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The impact of a dark fibre access remedy in non-competitive areas

Report prepared for Openreach

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1. Introduction and overview

1 On 29 March 2019 Ofcom published a consultation *Promoting competition and investment in fibre networks: Initial proposals – Approach to remedies* ('the Consultation'). The Consultation sets out Ofcom's initial views on the appropriate regulatory measures for wholesale fixed telecoms markets from 2021 ('the 2021 Review') and how these will differ geographically according to whether there is existing or prospective network competition between rival fixed networks.

2 This short report considers Ofcom's proposal to require BT to supply cost-based dark fibre access ('DFA') in 'non-competitive' areas as part of the 2021 Review. Ofcom envisages that DFA will give communications providers ('CPs') greater flexibility over the equipment and services they can offer in these areas than Openreach's active business connectivity services.[1]

3 Any benefits from such a DFA remedy must be carefully weighed against the risks to the very fibre deployment upon which DFA depends. DFA will give rise to multiple arbitrage opportunities. These will weaken Openreach's ability to recover its efficiently-incurred fibre deployment costs and, therefore, risk undermining its incentives to invest in fibre networks in non-competitive areas.

4 Such deployment risks would be highly undesirable given the importance of investment by Openreach to ensure the availability of fibre services for residential and business consumers in these areas. Absent commercial deployment by Openreach, consumers will remain unserved or the Government will need to use public funding to incentivise network build.

5 It seems premature for Ofcom to introduce a DFA remedy in 'non-competitive' areas as part of the 2021 Review. Delaying the introduction until future reviews will allow Ofcom to develop a more reliable information base upon which to determine whether DFA is an appropriate and proportionate intervention and, if so, in what areas and form.

6 This remainder of this document is structured as follows:

- Section 2 briefly outlines Ofcom's strategic focus on promoting nationwide access to fibre networks[2] for both business and residential consumers and the importance it places on duct and pole access ('DPA') to support this objective.
- Section 3 explains why DFA will enable and incentivise multiple forms of arbitrage by Openreach's customers.
- Section 4 sets out why such arbitrage is problematic - it risks nationwide fibre deployment by undermining Openreach's fibre investment incentives in non-competitive areas.
- Section 5 discusses why Ofcom needs to carefully balance the benefits and risks of DFA and that, based on our initial assessment, it seems premature to introduce DFA in the 2021 Review.
- Section 6 summarises our conclusions.

[1] For example, Openreach's portfolio of Ethernet Access Direct and Optical Spectrum Access services.

[2] i.e. 'full-fibre' or 'fibre-to-the-premises' networks.

2. Ofcom's focus on nationwide fibre deployment

7 In this section, we briefly outline Ofcom's strategic focus on promoting nationwide access to fibre networks for both business and residential consumers. We also explain the importance Ofcom places on CPs using DPA to support this objective. Finally, we provide a summary of the proposed DFA remedy for the 2021 Review.

Ofcom's strategic focus on widespread fibre deployment

8 The Government has set out it aims to achieve nationwide fibre connectivity.[3] This is required to guarantee that "*Britain is among the first countries to ensure that everyone benefits from [digital] revolution.*"[4] It also considers it is vital to ensure "*the UK has the telecoms infrastructure to meet the growing demands of consumers and businesses and promote the benefits of connectivity across the UK.*"[5]

9 The Government considers that the most effective way to deliver nationwide fibre connectivity is to promote competition and commercial investment where possible.[6] It also notes that parts of the country (so called "*non-competitive areas*") are likely to need more support than the market will provide alone.[7]

10 Ofcom has reflected these goals in its Strategic Policy Position, where it presents its strategy to "*secure full-fibre investment by promoting network-based competition*" where this is possible.[8]

Access to Openreach's duct and pole network is central to Ofcom's fibre objectives

11 Both the Government and Ofcom consider mandating unrestricted DPA to be central to delivering their fibre strategic objectives. The Department for Culture, Media and Sport ('DCMS')'s *Future Telecoms Infrastructure Review* ('FTIR') lists "*supporting market entry and expansion by alternative network operators through easy access, complemented by access to other utilities' infrastructure (for examples, sewers)* " as one of the prerequisites for successful implementation of the Government's vision.[9]

12 Similarly, Ofcom considers that "*the prompt implementation of an unrestricted duct and pole access remedy will become increasingly important to help facilitate large-scale investment in fibre.*"[10]

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3 See HM Government, *Industrial Strategy – Building a Britain fit for the future,* November 2017.
4 Ibid., page 38.
5 See DCMS, *Future Telecoms Infrastructure Review*, July 2018, page 2.
6 Ibid., page 4.
7 Ibid., page 2.
8 See Ofcom, *Regulatory certainty to support investment in full-fibre broadband: Ofcom's approach to future regulation*, July 2018, page 11.
9 See FTIR, page 5.
10 See Ofcom, *Regulatory certainty to support investment in full-fibre broadband: Ofcom's approach to future regulation*, July 2018, paragraph 6.1.

13 Ofcom mandated a form of DPA remedy as part of its Wholesale Local Access Market Review ('WLAMR') 2018.[11] However, that remedy included some restrictions to ensure it was primarily used for deploying broadband and telephone networks.[12] Ofcom has relaxed these restrictions in the Passive Infrastructure Market Review ('PIMR') 2019 through the introduction of unrestricted DPA. Ofcom considers the key benefits of unrestricted DPA are that it "*provide[s] greater flexibility, better reflecting the needs of operators investing in full-fibre networks to provide a range of services; for example, initially leased lines to businesses, and later broadband to homes.*"[13]

Ofcom is also considering dark fibre access in non-competitive areas

14 Ofcom considers that, in certain areas of the country, DPA will either not be available or not economically viable for network expansion. In such areas, it proposes to mandate DFA.[14,15]

15 Ofcom has considered the introduction of DFA previously:

- In the **Business Connectivity Market Review ('BCMR') 2016**, Ofcom sought to impose DFA for all business connectivity services in most geographic areas of the UK outside London.[16,17] In addition, Ofcom proposed charge control measures for DFA based on an 'active-minus' approach.[18] However, supported by Virgin Media, BT successfully appealed this market review, which led to Ofcom withdrawing its DFA remedy.[19]

- In the **BCMR 2019**, Ofcom introduced DFA for inter-exchange connectivity.[20] This remedy relates only to circuits connecting to one of BT's exchanges in which Ofcom considers BT does not face competition from rival operators.[21] Ofcom has proposed a charge control for DFA, using a 'cost-based' approach, rather than an 'active-minus' approach.

16 However, Ofcom proposes to introduce a longer-term DFA remedy in the Consultation. This remedy would be implemented in non-competitive areas (i.e. areas defined by Ofcom where there

11 Ofcom, *WLAMR 2018: Statement*, March 2018, paragraph 1.26.

12 Ibid., paragraph 2.7.

13 See Ofcom, *Regulatory certainty to support investment in full-fibre broadband*, paragraph 1.16.

14 Ibid., paragraph 1.27.

15 DCMS sets out in its February 2019 consultation (*Statement of Strategic Priorities for telecommunications, the management of radio spectrum and postal services*) that where DPA is not available or effective, "*there should be other options to support competitive network deployment, for example dark fibre access*" (paragraph 18). However, it goes on to note that "*In the FTIR, the Government encouraged Ofcom to consider regulatory options in these circumstances, in a way that does not undermine the case for operators to invest in their own networks using duct and pole access*." (emphasis added).

16 Ofcom imposed DFA Remedy on all CISBO product services in geographic markets of "London Periphery" and "Rest of the UK" (see Ofcom, *BCMR 2016: Statement*, April 2016, paragraph 1.51).

17 Ofcom did not impose DFA in the BCMR 2013. It successfully defended an appeal of this decision. Concerns related to efficient cost recovery and investment incentives were important elements of Ofcom's defence.

18 See Ofcom, *BCMR 2016: Statement*, April 2016, paragraph 1.38.

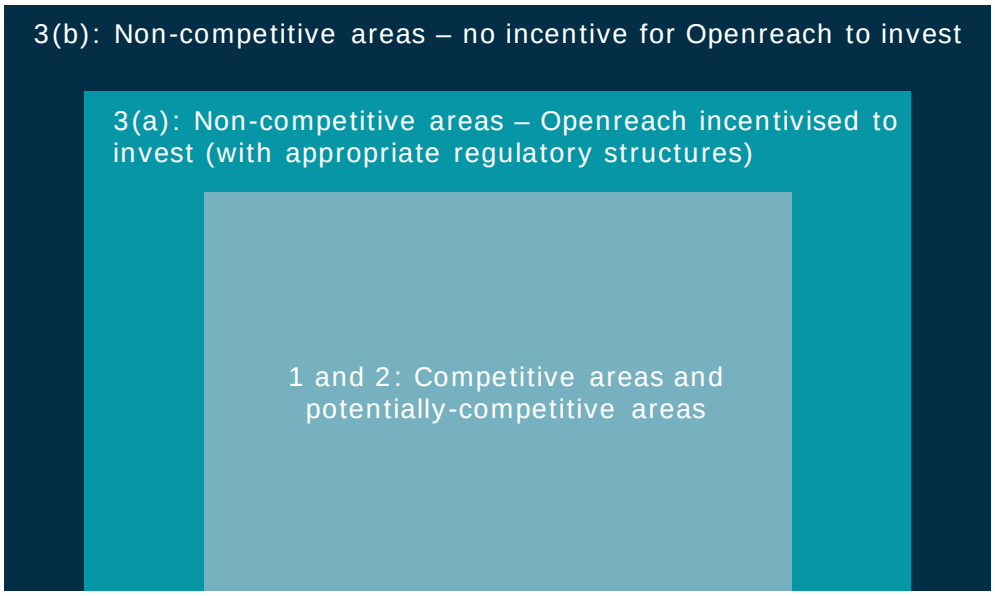
19 See Ofcom, *Statement on adding dark fibre to the temporary remedies for business connectivity markets*, April 2018.

20 See Ofcom, *Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets: Volume 2*, May 2019, paragraph 10.33.

21 For these exchanges (which do not include those which are within 100m of an alternative network), Ofcom also does not expect the UDPA remedy to lead to network-based competition. See Ofcom, *Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets: Volume 2*, May 2019, paragraph 10.34.

is no actual or prospective network competition – Areas 3(a) and 3(b) in Figure 1 below).[22] In these areas, retail competition for business connectivity services (and other downstream services) will continue to rely on regulated access to Openreach services.

Figure 1: Ofcom's proposed categorisation of different geographic areas



Source: AlixPartners

17 From 2021, Ofcom envisages moving towards DFA as the primary focus of regulation to secure retail competition in business connectivity markets in non-competitive areas, with regulation of the existing active products maintained on a 'safeguard' basis for a transition period. Ofcom considers that DFA provides several benefits over wholesale active services, including allowing other CPs to use their own electronic equipment to deliver services rather than having to use Openreach's equipment, and enabling more cost-effective bandwidth upgrades.

18 Ofcom suggests that the additional benefits of DFA could be significant, given the potential demand from large businesses and mobile backhaul sites (e.g. related to 5G services) in non-competitive areas. In addition, Ofcom suggests there may be wider benefits if DFA allows rival providers to provide similar products across potentially competitive and non-competitive services.

19 Ofcom argues that DFA is unlikely to weaken incentives for rival providers to invest in networks and services, since its scope is limited to non-competitive areas where there is limited potential for competitive fibre deployment. The Consultation does not explicitly consider the potential impact of DFA on Openreach's incentive to invest in fibre networks in non-competitive areas.

[22] For a more detailed description of Ofcom's proposed geographic market definition for the 2021 Review see: Ofcom, *Promoting investment and competition in fibre networks: Approach to geographic markets*, December 2018.

3. Dark fibre access risks multiple forms of arbitrage

20 Arbitrageurs make profit from exploiting different prices for the same underlying asset or service in different markets. In a regulatory setting, arbitrage can arise where access seekers take advantage of differences in the access charges set for similar wholesale services.[23]

21 In some settings arbitrage can be welfare enhancing. For example, when arbitrage leads to static efficiency[24] improvements. However, it can also be harmful. For example, it can undermine:

(a) **investment incentives**, and therefore, dynamic efficiency. Given the requirements for large, repeated and often sunk investments, such dynamic efficiency considerations are particularly important in telecoms markets.

(b) **national average pricing**. Where costs vary geographically and this is reflected in different pricing structures for different services, arbitrage (and related cherry-picking concerns) can undermine national average pricing.[25]

22 In telecoms markets CPs typically make decisions on which wholesale services (including self-supply) to use to meet customer requirements based on a range of considerations, including the value of the circuit to the customer, the total cost of provision over the expected customer lifetime, cashflow considerations (i.e. the extent of upfront costs), and cost recovery risks. Differences in the terms and conditions for regulated wholesale services that influence these types of consideration can therefore result in risks of arbitrage.

23 In this section, we set out why DFA will enable and incentivise multiple forms of arbitrage behaviour by Openreach's customers. In the next section, we then go on to explain why such arbitrage is problematic - it risks undermining the incentives for fibre deployment. We start by first explaining the types of downstream service substitution that DFA would enable.

DFA provides a highly flexible alternative to wholesale active services

24 At present, CPs that do not have their own network rely on wholesale services from other CPs to meet their customers' needs. In certain circumstances commercially negotiated wholesale services, including dark fibre, are available. However, such provision is based on commercially negotiated bespoke terms that we understand reflect the opportunity cost to the CP of providing the wholesale service.[26] As these services are offered on terms that are sufficiently attractive for both parties, the risks to the providing CP's investment incentives are mitigated.

25 Although such commercial service can be available, in many cases, CPs without the necessary infrastructure rely on Openreach's wholesale active services.

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23 This includes the effective access charges, where Openreach self provides an upstream service (such as DFA) and where the charge for that service are not observed.

24 i.e. allocative and productive efficiency.

25 This may concern Ofcom or the Government if they consider that national average pricing has important social benefits.

26 We understand that commercial dark fibre agreements can involve either high upfront charges and/or long contract durations, for example.

26 Dark fibre is an important input to Openreach's wholesale active services. Openreach currently uses a separate optical fibre as an input for each circuit for most business connectivity active products, including all of its Ethernet Access Direct ('EAD') and Optical Spectrum Access ('OSA') products.[27] There is currently no regulated access to Openreach's dark fibre outside of the inter-exchange market. The DFA remedy proposed for the 2021 Review would change this, giving CPs the choice to use dark fibre instead of Openreach's wholesale active services where it is profitable to do so across a wider geographic area.

27 DFA is a highly flexible wholesale product that can be used by CPs to provide a wide variety of products at different bandwidths and using different interfaces.[28] There are three broad ways that CPs can use DFA as an alternative to Openreach's wholesale active products:

(a) **Single-circuit substitution:** a CP uses DFA to provide a service which substitutes for a single Openreach active business connectivity service based on a single optical fibre.

(b) **Multiple-circuit substitution:** a CP uses DFA (potentially in combination with other inputs, such as DPA) to provide services that substitute for multiple Openreach active business connectivity services on the same route to aggregate traffic on a single fibre.[29] Such substitution could be undertaken by a CP self-supplying active services for its retail customers, or it could be undertaken by a CP using DFA to sell wholesale active services to downstream CPs (i.e. in competition to Openreach).

(c) **Multiple-service substitution**: a CP uses DFA (again, potentially in combination with other inputs, such as DPA) to provide a fibre broadband services to residential consumers, and active business connectivity services aggregated on to a single fibre.

DFA flexibility risks multiple forms of arbitrage

28 Differences in the effective access charges will enable CPs[30] to engage in arbitrage behaviour if dark fibre can be used to provide downstream active services more profitably than buying them from Openreach. Since dark fibre is an input into a wide range of services, in principle the potential for arbitrage extends across the full spectrum of Openreach's active services.

29 The scope for arbitrage between dark fibre and downstream active services will depend on the relative levels of the regulated charges for DFA and active charges. Ofcom has proposed that DFA should be 'cost-based'. We assume that the regulated 'cost-based' charge will be based on a uniform average unit cost per fibre that reflects Ofcom's assessment of Openreach's fully-allocated cost of providing dark fibre, potentially averaging costs over a defined geographic area.

30 In practice, a significant proportion of Openreach's dark fibre costs are fixed and common across multiple services and customers. This means that a uniform cost-based average charge for DFA will, in effect, result in each dark fibre strand making the same contribution to Openreach's fixed and common costs (see Box 1 for an illustrative example). By contrast, Openreach's charges for

27 Services that include redundancy may use more than one optical fibre.

28 Including traditional leased lines interfaces and contemporary Ethernet and optical interfaces.

29 Aggregation could involve more than one dark fibre strand in some cases. However, such substitution would involve less fibre strands than purchasing the equivalent active services. The same applies for multiple-service substitution.

30 Including those that are equally or, potentially, less efficient than Openreach.

active products are structured such that higher bandwidth services recover a larger proportion of fixed and common costs ('FCC').[31]

BOX 1: ILLUSTRATING THE EFFECT OF AVERAGE COST-BASED PRICING

Consider an investment by Openreach in a cable with 144 optical fibre strands from an exchange to a business park. The costs for this deployment (for example, the cost to purchase the fibre cable, any costs for upgrading/replacing ducts, the costs to lay the cable, etc), say £30,000, are fixed with respect to the number of fibre strands within the cable. Furthermore, the cost will be common to the individual services using the various strands; the costs are incurred for laying the entire fibre cable and there is not a separate cost for each fibre. Regulating the price at the average cost per fibre strand (e.g. £30,000/144 if all strands are lit) will result in an arbitrary allocation of the FCC of the cable to each fibre strand. There is not a good economic reason for recovering FCC in this way.

We understand that in BT's regulatory accounting system fibre cable costs are allocated based on lit strands. Therefore, if the utilisation of the fibre strands reduces (i.e. there are unlit strands), the allocation of the FCC will result in a higher average cost per fibre. In the example above, if there are 50 fibres lit then the average cost per lit fibre would be £30,000/50. However, this will continue to reflect an economically arbitrary allocation of FCC.

31 DFA will enable multiple forms of arbitrage[32], reflecting the scope for service substitution:

- **Single-circuit arbitrage.** This arises where it is more profitable for a CP to purchase DFA and use its own electronic equipment than buy an equivalent active product from Openreach, allowing it to undercut Openreach in the downstream business connectivity market. The scope for single-circuit arbitrage depends on the extent of the divergence between the FCC contribution included in the dark fibre charge and the greater contribution earned on active services. If higher bandwidth services make a larger contribution to the recovery of FCC, the potential for arbitrage would be greater.

- **Multiple-circuit arbitrage.** The possibility of multiple-circuit arbitrage also reflects the fact that CPs could use DFA to undercut multiple active business connectivity services. The incentive to do so is likely to be more significant than for single-circuit arbitrage. This is because multiple-circuit arbitrage allows CPs to reduce the cost of supplying the business park by using a single fibre strand to substitute for multiple Openreach active services (which would each use a separate fibre and each make contributions to the recovery of FCC). In economic terms, this allows the CP to only pay the contribution to FCC on a single fibre strand, thus avoiding the combined contribution to FCC from multiple active services.

- **Multiple-service arbitrage**. CPs could use DFA to undercut not only Openreach's active business connectivity services, but also other fibre-based services (including broadband). Multiple-service arbitrage allows a CP to substitute numerous active services with a single dark fibre strand (or a few fibre strands).[33] This allows the CP to avoid making the contribution to FCC across a wide range of services.

31 Varying FCC recovery based on the nature of demand can be economically efficient, as set out further in the section below.

32 We assume that the structure of DFA charges will be set in a manner that minimises the risk of arbitrage based on, for example, circuit length. However, if this is not the case, other forms of arbitrage risk may arise.

33 A CP might, for example, use DFA and DPA with passive optical networking technology to provide consumer services, which providing business services using Ethernet technologies.

32 Importantly, such arbitrage does not require the CP to be more efficient in providing the active services than Openreach.[34] Rather, it can arise due to the difference in the (arbitrary) recovery of FCC between the DFA and active services.

[34] Indeed, if the difference in charges for active and dark fibre services is sufficient, arbitrage can result in CPs replacing Openreach in the provision of active services for which they are less efficient than Openreach. Arbitrage can therefore be statically inefficient.

4. Arbitrage risks undermining fibre deployment

33 Openreach's decisions on whether to deploy fibre will depend on its expected returns on those deployments. These decisions are influenced by Openreach's perceptions of the risks of fibre deployment. Regulation can play an important role in mitigating some of these risks, and thereby expanding the scope for commercial fibre deployment.[35]

34 However, as we set out in this section, DFA would, in fact, *increase* the risks Openreach will not be able to recover its efficiently-incurred deployment costs due to arbitrage. This will chill investment and increase the requirement for public funding to achieve the Government's fibre deployment goals.

Arbitrage risks undermining Openreach's ability to efficiently recover its fibre deployment costs

35 FCC typically constitute a material proportion of overall costs for telecoms network operators. The approach adopted to recovering FCC can have a material impact on allocative efficiency. Ofcom has historically recognised that allowing the mark-up on marginal (or incremental) costs for FCC to vary according to the elasticity of demand[36] results in a more efficient outcome.[37]

36 If the price elasticity of demand varies across the various downstream services that consume fibre (e.g. different types of residential and business services), an efficient approach to recovering the costs of deploying that fibre would involve a differentiated pricing approach.

37 Single-circuit, multiple-circuit and multiple-service arbitrage would all involve CPs exploiting differences in the pattern of FCC recovery between dark fibre and Openreach's wholesale active services. This will, in effect, provide an artificial source of competitive constraint that will undermine Openreach's ability to recover its FCC efficiently, and likely reduce its expected return on fibre investments in non-competitive areas.

38 Single-circuit arbitrage will erode or eliminate Openreach's ability to achieve greater cost recovery for higher bandwidth wholesale business connectivity service charges as CPs switch to DFA for such services. This will reduce Openreach's ability to efficiently recover its FCC since the foregone recovery on a higher bandwidth circuit will not be offset by the sale of a dark fibre strand at a cost-based charge.

39 As set out above, Ofcom has previously recognised that tariff structures that reflect the underlying differences in demand conditions are likely to be efficient ways to recover FCC and it will expand output relative to a uniform tariff structure. For this reason, Ofcom has historically not sought to closely regulate BT's pricing structure for wholesale business connectivity services (or other regulated services) and has taken a basket approach to regulating the charges for these services.

40 We understand that the extent to which Openreach varies cost recovery within wholesale business connectivity services has reduced over time.[38] We further understand that his reflects both

35 For example, we understand that Ofcom's proposals in relation to establishing a regulatory asset base ('RAB') model for Openreach from 2021 are intended to mitigate certain fibre deployment cost recovery risks.

36 So-called 'Ramsey pricing'.

37 See, for example, the CAT Judgment of Case No. 1212/3/3/13, paragraph 167.

38 i.e. the so-called 'bandwidth gradient' has flattened.

changes to Ofcom's leased lines charge controls, but also Openreach's view of the changing efficient structure of charges given the nature of competition it faces. However, single-circuit arbitrage is not limited to substitution of services within the portfolio of regulated wholesale business connectivity services. Individual fibre strands are used by Openreach to provide a range of regulated and commercial services for which the demand conditions vary. Therefore, having the ability to vary cost recovery across these services can allow for a more efficient structure of charges. The ability for CPs to avoid higher FCC on certain active services by substituting individual circuits to DFA will undermine this charging structure.

41 However, although the risks of potential single-circuit arbitrage may have reduced over time, particularly within the business connectivity portfolio of services,[39] it has not been removed. Further, the risks associated with multiple-circuit and multiple-service arbitrage have increased, in particular due to Ofcom's increasing support for widespread competing network deployments based on a broad range of downstream services.

42 The impact of multiple-circuit arbitrage can be illustrated using the earlier example of a potential investment by Openreach in a fibre cable that serves a business park. In this scenario, DFA could allow a CP to serve all the businesses in the business park at a lower cost than using Openreach's active business connectivity services (e.g. EAD) by purchasing a single dark fibre strand (e.g. to provide the spine fibre) combined with DPA (or a wireless technology) to connect to customer premises.[40] If FCC are averaged across fibre strands, this type of arbitrage would allow Openreach to recover only a fraction of the cost of the fibre cable.[41] In such a scenario the risk is that Openreach's active products are only attractive to CPs where there is particularly high uncertainty over future demand and/or particularly high costs to serve the customers. Similar concerns arise in relation to multiple-service arbitrage,[42] albeit the broader range of business and residential services may enable CPs to exploit an even greater number of arbitrage opportunities.

Arbitrage risks undermining Openreach's incentives to invest in fibre

43 DFA, and the resulting arbitrage, can be expected to reduce Openreach's ability to recover its efficiently-incurred FCC by reducing, or eliminating, its ability to vary its recovery of FCC across a range of fibre-based services.[43] This will reduce the expected return on fibre investments and risks undermining Openreach's incentives to deploy fibre in non-competitive areas.

44 We understand that Openreach has already invested significant amounts in non-competitive areas to deploy fibre to provide business connectivity services and to support fibre-to-the-cabinet deployment. The arbitrage opportunities enabled by the introduction of 'cost-based' DFA, in addition to DPA, are likely to further compromise Openreach's ability to earn an appropriate risk-adjusted return on these historic investments. This *ex post* regulatory 'expropriation' of sunk

39 As, for example, the bandwidth gradient has reduced over time.

40 The use of wireless technology in this way will have a particularly marked effect if 5G develops as a credible, high quality access product.

41 This concern is additional to the single-circuit arbitrage issue.

42 For example, involving substitution of both business connectivity services and broadband services.

43 In addition, DFA is likely to reduce the utilisation of Openreach fibre assets as CPs exploit the aggregation opportunities offered by dark fibre.

investments is likely to increase the perceived regulatory risk of fibre investment.[44] The perception of greater regulatory risks would be expected to weaken Openreach's incentives to invest further.

45 The risks of arbitrage, enabled by the introduction of DFA, would have a further chilling effect on Openreach's incentives to make new investments in fibre. This would reduce Openreach's incentives to:

- **Deploy more fibre to provide business connectivity services.** This can be illustrated by considering an example decision by Openreach to deploy a fibre connection to a business park (see earlier example). Openreach can be expected to base this decision on whether it expects to earn sufficient return on the investment. Where multi-circuit arbitrage is feasible, the availability of cost-based DFA will reduce the expected return. As explained earlier, if dark fibre charges are based on the average unit cost for a fibre strand this will compromise, possibly severely, Openreach's ability to earn enough revenues from dark fibre and other wholesale services to recover its efficiently-incurred costs. Openreach can be expected to take these risks into account at the investment appraisal stage[45] when assessing the expected return and will not invest unless it considers that it will have sufficient opportunity to recover its costs.

- **Invest in new fibre networks.** 'Cost-based' DFA may also have a chilling effect on Openreach's incentives to invest in multiple-service fibre networks used to provide business and residential services.[46] This could arise, for example, in relation to a potential fibre deployment to a village with a population of 1,000 people adjacent to two business parks or industrial centres where the ability of Openreach to achieve higher cost recovery on the business services is critical to the fibre broadband deployment business case (i.e. revenues from broadband services are not sufficient alone to justify the investment).[47] In this scenario, 'cost-based' DFA could reduce Openreach's expected revenues from dark fibre and business connectivity services, undermining the business case[48] for making the fibre investment.[49] Indeed, the need for such economies of scope are an important element of Ofcom's reasoning underpinning its unrestricted DPA remedy.

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44 Raising so-called 'fair bet' concerns. We note that Ofcom's approach to regulating the charges for Openreach's GEA 40/10 product in the WLAMR 2018 was predicated on avoiding fair bet concerns.

45 Potentially alongside other risks, such as those associated with CPs making the investments, perhaps using DPA, should Openreach choose not to do so.

46 This does not mean that businesses will be provided with exactly the same service. For example, business services could remain provided on dedicated fibres while consumer services, provided alongside the business services, would share optical fibres in the spine among multiple users.

47 Ofcom acknowledges the importance of such economies of scale and scope to network deployment in its decision to remove usage restrictions on DPA (or PIA) in the PIMR 2019. For example, Ofcom notes that "*[u]sage restrictions would undermine the effectiveness of PIA. Limiting technological flexibility and/or limiting the scope of the PIA remedy is likely to materially increase the risk that a telecoms provider takes the view that it is not viable to invest in the first place. For example, a fibre network is costly to build, but once deployed has almost limitless capacity. The commercial business case for the initial investment therefore typically relies on using this capacity to generate as many different revenue streams as possible, through a wide range of different services. Information received from stakeholders as part of the 2018 WLA market review and in response to the 2018 PIMR Consultation supports this and suggests that any usage restrictions reduce the viability of their business cases, limiting the extent that investments could be justified.*" See paragraph 5.32 of the PIMR 2019 Draft Statement.

48 Such risks are in addition to those created by DPA-based arbitrage.

49 The effect of DFA on the fibre (i.e. FTTP) investment case is likely to be greater if the planned deployment provides dark fibre closer to the businesses since this would increase the potential for arbitrage.

46 This analysis highlights that the threat to investment incentives from DFA risks undermining the deployment of fibre networks to serve both business and residential consumers in non-competitive areas. This would not be in the interest of consumers in these areas, nor would it allow CPs to enjoy the potential benefits of DFA identified by Ofcom, since these are only possible if Openreach invests in the fibre networks upon which DFA depends.

Arbitrage also risks undermining fibre deployments by other CPs

47 Ofcom proposes to only introduce DFA in those areas that, based on its forward-looking assessment of market conditions, it considers sufficiently likely to be non-competitive over the five-year review period. This is to ensure that the use of DPA to deploy competing fibre networks is not undermined by DFA in prospectively competitive areas.[50,51] However, there remains a risk that DFA could undermine fibre deployment by CPs other than just Openreach.

48 There is inherent uncertainty about the boundaries between the non-competitive areas and the potentially competitive areas:

- **Geographic market definition is complex**. The boundaries of the 'non-competitive' area will be based on a geographic market definition exercise that will be undertaken by Ofcom. Such an assessment is complex and will involve Ofcom making important methodological decisions, including how to reflect the existence of network infrastructure currently only used to provide business connectivity services,[52] or the likely impact of unrestricted DPA. It will not involve identifying contiguous blocks of distinct and homogeneous areas for each of the area types identified by Ofcom (see Figure 1). Rather, the different types of geographic area will be fragmented, and there is likely to be a degree of heterogeneity within each.

- **Complexity is compounded by the dynamic nature of the market.** Furthermore, the categorisation of different areas is unlikely to be static. Changes in demand (and the underlying consumer needs and preferences) and the costs of provision mean that boundaries can change over time, and potentially rapidly so. Accurately predicting these changes over time, but particularly over the five-year 2021 Review period,[53] is difficult.

49 Ofcom's boundaries for the 'non-competitive' areas (and therefore the scope of DFA) will, therefore, be subject to risks of error.[54] If Ofcom inappropriately introduces DFA in areas that are

50 See the Consultation, paragraph 2.26.

51 DFA risks undermining DPA due to arbitrage risks that arise from both the different structure of charges and the different risk and cashflow implications for CPs of the two remedies.

52 We understand that Ofcom currently intends to take the presence of network infrastructure not used for broadband services (e.g. network infrastructure owned by CPs that only provide business connectivity services) in determining remedies, not in its market analysis, for the 2021 Review. This implies that 'non-competitive' areas could, in fact, have existing fibre deployments from at least one CP. The presence of such infrastructure, alongside the introduction of unrestricted DPA, could result in greater availability of commercially available dark fibre in such areas.

53 Considering, for example, the various other regulatory and policy changes likely to be adopted by Ofcom and the Government over this period.

54 This is even in the case where Ofcom adopts an appropriate methodology for establishing geographic market boundaries. As we set out in our January 2019 report for British Telecommunications plc, *The competitive impact of duct and pole access on the BCMR 2019*, the approach Ofcom proposed to adopt in its most recent geographic market definition exercise was not appropriate in our view. Adopting inappropriate market definition approaches will only heighten such risks of error.

in fact prospectively competitive, due to an incorrect market analysis or changing market conditions, it also risks undermining the incentives of rivals deploying their own fibre networks in such areas. This would result in Ofcom's 'non-competitive' designation in such areas becoming a self-fulfilling prophecy and would deprive consumers of the benefits of deeper network competition.

50 Furthermore, there is a risk that regulated DFA could undermine CP incentives to invest in fibre more broadly (i.e. its effect could be felt in Areas 1 and 2 in Figure 1). Regulated DFA would, for the reasons set out above, limit the ability of fibre infrastructure owners to adopt pricing structures in Areas 3a and 3b that differentiate cost recovery between services. The analysis presented by Ofcom in its December 2018 geographic market definition consultation[55] suggests that the 'non-competitive' areas are likely to cover much of the UK landmass. Therefore, the availability of regulated DFA across such a large part of the country could create a set of pricing benchmarks that customers in the competitive and prospectively competitive areas (i.e. Areas 1 and 2) could look to achieve or better. If this is the case, it could result in the effects of DFA on cost recovery in Areas 3a and 3b transmitting into Areas 1 and 2, with the resulting implications for cost recovery and incentives to invest.

A static approach to setting 'cost-based' DFA charges will exacerbate these risks

51 Under the current regulatory accounting framework, asset utilisation plays an important role in determining the uniform average unit cost per fibre strand for Openreach. We understand that the costs for assets such as duct and fibre optic cable which, as set out above, are fixed and common between the various fibre strands within the cable are typically only allocated to lit fibre strands. Therefore, as the utilisation of fibre assets declines, the average fibre cable costs per fibre strand will increase.

52 If CPs exploit multiple-circuit and multiple-service arbitrage opportunities this would be expected to progressively reduce the utilisation of Openreach's fibre assets (due to substitution from active service using multiple fibre strands to single fibre DFA). We would expect this fall in fibre asset utilisation to continue until the utilisation reached a new steady state, perhaps when the arbitrage opportunities were exhausted and/or when new demand for fibre increases.

53 If average unit fibre costs are calculated using fibre asset utilisation from previous periods, and if the asset utilisation is falling, this would lead to average unit costs being too low. This is because the average unit costs would be based on the higher utilisation from previous periods. Unless 'cost-based' dark fibre charges are adjusted to reflect how actual fibre utilisation will respond over time to dark fibre uptake, reduced asset utilisation will tend to reduce the recovery of Openreach's FCCs from fibre sales.[56]

54 We understand that Ofcom's approach to setting DFA charges in the BCMR 2019 does not take such considerations into account. Therefore, if a similar approach were to be adopted to set DFA charges under the 2021 Review, it would further contribute to undermining Openreach's opportunity to recover its efficiently-incurred costs.

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55 See, Ofcom, *Promoting investment and competition in fibre networks: Approach to geographic markets*, December 2018, Figure 4.10.

56 Such effects could also be compounded by the impact of DPA on Openreach fibre asset utilisation.

55 We understand that a material proportion of the FCC associated with fibre services relates to duct and pole assets. Therefore, to allow Openreach the opportunity to recover these duct and pole FCC, Ofcom could also consider adjusting the (national) regulated DPA charges. This could help maintain Openreach's cost recovery and, consequently, incentives to invest. But, it is also likely to reduce CP investment incentives[57] and, therefore, could undermine competitive investment in certain potentially competitive areas.

Reduced commercial fibre deployment will lead to greater public funding requirements

56 As we have explained, 'cost-based' DFA (in addition to DPA) is likely to reduce incentives for fibre deployment in non-competitive areas. This means that consumers in these locations are unlikely to benefit from commercial fibre services (and the putative competition benefits of dark fibre identified by Ofcom would not be realised). In effect, this would mean that these locations form part of Area 3(b) rather than Areas 3(a) in Figure 1 (in Section 2).

57 Ofcom envisages that government funding is likely to support fibre services in Area 3(b).[58] Our analysis suggests that DFA risks increasing the cost to the public purse of achieving fibre deployment by increasing the number of locations where commercial investment is not viable. Additional Government funding would effectively be a subsidy to support investment by Openreach in fibre networks that are used to provide CPs with low cost DFA.

[57] Given that DPA charges are set on a national basis, such impacts on CP incentives could be experienced beyond those areas affected by unrecovered FCC.

[58] See the Consultation, paragraph 3.21.

5. Ofcom needs to carefully balance the benefits and risks of dark fibre access

58 In this section, we explain why Ofcom needs to carefully balance the benefits and risks of dark fibre access. We also explain why, based on our initial assessment, it seems premature to impose a DFA remedy in the 2021 Review.

Ofcom should delay dark fibre access until the impact of duct and pole access is better understood

59 Ofcom's primary intervention for encouraging greater competition in rival networks upstream of dark fibre is DPA. As set out in Section 2, Ofcom has decided to implement unrestricted DPA through the PIMR 2019, which will enable CPs to use DPA without usage restrictions for the first time.

60 The changes made by Ofcom to DPA in both the WLA 2018 and PIMR 2019 have the potential to materially change the attractiveness of DPA for CPs. However, it is difficult to predict at this stage to what extent they will support competing fibre deployment across the country. Furthermore, as set out above, there will be uncertainty over the precise boundaries for the various geographic areas identified by Ofcom and how these may evolve over time.

61 Ofcom has previously argued that "*[i]mposing a dark fibre remedy in areas where network-based competition may emerge risks disincentivising investment, so we have decided to impose it only where we are confident that competitive investment is unlikely to occur*".[59] We agree with Ofcom that it needs to adopt a cautious approach when considering DFA given the risk that it will undermine fibre investment and that this could have an enduring effect.[60] Considering the risks of erroneously identifying non-competitive areas in the 2021 Review, it seems premature for Ofcom to impose a DFA remedy as part of the review. Delaying the introduction of the proposed DFA remedy until the 2026 review will allow Ofcom to develop a more reliable information base upon which to determine whether the DFA remedy is an appropriate and proportionate intervention and, if so, in what areas and form.

62 Allowing the primary elements of its fibre strategy to develop (most notably in relation to unrestricted DPA) over the 2021 Review period will allow Ofcom to better understand the extent to which CPs are likely to use DPA to make fibre investments and, therefore, to assess the boundary between the potentially-competitive areas and the non-competitive areas.

63 Delaying the introduction of the DFA remedy will not prevent the emergence of further commercial dark fibre services over the 2021 Review period. Such commercial services could, for example, be based on DPA services provided by aggregators pooling downstream dark fibre demand. Understanding the extent to which such services are likely to emerge absent further intervention by Ofcom (particularly for the higher value services[61] that will be more attractive for DFA substitution) is an important element of determining whether the proposed DFA remedy would be an appropriate and proportionate intervention.

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59 See: Ofcom, *Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets: Volume 2*, May 2019, paragraph 10.34.

60 i.e. creating a self-fulfilling prophecy that areas considered to be non-competitive will remain non-competitive.

61 Such as high bandwidth mobile backhaul services.

64 Ofcom currently has limited information to assess the extent to which CPs investment incentives would be harmed by DFA. In five years' time Ofcom will have a better understanding of the following factors, which influence CPs investment incentives:

- **Demand factors**, such as the expected level of residential consumer uptake and willingness to pay for retail fibre services and the extent to which businesses will continue to value dedicated business connectivity services over and above mass-market broadband services.

- **Supply factors,** and the extent to which competing fibre deployment (including that based on DPA) is likely. This will depend on, for example, the effectiveness of Ofcom's changes to DPA, CPs costs of deployment using DPA, rival deployment plans and their impact on efficient network design.

65 In five years, Ofcom may also have better information about Openreach's investments in fibre deployment in the non-competitive access areas. Moreover, a better understanding of the CPs likely investments (including those based on DPA) will also provide Ofcom with a greater understanding of how Openreach asset utilisation and cost recovery may be affected by greater infrastructure competition. This information will provide Ofcom with a greater understanding of the extent to which Openreach investments may be undermined via arbitrage, allowing it to quantify the risks to Openreach's investments in the non-competitive areas. Furthermore, Ofcom will benefit from further information on future availability of commercial dark fibre propositions.

66 Delaying DFA until future market reviews would remove the related risks to undermining fibre investment, but also give an opportunity for network-based competition based on DPA to develop. Any harm to consumers from lost retail competition (and the limited related benefits associated with DFA) is likely to be short-lived,[62] but harm from lost investment and deeper network competition is likely to endure for longer.

The approach to dark fibre access needs to carefully weigh the benefits and risks

67 In our view, it is not possible for Ofcom to design a DFA remedy that allows it to simultaneously deliver the claimed benefits of dark fibre while also preventing harmful arbitrage. Therefore, should Ofcom continue to mandate DFA in the 2021 Review, the DFA remedy design needs to appropriately reflect the balance of benefits and risks. This involves: 1) encouraging DFA take-up only where it results in genuine static efficiency improvements, and 2) balancing such benefits against the risks of harm to dynamic efficiency from DFA.

68 In our view, Ofcom's current DFA proposals do not do this:

- **First, Ofcom's assessment of the potential benefits of 'cost-based' DFA is highly limited**. It cites some potential DFA benefits related to, for example, greater CP control over electronics or bandwidth upgrades.[63] Yet it does not seek to quantify the claimed benefits beyond stating (without supporting evidence) that "*additional benefits from having access to dark-fibre over leased lines only could be significant*".[64] Furthermore, we understand that such

62 Such harm may also be mitigated by greater availability of commercially agreed dark fibre agreements.

63 See the Consultation, paragraph 3.33.

64 Ibid., paragraph 3.34.

benefits were strongly contested as part of the BCMR 2016 appeal process.[65] Ofcom does not seek to address these counterarguments in the Consultation.

Importantly, any such benefits need to be assessed against a counterfactual that takes into account that: 1) greater availability of commercial dark fibre may emerge based on DPA; and 2) Openreach has already introduced new high bandwidth products and may be expected to introduce new products in future to meet CP demand.

- **Second, Ofcom does not address arbitrage risks associated with DFA**.[66] This is surprising given Ofcom's historic concerns related to such risks.[67] Ofcom needs to consider carefully the likely extent of arbitrage and the impact it would have on investment by Openreach, including how it might vary with the level of charges for DFA.

69 In our view, if Ofcom had undertaken an appropriate impact assessment of its proposals[68] it is unlikely it would support its current 'cost-based' approach.[69] It may be that Ofcom intends to undertake an impact assessment in a future consultation.[70] However, we note that Ofcom already appears minded to mandate DFA. For example, it sets out in the Consultation that "*[w]e envisage that over time dark fibre will be the primary focus of our regulation.*"[71]

70 As set out above, Ofcom has decided to mandate inter-exchange DFA as part of its BCMR 2019 remedies.[72] It set out its assessment of the benefits and risks of this remedy in the BCMR Draft Statement.[73] The inter-exchange DFA remedy is materially different in scope to the proposed remedy under the Consultation. Notwithstanding this difference we note that:

- **Ofcom recognises the risks to investment incentives from DFA.** Although it argues in the case of inter-exchange DFA, "*by limiting the scope of the remedy to exchanges where network-based competition is least likely…means that the impact on rival investment is likely to be small*".[74] The criteria Ofcom uses to assess which exchanges are sufficiently unlikely to receive competing infrastructure investment was controversial amongst stakeholders. Ofcom changed its approach between the 2018 Consultation and the 2019 Draft Statement. This demonstrates the difficult judgements required to determine the likely limits of contestability,

65 As noted above, the CAT did not need to opine on the merits of the various dark fibre arguments in the BCMR 2016 appeal given the deficiencies it identified in Ofcom's market analysis.

66 'Arbitrage' is not mentioned once in the Consultation.

67 For example, such concerns played an important role in its defence of Colt's appeal of the BCMR 2013, and the choice of an 'active-minus' charge control for DFA in BCMR 2016.

68 i.e. one that could withstand profound and rigorous scrutiny.

69 Ofcom considered in some detail using a cost-based charge control approach for its proposed BCMR 2016 DFA remedy. Ultimately, Ofcom decided to use the "active minus" approach as it "*provided the best balance of costs and benefits [and] it would reduce the potential range of negative impacts*." (See Ofcom, *BCMR 2016: Statement*, April 2016, paragraph 9.88). However, in the Consultation Ofcom does not consider the relative merits of a cost-based or retail-minus control for the 2021 Review. Rather, it merely asserts that "*We envisage that over time dark fibre will be the primary focus of our regulation. Accordingly, we propose that dark fibre be supplied at cost*" (See Ofcom, *BCMR 2016: Statement*, April 2016, paragraph 3.30).

70 In our view it is important it does so to ensure that any remedies are appropriate and proportionate.

71 See the Consultation, paragraph 3.30.

72 Despite significant concerns expressed by infrastructure owners.

73 See Section 12 of Ofcom, *Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets: Volume 2*, May 2019.

74 Ibid., paragraph 12.74.

particularly given the introduction of unrestricted DPA. Such difficulties will likely be greater for the wider DFA remedy proposed in the Consultation.

- **Ofcom accepts the potential efficiency benefits of varying cost recovery to reflect differences in demand conditions.** Specifically, Ofcom acknowledges that "*a bandwidth gradient can allow a more efficient recovery of common costs relative to a flat pricing structure. This could be the case if a greater share of fixed or common costs were recovered from products with more inelastic demand*."[75] However, Ofcom argues that the design of the current leased lines charge control does not facilitate materially lower prices or common cost recovery for lower bandwidth services and therefore "*it is not clear that BT's bandwidth gradient Is materially expanding the availability of these services*".[76] It appears that Ofcom's arguments on efficient cost recovery focus on the potential impact of single-circuit arbitrage in relation to current wholesale business connectivity services and their charging structure.[77] As we have set out above, the risks of potential inefficient single circuit arbitrage have not been removed despite the reduction over time of the bandwidth gradient in business markets; and the risks arising from the DFA remedy proposed in the Consultation are broader. Furthermore, Ofcom's analysis of business connectivity markets is highly static and does not consider that the efficient structure of charges may change over time (as, for example, consumer demand and preferences change) such that a greater bandwidth gradient may become more desirable. The investment incentives for Openreach and CPs will be undermined if they are not able to efficiently reflect such changes in demand conditions in their future charges.

- **Ofcom accepts that dark fibre could result in stranded assets which could harm investment incentives** if such stranded assets "*are not appropriately taken into account in setting the price for BT's other services*".[78] However, Ofcom considers the risks of inter-exchange connectivity assets becoming stranded is low. It argues that the additional incentive to aggregate on these routes are small. In our view, the increase in both the ability and incentive to aggregate under the wider DFA remedy proposed under the Consultation is likely to be material and greater than for inter-exchange connectivity. This is particularly the case as CPs use it to deploy multi-service networks. Furthermore, for the reasons set out above, we do not consider the static approach to setting DFA access charges that Ofcom has adopted in the BCMR 2019 would adequately reflect the likely impact on Openreach's cost recovery arising from the proposed 2021 Review DFA remedy.

71 In principle, Ofcom could design a DFA remedy for the 2021 Review that strikes a more appropriate balance. The scope for arbitrage, and its impact on Openreach's cost recovery, will depend on the level of DFA charges. For the reasons set out above, 'cost-based' DFA would be particularly problematic. However, setting a higher dark fibre charge could, in principle, help limit profitable arbitrage opportunities and, therefore, reduce the risks of a DFA remedy.

72 However, setting such a charge is difficult in practice. For example, in the BCMR 2016 Ofcom proposed to set 'active-minus' dark fibre charges to mitigate the risk that DFA would prevent

75 Ibid., paragraph 12.77.

76 Ibid., paragraph 12.79.

77 Ofcom also explains why it does not consider arbitrage based on the different charging structure for EBD and inter-exchange DFA to be a material concern (see paragraphs 12.105 to 12.109). However, as set out in footnote 32 above, we have assumed for the purposes of this report that Ofcom would design the DFA remedy for the 2021 Review to avoid such concerns.

78 Ofcom, *Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets: Volume 2*, May 2019, paragraph 12.98.

efficient cost recovery by Openreach (i.e. the charge for a dark fibre circuit would be equal to the 1Gbit/s EAD charge minus the cost of the electronics). This approach was predicated on Ofcom's view that 'active-minus' charges would be higher than those set on a 'cost-based' methodology.

73 Active-minus charges based on the 1Gbit/s EAD service would eliminate only one specific form of single-circuit arbitrage - the ability to arbitrage on a per-circuit basis between a 1Gbit/s EAD service and DFA. There would remain other arbitrage possibilities. Arbitrage for higher-bandwidth active circuits (such as EAD 10Gbit/s and OSA products) would remain attractive unless Openreach's charge for those active circuits fell to no more than the DFA charge plus the additional costs of the active components. There would also remain an incentive to engage in multiple-circuit and multiple-service arbitrage. However, the opportunities to engage in such arbitrage strategies would be reduced with higher dark fibre charges.[79]

74 In the Consultation, Ofcom introduces the idea of implementing a Regulated Asset Base ('RAB') approach in non-competitive areas. Ofcom's RAB proposals are at an early stage and, therefore, are not detailed. However, it may be possible to design a RAB framework in such a way that Openreach's incentives to deploy fibre in non-competitive areas are maintained, even in the face of arbitrage. For example, this might involve a mechanism to ensure that the efficiently incurred costs of fibre services that cannot be recovered because of DFA are included in the RAB. However, the scope of any RAB, and how it will work in practice, are complex issues which will require careful design. Such issues are beyond the scope of this report.

75 Given the practical difficulties with setting DFA charges that strike the right balance, there are significant risks that any implementable solution would still fail to adequately reflect the risks to fibre deployment from DFA. In our view, this reinforces the need for Ofcom to reconsider mandating DFA in the 2021 Review.

[79] For example, the option to aggregate two or three active services provided to businesses in the same industrial estate may not be attractive if there was a higher DFA access charge. However, if there were (say) five or six active services that could be aggregated using a DFA-based deployment strategy, a CP may still be able to engage in arbitrage.

6. Conclusions

76 Ofcom's proposed introduction of a DFA remedy in the 2021 Review is a significant regulatory change that will give CPs access to a low cost and flexible alternative to Openreach's wholesale active services. We have discussed how:

- 'Cost-based' DFA will give CPs scope to engage in multiple forms of arbitrage by switching from Openreach's active products to dark fibre.
- This is likely to undermine Openreach's ability to recover its efficiently-incurred costs on existing and new fibre assets by limiting the scope for differing FCC recovery across bandwidths, services, and through CPs aggregating multiple active circuits over fewer fibres.
- Openreach will rationally expect that DFA-enabled arbitrage will reduce the expected return on prospective fibre investments, chilling its incentive to invest in non-competitive areas.
- Setting a higher dark fibre charge could mitigate, but not eliminate, the scope for arbitrage and the chilling effect on investment.

77 This analysis highlights that DFA risks undermining the deployment of fibre networks to serve business and residential consumers in non-competitive areas. This would undermine Ofcom's wider objective to ensure the availability of fibre services for businesses and consumers in non-competitive areas by reducing the viability of commercial investment to some locations. As a result, higher levels of government funding may be required to ensure that consumers in these areas benefit from fibre services.

78 Any adverse effect on the availability of fibre services would not be in the interest of consumers or taxpayers, nor would it allow CPs to enjoy the potential benefits of dark fibre identified by Ofcom, since these are only possible if Openreach invests in fibre networks.

79 It is therefore important that Ofcom undertakes and consults on a rigorous assessment of the impact of its DFA proposals. Such an approach should properly consider the nature and likely extent of the purported benefits of DFA, alongside the harm to the incentives to invest in fibre that DFA-induced arbitrage will create, taking fully into account the issues raised in Section 5 above. Particularly in light of the considerable uncertainty over key aspects of such an assessment, in our view it would be more appropriate to delay the introduction of DFA in the 2021 Review.

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