frontier economics

OFCOM'S PROPOSED APPROACH TO REMEDIES

Review of Ofcom's proposals

June 2019

CONTENTS

EXECUTIVE SUMMARY

Sky asked Frontier Economics to review critically Ofcom's consultation on how it proposes to regulate wholesale inputs (MPF+GEA) to superfast broadband (SFBB) services in potentially competitive and non-competitive areas. In summary, Ofcom proposes to allow BT/Openreach to set MPF/GEA prices above cost over the next five-year charge control period in order to incentivise FTTP investment. Ofcom's proposal is based on the apparent assumption that there is a simple positive and causal relationship between wholesale prices and FTTP investment.

The proposals create a risk of significant additional costs to consumers in potentially competitive areas (which we estimate to be in the order of £0.95bn-£1.42bn), over and above the revenue that is necessary for BT/Openreach to recover its costs for the provision of these services. However we find that network competition from Virgin Media and other altnets is likely to be by far the most important driver of FTTP investment in such areas and this competition is unlikely to be affected by higher wholesale charges. In non-competitive areas, Ofcom proposes to adopt cost-oriented charges for MPF/GEA in order to incentivise BT/Openreach to invest in FTTP by reducing its incentive to sweat its legacy assets. Ofcom proposes to further incentivise FTTP roll-out by providing BT/Openreach with additional returns in these areas if FTTP roll-out targets are met. We find that this approach could have merits but further information and analysis is required to offer a definitive view.

In its recent consultation, "Initial proposals – approach to remedies"[1], Ofcom proposes to soften charge controls in potentially competitive areas by moving away from a cost-based approach for MPF and BT's fibre-to-the-cabinet (FTTC) based 40/10 Mbps VULA service to an inflation adjusted price cap from March 2021[2]. In non-competitive areas, Ofcom proposes that regulation should be based on a Regulatory Asset Base (RAB) approach which reflects the costs of rolling-out fibre in these areas; and that both copper/FTTC-based and FTTP subscribers will contribute to the recovery of roll-out costs, if BT/Openreach meets pre-agreed/approved FTTP roll-out targets.

Sky has asked Frontier Economics to review critically Ofcom's proposals. This report provides this assessment.

The relationship between copper access charges and investment in FTTP is complex

Ofcom's proposals, especially in potentially competitive areas, seem to be based on a hypothesis that there is a positive and causal relationship between the level of wholesale copper access prices and investment in FTTP - higher wholesale prices will drive higher SFBB retail prices which will in turn support higher retail

1 Ofcom (2019), Promoting competition and investment in fibre networks, Initial proposals – Approach to remedies.

2 We refer throughout this report to Ofcom's proposals leading to 'higher prices' compared to a counterfactual where MPF+GEA charges are cost-based, as such costs would be expected to continue to fall. As Ofcom is proposing to adjust these charges for inflation, nominal prices in potentially competitive areas would also increase.

FTTP prices (and margins) and thereby strengthen the business case for full fibre investment.

In practice, however, the relationship is more complex. We find that where there is a prospect for more infrastructure competition, the competitive pressure on BT/Openreach to invest in fibre to defend its profits is likely to be the main factor driving its incentives to invest in FTTP. Furthermore, higher wholesale copper access prices will increase BT/Openreach's returns on its legacy copper assets, dampening its incentives to invest in FTTP. In addition, although in principle higher copper access charges could provide a stronger incentive for access seekers to invest in FTTP by depressing the returns on legacy copper services, this needs to be set against the risk of a loss of scale and market share for those access seekers (which can weaken altnet FTTP investment cases). Finally, even setting aside the potential negative impact of market share erosion, higher copper access prices may well have only a marginally positive impact on the fibre investment case for an access seeker/ altnet.

In the parts of the non-competitive areas where the cost of deployment is very high, increasing the level of wholesale copper access prices is likely to have a negligible (if any) impact on the commercial business case for FTTP investment. In such areas, FTTP roll-out would need to be supported by a public subsidy to reflect the wider social benefits (externalities) associated with 'near universal' roll-out of FTTP.

Assessment of proposals in potentially competitive areas

Ofcom's proposals in the potentially competitive areas entail a risk of significant cost for consumers

Any potential positive impacts of higher wholesale prices on investment must be weighed against the loss in consumer welfare that would result from the likely increase in retail charges (relative to a counterfactual where wholesale prices for standard broadband (SBB) and SFBB services are based on their underlying costs).

We have analysed this by quantifying the static effects of Ofcom's proposals. We estimate that the possible consumer welfare losses in potentially competitive areas between 2020/21 and 2025/26 range from £0.95bn-£1.42bn (under a plausible assumption that BT's actual costs will fall by 20%-30% over that period).

It is not clear that Ofcom's proposals are required to incentivise FTTP investment

Competition from cable and altnets will be the main driver of BT's fibre roll-out in potentially competitive areas

An important objective of Ofcom's proposals is to support the scale and speed of FTTP roll-out in potentially competitive areas. Within such areas however, the main driver of the speed and scale of FTTP investment is likely to be competition from

other network operators (especially from Virgin Media) rather than the level of wholesale charges for legacy services. Virgin Media is present in c.45% of the UK and is set to expand its coverage up to c.60% through its Project Lightning programme. Virgin Media also recently started offering 500 Mbps broadband services over its cable network – already well in excess of the speeds that BT/Openreach is able to offer over FTTC – and it also plans to launch DOCSIS 3.1-based services which will enable it to deliver gigabit speeds. As demand for higher bandwidth services increases, BT/Openreach will face pressure to upgrade its network in order to defend its market share. To illustrate this, we have modelled the incremental investment case for BT/Openreach to deploy fibre in a competitive pressure scenario where BT's market share would erode otherwise. We find that the incremental return from investing in fibre, relative to a counterfactual where BT/Openreach does nothing, corresponds to an internal rate of return (IRR) of 14% This suggests that BT/Openreach's decision to defend against new network roll-out or speed upgrades is likely to play a major role in driving its investment case in potentially competitive areas.

Higher MPF/GEA charges will increase BT/Openreach's returns from legacy services and undermine its incentives to invest in FTTP

Setting a price cap for MPF+GEA 40/10 services that is above cost will also increase BT's returns on both its wholesale and retail SFBB services. This will strengthen its incentives to sweat its copper assets rather than replace them with fibre in parts of the potentially competitive areas where it will take longer for Virgin Media or another altnet to roll-out FTTP.

Ultrafast broadband retail prices will not fully reflect the increase in the MPF/GEA prices, undermining the impact of higher anchor prices on investment

Previous modelling that we conducted for the 2018 WLA market review indicated that wholesale MPF/GEA prices will not be completely passed through to SFBB retail prices. This will dampen the potential impact of higher MPF/GEA on fibre returns. Furthermore, as new applications and services that require ultrafast broadband (UFBB) speeds become available, substitutability between higher and lower broadband bandwidths will likely decline and this will reduce the extent to which increases in retail SFBB prices are reflected in UFBB prices.

Increased MPF/GEA charges could have a modest impact on access seekers' and altnets' FTTP business cases but this will be countered by a risk of erosion of access seekers' market shares

In addition to promoting the speed and scope of FTTP roll-out in potentially competitive areas, Ofcom's proposals are also intended to promote altnet entry and roll-out and support an increase in the *number* of network-based competitors. We analysed the impact that increasing MPF/GEA prices above the cost-oriented level will have on the profitability of FTTP investment by using a financial model that Sky has developed to assess the business case for co-investment in FTTP.

We estimated the incremental return (in terms of IRR) resulting from Ofcom's proposals under the realistic assumption that, as competition emerges, wholesale and retail prices will converge towards cost-based prices over time. The results indicate that, under a differential of 20% between the cost-based cap and Ofcom's proposed approach during the charge control period, Ofcom's proposals imply that the (undiscounted) payback period falls by [✂] and the IRR increases by [✂]-[✂], depending on the degree of convergence of wholesale charges to costs after 2025/26.

As Ofcom's proposals will increase pressure on access seekers' legacy broadband product margins, there is a risk that the overall SFBB customer base of those players will erode over time – especially as migration to self-build FTTP (or altnet FTTP) will take time. This increases the risk of the self-build FTTP case and/or reduces the attractiveness of such players as anchor tenants for wholesale-only network builders.

Ofcom should assess the benefits of its proposals and less costly alternatives in potentially competitive areas

As shown above, the costs of Ofcom's proposals in potentially competitive areas could be substantial. At the same time, the benefits in terms of incentivising further, faster or more competitive FTTP roll-out are unclear. Indeed, under plausible assumptions, Ofcom's proposal could have a limited impact on the scale and speed of FTTP investment in significant parts of the potentially competitive areas where Virgin Media is present, and a marginal impact on the altnet FTTP business case. In light of this, there is a strong case for Ofcom to consider alternatives to its proposals (for instance, a nominal price freeze on MPF/GEA prices) and to conduct a cost benefit assessment, in order for its regulatory approach to achieve its stated objectives at minimum cost possible for consumers.

Assessment of proposals in non-competitive areas

Cost-based MPF/GEA charges should be the first step to incentivise FTTP investment in non-competitive areas

By definition, in non-competitive areas there is no need in principle to incentivise entry by Virgin Media or altnets as these are areas where the costs of roll-out could only justify up to a single FTTP network. In these areas, BT/Openreach would also have a stronger incentive to sweat its legacy assets. Ofcom's starting point, therefore, should be to strengthen BT's incentives to invest by setting cost-based MPF/GEA prices.

An additional mechanism that links extra returns to FTTP roll-out could incentivise further FTTP investment

Ofcom's RAB approach proposal will increase the expected revenues of BT/Openreach from investing in FTTP, compared to a counterfactual where costs are recovered only from the services that cause them. This means that prices for FTTP services will be lower and prices for copper-based services higher under Ofcom's proposal compared to the counterfactual, which should strengthen BT's

incentive to invest. As the proposed RAB approach, by increasing returns on copper-based services, re-introduces an incentive for BT/Openreach to sweat its legacy assets, it is necessary to link any additional revenues from FTTP roll-out in these areas with *actual* investment in FTTP, as recognised by Ofcom.

Ofcom's proposed additional mechanism to promote FTTP investment in non-competitive areas could be more targeted

Ofcom proposes a single RAB-based approach for the whole of the non-competitive areas despite the fact that these areas contain different geotypes, which will differ in terms of the potential business case for fibre investment:

- first, there are areas with very low premises density, where future revenues from FTTP network roll-out cannot be expected to cover the costs of a single network;
- second, there are areas where the incremental BT/Openreach profits from FTTP deployment are higher than the legacy profits, where BT/Openreach should have an incentive to roll out FTTP in principle; and
- finally, there are areas where the expected BT/Openreach revenues from FTTP network roll-out are higher than projected costs for BT/Openreach, but BT/Openreach will not have the incentive to roll-out in these areas as long as profits on legacy services are relatively higher. Here there seems to be a case for an additional intervention by Ofcom.

Based on some public evidence on costs of roll-out and our analysis, the shape of the cost curve outside the potentially competitive areas appears to be fairly flat up to c.85%-90% of premises. This indicates that the proportion of non-competitive areas that could require additional Ofcom intervention may be a fraction of the areas characterised as non-competitive by Ofcom. Overall, this seems to justify a consideration of whether Ofcom's proposals could be more targeted.

The RAB proposals appear potentially complex and cumbersome

The proposed regime hinges on Openreach providing accurate projections of its deployment plans and roll-out costs. As such it is likely to be vulnerable to gaming, since BT/Openreach will have an incentive to overestimate the costs and extent of roll-out and potentially underinvest and underspend. In addition, as Ofcom acknowledges, designing a RAB model has a number of challenges. These observations suggest that Ofcom should consider more fully whether it could meet its objectives in a simpler way. For example, one approach could be to make the hypothetical on-going network (HON) adjustment applicable in these areas payable subject to BT/Openreach achieving certain FTTP roll-out targets in these areas. Such an approach could ensure that no subscribers in these areas are required to pay more than they pay today (or in 2021) for the same services – otherwise there is a risk of Ofcom incentivising switching away from SFBB to lower speed broadband, and/or alternatives such as mobile broadband, against its overall objective of promoting FTTP migration. In our view, there is a strong case for Ofcom to consider further consultation on the approach to incentivising investment in the non-competitive areas, putting forward its assessment of a range of alternative and credible options.

1 INTRODUCTION

Ofcom has set out its broad policy direction for fixed markets in its July 2018 Strategic Policy Position. This proposed a unitary market review for all services (including those previously regulated under the wholesale local access and business connectivity market reviews). Other key proposals included:

- moving to a five-year market review period starting from 2021; and
- softening regulation in geographic areas considered potentially competitive to incentivise investment.

Ofcom's more recent consultation, "Initial proposals – approach to remedies"[3], sets out in more detail how Ofcom envisages regulating Openreach's legacy copper-based services (including FTTC) as well as its full fibre services.

Key proposals include a distinction between the approach to regulation in potentially competitive areas (covering c.70% of UK households)[4] and non-competitive areas (covering the remaining c.30%). In potentially competitive areas, Ofcom proposes to soften charge controls by moving away from a cost-based approach for MPF and BT's copper-based 40/10 Mbps VULA service to an inflation-adjusted price cap from March 2021. Ofcom hopes that this will incentivise investment in full fibre networks. The obvious outcome of this approach is that prices for MPF and 40/10 Mbps VULA would be *higher* under Ofcom's proposals than if they were set under the current approach.

In non-competitive areas, Ofcom is proposing that regulation should be based on a RAB approach which reflects the costs of rolling out fibre in these areas, with both copper-based and FTTP subscribers contributing to the recovery of these costs if BT/Openreach meets pre-agreed/approved FTTP roll-out targets.

Sky has asked us to provide economic analysis to review Ofcom's proposed approach to regulating wholesale inputs (MPF+GEA) to SFBB services. In particular, we have been asked to: (i) consider whether the proposal to set prices above their cost-oriented level will lead to net benefits to consumers by incentivising investment in fibre in potentially competitive areas; and (ii) assess the merits of the proposed RAB approach in non-competitive areas.

[3] Ofcom (2018), Promoting competition and investment in fibre networks: Initial Proposals – Approach to remedies.

[4] Ofcom indicates in the consultation document that areas where "*competitive networks are or may be built*" correspond to "*roughly two thirds of the country*" (see page 2 of the above consultation document).

2 FRAMEWORK FOR ASSESSING THE RELATIONSHIP BETWEEN WHOLESALE PRICES AND INVESTMENT

Ofcom appears to assume that there is a positive and causal relationship between the level of copper access wholesale prices and level of investment in FTTP. We start by explaining in this section that the relationship between the level of these prices and investment is complex and not necessarily positive. In Section 3, we assess the impact that Ofcom's proposals could have in incentivising FTTP investment in the potentially competitive areas. This is followed, in Section 4, by an estimation of the direct cost to consumers of allowing prices to drift higher than costs (in terms of the reduction in consumer surplus compared to a cost-based approach).

In the rest of this section we:

- describe how potential network investors will assess the business case for investing in fibre;
- set out the main drivers influencing the decision to invest; and
- describe how the level of wholesale charges may affect the business case for investment.

Section 3 applies this framework to Ofcom's proposals and provides an assessment of the potential impacts.

2.1 How investors assess the business case for investing in fibre

The decision to invest in a particular project (at a particular point in time) will typically be made alongside the consideration of a range of alternative options. In the context of investment in FTTP, these options include:

- **sweating legacy assets** - existing infrastructure owners (e.g. BT) may continue to rely on or sweat their legacy infrastructure assets (i.e. copper networks);
- **renting access to the incumbent's network** - existing access seekers (e.g. Sky and Talk Talk) or potential new entrants may choose to (continue to) rely on renting access to the incumbent's FTTP network infrastructure rather than invest in their own (directly as an investor or co-investor, or indirectly as an anchor tenant); and
- **delaying investment** - operators may have the option of delaying the investment until a later date, when demand and costs will be better understood; this is sometimes referred to as the "option value" associated with delaying an investment[5].

[5] See, for example, Pindyck and Rubenfield (1994), *Investment under uncertainty*

2.2 Factors influencing operators' decisions to invest

Following from the above, the decision to invest can be influenced via the following channels:

- **the profitability (or rate of return) of fibre investment projects** - factors that increase the potential rate of return by (i) reducing the costs of deploying fibre and/or (ii) boosting revenues will improve the business case for investment;
- **the hurdle rate** - investors will only undertake projects where the expected rate of return exceeds the relevant hurdle rate. Factors which reduce risk/uncertainty should lead to a lower hurdle rate, thereby making investment more likely; and
- **profitability of alternative options/counterfactual** - factors that make alternative options less/more profitable (including delaying investment) will increase/decrease the relative attractiveness of investment in fibre.

The table below summarises how the factors affecting the fibre business case affect investment incentives.

Figure 1 Key factors affecting the business case for fibre investment

Drivers of the business case for FTTP investment	Rate of return (RoR) and hurdle rate of fibre investment	Profitability of alternative options
Ofcom's proposals		
↑ **The level of wholesale access charges**	↑ **UFBB margins** Higher wholesale charges may drive higher retail prices and hence higher margins on UFBB ↓ **Market share erosion for access seekers** A higher charge could make it harder for access seekers to compete, resulting in a loss of market share and making the business case for FTTP investment by third parties more challenging	↑ **Access seeker FTTP investment incentives** Higher charges may make the FTTP investment case for access seekers relatively more attractive by reducing their returns from copper-based services ↓ **Openreach FTTP investment incentives** Higher returns from copper services make the case for BT/Openreach FTTP investment less attractive
Other drivers		
↑ Infrastructure competition	↓ Could reduce the potential profitability of investment due to competitive pressure from rival operators	↑ Competition from altnets reduces the value of BT/Openreach delaying investment and sweating existing assets

↑ Costs and legislative barriers	↑ High build costs/legislative barriers will reduce the potential RoR for investment	
↑ Demand for higher broadband speeds	↑ The greater the demand for higher speeds, the higher the premium paid for fibre services	↑ Demand for higher broadband speeds would make legacy products comparatively less attractive
↑ State aid	↑ State aid increases the RoR by defraying the cost of deployment in uneconomic areas	

Source: Frontier

First, as shown in Figure 1, increases in wholesale charges have an uncertain impact on the fibre investment case as they affect the incentives of access seekers and BT/Openreach in opposing ways. Second, the role that the level of wholesale charges plays in driving investment in fibre needs to be considered within the context of other factors that affect the incentives to invest in FTTP:

- where there is the prospect of infrastructure competition emerging (e.g. in low cost areas where the business case is inherently more attractive), the competitive pressure on BT/Openreach to invest in fibre to defend its market share may well be the main driver of its investment incentives;
- in areas where the cost of deployment is very high, increasing the level of wholesale charges is likely to have a limited impact on the commercial business case for FTTP investment. In such areas, where there is no commercial business case (i.e. where the expected profits from investing in fibre are not expected to cover the costs), there is a case for public subsidy to reflect wider social benefits (externalities) from near-universal roll-out of FTTP; and
- were consumers to be prepared to pay a higher premium for FTTP services, and where there is state aid, the need for higher wholesale charges to support the business case for FTTP investment is weaker.

In the following section we consider how the level of BT's regulated wholesale charges (in particular MPF+GEA rentals charges, the key wholesale inputs for SFBB services) affect the business case for investment in more detail.

2.3 The relationship between wholesale charges and investment

2.3.1 Higher SFBB wholesale charges could improve returns from fibre indirectly by increasing UFBB margins

A higher MPF/GEA price would increase the margin that a potential fibre investor could earn through the following mechanisms:

- **Cost pass-through:** as MPF and VULA are key inputs for access-based retailers such as Sky, an increase in MPF/GEA prices will result in a corresponding increase in their marginal costs. This can in turn be expected to drive an increase in SFBB retail prices for rival operators that use their own

infrastructure, such as BT/Openreach and Virgin Media, who may also respond to price increases by access seekers by raising their own prices.

- **UFBB vs SFBB substitutability:** Increases in the retail price of SFBB will indirectly result in an increase in UFBB retail prices. This is because, since SFBB and UFBB services are to a certain extent substitutable, SFBB will exert a degree of pricing pressure on UFBB services. As such, an increase in the retail price of SFBB should allow fibre operators to raise profitably UFBB prices by a certain amount.

The resulting increase in UFBB margins will lead to higher returns on investments in networks that deliver UFBB. The indirect impact on UFBB retail prices can also be expected to improve the returns on wholesaling fibre access to downstream providers, e.g. wholesale-only operators or vertically integrated operators that offer wholesale access to other retail operators.

These retail and wholesale impacts could incentivise some investments, for instance by:

- BT/Openreach, where the motivation to invest in fibre is not driven by competitive pressure; and/or
- altnets, where the incremental revenues would otherwise fall short of the level required to trigger investment, as the differential between an investment and no-investment case will be increased.

The overall impact will depend on the likely extent of the two effects outlined above. We consider each of these in more detail in the next section, where we assess the potential impacts of Ofcom's proposals.

2.3.2 Higher wholesale charges could also make access seekers' counterfactuals less attractive

An increase in the price of MPF/GEA is unlikely to be passed on in its entirety to retail customers, hence the margins of an access seeker on SFBB lines that it continues to rent from Openreach can be expected to fall as the MPF/GEA price rises. This will lower an access seeker's returns in the counterfactual where it continues to rely entirely on access to Openreach's network to deliver broadband services. This will in turn make investment in fibre by access seekers or altnets, relatively more attractive.

Whilst it is not clear that the business models of the major access seekers are consistent with investing directly in FTTP, a similar effect can be expected under an alternative model whereby an access seeker signs an anchor tenancy agreement with a third-party network builder. This is because any access seeker considering whether to sign up to such an agreement will consider it against the alternative of continuing to rent access from BT.

2.3.3 Higher wholesale charges are likely to erode access seekers' market shares

A higher wholesale charge can also be expected to reduce access seekers' market shares in the short-to-medium term due to the increased pressure on their SFBB retail margins that results from:

- wholesale charges being essentially a transfer price between BT Group's retail and infrastructure divisions, such that an increase in these charges will not affect BT's true (marginal) costs; and
- Virgin Media delivering services over its own cable infrastructure, such that its (marginal) costs will also be unaffected by changes in Openreach's wholesale charges.

An increase in the MPF/GEA price would allow BT/Openreach and Virgin Media to undercut access seekers at the retail level[6], leading to increases in their SFBB retail market share. Such a reduction in the retail SFBB market shares of access seekers would lead to a higher risk for altnets' FTTP investments, as the contestable retail market for such altnets would be lower.

2.3.4 The replacement effect will weaken BT/Openreach's incentives to invest

The level of wholesale charges has a direct, negative impact on the incentives of BT/Openreach to invest in FTTP, by making its counterfactual relatively more attractive:

- increasing wholesale charges will directly increase the margins on the legacy network; and
- this will disincentive some FTTP investments by Openreach as the differential between an investment case and the counterfactual no-investment case will narrow, due to the higher returns on the legacy network.

This has been referred to as the replacement effect.

2.3.5 Conclusion

The table below summarises, for each of these potential investors, the positive and negative effects of higher wholesale charges with respect to investment incentives.

[6] While BT/Openreach will still need to ensure the absence of a margin squeeze, the proposals imply BT/Openreach would likely have more flexibility in relation to this.

Figure 2 Impacts of higher MPF/GEA charges on incentives to invest in FTTP

Player	Positive effects	Negative effects
Existing access seekers	▪ Increase in UFBB margins ▪ High Openreach charges would make the case for self-build/co-investing more attractive	▪ Decrease in margins could result in loss of market share to BT/Openreach and/or Virgin Media
New entrants/altnets	▪ Increase in UFBB margins ▪ Higher Openreach charges may put pressure on SFBB margins, thereby encouraging access seekers to switch to alternative networks	▪ The market share impact on access seekers increases the risk of FTTP investment by altnets
Virgin Media	▪ Increase in UFBB margins	▪ To the extent that Ofcom's proposals could be expected to disproportionately increase the likelihood of entry by altnets in some areas, this could deter Virgin Media's network expansion in such areas
BT	▪ Increase in UFBB margins	▪ Higher margins on wholesale SFBB products disincentivises investment in UFBB due to replacement effect

Source: Frontier

When considering using wholesale charges as a potential policy lever to encourage fibre roll-out, it is important to consider carefully the above effects within the context of a forward looking analysis that also considers how other supply and demand-side factors affect the fibre business case. In the next chapter we review in detail Ofcom's proposals and consider their likely overall impact in the potentially competitive areas.

3 ASSESSMENT OF THE INVESTMENT EFFECT OF OFCOM'S PROPOSALS IN POTENTIALLY COMPETITIVE AREAS

3.1 Summary of Ofcom's proposals for potentially competitive areas

Ofcom has proposed to vary regulation in three different categories of geographic areas, to reflect variations in the level of competition in those areas. These areas are defined as follows:

- **competitive** - where at least two existing networks are present in addition to BT, supplying UFBB and leased lines services;
- **potentially competitive** - where non-BT/Openreach fibre networks are being built, or where there is a reasonable prospect of them being built; and
- **non-competitive** - where Ofcom thinks that non-BT/Openreach fibre networks will not be built to any material extent.

Ofcom proposes not to impose regulation in competitive areas[7]. For potentially competitive areas and non-competitive areas, it has proposed separate sets of remedies, with regulation in the former intended to reflect the potential for competitive investment and regulation in the latter focussing on BT's investment. In this chapter, we consider Ofcom's proposed approach in potentially competitive areas, focussing on its proposals relating to the price regulation of BT's copper/FTTC network.

3.2 Assessment of Ofcom's proposals for potentially competitive areas

3.2.1 Proposed remedies in potentially competitive areas

Ofcom proposes setting a charge control for MPF and GEA 40/10 such that these wholesale prices at the end of the current charge control period (March 2021) will be taken forward in inflation-adjusted terms, with pricing flexibility for higher bandwidth WLA services.

Ofcom considers that this approach strikes an "*appropriate balance between encouraging competitive network investment and protecting consumers over the period of the review.*"[8]

Ofcom's proposals can be expected to give rise to a total wholesale charge that is a substantive margin above BT's costs. This is due in particular to:

[7] The DPA remedy could be expected to continue to apply in such areas.

[8] Ofcom (2019), Promoting competition and investment in fibre networks Initial proposals – Approach to remedies, paragraph 2.18, page 14.

- **Ongoing efficiency effects** - BT/Openreach can be expected to reduce both its capex and opex associated with the provision of network services by increasing its efficiency. For the current charge control, Ofcom adopted efficiency targets of 4.8% per annum for opex and 3% for capex[9].

  To give a sense of a likely magnitude of these ongoing cost reductions, we note that Ofcom's total cost-based price cap for MPF+GEA is set to fall from £146.07 per annum to £144.75 between 2019/20 and 2020/21, which equates to a decline of 4% in real terms (taking into account Ofcom's assumed 3% inflation rate). If we were to assume similar ongoing cost reductions going forward, then this implies an overall decrease in costs of around 18% over the course of the upcoming five-year review period.
- **Hypothetical ongoing network (HON) adjustment** - MPF and GEA price caps for the current market review period have been set using a hypothetical ongoing network approach, which involves uplifting the value of depreciated assets to reflect the cost of maintaining a network on an ongoing basis. The effect of the HON is to raise the level of the price caps above BT's true costs According to Ofcom's 2018 WLA statement, the impact of the ongoing network adjustment for MPF is to increase the 2020/21 forecast charge for MPF rentals by around £8.60 per line per year, which amounts to around 6% of the total MPF+GEA charge[10] [11].

3.2.2 Assessment of the impact of Ofcom's proposals on incentives to invest in potentially competitive areas

The above indicates that Ofcom's proposed approach will give rise to a total wholesale charge for SFBB services that is substantively above Openreach's true costs. In the remaining part of this section we consider in more detail the extent to which Ofcom's proposals for potentially competitive areas could be expected to give rise to greater investment in fibre. In the subsequent section, we then weigh this against the potential loss in consumer surplus as a result of higher wholesale charges.

Competition will be the main driver of BT's fibre roll-out

Within potentially competitive areas, the level of wholesale charges for legacy services is likely to be of relatively limited importance for BT's fibre investment case. Given its position as the incumbent, with a large established customer base, BT/Openreach has significant defensive value to protect in areas where it faces actual/potential network competition. In such areas, the main driver for investing in fibre for BT/Openreach is likely to be competition from alternative ultrafast-capable networks – in particular Virgin Media, who is present in c.45% of the country and

[9] Ofcom 2017 WLA statement volume 2 paras 4.36 – 4.37, page 63 https://www.ofcom.org.uk/__data/assets/pdf_file/0023/112487/wla-statement-vol-2.pdf.

[10] Ofcom (2018), WLA Market Review Statement, Annex 12, para. A12.89, page 68.

[11] For GEA, Ofcom estimated BT's costs-based on a bottom-up model of the costs of an ongoing FTTC overlay network. It is not clear if the HON approach used for MPF may also affect the GEA cost estimates.

is set to expand its coverage to up to c.60% through its Project Lightning programme[12].

Virgin Media also recently started offering 500 Mbps services over its cable network – already well in excess of the speeds that BT/Openreach is able to offer over FTTC. The deployment of DOCSIS 3.1 technology will enable it to deliver gigabit speeds. As such, as demand for higher bandwidth services increases, BT/Openreach will face pressure to upgrade its network in order to defend its market share.

To illustrate this point, we have modelled the incremental investment case for BT/Openreach to deploy fibre relative to the counterfactual in which it continues to rely on its copper network. To demonstrate the importance of the defensive effect for BT/Openreach's investment incentives, we compare two separate scenarios for the counterfactual against which BT/Openreach assesses the case for fibre investment:

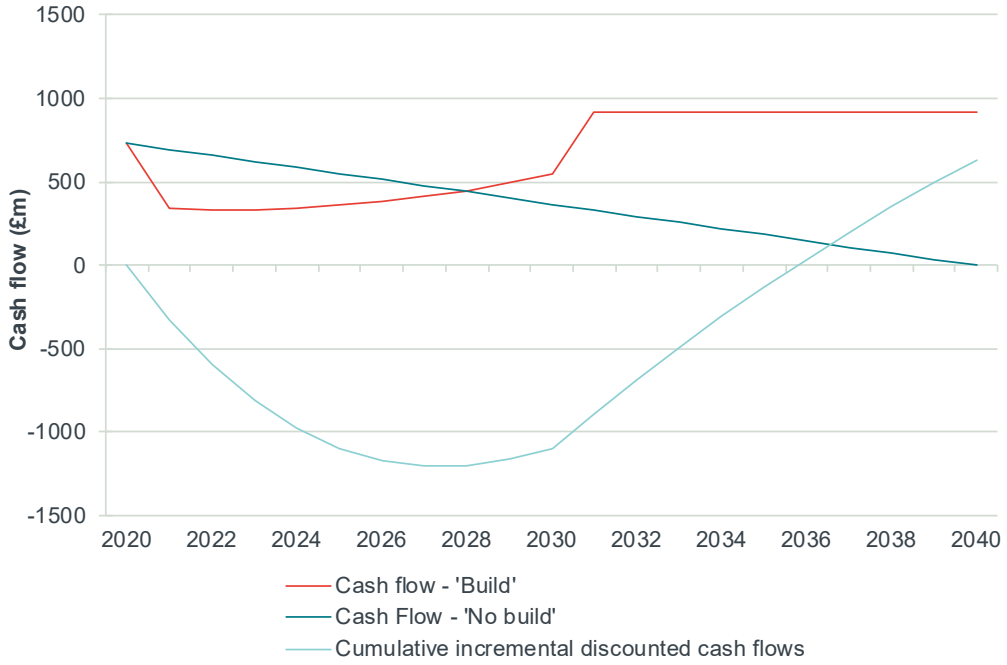
- **Competitive pressure** - in this scenario BT/Openreach's market share erodes over time due to competitive pressure from an alternative network that is able to offer ultrafast/ gigabit speeds (e.g. Virgin Media) – this provides the 'no build' cash flow projection. If BT/Openreach invests in FTTP, it can sustain its market share – which provides the 'build' cash flow projection. We assume that, absent BT/Openreach investment, subscribers on Openreach's network gradually switch over to Virgin Media's network and BT/Openreach's market share falls to zero by 2040. If BT/Openreach builds, we assume it rolls out fibre at a rate of 1m homes per year. This allows it to continue to compete effectively with Virgin Media as it upgrades the cable network and sustain its market share over the period. In practice, by investing, BT/Openreach could actually grow its market share vis-a-vis Virgin Media – this could provide an additional incentive (and return) for BT/Openreach to invest in potentially competitive areas – our estimates are conservative, as they do not reflect such an effect; and
- **No competitive pressure** - in this scenario BT/Openreach does not face any market share erosion, regardless of whether it invests in fibre, due to a lack of competitive pressure from an alternative network, including cable.

For each of the above scenarios we model the net impact on BT's cash flows over a 20-year period of investing in fibre. Figure 3 below compares how cash flows evolve in the competitive pressure scenario if BT/Openreach builds out fibre compared to the situation where it does not build. As Figure 3 shows the build cash flow trails the no build cash flow, due to the high upfront capex associated with rolling out fibre. However, the build cash flows exceed the no build from 2028 onwards, driven by the steady decline in market share under the no build scenario. Under these assumptions, we find that the incremental return from investing in fibre (relative to a counterfactual in which BT/Openreach does nothing, and hence loses market share) corresponds to an IRR of 14%[13].

[12] https://www.ispreview.co.uk/index.php/2019/05/virgin-media-grow-uk-network-by-107k-premises-adds-more-fttp.html "*The original aim of Project Lightning was to cover 4 million additional premises (17 million total or c.60%+ of the UK) by the end of 2020, although c.2.1 million+ now seems to be a safer bet for the end of 2019 and possibly 3 million+ at a later date.*"

[13] As a sensitivity, we considered a faster competitive pressure' scenario in which, absent investment, BT's share falls more rapidly initially, reaching 10% by 2030, and is held fixed thereafter This results in a higher return incremental return from investment, of 18%.

Figure 3 Illustrative modelling of BT's incremental cash flows from investing in fibre in Virgin Media areas



Source: Frontier

By contrast, the same analysis under the no competitive pressure scenario indicates that the net impact of investment would be an IRR of -3%. This illustrates the strong positive role that the defensive effect can be expected to play in driving Openreach's investment case in competitive areas.

Cable has also been identified as a key driver of investment in NGA infrastructure by incumbents across the EU – a 2016 BEREC report on NGA investment noted that:

> *"The strategic focus of incumbents in many MS on NGA rollout in areas where cable is already present has shown that incumbents deploy their NGA networks (VDSL, FTTP) in direct response to competition from the rollout of DOCSIS enabled broadband on cable networks."* [14]

Further, within the context of its assessment of whether BT/Openreach had a "fair bet" on its investment in FTTC, Ofcom noted that, at the time of its decision to roll-out SFBB, BT/Openreach was concerned that if it did not invest in fibre, it could lose market share to Virgin Media, which was deploying DOCSIS 3.0 across its network at the time [15].

Competition from Virgin Media could be expected to drive fibre investment by BT/Openreach in a significant part of the country (corresponding to Virgin Media's and altnets' footprints), which is likely to overlap largely with what Ofcom considers to be potentially competitive areas.

[14] BEREC (2016), Challenges and drivers of NGA rollout and infrastructure competition, pages 12 – 13.

[15] Ofcom 2018 WLA Market Review Statement, Annex 6, para A6.173, page 156.

In addition to the level of FTTP investment, competition from Virgin Media will also likely affect the speed of roll-out of FTTP by BT/Openreach in potentially competitive areas. This is because current network speed upgrades and the upgrade to DOCSIS 3.1 in the existing Virgin Media cable footprint can be undertaken relatively quickly, increasing the risk of BT/Openreach losing market share to Virgin Media in these areas unless it rolls out FTTP.

Higher MPF/GEA charges will increase BT/Openreach's returns from legacy services, undermining its incentives to invest in FTTP

Setting a price cap for MPF+GEA 40/10 that is above cost will increase BT's returns on both its retail and wholesale SFBB services, thereby strengthening its incentives to sweat its copper assets rather than replace them with fibre. The further away that regulated charges for these services are from their costs, the stronger this replacement effect will be.

The replacement effect is most relevant for parts of the potentially competitive areas where there may be more limited or later roll-out of FTTP by alternative providers. In parts of the country where (the prospect of) infrastructure competition is more intense, this effect, although still present, is likely be less important, since, as explained above, the need to invest in order to defend market share will dominate.

UFBB retail prices will fall short of any increase in MPF/GEA prices, undermining the impact of higher MPF/GEA charges on FTTP investment incentives for BT/Openreach and altnets

Access seekers will absorb a portion of any increase in wholesale charges

As noted in Section 2, the rate of cost pass-through from wholesale to retail prices[16] depends on:

- **The nature of the competition between the operators** - with linear demand and constant marginal costs, a monopolist is expected to pass-through 50% of cost increases. With perfect competition, if all firms face a marginal cost increase, then there should be 100% pass-through. In general, the degree of pass-through will depend on the nature of competition between the operators.
- **The number of operators that experience the marginal cost increase** - the more operators that experience an increase in marginal costs, the greater the rate of cost pass-through. For example, if there is only one operator that faces an increase in its marginal cost, then it is under greater pressure to absorb the cost increase to avoid losing sales to rivals. This may also limit rivals' incentives to respond to any retail price increases by this operator with increased marginal costs. In the context of SFBB services, it is only external (to BT) operators that rely on access to BT's network that will face an increase in marginal costs, which in turn means that the rate of pass-through will be lower than if all operators had faced the same cost increase.

[16] This is based on a differentiated Bertrand model of competition, in which operators compete on price and face downwards sloping demand curves, with the slope reflecting the degree of differentiation in the market.

Previous modelling that we conducted in the context of the 2018 WLA market review[17], to assess the potential benefits from Ofcom setting a cost-oriented price cap on VULA, indicated that the percentage pass-through falls as the differential between the VULA price and the cost-oriented level increases (reducing from around 85% to 65% as the differential rises from 10% to 50%).

Figure 4 Estimated pass-through of VULA price increases to Sky's SFBB retail prices

% VULA price above cost	10%	20%	30%	40%	50%
% pass through to Sky's retail SFBB prices	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Frontier

Thus, access seekers can be expected to absorb a substantial portion of any increase in wholesale charges, dampening the potential impact on fibre returns.

In relation to the impact of higher MPF/GEA prices on the investment incentives of altnets, the lower the degree of pass-through of any MPF/GEA price increase, the lower the margin made by access seekers on the copper-based products. This would in turn provide a stronger incentive in principle for access seekers to invest/commit to altnet investment in FTTP. We consider the materiality of this effect when we assess quantitatively the impact of higher MPF/GEA charges on the investment incentives of access seekers/altnets.

The link between SFBB prices and UFBB prices can be expected to weaken over time

The degree to which any increases in the SFBB price would be passed through to UFBB prices depends on the degree to which customers consider them to be close substitutes. The premium that consumers would be willing to pay for UFBB services, on top of the price of SFBB, should serve as a good indicator as to the extent of substitutability between the two product categories.

Evidence relating to consumers' willingness to pay for higher bandwidths[18] indicates that superfast customers would be willing to pay some but not a substantial premium more for access to gigabit speeds. Available data from the UK broadband market also indicates that whilst ultrafast commands a premium over superfast services, there appears to be relatively limited take-up of these services to date.

However, as new applications are developed and more consumers experience ultrafast speeds, the substitutability between higher and lower bandwidths can also be expected to decrease over time. Indeed, Ofcom noted in its 2018 WLA statement that:

> *"While we expect the charge control for 'up to 40 Mbit/s' VULA to constrain the prices of other speed variants and full-fibre*

[17] Frontier (2016), The Impact of a Cost-based VULA Price.

[18] A recent survey-based study conducted by CRA on behalf of Sky.

network services to a reasonable degree, over time this constraint will weaken." [19]

Further, within the context of its 2017 WLA consultation, Ofcom noted that BT's differential between SBB and SFBB pricing had been increasing over time and concluded that this suggests that SBB has become a weaker substitute for SFBB[20].

The expected decline in substitutability between higher and lower bandwidths, and the fact that the roll-out of any new fibre network will take several years to complete[21], will further weaken the expected impact of MPF/GEA prices on UFBB margins and on the fibre investment case.

It is also possible that Ofcom considers that the positive impact on UFBB margins could increase the pace of roll-out in certain areas (in addition to increasing the scope for roll-out). However, demand/cost uncertainty as well as operational constraints[22] (in the form of a maximum feasible rate of building out FTTP given building regulations, availability of labour, etc), which are unaffected by changes in wholesale prices, may well be more important factors in determining the pace of roll-out.

Higher MPF/GEA prices will put increased pressure on access seekers' margins leading to increased risk of erosion of their market shares

Uncertainty around the extent to which consumers are currently willing to pay a premium for ultrafast services, together with the significant upfront deployment costs associated with network roll-out, mean that achieving sufficient scale is important to the business case for fibre. Indeed, Ofcom has noted that where investments involve a step change in quality: "*This can lead to significant uncertainty on network deployment costs, consumer demand, and the prices that consumers will pay*."[23] At the same time, competition from established infrastructure players - BT/Openreach and Virgin Media - exacerbates the demand risk for new entrants, including access seekers building out their own networks. Having a pre-existing customer base that can be migrated across to a new network can be an important enabler of investment in fibre – in particular, for altnets that rely on wholesale revenues from access seekers.

The migration of its existing customer base is the primary driver of returns [✂]. Similarly, wholesale-only network builders have often sought to strike agreements

---

19 Ofcom (2018), WLA Market Review Statement – Volume 1, para. 1.38, page 10.

20 Ofcom (2017), WLA Market Review Consultation – Volume 1, page 37.

21 Supply-side factors, such as labour market constraints and planning restrictions, will likely constrain the rate of roll-out in the UK. A report by PRISM, on the cost of deploying FTTP in the UK, estimated that it would take 12 years to cover the whole of the UK with fibre, based on international comparisons and on typical deployment rates when the industry has made the necessary investments to move forward. This implies an average roll-out pace of around 2.5 million premises per year (see: https://www.nic.org.uk/wp-content/uploads/Cost-analysis.pdf). As of April 2019, BT's roll-out rate for its fibre network was around 20,000 per week or 1m per year (see: https://www.ispreview.co.uk/index.php/2019/04/openreach-making-strong-progress-on-fttp-for-new-build-homes.html).

22 Ofcom's 2017 WLA cost model (*WLA Volumes Module NON CONFIDENTIAL.xls*) projects that there will be around 29m UK households in total in 2020/21 (https://www.ofcom.org.uk/__data/assets/file/0025/112489/wla-cost-models.zip). Assuming that potentially competitive areas correspond to around 70% of the country, this implies around 20m households. At a rate of FTTP roll-out of 2.5 million premises per year, it would take c.8 years for FTTP roll-out to cover the premises in these areas.

23 Ofcom 2016, Initial conclusions from the DCR, page 42.

with established retail operators as “anchor tenants”, prior to roll-out – one recent example in the UK is the partnership between Vodafone and CityFibre.

Further, BEREC has noted that *“alternative operators investing in an own fibre access network were often those which gained considerable economic size, based on (LLU) access to the legacy network and had obtained a significant LLU presence (e.g. Free and Numericable-SFR in FR, Vodafone and Optimus in PT or Jazztel in ES).”*[24]

If increased pressure on access seekers’ SFBB margins due to higher wholesale charges were to have a significant negative effect on the overall SFBB customer bases of access seekers, including Sky and TalkTalk, then this will in turn reduce both the incentives to invest directly themselves or, more likely given the business models of access seekers and the costs or rolling out FTTP in the UK, as anchor tenants for another network operator.

Further, recent experience from the UK market indicates that the period of pricing flexibility that Ofcom granted to BT/Openreach for FTTC services was associated with BT/Openreach growing its retail market share. Between Q1 2011/12 and Q1 2016/17 BT retail’s share of DSL and fibre lines grew from 35% to 41% (excluding the impact of the acquisition by BT of EE in its broadband customer base)[25]. Whilst there are a number of reasons that may have contributed to this growth (e.g. BT’s entry into ownership/provision of premium content), this is also consistent with the hypothesis that a transition to a new technology where access charges are not cost-based could provide some advantage to BT/Openreach as a vertically integrated operator.

Modelling of the fibre investment case corroborates the limited role of GEA/MPF charges in incentivising new entrant FTTP investment in potentially competitive areas

In addition to promoting the speed and scope of FTTP roll-out in potentially competitive areas, Ofcom’s proposals are also intended to promote altnet entry/roll-out to support an increase in the *number* of network-based competitors in such areas. To help assess the extent to which the level of MPF/GEA prices affects the fibre business case for an access seeker (and by extension an alternative network that relies on access seekers’ business), we have analysed the impact that increasing MPF/GEA prices above the cost-oriented level would have on the profitability of FTTP investment, using a financial model that Sky has developed to assess the business case for FTTP build.

The business case is based on a co-investment model in which Sky rolls out fibre to [✂] premises in lower cost areas in a joint venture partnership (InfraCo, in which Sky has a shareholding) with another established access seeker. In addition, InfraCo provides wholesale access to a smaller third-party operator. The model assesses the profitability of the fibre co-investment project as a whole[26], by forecasting the incremental cash flows at both the retail and wholesale level,

[24] BEREC (2016), Challenges and drivers of NGA rollout and infrastructure competition, page 35.

[25] BT Q1 2012/13 Quarterly Results, KPIs; BT Q4 2017/18 Quarterly Results, KPIs.

[26] In other words, it does not model the investment case for either Sky or the JV partner individually Rather, it assesses whether the co-investment project would be profitable as a whole, taking into account the total incremental impact on the cash flows of both parties together, at both the wholesale and retail level.

relative to a counterfactual in which Sky and its joint venture partner continue to rely on wholesale access to Openreach's network.

The key drivers for the case for investing are:

- incremental revenues at the retail level, driven by growth in retail market share in the build area, together with the higher ARPUs associated with new fibre customers;
- wholesale revenues associated with selling access to a third-party operator; and
- the removal of wholesale charges previously paid to Openreach for access to its network.

Key assumptions for the base case are provided in Annex A. Some points to note are:

- [✂]; and
- [✂].

We have modelled the potential impact of Ofcom's proposed approach to regulating wholesale charges based on two scenarios:

1. **Ofcom proposals** - in line with Ofcom's consultation document, the prices of MPF and GEA 40/10 are held fixed at the 2021 price control levels, adjusting for inflation; and
2. **Cost-based pricing** - MPF and GEA 40/10 charges are set at cost which, as explained above, is expected to decline over time relative to the 2021 cap. Given the uncertainty around the likely magnitude of the differential between Ofcom's proposed pricing and BT's actual costs, we have varied the assumed cost reduction over the period 2021/22 – 2025/26 between being 10% to 50% lower than prices under the Ofcom proposals. For simplicity, BT's costs (and hence prices) are assumed to remain flat thereafter.

In modelling the impact of variations in wholesale charges, we assume that changes in MPF and GEA 40/10 charges are passed through to SFBB retail prices at a rate of 75% (which represents the mid-point of the likely potential range). Similarly, we assume that a £1 increase in retail prices of 40/10 SFBB services equates to a 0.75p increase in the prices of higher bandwidth services.

In addition to analysing how the incremental profitability of co-investment is affected by changes in wholesale charges, we consider separately how this changes if we also assume that an increase in wholesale charges is accompanied by some erosion in Sky's market share in areas where it has not yet rolled out fibre.

Our analysis indicates that plausible increases in wholesale prices will have a limited impact on the investment case of access seekers (or of alternative new entrant networks)

Figure 5 below shows the estimated payback and IRRs for the co-investment business case under the scenarios for the MPF and GEA 40/10 prices set out above.

Figure 5 Impact of Ofcom's proposed MPF/GEA price cap on IRRs of the fibre co-investment business case - no long-term price convergence

	MPF/GEA 40/10 price cap scenario					
	Ofcom proposals	Cost-based MPF/GEA 40/10 cap assuming x% (real) fall in costs between 2020/21 and 2025/26				
		-10%	-20%	-30%	-40%	-50%
Payback (years, undiscounted)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
IRR (20 years)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Delta MPF+GEA 40/10 price vs Ofcom proposals in 2025/6 (£ per annum)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Frontier

The results indicate that if we assume a differential of 20% between the cost-based cap and prices under Ofcom's proposed approach, the impact on the IRR and discounted payback period is fairly modest – under Ofcom's proposals, the IRR increases by around [✂], from [✂] to [✂], whilst the (undiscounted) payback period [✂]. As expected, the effect on the business case and the cost to consumers becomes correspondingly greater as the assumed differential increases.

These estimates assume that prices are flat in real terms from 2020/21 onwards. This means the differential between retail ARPUs and the cost oriented wholesale charges also remains fixed in real terms from 2025/26 onwards. In practice, as competition emerges, we would expect this differential to fall over time, and prices to converge more towards costs. To reflect this, we have also estimated the IRR impact of Ofcom's proposals, under the assumption that prices converge to costs by 2035/36. The table below shows the 20-year IRRs under this scenario.

Figure 6 Impact of Ofcom's proposed MPF/GEA price cap on IRRs of the fibre co-investment business case (long-term price convergence scenario)

IRRs (20 years)	x% (real) fall in costs between 2020/21 and 2025/26				
	-10%	-20%	-30%	-40%	-50%
Ofcom proposals – no convergence	[✂]	[✂]	[✂]	[✂]	[✂]
Ofcom proposals – with convergence	[✂]	[✂]	[✂]	[✂]	[✂]
Cost-based	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Frontier

Looking at the scenario where the cost-based price of MPF+GEA 40/10 is 20% below the 2020/21 level, the IRR under Ofcom's proposals falls from [✂]in the base case to [✂] (i.e. by [✂]).

Further, it is important to note that the above estimates of the IRR do not assume any loss in access seekers' market share which, as explained above, could arise from an increase in wholesale charges for SFBB. To illustrate the potential importance of this effect we have estimated the impact that such a reduction would have on the fibre co-investment returns under Ofcom's proposals. We find that a reduction in market share of 5 percentage points (in total across both Sky and its joint venture partner) would reduce the IRR by [✂] (from [✂] to [✂]).

Whilst we do not have visibility of the business case for a new entrant, alternative network, we would expect the impact on such a player's investment case to be similar. This is because:

- A new entrant wholesale network may benefit from an increase in wholesale charges (since this could in turn increase the wholesale prices that they are able to charge access seekers on their own network). However, since they would not be renting access from BT, the negative impact that an increase in wholesale charges would have on an access seeker's counterfactual would not apply here.
- Even if the new entrant was vertically integrated, it will have a much smaller retail share than established access seekers, at least in the early stages of deployment. Hence any retail benefits from higher MPF/GEA charges would be correspondingly smaller.
- Since the business case for a new entrant network would most likely rely on the wholesale volumes of an established non-BT/Openreach access seeker, it is likely to be equally negatively impacted by any loss in market share of such access seekers.

Virgin Media's upgrade and expansion programme is already underway and the level of Openreach's wholesale charges does not appear to be a significant factor in its deployment strategy

Liberty Global announced that it plans to launch gigabit speeds, based on upgrades to DOCSIS 3.1 in two UK cities, and is reported to have indicated that it

is close to having its whole footprint DOCSIS 3.1 ready[27]. Since the implementation of DOCSIS 3.1 technology will allow Virgin Media to upgrade its *existing* cable network to gigabit speeds at far lower cost than rolling out new fibre infrastructure, there is no prospect of it investing in fibre within its existing footprint for the foreseeable future.

In principle, higher wholesale charges could have a positive impact on Virgin Media's *plans for expansion*, by increasing UFBB retail prices and hence margins. Without the details of the Project Lightning business case, it is difficult to judge definitively what role Openreach's wholesale access charges play in Virgin Media's plans. However, our above finding – that the relative importance of this effect for access seekers' and new entrants' investment incentives is likely to be limited and decreasing over time – can also be expected to apply to Virgin Media's expansion. Moreover, unlike access seekers, Virgin Media does not currently rent wholesale access to Openreach's network and hence changes in wholesale charge have no direct impact on its counterfactual.

Project Lightning deployment is well under way, having been announced in 2015 (prior to the Ofcom announcement about the proposed change in regulatory approach), with a target completion date of 2020 (i.e. prior to the start of the next market review period). Further, the introduction of a cost-oriented cap does not appear to have affected Virgin Media's roll-out strategy. By the end of 2018, Virgin Media had built out to 1.6m homes[28] and its owner, Liberty Global noted in its Q1 2019 results: "*We continue to extend our reach with Project Lightning, where we are building 400,000-500,000 new premises every year*."[29]

Other dynamic effects may further dilute the impact of higher MPF/GEA charges

It is also important to consider the role of wholesale charges within the context of other dynamic effects that impact the business case for fibre. In particular:

- the likely competitive response from BT/Openreach and (where it is present) Virgin Media. This is particularly important in potentially competitive areas, across most of which Virgin Media is likely to be present and where BT/Openreach can be expected to be strongly incentivised to roll-out its own fibre network, in response to both Virgin Media and the entry (or threat of entry) by another operator. The greater the competitive threat, the lower the likely relative importance of the level of regulated wholesale charges, as new entrants will be expected to take into account the likely level of *post-entry* prices when assessing the FTTP entry business case; and
- supply-side constraints (e.g. labour constraints and planning hurdles) that limit in practice the rate at which FTTP can be deployed over time.

[27] https://www.ispreview.co.uk/index.php/2018/02/update-virgin-medias-uk-ipv6-docsis-3-1-plans.html, *Now Mike Fries has told investors that more than 90% of their networks across should be ready for DOCSIS 3.1 deployments in 2018. "*We are darn near all the way there in terms of having our entire footprint gigabit ready with 3.1,*" Fries said.*

[28] Liberty Global (2019), Q4 2018 Fixed Income Release, page 2

[29] Liberty Global (2019), Q1 2019 Results, page 2

4 CONSUMER WELFARE IMPACT OF OFCOM'S PROPOSALS IN POTENTIALLY COMPETITIVE AREAS

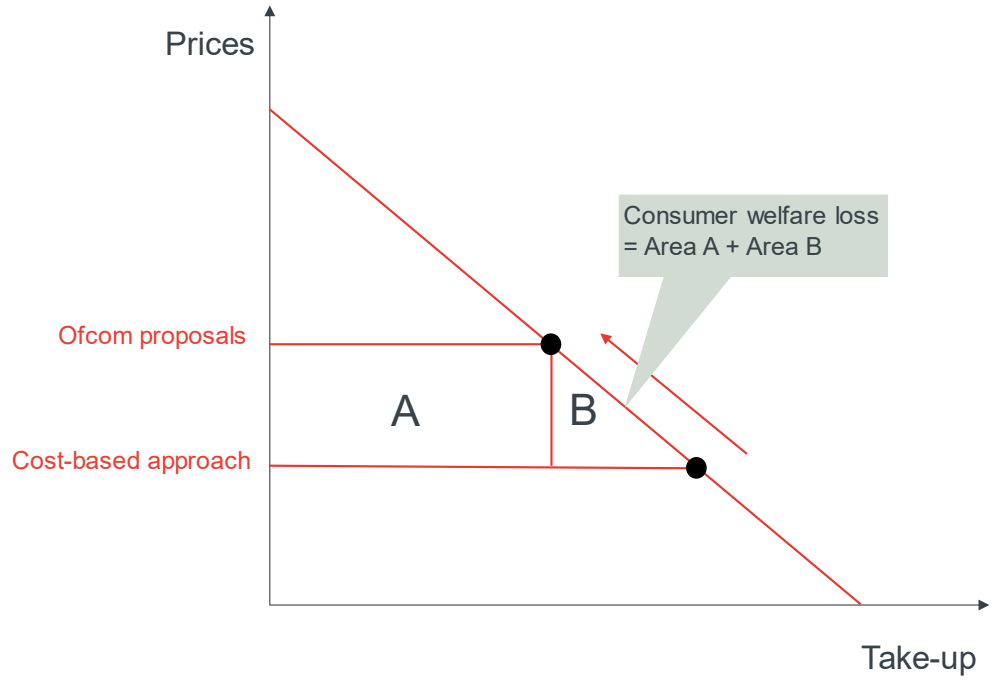
As explained above, it is important to weigh any potential positive impacts of higher wholesale charges on investment against the loss in consumer welfare that would result from the likely increase in retail charges, relative to the counterfactual in which wholesale prices for SFBB are set at cost.

4.1 Estimating the welfare loss of Ofcom's proposals

The following figure illustrates the consumer welfare losses that arise from an increase in the retail price of a service. The total consumer welfare loss will be determined by the sum of:

- Area A – The loss that arises due to existing consumers paying more for broadband services; and
- Area B – The loss that is due to customers no longer purchasing the service as a result of the price increase.

Figure 7 Illustration of the reduction in consumer welfare under Ofcom's proposals



Given the maturity of the broadband market in the UK, and the fact that broadband is now typically regarded as an essential service[30], we would expect the impact of an increase in wholesale charges on overall broadband volumes to be small. In

[30] E.g. see https://www.ofcom.org.uk/research-and-data/telecoms-research/broadband-research

estimating the consumer welfare loss, we therefore make the simplifying assumption that volumes do not change as a result of the price increase.

We have estimated the total welfare loss as follows:

- we multiply the projected change in retail price for each category of broadband service (standard, 40/10 and above 40/10) by the total number of broadband users within each of these categories within potentially competitive areas;
- the change in retail price is estimated in line with the assumptions used in our analysis of the above fibre co-investment business case – i.e. we assume a 75% pass-through from the MPF charge and GEA 40/10 charge and a 75% knock-on effect on the retail prices of higher bandwidths. Also, [✂], we estimate the impact of Ofcom's proposals relative to a counterfactual in which wholesale charges are set at cost with the assumed (real) cost reduction over the period 2021/22 – 2025/26 varying between 10% and 50%; and
- the total number of broadband users in each category is estimated based on [✂] the distribution of customers across different bandwidths, and assuming that around 70% of broadband customers fall in potentially competitive areas (c.20m) [31] [32].

Figure 8 below sets out the estimated consumer welfare loss in the year 2025/26 as well as the total five-year and 20-year NPV, estimated using the Treasury's social discount rate of 3.5% [33].

Figure 8 Consumer welfare loss due to Ofcom's proposed remedies for potentially competitive areas

% (real) reduction in cost of MPF+GEA 40/10 (2020/21 – 2025/6)	Total consumer welfare loss (real 2020/21 £m)		
	In 2025/26	five-year NPV (2021/22 – 2025/6)	20-year NPV (2021/22 – 2040/41)
10%	175	473	2,198
20%	350	946	4,397
30%	525	1,419	6,595
40%	699	1,892	8,794
50%	874	2,365	10,992

Source: Frontier

As Figure 8 shows, the potential consumer welfare losses are significant. If we were to assume that BT's actual costs will fall to 20% below the level of the 2020/21 wholesale charge by 2025/26 (which is plausible given the ongoing cost reductions outlined above), then this implies a total cost to consumers in the region £0.95bn over the market review period; if costs were to be 30% lower, the figure increases to £1.42bn.

[31] As noted above, Ofcom projects around 29m UK households in total in 2020/21. Assuming that potentially competitive areas correspond to around 70% of the country, this implies around 20m households.

[32] We note that the total number of broadband subscribers is held fixed throughout the modelling horizon It could be argued that, if fixed-to-mobile substitutability were to increase in the future, then the total number of fixed broadband subscribers may decline as households migrate away from fixed towards mobile broadband services. This could imply a reduction in the total welfare impacts but would also affect negatively the FTTP investment case.

[33] Freeman et al. (2018), Social Discount Rates for Cost-Benefit Analysis: A Report for HM Treasury.

4.2 Ofcom should assess the benefits of its proposals relative to the costs

As shown earlier, Ofcom's proposal could have a limited impact on the scale/speed of FTTP investment in significant parts of the potentially competitive areas where Virgin Media and/or altnets are present and a marginal impact on the altnet FTTP business case.

We recognise that a comprehensive quantification of the benefits of Ofcom's proposals, in terms of a detailed assessment of the increased scope of investment in potentially competitive areas, faster roll-out, and additional entry may be challenging in view of a number of factors that will affect the FTTP investment case. Nevertheless, there is a strong case for Ofcom to consider *alternatives* to its proposals in view of:

- the consumer harm risks from Ofcom's proposals set out above;
- the fact that Ofcom is already allowing SFBB prices to be higher than BT's costs through the proposed maintenance of the HON mark-up in potentially competitive areas;
- the significant role that competition from Virgin Media and others should play in incentivising scope and speed of FTTP roll-out in significant parts of the potentially competitive areas; and
- the limitation in the speed of roll-out that can in practice be achieved.

In doing so, Ofcom should assess the associated benefits and costs of these options in order to choose the one that achieves its stated objectives at minimum cost for consumers. For example, one such alternative would be for Ofcom to apply a nominal price freeze to MPF/GEA charges, rather than adjusting them for inflation. Based on our assessment, such a proposal may have a negligible impact on FTTP speed or scope of investment roll-out investment incentives in potentially competitive areas, whilst it would reduce significantly the cost to consumers.

5 ASSESSMENT OF OFCOM'S APPROACH IN NON-COMPETITIVE AREAS

In this section we consider Ofcom's proposals for regulation in the non-competitive areas. We start by summarising the proposals, and then consider the two main elements: first, the need for cost orientation for MPF+GEA charges, and second, Ofcom's proposal to link BT/Openreach's returns and FTTP roll-out in these areas. We then consider briefly some of the practical aspects of Ofcom's proposals.

5.1 Ofcom's proposals

Ofcom considers that its traditional approach to charge controls, whereby it allows BT/Openreach to recover the costs of new services from those consumers that purchase them, may not provide BT/Openreach with sufficient incentives to build fibre networks in non-competitive areas because it will "*tend to face higher than average build costs and because it does not face competitive pressures from rival infrastructure operators.*"[34] On this basis, it considers that "*there is a case for allowing BT*/Openreach*'s fibre investment to be partly funded through higher charges for copper-based services.*"[35]

Ofcom has indicated that it is considering using a RAB approach whereby investments in fibre are treated as a pool of costs that can be recovered across multiple services. This will be achieved by the calculation of a RAB mark-up which will apply to MPF/GEA.

Ofcom sets out that such approach will require a mechanism that links the FTTP investment costs that BT/Openreach is allowed to recover using this RAB mark-up with the investment that it undertakes (i.e. Openreach provides a plan for fibre deployment, Ofcom assesses it and then Ofcom sets the terms for cost recovery followed by an annual assessment of Openreach's delivery of its investment plans in terms of coverage and quality).

Ofcom has provided limited detail on its proposals in the non-competitive areas and hence our considerations are also more high-level and less definitive.

5.2 Cost orientation of VULA/MPF charges

Ofcom proposes that the HON adjustment should be removed from the setting of the charge controls in the non-competitive areas. Table 3 of the consultation document indicates that a possible approach would be to "*set charge controls on all services on the basis of BT's costs with no HON uplift.*" It is not clear however if, absent BT/Openreach rolling out FTTP as per a pre-agreed plan, the RAB mark-up would need to be applied to BT/Openreach's projections of the efficient costs for the provision of the services subject to a charge control in the non-competitive areas (as per current approach); or whether Ofcom is envisaging applying the RAB

[34] Ofcom (2019), Promoting competition and investment in fibre networks, Initial proposals – Approach to remedies., paragraph 3.5, page 20.

[35] Ibid, paragraph 3,5, page 21.

mark-up on top of the charges based on the application of an inflation adjusted type price control, as per Ofcom's proposals in the potentially competitive areas.

Unlike potentially competitive areas where entry could lead to competition driving prices lower in the longer-term, there is no such prospect in the non-competitive areas. By definition, in non-competitive areas there is no need to incentivise altnet/Virgin Media entry as these are areas where the costs of roll-out could only justify (at most) a single FTTP network. BT/Openreach would also have a stronger incentive to sweat its legacy assets in these areas. The starting point therefore to incentivise BT/Openreach FTTP investment in these areas is for the charge controls to set MPF/GEA charges based on cost, unless there is a clear case to depart from this approach that would lead to a benefit for consumers [36].

5.3 An additional mechanism that links overall returns to FTTP roll-out could incentivise FTTP investment in these areas

In the parts of the non-competitive areas where Ofcom intervention is justified, Ofcom's RAB approach proposal effectively increases the expected revenues of BT from investing in FTTP compared to a counterfactual where costs were recovered only from the services that drive them and MPF/GEA charges were cost oriented. Prices for FTTP services will be lower and prices for copper-based services higher under Ofcom's proposal compared to such a counterfactual. By increasing BT's expected future returns, this should strengthen BT's incentive to invest in these areas compared to a counterfactual based on the current approach.

However, the proposed RAB approach, by increasing the legacy returns, re-introduces an incentive for BT/Openreach to sweat its legacy assets in these areas. Hence a mechanism is required to link the additional revenues that BT/Openreach expects to make if it rolls out FTTP with its *actual* investment in FTTP. This is recognised by Ofcom in its proposals for the payment of a fibre cost mark-up on top of the MPF/GEA charges being *conditional* on actual FTTP roll-out by BT/Openreach.

5.4 Ofcom's proposals may be insufficiently targeted, increasing the risk of consumer harm

5.4.1 Definition of non-competitive areas

It is useful to consider the relationship between likely revenues and costs from FTTP investment in the areas determined by Ofcom as non-competitive. Ofcom sets out that non-competitive areas will need to meet all of the following three conditions:

- Openreach is the only (fixed) network present;

[36] For example, a departure to protect consumers in rural/remote areas from facing increased charges.

- no alternative providers have set out they have specific plans to build in these areas, and
- Ofcom does "*not consider that there is a possibility of network build.*"[37]

Whereas the first two conditions seem clear, the third condition could be interpreted in one of the following ways:

- areas of very high cost, where the expected revenues from FTTP network roll-out cannot be expected to cover the costs for a single network. In these areas, unless there is an external subsidy, there would be no FTTP network roll-out;
- areas where the expected revenues from FTTP network roll-out are higher than the projected costs for Openreach. However, as the transition from copper-based broadband services would imply a reduction in profitability, BT/Openreach does not have the incentive to roll-out in these areas unless the profits from offering a legacy service relative to offering a FTTP service is lower/reduced; and
- a third type of area where the incremental profits from FTTP deployment for BT/Openreach are higher than the legacy profits, but these may still not be sufficient to justify entry of an additional provider to BT/Openreach. In such areas BT/Openreach should have an incentive to roll-out FTTP in principle.

The distribution of the non-competitive areas between the three different types of area is important as, absent any other intervention:

- in areas of very high costs the case for intervention is that there are wider economic benefits from FTTP roll-out (i.e. for *all* consumers) and therefore roll-out in these areas should be funded by a public/Government subsidy; and
- in areas where the expected FTTP returns are higher than legacy returns (the third type of area), BT/Openreach should have an incentive to roll-out without any subsidy or other Ofcom intervention.

The areas where an additional intervention of the type considered by Ofcom seems to be justified are therefore the areas where BT/Openreach does not have the incentive to roll-out unless the profits from offering a legacy service relative to offering a FTTP service is lower/reduced.

The key determinant of the relative size of these areas (for a given FTTP revenue premium and legacy profits for BT/Openreach) is the cost of roll-out. The steeper the cost curve for rolling out FTTP outside the potentially competitive areas, the larger the size of the areas where intervention by Government or Ofcom could be required.

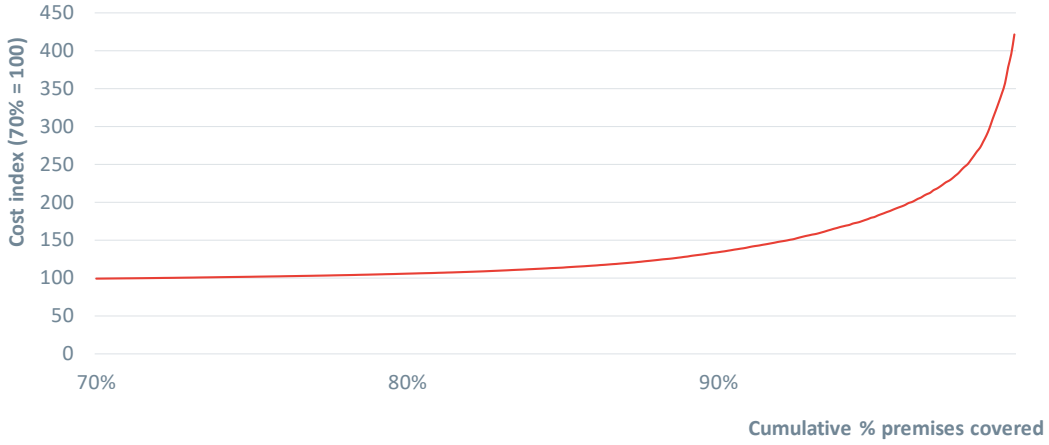
5.4.2 The likely shape of the cost curve in the non-competitive areas implies a more targeted approach by Ofcom may be required

As Ofcom has not set out any quantitative information or assessment of the potential size of these areas, it is useful to consider the shape of the cost curve to roll-out FTTP outside the potentially competitive areas in order to come to an initial

[37] Ofcom (2019), Promoting competition and investment in fibre networks, Initial proposals – Approach to remedies., paragraph 3.1, page 20.

view as to the likely extent of the different types of areas. Based on publicly available information[38], we have plotted below an estimate of this cost curve. This shows the estimated capex per premise passed for the final 30% of households/premises in the UK. As Figure 9 shows, the curve remains fairly flat up to about 80% of cumulative premises passed, rising steadily between 80% and around 90%, after which it starts to increase sharply.

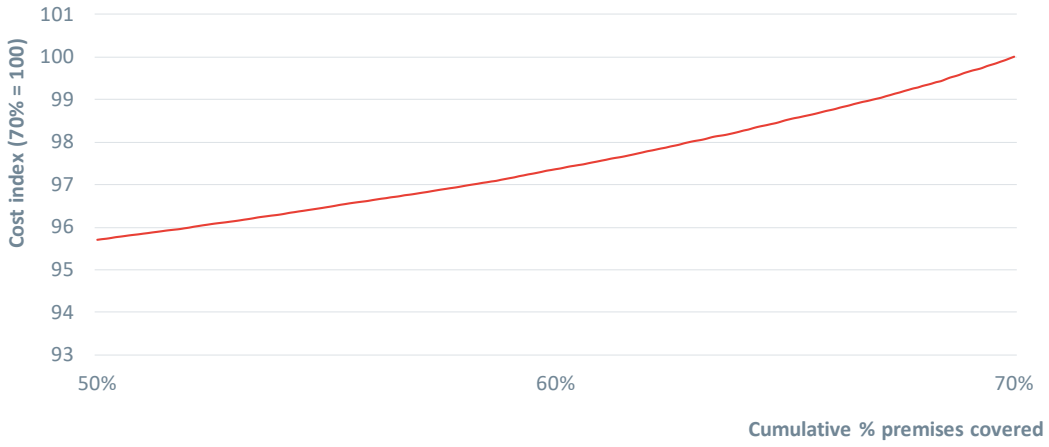
Figure 9 Cost curve for FTTP roll-out – cost per premise passed



Source: Frontier analysis of Prism data

As can be seen below (presented separately for clarity), the relative per-premise cost of covering the median premise in the UK (i.e. at 50% of premises) is lower than the cost at the lower end of the final 30% (i.e. at 70% of premises), but this difference is relatively small.

Figure 10 Cost per premise passed: 50% to 70% of UK premises



Source: Frontier analysis of Prism data

This suggests that the areas where BT/Openreach may not have an incentive to invest in FTTP because, although the incremental FTTP investment is profitable, the transition from copper-based broadband services would imply a reduction in its

[38] Based on publicly available data on average road length per premise, calculated at the Output Area (OA) level, combined with Prism cost data used for an NIC study, available here: https://www.nic.org.uk/wp-content/uploads/Cost-analysis.pdf.

overall profitability, may be between 85-95% of households (i.e. c.1/3rd of the 30% of households considered to be in non-competitive areas).

It is not possible without more detailed information on the profitability of FTTP investment in different areas for BT/Openreach to come to a more definite view on this assessment. There is, however, a risk that by considering the application of a RAB approach to all of the uncompetitive of areas, there could be an over-subsidy of BT/Openreach compared to the amount that would be required to ensure the socially desirable outcome.

5.5 As the RAB mark-up approach may be too complex, alternatives should be considered

The implementation of the MPF/GEA mark-up is directly linked to BT's actual investment. It should only apply if Openreach actually rolls out fibre where it would not have an incentive to do so absent the mark-up. In principle, this should help to address the replacement effect. However, the proposed regime hinges on Openreach providing accurate projections of its deployment plans and roll-out costs. As such it is likely to be vulnerable to gaming, since BT/Openreach will have incentives to overestimate the costs[39]/extent of roll-out and potentially underinvest/underspend. Ofcom recognises this, noting that it "*will need to consider how to best ensure that Openreach delivers the agreed investment*."[40] This seems challenging as forecasts can never be entirely accurate and there may well be objective reasons why BT/Openreach underperforms relative to its projections.

These proposals also have a cost in the sense that consumers of copper-based services in these areas pay a higher price than they would pay if there was no fibre cost mark-up, even though they do not (and some may never) consume a FTTP service. If the price they pay is no higher than the price they pay in 2021, and the period of the transition from the copper-based service to FTTP is not long, then the benefits from faster/further roll-out of FTTP could justify the higher costs for copper-based subscribers in these areas. This will however depend on the relative magnitude of the mark-up and the rate at which consumers transition to FTTP in non-competitive areas, amongst other things. This should be evaluated as part of Ofcom developing its final proposals.

In addition, as Ofcom acknowledges, designing a RAB model raises a number of challenges. For example, the GEA/MPF mark-up will be derived from the net costs of fibre roll-out in these areas: these are the costs of FTTP roll-out minus the expected revenues. BT/Openreach will have an incentive to underestimate the FTTP revenues (and overestimate costs), raising the issue of how Ofcom will distinguish between genuine demand forecasting errors and any incentive effects.

These observations suggest that Ofcom should consider how it could meet its objectives by a simpler mechanism. For example, one approach could be to make

[39] As the RAB approach relates to new FTTP assets, this could include over-dimensioning the network (i.e. investing in capacity that exceeds the level of likely take up or necessary redundancy), in order to inflate the size of the asset base, as well as simply overstating the extent of true costs.

[40] Ofcom (2019), Promoting competition and investment in fibre networks, Initial proposals – Approach to remedies., paragraph 3.20, page 25.

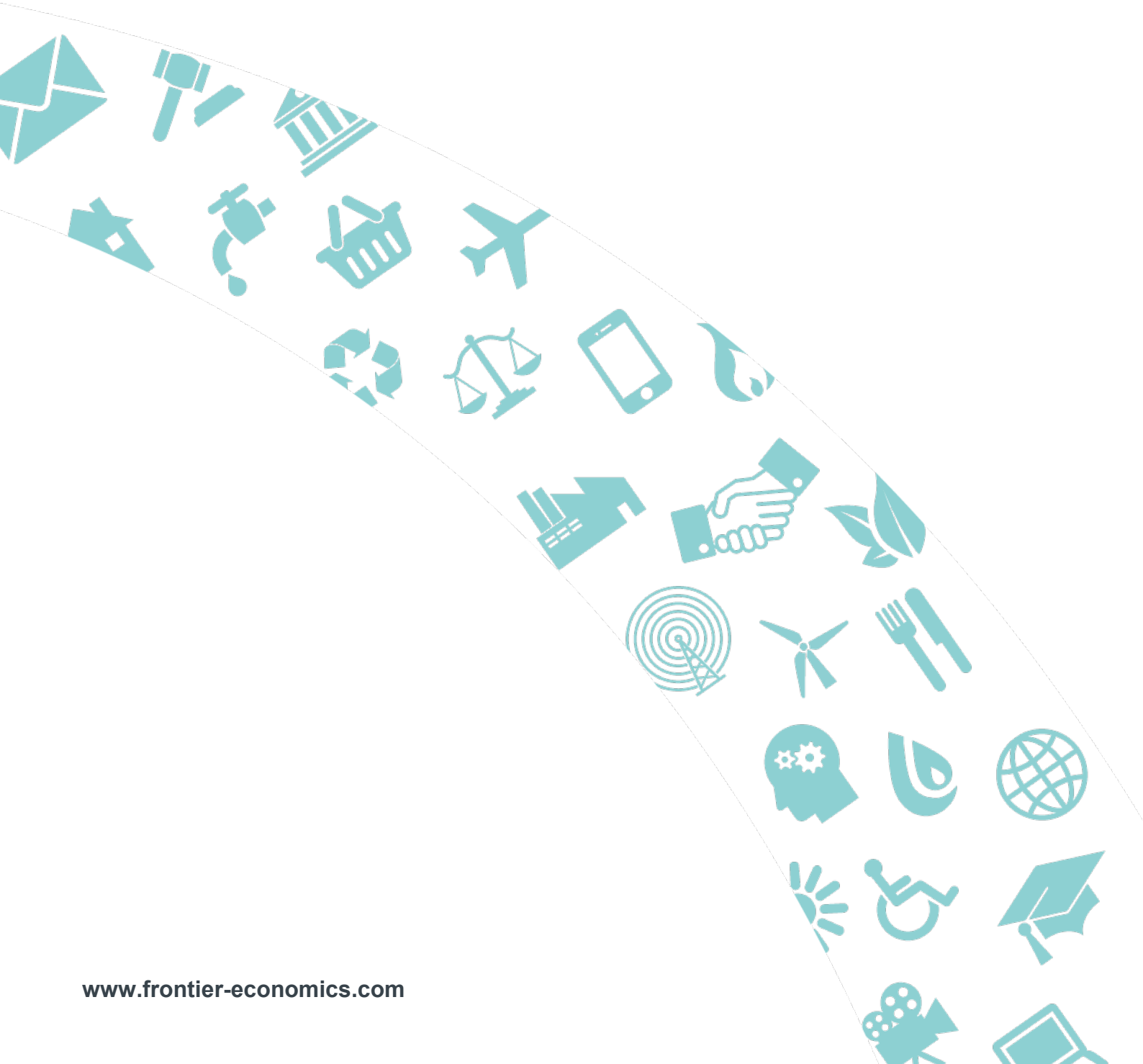
the HON adjustment applicable in these areas payable subject to BT/Openreach achieving certain FTTP roll-out targets in these areas. Such an approach could ensure that no subscribers in these areas are required to pay more than they pay in 2021 for the same services – otherwise there is a risk of Ofcom incentivising switching away from SFBB to lower speed broadband, and/or alternatives such as mobile broadband, against its overall objective of promoting FTTP migration.

Ofcom should therefore consider another consultation on the approach to incentivising investment in the non-competitive areas putting forward some alternative options for full consultation.

ANNEX A MODELLING ASSUMPTIONS

[✂]

frontier economics



www.frontier-economics.com