul aggregation nodes to core nodes.

7.131 This section sets out our assessment of whether the access layer and the aggregation layer are part of the same product market or form different product markets.

7.132 Initially, we note that in both the BCMR and the WFTMR Ofcom distinguishes between leased lines access services (which refer to the access layer) and inter-exchange connectivity services (which refer to the aggregation layer) and defines them as separate product markets.¹⁸⁶

7.133 From a demand-side perspective, and given that the two layers constitute different parts of the network, a circuit in one layer cannot be substituted for a circuit in the other layer.

7.134 From a supply-side perspective, the Parties submitted that the two layers form part of a single market. The Parties submitted that, while bandwidth tends to be higher in the aggregation layer, bandwidth requirements in a more rural area in the aggregation layer could well be below bandwidth required for an access connection of a busy urban site in which multiple sectors are installed

¹⁸⁶ We note that the BCMR uses the terminology CI access services and CI inter-exchange connectivity services. [Volume 2: market analysis, SMP findings, and remedies for the Business Connectivity Market Review \(BCMR\) \(ofcom.org.uk\)](#) page 4; [2021 WFTMR Volume 2: Market analysis \(ofcom.org.uk\)](#), paragraph 1.1 [public document].

and transmission equipment at many different frequencies are deployed. The Parties further submitted that for circuits with similar bandwidth requirements, the same products in the access and aggregation layer are likely to be deployed.

7.135 However, the Parties' submission does not take into account the role of existing network density in a given layer. In particular, without any network presence in a given layer, a supplier has to deploy such network in order to connect customers in that layer (even if the supplier already had network presence in the respective other layer). We understand such deployment requires time and significant investment.

7.136 In line with this, third parties largely submitted that a supplier that is only active in the aggregation layer could not, within a short time frame and at minimal cost, switch to supplying leased lines in the access layer or vice-versa:

- (a) BT, Three, Vodafone, CityFibre, Colt, TalkTalk and Eir all submitted that switching was not possible within a short time frame and at minimal cost.
- (b) Three, Vodafone, Colt and TalkTalk submitted that a switch would require significant investment to construct the network for the new layer.
- (c) Three, Colt and TalkTalk submitted that switching would be time consuming, although Colt also noted the option of utilising regulated duct/fibre offerings or buying wholesale leased lines from another supplier.
- (d) Only MBNL and Neos Networks submitted that such switching was possible, although Neos Networks further submitted that a switch to supplying leased lines in the access layer would be possible by utilising wholesale access products, while a switch to supplying leased lines in the aggregation layer would require some increased investment.

7.137 Third parties submitted that most leased line suppliers offer leased lines in both the access layer and the aggregation layer, although one third party submitted that suppliers may focus on only one layer.

- (a) BT, Vodafone, MBNL, Neos Networks, Colt and Eir all submitted that most leased line suppliers offer leased lines in both the access layer and the aggregation layer, while no third party submitted that this was not the case.

- (b) TalkTalk submitted that while the two largest operators (Openreach and Virgin) are active in both layers, other providers focus on the access layer (eg Colt) or the aggregation layer (eg Zayo).

7.138 While the presence of the same or a similar set of suppliers may indicate some similarity in the competitive conditions, we note that Ofcom indicated that competitive conditions are likely to differ, with the competition bottleneck being typically in the access layer.¹⁸⁷

7.139 Our view is that leased lines in the access layer and in the aggregation layer are not substitutable from a demand-side perspective or from a supply-side perspective.

View on product market definition

7.140 Our view with respect to the product market definition is as follows:

- (a) Dark fibre users can switch to alternative options, including certain types of active products, which may point to a relevant product market that is wider than dark fibre. However, the evidence does not allow us to draw exact boundaries and we have left the market definition open in this respect as, in any case, it does not change the outcome of our competitive assessment.
- (b) Mobile backhaul and wholesale leased lines used for other purposes are likely to form part of the same product market. However, we also note that MNOs' requirements may differ from those of other customers.
- (c) The access layer and the aggregation layer are likely to form distinct product markets.

Geographic market definition

7.141 The Parties submitted that there is no significant variation in either demand or supply conditions across different areas of the UK (for the supply of leased lines) and therefore the geographic market can be defined as national.

7.142 The Parties further submitted that Ofcom's regulations aim at levelling competitive conditions across different geographic areas and that since all suppliers of leased lines have the same access to Openreach inputs,

¹⁸⁷ Ofcom submitted that the different purpose of access and aggregation services leads to a difference in competitive conditions: whereas access connections are limited to individual business (and mobile) demand, the aggregation layer combine the demand of consumers (primarily residential broadband), businesses and mobile operators.

regulation allows supply-side substitution overall to be extended beyond individual suppliers' network footprints.

7.143 Third parties have told us that in the supply of leased lines, the number and the identity of competitors vary strongly across different regions within the UK.¹⁸⁸

Access layer

7.144 In the WFTMR, Ofcom retained the BCMR concept of geographically distinct sub-markets within the UK, albeit with slightly different terminology. The distinct geographic markets under the WFTMR are:

- (a) The Central London Area (CLA) where several suppliers are present;
- (b) the HNR areas which are characterised by the presence of BT and more than one other operator;
- (c) Area 2 (where there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks); and
- (d) Area 3 (where there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks).¹⁸⁹

7.145 Ofcom did not provide us with figures for the proportion of MNO backhaul that sits within each of these markets. However, it did provide figures for 2017 relating to its previous market review (which used somewhat different geographic definitions). In that review, approximately 61% of MNO sites were in BT-only areas, 31% were in BT+1 areas, 4% were in other HNR areas and 3% were in the CLA.¹⁹⁰

7.146 We understand that the largest cost in providing leased lines is digging a route.

7.147 In the access layer, we further understand that substitutability with leased lines offered by alternative providers quickly disappears as the distance

¹⁸⁸ [REDACTED].

¹⁸⁹ 2021 WFTMR Volume 2: Market analysis (ofcom.org.uk), paragraphs 7.7 - 7.9 [public document]. Volume 2: market analysis, SMP findings, and remedies for the Business Connectivity Market Review (BCMR) (ofcom.org.uk) paragraphs 5.2 and 5.3 [public document].

¹⁹⁰ Ofcom defined geographic markets based on the presence of infrastructure belonging to networks other than BT. Ofcom said that it categorised areas based on the situation facing a typical customer in that area.

between the base station and the providers' nearest point of presence increases. In particular, the Parties submitted that, in the [REDACTED].

7.148 MNOs' access to a regulated Openreach product may soften differences in competitive conditions between different areas to some extent. However, tenders indicate that network presence of a given supplier is a key factor for MNOs in choosing their supplier.¹⁹¹

Aggregation layer

7.149 In its BCMR, Ofcom has previously defined each BT exchange in the aggregation layer to be a separate geographic market.¹⁹² In its WFTMR, Ofcom retained this geographic market definition.¹⁹³ Ofcom classifies exchanges by the number of suppliers present at each exchange, namely BT-only, BT+1 (where BT and one other supplier is present) and BT+2 (where BT and two or more other suppliers are present). While each exchange is a separate market, Ofcom continues to group those exchanges as BT-only, BT+1 and BT+2 exchanges.¹⁹⁴

7.150 While we understand that BT exchanges only form part of the aggregation layer, the Parties submitted that the vast majority of aggregation points are BT exchanges, because customers (such as MNOs) build their network along the BT network.

7.151 Other than the Parties' general point about the availability of Openreach (which we do not consider is likely to replicate the presence of an additional supplier with its own infrastructure), we did not receive any evidence to indicate that Ofcom's classifications should be further widened or narrowed.

View on geographic market definition

7.152 Our view is that the geographic market for both the access layer and the aggregation layer is likely to be local.¹⁹⁵

¹⁹¹ [REDACTED].

¹⁹² [Volume 2: market analysis, SMP findings, and remedies for the Business Connectivity Market Review \(BCMR\) \(ofcom.org.uk\)](#) paragraph 7.76 [public document].

¹⁹³ [2021 WFTMR Volume 2: Market analysis \(ofcom.org.uk\)](#), paragraph 7.233 [public document].

¹⁹⁴ [Volume 2: market analysis, SMP findings, and remedies for the Business Connectivity Market Review \(BCMR\) \(ofcom.org.uk\)](#) paragraph 8.77, and also [2021 WFTMR Volume 2: Market analysis \(ofcom.org.uk\)](#), paragraph 7.249 [public document].

¹⁹⁵ In the access layer, this means four distinct areas (the CLA, the HNR, Area 2 and Area 3). In the aggregation layer, this means individual BT exchanges, which may be grouped into BT Only, BT+1 and BT+2 exchanges.

Theory of harm

7.153 As set out above, Virgin is the second largest provider of mobile backhaul to MNOs in the UK. Virgin currently supplies mobile backhaul to Three, MBNL (the network sharing joint venture between BT and Three), Vodafone and O2. In addition, it [REDACTED].

7.154 The Proposed Merger would combine Virgin, the second largest supplier of mobile backhaul, with O2, the largest supplier of retail mobile services in the UK.¹⁹⁶

- (a) Three [REDACTED] raised concerns that the Merged Entity could engage in an input foreclosure strategy with respect to the supply of mobile backhaul to MNOs.
- (b) As a related concern, Three and Vodafone submitted that the Proposed Merger may result in a loss of a competitive constraint on BT.
- (c) [REDACTED], CityFibre and [REDACTED] submitted that the Proposed Merger will or may reduce the incentive of Virgin to supply leased lines to competing MNOs; and
- (d) BT submitted that the Merged Entity may favour its own downstream business.

7.155 Three and Vodafone's concerns focus [REDACTED] Three and Vodafone have submitted [REDACTED]. [REDACTED].

7.156 Three submitted that it is not only concerned about direct sourcing of mobile backhaul from Virgin but also about indirect sourcing ([REDACTED]).

7.157 Taking into account the submissions from third parties, we have identified a number of different ways by which the Merged Entity could pursue a foreclosure strategy with respect to mobile backhaul:

- (a) Strategy 1: withdraw supply of dark fibre or mobile backhaul more generally;
- (b) Strategy 2: increase prices for mobile backhaul; and

¹⁹⁶ [REDACTED].

(c) Strategy 3: decrease the quality of its mobile backhaul offering (by delaying dark fibre roll-out and/or by delaying repairs of connections).¹⁹⁷

7.158 We note that the main ‘targets’ for an input foreclosure strategy by Virgin are Three and Vodafone. This is because they are the only MNOs, other than O2, that substantially rely on Virgin for their mobile backhaul requirements, given that [REDACTED].

7.159 We therefore focus our competitive assessment on the potential impact on Three and Vodafone. Additionally, and in line with the concerns raised by third parties, we focus our assessment on an input foreclosure strategy with respect to dark fibre. Where relevant, we also set out any wider input foreclosure concerns with respect to mobile backhaul.

7.160 To the extent that Virgin’s supply of dark fibre is constrained by the supply of active leased lines by Openreach, we also consider the impact that the change of Ofcom’s regulation may have on Openreach’s pricing strategy. And relatedly, given the highly concentrated nature of the backhaul supply – with BT and Virgin being the only suppliers in large parts of the country – we also consider whether Openreach may act strategically in response to the Proposed Merger by changing its pricing.

8. Wholesale leased lines: competitive assessment

Introduction

8.1 We frame our competitive assessment by reference to the following three questions, as set out in our Merger Assessment Guidelines.¹⁹⁸

(a) Ability: would the Merged Entity have the ability to harm rivals, through refusing to supply them with mobile backhaul, increasing prices or decreasing quality?

(b) Incentive: would it find it profitable to do so?

(c) Effect: would the effect of such action by the Merged Entity be sufficient to reduce competition to the extent that it gives rise to a substantial lessening of competition (SLC)?

¹⁹⁷ While for active leased lines, we understand that there may be additional parameters of quality, we understand that for dark fibre, the main quality parameters are the (timely) roll-out of the fibre as well as the (timely) repair of any broken connections. Three told us that they are reliant on the provider (in their case, Virgin) to fix any broken connections in the fibre lines, which is a ‘fairly common’ occurrence.

¹⁹⁸ MAGs paragraph 5.6.6.

- 8.2 In order to reach an SLC finding, all three questions must be answered in the affirmative.¹⁹⁹
- 8.3 The analysis of these questions overlaps and many of the factors affect more than one question. Therefore, we initially set out the evidence we have gathered, before we set out our views on ability, incentive and effect on the basis of this evidence.
- 8.4 While our assessment considers the scope for foreclosure with respect to mobile backhaul in general, we focus on the access layer. We assess the aggregation layer in less detail because:
- (a) The extent to which the Proposed Merger could affect MNOs' mobile backhaul costs in the aggregation layer is limited due to the fact that the Proposed Merger is unlikely to affect a large proportion of aggregation circuits; and
 - (b) the cost for mobile backhaul in the aggregation layer accounts for the minority of MNOs' backhaul costs.²⁰⁰
- 8.5 We further focus our assessment on areas where Virgin and Openreach are the only two suppliers (that is, 'duopoly areas'), as we consider that fewer concerns about foreclosure arise in areas where alternative mobile backhaul suppliers are available.²⁰¹
- 8.6 We consider two key topics within our assessment:
- (a) First, we set out evidence on the differences between dark fibre and active leased lines. This evidence is important to understand the extent to which MNOs could switch from Virgin's dark fibre to active leased lines (that are for example supplied by Openreach), including the consequences that such a switch would have from a technical and a cost perspective. It thereby informs the extent to which the Merged Entity would have the ability to engage in a foreclosure strategy: If the technical or cost differences between dark fibre and active leased lines are more material, then the ability to foreclose by withdrawing dark fibre or worsening the dark fibre offering (eg by increasing prices) is larger.
 - (b) Second, we set out evidence on the importance of MNOs' mobile backhaul costs. This evidence is important to understand the potential for the harm that the Merged Entity could impose on rivals, given that, all else

¹⁹⁹ MAGs, paragraph 5.6.7.

²⁰⁰ See section 'Observations on dark fibre and active leased lines in the aggregation layer' for further detail.

²⁰¹ For Vodafone, we note that [REDACTED].

being equal, the lesser the importance of mobile backhaul costs, the smaller the potential for harm.

8.7 In addition, we assess:

(a) the contractual protections with respect to Virgin's current contracts with MNOs; and

(b) the role of the network sharing arrangements between O2 and Vodafone.

8.8 Both are relevant to understanding the extent to which there are any protections that limit the Merged Entity's ability and/or incentive to engage in a foreclosure strategy, although neither is determinative in the context of a vertical foreclosure theory of harm.

8.9 Finally, we assess the importance to Virgin of supplying mobile backhaul. This is relevant to understanding the impact that a foreclosure strategy would have on the Merged Entity's profits and can therefore inform to what extent the Merged Entity would have an incentive to engage in a foreclosure strategy.

Comparison between using dark fibre and active leased lines in the access layer

8.10 Dark fibre and active services are both used by MNOs to provide connectivity over fibre; the difference is who provides the electronic equipment for the circuit. For dark fibre, the equipment is installed and managed by the customer rather than by the supplier as it is for active services.

8.11 In this section, we compare dark fibre and active services for mobile backhaul customers. Much of our analysis is based on a comparison with Openreach's active services because Openreach is the only viable alternative to Virgin in most of the areas where Virgin is present.²⁰²

8.12 Our comparison has the following aspects:

(a) First, we present an overview of the differences between dark fibre and active products.

(b) Second, we describe the significance of these differences for MNOs.

²⁰² Ofcom does not require Openreach to provide dark fibre in areas where Virgin has a significant presence (see section on 'The role of Ofcom's regulatory conditions' in Chapter 7) [38].

- (c) Third, we consider whether the significance of these differences is likely to change in the future.
- (d) Fourth, we present evidence on the scale of cost differences between dark fibre and active products.
- (e) Finally, we assess whether the cost differential may change in the future, considering in particular whether Openreach is likely to increase the prices of its active products going forward.

8.13 We note that there are differences between MNOs in their backhaul requirements, preferences, procurement and costs (see the evidence set out in this section). Our analysis focuses on Three [X] as they are the primary targets of a potential foreclosure strategy (see Chapter 7, section 'Theory of Harm').

Dark fibre compared to active services: an overview

- 8.14 According to Ofcom, dark fibre has several benefits, all of which are potentially relevant to MNOs:
- (a) Dark fibre users are able to choose their own electronic equipment that can better suit their needs. Although dark fibre users will replicate the functions of the electronics used by active leased line providers, they have flexibility in choosing what features they need and how to meet those needs.
 - (b) Dark fibre users are able to eliminate inefficient active equipment duplication. Users generally deploy their own equipment at each end of an active service, in addition to the provider's equipment. As a result, dark fibre users generally do not incur significant extra equipment costs compared to users of active products. A reduction in the total equipment used also means that there are fewer points of failure, which may reduce repair times and the frequency of faults.
 - (c) Dark fibre users are able to make decisions on bandwidth upgrades based on the underlying cost of upgrading (that is, the incremental cost of the required equipment). In contrast, for an active circuit, the cost of upgrading depends on the price difference between the current service and the faster service. For users contemplating upgrading from a 1Gbit/s active service to a faster active service, this difference may be substantial

since Openreach's VHB prices are markedly higher than prices for lower bandwidth products.²⁰³

8.15 This is consistent with submissions we received from Three, [redacted] and Openreach about the differences between dark fibre and Openreach's Ethernet leased lines.

(a) [redacted]

(b) Three submitted that, for dark fibre products, it is responsible for deploying, provisioning and managing capacity and that this allows it to support its requirements. Three stated that for Openreach EAD 1Gbit/s and 10Gbit/s active products, 'any additional capacity will incur additional costs and additional links'. Three also told us that economically dark fibre is 'much, much better than managed bandwidth'. Three submitted that it must deploy its own equipment at the cell site and BT exchange when using (active) EAD services and that this equipment is the same as the equipment used for dark fibre.²⁰⁴

(c) Openreach submitted that Ethernet services are sold at specific bandwidths and cannot be scaled by customers beyond these levels. To increase bandwidth from EAD 1Gbit/s to EAD 10Gbit/s, the customer will need to order the new higher bandwidth product and subsequently cease the existing product, incurring a new connection charge and a change in the rental tariff.

8.16 In contrast, the Parties and EE questioned some of the benefits identified by Ofcom:

(a) The Parties submitted that MNOs save on equipment costs when using active products, since they do not need to light the fibre themselves.

(b) Similarly, EE submitted that it [redacted]. However, we note that EE is in a different position to [redacted] Three. In particular, where an MNO is vertically integrated with its backhaul provider, the advantage Ofcom identified above in relation to the cost of upgrading no longer applies.

8.17 In summary, dark fibre has a number of differences with an active Ethernet product, as identified by Ofcom.

²⁰³ As explained in Chapter 7, Ofcom uses the term VHB to refer to services above 1Gbit/s. For further details see the section 'Ofcom evidence on trends in Openreach's leased line prices' in Appendix D.

²⁰⁴ Three submitted that it must deploy its own equipment at the cell site and BT exchange for EAD services. This equipment is the same as the equipment used for dark fibre. [redacted].

8.18 In particular, the cost of scaling up to a higher bandwidth is likely to be different. While the Parties argued that dark fibre users require additional equipment, in our analysis below we have assumed that this is not the case (see paragraph 8.36(e)). This is consistent with Ofcom's view that users of active products generally deploy their own equipment.²⁰⁵ In any event, to the extent that the Parties are correct that customers purchasing active products avoid some equipment costs, then this will make Openreach's active products relatively more appealing. This may limit the Merged Entity's ability to engage in foreclosure.²⁰⁶

8.19 Active products vary in terms of both scalability and price, meaning some products are more suitable than others for circuits requiring high and/or rapidly growing bandwidth. It is thus important to distinguish WDM products from Ethernet products.

8.20 In this regard Ofcom submitted that:

- (a) Openreach's OSA FC product (a WDM product) is more flexible than other active services such as Ethernet. Additional capacity can be added to OSA FC (and WDM systems) by upgrading existing equipment with a low incremental cost, using the existing fibre connection. In contrast, adding capacity to a 10Gbit/s Ethernet circuit would, for example, require the purchase of a new 10Gbit/s circuit with an additional, separate, fibre and additional equipment. (Ofcom's view on the cost of scaling up a dark fibre circuit is set out above.)
- (b) Compared to dark fibre, there may still be equipment duplication for some OSA FC customers. Further, the base OSA FC product includes a 10Gbit/s active circuit that is used to monitor the availability of the circuit (for fault alerts) and which may not be required by the user.
- (c) OSA FC is expensive.

8.21 This is consistent with submissions we received from third parties.

- (a) According to two MNOs, dark fibre is cheaper than OSA products;

²⁰⁵ [REDACTED] also largely supported this position (see paragraphs [REDACTED]).

²⁰⁶ As a separate point, the Parties also submitted that while the cost of the equipment that a dark fibre user needs to upgrade a circuit from 1Gbit/s to 10Gbit/s might be [REDACTED] than the cost of switching from a 1Gbit/s active product to a 10Gbit/s active product, it is necessary to consider the original price of the dark fibre, which may be [REDACTED]. We discuss the relative costs of using dark fibre and active products in further detail below.

- (b) One MNO further submitted that dark fibre allows full end-to-end control over the circuit;^{207,208} and
- (c) Openreach submitted that its OSA FC services are scalable beyond 10Gbit/s in terms of bandwidth by the customer (they can light additional wavelengths) without incurring additional charges from Openreach.

8.22 In summary, we understand that WDM products are more flexible than Ethernet products and can be scaled up to a higher bandwidth at a relatively low extra cost.

8.23 In these respects, the differences between these products and dark fibre are smaller than for active Ethernet products. However, the baseline cost of a WDM product is high.

8.24 We consider costs in further detail below.

The significance of the differences between dark fibre and active products

8.25 In this section, we summarise our understanding of the relative importance of the differences between Openreach's active products and Virgin's dark fibre. Evidence is set out in further detail in Appendix D.

8.26 We consider that the evidence shows that:

- (a) MNOs are interested in dark fibre. Three [redacted] have stated they have an [redacted]. Telefónica stated that O2 will consider [redacted].
- (b) The Parties identified Openreach's EAD 10Gbit/s product as a likely substitute for dark fibre in the access layer. Three [redacted] consider that [redacted].
- (c) Ofcom submitted that Openreach earns markedly higher returns on VHB services (although it expects price differentials to fall in the future).

8.27 We consider that cost, rather than technical or performance differences, is the main reason for MNOs' interest in dark fibre, particularly as they are likely to require higher bandwidth in the future:

- (a) [redacted].

²⁰⁷ [redacted].

²⁰⁸ [redacted] said that 'there are additional costs to add transponders to increase capacity over the WDM channels' [redacted]. However, we understand that these costs are also incurred for a dark fibre service and we note that in [redacted] cost comparison calculations the [redacted] – see [redacted]. We also understand from Ofcom (see paragraph 8.20(a)) and Openreach (see paragraph 8.21(c)) that these costs may be low.

(b) [REDACTED].²⁰⁹

8.28 We consider that, while MNOs may perceive that there are certain advantages to using dark fibre, not having access to dark fibre is unlikely to constitute a significant disadvantage for MNOs from a technical perspective.

Is the significance of the differences between dark fibre and active products likely to change in the future?

8.29 Over the coming years, MNOs will roll out their 5G networks and customer take-up of 5G will increase. Rising bandwidth demand (driven in part by 5G adoption) means that MNOs will need to expand their backhaul capacity. As set out in Chapter 7, this might mean that MNOs need some access connections with capacity of over 10Gbit/s in the future.

8.30 In addition, MNOs may change how their RANs are designed in the future, using technologies such as CRAN which may affect the backhaul solution required at certain sites.²¹⁰ We have considered whether these developments are likely to mean that the significance of the differences between dark fibre and active products changes in the future.

8.31 We note two contextual points:

(a) The evidence set out in Chapter 7 indicates that the timing and number of sites at which demand for bandwidth will exceed 10Gbit/s is uncertain. In any event, the number of sites affected within the next five years or so is likely to be relatively small. Similarly, the extent to which MNOs deploy new network configurations such as CRAN and the timescale over which this may occur is uncertain.

(b) Additionally, we understand that demand for bandwidth exceeding 10Gbit/s is likely to be primarily in urban areas. We note that a number of these areas are likely to be more competitive, as other suppliers of dark fibre (such as CityFibre, Colt, etc) are more likely to be present (as set out in Chapter 7 and Appendix C).

8.32 The developments set out above (paragraph 8.29) may mean that, for a relatively small number of sites, the alternative BT active product (that would be used instead of dark fibre from Virgin) is OSA rather than EAD 10Gbit/s. We understand that the technical differences between OSA (which is a WDM product) and dark fibre are not major. However, as set out below, OSA

²⁰⁹ [REDACTED].

²¹⁰ As set out in Chapter 7, CRAN (Centralised RAN or Cloud RAN) is one way that MNOs may configure their RANs in the future, in order to reduce costs and improve performance.

products can be considerably more expensive than EAD 10Gbit/s. Thus, in the future and for a relatively small number of sites, the additional costs of not using dark fibre may be greater than they are at present.²¹¹

Comparison between the cost of dark fibre from Virgin and BT's active products in the access layer at current prices

- 8.33 As explained above, cost is seen as a key difference between dark fibre and active products for MNOs. In this section, we set out evidence on the current cost of dark fibre from Virgin and active leased lines from BT. We focus on evidence from the Parties as well as Three [X], as these represent the primary targets of a possible foreclosure strategy.
- 8.34 According to the Parties, Three [X], any comparison of cost should be on the basis of Total Cost of Ownership (TCO), which includes upfront capital expenditure plus annual operating costs.²¹²
- 8.35 Given that the balance between upfront and ongoing costs varies between products, we consider that the net present value (NPV) of the TCO should be used. We recognise that TCOs are imprecise, particularly when assessed over long periods as is the case here as, for example, the price of active products or bandwidth requirements may change in the future. Nonetheless we consider that the NPV of the TCO is the best available metric for comparing the cost of different products.²¹³
- 8.36 Our methodology for calculating the NPV of the TCO is as follows:^{214 215}
- (a) We model the TCO of active and dark fibre products over a comparable period, namely [X] years. To calculate the NPV, we use a discount factor of [X] for Three and [X].²¹⁶
 - (b) We estimate the TCO for Openreach's Ethernet 10Gbit/s products using evidence from Three [X] on the specific product variants and typical circuit lengths that they use.²¹⁷ A key assumption is that we use

²¹¹ Evidence from the Parties, Three, Vodafone, BT and Ofcom about how the differences between dark fibre and active products may change in the future is set out in Appendix D

²¹² [X]. As set out in Appendix D, there were some differences in the methodology and assumptions submitted by the Parties, [X] and Three.

²¹³ In light of this imprecision, in our vertical arithmetic model we have run a sensitivity analysis using different percentage cost increases – see paragraphs 8.310-8.311 below.

²¹⁴ In its TCO estimates Three included various additional one-off cost elements ([X]). Vodafone did not include these. For consistency, we have largely excluded these.

²¹⁵ Evidence we have received for active and dark fibre costs, including estimates submitted by the Parties, Vodafone and Three, is discussed in Appendix D.

²¹⁶ These discount rates reflect the evidence provided to us. [X].

²¹⁷ In Appendix D, we consider the impact of different product mixes on the TCOs for [X]. These have [X] on the relative TCOs of a 10Gbit/s Ethernet service from Openreach compared to dark fibre from Virgin.

Openreach's current prices based on a seven-year contract term which offers the cheapest price currently available. We consider that this represents a reasonable estimate of the costs an MNO would incur if it needed to use Openreach's active products (for example, if the Merged Entity engaged in foreclosure). We assume these prices do not change over the [redacted]-year period that the TCO relates to.

- (c) We also present results for OSA FC as an illustration of the cost of using an active service in the access layer at those sites that may need more than 10Gbit/s bandwidth.²¹⁸ We present two estimates of the TCO, [redacted].²¹⁹
- (d) With respect to Virgin's dark fibre, we estimate the discounted contract value and add fibre tax.²²⁰
- (e) We do not include equipment costs in our TCO calculations for either active products or dark fibre. We consider this is appropriate and consistent given [redacted] Three's submission that [redacted].²²¹

8.37 Our TCO estimates are summarised in Table 8-1. As noted above (paragraph 8.35), these are imprecise and should thus only be seen as indicative of the relative costs of different products.

8.38 The table also sets out the resulting cost difference of EAD (ie, Ethernet) and OSA (ie, WDM) products as compared to dark fibre, showing that:

- (a) The difference in cost between dark fibre from Virgin and Openreach's EAD 10Gbit/s product is [redacted]; for Three, the EAD 10Gbit/s cost is around [redacted] than Virgin's dark fibre charges (including fibre tax).
- (b) For [redacted], the cost difference between dark fibre from Virgin and shared OSA circuits from BT Enterprise is [redacted] than for an EAD 10Gbit/s circuit. However, [redacted].

²¹⁸ The Parties submitted that this comparison is inappropriate since these products are not used in the access layer. [redacted] However, as explained in paragraph 8.32, MNOs may use OSA at some sites to meet their future needs. We address the Parties' arguments in relation to how this may affect the price Virgin charges for dark fibre in paragraph 8.47.

²¹⁹ These OSA FC TCOs reflect the prices charged by BT Enterprise, rather than Openreach. They also reflect a five-year contract term. [Openreach's price list](#) indicates that it offers a larger discount for customers that commit to a seven-year term.

²²⁰ For Three, we took into account that the one-off capex costs of dark fibre [redacted]. [redacted].

²²¹ The Parties submitted that dark fibre users incur additional equipment costs – we discuss this point in paragraph 8.17.

Table 8-1: TCO comparison for [redacted] (per access connection)

	[redacted]	[redacted]
NPV of TCO		
Openreach Ethernet 10Gbit/s	[redacted]	[redacted]
BT OSA (unilateral)	[redacted]	[redacted]
BT OSA (shared)	[redacted]	[redacted]
Virgin dark fibre [redacted]	[redacted]	[redacted]
Cost change compared to Virgin dark fibre [redacted] (%)	[redacted]	[redacted]
Openreach Ethernet 10Gbit/s	[redacted]	[redacted]
BT OSA (unilateral)	[redacted]	[redacted]
BT OSA (shared)	[redacted]	[redacted]

Source: CMA estimates

8.39 The estimates for [redacted] in Table 8-1 are not directly comparable since they are based on different assumptions, given the differences in their network profile and assumed cost of capital. However, it does appear that [redacted].²²²

(a) [redacted] considered that it was able to secure dark fibre from Virgin for a [redacted]. Internal documents indicate that Virgin’s pricing to Three reflects [redacted].²²³

(b) In contrast, [redacted] has [redacted] from other providers.²²⁴ [redacted].

8.40 For the following reasons, the cost differences shown in Table 8-1 above are only indicative, even for the same MNO:

(a) Active prices will vary across cell sites depending on their location (that is, how close they are to Openreach’s network and the length of the circuit required). Similarly, dark fibre prices will vary between cell sites; for example, depending on [redacted].²²⁵

(b) When assessing costs over long periods (as is the case here) the estimates are sensitive to the assumptions about the future price of active products (including the impact if bandwidth requirements change in the future). As explained above, our TCO calculations assume that Openreach/BT’s charges do not change over the [redacted]-year period that the TCO relates to.

(c) The NPV estimate – particularly for active products – will vary depending on the assumed discount rate.

8.41 In summary, comparing the costs of dark fibre and active products is inherently imprecise. Our comparison indicates that the alternative active

²²² This is the case once the effect of the different discount rate used for [redacted] is removed.

²²³ For example, Virgin, [redacted] and [redacted]. See also [redacted].

²²⁴ [redacted].

²²⁵ [redacted].

product from Openreach can, in some instances, be more expensive than dark fibre from Virgin.

Likely changes to the cost difference between Virgin's dark fibre and BT's active services in the access layer

8.42 The cost comparison above reflects current prices. We have considered whether the results of this comparison might change in the future.

8.43 One reason for this would be if Virgin's dark fibre prices change, and we consider this issue first.

8.44 We then set out evidence in relation to Openreach's future prices in the following order:

- (a) Openreach's ability to increase leased line prices given Ofcom's regulations; and
- (b) Openreach's incentives to increase (or not decrease) leased line prices, both
 - (i) in the absence of the Proposed Merger; and
 - (ii) in response to a potential softening of competition from Virgin following the Proposed Merger.

Future changes in Virgin's dark fibre prices

8.45 As set out below (paragraph 8.67), Virgin [REDACTED].²²⁶ We have not received any evidence that this is likely to change going forward. As such, we would expect that, absent the Proposed Merger, any price change in Openreach's prices [REDACTED].

8.46 Accordingly, even if Openreach were to increase its prices in the absence of the Proposed Merger (for example, due to changes in regulation or other market developments), we would not expect this to materially change the cost differential between Openreach's active products and Virgin's dark fibre.

8.47 The Parties also submitted that, if demand for bandwidths above 10Gbit/s emerged in the access layer, Virgin would likely [REDACTED].

8.48 We note that this assumes that Virgin is able to distinguish between those cell sites that require more than 10Gbit/s and those that do not (so as to charge

²²⁶ See the section 'Virgin's pricing strategy for dark fibre' in Appendix D.

the former a different – presumably higher – price for dark fibre). The Parties did not explain the basis for this assumption. In any event, we have not needed to resolve this issue, given that the number of sites requiring more than 10Gbit/s in the next few years is likely to be relatively small (see above, paragraph 8.32).

Openreach's ability to increase leased line prices

- 8.49 As set out in Chapter 7, Openreach's active products are currently subject, in most of the UK,²²⁷ to price controls including price caps that hold prices constant overall (in real terms).
- 8.50 There is a price cap on a 'basket' covering Ethernet leased lines of all bandwidths. There are separate caps on each individual component of Openreach's WDM services.²²⁸ Discounts offered by Openreach generally do not count towards the calculation of the price.²²⁹
- 8.51 Openreach therefore has the ability to increase Ethernet 10Gbit/s prices in three ways:
- (a) First, Openreach will be able to increase prices for all Ethernet leased lines (including Ethernet 10Gbit/s) by inflation;
 - (b) second, Openreach will be able to increase Ethernet 10Gbit/s prices by more than inflation if this larger increase in price is offset against smaller price increases (or decreases) in other access services within the basket; and
 - (c) third, Openreach will be able to remove existing price discounts for EAD 10Gbit/s services without making any changes to the prices of other products in the basket.
- 8.52 To illustrate the potential scale of this effect, Table 8-2 presents the current price discounts offered by Openreach for minimum term commitments (five- and seven-year minimum period terms) for EAD 10Gbit/s products (the key products in the access layer). As shown by the table, MNOs can benefit from

²²⁷ In the access layer the exceptions are (i) competitive areas where Openreach was not found to have Significant Market Power (SMP) ie the CLA and Hull; and (ii) High Network Reach (HNR) areas, which have two or more competitors to Openreach.

²²⁸ The Ethernet basket also includes leased lines in the aggregation layer. Ofcom, [Volume 4: Pricing remedies](#), 18 March 2021, paragraph 6.111.

²²⁹ Ofcom, [Volume 7: Legal instruments](#), 18 March 2021, Schedule 1, Part 3, Conditions 12E.15 and 12E.16 on page 160.

discounts of 25% for the connection fee and up to 38% for the annual rent if they enter into long-term contracts.

Table 8-2: Openreach EAD 10Gbit/s prices for different contract terms

Product	Minimum period (years)	Connection	Annual Rental	Discount compared to base price	
				Connection	Annual rental
EAD 10Gbit/s	Base Price	£ 5,432	£ 4,980		
	5	£ 4,063	£ 4,380	25%	12%
	7	£ 4,063	£ 3,100	25%	38%
EAD LA 10Gbit/s*	Base Price	£ 5,432	£ 4,146		
	5	£ 4,063	£ 3,648	25%	12%
	7	£ 4,063	£ 2,600	25%	37%

Source: Openreach price list and % discount is calculated by the CMA.
 * EAD Local access (EAD LA) is a variant of Openreach's EAD product.

8.53 Similarly, Openreach also has the ability to increase WDM prices by inflation or by removing existing discounts.

Expected change in Openreach's prices in the absence of the Proposed Merger

8.54 Ofcom submitted that VHB prices are markedly higher than prices for lower bandwidth products (the so-called 'bandwidth gradient') and Openreach earns markedly higher returns on VHB services.²³⁰

8.55 Over time, BT's Ethernet prices have been declining and the price gap across bandwidths has been narrowing, making the bandwidth gradient flatter and more cost reflective. Ofcom expects increasing competitive pressure on prices over the next few years.

8.56 Similarly, Openreach submitted that, despite the absence of a charge control for VHB prior to 2019, it reduced its 12-month term EAD 10Gbit/s connection and rental prices and in July 2019, it also introduced new discounts for customers that sign up for a seven-year minimum term.²³¹

8.57 In summary, in light of these submissions we consider that Openreach's prices are relatively unlikely to increase in the absence of the Proposed Merger.

²³⁰ See further detail in Appendix D.

²³¹ Openreach submitted that it reduced the connection price by 9% from £6,000 as at 31 March 2016 to £5,436 as at 1 October 2019 for its twelve-month term EAD 10Gbit/s product. EAD 10Gbit/s rental pricing has been reduced by 44% on Local Access (LA) circuits from £7,500 as at 31 March 2016 to £4,146 as at 1 October 2019, and by up to 47% on standard circuits.

Openreach's incentives to increase prices in response to potential softening competition from Virgin

- 8.58 Openreach could in principle have an incentive to increase its prices for EAD 10Gbit/s services after the Proposed Merger, if it believed that the Merged Entity has a weaker incentive to compete than Virgin.
- 8.59 The evidence suggests that Openreach is unlikely to have an incentive to materially raise the price of its active leased lines as a result of the Proposed Merger, for the following reasons.
- 8.60 First, Ofcom submitted that, given its proposed regulatory requirements aimed at tackling discrimination, it does not appear straightforward for Openreach to raise leased line prices to MNOs without also raising them to other customers.
- 8.61 Ofcom considered that this makes it less attractive for Openreach to raise prices across the board because it is unlikely to be profitable for Openreach to increase prices to other customers as a result of the Proposed Merger.
- 8.62 The range of factors that influence Openreach's preferred prices to other customers is unlikely to change as a result of the Proposed Merger, in part because Virgin's incentives when supplying leased lines to other customers are unlikely to change. Ofcom estimated that other customers account for around [X] for EAD 10Gbit/s circuits for access; this figure is [X] if the focus is on EAD 10Gbit/s circuits for access on a five-year contract term (which are disproportionately appealing to MNOs).
- 8.63 We agree with Ofcom that having to increase prices to all customers makes it a less appealing strategy for Openreach following the Proposed Merger.
- 8.64 We consider that Ofcom's regulatory requirements are likely to mean that Openreach is able only imprecisely and indirectly to target price rises at MNOs (for example, by focusing on products that are more likely to appeal to MNOs). This reduces the risk that Openreach would consider it profitable to materially raise active prices.
- 8.65 Second, the Parties submitted that Virgin does not exert a particularly significant constraint on Openreach's pricing and that Virgin's dark fibre offering has not had a meaningful impact on Openreach's pricing.
- 8.66 Evidence suggests that the competitive pressure exerted by Virgin on Openreach's pricing has indeed, at least to date, been relatively limited. Pricing evidence does not appear to indicate that the presence of Virgin alone had a significant impact on the prices charged by Openreach.

- (a) Openreach offers discounts on EAD 1Gbit/s connection charges in the CLA and HNR areas. However, it did not indicate that it offers different discounts as between BT-only and BT+1 areas. This suggests that the presence of Virgin alone may have a limited impact on Openreach's pricing. While Virgin's presence alongside other networks may have a more significant impact on competition, currently only a small minority of access circuits are in areas with multiple competitors to Openreach (see section 'Geographic market definition' in Chapter 7).
- (b) Openreach does not charge different prices for 10Gbit/s EAD in different geographic markets.²³²

- 8.67 Evidence showing that, historically, Openreach's rivals used to compete by undercutting its prices (that is, Openreach is a price leader)²³³ also suggests that competitive pressure on Openreach is limited. This is in line with the Parties' submissions that Virgin [redacted].²³⁴
- 8.68 Third, in relation to VHB products, there are likely to be risks for Openreach in raising prices in the hope that the Merged Entity would do likewise.
- 8.69 Current dark fibre prices (other than for the regulated dark fibre that Openreach is required to supply at some sites) are not transparent to competitors.²³⁵ In such an environment, Openreach is unlikely to be confident that the Merged Entity has in fact raised prices.
- 8.70 In addition, dark fibre contracts can be long-term (see Chapter 7). This increases the downsides should Openreach miscalculate, since customer loss is not easily reversible.

Summary of evidence comparing Virgin's dark fibre and active products

- 8.71 In summary:
- (a) Three [redacted] are interested in using dark fibre and currently purchase it from Virgin.
 - (b) Dark fibre has some technical differences compared to active products. However, it is cost, rather than technical or performance differences, that is the main reason for MNOs' interest in dark fibre.

²³² The only geographic discounts that Openreach referred to were for lower bandwidth products. Openreach also submitted that prices do not differ geographically for VHB services.

²³³ See the section 'Ofcom evidence on trends in Openreach's leased line prices' in Appendix D.

²³⁴ See the section 'Virgin's pricing strategy for dark fibre' in Appendix D.

²³⁵ Openreach said that alternative providers' dark fibre prices are often not published.

- (c) From a technical perspective, Openreach's EAD 10Gbit/s product is a suitable alternative in the access layer, except for some limited applications that can be served by WDM services.
- 8.72 Comparing the cost of active services and dark fibre is complex, therefore, our comparison is indicative, rather than conclusive. The main challenges are:
- (a) The cost of dark fibre varies between Three [redacted] reflecting the location of the particular sites they want to connect and [redacted].
 - (b) Active and dark fibre products have different payment profiles (particularly [redacted]), where most of the cost is paid upfront).
 - (c) When assessing costs over long periods as is the case here, the estimates are sensitive to the assumptions about the future price of active products, including the impact if bandwidth requirements change in the future.
- 8.73 Our analysis indicates that, at current Openreach prices, the difference in cost between dark fibre and Openreach's 10Gbit/s Ethernet active product is as follows:
- (a) [redacted]; and
 - (b) The EAD 10Gbit/s cost is around [redacted] than Virgin's dark fibre charges (including fibre tax) for Three.
- 8.74 The cost difference between dark fibre and WDM products appears to be [redacted] if the MNO is unable to share the circuit. For shared WDM circuits, the cost differential appears [redacted].
- 8.75 While Openreach may adjust its prices in the absence of the Proposed Merger (for example, due to changes in regulation or other market developments), we would not expect this to materially change the cost differential between Openreach's active products and Virgin's dark fibre.
- 8.76 We consider that Openreach is unlikely to have an incentive to materially raise the price of its active circuits as a result of the Proposed Merger.

Observations on dark fibre and active leased lines in the aggregation layer

- 8.77 Below we set out some observations on dark fibre and active leased lines in the aggregation layer:
- (a) We first describe the products that are relevant to this layer;

- (b) we then set out some brief observations in relation to the costs of these products; and
- (c) finally, we set out evidence on the likely extent to which the Proposed Merger could affect mobile backhaul costs in this layer.
- 8.78 Dark fibre can be purchased from Virgin for use by MNOs in the aggregation layer. However, since MNOs require higher capacity circuits in this layer, the alternative active product to dark fibre in the aggregation layer is WDM, rather than the 10Gbit/s Ethernet circuits that are generally suitable in the access layer.
- 8.79 In particular, in the aggregation layer:
- (a) [redacted] told us that the alternative active product to dark fibre would be OSA or OSA-FC circuits from Openreach, [redacted]; and
- (b) The Parties submitted that there is demand for bandwidths over 10Gbit/s in the aggregation layer. They submitted that Virgin [redacted].²³⁶
- 8.80 Three does not [redacted] purchase dark fibre from Virgin in the aggregation layer. Instead it purchases active products managed by third parties, including from Neos Networks [redacted].²³⁷ This suggests that, for Three, any technical advantages from using dark fibre are not crucial.²³⁸
- 8.81 As set out above, the Parties submitted that [redacted]. As a result, the Parties submitted that [redacted].
- 8.82 The costs of both dark fibre from Virgin and active products from Openreach are higher in the aggregation layer than in the access layer.²³⁹ As a result, the TCOs set out in Table 8-1 are not relevant to this layer.
- 8.83 As explained below, we do not need to estimate the magnitude of the cost differential between dark fibre and active products in the aggregation layer more precisely.
- (a) The Parties submitted that the vast majority of aggregation points are BT exchanges, because customers (such as MNOs) build their network along the BT network.

²³⁶ [redacted] See also the section 'Virgin's pricing strategy for dark fibre' in Appendix D.

²³⁷ [redacted].

²³⁸ We consider the Neos Networks contract in further detail from paragraph 8.183.

²³⁹ Appendix D sets out further evidence on the costs of dark fibre and active products in the aggregation layer.

(b) [REDACTED] Three submitted that [REDACTED] of the aggregation circuits that MNOs purchase from third parties connect at BT exchanges.²⁴⁰

(c) The effects of the Proposed Merger in this layer thus depend on the extent to which Virgin's network is present at these exchanges.

8.84 Ofcom has analysed the extent to which other networks are present at BT exchanges. It found that, out of a total of 5,569 BT exchanges, BT was the only network present at 77% (4,275) of them, 13% (745) had one other network present and 10% (549) had two or more other networks present.^{241,242} Where other networks are present, one of them will often be Virgin but this is not always the case.

8.85 This suggests that the Proposed Merger is unlikely to have a material effect on competition for a large proportion of aggregation circuits because Virgin is not present at the majority of exchanges and, where it is, it often faces competition from at least two rivals (Openreach and an alternative network).²⁴³

8.86 Consistent with this, the Parties submitted that Virgin faces competition from Openreach and other communications providers (for example, Neos Networks or Zayo) in the aggregation layer.

8.87 Additionally, and as described further below, mobile backhaul in the aggregation layer accounts for only a low proportion of MNOs' costs.

8.88 In summary, the evidence set out above indicates that:

(a) There are active products that can be used instead of dark fibre in the aggregation layer; and

(b) the extent to which the Proposed Merger could affect mobile backhaul costs in the aggregation layer is limited. This is due to the fact that the Proposed Merger is unlikely to affect a large proportion of aggregation

²⁴⁰ [REDACTED].

²⁴¹ Ofcom, [2021 WFTMR: Annexes 1-26](#), 18 March 2021, Table A6.1.

²⁴² In addition to those networks present at the BT exchange, in some instances other suppliers are close enough that they might extend their networks in order to connect to the BT exchange. Ofcom found that at 118 of the 'BT+1' exchanges the nearest second network was within 50m and at 224 it was within 100m (see Ofcom, [2021 WFTMR Volume 2: Market analysis](#), 18 March 2021, paragraph 8.313). Also, at approximately 600 of the 'BT only' exchanges there was another network within 100m (as shown by the number of these exchanges where regulated dark fibre was not introduced - see Ofcom, [2021 WFTMR Volume 3: Non-pricing remedies](#), 18 March 2021, paragraph 6.156).

²⁴³ Our position implicitly assumes that the mix of exchanges (between 'BT only', 'BT+1' and 'BT+2') that MNOs use for aggregation is similar to the overall mix of BT exchanges.

circuits and because aggregation accounts for a minority of MNOs' backhaul costs.

The importance of MNOs' mobile backhaul costs

- 8.89 Mobile backhaul costs represent just one of a large number of cost items in the provision of mobile services by MNOs to retail customers. This section sets out the relative and absolute size of mobile backhaul costs in relation to the other costs that MNOs incur. This provides an indication of the Merged Entity's ability to engage in foreclosure of its rival MNOs through increasing their costs.
- 8.90 The approach in this section is as follows:
- (a) To consider different proportions of MNOs' costs moving from broad (total mobile backhaul costs) to narrow (outlays on Virgin's dark fibre where no alternative suppliers – other than BT's active products – are present).
 - (b) to distinguish between current costs and MNOs' forecast costs for the next five years.
 - (c) to present different estimates which provide indications of the boundaries of the effect the Proposed Merger may have on MNOs' mobile backhaul costs and the ability of MNOs to compete effectively. We believe that there is no single best estimate for these effects.
 - (d) as an extension, we also use these estimates to provide a rough indication of the additional costs that Three and Vodafone would incur in a 'naïve' scenario²⁴⁴ of partial foreclosure where it is assumed that Virgin increases the price of dark fibre up to the price of Openreach's active product in areas where it is in a duopoly with BT.
- 8.91 We asked MNOs to provide their current and projected mobile backhaul costs (access and aggregation) and their total network costs and total mobile operating cost. We also asked for their current and projected outlays to Virgin and the number of RAN sites for which it provides mobile backhaul.
- 8.92 Vodafone was not able to apportion its aggregation backhaul costs to its MNO activities as [REDACTED]. Except where otherwise stated, these costs were therefore excluded from the analysis for Vodafone below.²⁴⁵ This may lead to a degree

²⁴⁴ As we explain below, this scenario only provides a rough estimate of the (first-round) effects of a foreclosure strategy. It does not represent an equilibrium in which all market participants have chosen their optimal strategies

²⁴⁵ We note that in any case, mobile backhaul outlays to [REDACTED] in the aggregation layer do not appear to be material. For instance, Vodafone spent [REDACTED] ([REDACTED]). For information, we also note that Three [REDACTED].

of inconsistency in our estimates, but we note that the focus of the analysis should be on access connections because [redacted]²⁴⁶ and [redacted]²⁴⁷; and because costs for access backhaul account for the majority of backhaul costs of MNOs (this is confirmed in Telefónica's internal documents).²⁴⁸

8.93 Each of the estimates t above is described in turn.

Current cost of mobile backhaul

8.94 As we have set out above in the section 'Comparison between the cost of dark fibre from Virgin and BT's active products in the access layer at current prices', the different mobile backhaul products have different tariffs and payment structures.

8.95 Depending on the type of product and contract terms, MNOs' mobile backhaul costs may vary significantly over time. Each estimate below provides therefore only a snapshot of their mobile backhaul costs at a particular point in time. In the following section, we also present mobile backhaul costs over time.

8.96 Table 8-3 below compares each MNO's backhaul costs:

(a) The Parties submitted that O2's backhaul costs in 2019 of £[redacted] (which included £[redacted] self-supply²⁴⁹) represented: [redacted]% of its direct costs; [redacted]% of its incremental costs; [redacted]% of its total costs; [redacted]% of revenues; and around [redacted]% of its total network expenditure (operating and capital expenditure) of £[redacted].

(b) Three told us that its total mobile backhaul costs in the financial year 2020 amounted to £[redacted]. This includes both capital expenditure and operating expenditure (£[redacted]). Three calculates that this represented [redacted]% of total network costs²⁵⁰ and that backhaul operating expenditure represented [redacted]% of total mobile operating expenditure.²⁵¹

(c) Vodafone told us that its total backhaul costs in 2019/20 amounted to £[redacted]; [redacted].²⁵²

²⁴⁶ Three listed [redacted] that competed to supply aggregation.

²⁴⁷ Vodafone listed [redacted] as 'major suppliers' it has considered previously (the list is not exhaustive).

²⁴⁸ For Three [redacted]. For Vodafone [redacted]. For internal documents [redacted].

²⁴⁹ Mostly [redacted].

²⁵⁰ Total mobile network costs relate to Three's [redacted].

²⁵¹ These figures are based on Three's reported operating expenses. This includes [redacted].

²⁵² Q4 2019 to Q3 2020 [redacted].

(d) EE told us that its total mobile backhaul costs in 2020 amounted to £[redacted]; [redacted]²⁵³ [redacted]. EE calculates that this represented [redacted]% of its total network costs.²⁵⁴ [redacted].

Table 8-3: Mobile backhaul as a proportion of MNOs' costs

	O2	Three*	Vodafone†	EE‡
Backhaul costs as a percentage of total mobile network costs	[redacted]%	[redacted]%	[redacted]%	[redacted]%
Backhaul costs as a percentage of total mobile operating costs	[redacted]§	[redacted]¶	[redacted]#	n.a.

Source: O2 and third parties

* [redacted]

† [redacted]

‡ [redacted]

§ Telefónica submitted the percentage of total costs.

¶ Three submitted mobile backhaul opex as a percentage of total mobile operating cost.

[redacted] and £[redacted] (= £[redacted]/ [redacted]%).

8.97 We note that the bases on which MNOs have calculated these estimates may differ. We did not specify a precise methodology. However, as set out in this subsection, we believe that a consistent overall message emerges about the importance of mobile backhaul costs across MNOs.

8.98 For completeness, we have also compared the information with data on mobile backhaul costs that the CMA collected in its BT/EE investigation²⁵⁵ (see Table 8-4 below). The table shows that the shares of mobile backhaul costs in 2015 are [redacted].

Table 8-4: Mobile backhaul as a proportion of MNOs' costs in BT/EE merger investigation

	O2	Three*	Vodafone*	EE	Ofcom estimate
Backhaul costs as a percentage of total mobile network costs	[redacted]	[redacted]	[redacted]	[redacted]	18%
Backhaul costs as a percentage of total mobile operating cost	[redacted]	[redacted]	[redacted]	[redacted]	8%

Source: [Final Report BT/EE](#), p. 239

* Operating expenses only

8.99 In the BT/EE investigation, the CMA concluded that backhaul costs accounted for a small proportion of an MNO's total costs in providing retail mobile services.

8.100 The CMA also noted that there was limited evidence available on the future development of mobile backhaul costs but concluded that backhaul costs would not increase by an order of magnitude that would affect its assessment.

²⁵³ [redacted].

²⁵⁴ EE lists the following elements of its total mobile network cost figure: [redacted].

²⁵⁵ [Final Report BT/EE](#), page 239.

Current costs of mobile backhaul supplied by Virgin

8.101 We now consider the share of current mobile backhaul costs that MNOs incur for the services Virgin provides. We consider here solely Three and Vodafone as these represent the primary targets of a possible partial foreclosure strategy.

(a) Three told us that of its total mobile backhaul costs of £[redacted] it spent around £[redacted] on Virgin.²⁵⁶ This would therefore represent around [redacted]% of Three's total mobile network costs or [redacted]% of its total costs.

(b) Vodafone told us that of its total backhaul costs of [redacted].[redacted].

Summary of evidence on current mobile backhaul costs

8.102 The data from MNOs on mobile current backhaul costs as a proportion of total mobile network costs and total mobile operating costs are broadly [redacted] MNOs and [redacted] previous CMA estimates.²⁵⁷ We therefore believe that, even if the bases on which MNOs calculated these estimates may differ, these estimates are reliable.

8.103 The information shows that mobile backhaul costs represent a relatively small proportion of the overall costs MNOs incur. It further shows that the cost MNOs currently incur for mobile backhaul supplied by Virgin represents only a minority of their total mobile backhaul costs, and, correspondingly, an even smaller proportion of their overall costs.

Future costs of mobile backhaul and the rollout of 5G

8.104 As MNOs are in the process of beginning the rollout of 5G, and the use of dark fibre is currently limited, we believe that it is necessary to also conduct the above assessment on the basis of MNOs' projected backhaul costs and the contracts that they have concluded with Virgin. We therefore asked MNOs for information on their projected mobile backhaul costs and use of dark fibre supplied by Virgin.

8.105 The Parties believe that, while total backhaul costs may increase in the future, they can be expected to remain a very small proportion of total costs.

²⁵⁶ Using average annual outlay for the period 2020-2022.

²⁵⁷ CMA 2016, [Final Report BT/EE](#), p. 239.

8.106 The Parties told us that O2 estimates that its operating expenses on mobile backhaul would [REDACTED] ([REDACTED] industry reports from IDC), while in a high-traffic case, [REDACTED].

8.107 The Parties also consider that other variable costs (and revenues) may [REDACTED] increase but even in a scenario where this did not happen, and its backhaul costs increased by [REDACTED]% between 2020 and 2024 on average, the proportion of backhaul costs in total variable costs would rise from around [REDACTED]% to around [REDACTED]% and would therefore continue to remain very small.

8.108 EE estimates its mobile backhaul costs will [REDACTED], as set out in Table 8-5 below.

Table 8-5: EE's projected mobile backhaul as a proportion of its mobile network costs

	2021	2022	2023	2024	2025
Total mobile backhaul costs	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Total mobile network costs	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Share	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Source: BT.

8.109 Three told us that its total backhaul costs are [REDACTED],²⁵⁸ [REDACTED].

8.110 Table 8-6 below shows the projected proportion of Three's mobile backhaul costs within its total mobile network costs and total mobile operating costs.

Table 8-6: Three's projected mobile backhaul as a proportion of its costs

	2021	2022	2023	2024	2025
Total mobile backhaul costs	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Total mobile network costs	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Share	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Total mobile backhaul opex	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Total mobile operating costs	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Share	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Source: Three.

8.111 As can be seen above in Table 8-6, [REDACTED].²⁵⁹ Three submitted that [REDACTED].

8.112 Vodafone told us that it estimates its demand for mobile backhaul to [REDACTED].²⁶⁰ [REDACTED].²⁶¹ [REDACTED].²⁶² [REDACTED].

²⁵⁸ [REDACTED].

²⁵⁹ In Three's contracts with Virgin, over [REDACTED]% of the total contract value is paid in years [REDACTED] which leads to high mobile backhaul costs in years [REDACTED] (after which these capital expenditures decrease and [REDACTED] annual rental costs to Virgin remain).

²⁶⁰ [REDACTED].

²⁶¹ Vodafone submits however, that there is currently 'huge uncertainty [...] regarding future mobile backhaul product prices'.

²⁶² As set out in Chapter 9, [REDACTED]. While this is likely to have some impact on Vodafone's cost base, we would expect that Vodafone took this development into account in its projections. In any case, [REDACTED] is unlikely to be material enough to have a significant impact on our assessment of mobile backhaul costs as a proportion of different cost measures. Indeed, [REDACTED].

8.113 [REDACTED].

Table 8-7: Vodafone's projected mobile backhaul as a proportion of its costs

[REDACTED]

Source: Vodafone.

8.114 As can be seen in Table 8-7 above, Vodafone's mobile backhaul costs [REDACTED].

8.115 We note that Three's and Vodafone's estimates are predicated on [REDACTED]. If Virgin dark fibre was not available, the above cost estimates may be greater. (See Appendix D for a comparison between using dark fibre and active leased lines prices).

8.116 We consider below in more detail the costs incurred by MNOs for the provision of Virgin's services.

Future costs of mobile backhaul supplied by Virgin

8.117 We present different estimates (partly due to different data being available) which can only provide indications of the boundaries of the effect the Proposed Merger may have on MNOs' mobile backhaul costs and the ability of MNOs to compete effectively.

8.118 We consider Three's and Vodafone's outlays for Virgin's mobile backhaul. That is, we exclude outlays to other mobile backhaul providers (notably large outlays to BT) from their mobile backhaul costs.

8.119 In doing so, we take into account the increasing importance of Virgin due to the increased take up of its dark fibre and assess whether these outlays represent a significant share of Three's and Vodafone's overall costs. This provides an indication of their 'exposure' to Virgin as a supplier of mobile backhaul.

8.120 Three told us that it has recently concluded contracts for the supply of dark fibre. The main supplier will be Virgin which will provide dark fibre connections for [REDACTED] sites ([REDACTED] existing and [REDACTED] new) in 2025. The contract value with Virgin for the agreed number of sites is around £[REDACTED].²⁶³ [REDACTED].

8.121 Based on these figures, the annualised total cost of mobile backhaul supplied by Virgin represents around [REDACTED]% of Three's total mobile network costs and total cost in 2025, as shown in Table 8-8, below.

²⁶³ Including £[REDACTED] for [REDACTED].

Table 8-8: Three’s projected mobile backhaul supplied by Virgin as a proportion of its costs

	Contracted outlays (2025)	[REDACTED]
Costs of mobile backhaul supplied by Virgin	[REDACTED]	[REDACTED]
Share of total mobile network costs	[REDACTED]	[REDACTED]
Share of total cost	[REDACTED]	[REDACTED]

Source: CMA analysis based on [REDACTED].

8.122 Vodafone told us that the share of its RAN sites connected by Virgin will increase from currently [REDACTED], as shown in Table 8-9 below.²⁶⁴ To the extent that our projection of Vodafone’s mobile backhaul costs includes other elements (eg equipment), the figures below will represent an over-estimate of Virgin’s charges for backhaul.

Table 8-9: Vodafone’s projected mobile backhaul costs at sites supplied by Virgin as a proportion of its costs

	2021	2022	2023	2024	2025
Cost of mobile backhaul at sites supplied by Virgin	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Share of total mobile network costs	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Share of total mobile operating costs	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Source: Vodafone.

Mobile backhaul liable to foreclosure by Virgin

8.123 As a further refinement of the assessment above, we identify only those outlays of Three and Vodafone on mobile backhaul supplied by Virgin where Three and Vodafone have no alternative supplier of dark fibre and where the only available alternative mobile backhaul would consist of Ethernet services from BT (that is, ‘duopoly sites’).

8.124 We believe that this is relevant as fewer concerns about foreclosure arise in areas where alternative mobile backhaul suppliers are available to Three and Vodafone; that is, sites where there is no duopoly between Virgin and BT.

8.125 We asked Three and Vodafone for information about the share of their RAN site estate which can only be served by both BT and Virgin (‘duopoly sites’)²⁶⁵ and the associated outlays.²⁶⁶

²⁶⁴ We note that as the different mobile backhaul products Vodafone uses have different costs (see section ‘Comparison between the cost of dark fibre from Virgin and BT’s active products in the access layer at current prices’), in practice the share of sites does therefore not necessarily correspond to the share of costs (the required data is missing).

²⁶⁵ As we had not specified a particular methodology to identify such sites, it is conceivable that Three and Vodafone may have based their assessment on Ofcom’s definition of geographic areas (see BCMR 2019, [Volume 2: market analysis, SMP findings, and remedies for the Business Connectivity Market Review](#), paragraph 5.1 et seq. [public document]).

²⁶⁶ This implicitly assumes that BT is ubiquitous.

- 8.126 Three told us that [redacted]% of its sites are served by Virgin and can only alternatively be served by BT.²⁶⁷ [redacted]. We therefore consider that Virgin currently has only a very limited ability to foreclose Three.²⁶⁸
- 8.127 This situation changes with the rollout of dark fibre by Virgin. Three told us that in 2025 [redacted]% of its sites will be served by Virgin and can only alternatively be served by BT.²⁶⁹ [redacted].
- 8.128 Three estimates that the sum of outlays to Virgin for these sites will amount to £[redacted] per year for rent and maintenance and a total of £[redacted] of installation costs over the period until March 2025.²⁷⁰
- 8.129 In areas where there is most risk that the Merged Entity would have the ability to foreclose Three in 2025, mobile backhaul represents annualised²⁷¹ costs (including installation costs) of around £[redacted] million.²⁷² This represents around [redacted]% of Three's total mobile network costs and the operating expenses thereof represent [redacted]% of Three's total operating costs in 2025.

Table 8-10: Three's projected mobile backhaul supplied by Virgin at 'duopoly sites'

	2020	2025
Annualised total costs of mobile backhaul supplied by Virgin	[redacted]	[redacted]
Share of total mobile network costs	-	[redacted]
Annual opex of mobile backhaul supplied by Virgin	-	[redacted]
Share of total mobile operating costs	-	[redacted]

Source: CMA analysis

- 8.130 Vodafone told us that it operates [redacted].²⁷³ [redacted].
- 8.131 [redacted].
- 8.132 [redacted]. Absent data on all of these sites, we conservatively assume that all sites served by Virgin are 'duopoly sites'. We then apply the same cost to each connection as above for 2020.

²⁶⁷ As of March 2020, Three operated [redacted] RAN sites in the UK of which [redacted] sites ([redacted]%) can only be served by both BT and Virgin. Of these [redacted] sites, [redacted] are served by Virgin. (Virgin committed to serve a total of [redacted] sites in 2020. Three estimates that the sum of annual rental outlays to Virgin for these sites amounted to £[redacted] in 2020. We note that Three submitted that all sites served by Virgin would be sites that can only be served by BT and Virgin [redacted].

²⁶⁸ Even if all of these [redacted] RAN sites were connected via dark fibre (ie, it could be assumed that the Merged Entity could have the ability to engage in (total or partial) foreclosure for these sites), the costs associated only amount to around £[redacted] per year.

²⁶⁹ Three plans to operate [redacted] RAN sites in 2025 of which [redacted] sites ([redacted]%) can only be served by both BT and Virgin. Of these [redacted] sites, [redacted] ([redacted]%) of all sites will be served by Virgin.

²⁷⁰ The mobile backhaul for which the Merged Entity could have the ability to engage in (partial or total) foreclosure in 2025 consists therefore of [redacted] sites, representing annual costs of £[redacted] and installation costs of £[redacted] million.

²⁷¹ We assume a time horizon of [redacted] years and abstract from the time profile of installation costs over time here.

²⁷² N.b.: this figure is higher than the cost estimate in Table 8-8. This inconsistency is caused by different bases on which these figures have been calculated as the 'true' figures were not provided by Three.

²⁷³ Numbers of sites in response to [redacted] suggests that this includes Vodafone Beacon sites.

8.133 The total costs of these sites represent around [REDACTED]% of total mobile network costs and [REDACTED]% of total mobile operating costs.

Table 8-11: Vodafone’s projected mobile backhaul supplied by Virgin at ‘duopoly sites’

	2020	2025
Costs of mobile backhaul supplied by Virgin	[REDACTED]	[REDACTED]
Share of total mobile network costs	[REDACTED]	[REDACTED]
Share of total mobile operating costs	[REDACTED]	[REDACTED]

Source: CMA analysis

8.134 As an extension, we adopt a ‘naïve’ approach to illustrate the potential effects of foreclosure on Three and Vodafone by a price increase.

8.135 We assume that the Merged Entity increases the prices of the sites where it faces only BT as a competitor (‘duopoly sites’) up to the price of Openreach’s 10Gbit/s Ethernet services,²⁷⁴ as this is the maximum cost increase Virgin could impose on Three and Vodafone through a foreclosure strategy (as long as 10Gbit/s Ethernet products are a suitable alternative).

8.136 To approximately quantify this price increase, we use the difference between the annual rental charge Three and Vodafone pay for dark fibre from Virgin (plus fibre tax) and the annual rental charge for Openreach’s 10Gbit/s Ethernet service from our TCO calculations. We assume that Openreach’s 10Gbit/s Ethernet price is fixed: that is, Openreach does not, or is not able to, react strategically.²⁷⁵ For simplicity, we also disregard Openreach’s connection charges.

8.137 We note that this is only a rough estimate of the (first-round) effects of such a foreclosure strategy by Virgin in relation to Three and Vodafone. It does not represent an equilibrium in which all market participants have chosen their optimal strategies.²⁷⁶

8.138 Based on current prices, we estimate that, if Virgin increased the price it charges to supply dark fibre for Three’s [REDACTED] sites up to the the annual rental charge for Openreach’s 10Gbit/s Ethernet service²⁷⁷, it would raise Three’s

²⁷⁴ We assume here that bandwidths above 10Gbit/s are not required within the time horizon considered (see also the related discussion in section ‘Recent and future developments’).

²⁷⁵ We assume here that bandwidths above 10Gbit/s are not required within the time horizon considered (see also the related discussion in section ‘Recent and future’).

²⁷⁶ Amongst other assumptions, we do not consider whether and how BT (and other mobile backhaul suppliers) would react to such a foreclosure strategy, including outside of areas where Virgin has no other competitor than BT.

²⁷⁷ We assume here that all or most of the dark fibre installation costs are sunk in 2025 and consider only annual rent and maintenance costs. Further, given the [REDACTED] of Three’s contracts with Virgin, we use Openreach rental charges for 10Gbit/s Ethernet in an 84-month minimum period including main link charges.

annual costs by around £[REDACTED]. This represents around [REDACTED]% of its total mobile network costs and around [REDACTED]% of its total mobile operating costs.

8.139 Similarly, if Virgin increased the price it charges to supply dark fibre to the [REDACTED] Vodafone's sites it is expected to supply in 2025, it would raise Vodafone's annual costs by around £[REDACTED].²⁷⁸ This represents around [REDACTED]% of Vodafone's total mobile network costs and [REDACTED]% of its total mobile operating costs.

Summary of future mobile backhaul costs

8.140 Demand for mobile traffic has been increasing significantly and is forecast to increase further. This, and the introduction of 5G, require the mobile backhaul infrastructure of MNOs to be able to transmit higher volumes of data as well as other improvements.

8.141 Evidence we have received from MNOs suggests that this shift is likely to lead to increased mobile backhaul costs. However, based on MNOs' projections, this increase appears to be moderate and mobile backhaul costs are forecast to remain a relatively small proportion of MNOs' costs.

8.142 We expect Virgin to represent a small (albeit increasing) share of these costs, with BT remaining the main supplier of mobile backhaul for Three and Vodafone within the time period we have considered.

8.143 We have also shown that, in a naïve scenario of partial foreclosure by Virgin in areas where it faces competition from BT only, the annual cost increases that the Merged Entity could impose on Three and Vodafone would represent only a small proportion of their costs.

8.144 Our calculations are based on the projections made by Three and Vodafone and therefore we believe that they give a good indication of the boundaries of the effect the Proposed Merger may have on Three's and Vodafone's mobile backhaul costs.

8.145 We have not obtained sufficiently reliable information about market participants' projections further into the future, that is, after [REDACTED]. For instance, Vodafone told us that its mobile backhaul plans extend to no more than [REDACTED] years into the future.²⁷⁹

²⁷⁸ The precise figure depends on the mix of product variants used (eg, rental charges for EAD connections from Openreach are higher than for EAD LA connections). In order to be conservative, in this calculation we have assumed [REDACTED]% of connections require [REDACTED].

²⁷⁹ [REDACTED]. Three [REDACTED] provided plans and forecasts for the period until 20[REDACTED] only.

8.146 That said, we note that two factors are at play in relation to future backhaul requirements at sites that are already supplied by Virgin, limiting its ability to significantly increase large proportions of MNO's costs:

- (a) First, the time profile of dark fibre costs is currently such that a significant part is paid at the beginning of the contract and that lower yearly operating expenses occur in the following years of a contract (see section 'Virgin's pricing strategy for dark fibre' in Appendix D).
- (b) Second, dark fibre contracts with Virgin allow MNOs to continue the supply of dark fibre at the end of the current contract period up to a total of [redacted] years without incurring the initial set-up costs again.

The role of current Virgin contracts with MNOs

8.147 Virgin currently has contracts for mobile backhaul with the following MNOs:

- (a) Three (for mobile backhaul in the access layer);
- (b) Vodafone (for mobile backhaul [redacted]); and
- (c) MBNL (for mobile backhaul [redacted]).

8.148 Virgin also [redacted].

8.149 The Parties submitted that the [redacted] Virgin has recently entered into with Three, Vodafone and MBNL mean that Virgin's ability to withhold supply would be restricted to a decision not to participate in future tenders by Three (since the current contracts offer protection [redacted]).

8.150 We note that, in practice, contracts between providers and their customers may not completely remove a provider's ability to harm its downstream rivals, given that certain rivals might not be covered by these contracts, the contracts might not prevent all ways in which the competitiveness of rivals could be harmed and the contracts may be of a limited duration.²⁸⁰

8.151 Moreover, over time contracts may be renegotiated or terminated, and firms may waive their rights to enforce any breaches in light of their overall

²⁸⁰ See, in this regard, the approach adopted in Provisional Findings Report anticipated acquisition by Thermo Fisher Scientific Inc of Gatan, dated 17 April 2019, paragraphs 10.125, 10.128 and 10.204. A similar position is reflected in the CMA's revised Merger Assessment Guidelines.

bargaining position (reflecting the change in market structure brought about by a merger).²⁸¹

8.152 In any event, contracts do not, of course, apply to potential market entrants.²⁸²

8.153 We set out below the key points from these contracts with Virgin and the protections they offer to the applicable MNOs.

8.154 In particular, we consider whether they offer protection for these MNOs against each of the following three foreclosure strategies.

(a) Strategy 1: withdraw supply of dark fibre;

(b) Strategy 2: increase prices for dark fibre; and

(c) Strategy 3: decrease quality.

Three's contracts

8.155 Three entered into a [REDACTED] with Virgin in [REDACTED]. [REDACTED], Three expects to source [REDACTED] dark fibre circuits from Virgin.²⁸³

Strategy 1: Withdraw supply of dark fibre

8.156 In terms of agreed orders²⁸⁴, there is: a high degree of contractual certainty (up to [REDACTED]²⁸⁵ years [REDACTED];^{286,287} and consequently a high level of protection from withdrawal of agreed orders.

8.157 [REDACTED] and the [REDACTED] may depend on the contracting parties' negotiating strength at that time.

²⁸¹ See, in this regard, the approach adopted in Provisional Findings Report anticipated acquisition by Thermo Fisher Scientific Inc of Gatan, dated 17 April 2019, paragraphs 10.125, 10.128 and 10.204. A similar position is reflected in the CMA's revised Merger Assessment Guidelines.

²⁸² See, in this regard, the approach adopted in Provisional Findings Report anticipated acquisition by Thermo Fisher Scientific Inc of Gatan, dated 17 April 2019, paragraphs 10.125, 10.128 and 10.204. A similar position is reflected in the CMA's revised Merger Assessment Guidelines.

²⁸³ Further details of this contract can be found in Appendix E.

²⁸⁴ Agreed orders comprise those orders already placed and forthcoming monthly orders under the [REDACTED].

²⁸⁵ [REDACTED].

²⁸⁶ See Appendix E for detail and [REDACTED].

²⁸⁷ [REDACTED].

Strategy 2: Increase prices for dark fibre

8.158 The Parties submitted there was [REDACTED]²⁸⁸ whereas Three submitted [REDACTED], Virgin may refuse to agree new orders in the future in the absence of a price increase.

8.159 [REDACTED].²⁸⁹

Strategy 3: Decrease quality (by delaying roll-out and/or repairs)

8.160 The Parties submitted there was [REDACTED].²⁹⁰ Three submitted [REDACTED].

8.161 Quality may be decreased by delaying (i) delivery of a connection (delayed rollout) and (ii) repairs following service disruption. [REDACTED]. Appendix E sets out detail of [REDACTED] under both service agreements. [REDACTED]²⁹¹ [REDACTED].

8.162 [REDACTED] are relatively significant²⁹² and circumstances when Virgin may claim [REDACTED] (and avoid paying) are in general relatively limited [REDACTED].

8.163 Three submitted Virgin has missed the 2020 year-end target [REDACTED] of the [REDACTED] planned connections.

8.164 The impact of a delay occurs only at the specific RAN site connection, so is primarily localised. Delays in rolling out dark fibre would [REDACTED]. Repairs are only necessary where there is a fibre break, the impact is localised and Three submitted that the average monthly number of fibre breaks amounts to [REDACTED] ([REDACTED]).

Vodafone's contracts

8.165 Vodafone signed [REDACTED].²⁹³

Strategy 1: Withdraw supply of dark fibre

8.166 [REDACTED]. The Parties also submitted that [REDACTED]. Vodafone submitted that there is a risk that the Merged Entity withdraws access to dark fibre following the Proposed Merger.

²⁸⁸ [REDACTED].

²⁸⁹ [REDACTED].

²⁹⁰ [REDACTED]

²⁹¹ [REDACTED]

²⁹² See Appendix E which notes the [REDACTED] is equal to approximately [REDACTED] of the average total price per connection over the [REDACTED].

²⁹³ Further details of this contract can be found in Appendix E.

8.167 There is a high degree of contractual certainty for dark fibre orders that have already been placed and installed since [REDACTED].

8.168 [REDACTED].

Strategy 2: Increase prices for dark fibre

8.169 The Parties submitted that the contract [REDACTED]. [REDACTED].

8.170 The contract [REDACTED].

8.171 We consider that [REDACTED] and we further consider that the time period [REDACTED].

Strategy 3: Decrease quality (by delaying roll-out and/or repairs)

8.172 The Parties submitted that the contract [REDACTED]. Vodafone submitted that the contract [REDACTED].

8.173 [REDACTED].

8.174 We consider that decreasing quality, either by delaying roll-out or repairs, would be a costly strategy for Virgin because [REDACTED]. We consider it unlikely that Virgin would be able to argue successfully that [REDACTED].

MBNL contract

8.175 Virgin has a contract with MBNL, a network sharing joint venture between BT and Three, described in Chapter 7. This was [REDACTED].

8.176 [REDACTED].

8.177 [REDACTED].²⁹⁴

8.178 The Parties submitted that the contract [REDACTED].

8.179 Three submitted that whilst MBNL plans [REDACTED], any delays to dark fibre provision by Virgin under other contracts [REDACTED].

8.180 As noted above, we understand that [REDACTED]. We understand that Three could switch to Openreach should Virgin try to increase prices given Openreach's ubiquitous presence and the fact that Openreach is required by regulation to provide access to 1Gbit/s Ethernet services (except for in the CLA).

²⁹⁴ For completeness, [REDACTED] submitted that there is a further '[REDACTED]-year termination period but MBNL currently plan to replace the supply of these circuits before the end of the [REDACTED]-year term'.

8.181 As set out in Chapter 7, price cap regulations apply (except for in HNR areas) that include Openreach's regulated 1Gbit/s Ethernet services as one of the products in the product basket(s).

8.182 While the WFTMR regulation gives Openreach some flexibility when setting prices for different services or geographic areas, we consider it unlikely that Openreach would increase its prices for 1Gbit/s Ethernet products as a result of the Proposed Merger. The reason for this is that for 1Gbit/s Ethernet products, mobile backhaul only constitutes a small proportion of demand – and due to non-discrimination obligations, Openreach would not be able to increase prices for mobile backhaul customers only.

[X]contract

8.183 [X], [X] ran a tender to unbundle BT exchanges in its aggregation layer, with [X] being the sole winner of the supply contract. The contract has an overall value of £[X].²⁹⁵

8.184 [X] submitted that [X] proposed [X].

8.185 [X]. The value of [X]' contract [X].

8.186 [X] submitted concerns that Virgin may deteriorate the terms at which it supplies mobile backhaul and/or refuse to supply mobile backhaul. It submitted that these concerns not only relate to direct sourcing from Virgin but also to [X].

8.187 As noted above, [X] submitted that the proposed connectivity included [X]. However, for those connections for which [X] relies [X], we understand that [X].²⁹⁶

8.188 As such, all mobile backhaul connections that [X] sources [X] from [X] Virgin relate to [X].

8.189 For the Merged Entity to worsen the terms on which [X] purchases aggregation circuits in a targeted fashion, it would need to identify those dark fibre circuits that [X] use to supply MNOs, rather than other customers. It is unclear how feasible this is in practice.²⁹⁷

²⁹⁵ [X] noted that it has several phases of its aggregation programme.

²⁹⁶ Liberty Global further submitted that [X].

²⁹⁷ On the one hand: (i) Virgin is aware that its dark fibre [X]; and (ii) Virgin submitted that it [X] may thus seek to understand what a customer intends to use that fibre for. On the other hand, Virgin submitted that (i) it would be feasible for a firm [X] to purchase dark fibre without Virgin knowing who which end customers would use it; and (ii) different wavelengths on a piece of dark fibre could be used to serve different customers.

8.190 In any event, we consider that, even if the Merged Entity were able to withdraw its supply of [redacted] to [redacted] (or deteriorate terms by increasing price or decreasing quality), and even if this resulted in [redacted] no longer being able to supply [redacted] with the mobile backhaul connections for which [redacted], [redacted] could switch to Openreach:

(a) Openreach has a ubiquitous presence, and indeed [redacted].

(b) Openreach is required to provide access to OSA products (except for in BT+2 or more areas).

8.191 OSA products are subject to a regulatory price cap (except for exchanges where BT faces competition from two or more competitors), with there being separate caps on each individual component of Openreach's WDM services (see Chapter 7, section 'The role of Ofcom's regulatory conditions'). Openreach would hence not be able to increase its prices for OSA products in response to the Proposed Merger.

The role of network sharing arrangements between O2 and Vodafone

8.192 Vodafone and O2 are party to a network sharing arrangement which comprises:

(a) Cornerstone Telecommunications Infrastructure Limited (CTIL), [redacted]; and

(b) the Beacon contractual arrangements, [redacted].

8.193 [redacted].

8.194 [redacted]:

(a) [redacted];

(b) [redacted].

8.195 Below, we have assessed whether the Beacon network sharing arrangements between O2 and Vodafone may protect Vodafone against possible input foreclosure concerns.²⁹⁸

²⁹⁸ Appendix F provides further details on the Project Beacon network sharing arrangements.

[REDACTED]

8.196 The Parties submitted that mobile backhaul in the access layer is shared between O2 and Vodafone [REDACTED], if the Merged Entity were to degrade the quality of the backhaul provided to a Vodafone site, [REDACTED] would be adversely impacted at that site.

8.197 Vodafone submitted that [REDACTED].

8.198 Due to the sharing, any deterioration in the quality of the mobile backhaul sourced [REDACTED]. We therefore consider it unlikely that the Merged Entity would have an incentive to withdraw dark fibre supply or decrease quality (by delaying roll-out and/or repairs) in [REDACTED] areas.

8.199 However, we understand from Vodafone that [REDACTED]. This would imply that a potential price increase for mobile backhaul sourced by Vodafone would not have any effect on O2, but that Vodafone would be the sole bearer of such price increase.

8.200 The Parties submitted that [REDACTED].

8.201 However, the existence of a mechanism that may be used does not imply that Vodafone would be able to unilaterally rely on it. In particular, it is unclear whether Vodafone would be able to address financial [REDACTED] without O2's agreement. Additionally, it is unclear whether the [REDACTED] is limited to [REDACTED] or whether it also applies to other [REDACTED].

8.202 We therefore consider that the Beacon network sharing arrangements do not offer Vodafone protection against the Merged Entity increasing its mobile backhaul costs.

8.203 In terms [REDACTED].²⁹⁹

8.204 Additionally, we note that the Parties submitted that [REDACTED]. In particular, the Parties submitted that:

(a) [REDACTED];

(b) O2 considers that [REDACTED];

(c) [REDACTED].

²⁹⁹ [REDACTED].

[REDACTED]

8.205 We understand that [REDACTED].

8.206 We therefore consider that, [REDACTED], the Beacon network sharing arrangements do not provide any protection against a foreclosure strategy (irrespective of whether the strategy related to withdrawing dark fibre supply, increasing price or decreasing quality).

8.207 All [REDACTED] are located in London. We note the following with respect to the presence of alternative suppliers of mobile backhaul in London:

- (a) The Parties submitted that Ofcom has found that the provision of leased lines in Central London is competitive and that [REDACTED].
- (b) Vodafone submitted that there are only [REDACTED].
- (c) There are a number of alternative mobile backhaul suppliers active in London (namely Colt, Zayo, Neos Networks and euNetworks).

[REDACTED]

8.208 The Parties submitted that [REDACTED].

8.209 Vodafone submitted that Vodafone and Telefónica have agreed to [REDACTED] their active sharing arrangements in a number of large cities with populations above 100,000 inhabitants, and that Vodafone [REDACTED].

8.210 Should the [REDACTED] not proceed, these sites would remain [REDACTED] sites subject to the same protections described above.

8.211 Should the [REDACTED] proceed, then we consider that, [REDACTED], the Beacon network sharing arrangements do not provide any protection against a foreclosure strategy (irrespective of whether the strategy related to withdrawing dark fibre supply, increasing price or decreasing quality).

8.212 We note that with respect to [REDACTED], the Parties made the following submissions:³⁰⁰

- (a) The Parties submitted that for [REDACTED], Virgin is not present as a potential supplier and that there can hence be no foreclosure concerns.
- (b) The Parties further submitted that [REDACTED] where Virgin is present, but in addition to BT there is a least one other supplier of mobile backhaul, such

³⁰⁰ The provided figures combine sites in [REDACTED].

that Vodafone could, in addition to sourcing from BT, source from at least one other supplier.

- (c) The Parties submitted that there are [REDACTED] sites where BT and Virgin are the only alternative suppliers of mobile backhaul.³⁰¹

8.213 With respect to these submissions, we note the following points:

- (a) We agree that there are no foreclosure concerns in areas where Virgin is not present as a potential supplier.
- (b) We consider that fewer concerns about foreclosure arise in areas where alternative mobile backhaul suppliers are available. However, areas where there is only one supplier in addition to BT and Virgin could in principle still raise concerns if Virgin was a strong competitive constraint because if Virgin withdrew (or worsened) its mobile backhaul offering, this could result in a significant reduction in competitive pressure and hence increase in price.
- (c) Vodafone submitted that there are [REDACTED].

Summary

8.214 Vodafone and O2, as part of Project Beacon, share and will continue to share mobile backhaul in the [REDACTED]. While the sharing implies that any deterioration in the quality of the mobile backhaul sourced [REDACTED], we understand that a potential price increase for mobile backhaul sourced by Vodafone may not have any effect on O2.

8.215 [REDACTED].

The importance to Virgin of supplying mobile backhaul

8.216 The importance to Virgin of supplying mobile backhaul is likely to affect whether the Merged Entity will have an incentive to engage in a foreclosure strategy by withdrawing MNOs' access to its mobile backhaul: if mobile backhaul is very important to Virgin, this may suggest that upstream losses as a result of such input foreclosure could be especially severe for the Merged Entity. However, this evidence has to be seen in the context of the potential benefits of foreclosure (set out below in our vertical arithmetic section).

³⁰¹ We note that this is a revised figure, with the Parties initially submitting a figure of only [REDACTED].

8.217 Additionally, in order to assess whether the Merged Entity could have an incentive to withdraw dark fibre mobile backhaul but continue to offer active leased lines mobile backhaul, it is important to understand how Virgin decides which type of product - dark fibre vs active leased lines - to offer as mobile backhaul.

Profitability of mobile backhaul

8.218 The Parties submitted that there are strong incentives for Virgin to supply wholesale leased lines to downstream competitors, and that, if it were to withhold supply, it would [REDACTED].

8.219 As a starting point, we note that mobile backhaul makes up [REDACTED] of Virgin's total revenue from wholesale leased lines, earning [REDACTED] out of a total [REDACTED] in 2019, which is roughly [REDACTED].

8.220 In terms of profitability, the Parties submitted that [REDACTED].

8.221 Liberty Global submitted that the key Virgin mobile backhaul contracts exhibit [REDACTED] profitability:

(a) Three: [REDACTED].³⁰² [REDACTED]³⁰³ [REDACTED].

(b) Vodafone: [REDACTED]³⁰⁴, [REDACTED].

(c) O2: [REDACTED].

(d) MBNL: [REDACTED].

8.222 The Parties submitted that the [REDACTED] profitability is due to sunk network cost.

8.223 The Parties further submitted that [REDACTED].

Offering dark fibre vs active leased lines

8.224 Virgin provides mobile backhaul both as dark fibre and as active leased lines. Dark fibre accounts for [REDACTED] Virgin's overall mobile backhaul revenues, accounting for [REDACTED] of its mobile backhaul revenues in 2020. Details on the split per product are provided in Table 8-12 below.

³⁰² See Appendix E for further details.

³⁰³ Surplus Cash Flow is a cash flow measure of profitability after taking into account cost of sales, operating expenditure and capital expenditure.

³⁰⁴ [REDACTED].

Table 8-12: [REDACTED]

[REDACTED]

Source: [REDACTED]

Rationale

- 8.225 The Parties submitted that [REDACTED] incentivises Virgin to offer dark fibre [REDACTED]. In particular, the Parties submitted that dark fibre [REDACTED].
- 8.226 The Parties further submitted that ceasing to offer dark fibre would result in the Merged Entity losing business to BT, as well as to other competitors and to self-supply by MNOs.
- 8.227 However, when we asked how Virgin's active products compete with Openreach's active products, Liberty Global submitted that, [REDACTED]. Liberty Global told us that [REDACTED].
- 8.228 In terms of the incentives to offer dark fibre, Vodafone submitted that Openreach does not offer the dark fibre access product that it requires. Vodafone believes this is because BT, as a vertically-integrated mobile and fixed operator does not have the incentives to supply and therefore support other mobile operators. Vodafone further submitted that [REDACTED].
- 8.229 However, we consider that Openreach's strategic considerations are likely to be substantially different to those of the Merged Entity given that Openreach is subject to regulation.
- 8.230 In this respect, Openreach submitted that it is obliged by regulation to treat all of its customers and communication providers equally and that it is not able to unduly discriminate. Openreach further submitted that it understands other network providers' dark fibre offerings to be bespoke solutions, where prices are also often bespoke.
- 8.231 Ofcom indicated that, under the regulation set out in the WFTMR, if Openreach were to choose to supply a commercial dark fibre product to one customer in an area where BT has SMP then it would need to also make that product available to others. It would also be subject to non-discrimination obligations, and Ofcom indicated that access must be on fair and reasonable terms, conditions and charges and on an EOI basis. Ofcom suspected that Openreach has chosen not to voluntarily introduce a dark fibre product because it would risk cannibalising sales from Openreach's higher margin VHB active products.
- 8.232 In contrast, Virgin is currently [REDACTED].

8.233 As such, the fact that Openreach does not currently choose to offer dark fibre (except for in those areas where it is obliged to do so by regulation) does not necessarily mean that the Merged Entity would follow the same strategy.

Profitability

8.234 As noted above, Liberty Global submitted that Virgin's wholesale business [REDACTED].

8.235 While, as set out above, the Parties submitted that [REDACTED], Liberty Global also told us that that it would be difficult to achieve [REDACTED], citing the ubiquitous presence of Openreach's active products as a reason.

8.236 Liberty Global provided us with the unit economics for: dark fibre on the basis of Virgin's contract with Vodafone;³⁰⁵ and Ethernet and WDM services (referred to as 'HCS' – 'high capacity services') as a blended view over Virgin's entire customer base (that is, including not only mobile backhaul but also enterprise customers). This evidence is set out in Table 8-13 below.

Table 8-13: [REDACTED]

[REDACTED]

Source: [REDACTED]

8.237 As the table shows, Virgin's profitability (as measured by surplus cash flow³⁰⁶) [REDACTED].

8.238 However, as the figures for Ethernet and HCS products represent a blended view of the entire customer base and so are not limited to mobile backhaul, this is not a like-for-like comparison. It therefore does not provide robust evidence on how the profitability of dark fibre mobile backhaul compares to that of mobile backhaul supplied as active leased lines.

Internal documents

8.239 We have reviewed internal documents on the profitability of Virgin's mobile backhaul offering and its strategy going forward.³⁰⁷

8.240 First, we note that internal documents [REDACTED].

³⁰⁵ Virgin's contract with Vodafone is discussed further in Appendix E.

³⁰⁶ Surplus Cash Flow is a measure of profitability after taking into account cost of sales, operating expenditure and capital expenditure.

³⁰⁷ For further details on our internal document review, see Appendix B.

8.241 Based on revenue figures submitted by the Parties, dark fibre, with respect to wholesale leased lines as a whole, accounted for [REDACTED] in 2019, with dark fibre for mobile backhaul accounting for [REDACTED] of this.

8.242 Liberty Global's internal documents indicate that [REDACTED] part of Virgin's business. For example:

- (a) A December 2019 presentation given by the Virgin CEO to the Liberty Global board says that '[REDACTED]'.
- (b) Another July 2020 Liberty Global board document update on Virgin says that the [REDACTED].
- (c) An update presentation on Virgin from a December 2020 Liberty Global board meeting says that [REDACTED].
- (d) A July 2020 presentation given to the Liberty Global board says, in relation to capital investment opportunities for Liberty Global generally, that B2B Fibre has [REDACTED].³⁰⁸

8.243 Second, and primarily in the context of 5G, Liberty Global internal documents indicate consistently that [REDACTED]. For example:

- (a) A presentation from a March 2018 Liberty Global board retreat (not specifically in relation to Virgin) [REDACTED].
- (b) A presentation on [REDACTED] from a Liberty Global board meeting (not specifically in relation to Virgin) in October 2018 emphasises [REDACTED].
- (c) A presentation by the Virgin CEO to the Liberty Global board from December 2019 says that [REDACTED].
- (d) A [REDACTED] presentation for the Liberty Global board (not specifically in relation to Virgin) in March 2020 states that [REDACTED].

Summary

8.244 The evidence set out above shows that while mobile backhaul makes up [REDACTED] of Virgin's total revenue from wholesale leased lines, the incremental profits from Virgin's key mobile backhaul contracts are [REDACTED].

8.245 In terms of offering dark fibre or active leased lines, the Parties' submissions suggest that while dark fibre [REDACTED].

³⁰⁸ We note that this internal document refers to B2B fibre in general, rather than dark fibre specifically.

8.246 While we have not received robust evidence on how the profitability of dark fibre mobile backhaul compares to that of mobile backhaul supplied as active leased lines, the submissions of the Parties suggest that the profitability [REDACTED].

8.247 Finally, Liberty Global's internal documents indicate that [REDACTED] part of Virgin's business and indicate consistently that [REDACTED].

Ability

8.248 We set out below our findings on the Merged Entity's ability to engage in an input foreclosure strategy with respect to mobile backhaul based on the evidence set out above.

8.249 As noted above, while our assessment considers the scope for foreclosure with respect to mobile backhaul in general, we focus on the access layer as the extent to which the Proposed Merger could affect mobile backhaul costs in the aggregation layer is limited. This is due to the fact that the Proposed Merger could affect only a small proportion of aggregation circuits and, more generally, aggregation costs account for the minority of MNOs' backhaul costs.

8.250 We consider that there are two overarching issues that limit the ability of the Merged Entity to harm rival MNOs through input foreclosure, namely:

(a) The ubiquitous presence of active leased lines supplied by Openreach and;

(b) The limited importance of MNOs' mobile backhaul costs in general and the limited exposure to Virgin specifically.

8.251 Additionally, there are certain protections, including contractual obligations and the network sharing arrangements, that may limit the Merged Entity's ability to engage in certain foreclosure strategies.

8.252 Finally, and for completeness, we also consider whether the Merged Entity would have the ability to engage in a foreclosure strategy with respect to mobile backhaul provided as active leased lines as opposed to dark fibre.

Overarching issues

8.253 With respect to the ubiquitous presence of Openreach's active leased lines, the evidence set out above indicates that while MNOs may perceive that there are certain advantages to using dark fibre, not having access to dark fibre is unlikely to constitute a significant disadvantage for MNOs from a technical perspective.

- 8.254 The evidence we have seen suggests that MNOs could, from a technical perspective, use active leased lines rather than dark fibre in order to meet their backhaul requirements. This, combined with the ubiquitous presence of Openreach, means that MNOs would be able to switch to a technically suitable alternative mobile backhaul product. In the access layer, Openreach's 10Gbit/s Ethernet product is suitable except for specific applications, which are unlikely to be high in volume and for which Openreach's WDM products are likely to be suitable.
- 8.255 Comparing the costs of dark fibre and active leased lines services is inherently imprecise as costs (and cost differences) will depend on the respective network profile of the MNO and the location of the particular sites being connected, as well as on the potential for the cost of active services to change during the long time period being assessed.
- 8.256 Notwithstanding these difficulties, our TCO comparison indicates that the alternative active product from Openreach can, in some instances, be more expensive than dark fibre from Virgin.
- 8.257 In the [REDACTED], the cost difference of dark fibre and Openreach's 10Gbit/s Ethernet active product is [REDACTED] for Vodafone and [REDACTED] for Three. The cost difference between dark fibre and Openreach's WDM products in the access layer appears to be significantly higher.
- 8.258 We consider that these cost differences are indicative, and we therefore conduct sensitivity analysis around these estimates as part of our assessment of incentive below.
- 8.259 We have considered price differences based on current prices, but also whether Openreach may charge different prices in the future. In particular, the regulatory framework gives Openreach the ability to increase the prices of Ethernet products (including 10Gbit/s products), albeit with certain limitations.
- (a) We consider that Openreach's prices are relatively unlikely to increase in the absence of the Proposed Merger. Additionally, we note that [REDACTED] and, in the absence of the Proposed Merger, we would expect this to continue. Hence, we would expect that any change to Openreach's prices would, in the absence of the Proposed Merger, [REDACTED], thereby being unlikely to impact the price difference derived above.
- (b) We consider it unlikely that the Proposed Merger would, in itself, affect Openreach's incentive to raise leased line prices materially (that is, in response to a potential softening of competition).

- 8.260 With respect to the importance of MNOs' mobile backhaul costs, the evidence set out above shows that mobile backhaul costs currently represent only a relatively small proportion of the overall costs MNOs incur. In particular, mobile backhaul costs currently amount to less than [X]% of MNOs' mobile operating cost and less than [X]% of MNOs' network cost.
- 8.261 Demand for mobile traffic has been increasing significantly and is forecast to increase further. This, and the introduction of 5G, require the mobile backhaul infrastructure of MNOs to be able to transmit higher volumes of data (amongst other improvements).
- 8.262 Evidence from MNOs suggests that this shift is likely to lead to increased mobile backhaul costs. Nevertheless, this increase appears to be moderate, with the evidence indicating that mobile backhaul costs will remain a relatively small proportion of MNOs' costs. In particular, projections from Three and Vodafone indicate that mobile backhaul will account for at most [X]% of these MNOs' mobile operating cost and at most [X]% of these MNOs' network cost in the years up until 2025.
- 8.263 Evidence also indicates that Virgin represents only a small (albeit increasing) share of these costs. Projections from Three and Vodafone indicate that mobile backhaul procured from Virgin will account for at most [X]% of their mobile operating costs and at most [X]% of their network costs up to 2025. When only looking at sites in duopoly areas (that is, areas where Openreach is the only alternative to Virgin and where foreclosure concerns are more likely to arise), these percentages remain similarly low.
- 8.264 While we acknowledge certain limitations with respect to the data set out above, including uncertainty with respect to future projections, the evidence indicates that mobile backhaul costs account for, and will continue to account for, a relatively small proportion of MNOs' costs, and that this proportion is even smaller when only considering mobile backhaul sourced (or anticipated to be sourced) from Virgin.
- 8.265 Combining evidence on the importance of MNOs' mobile backhaul costs with the technical substitutability of Openreach active leased line products and dark fibre and the derived cost difference, we consider that the Merged Entity's ability to raise MNOs' costs is limited.
- 8.266 Our estimates on the potential cost increase for MNOs from a foreclosure strategy if prices increased to the current level of Openreach's 10Gbit/s Ethernet active leased line products are as follows:
- (a) For Three, a cost increase of around [X]% of its total mobile network costs and around [X]% of its total mobile operating costs; and

(b) For Vodafone, a cost increase of around [REDACTED]% of its total mobile network costs and around [REDACTED]% of its total mobile operating costs.

8.267 Overall, we found that that the Merged Entity's would currently not be able to engage in partial or full input foreclosure in the supply of mobile backhaul.

8.268 While going forward there is likely to be some demand for applications for which MNOs require a more expensive active leased line product (namely OSA), the timing of the demand is uncertain and the number of sites affected is likely to be relatively small.

8.269 We therefore found that, going forward, the Merged Entity's ability to engage in an input foreclosure strategy is also limited.

Additional protections

8.270 We set out below our views on the extent to which Three and Vodafone's contracts for the supply of dark fibre from Virgin further limit the Merged Entity's ability to engage in partial or full foreclosure strategies.

8.271 We note that, even if the Merged Entity were unable to engage in a foreclosure strategy without breaching its agreements and/or contracts (and/or being liable for damages), if the profits from a foreclosure strategy were sufficiently large to outweigh the cost of such breach or damages, it could still have an incentive to breach the contract.³⁰⁹

8.272 With respect to Three, [REDACTED].

8.273 In relation to pricing for the already contracted work packages,³¹⁰ we consider that [REDACTED].³¹¹

8.274 Additionally, we consider that [REDACTED]³¹² [REDACTED].

8.275 With respect to Vodafone [REDACTED].

8.276 In particular, it is not clear:

(a) [REDACTED];

³⁰⁹ As discussed in the section 'Incentive', our view is that, even absent any contractual protections, the Merged Entity would not have an incentive to engage in a foreclosure strategy with respect to mobile backhaul. We therefore do not consider it necessary to assess the impact of the cost of breaching the existing agreements and/or contracts, as these costs would make a foreclosure strategy even more costly for the Merged Entity.

³¹⁰ Given that, as set out above [REDACTED].

³¹¹ [REDACTED].

³¹² Given that, as set out above, [REDACTED].

(b) [REDACTED]

(c) [REDACTED].

8.277 We consider that [REDACTED]. We acknowledge Vodafone's submission that, [REDACTED].

8.278 Nevertheless, while we consider that this explains why Vodafone was willing to sign the contracts in the first place and would want to [REDACTED], we consider it unlikely that Vodafone would be able to obtain [REDACTED]: given the [REDACTED] and the [REDACTED], it is unclear how Virgin would benefit from offering Vodafone [REDACTED] (and hence why Virgin would be willing to do that).

8.279 Additionally, we consider that [REDACTED].

8.280 With respect to protections from network sharing agreements, Vodafone and O2, as part of Project Beacon, share and will continue to share mobile backhaul in the [REDACTED].

8.281 Our view is that, in the [REDACTED], the Beacon network sharing agreements:

(a) Are likely to provide protection for Vodafone against a foreclosure strategy of Virgin withdrawing dark fibre supply or decreasing quality at least until [REDACTED], and potentially longer; but

(b) are unlikely to provide protection for Vodafone against a foreclosure strategy of Virgin increasing mobile backhaul costs.

8.282 To the extent that [REDACTED], our view is that, [REDACTED], the Beacon network sharing arrangements do not provide any protection for Vodafone against a foreclosure strategy in these areas.

Foreclosure with respect to mobile backhaul provided as active leased lines

8.283 As set out above, our main concern relates to the provision of mobile backhaul in the form of dark fibre. However, Virgin also supplies mobile backhaul in the form of active leased lines to MBNL and dark fibre to [REDACTED] as mobile backhaul in the form of active leased lines.

8.284 Our view is that Virgin would be unlikely to be able to engage in a foreclosure strategy with respect to the [REDACTED] under the current MBNL contract or any extension of it because the [REDACTED] product offered by BT constitutes a suitable alternative that is unlikely to lead to a significant price increase for MBNL.

8.285 Our view is that Virgin would be unlikely to be able to engage in a foreclosure strategy with respect to the mobile backhaul it indirectly [REDACTED] because the OSA

products offered by BT are likely to constitute a suitable alternative that is unlikely to lead to a significant price increase for [REDACTED].

Incentive

- 8.286 This section considers the Merged Entity's incentive to engage in input foreclosure in the supply of wholesale leased lines to rival MNOs. We note that in order to reach an SLC finding we need to find that the Merged Entity would have both the ability and the incentive to foreclose, and that the effect of this foreclosure would reduce competition so as to give rise to an SLC in the affected market.³¹³
- 8.287 In this section, we draw on the evidence presented in previous sections. Our assessment is largely based on a vertical arithmetic analysis, which is described in detail in Appendix G.
- 8.288 We first consider the two foreclosure strategies that we assess in our incentive analysis: withdrawal of supply and price increases. We then set out our analysis of the profitability of the two strategies.³¹⁴

Withdrawal of supply versus price increase

- 8.289 The Merged Entity would have two possible strategies at its disposal to increase the backhaul cost of its rival MNOs: withdrawing the supply of backhaul (either completely or by deciding to supply only active backhaul products rather than dark fibre) or charging a higher price for its dark fibre.
- 8.290 Withdrawal of supply is likely to be a costly strategy to pursue:
- (a) First, the Parties have indicated that the supply of mobile backhaul generates [REDACTED] incremental margins for Virgin, which would lead to [REDACTED] losses in the case of withdrawal of supply.
 - (b) Second, supplying dark fibre gives Virgin a further means of [REDACTED] from that of its main competitor, Openreach. By offering [REDACTED], both Openreach and Virgin may be able to charge higher prices to customers with a strong

³¹³ MAGs, paragraph 5.6.7.

³¹⁴ We do not formally assess the Merged Entity's incentive to foreclose rival MNOs through a decrease in the quality of the dark fibre supplied to them. It is difficult to adapt our formal analysis to the case of quality degradation, as the cost to the Merged Entity of such a strategy is hard to assess. However, given that the Merged Entity does not have an incentive to withdraw supply (as discussed below), it would also have limited incentive to undertake actions that might result in Three or Vodafone withdrawing from their contract, such as introducing long delays in the roll-out or repair of dark fibre connections.

preference for their own product. This is consistent with the evidence, provided by Virgin, that dark fibre is [✂] than active products.

- 8.291 Increasing the price of dark fibre might be a less costly strategy for the Merged Entity. Compared to withdrawal of supply, price increase leads to lower upstream losses, as only part of sales volume may be lost, and the volume still supplied would be sold at a higher price.
- 8.292 The Parties submitted that the [✂] in Virgin's contracts with Three and Vodafone would make price increases impossible.
- 8.293 However, contractual protections can be interpreted as imposing costs on Virgin in the case it decided to breach their terms. It is therefore possible to consider the Merged Entity's incentive to increase the prices for dark fibre, while taking into account the additional costs from breaching the existing contractual terms. For example, a moderate incentive to increase prices if contracts were not in place may be offset by the additional costs that the Merged Entity would incur for breaching the contracts.

The Merged Entity's incentive to withdraw supply

- 8.294 Our analysis of the Merged Entity's incentive to withdraw supply of dark fibre is based on a vertical arithmetic model.³¹⁵
- 8.295 The logic of a vertical arithmetic analysis is that foreclosure would lead to upstream losses for the Merged Entity, as profits on dark fibre no longer sold to MNOs would be sacrificed. On the other hand, foreclosure would increase the mobile backhaul costs of the foreclosed MNOs, which they would at least partially pass through to their retail prices. The resulting retail price increase would induce some customers to switch away from the foreclosed MNOs and some of them would be captured by the Merged Entity.
- 8.296 In order for the foreclosure strategy to be profitable, the retail profits gained by the Merged Entity from these new customers should at least compensate for the wholesale losses incurred.
- 8.297 Our assessment is therefore based on a comparison between the customer losses at Three and Vodafone required to make supply withdrawal profitable for the Merged Entity and the customer losses predicted to occur following

³¹⁵ The model follows the one used by the CMA for a similar analysis in the investigation of the merger between BT and EE. See [Final report on the on the anticipated acquisition by BT Group plc of EE Limited](#), paragraphs 16.124-134 and Appendix K.

withdrawal of supply. The details of the analysis are presented in Appendix G. The approach is summarised below.

Estimating the loss of MNOs' customers that would make foreclosure profitable

8.298 The vertical arithmetic model is based on variables whose values are subject to significant uncertainty. To compensate for this, we make very conservative assumptions, which we recognise bias the estimation towards lower volumes of required customer loss, and so make the foreclosure strategy more profitable. This approach was designed to ensure that we did not overlook a potential foreclosure effect.³¹⁶ In particular:

- (a) The wholesale losses that Virgin would incur are spread across a period of several years. As our analysis is based on yearly losses and profits, the conversion of the stream of losses into an equivalent annual loss depends on the discount factor used. We have adopted a low discount factor, which decreases the value of the annual loss, making foreclosure less costly.
- (b) Following the approach used by the CMA in the BT/EE merger investigation,³¹⁷ we have increased the Parties' average retail margins by 20%, to account for the additional margin that the Merged Entity may earn by cross-selling fixed products to the captured mobile customers.
- (c) We have assumed that customers switching from any of the foreclosed MNOs would not divert to another foreclosed MNO, that is, customers switching from Three would not divert to Vodafone and vice versa. This is a very conservative assumption and represents an upper bound for the diversion to the Merged Entity in the case of foreclosure.

8.299 Under these very conservative assumptions, for foreclosure to be profitable, Three would have to lose at least 179,000 and Vodafone at least 139,000 customers.

Estimating the expected decrease in MNOs' customers

8.300 In order to estimate the expected impact of supply withdrawal on the MNOs' customer population:

- (a) We have estimated the increase in mobile backhaul costs caused by foreclosure; and

³¹⁶ If we then found incentive, we recognised that our conservative assumptions would need to be further tested.

³¹⁷ [Final report on the anticipated acquisition by BT Group plc of EE Limited](#), paragraph 16.126(b).

- (b) we have assessed to what extent these costs would be passed through into retail prices and how retail customers would respond to price increases.

Increase in mobile backhaul costs

- 8.301 In order for the Merged Entity to have an incentive to engage in input foreclosure, the foreclosure has to lead to a cost increase for the foreclosed input high enough to induce a sufficient number of downstream customers to switch away from the foreclosed firms.
- 8.302 In the case of mobile backhaul, the achievable cost increase depends on:
- (a) The price of the closest alternative to Virgin's dark fibre, which in the [redacted] is typically Openreach's EAD 10Gbit/s product; and
- (b) the proportion of the MNOs' backhaul that is vulnerable to a price increase.
- 8.303 The analysis assumes that, post-merger, Openreach's prices would remain at their current level. The Parties submitted that this approach is conservative, as the Openreach prices are likely to fall over time, while Virgin's dark fibre [redacted].
- 8.304 This assumption also implies that Openreach would not respond strategically to a decision by the Merged Entity to increase the price of dark fibre. As described above, the current regulatory regime leaves scope for Openreach to increase prices for EAD 10Gbit/s products.
- 8.305 However, as also set out above, Openreach is subject to non-discrimination obligations and the evidence suggests that the competitive pressure exerted by Virgin on Openreach's pricing has, at least to date, been relatively limited.
- 8.306 Even if, absent the Proposed Merger, Virgin were to become a greater constraint on Openreach and if, as a result of the Proposed Merger, this competitive constraint were to be lost, the current difference between the pricing of Virgin's dark fibre and Openreach's alternative active products would still be a reasonable approximation of the increase in backhaul costs that Three and Vodafone could experience in the case of foreclosure. This is because the current price difference already reflects a situation where Virgin does not impose a significant competitive constraint on Openreach.
- 8.307 Our approach for computing the cost of dark fibre and of Openreach's products and for comparing the two values is set out in Appendix D.

8.308 Table 8-14 below shows the cost difference (at current prices) between Virgin’s dark fibre and Openreach’s active products for the [REDACTED], for both Three and Vodafone. The comparison is based on a [REDACTED]-year time horizon, which reflects the length of Three’s and Vodafone’s contractual protections [REDACTED].³¹⁸ For both Three and Vodafone, we base our analysis on [REDACTED]³¹⁹. [REDACTED],.

Table 8-14: Cost difference between Virgin’s dark fibre and Openreach’s EAD 10Gbit/s at current prices

	Cost difference
Three	[REDACTED]
Vodafone [REDACTED]	[REDACTED]

Source: CMA calculations.

8.309 In the case of Vodafone, our estimates imply that the cost of Openreach’s EAD 10Gbit/s would be approximately [REDACTED] as that of dark fibre [REDACTED]connections. To account for the uncertainty around our estimate and for a potentially larger cost difference in relation to [REDACTED]that Vodafone will be sourcing from Virgin, for the purpose of the vertical arithmetic analysis we have assumed that foreclosure would lead to [REDACTED].

8.310 We have applied these cost increases to the overall cost of the dark fibre mobile backhaul connections that Three and Vodafone are planning to source from Virgin. The assumptions underlying this calculation are set out in Appendix G. To account for potential imprecisions in our estimates of the cost of mobile backhaul, we have also run a sensitivity analysis using different percentage cost increases.

8.311 The result of our analysis remains the same: there is no incentive to foreclose, even when considering much higher cost increases, such as [REDACTED].

Pass-through of cost increases and customer loss

8.312 When assessing the impact of mobile backhaul cost increases on retail customer loss, we have treated mobile backhaul costs as fully variable.

8.313 In reality, part of these costs is likely to be fixed in nature. An increase in fixed costs would not have a direct impact on the retail prices of the foreclosed MNOs, and therefore would induce a smaller loss of retail customers, reducing the Merged Entity’s incentive to foreclose. Therefore, considering all mobile backhaul costs as variable is likely to overestimate the incentive to foreclose and is, therefore, a conservative assumption.

³¹⁸ [REDACTED].

³¹⁹ [REDACTED]

8.314 We have then followed the approach used by the CMA in its BT/EE merger investigation³²⁰ and have considered a simplified model in which MNOs sell a single retail product. We have considered the cases of linear and of isoelastic demand.³²¹ The parameters of the demand functions are estimated based on data on revenues, customers and variable costs. We have also performed a sensitivity analysis, by varying the value of the price elasticity of demand. The details of the analysis are set out in Appendix G.

8.315 Under both linear and isoelastic demand, the expected customer loss is much smaller than the value that would make foreclosure profitable for the Merged Entity (see paragraph 8.299 above). For Three, the estimated customer loss is less than [X]; for Vodafone, it is less than [X].

8.316 Given that we found that the Merged Entity's ability to engage in an input foreclosure strategy is limited, we did not need to conclude on whether the Merged Entity will have the incentive to do so. Nonetheless, based on the evidence set out above, we found that the Merged Entity would not have an incentive to withdraw supply of dark fibre.

The Merged Entity's incentive to increase the price of dark fibre

8.317 As we set out above, increasing the price of dark fibre might be a less costly foreclosure strategy than withdrawing supply.

8.318 However, assessing the incentive to foreclose through increasing prices requires a somewhat different analysis than the one developed for the case of withdrawal of supply.

8.319 This is because, under the assumptions that upstream cost increases would be at least partly passed through into higher downstream prices, and that some downstream customers would respond by switching to the Merged Entity, in any vertical merger the Merged Entity would have some incentive to marginally increase the prices charged in the upstream market.³²²

8.320 The question is therefore not whether the Merged Entity has an incentive to increase prices, but whether it has an incentive to increase them to a material extent. A formal analysis would require us to assess how MNOs' demand for dark fibre from Virgin would change in response to a price increase and at

³²⁰ [Final report on the anticipated acquisition by BT Group plc of EE Limited](#), paragraph 16.133.

³²¹ Linear demand curves assume demand becomes more sensitive to changes in price as the price level increases and imply a pass-through rate of marginal costs into prices of 50%; isoelastic demand curves assume that demand is equally sensitive to changes in price regardless of the price level and imply a pass-through rate above 100%. These two demand specifications are widely used in merger analyses for their tractability.

³²² In fact, assuming that the Parties were pricing optimally pre-merger, increasing prices upstream by a very small amount has a negligible effect on upstream profitability but induces an increase in downstream profits.

what level of price increase upstream losses for the Merged Entity would become greater than downstream gains.

- 8.321 We have not performed this formal analysis. However, given the technical substitutability between dark fibre and active products, we consider that any price increase materially higher than the current cost difference between Virgin's dark fibre and Openreach's EAD 10Gbit/s would result in the Merged Entity losing the vast majority of its dark fibre sales.
- 8.322 Given that, as we conclude above, the upstream losses from withdrawal of supply would be substantially larger than the corresponding downstream gains, a price increase strategy resulting in the loss of most dark fibre sales would equally be unprofitable.
- 8.323 Because of the limited price difference between dark fibre and Openreach's active products, it appears implausible that the Merged Entity could impose a significant price increase without incurring losses. Therefore, while the Merged Entity might have an incentive to increase prices somewhat, it would not have the incentive to impose a substantial increase, large enough to have a material impact on MNOs' cost base.
- 8.324 Given that we found that the Merged Entity's ability to engage in an input foreclosure strategy is limited, we did not need to conclude on whether the Merged Entity will have the incentive to do so.
- 8.325 Nonetheless, based on the evidence set out above, we found that there would be no incentive for the Merged Entity to foreclose Three or Vodafone by increasing the price of dark fibre backhaul.

Effect

- 8.326 Given our views on the Merged Entity's ability and incentive to engage in a foreclosure strategy, we have not separately assessed the effect that a foreclosure strategy of the Merged Entity would have on competition. However, we note that our assessment of the Merged Entity's ability to engage in a foreclosure strategy already takes into account the extent to which such strategy would harm rival MNOs.

9. Wholesale mobile: market definition and background

- 9.1 In this chapter we set out our assessment of market definition and briefly describe the market for wholesale mobile services.

Market definition

- 9.2 Market definition provides a framework for the analysis of the competitive effects of a merger. The relevant market (or markets) is the market within which the merger may give rise to an SLC and contains the most significant competitive alternatives available to the customers of the merged companies. Market definition is a useful analytical tool, but not an end in itself, and identifying the relevant market involves an element of judgement.³²³
- 9.3 The boundaries of the market do not determine the outcome of our analysis of the competitive effects of a merger in any mechanistic way. In assessing whether a merger may be expected to give rise to an SLC, we may take into account constraints from outside the relevant market, segmentation within the relevant market, or other ways in which some constraints are more important than others.³²⁴
- 9.4 In practice, the analysis underpinning the identification of the market or markets and the assessment of the competitive effects of a merger overlap, with many of the factors affecting market definition being relevant to the assessment of competitive effects and vice versa.³²⁵
- 9.5 Mobile Network Operators (MNOs) provide wholesale mobile services to Mobile Virtual Network Operators (MVNOs). These wholesale access services allow retail customers of MVNOs to make use of an MNO's radio access network (RAN). Wholesale services also include call origination and may include other services such as use of the MNO's core network.³²⁶
- 9.6 We assessed market definition in relation to:
- (a) The (upstream) supply of wholesale mobile services; and,
 - (b) the (downstream) supply of retail fixed-mobile bundles.

Wholesale mobile services

- 9.7 We investigated the extent to which different aspects of the provision of wholesale mobile services to MVNOs should be considered as a single market on the basis of demand-side or supply-side factors.

³²³ MAGs, paragraphs 5.2.1–5.2.2.

³²⁴ MAGs, paragraph 5.2.2.

³²⁵ MAGs, paragraph 5.1.1.

³²⁶ Call origination is the ability for an end user to make a call to the network on which the call will be terminated (call termination), which could be a fixed network in the case of a mobile user calling a landline.

- 9.8 Our candidate market is the wholesale supply by MNOs to MVNOs of network access and call origination on public mobile telephone networks. These are the services that O2 currently supplies to MVNOs.
- 9.9 Applying the framework of the hypothetical monopolist test, we considered whether the market should be defined more broadly than the candidate market (that is, whether MVNOs could switch from the wholesale supply of network access and call origination to another provider in the event of an increase in price or reduction in quality) or whether the market is narrower than the candidate market (that is, whether MVNOs could switch to procuring the supply of network access and call origination services separately).
- 9.10 The Parties submitted that the relevant market is the wholesale supply of network access and call origination on public mobile telephone networks.
- 9.11 The Parties considered that there are no sub-divisions as regards access provided to different types of MVNO or branded resellers (collectively 'non-MNOs'), and note that the European Commission has previously found that, from a supply-side perspective, each MNO can supply the access required by each type of non-MNO.
- 9.12 Third parties stated that they considered that the relevant product market to be the provision of wholesale network access and call origination services on public mobile telephone networks.³²⁷
- 9.13 We have not identified any alternative services that MVNOs could switch to (in order to supply retail mobile services) in the event of an increase in price or reduction in quality. Neither the Parties nor third parties have suggested that such alternative services exist. As such, we do not consider that the market is wider than the wholesale supply of network access and call origination on public mobile telephone networks.
- 9.14 In relation to whether the market is narrower than the candidate market, we considered whether MVNOs procure access and call origination separately, and whether the conditions of competition in the supply of wholesale network access services and call origination services are the same such that the market can be aggregated on the basis of supply-side factors.

³²⁷ [redacted]. BT, Vodafone, TalkTalk, Sky, Dixons Carphone, Three, and Utility Warehouse all generally agreed with the Commission's approach in previous cases of defining a single market for the wholesale supply of network access and call origination on public mobile telephone networks. Lycamobile stated that 'the demand side for multiple play and value-added services should be considered as part of the definition of wholesale market.'

- 9.15 The evidence indicates that currently these services are purchased by MVNOs from MNOs together.
- (a) Vodafone stated that previous European Commission cases have found a single market for wholesale access and call origination and stated: ‘Since both services were considered to be generally supplied together, they were seen as being part of a single market... Vodafone agreed with this definition.’
 - (b) Utility Warehouse stated that both network access and call origination are fundamental aspects of the provision of services from MNOs to MVNOs.
 - (c) [redacted] stated that it purchases both access and call origination from its current MNO partner.
- 9.16 Furthermore, we found that the four MNOs compete to supply both wholesale supply of network access services and call origination services to MVNOs. As such, we consider that the conditions of competition between the MNOs are the same for each service.
- 9.17 Accordingly, we consider that the relevant product market is the wholesale supply by MNOs to MVNOs of network access and call origination on public mobile telephone networks.
- 9.18 The regulations under which an MNO operates are national in scope and we do not consider that the market is broader, including, for example MNOs operating outside the UK. Therefore, we consider that the geographic market is the UK.
- 9.19 Given the above, our finding is that the appropriate market definition is the supply of wholesale mobile services in the UK.
- 9.20 Our market definition is consistent with previous cases considered by the European Commission and the CMA, which have consistently defined a wholesale market for network access and call origination on public mobile telephone networks (‘wholesale mobile services’).³²⁸ Furthermore, the Commission and CMA have, in previous cases, both concluded that the market is national in scope.³²⁹

³²⁸ For example, CMA, [BT/EE Final Decision](#), 15 January 2016, paragraph 13.10, European Commission, [Case M.7018- Telefónica Deutschland/E-Plus](#), 2 July 2014, paragraph 79, and European Commission, [Case M.6992- Hutchison 3G UK/Telefónica Ireland](#), 28 May 2014, paragraph 156.

³²⁹ For example, CMA, [BT/EE Final Decision](#), 15 January 2016, paragraph 13.10, European Commission, [Case M.7018- Telefónica Deutschland/E-Plus](#), 2 July 2014, paragraph 83, and European Commission, [Case M.6992- Hutchison 3G UK/Telefónica Ireland](#), 28 May 2014, paragraph 165.

Retail fixed-mobile bundles

- 9.21 We investigated the extent to which the supply of retail fixed-mobile bundles in the UK would be likely to form a single product market.
- 9.22 In particular, we considered whether retail customers would respond to a price increase or reduction in quality of the mobile aspect of a fixed-mobile bundle by unbundling (that is, they would no longer purchase fixed and mobile services as part of a single bundle).
- 9.23 Our competitive assessment is focussed on whether customers of fixed-MVNOs would unbundle or switch their fixed-mobile bundle in response to a price increase or reduction in quality in the mobile aspect of their fixed-mobile bundle.
- 9.24 In our assessment, we defined fixed-mobile bundles in a relatively ‘loose’ sense; in particular, they did not have to be supplied under a single contract and we have considered bundles to include scenarios in which a fixed customer is cross-sold mobile services by their provider but has separate contracts for each type of service. This assessment of bundles may not constitute bundling in the sense used in economics literature.
- 9.25 The Parties submitted that it is not appropriate to define a separate market or markets for fixed-mobile bundles of any configuration (for example, a separate market for quad-play bundles, or any other combination of fixed and mobile products).
- 9.26 The Parties stated that customers remain willing to ‘unbundle’ and purchase products separately. The Parties also noted that uptake of fixed-mobile bundles in the UK is limited, and that there is supply-side substitution given that providers can offer fixed and mobile services separately, or as part of a bundle and for those providers who do not provide certain services, these can be offered to retail customers via wholesale access from another provider).
- 9.27 We have gathered the following evidence from the Parties and third parties:
- (a) As set out in Chapter 2, Industry background, fixed-mobile bundles currently remain niche in the UK, and uptake is low in the UK relative to other European markets;
 - (b) evidence relating to consumer preferences in relation to fixed-mobile bundles in the UK is mixed, with some providers noting that customer preferences are such that they have no preference for bundles over purchasing products separately. Others state that customers prefer to purchase fixed-mobile bundles, noting the simplicity of having a single

supplier for multiple services. (The benefits of bundling on the supply-side and demand-side benefits that have been put to us are set out in Appendix N);

- (c) third parties provided limited comments and evidence in response to how customers of fixed-mobile bundles would respond to a small but significant and non-transitory increase in price (SSNIP):
 - (i) Utility Warehouse considered that a 10% increase in the price of fixed-mobile bundles would lead to more than [X] of customers switching to purchasing their respective components separately where the bundle does not include pay-TV and more than [X] of customers switching to purchasing their respective components separately where the bundle includes pay-TV. Utility Warehouse stated that this was due to the 'very competitive field of fixed telephony, internet and mobile providers to choose from' with 'more limited' choices in relation to pay-TV.
 - (ii) Vodafone considered that less than [X] of customers purchasing fixed voice and mobile and fixed voice, broadband, and mobile customers would switch to purchasing their respective components separately in response to a [X] increase in the price of bundles.
- (d) customers of fixed-mobile bundles can unbundle because they tend to purchase these services under separate contracts. Mobile customers can use a simple 'text-to-switch' process to switch the mobile aspect of their bundle. There are a number of additional factors, such as customers' preferences for the fixed services provided by particular providers, and the fact that choice of fixed services is seen as a household decision whilst choice of mobile services is an individual decision, that may lead to unbundling. We set out this evidence in further detail in Chapter 10.

9.28 Our competitive assessment considers a range of estimates for what proportion of customers would unbundle their fixed-mobile services. There are a wide range of estimates for the rate of unbundling.

9.29 Given that retail customers can respond to a price increase or reduction in quality of the mobile aspect of a fixed-mobile bundle by unbundling, and factors such as customer preferences make it likely they would do so, we do not define a separate market for fixed-mobile bundles.

9.30 Some third parties stated that customer preferences in the UK may change such that fixed-mobile bundles will be valued more in the future, and that the Proposed Merger could accelerate this process. We consider that, if this were to be the case, customers of fixed-mobile bundles would not be likely to

‘unbundle’ in response to a small but significant increase in the price of a fixed-mobile bundle. Whilst we consider that currently there is no separate market for fixed-mobile bundles in the UK, we consider the impact of future changes in the nature of demand for fixed-mobile bundles in our competitive assessment in Chapter 10.

Background to wholesale mobile

The Parties

- 9.31 O2 is an MNO and supplies wholesale access to four MVNOs: Sky Mobile, Lycamobile, Manx Telecom³³⁰ and Truphone. Sky Mobile accounted for [X] of O2’s wholesale revenue in 2019, and Lycamobile accounted for [X].
- 9.32 Virgin Mobile is an MVNO and is transitioning in 2021 from EE to Vodafone as its MNO host.
- 9.33 Liberty Global [X].

MNO and MVNO shares of supply

- 9.34 There are four MNOs providing wholesale mobile access in the UK: EE, Vodafone, O2 and Three.
- 9.35 There are over 150 MVNOs currently operating in the UK, which include sub-brands and joint ventures of MNOs. Most MVNOs operating in the UK are ‘light’ MVNOs; there are seven ‘full’ MVNOs.³³¹
- 9.36 Combined, MVNOs accounted for a total of [10-20%] of retail mobile customers in 2020 (see Table 9-2). The largest MVNOs, in terms of number of subscribers, are: [X] and [X].
- 9.37 The MNO hosts of each of the eight largest MVNOs are listed in the following table.

³³⁰ Manx Telecom acts as an MVNA/MVNE. MVNA/MVNEs provide enablement and aggregation services to small MVNOs seeking wholesale access. For example, Manx Telecom helped China Unicom launch as an MVNO in the UK.

³³¹ See Chapter 2 for definition of light and full MVNOs. These full MVNOs are: Virgin, Sky Mobile, Lycamobile, Vectone, Truphone, Gamma, and Cloud9.

Table 9-1: MVNOs and their host MNO, 2021

<i>MVNO</i>	<i>Host MNO</i>
Asda Mobile	EE, migrating to Vodafone
Dixon's Carphone (iD Mobile)	Three
Lebara	Vodafone
Lycamobile	O2
Sky Mobile	O2
TalkTalk	O2
Utility Warehouse	EE
Virgin Mobile	Vodafone (migrating from EE)

Source: Ofcom.

9.38 The four MNOs also operate a number of sub brands:

- (a) O2 owns giffgaff and has a 50:50 joint venture with Tesco Mobile;
- (b) EE owns Plusnet;
- (c) Vodafone owns VOXI and Talk Mobile; and,
- (d) Three owns the SMARTY brand.

9.39 MNO and MVNOs' retail level shares in 2020 are shown in Table 9-2.³³² For each MNO, the retail shares include subscribers of the sub brands and joint ventures listed above.

Table 9-2: MNO and MVNO retail subscriber shares, Q2, 2020

<i>Mobile provider</i>	<i>Subscriber share</i>	<i>Subscriber share (range)</i>
O2 (inc Tesco Mobile)	[30]	[30-40]
EE	[20]	[20-30]
Vodafone	[10]	[10-20]
Three	[10]	[10-20]
Virgin	[0]	[0-5]
Sky Mobile	[0]	[0-5]
Lycamobile	[0]	[0-5]
Dixons Carphone PLC	[0]	[0-5]
Lebara Mobile	[0]	[0-5]
Utility Warehouse Ltd	[0]	[0-5]
Asda Mobile	[0]	[0-5]
TalkTalk Mobile	[0]	[0-5]
Others	[0]	[0-5]

Source: Ofcom.

Notes:

1. Figures do not sum to 100% due to rounding.
2. Q2 2020 the most recently available at the time of drafting. Shares of subscribers may vary between quarters.

9.40 Table 9-3 shows the share of MVNO subscribers for each host MNO; that is, the percentage of MVNO subscribers that each MNO hosts as a percentage

³³² While shares of revenue can also shed light on how retail competition operates, it is not necessary to explore this alternative metric for the purposes of this decision.

of the total number of MVNO subscribers. As such, it excludes retail shares of the MNOs themselves.

- 9.41 The shares of supply estimated in the table assign Virgin Mobile and Asda Mobile’s subscribers to EE, although in 2021 these MVNOs will migrate to Vodafone ([§]). The switch of these MVNOs to Vodafone will [§] reduce EE’s share [§] and increase Vodafone’s share [§]. O2 will remain the second largest supplier of wholesale mobile services.

Table 9-3: Shares of supply at wholesale level, Q2, 2020

MNO	%	
	<i>Wholesale share of supply</i>	<i>Wholesale share of supply (range)</i>
EE	[§]	[40-50]
O2	[§]	[30-40]
Three	[§]	[10-20]
Vodafone	[§]	[5-10]

Source: CMA analysis of Ofcom [§].

Notes: excludes smaller MVNOs. We estimate that the subscribers for these smaller MVNOs, which have not been allocated to an MNO’s wholesale share of supply, account for approximately 0.3% of all retail mobile subscriptions.

10. Wholesale mobile: competitive assessment

Introduction

- 10.1 This chapter describes our competitive assessment in relation to the supply of wholesale mobile services to MNOs.
- 10.2 As described in Chapter 6, we have considered the extent to which the Merged Entity has the ability and incentive to harm fixed-MVNOs at the wholesale level.
- 10.3 We have framed our competitive assessment by reference to the following three questions:
- (a) Would the Merged Entity have the ability to harm rivals?
 - (b) would it have the incentive to do so? and
 - (c) would the effect of such action be sufficient to reduce competition to the extent that it gives rise to a substantial lessening of competition?³³³
- 10.4 In order to reach an SLC finding, all three questions must be answered in the affirmative.³³⁴

³³³ MAGs, paragraph 5.6.6.

³³⁴ MAGs, paragraph 5.6.7.

- 10.5 We have described separately evidence relating to the ability and incentive of the Merged Entity to harm rivals at contract renewal or renegotiation (either partially or totally), and the ability and incentive of the Merged Entity to harm Sky, its largest fixed-MVNO customer, during the duration of its contract.

Ability to foreclose fixed-MVNOs

Our approach

- 10.6 Our assessment of the ability of the Merged Entity to foreclose fixed-MVNOs who are looking to negotiate a new contract (including Sky upon contract renewal or renegotiation) includes analysis of:
- (a) The extent to which MNOs view each other as rivals in the supply of wholesale mobile services to MVNOs;
 - (b) tendering: in particular, the extent to which rival MNOs are active in competing to host MVNOs (with a focus on fixed-MVNOs); the nature and transparency of the tender process; the criteria on which fixed-MVNOs assess bids (and the role of switching costs in their assessment); evidence from specific tender processes, including the offers made and evidence relating to how MNOs improve their offers;
 - (c) the strategies that MNOs employ in relation to MVNOs (with a focus on fixed-MVNOs);
 - (d) the extent to which rival MNOs have the capacity and quality of network to host MVNOs; and
 - (e) the extent to which wholesale mobile costs are a significant proportion of a fixed-MVNO's costs.

The Parties' view

- 10.7 The Parties stated that the Merged Entity will not have any ability to foreclose MVNOs' access to the retail mobile market due to the existence of credible alternative providers of wholesale mobile services. The Parties stated that if the Merged Entity were to seek to implement a foreclosure strategy the opaque nature of the negotiating process would mean that rival MNOs would not bid less competitively.

Evidence on wholesale competition between MNOs

10.8 We have gathered evidence from O2 and other MNOs as to the extent to which each MNO views the other MNOs as rivals in the supply of wholesale mobile services to MVNOs.³³⁵

10.9 In relation to O2 we note the following:

- (a) An internal document from O2 states that [REDACTED].
- (b) An internal document from O2 [REDACTED] notes the [REDACTED].
- (c) O2 noted that [REDACTED].

10.10 In relation to other MNOs, we note:

- (a) BT noted in an internal document relating to the Virgin 2019 opportunity [REDACTED].
- (b) [REDACTED].
- (c) [REDACTED].

Evidence relating to previous tender processes

Background

10.11 MVNOs seeking new wholesale mobile access agreements with MNOs may issue a formal request for proposal (RFP) to MNOs, engage in informal discussions with them, or use a combination of these approaches. MVNOs will typically issue RFPs and/or engage in discussions with a number of MNOs when seeking to enter the market for retail mobile services or renew existing arrangements.

10.12 O2 stated that MVNOs use formal RFPs in only a small number of cases, with the majority of negotiations held by way of more informal engagements with several MNOs.

10.13 MVNOs do not need to have a fixed intention to switch MNO host in order to start a tendering process. For example, Liberty Global stated that Virgin 'ran an RFP in 2019 to assess the possibility of changing,' indicating that MVNOs can also use tendering processes to assess the market.

³³⁵ Excerpts from these documents are included in Appendix I.

- 10.14 Where an RFP is issued, the process commences with the MVNO sending out an RFP to MNOs. The RFP can contain information on the MVNO as well as the MVNO's future strategy and goals, the RFP timetable the MVNO seeks to follow, process instructions, various technological or commercial information and/or requirements etc. In some cases, MVNOs outline how bids will be evaluated based on various factors, as well as areas of high importance for the tendering MVNO. However, this is not always the case and MVNOs may issue a more light-touch RFP, loosely setting out, for example, future business strategies, various requirements and/or process timings.
- 10.15 RFP processes or more informal processes can be halted, paused or delayed by the tendering MVNO³³⁶ and there is no industry-standard length for an RFP process. It appears that the length of a process depends on factors such as terms demanded by MVNOs as well as terms offered by MNOs, the size of the transaction, the number of bidders involved etc.
- 10.16 Our review of internal documents has shown that both formal and more informal tender processes can have multiple rounds of bidding or negotiation during which an MVNO may try and obtain more favourable terms, including through counter-offers. For example:
- (a) [REDACTED];
 - (b) [REDACTED];³³⁷ A document produced by [REDACTED] and
 - (c) internal documents from O2 showed that [REDACTED].
- 10.17 In the case of RFP processes, bids can still be submitted (or proposals made outside the framework of the RFP) after an official RFP has ended, but before final agreements are signed.
- 10.18 An example of this is [REDACTED].³³⁸ [REDACTED].
- 10.19 Typically, once the final bids are received, the MVNO identifies a subset of bidders it wants to engage with in more in-depth negotiations.
- 10.20 The Parties stated that this normally involves one, or at most, two MNOs. [REDACTED]. This is mainly due to the resource-intensive nature of the negotiation process involved in agreeing heads of terms.³³⁹ The final wholesale mobile access

³³⁶ For example, [REDACTED].

³³⁷ This document was produced in [REDACTED].

³³⁸ Liberty Global submitted [REDACTED].

³³⁹ For example, [REDACTED].

agreement is signed once the MVNO has identified the most attractive overall offer and both signing parties finalise the terms on which they will contract.

Transparency of tender processes

10.21 The evidence we gathered suggests that generally MNOs do not know who they are bidding against, or the terms that rival MNOs are offering MVNOs. Evidence from MNOs suggests that instead they make assumptions:

- (a) BT stated: 'We do not know anything for sure because you never do; you are in a negotiation. Our expectation would be that all MNOs would be involved.' BT also stated: 'BT assumes that it typical for an MVNO to consult with all UK MNOs during MVNO supplier selection, and therefore proceeds on the general basis that it will compete against all the other MNOs in each bid.'
- (b) Vodafone stated: '[T]hey [MVNOs] run RFP processes so they do not [tell us who else is participating] really, and even in the informal discussions, they will not tell us what the nature of their discussions with others truly is.' Vodafone also stated '[i]n the last stages, it is a mixture. Sometimes we are assuming. Sometimes we figure it out because the MVNO will say, "Look, we really like you but it is safer for us to not change."' Vodafone stated that 'MVNOs are careful not to discuss the details of other bids under the terms of non-disclosure agreements between each bidder and the MVNO. However, even if not disclosed by the MVNO, it can generally be deduced which MNO competitors have successfully made it through each stage of a bid process.'
- (c) Three stated, in relation to whether it knows which of its rival MNOs are negotiating: '[n]ot typically, but I do not want to speculate, but with only four players in the market, you could assume, you could make your own assumptions.' Three stated 'they [MVNOs] do not tell us [who else is participating].'
- (d) Evidence supplied by Three shows that in the majority of cases, it was unaware who it was bidding against in the last five years. In three out of nine tenders Three stated that it was aware that there were other bidders but it did not always know how many.

10.22 Internal documents and submissions from the Parties also show that MNOs are not typically aware with whom they are competing:³⁴⁰

(a) O2 submitted [REDACTED];

(b) Liberty Global submitted [REDACTED];

(c) An internal document shows that Virgin's [REDACTED]; and

(d) in 2019, O2's [REDACTED].

10.23 Liberty Global submitted that, after the 2019 Virgin RFP process, [REDACTED].

10.24 We note that this evidence appears consistent with the evidence in the BT/EE merger inquiry in which the CMA found that the wholesale mobile access market was not transparent: '[i]n any given bidding negotiation, the MNOs involved in the process would not always be aware of which other MNOs were bidding. For example, the perception of an MNO's involvement has been referred to by some MVNOs as important in obtaining competitive outcomes'.³⁴¹

Frequency of tender processes

10.25 The evidence we gathered indicates that there is no set interval or industry standard contract length after which MVNOs go out and tender their business. For example, the contract lengths of the Parties range from [REDACTED].³⁴² The Parties state that, typically contract lengths between MNOs and MVNOs range from two to five years in the UK.

10.26 Vodafone submitted that an 'important characteristic of the MVNO market is that the agreements and partnerships are generally long term, so these opportunities do not come about very frequently. Recruitments can be up to five years in length... We also know that there are some MVNOs who have agreed very, very long-term contracts, maybe up to ten years, and others who are in some kind of... almost JV-like partnership structure.'

10.27 Three submitted that MVNO contracts 'are usually a five year duration, but we have seen cases where tenders suggest that the party is looking for a ten year relationship, but it does not necessarily mean that it is a ten year

³⁴⁰ We have seen limited evidence to the contrary. The one piece of evidence that we have seen to the contrary is a document from [REDACTED].

³⁴¹ CMA, [BT/EE Final Report](#), 15 January 2016, paragraph 13.35.

³⁴² Telefónica/O2 lists the length of its MVNO contracts where it acts as the hosting MNO, while Liberty Global lists the length of its contracts as an MVNO.

contract, but they are looking for a longer tenure of contract, we have seen that in[REDACTED]’.

10.28 Different MVNOs have different preferences for the length of their agreements with MNOs. For example:

(a) [REDACTED]; while

(b) O2 stated that [REDACTED].

Key parameters considered important by MVNOs in seeking MNO hosts

10.29 Key parameters considered by MVNOs include factors such as costs, network quality and access to future technology.

10.30 Liberty Global submitted internal documents which assessed bids in Virgin’s 2016 and 2019 RFP processes.³⁴³ The documents show that:

(a) [REDACTED].

(b) [REDACTED].

10.31 [REDACTED]:

(a) [REDACTED].

(b) [REDACTED].

10.32 [REDACTED].

Switching costs

10.33 We gathered the following evidence in relation to switching costs. If switching MNO is costly, incumbent MNOs may have an advantage when bidding for MVNOs that they currently host.

10.34 Various MVNOs submitted evidence concerning the costs and the preparatory process for switching networks. Evidence on the estimated timeframe for the migration process varied from months to a number of years dependent on the negotiation, preparatory and migration process necessary. The evidence indicates that switching may be easier for full, fixed-MVNOs as they do not need to replace individual customer’s SIM cards when switching MNO hosts. In particular:

³⁴³ [REDACTED]

- (a) [REDACTED].
- (b) Liberty Global stated that '[t]he costs attributable to the set-up and switch to Vodafone [from EE] are approximately [REDACTED].' Liberty Global also stated that '[t]otal project costs are estimated as [REDACTED], but this figure includes [REDACTED].
- (c) Liberty Global also stated that 'based on recent experience... direct churn [from switching MNO] can be less than [REDACTED] of the customer base [for a full MVNO]... Virgin's current expectation is that less than [REDACTED] of the base migrated will churn as a result [of moving from EE to Vodafone]'.
- (d) Asda stated that, in its experience, 'the process for selecting a provider and negotiating the relevant agreement takes 12 - 18 months and migration takes a further 12 months. [REDACTED].
- (e) [REDACTED] stated that the estimated timeframe to move to another MNO 'is six months to one year. The costs of switching could be a loss of up to 25% of customer base, and £[REDACTED] costs to move.' Additionally, [REDACTED] stated that '[b]arriers to overcome are potential loss of customer base, and subsequent financial impact.'
- (f) Dixons Carphone stated that 'an MVNO migration... would likely require at least six months to plan and six months to execute and is a resource intensive process involving the MVNO, the current host and new host MNO. The costs are difficult to estimate [REDACTED], excluding the cost of swapping the Sim cards and incentives for customers to do so. There could also be an element of churn risk.'
- (g) At the start of its 2019 RFP process, Virgin envisaged that the process including the technical setting-up and migration to a new MNO would be carried out from [REDACTED].³⁴⁴
- (h) Liberty Global stated that the primary reason the 2016 RFP process was won by EE (the incumbent host) as [REDACTED].

10.35 In relation to the evidence outlined above we place more weight on the evidence supplied by Liberty Global and Sky as they are full, fixed-MVNOs (as our assessment is focussed in particular on Sky, a full fixed-MVNO).

10.36 O2 stated that [REDACTED].

³⁴⁴ [REDACTED].

Evidence from recent tender processes

Participation and win rates

10.37 Participation rates indicate how often MNOs participate in tender processes and win rates indicate how successful MNOs are in winning when they do bid.

10.38 To the extent that an MNO rarely participates in tenders, this may imply that it perceives itself as having a low probability of winning (and/or that it is a weak competitor). It may also indicate that the MNO does not have a strategy of bidding for MVNOs or does not find certain MVNO opportunities attractive. (A description of MNO strategies in hosting MVNOs follows this section.) To the extent that an MNO wins on a regular basis, this indicates that it offers the most competitive bids to MVNOs.

- *All recent tenders*

10.39 All MNOs participated in bidding for MVNO opportunities over the last five years. These are summarised in Table 10-1 below.

Table 10-1: MVNO opportunities since 2016 and MNO participation

	O2	EE	Vodafone	Three
Number of MVNO opportunities the MNO was aware of (A)	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Number of MVNO opportunities the MNO bid for (B)	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Number of opportunities which proceeded and for which there has been a result (C)	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Number of MVNO opportunities the MNO won (D)	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
MNO participation rate (= B/A*100), %	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
MNO win rate (= D/C*100), %	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Source: CMA analysis of [REDACTED].

1. EE submitted that [REDACTED].

2. [REDACTED].

3. [REDACTED].

4. [REDACTED].

5. No total number of opportunities and participation rate were calculated for O2 as O2 only submitted a table of bids (not opportunities) [REDACTED]. O2 submitted a larger dataset of MVNO opportunities [REDACTED]. However, this dataset includes all opportunities that O2 had considered or been approached about, irrespective of how speculative the opportunity was.

6. [REDACTED]

10.40 O2 submitted that, over the last five years it bid in [REDACTED] MVNO opportunities. O2's win rate over this timeframe has been [REDACTED]. O2 did not submit how many MVNO opportunities it was aware of.

10.41 EE submitted that it bid for a total of [REDACTED] opportunities since 2016 ([REDACTED] participation rate).³⁴⁵ This includes [REDACTED] opportunities [REDACTED], [REDACTED] and [REDACTED] that EE either won or lost. Of the [REDACTED] opportunities with a result, EE has won [REDACTED].

³⁴⁵ [REDACTED].

10.42 Three submitted that it bid for a total of [redacted] MVNO opportunities over the last five years. One of those opportunities [redacted]. Three's win rate over this time frame has been [redacted].

10.43 Vodafone submitted that it bid for a total of [redacted] opportunities [redacted]. Vodafone's win rate over this time frame has been [redacted].

- *Recent fixed-MVNO tenders*

10.44 Based on the evidence available, we are aware of [redacted] fixed-MVNO opportunities over the last five years. The opportunities and the participation by rival MNOs are summarised in Table 10-2, below.³⁴⁶

Table 10-2: Fixed-MVNO opportunities since 2016 and MNO participation

<i>Opportunity</i>	<i>O2 participated?</i>	<i>EE participated?</i>	<i>Vodafone participated?</i>	<i>Three participated?</i>
Virgin Mobile (2016)	[redacted].	WON	[redacted].	[redacted].
Sky Mobile (2018)	WON	[redacted]	[redacted]	[redacted]
Virgin Mobile (2019)	[redacted].	[redacted].	WON	[redacted]
[redacted]	[redacted].	[redacted]	[redacted]	[redacted]
[redacted]	[redacted].	[redacted]	[redacted]	[redacted]
Number participated in (A)	[redacted]	[redacted]	[redacted]	[redacted]
Number participated in with result (B)	[redacted].	[redacted]	[redacted]	[redacted]
Number won (C)	[redacted].	[redacted]	[redacted]	[redacted]
Participation rate (A/5*100), %	[redacted]	[redacted]	[redacted]	[redacted]
Win rate (C/B*100), %	[redacted]	[redacted]	[redacted]	[redacted]

Source: CMA analysis of submissions from EE, O2, Three, Sky and Vodafone.

Notes:

1. [redacted].
2. [redacted].
3. [redacted].
4. [redacted].
5. [redacted].
6. [redacted].
7. [redacted].
8. [redacted].

10.45 On average, there are [redacted] participants in a fixed-MVNO tender process.³⁴⁷ We note that for the most recent large fixed-MVNO processes ([redacted] Virgin 2019) [redacted] MNOs participated.

10.46 [redacted] and [redacted] have participated in all fixed-MVNO processes identified and O2 has bid in [redacted] of these processes.

10.47 [redacted].

³⁴⁶ We have taken a slightly different approach to compiling the evidence for Table 10-1 and Table 10-2. Table 10-1 presents the evidence as put to us by O2, BT, Vodafone and Three. We have more information in relation to the opportunities listed in Table 10-2 so we have verified statements from O2, BT, Vodafone, and Three using evidence from the fixed-MVNOs as to who participated in these processes.

³⁴⁷ [redacted].

10.48 Each of the four MNOs participated, on average in 85% of the fixed-MVNO processes.³⁴⁸

10.49 [REDACTED].

Recent fixed-MVNO processes

10.50 The details of [REDACTED] recent fixed MVNO tenders for which we have evidence are set out in detail in Appendix J. These are:

(a) Virgin 2016;

(b) Sky 2018;

(c) Virgin 2019;

10.51 Key aspects of those tenders are:

(a) Regarding Virgin's 2016 RFP process, Liberty Global stated that: [REDACTED].
Three stated that they believed that Virgin remained with EE in 2016 [REDACTED].

(b) On its 2018 tender, Sky stated that it [REDACTED].

(c) On Virgin's RFP process in 2019, Liberty Global submitted that [REDACTED].

(d) [REDACTED].

Evidence relating to MNO strategies and willingness to host MVNOs

Introduction to evidence

10.52 This section sets out the evidence we gathered in relation to MNO strategies and their willingness to host MVNOs:

(a) We set out the evidence provided by MNOs on the factors they consider when deciding whether to bid for MVNOs;

(b) we summarise the evidence received from each MNO on their strategies in relation to hosting MVNOs; and

(c) we set out the evidence on EE's behaviour since its merger with BT, given that post-merger the Merged Entity will also be a vertically integrated provider of fixed-mobile bundles.

³⁴⁸ [REDACTED].

Evidence relating to the factors that MNOs consider in deciding whether to bid

10.53 Due to the costly and time-consuming nature of competing to host MVNOs, MNOs will not necessarily bid for each contract that becomes available.³⁴⁹ Furthermore, MNOs may be unwilling to invest the time and resources to participate in a process where they think the likelihood of the MVNO switching from its current host is low, that is, they do not want to be used as a ‘stalking horse.’ Nevertheless, we noted in paragraph 10.45 above that [REDACTED] MNOs participated in the most recent large fixed-MVNO processes.

10.54 MNOs may host MVNOs in order to:

- (a) Earn wholesale revenue from customers that its own retail brands may not reach:
 - (i) O2 submitted that MVNOs allow it ‘to play a role in the wider market;’³⁵⁰
 - (ii) BT submitted that: ‘our wholesale customers can often reach certain retail customers more effectively than we can;’
 - (iii) [REDACTED] and
 - (iv) Three submitted that MVNOs can allow it to partner in ‘specific segments where Three does not have a direct capability’ (it references multi-play, business, Internet of Things, and ethnic segments).³⁵¹
- (b) Increase their returns from network investments or grow their network:
 - (i) The Parties stated that increasing the number of network users, including via hosting MVNO customers, helps lead to scale benefits for MNOs. As such, it is economically desirable for MNOs to fill spare capacity on their network through MVNO agreements, rather than leaving spare capacity unutilised.
 - (ii) [REDACTED].
 - (iii) Three noted that winning large MVNOs would allow it to grow its network and use it more efficiently.³⁵²

³⁴⁹ Vodafone states that [REDACTED]. Similarly, [REDACTED].

³⁵⁰ See Appendix I.

³⁵¹ See Appendix I.

³⁵² [REDACTED].

(iv) [REDACTED].

10.55 [REDACTED] and the Parties have both noted that, if they do not supply an MVNO, a rival MNO will. The Parties note that a rival MNO hosting an MVNO will earn wholesale revenue from supplying the MVNO, whilst those not supplying the MVNO will face retail competition from the MVNO.

10.56 There are several key factors that MNOs consider when deciding whether to bid to host an MVNO.

10.57 O2 told us the factors that it takes into consideration when deciding whether it should engage in an MVNO opportunity are the following:

(a) [REDACTED].

(b) [REDACTED].

(c) [REDACTED].

10.58 Vodafone submitted that it assesses opportunities based on:

(a) [REDACTED];

(b) [REDACTED];

(c) [REDACTED].

10.59 EE submitted that it generally considers the following when assessing individual MVNO opportunities:

(a) [REDACTED];

(b) [REDACTED]

(c) [REDACTED].³⁵³

10.60 Three stated that it evaluates opportunities based on factors such as:

(a) [REDACTED];

(b) [REDACTED];

(c) [REDACTED]; and

(d) [REDACTED].

³⁵³ BT also mentions [REDACTED].

Evidence relating to MNO strategies

10.61 MNOs stated that they are active in competing for MVNOs. Appendix I summarises evidence from internal documents in relation to each MNO's strategy in hosting MVNOs.

- (a) O2 stated that the provision of wholesale access is a key part of its overall strategy and that it is willing to host MVNOs on its network even though these MVNOs compete with it on the retail mobile market. O2 stated that if it does not compete for MVNOs it will sacrifice potential wholesale revenue and the MVNO could cannibalise its retail sales as the MVNO will be hosted by another MNO. Internal documents from O2 show that [REDACTED].
- (b) BT stated that [REDACTED]. BT further stated that [REDACTED]. [REDACTED].
- (c) Vodafone stated that [REDACTED]. Vodafone stated that [REDACTED]. Vodafone also stated that [REDACTED]. Vodafone stated [REDACTED]. Vodafone noted that [REDACTED]. [REDACTED].
- (d) We note that Vodafone has recently won the MVNO business of Asda and Virgin Mobile, [REDACTED]. Internal documents from Vodafone show that [REDACTED].
- (e) Three stated that: 'H3G's ambition [REDACTED]. H3G has continued to invest in order to maintain its MVNO business and provide its portfolio of MVNO partners with the support they need to grow.' Three has noted that its ability to grow its MVNO business: 'is probably contingent on [REDACTED] and fulfilling our ambition to roll out a 5G network that means we have a better story to tell to prospective MVNO customers.' Internal documents from Three show that amongst the opportunities that Three identifies as [REDACTED].

Evidence relating to EE's recent behaviour

10.62 Post-merger, Virgin/O2 will be an integrated provider of fixed-mobile bundles as BT/EE has been since 2016. In this context, we have set out below, the evidence on EE's bidding behaviour in recent tender opportunities for fixed-MVNOs.

10.63 In its BT/EE merger investigation, the CMA found that, prior to 2016: '[EE was] considered by fixed-MVNOs to be an important competitor to other MNOs... [EE] exerted an important constraint in the market for the supply of wholesale mobile services.'³⁵⁴

³⁵⁴ CMA, [BT/EE, Final Decision](#), 15 January 2016, paragraphs 14.45 and 14.46.

10.64 We have considered the following evidence in relation to whether EE now bids less aggressively for MVNOs, particularly fixed-MVNOs:

- (a) Table 10-1, above, shows that EE [REDACTED], and in relation to fixed-MVNOs its participation rate is [REDACTED] and its win rate is [REDACTED] (see Table 10-2);
- (b) internal documents from BT suggest that [REDACTED] (see Appendix I for more detail);
- (c) in relation to the recent Virgin tender, Liberty Global noted that EE's bid [REDACTED]. Virgin switched MNO from EE to Vodafone (see Appendix J for more detail);
- (d) an internal document from O2 [REDACTED] (see Appendix I.);
- (e) an internal document [REDACTED] notes that EE has a weakness in bidding for Sky, a fixed-MVNO, as it is a 'direct converged competitor' (see Appendix I); and
- (f) [REDACTED] (see Appendix I).

Evidence relating to network capacity and quality

10.65 To the extent that rival MNOs do not have spare network capacity of sufficient quality, and are unable to add additional capacity in a timely manner, they may not be seen as viable alternatives to O2 in the event that the Merged Entity engages in a foreclosure strategy.

10.66 Evidence, including measures produced by Ofcom and Rootmetrics, relating to capacity and quality is set out in Appendix K. In summary, the evidence indicates that:

- (a) On measures of network speed and reliability EE performs better than other MNOs;³⁵⁵ and
- (b) customer satisfaction with Three is lower than for other networks,³⁵⁶ although it outperforms O2 on measures of overall network speed and reliability.³⁵⁷ Three has the lowest voice and data coverage.³⁵⁸ Certain MNOs and MVNOs perceive Three has having poor network quality. We

³⁵⁵ See Table 2 in Appendix K.

³⁵⁶ Table 1, Appendix K.

³⁵⁷ Table 2, Appendix K.

³⁵⁸ Table 4 and Table 5, Appendix K

note that a large proportion of Three’s spectrum will be used to support the deployment of 5G. [REDACTED].

Evidence relating to wholesale mobile access costs

10.67 The cost to fixed-MVNOs of wholesale mobile access as a proportion of their total costs of supplying mobile services is relevant to our assessment of ability. All else being equal, if the cost of wholesale access accounts for only a small proportion of a fixed-MVNO’s total cost of supplying mobile services, then the Merged Entity will be less able to harm fixed-MVNOs’ ability to compete at retail level.³⁵⁹

10.68 Sky stated that the average monthly wholesale mobile access cost per customer is £[REDACTED].³⁶⁰ We compare this below to the average monthly retail price paid by different types of Sky customers³⁶¹ and calculate the proportion of the price paid by these customers that is the wholesale mobile access cost.

Table 10-3: Average monthly wholesale mobile access cost as a proportion of the price paid by Sky customers, 2019

<i>Product</i>	<i>Average retail price, £</i>	<i>Average wholesale mobile access cost, £</i>	<i>% of average price paid that is wholesale mobile access cost</i>
Mobile...			
... with handset	[REDACTED]	[REDACTED]	[REDACTED]
... without handset	[REDACTED]	[REDACTED]	[REDACTED]
Fixed-mobile bundle			
... with handset	[REDACTED]	[REDACTED]	[REDACTED]
... without handset	[REDACTED]	[REDACTED]	[REDACTED]
Quad-play fixed-mobile bundle			
... with handset	[REDACTED]	[REDACTED]	[REDACTED]
... without handset	[REDACTED]	[REDACTED]	[REDACTED]

Source: CMA analysis of [REDACTED].

Notes:

1. The retail prices of fixed-mobile bundles are calculated as a weighted average of the prices of different fixed-mobile bundles offered by Sky weighted by number of customers.
2. Data relating to the quad-play fixed-mobile bundle has been included as this is [REDACTED].

10.69 This shows the following:

- (a) For customers who only buy Sky Mobile without a handset, the wholesale mobile access cost accounts for [REDACTED]% of the average price paid. The proportion of Sky’s total cost of providing this service accounted for by the wholesale mobile access cost will be higher than this (assuming that its costs are below its retail prices).³⁶²

³⁵⁹ MAGs, paragraph 5.6.10(a).

³⁶⁰ [REDACTED].

³⁶¹ [REDACTED].

³⁶² We note that, for mobile-only customers, to the extent that the proportion of costs that are wholesale costs is sufficiently high enough to give O2 the ability to foreclose Sky, the pre- and post-merger incentives to do so are not significantly different (given that O2 and Sky already compete against one another in the supply of retail mobile-only services).

- (b) For Sky customers with fixed-mobile bundles, the average wholesale mobile access cost accounts for between [redacted]% and [redacted]% of the average price paid, depending on the type of bundle and whether the bundle includes the handset or not. As above, the proportion of Sky's total costs of providing this service accounted for by the wholesale mobile access cost will be higher than this.

Summary and finding on ability to foreclose fixed-MVNOs

- 10.70 The evidence set out above relates to the ability of the Merged Entity to foreclose fixed-MVNOs at contract renewal or negotiation, either partially or fully.
- 10.71 Whilst, for the reasons set out in Chapter 6, we focussed on the ability of the Merged Entity to foreclose fixed-MVNOs, we consider that the evidence (particularly that relating to participation rates, MNO strategies, and transparency in the bidding process) is also relevant to the extent to which the Merged Entity and other MNOs will compete for mobile-only MVNOs post-merger.
- 10.72 The evidence shows that:
- (a) In general, MNO participation rates in competing for fixed-MVNOs are high ([redacted]), with fixed-MVNOs having, on average, bids from [redacted] MNOs;
 - (b) each of O2's rivals credibly compete in the supply of wholesale services to MVNOs:
 - (i) In relation to EE, the evidence shows that although it has recently lost a major fixed-MVNO (Virgin), [redacted] has a record of winning fixed-MVNOs ([redacted] Virgin in 2016). Furthermore, BT has stated that [redacted].
 - (ii) [redacted]. Evidence from certain MNOs and MVNOs is that they perceive Three as having poor network quality. However, on some metrics of network speed and reliability, Three's network is better than O2's. We note that a large proportion of Three's spectrum will be used to support the deployment of 5G. [redacted]. Statements and internal documents from Three [redacted].
 - (iii) Vodafone's participation rate in competing for fixed-MVNOs has, until recently, been [redacted] (Vodafone bid for [redacted] opportunities). However, statements and internal documents from Vodafone provide consistent evidence that it is [redacted]. [redacted] Vodafone recently won Virgin, a fixed-MVNO.

(c) the tender process appears to be characterised by a lack of transparency, such that MNOs do not know who they are competing against. The Merged Entity would therefore be uncertain as to its rivals' bidding behaviour (in particular who is bidding and the nature of their offers). Furthermore, there is evidence that MVNOs are strategic buyers and they are able to extract concessions and improved offers from MNOs through multiple rounds of bidding or negotiation.

10.73 The average wholesale mobile access cost accounts for a low proportion of the average retail price of a fixed-mobile bundle which would limit the Merged Entity's ability to foreclose fixed-MVNOs.

10.74 We therefore found that the Merged Entity will not have the ability to foreclose fixed-MVNOs, due to the high levels of participation by MNOs in bidding for fixed-MVNOs, the current strategies of O2's rivals, the fact these rivals are successful in winning fixed-MVNOs, and the low proportion of the retail price of a fixed-mobile bundle accounted for by the wholesale mobile access cost. In the event that the Merged Entity increased its prices, or withdrew from bidding for fixed-MVNOs, competition to host fixed-MVNOs would remain from EE, Vodafone and Three.

10.75 We also considered the extent to which the Proposed Merger may lead to weaker bidding by rival MNOs.

10.76 We note that post-merger two of the four MNOs, EE and O2, will be part of vertically integrated providers of fixed-mobile bundles. Vodafone and Three may consider that EE and O2 may be less likely to bid aggressively for fixed-MVNOs given that they compete directly with fixed-MVNOs at the retail level in the supply of fixed-mobile bundles. As such, Vodafone and Three may adjust their bidding behaviour to also bid less aggressively.

10.77 We found that Vodafone and Three are unlikely to bid less aggressively in response to the Proposed Merger given that:

- (a) EE remains an active competitor to host fixed-MVNOs, even though it is now a vertically integrated supplier of fixed-mobile bundles;
- (b) the lack of transparency in tenders may limit the ability of Vodafone and Three to respond to the change in the market structure by bidding more weakly. Furthermore, infrequent tenders will limit their ability to learn from other MNOs whether they can bid weakly. Given this, any change in their bidding behaviour may risk losing an opportunity; and
- (c) finally, even if the Merged Entity bid more weakly or withdrew from bidding for certain fixed-MVNOs, and this was known by other MNOs,

there could be no certainty for other potential bidders as to whether this was a short or long term position given that there would appear to be few barriers to the Merged Entity starting to compete for fixed-MVNOs in the future. Furthermore, we have seen evidence that MNOs may make offers to fixed-MVNOs late in the bidding process which means that the Merged Entity could enter bidding at any point before a contract with a rival MNO is signed.

Ability to foreclose Sky in-contract

10.78 We next set out evidence on the ability of the Merged Entity to foreclose Sky in-contract: that is, without taking steps that would constitute a breach of that contract or otherwise entitle Sky to terminate it.

10.79 Sky stated that [REDACTED]. [REDACTED]:

(a) [REDACTED];

(b) [REDACTED];³⁶³ and

(c) [REDACTED].

10.80 We note that in practice, contracts between providers and their customers may not completely remove a provider's ability to harm its downstream rivals, given that the contracts might not prevent all ways in which the competitiveness of rivals could be harmed. Moreover, over time contracts may be renegotiated or terminated, and firms may waive their rights to enforce any breaches in light of their overall bargaining position (reflecting the change in market structure brought about by a merger).³⁶⁴

10.81 O2 stated that the fact that [REDACTED] that Sky considers that the contract affords it ample protection against any foreclosure strategy. Sky has stated that [REDACTED]. As such, we consider that the means by which the Merged Entity could harm Sky in-contract may be limited.

10.82 Nevertheless, Sky stated that [REDACTED]. Furthermore Sky stated that: 'it is impossible to provide contractually for all commercial circumstances or market developments over a long-term deal.'

³⁶³ Sky stated that [REDACTED].

³⁶⁴ See, in this regard, the approach adopted in Provisional Findings Report anticipated acquisition by Thermo Fisher Scientific Inc of Gatan. CMA, Anticipated acquisition by Thermo Fisher Scientific Inc of Gatan, provisional findings report, 17 April 2019, paragraphs 10.125, 10.128 and 10.204. A similar position is reflected in the CMA's revised Merger Assessment Guidelines.

10.83 Whilst Sky has noted [REDACTED], we have not identified potential actions that the Merged Entity could engage in that would (i) harm Sky during the life of its contract (nor have we been supplied with evidence of what any such actions might entail) and (ii) not be such as to give grounds to terminate the contract.

Summary and findings on ability to foreclose Sky in-contract

10.84 We found that the [REDACTED] agreement between Sky and O2 may not fully protect Sky from in-contract foreclosure.

10.85 However, we have not identified potential actions that the Merged Entity could engage in that would harm Sky during the life of its contract. For this reason, we consider that the Merged Entity would have limited means to engage in activity that would foreclose Sky within the framework of its existing contract.

10.86 Furthermore, we note that [REDACTED] provides for [REDACTED].

10.87 We already found that the Merged Entity will not have the ability to foreclose fixed-MVNOs due to competition from EE, Vodafone and Three. As such, we consider that Sky has other options in the event that its contract is breached. The Merged Entity will be aware of both the [REDACTED], and the other options available to Sky beyond the current contract, thus limiting its ability to foreclose Sky in-contract.

Finding on ability to foreclose fixed-MVNOs

10.88 We found that the Merged Entity will not have the ability to foreclose, partially or totally, fixed-MVNOs.

Incentive to foreclose fixed-MVNOs

10.89 We set out below our assessment of the Merged Entity's incentives to foreclose fixed-MVNOs, although we note that in order to reach an SLC finding we need to find that the Merged Entity would have both the ability and the incentive to foreclose, and that the effect of this foreclosure would reduce competition so as to give rise to an SLC in the affected market.³⁶⁵

Our approach

10.90 This section sets out evidence relating to the Merged Entity's incentive to foreclose fixed-MVNOs at contract renewal or renegotiation. We then assess

³⁶⁵ MAGs, 5.6.7.

evidence relating to the Merged Entity's incentive to foreclose Sky during the lifetime of its contract.

- 10.91 The incentive for the Merged Entity to foreclose fixed-MVNOs will be greater if a large proportion of a fixed-MVNO's customers who purchase a fixed-mobile bundle would respond to an increase in the price of the mobile component (or a reduction in the quality of the service) by switching their purchase of both the mobile and fixed components to the Merged Entity.
- 10.92 If customers are likely to 'unbundle', meaning that they would switch only the mobile component of their purchase, and retain their fixed services with their current provider, the pre- and post-merger incentives of O2 and the Merged Entity, respectively, would broadly be the same because the Merged Entity will only recapture mobile customers.
- 10.93 If customers switch their whole bundle to providers other than the Merged Entity, the Merged Entity may not have an incentive to foreclose (as it would lose wholesale revenue from these customers without recapturing them at the retail level).
- 10.94 As noted in Chapter 9, in our assessment we have used the term fixed-mobile bundle to describe services wider than those sold to customers under a single contract. For example, we have considered bundles to include scenarios in which a fixed service customer is cross-sold mobile services by their provider but has separate contracts for each type of service.

The Parties' view

- 10.95 The Parties told us that the Merged Entity will not have the incentive to restrict or degrade the supply of wholesale mobile services to Sky, or any other fixed-MVNOs, by not bidding or bidding less aggressively for future contracts to supply them.
- 10.96 The Parties submitted that it is not plausible that sufficient numbers of Sky's fixed (pay-TV and broadband) customers would switch these services to the Merged Entity due to a degradation in their mobile services to make a foreclosure strategy profitable.

Structure of our assessment

- 10.97 Below, we set out evidence relating to the following:
- (a) Contextual evidence on unbundling;
 - (b) unbundling rates;

- (c) future unbundling behaviour;
- (d) current customer switching rates;
- (e) future switching behaviour; and,
- (f) quantitative analysis of the parties' incentives to foreclose.

Contextual evidence on unbundling

10.98 We gathered evidence on how fixed-mobile bundles are sold in order to understand the ease and likelihood of unbundling. In particular, we considered how customers would respond if there was a price increase, or reduction in the quality, of the mobile aspect of their fixed-mobile bundle. If customers unbundle in response to a price increase/quality reduction of the mobile aspect of their fixed-mobile bundle, the Parties' incentives to foreclose would be weaker.

How customers are sold fixed-mobile bundles

10.99 The evidence we gathered indicates that providers of fixed-mobile bundles typically try to cross-sell fixed products to their mobile customers and mobile products to their fixed customers.

10.100 The Parties and third parties submitted that there are a number of benefits to both customers and providers from cross-selling of fixed-mobile bundles. These are summarised in Appendix N.

10.101 The Parties submitted that the rationale for the Proposed Merger includes the Merged Entity having the ability to cross-sell fixed-mobile services to their customers.

10.102 An internal document submitted by the Parties which assesses the synergies of the Proposed Merger estimates that [REDACTED].^{366,367}

10.103 The Parties [REDACTED] submitted that [REDACTED].³⁶⁸

- (a) The Parties told us that O2 tried to cross-sell fixed broadband to its existing mobile customers but only achieved a small market share in residential fixed broadband (around [REDACTED]% of customers in 2012) before the business was sold to Sky.

³⁶⁶ [REDACTED].

³⁶⁷ [REDACTED].

³⁶⁸ [REDACTED].

(b) Sky noted that it [✂].

10.104 We consider that customers may be more reluctant to switch their broadband fixed service provider than their mobile provider:

- (a) For example, customers switching fixed services from a provider on the Openreach network (such as Sky) to one on a different network (such as Virgin or CityFibre) currently need to contact both their existing and their new provider to coordinate the switch and make sure there is no gap between the old service ending and the new one starting.³⁶⁹
- (b) Research by Ofcom found that a high proportion of consumers who had considered switching fixed services but decided against it were put off by process-related worries. These concerns included: being worried about being without a particular service (e.g. landline, broadband and/or pay TV) during the switch; difficulty cancelling the service; worrying about paying two providers at the same time; and concern about arranging the services to start/stop at the right time.³⁷⁰
- (c) Switching mobile providers only requires users to send a free text message under the ‘text-to-switch’ process. Customers of fixed-mobile bundles can use text-to-switch to switch mobile provider in the same way that mobile-only customers can.^{371 372}

Factors relating to the ease of unbundling

10.105 We assessed whether it is easy to unbundle fixed and mobile services. If fixed-mobile customers have the option to subscribe to separate contracts for each service acquired, then unbundling will be easier as they can switch the mobile aspect of their fixed-mobile bundle without affecting their fixed services, which are supplied under a different contract.

- (a) We noted above that ‘text-to-switch’ is designed to make the switching process easier for mobile customers (including those who purchase fixed-mobile bundles).

³⁶⁹ Ofcom (2021). Switching broadband provider.

³⁷⁰ Ofcom (2016). Making switching easier and more reliable for consumers. We have not assessed the reliability of this survey.

³⁷¹ Ofcom notes that if fixed-mobile customers switch mobile provider they may lose benefits gained from purchasing fixed and mobile services together. From December 2022, fixed providers will be required to tell customers what this impact will be; Ofcom has recently proposed that the same rules apply to mobile providers. Ofcom, email to CMA, 8 March 2021. See also Ofcom (2021). Quick, easy and reliable switching, 3 February 2021.

³⁷² Customers can keep their existing numbers by texting ‘PAC’ to their old provider using 65075. They can then give this PAC code to their new provider who must arrange for the switch to be completed within one working day. See also: Ofcom (2019). Text to switch: it’s never been simpler to switch mobile network, 28 June 2019.

- (b) Sky told us that it offers customers pay-TV, fixed broadband, fixed voice, and mobile, all under separate contracts.³⁷³ Sky told us that [REDACTED].
- (c) Other providers of fixed-mobile bundles such as BT and Vodafone also offer customers fixed-mobile bundles under separate contracts. As at January 2021, [REDACTED] Virgin's customers take both fixed and mobile services under separate contracts.³⁷⁴

Factors that may make unbundling more likely

10.106 We assessed whether customers would be likely to unbundle if there is a price increase, or reduction in the quality of, the mobile aspect of their fixed-mobile bundle. We consider the factors that may make unbundling more likely are:

- (a) The extent to which customers view their mobile and fixed purchases separately;
- (b) the extent to which customers have strong preferences for certain fixed services; and
- (c) any administrative processes that may allow fixed-mobile providers to attempt to retain their fixed customers.

Individual and household decisions

10.107 The Parties and some third parties submitted that choosing fixed services providers is largely a household decision, with all members of the household frequently using a single broadband connection, whilst choosing a mobile provider is largely an individual decision, with multiple mobile subscriptions per household.³⁷⁵

10.108 As such, we consider that, to the extent that fixed and mobile services are seen as either individual or household decisions, unbundling and choosing a different mobile provider to the fixed provider will be more likely.

³⁷³ Sky told us that its standard approach is to require customers wishing to take its broadband or fixed voice services to take both together at the same time (ie a customer cannot take one without the other), but still under separate contracts.

³⁷⁴ BT; Vodafone. However, we note that [REDACTED] of Virgin's Oomph customers take their services under a single contract Oomph bundle.

³⁷⁵ Ofcom noted that: "there tends to be only one broadband provider per household. Whereas, due to the nature of mobile contracts (ie each individual has a separate handset/number), it is likely that more than one individual in the household is the decision-maker regarding the selection of a mobile provider, and therefore more than one provider may be used within the same household."

10.109 Ofcom asked customers who bought fixed and mobile services from the same provider, “Thinking about these services, do you regard them as a package of services or as individual services?”. Just over half of respondents purchasing fixed and mobile services from Sky, BT/EE and Virgin answered that they considered themselves to be purchasing a package of services.³⁷⁶ (These survey results are summarised in Appendix L.)

10.110 We consider that this suggests that about half of respondents who purchase fixed and mobile services from the same provider consider the services they purchase to be supplied separately. As such, they may be likely to unbundle in response to a price increase, or a reduction in quality of, the mobile component of their fixed-mobile bundle.

Customer preferences for fixed providers

10.111 We next set out evidence relating to the preferences of Sky and Virgin customers. We have focussed on Sky and Virgin as the two largest fixed-MVNOs.

- *Evidence relating to customer preferences in relation to Sky pay-TV*

10.112 Sky is the largest provider of retail pay-TV services in the UK with over [X] pay-TV connections in 2019.³⁷⁷

10.113 Over [X] of all Sky customers purchased pay-TV from it in 2019. This compares to [X]% and [X] for Virgin and BT respectively.³⁷⁸

10.114 Sky considers that its pay-TV service is differentiated from other providers on the following aspects:

- (a) The broad range of exclusive and non-exclusive content, both linear and on-demand. Sky told us that it currently has more channels on its platform than other providers, including the Sky Atlantic channel which is exclusive to Sky;

³⁷⁶ Ofcom 2020 Core Switching Tracker. This is an annual survey. The survey approach in 2020 was different from previous years due to the constraints of survey-taking during the COVID-19 restrictions. It employed a ‘post-to-web’ approach in which survey invitations were sent by a post to a random sample of addresses in the UK in which survey participants were given a code enabling them to access and complete the survey questionnaire online. The achieved sample using this method fell short of the required sample sizes and a non-random online survey was used to fill the gap. We consider that this methodology is not as robust as a fully random probability-based survey.

³⁷⁷ CMA analysis of Sky 2019 subscriber figures.

³⁷⁸ For further detail, see Appendix N.

- (b) the content distribution. The combination of satellite and online distribution is unique and allows Sky to reach a wide range of customers;
- (c) the platform. Sky told us that its Sky Q platform is differentiated by the user interface, voice capability, large storage capacity, availability of wireless multiroom boxes and also the availability of companion apps; and,
- (d) Sky also told us that its service has been recognised as delivering a best-in-class experience.

10.115 Evidence from the Parties' internal documents showed the extent to which Sky's relative strength is pay-TV. In particular:

- (a) Liberty Global refers to Sky as having a [REDACTED];
- (b) Liberty Global said that Sky is [REDACTED]; and,
- (c) Virgin's joiners survey found that [REDACTED].

10.116 Evidence from Liberty Global suggests that it views [REDACTED] Sky pay-TV customers as loyal to Sky and unlikely to drop or switch pay-TV provider.³⁷⁹

10.117 Research by Ofcom shows that 90% of Sky pay-TV customers are satisfied with their TV service.^{380,381}

- *Evidence relating to customer preferences in relation to Virgin's broadband*

10.118 The evidence provided to us suggests that Virgin's key strength is broadband, perhaps due to the faster speeds offered (as compared to other broadband providers) within its network footprint.

- (a) An internal document provided by the Parties shows that [REDACTED].
- (b) Around [REDACTED] of Virgin's customers purchased broadband in 2019. The figure is [REDACTED] and [REDACTED] for BT³⁸² and Sky respectively.³⁸³

10.119 Evidence from Liberty Global suggests that it views Virgin's broadband customers as loyal.³⁸⁴

³⁷⁹ For example, an internal document from 2020 provided by Liberty Global shows [REDACTED].

³⁸⁰ Ofcom (2019) Customer Satisfaction Tracker.

³⁸¹ Compared to 86% of Virgin's TV customers, 85% of BT's TV customers and 83% of TalkTalk's TV customers.

³⁸² Excluding EE/Plusnet.

³⁸³ For further detail, see Appendix N.

³⁸⁴ An internal document from 2020 provided by Liberty Global shows [REDACTED].

10.120 Research by Ofcom shows that 85% of Virgin customers are satisfied by the speed of their broadband service, which is above the average customer satisfaction of broadband providers (80%).³⁸⁵

Administrative processes that may allow fixed-mobile providers to attempt to retain their fixed customers

10.121 We assessed whether there are any administrative processes that may allow fixed-mobile providers to attempt to retain their fixed customers when they wish to switch their fixed service to an alternative provider. As noted above, customers with fixed-mobile bundles can use measures such as ‘text to switch’ in order to switch mobile provider.

10.122 The following evidence relates to Sky, but we consider this relevant given that Sky is the only current fixed-MVNO customer of O2.

10.123 At present, fixed-mobile customers of Sky switching their fixed services or fixed-mobile bundles to most other broadband operators do not need to contact Sky when leaving - they just need to contact the destination provider, as their fixed services are already managed by Openreach.³⁸⁶ However, if they wish to switch to Virgin, they need to contact both providers as Virgin uses a separate network to provide fixed services.

10.124 We consider that this could give Sky the chance to retain the fixed services provided to these customers as they could, for example, offer a better deal or a solution to any potential issues. Therefore, to the extent that the reason for switching relates to a price increase, or reduction in the quality of, the mobile aspect of their fixed-mobile bundle, Sky could attempt to retain the customer’s purchase of fixed services.

Unbundling rates

10.125 We assessed the quantitative evidence available to us on the likely rate at which fixed-mobile customers would unbundle in response to a price increase, or reduction in the quality of, the mobile component of their fixed-mobile bundle.

10.126 We used data on Virgin and Sky customers from 2019 and survey data from 2020, as well as comments from third parties. These are summarised in Appendix L.³⁸⁷ The estimated unbundling rates for customers of fixed-mobile

³⁸⁵ Ofcom (2019) Customer Satisfaction Tracker.

³⁸⁶ Ofcom (2021). Switching broadband provider.

³⁸⁷ In Appendix L we also describe other sources of evidence that we did not consider it appropriate to place weight on. These sources of evidence estimated rates of unbundling to be as high as [x]%.

bundles that we considered appropriate to place weight on are set out in the table below.

Table 10-4: Summary of unbundling estimates

<i>Source of evidence</i>	<i>Unbundling rate</i>
Sky unbundlers, 2019	[X]
Virgin unbundlers, 2019	[X]
Utility Warehouse' SSNIP estimates	[X]
Vodafone's SSNIP estimates	[X]
Ofcom's 2020 Core Switching Tracker	45%

Source: CMA analysis.

10.127 As set out in the table above, the first set of rates we considered are the current rates of unbundling of Sky and Virgin's fixed-mobile customers, that is the proportion of fixed-mobile customers that removed mobile services from their fixed-mobile bundle in 2019. These are in the range of [X]%.

10.128 We note that these current rates of unbundling may not be representative of what would happen if a fixed-MVNO was to be partially foreclosed by the Merged Entity (either through higher prices or a reduction in the quality of the mobile aspect of a fixed-mobile bundle). If this were to be the case, we would expect rates of unbundling to be higher.

10.129 The second set of unbundling rates we placed weight on are those provided by Utility Warehouse and Vodafone. These are estimations of unbundling rates as a response to a SSNIP and are in the range of [X]%.

10.130 Lastly, we consider the evidence from Ofcom's 2020 Core Switching Tracker (see paragraph 10.109 above). This suggests that 45% of respondents who purchase mobile and fixed services from the same provider regard the services they purchase to be supplied separately, and so may be likely to unbundle in response to a price increase, or reduction in quality of, the mobile component of their fixed-mobile bundle.

10.131 We note that the Parties' quantitative analysis (described later in this chapter) uses rates of unbundling of [X]%. Lower unbundling rates will increase any incentive to foreclose, and the estimate used by the Parties is well below our upper bound estimate of [X]% above.

10.132 Even with the Parties' low unbundling rate of [X]% the quantitative analysis does not find a foreclosure strategy profitable.

Future unbundling behaviour

10.133 We recognise that the estimates of unbundling set out above are based on current market conditions. Going forwards, we note that the uptake of fixed-mobile bundles may increase. In Appendix N, we set out the evidence in

relation to the future fixed-mobile landscape in more detail. In summary, we found that:

- (a) On the one hand, current uptake is low:
- (i) Evidence from Ofcom suggests that in 2020 14% of broadband subscribers also purchased their mobile services from the same provider;
 - (ii) third parties and the Parties said that take-up of fixed-mobile bundles in the UK has lagged behind other European countries such as Belgium, the Netherlands, Portugal and Spain and it is at an early stage of development;
 - (iii) there is evidence to suggest that, at present, customers have little interest in a converged offer;³⁸⁸ and
 - (iv) moreover, a [REDACTED] document provided by [REDACTED] suggests [REDACTED].³⁸⁹
- (b) On the other hand, uptake is expected to increase:
- (i) Third parties submitted that the uptake of fixed-mobile bundles may increase;³⁹⁰ and,
 - (ii) internal documents submitted by the Parties and third parties indicate that the uptake of fixed-mobile bundles has been increasing over the last three years and that there could be [REDACTED]% penetration by fixed-mobile bundles by 2022 (this would be [REDACTED] the proportion of broadband customers also purchasing mobile from the same provider compared with 2020, as described in 10.132(a)(i)).³⁹¹

10.134 We consider that the following factors could impact the extent of unbundling in the future:

- (a) The possible introduction of single contracts could make unbundling more difficult.³⁹² However, third parties told us that this is difficult to implement in reality³⁹³ and some providers said [REDACTED].

³⁸⁸ An internal document from [REDACTED].

³⁸⁹ The extent of the constraint placed on the Parties by mobile-only providers is [REDACTED]. [REDACTED]. A similar document supplied [REDACTED].

³⁹⁰ For further detail, see Appendix N.

³⁹¹ For further detail, see Appendix N.

³⁹² For example, because customers could lose out on inter-linked discounts by separating the services from their bundles or, assuming that the contract ends at the same date for both fixed and mobile services, customers may find it easier to switch away whole bundles.

³⁹³ [REDACTED] told us that it would be difficult to offer a single contract as end dates are different for fixed and mobile contracts.

(b) A more compelling fixed-mobile customer proposition would make unbundling less likely given that customers' preferences for bundles will increase as bundles become more attractive. However, the evidence received from third parties (described in full in Appendix N) suggests that planned propositions do not differ significantly from current propositions:

(i) [redacted] said that [redacted];

(ii) [redacted] said that [redacted];

(iii) [redacted] said that [redacted].

(c) Switching processes may change. For example, Ofcom has proposed amendments to the process for switching fixed services that would just require consumers to contact their new provider, even if they are changing network.³⁹⁴

10.135 Given that we found that [redacted], and future planned propositions do not appear to differ significantly from current propositions, we consider that the level of unbundling is unlikely to significantly change in the foreseeable future.

10.136 However, to the extent that providers introduce single contracts or more compelling fixed-mobile propositions emerge in the future customers may be less likely to unbundle.

Current customer switching rates

10.137 The Merged Entity would only have the incentive to engage in a potential foreclosure strategy if a significant proportion of Sky fixed-mobile customers switch their whole bundle to the Merged Entity. If customers switch only the mobile component of their purchase, and retain their fixed services with their current provider, then the pre- and post-merger incentives of the Merged Entity would broadly be the same as the Merged Entity will only recapture mobile customers.

10.138 We considered a range of estimates for switching rates from Sky to the Merged Entity.³⁹⁵ The estimates that we considered appropriate to place weight on are set out in the table below.

³⁹⁴ Ofcom, *Quick, easy and reliable switching*, 3 February 2021.

³⁹⁵ See Appendix L.

Table 10-5: Summary of switching evidence

<i>Source of evidence</i>	<i>Diversion from Sky to the Merged Entity</i>
Sky port-out data and CMA analysis	[REDACTED]
Parties' estimate of diversion based on residual market shares	[REDACTED]
[REDACTED]	[REDACTED]

Source: CMA analysis.

10.139 These estimates show that between [REDACTED] and [REDACTED] of Sky customers who switch their fixed-mobile bundle would switch to the Merged Entity. However, we consider that [REDACTED] is likely to be an overestimate as currently Virgin only offers fixed services to [REDACTED]% of UK premises.³⁹⁶

Future switching behaviour

10.140 The levels of switching between Sky and the Merged Entity set out above are based on current market conditions and these may change if there is an increased uptake of fixed-mobile bundles in the future.

10.141 We consider that the following factors are relevant for assessing future diversion:

- (a) More providers may offer fixed-mobile bundles. We note that, if more providers offer fixed-mobile bundles, customers would have more alternatives to choose from, such that current diversion from Sky to Virgin may be overstated.³⁹⁷
- (b) We received the following evidence from third parties in relation to their future planned propositions for fixed-mobile bundles:³⁹⁸
 - (i) [REDACTED] said that [REDACTED]. However, [REDACTED] stated that [REDACTED].³⁹⁹
 - (ii) [REDACTED] said that if the take-up of fixed-mobile bundles accelerates, the market for mobile-only players [REDACTED].⁴⁰⁰ [REDACTED] said that it [REDACTED].⁴⁰¹ [REDACTED].
- (c) Providers without a fixed or mobile presence may attempt to merge or partner in order to provide fixed-mobile bundles, such that there would be more alternative providers of fixed-mobile bundles. We have seen

³⁹⁶ See Appendix L

³⁹⁷ Furthermore, all else equal, the greater the degree of competition in the provision of fixed-mobile bundles, the lower the margins that providers of fixed-mobile bundles will earn. This would reduce the incentive of the Merged Entity to foreclose, given that each retail customer regained by the Merged Entity will earn the Merged Entity less.

³⁹⁸ For further detail, see Appendix N.

³⁹⁹ For further detail, see Appendix N.

⁴⁰⁰ For further detail, see Appendix N.

⁴⁰¹ [REDACTED].

evidence that providers in the telecommunications industry consider such actions.⁴⁰²

- (d) Customers may become more 'sticky' when they take up more products in a bundle, such that fewer customers may switch between providers.⁴⁰³
- (e) Liberty Global has told us that its current network roll-out plans may expand coverage across the UK from [X]% to [X]% of existing premises by 2026, such that Virgin is able to offer fixed-mobile bundles to more customers. This means that the option to switch from Sky to Virgin may increase, all other things being equal.

10.142 In estimating future diversion from Sky to the Merged Entity, the evidence presented above is mixed:

- (a) The Parties' incentives to foreclose in the future may increase with, for example, the expansion of Virgin's fixed networks to cover a higher proportion of UK households; and
- (b) other factors, such as the emergence of other providers of fixed-mobile bundles, may reduce any incentive of Merged Entity to foreclose given the lower potential diversion and the increased number of competitors in the retail of fixed-mobile bundles.

Quantitative analysis

10.143 We have undertaken a vertical arithmetic analysis to assess quantitatively the Merged Entity's incentive to foreclose Sky.

10.144 The logic of a vertical arithmetic analysis is based on a comparison between the losses that the Merged Entity would incur in the wholesale mobile market by not bidding for Sky (or bidding more weakly) at the expiration of the current contract, and the corresponding gains that it would generate in the retail market.

10.145 A foreclosure strategy would lead to an increase in the wholesale costs faced by Sky as a result of the reduced competition between MNOs. This would be, at least partly, passed through to Sky's retail prices, inducing some of its retail customers to switch to alternative providers. Some of these customers would switch to the Merged Entity, allowing it to generate

⁴⁰²Documents supplied by O2, Liberty Global and [X] all speculate as to potential future consolidation between different providers. One example is from Liberty Global: [X].

⁴⁰³ For further detail in relation to customer churn, see Appendix N.

additional retail profits. The foreclosure strategy is profitable if these retail profits are greater than the wholesale losses incurred.

10.146 The Parties submitted a vertical arithmetic analysis covering two possible foreclosure strategies:

- (a) The Merged Entity refusing to bid for a new contract (total foreclosure); and
- (b) the Merged Entity bidding less aggressively than O2 would have done absent the Proposed Merger (partial foreclosure).

10.147 In the case of total foreclosure, the Merged Entity would lose all wholesale profits from the Sky contract as they cease to supply Sky.

10.148 In the case of partial foreclosure, upstream losses depend on the probability that the Merged Entity would still win the contract with Sky despite bidding more weakly. The Merged Entity's wholesale profits would be zero if the contract is not won but would be larger than current profits if the contract is won, as the wholesale price would be higher. The upstream loss is then computed as the difference between pre-foreclosure wholesale profits and the expected post-foreclosure wholesale profits.

10.149 The model submitted by the Parties is based on the analysis the CMA undertook in the BT/EE merger investigation.⁴⁰⁴ We consider that this approach is suitable for the analysis of the Merged Entity's incentive and have followed it with some adjustments.

10.150 Below, we briefly set out the three key parameters whose values are most uncertain or where we disagree with the Parties' assumptions:

- (a) the probability of Sky's fixed-mobile customers unbundling in response to a price increase;
- (b) the cost increase that Sky could face in the case of foreclosure; and
- (c) the probability that the Merged Entity would still win the contract with Sky despite bidding more weakly.

10.151 We then present the results of the analysis.⁴⁰⁵

⁴⁰⁴ Final report on the on the anticipated acquisition by BT Group plc of EE Limited, Appendix I.

⁴⁰⁵ The details of the analysis, and the assumptions we have used in it, are presented in Appendix M.

Main parameters of the model

- 10.152 The rate of unbundling determines the proportion of Sky's fixed-mobile retail customers who would switch only the mobile component rather than the entire bundle. This has further implications on where those customers would divert to and on the profits that the Merged Entity would gain if it could attract them.
- 10.153 The Parties' model considered an unbundling rate between [X]% and [X]%, which the Parties submitted was conservative. Table 10-4 above shows there are a wide range of estimates for the rate of unbundling. To reflect this, we used a wider range, between 10% and 50%, for our vertical arithmetic analysis.
- 10.154 In their analysis, the Parties considered wholesale cost increases between [X]% and [X]%. However, they submitted that cost increases as high as [X]% would be unrealistic.
- 10.155 We based our assessment on [X]. Based on this evidence, we have used a wholesale cost increase between [X]%, which is within the [X]%-[X]% range used by the Parties.⁴⁰⁶
- 10.156 In their analysis of partial foreclosure, the Parties had assumed that, if bidding more weakly, the Merged Entity could have retained the contract with Sky with a probability between 25% and 50%. The 25% lower-bound figure was motivated by the fact that, with four MNOs in the market, in a random draw the probability of retaining an MVNO would be 1/4. The 50% upper bound was driven by the consideration that very high probabilities are implausible, as they would imply that a price increase would be profitable even absent the Merger.
- 10.157 We based our assessment on [X]. This evidence suggests that, if the Merged Entity were to offer terms corresponding to a [X]% wholesale cost increase, it could reasonably still win the contract with Sky with a probability between 33% and 50%. We therefore used this range in our calculations.⁴⁰⁷

Results of the analysis

- 10.158 Given the uncertainty around the value of the parameters discussed above, as well as of other parameters used in the model,⁴⁰⁸ we have

⁴⁰⁶ See Appendix M for more detail

⁴⁰⁷ See Appendix M for more detail

⁴⁰⁸ See Appendix M for more detail

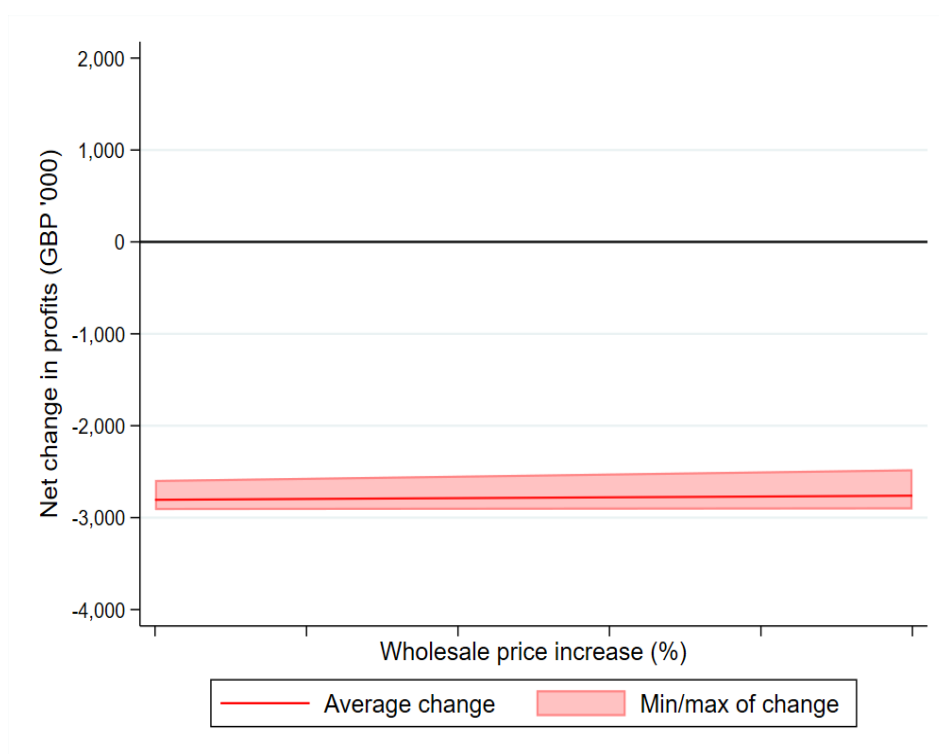
assessed the Merger Entity's incentive to foreclose Sky under any reasonable combination of parameter values.

10.159 The following figures show the outcome of the analysis:

- (a) Figure 10-1 shows the net change in profits modelled for a total foreclosure of Sky for a range of wholesale price increases;
- (b) Figure 10-2 shows the net change in profits modelled for a partial foreclosure of Sky for a range of wholesale price increases; and
- (c) Both figures show that neither total foreclosure nor partial foreclosure of Sky at contract renewal would be profitable for the Merged Entry under any of the scenarios considered.

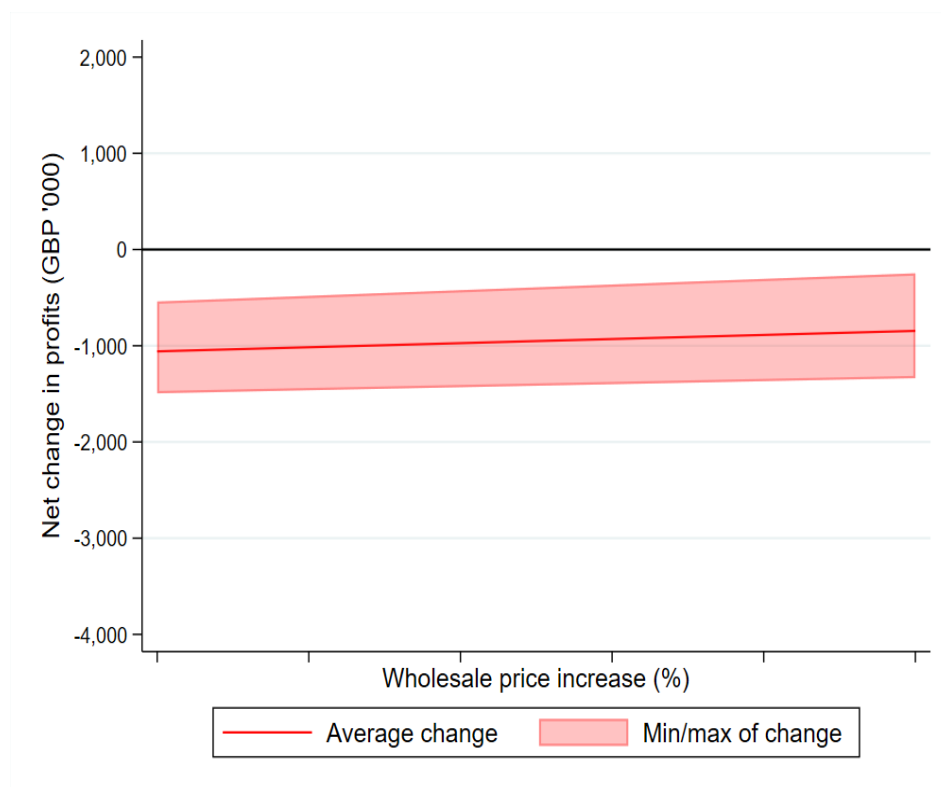
10.160 Although there is a range of uncertainty around the modelled losses, even at the highest wholesale price increase considered a partial foreclosure strategy is not profitable (the net change in profits from such a strategy would be negative).

Figure 10-1: Results of the analysis of the total foreclosure of Sky



Source: CMA.

Figure 10-2: Results of the analysis of the partial foreclosure of Sky



Source: CMA.

Summary and findings on incentive to foreclose fixed-MVNOs

10.161 We found that:

- (a) Customers of fixed-MVNOs can easily unbundle as a result of a price increase or reduction in the quality of the mobile component of their bundle. Customers of fixed-MVNOs can unbundle because they tend to purchase fixed and mobile services under separate contracts and can use 'text-to-switch' to switch the mobile aspect of their bundle. (This was designed to make the process of switching mobile provider simpler and easier.);
- (b) Customers of fixed-MVNOs who experience a price increase or quality reduction in the mobile aspect of their fixed-mobile bundle are likely to retain their fixed services with the fixed-MVNO because:
 - (i) They tend to view the purchase of fixed services as a household decision, and the purchase of mobile services as an individual decision;
 - (ii) those with a strong preference for the fixed services provided by a fixed-MVNO may unbundle in order to stay with their preferred provider; and,

- (iii) the administrative process required for customers to switch from Sky to Virgin currently gives Sky the opportunity to attempt to retain its fixed customers (although this may change in the future).
- (c) Given that we found that [REDACTED], and future planned propositions do not appear to differ significantly from current propositions, we consider that the level of unbundling is unlikely to significantly change in the foreseeable future.
- (d) However, to the extent that providers introduce single contracts or more compelling fixed-mobile propositions emerge, customers may be less likely to unbundle.
- (e) Notwithstanding any potential future reduction in the likelihood of unbundling, our quantitative analysis suggests that foreclosure is not profitable even at very low levels of unbundling.
- (f) For those Sky fixed-mobile customers that would not unbundle (that is, they would switch away the whole bundle), diversion to the Merged Entity may be limited by the presence of other providers of fixed-mobile bundles and the fact that currently Virgin has a limited geographic footprint.
- (g) It is not clear how diversion from Sky to the Merged Entity will evolve in the future.
- (h) Our analysis of the Parties' vertical arithmetic indicates that neither total foreclosure nor partial foreclosure of Sky at contract renewal would be profitable for the Merged Entity under any of the scenarios considered.

10.162 Given the above, we consider that the post-merger incentives of the Merged Entity will not differ from the pre-merger incentives to the extent that a foreclosure strategy would be profitable.

Incentive to foreclose Sky in-contract

10.163 Our analysis of incentives, in particular our quantitative analysis, assesses the incentive to foreclose Sky by not bidding for it, or bidding more weakly, at the expiration of the current contract.

10.164 We also considered whether the Merged Entity would have the incentive to foreclose Sky in-contract.

10.165 We consider that the cost to the Merged Entity of in-contract foreclosure of Sky may be higher than the out-of-contract scenario because

the Merged Entity may incur reputational damage or financial penalties from foreclosing Sky in-contract.

10.166 The benefits of in-contract foreclosure may also be lower compared to the out-of-contract scenario because the mechanisms available to foreclose Sky without breaching the contract are likely to be limited, as described in paragraph 10.81 above.

10.167 We note that, should the Merged Entity foreclose Sky in-contract, Sky could potentially retaliate by withholding Virgin's access to its pay-TV content (or it could potentially increase the price or degrade the quality of its pay-TV offered to Virgin).

10.168 [✂]

10.169 Whilst we have not assessed the likelihood of such retaliation, we note that such a strategy would impose additional costs on the Merged Entity.

Summary and findings on incentive to foreclose Sky in-contract

10.170 We found that neither total foreclosure nor partial foreclosure of Sky at contract renewal would be profitable for the Merged Entry. We also consider that in-contract foreclosure of Sky may be more costly and provide less benefit to the Merged Entity. Therefore, we found that the Merged Entity would not find it profitable to foreclose Sky in-contract.

Finding on incentives

10.171 Given that we found that the Merged Entity would not have the ability to foreclose fixed-MVNOs, we did not need to conclude on whether the Merged Entity will have the incentive to do so. Nonetheless, based on the evidence set out above, we found that the Merged Entity will not have the incentive to foreclose fixed-MVNOs.

Effect

10.172 Given our views on the Merged Entity's ability and incentive to engage in a foreclosure strategy, we have not separately assessed the effect that a foreclosure strategy of the Merged Entity would have on competition.

11. Decision

- 11.1 As a result of our assessment, we found that the Proposed Merger, if carried into effect, will result in the creation of a relevant merger situation (RMS).
- 11.2 We concluded that the Proposed Merger may not be expected to result in a substantial lessening of competition (SLC) within any market or markets in the United Kingdom, including as a result of vertical effects in the supply of:
- (a) Wholesale leased lines to MNOs, at each of the access and aggregation layers on a local basis; and
 - (b) Wholesale mobile services to MVNOs in the UK.