SPC Network

Report for Vodafone

Geographic Market Definitions and Remedies in the Wholesale Fixed Telecoms Market

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About SPC Network

SPC Network was founded in 2003 and has worked for over 45 clients worldwide. We undertake Strategic Policy Development for clients in platform and networked industries, by combining the knowledge of our consultants with specific and valuable skills to ensure rigorous analysis and exceptional advice. Our core consultancy team and network of partners have substantial experience in industry and consulting and so we understand the practical issues and challenges facing the market. Through advanced academic training, we have developed the key skills and rigorous approach needed to support our clients win the policy debate.

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1 EXECUTIVE SUMMARY

Ofcom's Wholesale Fixed Telecoms Market Review (WFTMR) proposes that the Wholesale Local Access (WLA) market consists of two geographic areas, Area 2 and Area 3[1], that have different levels of current and prospective fibre deployment. Ofcom finds Openreach to have Significant Market Power (SMP) in both Areas but proposes different regulations in each Area. In Area 2, where in some parts there is competitive build already and the prospect of more, Ofcom proposes that the GEA 40/10[2] product will be regulated at the current price, adjusted for inflation, with higher speeds unregulated. This is known as "anchor pricing" regulation. In Area 3, where there is no prospect of competitive network build, Ofcom proposes to regulate the price all speed variants of Generic Ethernet Access (GEA).

Vodafone UK has asked SPC Network to consider whether:

- Ofcom's methodology for establishing the boundary between the two geographic markets is likely to overstate the size of Area 2, and so understate the size of Area 3; and
- The choice of 40/10 as the anchor product will continue to be effective as a means of consumer protection over the period until 2026 or whether it should be replaced by a higher speed anchor.

Vodafone has asked that SPC Network pays particular attention to the likely effect of Ofcom's proposals on consumers when considering these two questions.

The Size of Area 2 and Risks for Consumers

Ofcom's methodology for identifying those postcode sectors to include in Area 2 is based on actual build and information about planned build provided to Ofcom as part of the WFTMR. This approach contrasts with the way Ofcom has defined geographic markets in the past, which has been based on actual operator presence only, and with the approach taken by other European regulators, which also relies on actual presence.

Our concern with the approach adopted by Ofcom in this review is that it is overly speculative and based on a static, "snapshot" of existing plans that could be subject to substantial change. In this report we have identified three factors that could lead to actual build falling short of planned build:

- Presence of competing networks;
- Availability and quality of duct and pole access; and
- Local planning, civils and dig conditions.

To this list should be added the current uncertainty on labour supply caused by Brexit and the impact of the Covid 19 outbreak on consumer spending, access to investment capital and the

[1] Ofcom identifies Area 1, which is fully competitive, but has found no part of the UK to be included in Area 1.
[2] A wholesale broadband access product offering 40Mbps download and 10Mbps upload speeds.

practical delays to network rollout resulting from adherence to Government health safeguarding advice.

All of these factors could lead to a reduction on the build out plans of operators and so the static approach adopted by Ofcom is likely to overstate the size of Area 2. This matters because any overstatement is likely to have an impact on consumers. Ofcom's regulatory approach relies on anchor pricing to protect consumers from anticompetitive practices and to encourage Openreach and competitor investment in Area 2 and on regulation to encourage Openreach investment in Area 3.

However, if the size of Area 2 is overstated then it is likely there will be a "fringe" area, that part of Area 2 that should be in Area 3, where Openreach has neither a competitive nor regulatory incentive to investment. Consumers in these parts of Area 2 are therefore likely to have the worst of all worlds.

The effectiveness of 40/10 as an Anchor Product

The effectiveness of an anchor product as a consumer protection measure relies on consumers be willing to trade down to the anchor product if the price premium for a superior product becomes too large. However, if consumers increasingly prefer faster broadband offers, so that they can gain higher quality access to, for example, video streaming services, then they may be willing to pay an increasing premium for the superior product.

Looking across the European Union, we have found that there is a general move by consumers to higher speed access products and that this move is unaffected by any change in the premium they have to pay for the higher speed access. Consumers appear just as willing to trade up whether the price premium increases or decreases. We also see that consumers in the Hull Area, where a full fibre network is ubiquitous, are willing to pay a higher price for broadband access than the price in the rest of the UK.

The reason this matters is that Ofcom relies on an anchor product at 40/10 constraining Openreach's pricing behaviour on higher bandwidth products. However, our expectation is that 40/10 will cease to be an effective anchor during the period of this review. In this case, Openreach would have the incentive and ability to increase the price of 80/20 above the competitive level, resulting in higher consumer prices.

Conclusion

Our overall conclusion is, first, that Ofcom should take a more dynamic approach to defining Area 2 (and therefore Area 3) recognising that network development is a discovery process. Firms developing networks do not know with 100% certainty in advance how much network they can build and are most likely to over, rather than under, state the likely extent of their network. We are very concerned that regulation for the period 2021 – 2026 will result in a lack of regulatory or competitive incentive for fibre build in fringe areas.

Secondly, the evidence suggests that consumers are trading up to higher speed broadband access across Europe and in the UK. The effectiveness of GEA 40/10 as an anchor product is therefore likely to substantially weaken and so there is a significant risk that Openreach will be able to exploit that by setting the price for GEA 80/20 above the competitive level if that product variant is unregulated, with negative effects for consumer welfare. This problem could be overcome by setting GEA 80/20 as the anchor product at the start of the review period.

We have shown by analysing data across Europe and modelling the price and propensity to change speed that consumers do not opt for lower bandwidth products even if the price premium for higher bandwidth products increases. Therefore, we conclude that a dominant entity would be able to increase their prices for higher speeds in areas where they have SMP without the regulation of a lower speed anchor product effectively constraining prices.

2 INTRODUCTION

In January 2020, Ofcom launched its Wholesale Fixed Telecoms Market Review 2021 – 2026 (WFTMR) covering wholesale local access (WLA) and leased lines (LL). For WLA, the WFTMR proposes two geographic markets:

- Area 2 – where there is already some material commercial deployment by rival networks to Openreach or where this could be economic; and
- Area 3 – where there is unlikely to be material commercial deployment by rival networks to Openreach[3].

Ofcom finds BT to have Significant Market Power (SMP) in both these geographic markets but imposes different remedies, in particular with regard to the pricing of different Generic Ethernet Access (GEA) bandwidths.

- In Area 2, Ofcom proposes an "anchor product" which would be price controlled with pricing freedom for higher speed broadband access.
- In Area 3 Ofcom proposes a charge control on all copper and fibre to the cabinet (FTTC) bandwidths.

This difference in regulation reflects the difference in competitive conditions as found by Ofcom. Table 1 provides more information on the proposed price regulation in the two geographic markets.

Table 1: Summary of WLA Regulatory Proposals

Service	Proposal
WLA Services in Area 2	A charge control based on Metallic Path Facility (MPF) and Fibre to the Cabinet (FTTC) 40/10[4] rental charges, inflation adjusted from 2021 levels. Pricing flexibility, subject to fair and reasonable conditions, on rental charges for higher bandwidths. A charge control on Fibre to the Premises (FTTP) 40/10 rental charges where a copper-based service is not available, set at a premium to the FTTC 40/10 price.
WLA Services in Area 3	A charge control on MPF and FTTC rental charges across all bandwidths. A Regulatory Asset Base (RAB) charge control to support Openreach's investment in fibre networks whereby MPF and FTTC charges are marked-up to allow the recovery of BT's fibre investment costs where pre-specified investment targets are met.

(Source: Ofcom, *WFTMR 2021 – 2026)*)

[3] Ofcom '*WFTMR 2021 - 2026*'. Para. 2.26

[4] This refers to a download speed of 40 Mbps and an upload speed of 10 Mbps.

Vodafone UK has asked SPC Network to consider whether:

- Ofcom's methodology for establishing the boundary between the two geographic markets is likely to overstate the size of Area 2, and so understate the size of Area 3; and
- The choice of 40/10 as the anchor product will continue to be effective as a means of consumer protection over the period until 2026 or whether it should be replaced by a higher speed anchor.

Vodafone has asked that SPC Network pays particular attention to the likely effect of Ofcom's proposals on consumers when considering these two questions.

This report addresses the questions above and is structured as follows:

- Sections 3 & 4 address the first of the two questions posed by Vodafone. Section 3 examines Ofcom's and other NRA's approaches to geographic market definition and Section 4 the likely effects on consumers of Ofcom's proposals.
- Sections 5 & 6 consider the second question. Section 5 examines whether 40/10 is likely to remain an effective anchor product, drawing on empirical evidence from the UK and the European Union. Section 6 considers the regulatory risks of setting an anchor product at too slow a speed.
- Section 7 concludes.

SPC Network has worked closely with Vodafone in producing this report. However, all opinions expressed herein are those of SPC Network and not necessarily of Vodafone.

3 OFCOM'S APPROACH TO GEOGRAPHIC MARKET DEFINITION IN WLA

In this section we consider Ofcom's approach to geographic market definition, focusing specifically on how Ofcom proposes to identify those postcode sectors to be included in Area 2.

3.1 Summary of Approach

Ofcom's approach to identifying the extent of the different geographic areas has developed since its 2018/19 consultation on its approach to geographic markets[5]. In that document it identified three geographic markets: competitive areas, potentially competitive areas and non-competitive areas. The definition of potentially competitive areas was given as:

> ***Potentially competitive areas:*** *in areas we have not identified as effectively competitive, we will assess whether there is a prospect for competitive entry. We would consider such a prospect exists if (i) at least one alternative network is already present, (ii) an alternative network provider has announced plans to build in the area, or (iii) we consider there is potential for entry, in particular based on urban density. In potentially competitive areas, our focus will be on promoting competitive entry through the remedies we impose.*[6]

Ofcom goes on to explain:

> *In order to assign geographic areas to the three categories explained above, we need to assess the presence of existing, planned and potential future networks. We expect to use the following approach to map these deployments:*
>
> - ***Existing networks****: we anticipate using data provided by network operators as part of Ofcom's Connected Nations programme to map where existing networks are. We have also considered using data about existing networks that provide only leased lines. Generally, we do not expect to include these in assessing network presence given that they do not supply residential services.*
> - ***Planned deployments****: we propose to gather network plans from a number of operators.*
> - ***Potential future rollout****: based on discussions with network operators on key drivers of their investment decisions, we have determined a number of criteria we propose to use to select "clusters" of areas of the UK where network rollout may be economically viable.*[7]

[5] Ofcom '*Promoting investment and competition in fibre networks – Approach to geographic markets*.' December 2018
[6] Ibid Paragraph 1.11
[7] Ibid Paragraph 1.12

In the WFTMR Ofcom has updated its definition of what it now refers to as Area 2[8] to:

> *a geographic market comprising postcode sectors where there is already some material commercial deployment by rival networks to BT or where this could be economic.*[9]

Ofcom then explains that it has revised its approach to identifying those postcode sectors to be included in two ways. As in its 2018 document it includes existing networks, but it now no longer includes areas that its own analysis suggests could be economically viable:

> *We have re-considered this approach. Whilst this approach provides the widest view of areas where deployment is potentially attractive, we think including these areas may be somewhat speculative. We think that including the early/uncommitted build plans provided by operators better captures likely future build. As such, we have not included in our assessment areas where there is no planned build, but which were previously identified by our cluster analysis.*[10]

As the quotation above says, the second change that it has made involves an extension in the category of planned developments:

> *In relation to planned build, there are differences in the level of certainty associated with operators' ambitions for roll-out. We found that an operator's plans for certain towns or cities might be at different stages of development. Some operators' plans included lists of target towns without further details. The same operator may also have plans for some towns at a very advanced 'ready to build' stage (i.e. with all relevant senior management sign-off, funding and planning permissions in place).*
>
> *We propose to include all current plans in our assessment of the possible extent of MSN deployment over the review period. Whilst we recognise that plans can change, we think that including all plans gives a good view of the areas likely to see build. If we only took into account plans that had been signed off and those in the course of build, we could be understating the scope of rollout for this review period. We think using early plans of operators gives a reasonable indication of the areas in which build is most likely to be attractive.*

We believe that Ofcom is right to drop its original approach of identifying potentially competitive areas as it would be somewhat "speculative". However, by extending the category of planned developments (such that it includes build phase, committed/more certain plans and less certain plans[11]) its approach remains inherently uncertain and hence is still speculative. We explain in

[8] Although Ofcom refers to competitive areas, potentially competitive areas and non-competitive areas in its Overview (Volume 1), thereafter it appears to refer to the areas simply as Areas 1, 2 and 3.
[9] Ofcom, Op cit. footnote 3 Volume 2, paragraph 7.6.
[10] Ibid. Volume 2, Paragraph 7.34,
[11] Ibid. Annex 8, Paragraph A8.43.

the next section why this approach is extremely likely to lead to an overstatement of the geographic extent of Area 2.

3.2 Concerns with Ofcom's approach

Ofcom's approach can be critiqued at both a general level, regarding the need to move to a projected basis for market presence, and by considering specific limitations in the approach now being proposed.

We deal first with Ofcom's decision to adopt the radically different approach of including anticipated network build and contrast it with the approach typically being taken by other European regulators. Ofcom is the only NRA to use anticipated build. We then consider Ofcom's decision to move to a 50% coverage rule (from the previously proposed 65% coverage rule), before finally contrasting Ofcom's static "snapshot" approach to identifying future network deployment with a more dynamic approach.

3.2.1 Moving to a projected basis for market presence

In previous market reviews Ofcom has based its geographic market definitions on actual market presence, rather than taking a view of how many networks might be available to customers over the period of the review using operators' network plans. This very significant change in approach is explained first by Ofcom in its consultation in 2018 on *Promoting investment and competition in fibre networks*:

> *Given the greater potential for investment, in our market assessment we expect to place more emphasis on the competitive impact of future network build. This is because the ex ante regulations that we are proposing to introduce are intended to support rollout of new ultrafast networks that will fundamentally change the structure of the market. This is a change to our historical approach, which recognised the prohibitively high barriers to network build that have previously existed and so aimed to promote greater competition within the existing market structure rather than promoting entry.*[12]

It reiterates that position in its present consultation:

> *In previous market reviews we have typically undertaken this exercise focussing on existing competitive conditions for each product market in isolation (in particular in WLA and BCMR reviews). In the period covered by this review we expect the potential for new network build to be much more dynamic than in the past. We focus not only on existing competitive conditions but also, importantly, on how we expect the competitive environment to evolve over the review period based on new network build.*[13]

[12] Ofcom. op cit. footnote 5, paragraph 2.8
[13] Volume 2, paragraph 7.12

Ofcom contends, then, that this change in approach is needed so that *ex ante* regulation can support the investment and rollout of fibre networks.

However, the approaches taken by regulators in countries in the European Union show that Ofcom is alone in its view that such a significant change is required, as illustrated in Table 2 (see page 11). Whilst these other regulators all face a similar environment in which there is a strong desire for investment in competing fibre networks, it appears that they believe it is possible to achieve this by defining geographic markets and/or deploying geographically differentiated remedies based on actual, rather than planned, network presence.

Spain, which is notable for its very impressive fibre investment and rollout, provides an interesting contrast to the UK. In its 2016 market review CNMC, the Spanish Regulator, had two complementary goals: 1) to promote efficient network investment and 2) to spur sustainable competition.[14] The review resulted in two geographic markets being defined at the retail level. Zone 1 included areas of effective competition and Zone 2 comprised the rest of the country[15]. In the Wholesale Local Access (WLA) market, within Zone 1 a separate Next Generation Access (NGA) zone was identified, which included those areas found to be effectively competitive on the basis of actual competitive network presence (at the WLA level as opposed to the retail level). To be effectively competitive, an area needs at least three NGA networks with coverage greater than 20% and the incumbent operator (Telefonica) needs to have a market share of less than 50%. This NGA area covers 66 municipalities, which equates to roughly 35% of the population. Telefonica was found to have SMP in all areas outside of the NGA zone and comprehensive regulation[16] of a GEA style wholesale product was imposed.

This approach to regulation has not acted as a constraint on investment in fibre or the continuing development of sustainable competition. In 2016 Spain had an estimated 62.8% fibre coverage and by 2018 that had increased to 77.4%[17]. It is also expected that the number of municipalities to be included in the competitive NGA zone will increase to around 100 when the next market review is undertaken[18].

Another interesting example is Italy, where AGCOM, the Italian NRA, found the Milan area to be a separate relevant market (at the WLA level) and not subject to SMP, on the basis that both TIM and Open Fiber offer FTTH services and TIM's market share.

The rest of Italy forms a single geographic market and TIM was found to have SMP. However, AGCOM identified 26 "contestable municipalities" based on the presence of at least two alternative NGA networks, in addition to TIM, with at least 60% coverage each and 75% combined, and TIM having a retail market share of less than 40%. AGCOM anticipates that the

[14] Presentation by CNMC

[15] Zone 1 consists of ca. 14.5m lines, 58% of the total number of lines in Spain.

[16] Price regulation of GEA access is based on an Economic Replicability Test. Other regulations include transparency and non-discrimination.

[17] European Commission Digital Scorecard

[18] Vodafone internal country briefing

competitive conditions will change significantly during the review period and so will review the list of contestable municipalities annually.

AGCOM imposed different remedies in this area than in the rest of the market. Specifically, AGCOM imposed cost oriented GEA pricing in the rest of Italy but allows flexibility in the contestable municipalities from 2021 provided that it sees more effective competition and take up of higher speed access services in these areas being at least 25%. This threshold was chosen to accelerate the uptake of higher speed access before allowing reasonable and cost-oriented price reductions. The European Commission took the view that competitive differences between the contestable municipalities and the rest of Italy were already sufficient to allow greater price flexibility[19].

These two examples suggest that it is possible to define geographic markets and/or impose geographically differentiated remedies based on actual network presence (as Ofcom has in previous market reviews) without it being an impediment to investment or the development of infrastructure competition.

3.2.2 Changing the percentage basis for network presence

Ofcom explains that it has decided to lower the proportion of the postcode sector covered by an operator's network from 65% to 50% for that network to be considered "present" in the postcode sector[20]. This lower threshold will inevitably increase the size of Area 2.

Our concern with this approach is that a reduction in the threshold could bring into Area 2 postcode sectors where Openreach retains a dominant position. If we assume that customer take up is evenly spread across the postcode sector, then when an alternative operator is present in only 50% of the premises Openreach will immediately have a 50% market share, to which must be added any customers it has in the half of the postcode covered by the other network(s). Whatever proportion it has in the 50% covered by the alternative network(s), its minimum 50% market share in the postcode sector overall means that it would be presumed to be dominant under both competition law and under the European Commission's SMP Guidelines[21].

The economic viability of extending network coverage will vary from postcode sector to postcode sector. Some postcode sectors with 50% coverage by a network other than Openreach will see no more coverage by that or any other network. Others may see a significant expansion. Those postcode sectors with a lower likelihood of coverage extending much beyond 50% have a greater likelihood that Openreach will remain dominant in the area as its market share is less

[19] *Commission Decision concerning case IT/2019/2181-2182: Wholesale local access provided at a fixed location and wholesale central access provided at a fixed location for mass-market products in Italy: Comments pursuant to Article 7(3) of Directive 2002/21/EC* 11 July 2019

[20] Ofcom 'WFTMR 2021 – 2016' Vol. 2, Paras. 7.22 – 7.24

[21] European Commission *'Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services'* 2018, para. 55

likely to fall below the level at which dominance is presumed. Placing these postcode sectors in Area 2 is likely to overstate the area in which competition is likely to have a constraining effect on Openreach and so an overstatement of the size of Area 2.

Other countries in Europe have generally adopted a higher requirement for network coverage, based on actual rather than projected presence. Where NRAs have adopted a lower coverage requirement then operator presence alone is not sufficient and is always associated with a requirement for the SMP operator's market share to be below a certain level. This is shown in Table 2 below.

Table 2: Coverage Requirements of other NRAs

	Market	Geographic markets of remedies	No. of operators other than SMP	Minimum coverage requirement	Maximum SMP operator market share
Denmark	3b	Remedies	2	75%	40%
Hungary	3a	Markets	2		50%
Italy	3a	Remedies	2	60% each 75% combined	40%
Ireland	3b	Markets	2	30%	50%
Poland	3a	Markets	2	65%	40%
Portugal	3a	Markets	2 or 1	50% 20%	 50%
Spain	3a	Remedies	2	20%	50%
UK	3a	Markets	1	50%	

(Source: NRAs, Vodafone, SPC Network)

3.2.3 Network deployment is a dynamic process

Ofcom's approach provides a comprehensive "snapshot" of the plans of operators at a given point in time. These plans, however, are extremely unlikely to provide a direct correspondence with future network build, as the future rollout of a fibre network is an inherently uncertain process. It is best characterised as a learning process: as an operator attempts to firm-up its plans, or even to start a build, it learns things about the environment that cause it to revise its plans.

It is possible to develop a more dynamic model of the network build process than Ofcom has done. SPC Network and DAS Ltd developed a multi-criteria decision (MCD) model for a group of operators last year (which was demonstrated to Ofcom). Ofcom rejected the use of this model arguing that

> *we consider this would introduce significant and disproportionate complexity into our modelling relative to improving the accuracy of the outputs.*[22]

We developed the model as a constructive contribution to Ofcom's consultation exercise, but it also provides a solid basis for critiquing Ofcom's approach. By examining a number of the parts of that model we can illustrate the limitations of using a static "snapshot" approach, which would be highly likely to lead to an overstatement of the size of Area 2.

Here we focus on three key building blocks of the model:

- Presence of competing networks;
- Availability and quality of Duct and Pole Access;
- Local planning, civils and dig conditions.

Presence of competing networks

To develop the model, we interviewed a number of fibre network operators in the UK to understand their decision-making processes for planning and deploying fibre. We were able to identify the core issues that are relevant to all operators, as well as gaining an understanding of the ranking in importance of these issues. The actual presence of competing fibre operators, or publicly announced credible plans to deploy fibre, was emphasised by all of the operators interviewed as an important decision making criterion.

There are significant economies of density and scale in building a fibre network. Very large up-front fixed, sunk costs are incurred, which can only be recovered if a sufficient number of customers are connected to the network. Multiple competing networks make the recovery of those costs more challenging and uneconomic under certain conditions. For this reason, it makes sense for network operators to prefer to avoid areas where other operators have already deployed fibre networks or have announced plans to deploy.

When operators make public statements about network deployment plans, there can be an element of "signalling": that is larger, more financially credible operators announcing deployment in a particular geographic area could be sufficient for other operators that had earlier announced their intention to build there to rethink their plans. The challenge, however, is for each operator to try to "see through" the signalling and also to have a sense of its own position in the financial "pecking order".

Over the period of the market review operators will respond to the developments in the market and revise their deployment plans accordingly. What this means in practical terms is that public positions that are then backed up in private submissions to Ofcom are highly likely to represent an overstatement of the build that will ultimately take place.

[22] Paragraph A17.55, Annexes.

It is possible within a dynamic MCD model to address the fact that operators will revise their plans to avoid competing networks or at least minimise overbuild. An operator could have a decision rule that it will not build where another operator has already deployed fibre or has announced credible plans to deploy fibre. Then if an area that is on its plan for future deployment is in the meantime covered by Openreach or another fibre operator (or a credible intention to build has been announced, although that build may never happen), its build plan will be updated to remove that area. If the operator deploying fibre is Openreach this could mean that all competing operators would update their build plans to avoid that area[23]. This cannot be captured in a static, "snapshot" model.

An alternative means to minimise competitive over-build is for operators to merge and then rationalise build plans to eliminate areas of overlap. We have no insight about CityFibre's motivation for its acquisition of Fibre Nation, however it is consistent with the argument that firms will merge to avoid competitive overlap. A key message from the interviews that we undertook was that there is an expectation within the industry that there will be a need for rationalisation at some point to ensure the financial viability of the deployed fibre networks.

Availability and quality of Duct and Pole Access

Interviewees also highlighted the crucial importance of the availability and the quality of Duct and Pole Access (DPA) to the economic viability of fibre investment. Importantly, though, they also emphasised the uncertainty about quality and availability in any specific geographic area. Operators deal with this uncertainty in different ways and this is reflected in the different decision rules they employed in their network deployment models.

One approach was to require the investment case to pass on the assumption that DPA would not be available at a suitable quality, meaning that if it did in fact turn out to be possible to use DPA then the investment out turn would be better than the plan had suggested. Under this approach learning about availability and quality of DPA would not cause a planned rollout to a geographic area to be cancelled, rather it would only serve to improve the expected returns on the investment.

However, an alternative approach is to set a presumed level of availability of DPA within the business case. For example, it could be assumed that DPA would be available at the necessary quality for 50% of the network deployment in that geographic area. A stronger version of this would be to require close to 100% availability of DPA in the business case. Where this type of decision rule is applied it is clear that initial plans for network deployment would necessarily have to be revised as the operator learned about the quality and availability of DPA area by area. Interviewees emphasised that if preliminary network investigations in a specific geographic area

[23] This is not to suggest that competing operators will never build in areas where Openreach has deployed fibre, but it does highlight the importance of a first mover advantage for competing fibre suppliers.

revealed that DPA would not be available to the level required then the planned build would be shut down, with resources being reallocated to other target areas.

What this means practically is that the static view of the market that Ofcom has captured would be an overstatement of the build that would actually take place. Under a dynamic MCD model this type of decision rule can be accommodated.

Local planning, civils and dig conditions

A third broad area that is open to learning by operators as they deploy fibre is the operational conditions in the specific geographic area. This encompasses a number of factors including the strength and effectiveness of the relationship with the local planning authority, the availability of satisfactory civil engineering contractors in that area (at a specific point in time) and the local conditions for digging trenches etc.

Although preliminary investigations allow an operator to target a specific area, it is only as the build phase starts that the true nature of these factors becomes apparent. Interviewees explained that deployment plans would be revised if the conditions turned out to be less favourable than had been expected. An operator faced with an obstructive planning department could respond to this in the extreme by cancelling the fibre deployment altogether and move on to another target area. Where a cluster of geographic areas covered by a single planning relationship had been selected for development, the decision could be made not to go ahead with development outside of the first area in the cluster, with the result again that the original planned target coverage is reduced. This problem is recognised by Ofcom:

> *In some cases, operators indicated that they had considered an area or location for build, but they had subsequently decided not to proceed due to difficulties encountered either at the planning, permissions or build stage. We have therefore not included planned build by an operator where it has explicitly ruled out such build.*[24]

Although Ofcom ruled out certain areas, it is clear that this problem could still be encountered by operators as they progress their network rollout and hence further areas will be removed from build plans.

On the operational side, where an operator uses local contractors it is possible that a satisfactory contractor could not be found or that the relationship with a selected contractor deteriorates over the period of deployment, which, as in the cluster case above, could lead to some target areas not going ahead. One interviewee explained that it can be difficult to find a suitable contractor in an area if the available contractors have past or current relationships with Openreach that prevent them from, or incline them against, working with a rival operator.

[24] Footnote 95, page 53, Annexes.

At a general level, interviewees highlighted that Brexit would be likely to pose a significant challenge, as EU nationals presently make up a significant proportion of the workforces of civil contractors. The implication of this being that build plans would have to be changed either by pushing back in time the planned deployments or, if there is an increase in labour costs, by eliminating some of the planned areas, as they would be no longer financially viable.

Interviewees also highlighted how deployment plans could need to be amended when faced with more difficult local dig conditions than had been expected. Again, at the extreme, this could lead to withdrawal from an area or alternatively the extent of coverage could be reduced.

Interviews were conducted long before the coronavirus/Covid 19 pandemic, which is creating uncertain and challenging economic conditions affecting capital and consumer confidence. It is also almost certainly having a significant effect on the availability of labour and the opportunities for companies to undertake network build. Unforeseeable events, such as this pandemic, inevitably affect any prospective rollout of fibre networks and so raise further questions about Ofcom's approach of using network build plans of operators to define geographic markets.

Table 3 below compares the number of households estimated to have been passed by various full fibre network operators in 2019 with the stated deployment ambitions of those operators. The required simple annual growth rate for each operator to realise its ambition is calculated. It is clear from this table that operators have to grow at a very significant rate each year to achieve those ambitions.

Table 3: Actual and Ambition Fibre Build

	Actual 2019* (x 1,000)	Ambition** (x 1,000)	Date	Required annual growth rate
Openreach	2,000	3,000	2021	25%
Hyperoptic	400	2,000	2022	133%
CityFibre	107	1,000	2021	417%
Gigaclear	100	150	2020	50%

*Source: Openreach Business Briefing December 2019
** Source: Company websites and announcements

Fibre Nation, the fibre network builder established by TalkTalk in 2018, was acquired by CityFibre in January 2020. It had ambitions to pass three million homes by 2024. At the time of its acquisition it had passed 49,000 homes in the York area[25] and so would have had to build at a

[25] https://www.cityfibre.com/news/cityfibre-acquires-fibrenation-adds-talktalk-strategic-customer-increasing-rollout-plans-pass-8-million-premises/

rate of around 750,000 homes per year to meet this target. Given that only Openreach has been building at this rate, there is strong doubt that it would have reached this target.

Given the various uncertainties discussed in this section, there must be significant doubt as to whether these targets will be met. We have no knowledge of what each company has provided Ofcom in response to S135 requests for this market review. However, the growth rate that needs to be achieved in the face of uncertainty leads us to expect that there is a strong risk that operators will not meet their own objectives and hence Ofcom will have overstated the size of Area 2.

4 IMPLICATIONS FOR CONSUMERS

More important than a concern for accuracy in identifying those postcodes sectors that should be included in Area 2 is the negative impact that the overestimation of the extent of Area 2 (by including geographic areas that should actually be in Area 3) will have on consumers. We refer to this area of overestimation as the "fringe area". There are two potential negative effects:

- Under-deployment of fibre; and
- Less effective competition based on existing FTTC-based wholesale products.

4.1 Under-deployment of fibre

Ofcom expects competition to provide the incentives for Openreach to deploy fibre in Area 2, whereas in Area 3 regulation is required to provide those incentives. The concern identified above is that some geographic areas in Area 2 (as identified by Ofcom) will not actually have Openreach plus at least one further operator present, and therefore Openreach will not be under competitive pressure to deploy fibre. It is conceivable that some areas could initially look attractive to an alternative fibre provider, on the basis that they can deploy fibre in advance of Openreach, but they will then become unattractive if Openreach "signals" that it intends to operate in that area. It is clear that Openreach benefits enormously from its ubiquitous presence, giving it a significant information advantage over other operators, which it can exploit strategically both in "signalling" its intentions and in making economic assessments of each geographic area.

An alternative operator could also find that the DPA infrastructure is inadequate or that there are problems associated with civil works, as suggested earlier. For a variety of reasons then this could result in some areas being avoided by alternative providers and hence Openreach would have no competitive incentive to deploy fibre in those areas. Ofcom recognises this problem in relation to Area 3:

> *Additionally, in the absence of competition, Openreach will face weak incentives to deploy new and better networks.*[26]

If those geographic areas were in Area 3 then regulatory incentives could lead to fibre deployment, but in the absence of either competitive or regulatory incentives there is a risk that they would remain without fibre investment, meaning consumers would not benefit from full fibre networks.

4.2 Less effective competition based on existing FTTC-based wholesale products

Given that this fringe area could remain fibre free, the contrasting approaches to regulation of FTTC[27]-based products in Areas 2 and 3 is particularly important. Not only might customers in these areas not enjoy the benefits of fibre, there is a significant risk that they will be harmed by the lack

[26] Volume 4, paragraph 2.5
[27] Fibre to the Cabinet

of effective regulation of FTTC-based wholesale products. Ofcom explains this issue in relation to Area 3:

> *As set out above, in Area 3 we do not expect investment in rival networks to a material extent. As a result, we consider that pricing flexibility for higher bandwidth FTTC services (GEA 55/10 FTTC and GEA 80/20 FTTC services) would harm consumers as it would not lead to significantly more network build and would likely result in higher prices than necessary to allow Openreach to recover its efficient incurred costs for its legacy FTTC network.*[28]

These fringe areas will only have the regulation of Area 2, namely a price control on FTTC 40/10, whereas in practice they will have the same competitive conditions as Area 3 and hence should have a wider set of regulations of the FTTC based wholesale products. Without this regulation there is a serious risk that Openreach would be able to abuse its market power to the detriment of customers.

4.3 An overall assessment of the impact of Ofcom's approach

Ofcom explains that its new approach to geographic markets allows its *ex ante* regulation to support investment in competing fibre networks. From our review of other regulators, drawing specifically on the examples of Spain and Italy, it is not clear that such a change is required. However, Ofcom risks causing serious harm to some consumers by moving to a speculative approach based on potential network deployment. On balance, therefore, a methodology that allows Ofcom to identify the extent of Area 2 more accurately or a reversion back to an approach based on actual network presence as has been used in the past would reduce the risk of consumer harm.

[28] Volume 4, paragraph 2.38

5 THE EFFECTIVENESS OF 40/10 AS AN ANCHOR PRODUCT

In this Section we consider whether GEA 40/10 will remain an effective anchor during the period of the charge control (2021 – 2026). Our assessment is that the evidence of consumer behaviour and response to price changes suggests that 40/10 will be an increasingly weak anchor product and that at some point over the period consumers will no longer see retail products based on GEA 40/10 as an effective substitute for those based on GEA 80/20, meaning that it will not be able to constrain prices of the higher speed service.

We explain our reasoning and the possible effect on consumers below. We first summarise Ofcom's argument for 40/10 remaining the anchor product before setting out a framework for analysis and then presenting empirical data that demonstrates that consumers appear willing to move up bandwidths regardless of the price premium for higher speeds. Finally, in Section 6 we set out the possible implications for consumers in the event that the price of 40/10 ceases to be able to constrain higher bandwidth prices.

5.1 Ofcom's Position

Ofcom first introduced anchor pricing in the 2018 Wholesale Local Access market review and sets out in Volume 4 of the WFTMR its opinion that 40/10 will remain an effective anchor, citing evidence from data that have been redacted from the consultation document. The redacted data apparently show the increase in the consumption of GEA 80/20 from 2018 to 2020 and forecast out to 2024. Ofcom then adds:

> *However, this increase has not been driven by a high demand from consumers for the higher bandwidth products, but has instead in large part been driven by provider-led programmes to upgrade customers at little or no additional cost to the customer. In particular, Openreach has incentivised provider-led upgrades by setting very low incremental wholesale prices for higher bandwidth products. This is consistent with the 40/10 providing a strong anchor constraint on higher bandwidth prices.*[29]

Ofcom adds the following in a footnote to the paragraph quoted above:

> *There is a possibility that once customers have been accustomed to higher speeds, they may be more willing to pay a higher price than they would have been willing to pay for an upgrade. However, we consider that subscribers who have been migrated onto higher bandwidths in this way are on average likely to have a lower incremental willingness to pay for faster speeds than those who upgraded themselves, and may be more willing to switch back to slower services if relative prices increased significantly, which is likely to constrain the prices of the higher speed services.*[30]

[29] Ofcom 'WFTMR 2021 – 2026'. Volume 4, Para. 1.33(a)
[30] Ibid, Footnote 11

The speculative nature of the language in the footnote is striking, as is the lack of empirical evidence to support Ofcom's claim. Ofcom provides no evidence that enough consumers will downgrade to 40/10 if the price premium of 80/20 becomes too high, describing such behaviour as merely a "possibility". Given the importance of using the right anchor product, a more robust empirical analysis of consumer behaviour is necessary to determine whether GEA 40/10 will remain an effective anchor product or whether the anchor should be increased to GEA 80/20.

5.2 Vertical differentiation and the use of anchor products for consumer protection

5.2.1 An analytical framework of vertical differentiation[31]

Vertical differentiation refers to a product space in which all consumers agree that one product is superior to the other. Thus, there are two product variants: high and low quality (q_H, q_L). All consumers would prefer q_H if there were no difference in price (p), that is $p(q_H) = p(q_L)$. In the case examined in this report, higher bandwidth broadband access is considered superior to lower bandwidth access.

However, consumers also have a "taste" (θ) which represents their marginal utility[32] of quality. Consumers also have Income (I) and expenditure on other goods (y) which affects ability to pay and are generally included in models of vertical differentiation. They have been excluded from the framework presented here for simplicity.

Consumers' utility function (U) is given as:

$$U = \begin{cases} \theta q_i - p_i, & Product\ q_i is\ bought \\ 0, & Nothing\ is\ bought \end{cases} \quad (1)$$

When $(\theta q_H - p_H) = (\theta q_L - p_L)$ consumers are indifferent between the two product variants.

Broadband is an experience good, i.e. its quality is difficult to ascertain in advance of purchase. Thus, consumers do not know whether higher speed access is superior to lower speed access before purchase. This is at least partly because the additional services a consumer can obtain from higher speed access may not be known to him/her before s/he has access to higher speed broadband and some applications will only be developed when enough consumers use higher speed broadband.

[31] The analytical framework presented here is based on Tirole, J. (1988). *The theory of industrial organization*. MIT press, Section 2.1.1.

[32] Utility is the pleasure of satisfaction derived by an individual from being in a particular situation or from consuming goods or services.

If all consumers were uniformly distributed (à la Hotelling[33]) according to taste, the marginal consumer at any given two prices points (p_H, p_L) would be located at x, which would lie between the two product variants.

If the price premium of q_H relative to q_L increased ($\bar{p}_H > p_H$), and taste remained constant, the marginal consumer would move closer to q_H and more consumers would purchase q_L, assuming tastes do not change. However, if experience of higher speed broadband meant that more consumers preferred higher speeds, i.e. θ moved towards q_H, then the marginal consumer would move towards q_L and more consumers would buy q_H.

Thus at time T_0, the marginal consumer sits at $(\theta q_H - p_H) = (\theta q_L - p_L)$ and at time T_1, after a change in prices and tastes, such that the marginal utility q_H increases, the marginal consumer is located at $(\bar{\theta} q_H - \bar{p}_H) = (\theta q_L - p_L)$.

If the increased taste for the high quality product exceeds the increase in price premium, then consumers will continue to prefer the high quality product. Thus, consumers will switch to the higher quality product so long as the inequality below holds:

$$(\bar{\theta} q_H - \bar{p}_H) - (\theta q_L - p_L) > 0 \qquad (2)$$

Taste is likely to be unobservable, but we can observe changes in the price premium for higher quality products over lower quality ones and in demand for different quality levels. So long as demand for higher speed products continues to increase as the price premium increases, we can conclude that consumers have an increased taste for the higher quality product.

The key point in the context of this paper is that if $\bar{\theta} - \theta > \bar{p}_H - p_H$ (that is the marginal utility of quality is greater than the marginal increase in price) then consumers will continue to purchase the higher quality product even if the price premium relative to the lower quality product also increases. This can be observed by examining consumers' response to a change in the price premium for the superior product and is examined empirically below in relation to broadband access speeds.

[33] Hotelling (*Harold, H. (1929). Stability in competition. Economic Journal, 39(153), 41-57.*) created a model of product differentiation in a "linear city" in which consumers were distributed evenly between vendors of goods at either end of the city. Vendors were differentiated by the distance consumers needed to travel to buy from each vendor with consumers always preferring a shorter journey, *ceteris paribus.* A similar approach can be used in the analysis of vertical differentiation with a "vertical city" replacing the "linear city".

5.2.2 Consumer protection, vertical differentiation and anchor products

Having set out a general approach to vertical differentiation, we now place that in the context of the use of an anchor product and examine whether slower speed broadband will continue to act as an effective anchor product.

The idea of anchor products was first developed as a means of incentivising investment by allowing a firm with market power some degree of pricing freedom over higher speed bandwidth[34]. As Ofcom recognises, however, anchor prices also provide some degree of consumer protection *provided that lower bandwidth products constrain the price of higher bandwidth[35].*

Anchor products exist, therefore, when products variants are vertically differentiated. In the case of broadband access, upload and download bandwidth are indicators of quality and a product offering higher bandwidth is superior to the lower bandwidth product. For the purpose of this paper a higher quality product in the retail market is considered to be based on GEA 80/20 and a lower quality product on GEA 40/10.

For the lower quality product to be an effective anchor it must offer at least the same utility (as described in equation 1 above) as the superior quality product. Consumers must therefore be prepared to trade-off the lower access speed for the lower price or, conversely, be prepared to pay more for a superior quality product.

To explain this further, suppose that at £25 per month for 40/10 and £30 per month for 80/20Mbps consumers are indifferent, i.e. each has the same utility and so $(\theta q_L - p_L) = (\theta q_H - p_H)$, where the subscripts $_L$ and $_H$ refer to the 40/10 based and 80/20 based products respectively.

If the price premium of 80/20 increased relative to 40/10 and the consumers are indifferent, then we would expect to see demand from marginal consumers switch from the high quality product to the low quality product. (How quickly we would see that switching would demand on search and switching costs, but for the sake of illustration we can assume switching is costless and instant.) The marginal consumer would now move closer to 80/20 and more consumers would buy 40/10. The anchor product would thus be working as a constraint on the higher quality product.

However, if consumer tastes have changed and there is an increased preference for the 80/20 based product then 40/10 acts as less of a constraint. The marginal consumer would now move closer to 40/10 and more consumers would buy 80/20.

[34] Williamson, Brian, Anchor Product Regulation - Retrospective and Prospective (October 7, 2013). Available at SSRN: https://ssrn.com/abstract=2336963 or http://dx.doi.org/10.2139/ssrn.2336963

[35] Ofcom '2020 WFTMR Volume 4: Pricing remedies' Para 1.32 onwards.

As we have seen above, Ofcom suggests that this will not be the case and that 40/10 is likely to continue to act as a constraint. In the section below, we draw on international data to examine whether Ofcom is correct in its assumption.

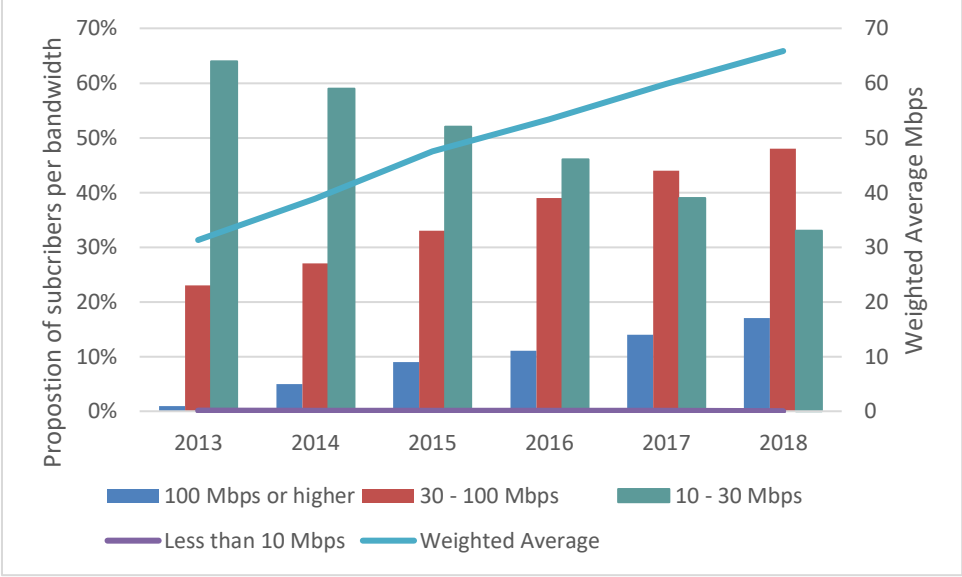
5.3 Taste and the demand for higher bandwidth broadband

In this section of the paper we examine whether there is evidence that consumers' taste for higher speed broadband access has changed and what might be causing that change in taste. We then go on to examine whether a change in the price premium for higher speed broadband access is having any effect on demand for higher speed broadband.

5.3.1 Consumer Preferences

Data provided by Ofcom show that in the period since 2013, consumers are switching to higher bandwidth access products driving up the weighted average broadband access speed for the UK as a whole. The proportion of consumers on services between 10 – 30Mbps fell from 64% in 2013 to 33% in 2018. By contrast the proportion on services of 100Mbps or more increased from 1% to 17%. Over the period the weighted average bandwidth more than doubled from 31 to 66 Mbps[36]

Figure 1: UK Subscribers per Bandwidth 2013 - 2018

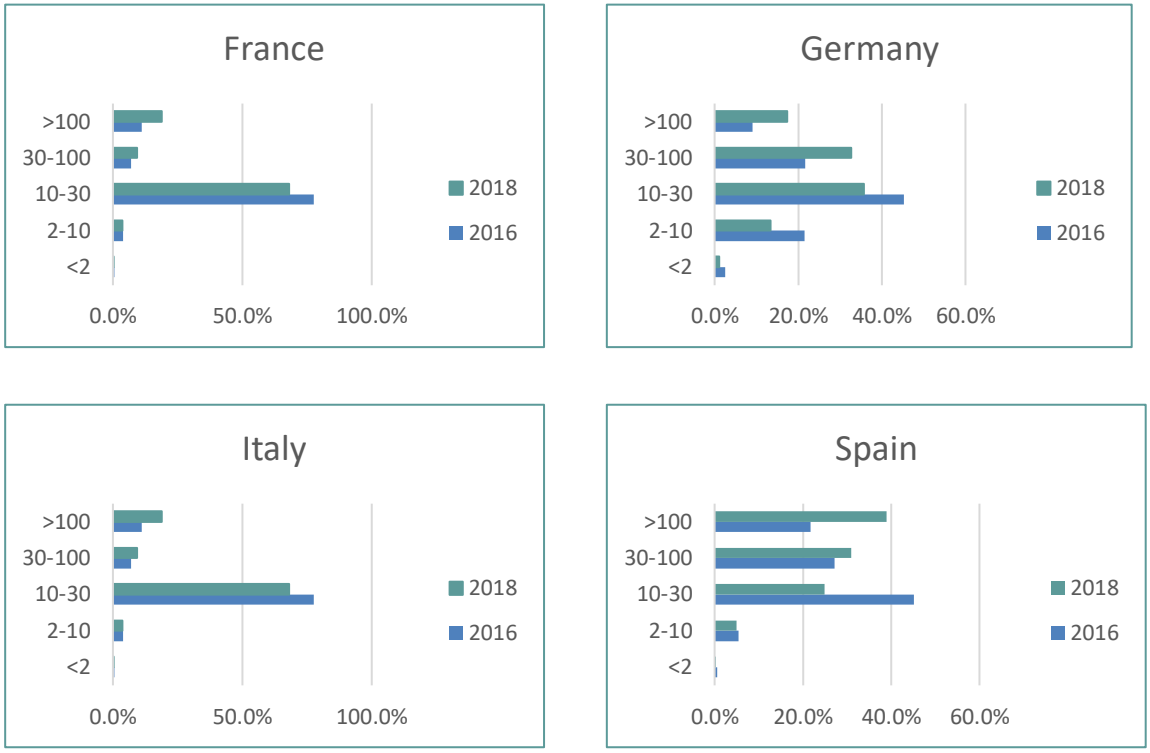


(Source: Ofcom, SPC Network)

This trend of moving up bandwidths is not unique to the UK and can be seen throughout Europe. Figure 2 below shows the trend in the four largest EU countries from 2016 to 2018, again showing the proportion of lower bandwidth subscribers decreased and increased for higher bandwidth subscribers.

[36] To calculate the weighted average have used a bandwidth of 7.5Mbps for the "<10Mbps" band and 150Mbps for the ">100Mbps" band. The mid-point has been used for other bands.

Figure 2: Proportion of Customers by Bandwidth: France, Germany, Italy, Spain

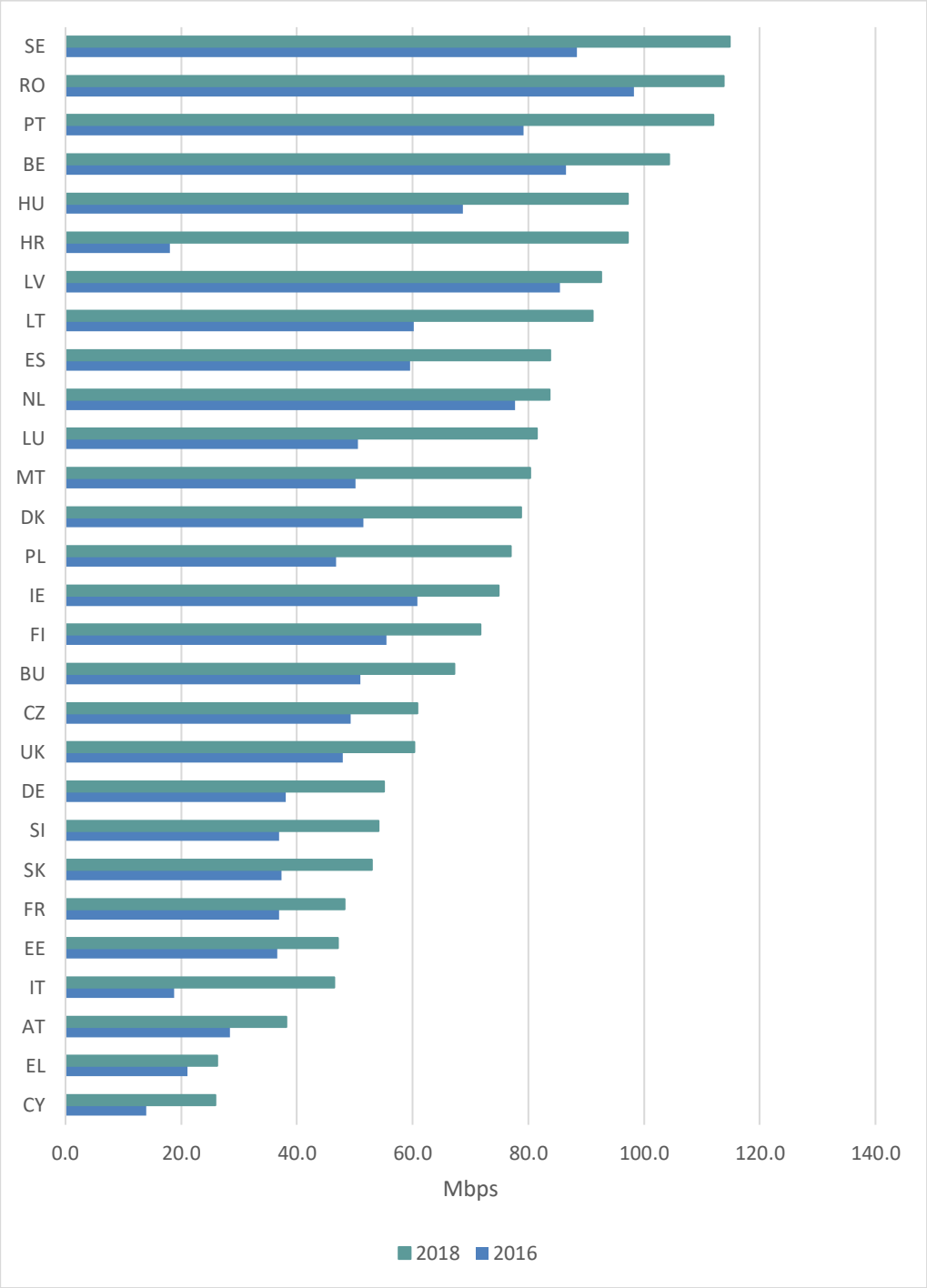


(Source: European Commission 2016 & 2018)

Figure 3 below shows the weighted average download speed for all EU countries in 2016 and 2018. As can be seen, every country has seen an increase indicating that this trend is not restricted to the largest countries only.

In all countries the weighted average speed is increasing due to the proportion of customers subscribing to packages offering 30Mbps falling and the proportion subscribing to packages above 30Mbps increasing.

Figure 3: Weighted Average Download Speed 2016 - 2018

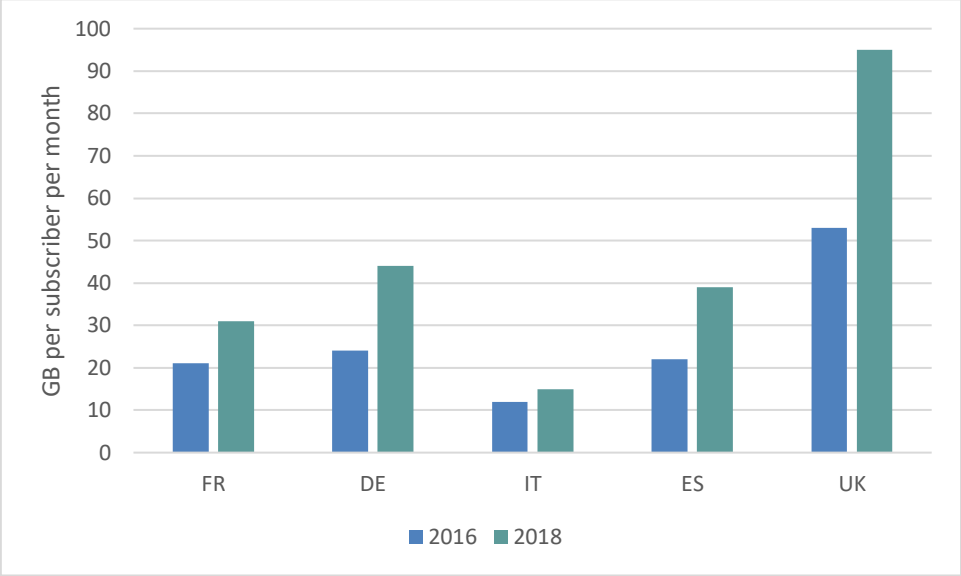


(Source: European Commission 2016 & 2018, SPC Network)

We now consider what might be driving this change in preferences towards higher speed access.

Ofcom publishes data for the average monthly download per capita for the EU5 countries[37]. These data show significant growth between 2016 and 2018, as shown in Figure 4 below.

Figure 4: Fixed Data Volumes EU5 2016-2018 (GB/Month)



(Source: Ofcom)

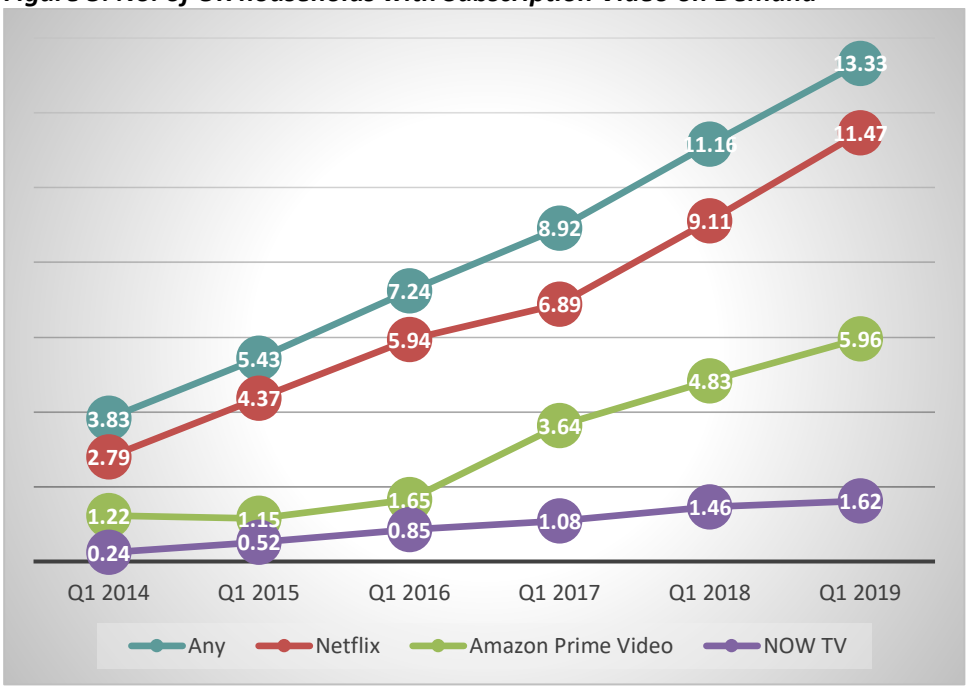
The highest proportionate growth is in Germany (83%) and the highest absolute growth is in UK (42GB per subscriber per month).

The use of video streaming services, such as Netflix, is a key driver of the demand for data and, according to Cisco, will continue to be so into the future[38]. Although broadcast TV remains the most popular means of consuming video content, this is changing rapidly and particularly amongst younger people. Ofcom data show that since 2014 there has been strong growth in the number of UK households with at least one subscription video on demand (SVoD) service. In 2014, fewer than 4 million households had an SVoD and by 2019 this had increased by a factor of 3.5 to over 13 million.

[37] The most recent data available from Ofcom are for the period prior to Jan 31st 2020 when the UK left the EU. Reference to "EU5" countries therefore includes the UK.

[38] Cisco *'Annual Internet Report (2018 – 2023) White Paper'* available at https://www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.html

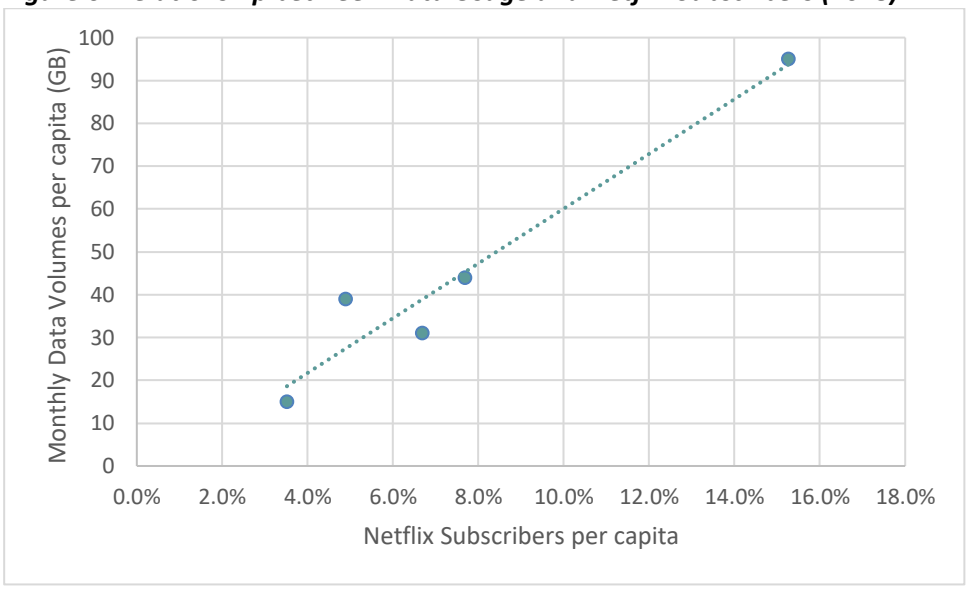
Figure 5: No. of UK households with Subscription Video on Demand



(Source: Ofcom)

Internet usage correlates very strongly with per capita subscriptions to Netflix, which accounts for the largest number of households with SVoD, as can be seen in Figure 6 below.

Figure 6: Relationship between Data Usage and Netflix Subscribers (2018)



(Source: Ofcom, Statista, Eurostat, SPC Network)

The number of subscriptions to SVoD services, however, only tells part of the story. Once consumers have moved up to higher levels of bandwidth they may also find they can use higher quality end user equipment. Ofcom data show that in 2019 sales of 4K TVs more than doubled

from 17% in 2017 to 35% in 2019[39]. 4K TVs consume more bandwidth for the higher picture quality, making it less likely that consumers with a high specification device would move down bandwidths if the price premium became too high.

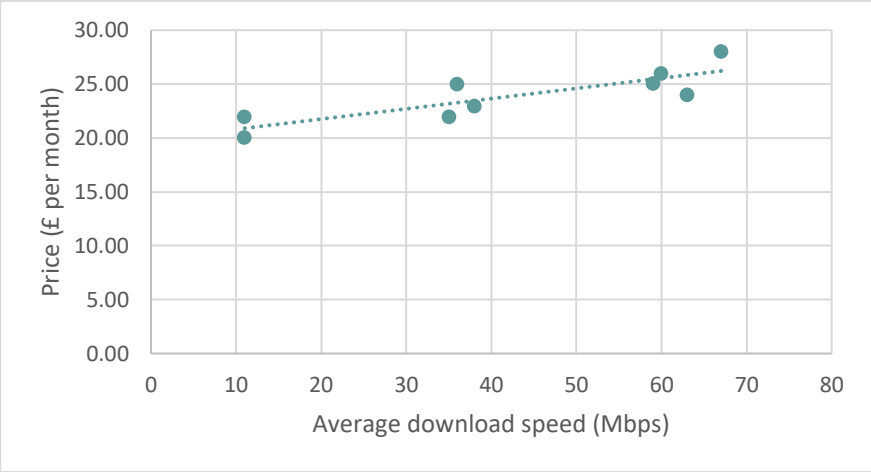
What is unknown is whether increasing demand for SVoD, and indeed non-subscription VoD such as YouTube, and the demand for higher quality end user equipment are driving the demand for higher bandwidth access or whether consumers who have traded up to higher bandwidths find that they can now watch VoD without the interruptions that come from significant amounts of data buffering. Nevertheless, the key question is whether the change in taste for higher speed access means that 40/10 is no longer an effective anchor. This is considered in the next section.

5.3.2 The Effectiveness of 40/10 as an Anchor Product

The key question to be analysed in this paper is whether a lower speed (40/10) product acts as an effective anchor on higher speed (80/20) products. If this were the case we would expect to see the proportion of customers subscribing to lower speeds increase as the price premium for higher speeds increases.

Ofcom's claim is that that the move up to higher bandwidths is "provider-led" and that Openreach has incentivised providers to upgrade. We understand from Vodafone that the contract between Openreach and providers includes very significant rebates if providers meet agreed half-yearly targets for higher bandwidth versions of GEA, i.e. versions above the anchor product of 40/10. This leads to a very shallow retail price gradient between standard (ADSL), superfast (GEA 40/10) and Ultrafast (GEA 80/20) broadband, when the rebate is applied and passed on to consumers. This price gradient is shown in Figure 7.

Figure 7: Retail Broadband Price Gradient



(Source: Company Websites, SPC Network)

The two markers on the left of the chart show the price and advertised average download speeds of retail packages based on ADSL, the three in the middle on GEA 40/10 and 55/10 and

[39] https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/smart-speakers-and-4k-tvs 28 November 2019

the four on the right on GEA 80/20. The shallowness of the price gradient is clear to see. In all cases there is an overlap between the prices for each group of products. The competitiveness of the retail market mean that these retail price differences reflect the wholesale prices set by Openreach for different access products, after contractual discounts.

The evidence above seems to support Ofcom's view that the move up to higher bandwidth is indeed "provider-led" and, in particular, are encouraged by Openreach through its rebate programme. However, Ofcom does not appear to recognise that so long as 40/10 is the anchor product then Openreach has a clear commercial interest in encouraging providers to move their customers onto higher speed versions of GEA where the price is unregulated. We will argue later in this paper that 40/10 is an increasingly weak anchor and that consumers are already not willing to trade down and that, therefore, Openreach has the incentive to raise the price of 80/20 above the competitive level and the ability to do so.

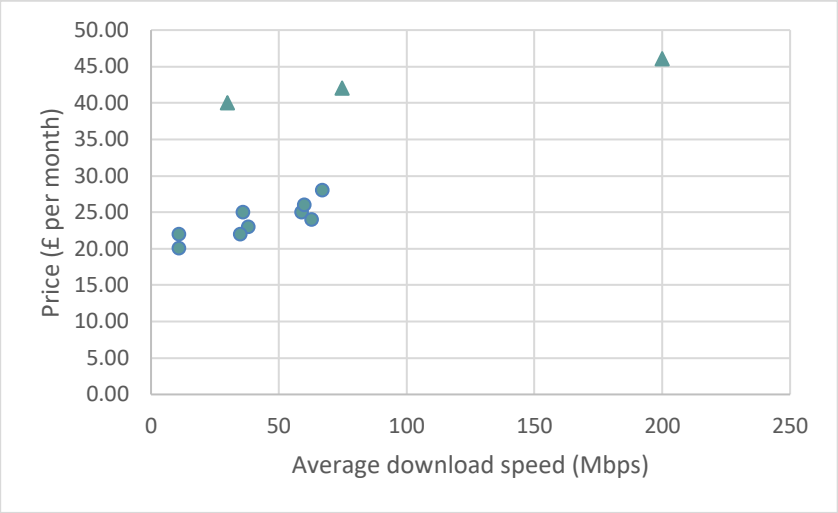
The UK is home to a natural experiment regarding the demand for fibre based broadband as the area around and including the city of Kingston upon Hull (the Hull Area) is not part of the BT/Openreach network and has been upgraded so that close to 100% of households have access to full fibre broadband. The Hull Area is also not subject to the "provider-led" programmes that Ofcom refers to the WFTMR consultation[40]. This allows us to examine whether consumers are willing to trade up even where there are no provider-led initiatives to do so.

KCOM is the incumbent operator in the Hull Area and offers access speeds of 30 Mbps, 75 Mbps, 200 Mbps, 400 Mbps and 900 Mbps on its fibre network. Figure 7 above is reproduced below incorporating the prices in Hull for their three lowest bandwidth products. The three triangular markers at the top of the graph represent KCOM prices and speeds.

KCOM prices follow a similar shallow price gradient to those in the rest of the UK, but at a significant premium over UK wide prices. For example, the average price of the three retail products based on GEA 80/20 is £26.00, whereas the price in the Hull Area for the 75Mbps package is £42.00[41]: a premium of 61%.

[40] Ofcom, op. cit. footnote 30.
[41] Source: KCOM website. Checked 15th April 2020

Figure 8: Retail Broadband Price Gradient (incl. KCOM)

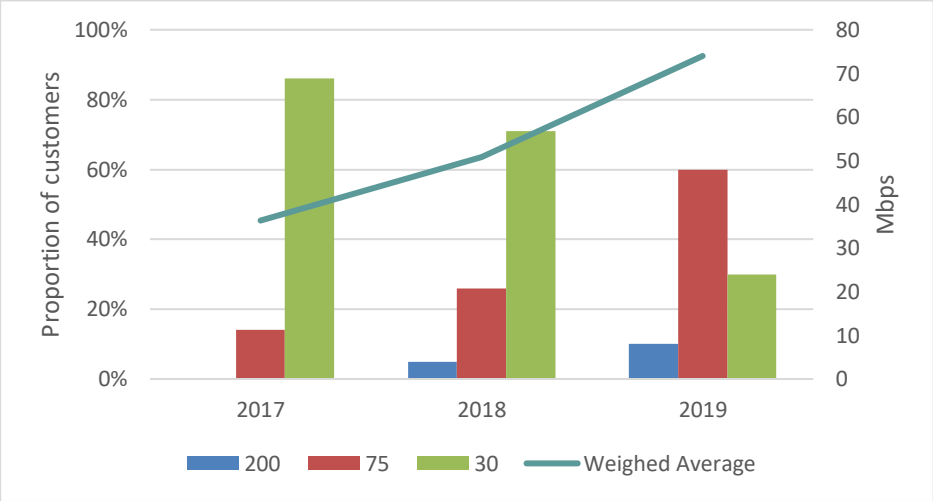


(Source: Company Websites, SPC Network)

There are no public data on the number of consumers using each bandwidth in the Hull Area and so it is not possible to recreate Figure 1 showing the proportion of consumers on each bandwidth. However, using average download speed data from Thinkbroadband.com, we have been able to estimate the distribution of customers across the current set of KCOM's products to produce a weighted average similar to the mean calculated by Thinkbroadband for the years 2017 – 2019. The results are shown in Figure 9 below.

As can clearly be seen, there needs to be a significant decline in the number of customers subscribing to the 30Mbps product and a consequent increase in subscribers to the 75 Mbps and 200 Mbps packages. Some 60% of customers would need to be signed up to the 75 Mbps package to achieve the average download speed calculated by Thinkbroadband.com for 2019.

Figure 9: Hull Subscribers per Bandwidth 2017 - 2019



(Source: SPC Network)

We have also calculated what the distribution of customers across KCOM's product set would need to be in the rest of the UK to produce the average download speed calculated by Thinkbroadband.com for 2019. The comparison is shown in Table 4.

This calculation suggests that proportionately three times as many customers connect to the high bandwidth product in the Hull Area, where FTTH is ubiquitous, as in the rest of the UK. This higher rate is despite a higher price and the lower median income in the Hull Area than the rest of the UK: around £27,500 in the Hull Area compared with £30,400 in the UK as a whole[42].

Table 4: Comparison of subscriber distribution: UK and Hull

	Hull	UK
200 Mbps	10%	0%
75 Mbps	60%	18%
30 Mbps	30%	82%

The increasing proportion of customers using high speed broadband in the Hull Area, where there are no equivalent provider-led initiatives to the rest of the UK, suggests that consumers are willing to pay a premium for higher speed access. Data on the number of subscribers to SVoD and the number of 4K TVs are not disaggregated to the level of individual cities. However, on the assumption that the Hull Area is not significantly different from the rest of UK, we could expect that once consumers have subscribed to SVoDs and/or have higher specification devices, they would be less willing or able to downgrade packages. Again, this challenges Ofcom's view that consumers would move down to lower speeds if higher speed broadband became more expensive.

5.3.3 Response to a Price Change

In Section 5.2.1 above we set out a framework for establishing whether the utility derived from a superior product could outweigh an increase in price premium if consumer tastes had changed to prefer the higher quality product. We proposed that if the following condition held, then consumers would prefer the higher quality product even if the price premium increased:

$$(\bar{\theta} q_H - \bar{p}_H) - (\theta q_L - p_L) > 0$$

To test for this, we have analysed the effect of a change in the price premium of >100Mbps product compared with 12-30Mbps on the proportion of consumers subscribing to higher speed (>100 Mbps) products across 27 EU Member States[43].

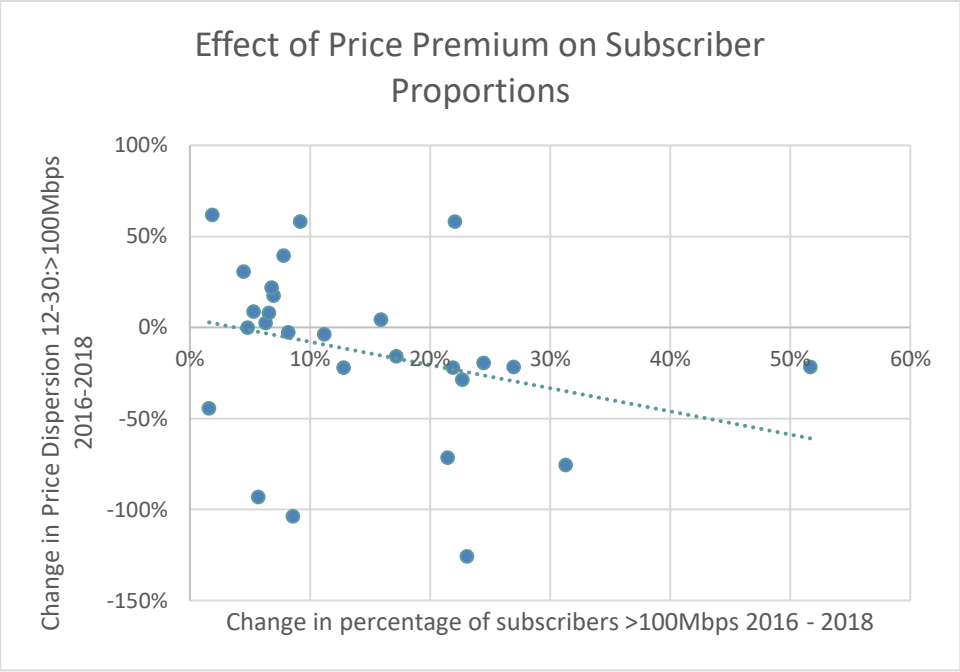
The results are shown in Figure 10. In the chart each marker represents an EU country. On the X-axis is the percentage change in the proportion of subscribers to 100Mbps and above products

[42] Source: https://www.plumplot.co.uk/Hull-salary-and-unemployment.html (19th March 2020)
[43] Greece is not included as the data source did not have price data for 100Mbps packages in 2016.

between 2016 and 208. In all countries there has been an increase in this proportion, hence all values are positive.

On the Y-axis is the percentage point change in the price premium for 100Mbps products compared with 12-30Mbps products over the same period. As can be seen, in some countries the premium increased whilst in others in decreased. The strong indication from this chart is that consumers are willing to move up bandwidths irrespective of any change in the price premium. Ofcom's statement in Vol. 4, para. 1.33(a) of the WFTMR and the accompanying footnote are, therefore, unsupported by the available empirical evidence. Given the trends in tastes, usage habits and responses to price increases there is no reason to presume, as Ofcom does, that consumers will trade down to a slower speed access product in the event of an increase in the price premium of higher speed products.

Figure 10: Effect of Change in Price Premium on Change in Subscriber Volumes: 2016 - 2018



(Source: European Commission 2016 & 2018, SPC Network)

The trend line shows a negative relationship, i.e. where the price premium has decreased more consumers have traded up to higher speed products. The mathematical relationship between the two variables, based on a simple linear regression, is:

$$\Delta Subs = 0.13 - 0.07\Delta Premium$$
(T Stat = -1.56)

This indicates that there is a weak negative relationship between the change in the number of subscribers to 100 Mbps packages and the change in the price premium, as shown by the trend line. However, the T Stat means that that relationship is not statistically significant at 5% or even 10%.

The strong indication from this chart is that consumers are willing to move up bandwidths irrespective of any change in the price premium. Ofcom's statement in Vol. 4, para. 1.33(a) of the WFTMR and the accompanying footnote are, therefore, unsupported by the available empirical evidence. Given the trends in tastes, usage habits and responses to price increases there is no reason to presume, as Ofcom does, that consumers will trade down to a slower speed access product in the event of an increase in the price premium of higher speed products.

From the analysis above, we conclude that there is an increasing likelihood that consumers' taste for higher speed broadband access will outweigh an increase in the price premium for retail products based on GEA 80/20 rather than GEA 40/10. It is quite probable, therefore, that at some point during the period 2021 – 2026 40/10 will cease to be an effective anchor and will be unable to constrain the price of retail products based on GEA 80/20. In the next section of this paper we consider the risks of retaining an anchor product that is ineffective.

5.4 Section Summary and Conclusions

This section of the paper has set out a framework for assessing whether a lower quality vertically differentiated product can act as an effective anchor on a higher quality product. If the utility of the higher quality product is greater than the price premium than consumers will prefer the higher quality product.

The section has also shown that across Europe a greater proportion of consumers are now buying higher speed access than in 2016 and has shown that this increase is correlated with an increase in the consumption of SVoD and higher specification consumer devices, such as 4K TV.

Finally, this section has shown that consumers across Europe are subscribing to higher speed broadband regardless of whether the premium has increased or decreased. A simple linear regression analysis shows that whilst the relationship between the change in 100Mbps subscribers and change in price premium is negative, this is both weak and not statistically significant at 10% confidence.

Our conclusion from this section is that slower speed broadband is very unlikely to act as an anchor in future. Although we cannot say exactly when, we expect that during the current review period, consumers would not trade down to slower speed products if the price differential increased and so GEA 40/10 will not act as an effective anchor product.

The next question to consider, therefore, is the likely effect of this from a competition perspective and, therefore, the correct regulatory response.

6 THE REGUALTORY RISK OF A TOO SLOW ANCHOR PRODUCT

In this section we consider the potential risks for customers of the anchor product being set too low when demand for higher speeds is unaffected by the price premium.

In paragraph 1.33(a) of the WFTMR (quoted above), Ofcom gives no consideration to Openreach's possible motive for setting a minimal price difference between 40/10 and 80/20 versions of GEA. We, therefore, speculate on what that intention or effect might be, bearing in mind what Ofcom says at WFTMR Volume 4 para. 2.5:

> *Absent regulation, Openreach would have the incentive and ability to fix and maintain prices for WLA … at an excessively high level … so as to have adverse effects for end users."*

The evidence presented above shows that consumers are on a one-way trajectory up the bandwidth gradient and that, even when the price premium for a higher bandwidth increases, consumers are still willing to trade up. A simple regression shows that there is no significant relationship between a change in price and a change in demand. Over time, as more consumers move up to higher bandwidths, 40/10 is unlikely to act as an effective anchor on 80/20 and higher bandwidths.

Let us assume that at some point between 2021 and 2026 a tipping point is reached at which 40/10 is no longer an effective anchor due to consumer demand for video streaming services and 4K TV for example. Let us also assume that 40/10 is the only regulated product in Area 2 and so Openreach has pricing freedom on 80/20 and above. Once a critical mass of customers has migrated to 80/20, whether due to demand pull or provider push, Openreach would have the ability and incentive to raise the price of 80/20 above the competitive level knowing that consumers would not be willing to trade down and so operators would have to continue buying GEA 80/20. It is therefore in Openreach's commercial interests to encourage provider-led initiatives that move consumers up to retail products based on 80/20. This would be a particular problem in the fringe parts of Area 2 that have been misallocated and should have been allocated to Area 3.

In this case, consumers would lose out by paying excessive prices and not being upgraded to FTTP.

By not regulating the price of 80/20, Ofcom would be making, what BEREC describe as a "type I error": applying deregulation or lighter regulation where regulation, or stronger regulation, is still justified[44]. BEREC goes on to say:

> *The effects of such situation would normally be a reduction in the competitive pressure faced by the SMP operator, resulting in an increase in prices and a reduction in quality*

[44] BEREC (2014) *'BEREC Common Position on geographical aspects of market analysis (definition and remedies)'* para. 169.

> *and innovation to the detriment of consumers. In addition, in the absence of a regulated wholesale service, market entry might be rather difficult, which could lead to a reduction in effective competitive pressure at the retail level.*[45]

If barriers to entry were low, then such price rises may be met with competitive entry that could constrain Openreach. However, as we are concerned that Ofcom has overstated the size of Area 2 there will be parts of the Area where competitive entry or expansion is not economic for other operators, allowing Openreach to continue to benefit from excessive prices.

Ofcom could respond by making 80/20 the anchor product part-way through the charge control period, but this would require a proper regulatory process to be followed, which would take time. During that period Openreach would still have the incentive and ability to raise prices above the competitive level, harming consumer welfare.

Our view based on our analysis of the empirical data, is that Ofcom would better protect both competition and consumers by making GEA 80/20 the anchor product in the first place, as this will more likely remain an effective anchor until 2026.

[45] Ibid para. 170

7 CONCLUSIONS

This report has shown that the static approach Ofcom has taken to defining Area 2 when network development is inherently uncertain, for a variety of reasons, runs the risk of overstating the size of Area 2. This matters because the regulation Ofcom proposes to impose on Openreach may have a negative effect on consumers if geographic markets are incorrectly defined. This negative effect will be most visible in the fringe: that is those postcode sectors that should be in Area 3 but are assigned to Area 2.

Ofcom relies on competition to incentivise fibre investment in Area 2 and expects the regulation of an anchor product to incentivise investment by Openreach having pricing freedom for higher bandwidth versions of GEA. In Area 3, Ofcom expects that its pricing regulation will provide Openreach with incentives to invest even if it faces no competitive pressures.

However, if Ofcom misallocates postcode sectors to Area 2 that should really be in Area 3, as seems likely it will do, then Openreach will be under neither competitive pressure nor regulatory incentive to invest. In these areas, therefore, there is a significant risk that consumers will suffer.

This report has also examined whether GEA 40/10 is likely to remain an effective anchor product over the period from 2021 – 2026. Consumer behaviour in the Hull Area, the rest of the UK and Europe in general suggests that consumers trading up to higher bandwidth products and this is irrespective of the price premium charged for that superior product.

Our concern is that if 40/10 ceases to be an effective anchor, as consumers would not trade down, then Openreach will have the incentive and ability to set prices at an excessively high level, as Ofcom indicates. Setting the anchor product at 80/20 would remove this possibility and keep prices down to the competitive level.