SPC Network

Is GEA 40/10 and Effective Anchor Product?

Report for Vodafone UK and Sky

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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

In the Wholesale Fixed Telecoms Market Review (WFTMR) of January 2020 Ofcom has proposed to use anchor product regulation to constrain wholesale prices of GEA 80/20 and higher speeds using a regulated price for GEA 40/10 in Area 2 only. In its further consultation, issued in July 2020, Ofcom proposed to extend the anchor product to Area 3 (Ofcom 2020A & B). Area 2 is defined as that part of the UK where there is already some material commercial deployment by rival networks to Openreach, or where this could be economic. Area 3 is where there no rival networks to Openreach are expected to be built.

The concept of anchor product pricing emerged in 2007 as a means to allow investment decisions to reflect value, risk and reward and to safeguard end users from monopoly abuse where competition was insufficient (Williamson 2007). The consumer safeguarding aspect works because the price of the anchor product constrains other "superior" products: if the provider sets the price of superior products too high, consumers will trade down to the anchor.

Ofcom has always recognised that anchor product regulation would be ineffective if the anchor product is too slow, compared to the next non-anchor product, as it would not then act as an effective substitute. Thus, the anchor product may need to change over time if consumer demand changes due to, for example, consumption of HDTV (Ofcom 2007, para A7.11).

SPC Network prepared a report for Vodafone in response to the January 2020 consultation document that, *inter alia,* showed evidence from EU countries (including the UK) that demand for higher speed broadband services increased independently of whether the price premium for the higher speed increased or decreased over time.

In this report, Vodafone and Sky, collectively account for ca. [✂]% of broadband subscribers, have commissioned SPC Network to analyse demand for services based on GEA 80/20 and GEA 40/10 given the relative of the two services and, therefore, whether GEA 40/10 is an effective anchor. To do so, we have created two separate models:

1. A price reaction model that tests how operators set prices of GEA 80/20 based products in relation to rivals' GEA 80/20 products and in relation to GEA 40/10 based products.

2. Demand models for each of Sky and Vodafone[1] which assess how demand for retail products based on GEA 40/10 and 80/20 respond to prices.

The models are based on retail prices and demand which feed through into demand in the wholesale market as demand for GEA 40/10 and 80/20 is derived from the retail market. The analysis has found that:

- UK broadband providers set prices of 80/20 based services taking account of the price of competitors' 80/20 based services but that they take no significant account of rivals' 40/10 based services;
- Demand for 80/20 based services for each of the two operators whose data are analysed (Sky and Vodafone) is found to be independent of the price of 40/10 based services.

On the basis of these findings, it is our view that GEA 40/10 is not an effective anchor product. Indeed, demand for 40/10 is now so low that a retail service based on GEA 80/20 could be regarded as the entry level broadband service. Ofcom recognises that, absent regulation, Openreach has the incentive and ability to maintain prices of Wholesale Local Access at an excessively high level (Ofcom 2020A, Vol. 4, Para. 2.5). It is our view, based on the evidence in the report, that the weakness of GEA 40/10 as an anchor product means that Openreach could take advantage of this incentive and ability and set prices above the competitive level with consequent harm for consumers. Such a problem could be mitigated if Ofcom set GEA 80/20 as the anchor product from 2021.

[1] Separate models for each operator have been created for reasons of confidentiality and to take account of differences in the time series data provided.

2 INTRODUCTION

In its Wholesale Fixed Telecoms Market Review (WFTMR) consultation document issued in January 2020, Ofcom proposed to use an "anchor product" approach to price regulation in Area 2: that part of the UK where there is already some material commercial deployment by rival networks to Openreach, or where this could be economic. Ofcom proposed that Openreach's GEA 40/10[2] product would be the anchor. In Area 3, where there is unlikely to material competition to Openreach, Ofcom proposed to introduce a charge for each access speed (Ofcom 2020 A). In July 2020, Ofcom issued a further consultation document in which it proposed to extend the anchor product pricing to Area 3 (Ofcom 2020 B), keeping the same anchor product.

SPC Network was commissioned by Vodafone UK to prepare a response to the January WFTMR addressing, *inter alia,* whether GEA 40/10 would remain an effective anchor over the period of the market review or whether consumer demand for a higher access speed would render GEA 40/10 ineffective as anchor product. SPC Network's report drew on evidence from across the EU and found that there was increasing evidence to suggest that consumers were choosing to upgrade their access speed irrespective of whether the price premium for higher speeds increased or decreased relative to lower speeds (SPC Network 2020).

Vodafone and SPC Network presented the results of the analysis to Ofcom on 14th July. As a result of that meeting, Vodafone has asked SPC Network to undertake a more detailed analysis of the effectiveness of GEA 40/10 as an anchor product using subscriber data provided by Vodafone. Subsequently, Sky agreed to take part in this analysis and provided its data as well[3].

This paper presents the results of this analysis and is structured as follows:

- Section 3 describes the concept of anchor pricing, in particular its role in consumer protection;
- Section 4 sets out the hypothesis that GEA 40/10 is no longer an effective anchor; describes the econometric models used to test this hypothesis; and presents the results of those

[2] Generic Ethernet Access. The 40/10 refers to a download speed of 40 Mbps and an upload speed of 10 Mbps.
[3] Datasets were provided to SPC Network only and were not shared between the operators. Each operator has only seen the results of the model using its data.

models. Separate models are presented for Sky and Vodafone to maintain confidentiality and to allow from some differences in the time series data provided by the operators;

- Section 5 concludes and sets out the policy implications of the findings.

SPC Network acknowledges the support of both Sky and Vodafone. However, the findings presented here are those of SPC Network only and may not coincide with the views of either Sky or Vodafone.

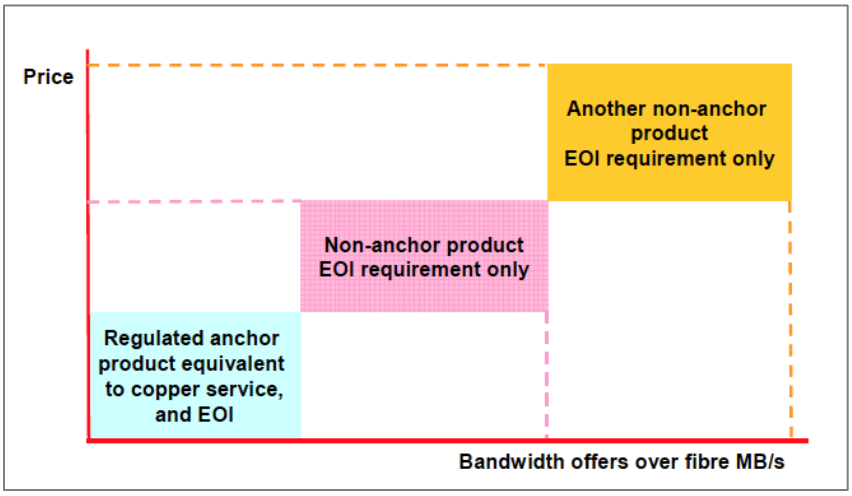
3 ANCHOR PRICING

3.1 Development of the Idea

The idea of anchor product pricing as a regulatory tool first emerged in 2007. Brian Williamson described anchor product regulation as an approach that “would allow investment decisions to reflect value, risk and reward while at the same time safeguarding applications-based competition in downstream markets and protecting end users from potential monopoly abuse where competition is insufficient” (Williamson 2007).

The concept of anchor pricing is quite simple. An entry level product provided by the dominant access provider, in this case a low speed broadband service from Openreach, is declared the anchor product and its price is regulated regardless of the technology used to deliver that product. The dominant operator is then allowed pricing flexibility on higher speed access services, i.e. the price of higher speed services is unregulated. If the dominant firm seeks to set too high a price for higher speed services, then consumers will trade down to the lower speed service. Thus, the unregulated price of high-speed broadband is constrained by the regulated price of the anchor, as illustrated in Figure 1.

Figure 1: Anchor Product Pricing



Source: Williamson 2007

At the time that the anchor product concept was developed, there was little fibre deployment in the UK. The expectation then was that the anchor product would be the equivalent to what was available over copper access. Allowing the dominant operator to have pricing freedom over higher speed services would encourage investment in more fibre to the cabinet or even to the home. This investment incentivising property of anchor pricing is described by Williamson as providing:

> *"pricing freedom to allow the potential investor to explore whether there are service price points which generate incremental revenue for quality service that exceed the incremental cost associated with that investment"* (Williamson 2014)

Ofcom took up the idea of anchor product regulation in its 2007 consultation on policy approaches to Next Generation Access (Ofcom 2007, Annex 7). Ofcom distinguished between a 'static' and a 'floating' anchor regime. It described a static anchor as a product defined at the beginning of the regime that would not make consumers worse off by taking the anchor product. Thus, the anchor product would be "similar to those of the current generation broadband at the time the anchor is imposed, at a price akin to that of existing current generation broadband" (Ofcom 2007, para. A7.3). By contrast:

> *"A 'floating' anchor product can be adopted to potentially mitigate the risk that the anchor fails to remain an effective price constraint on higher bandwidth products over time by incorporating a mechanism to update the anchor product over time..."* (Ofcom 2007, para. A7.4)

Ofcom recognises that having the correct specification for the anchor product is essential if this form of regulation is to be successful. If the initial definition is incorrect, i.e. too slow an access speed compared to the next higher speed product, it would not act as an effective anchor. This would allow the bottleneck asset owner to leverage market power into non-anchor products. The bottleneck asset owner could then abuse that market power by, for example, setting excessive pricing knowing that its customer has little option to trade down (Arnott 2008).

Ofcom also recognises that the anchor product and prices may need to change over time in response to technology development and customers' demands and expectations. What customers view as a basic broadband product today may change significantly if, to use Ofcom's example, consumption of High Definition video content takes off (Ofcom 2007, para. A7.11).

Outside the UK, the concept of anchor pricing was taken up the European Commission who recognised, in its Recommendation on non-discrimination (European Commission 2013), that an effective regulated anchor could constrain the price of higher speed broadband services. It defined a copper anchor as:

> *"…a cost-oriented copper wholesale access product which constrains the NGA prices in such a way that NGA services will be priced in accordance with the consumers' willingness to pay for the additional capacity and functionalities an NGA-based retail product can provide in comparison with a copper-based retail product."* (European Commission 2013, Article 6(c))

Anchor pricing was also picked up in Australia in relation to its National Broadband Network (NBN), a government investment in high speed broadband to be available nationwide on a wholesale only basis, and for the same reasons set out by Ofcom. Specifically, in relation to the consumer protection aspects of anchor pricing, the anchor price acts as a constraint on pricing of other generally substitutable services (Ergas 2008). In the same context, de Ridder (2008) suggests that of nine different approaches to pricing for the NBN, anchor pricing is the only one that means all four outcomes he considered desirable: return on investment, affordability to end users, affordable to open access and not foreclosing alternative investment. He concludes by stating that in his view:

> *"…a vertically integrated access-provider with a retail-price based access regime, possibly in conjunction with anchor pricing, provides the best prospect of getting access pricing for the [Fibre to the Node] network that is just right"* (de Ridder 2008, p.12)

In the analysis that follows, the efficacy of anchor product regulation to stimulate investment and protect consumers from excessive pricing is not challenged. Rather the focus of the analysis is whether GEA 40/10 remains an effective anchor to protect consumers in the light of changing demands and expectations.

3.2 The Economics of Anchor Pricing

Anchor product pricing is based on the economics of vertical differentiation and the substitutability of a lower priced 'inferior' product for a higher priced 'superior' product. This occurs when there is 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 to be superior to lower bandwidth access.

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

Consumers' utility function (*U*) is given as:

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

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.

[✂]

If all consumers were uniformly distributed (à la Hotelling[4]) 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.

[4] Hotelling (2929) 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".

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:

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

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.

3.2.1 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.

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 GEA 40/10 and £30 per month for GEA 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 GEA 80/20 increased relative to GEA 40/10 and 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 depend 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 GEA 80/20 and more consumers would buy GEA 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 GEA 80/20 based product then GEA 40/10 acts as less of a constraint. The marginal consumer would now move closer to GEA 40/10 and more consumers would buy GEA 80/20.

As we have seen above, Ofcom suggests that this will not be the case and that GEA 40/10 is likely to continue to act as a constraint. This suggestion is tested in the next section of the paper.

4 THE MODELS

4.1 Market Background

Broadband providers, such as Sky and Vodafone, sell a variety of broadband packages, usually differentiated by speed, in the retail market to consumers. Vodafone, for example, sell products branded "Superfast 1" and "Superfast 2" offering average download speeds of 35 Mbps and 63 Mbps respectively. Until May 2019, Sky's equivalent products were Broadband Superfast and Broadband Ultrafast offering similar speeds. In May 2019, Sky changed their product portfolio and only offer a single price package regardless of the download speed available at the customer premises.

Sky and Vodafone both acquire wholesale access from Openreach, purchasing either the GEA 40/10 package or GEA 80/20 package dependent on the retail customer's choice of package in the case of Vodafone, and since May 2019 the fastest speed available in the case of Sky. Prior to May 2019 Sky's choice of wholesale product was also based on the retail product sold[5].

The demand for GEA 40/10 and GEA 80/20 is, therefore, derived from the demand for retail products, which in turn is affected by both the relative price and utility of the two products. Therefore, the extent to which GEA 40/10 acts as an anchor product at the wholesale level can be measured by changes in demand for retail products based on GEA 40/10 and GEA 80/20.

4.2 Hypothesis

The hypothesis to be tested is that consumer demand for higher speed broadband services means that GEA 40/10 is no longer an effective anchor product that constrains the price of GEA 80/20 at the wholesale level.

To test this hypothesis, we have created two separate models:

- A price reaction model that tests how operators set prices of GEA 80/20 based products in relation to other GEA 80/20 products and in relation to GEA 40/10 based products.
- A demand model for each of Sky and Vodafone which assesses how demand for retail products based on each of GEA 40/10 and 80/20 responds to prices.

[5] For this reason, the Sky model reported below is based on data up to May 2019.

4.3 Price Reaction Model Description and Results

This section reports the price reaction equations that model how the price a provider charges for a product (e.g. 80/20) will be affected by pricing of competitors both for the same product (80/20) and also for a potential substitute (40/10), lagged by one week. Lagging prices by one week is necessary to avoid endogeneity, but also captures the fact that providers will not be able to react instantaneously to competitors' prices.

The model uses weekly pricing data from April 2017 to July 2020 for five operators (BT, Sky, TalkTalk, Virgin Media and Vodafone) [✂].

The equations take the form:

$$P40_{i,t} = \alpha_{40,i} + \beta_{40}\, P40\_comp_{i,t-1} + \gamma_{40}\, P80\_comp_{i,t-1} + u_{40,i,t}$$

$$P80_{i,t} = \alpha_{80,i} + \beta_{80}\, P80\_comp_{i,t-1} + \gamma_{80}\, P40\_comp_{i,t-1} + u_{80,i,t}$$

where:

$P40_{i,t}$ and $P80_{i,t}$	are prices of provider *i* for 40/10 and 80/20 services respectively in week *t*;
$P40\_comp_{i,t-1}$ and $P80\_comp_{i,t-1}$	are the minimum prices charged by other providers (excluding operator *i*) for 40/10 and 80/20 services respectively in week *t-1*;
$\alpha_{40,i}$, β_{40}, γ_{40} *and* $\alpha_{80,i}$, β_{80}, γ_{80}	are estimated model parameters. If the competitive price of 80/20 services changes by £1, operator *i* will change its own price by £β_{80}. Similarly, if the competitive price of 40/10 services changes by £1, operator *i* will change its own price by £γ_{80}. Any permanent price differentials between providers are allowed for in the provider specific constant term α_i;
$u_{40,i,t}$ *and* $u_{80,i,t}$	are model residuals for the 40/10 and 80/20 equations respectively in week *t*.

A priori, we expect a large β_{80} (possibly close to one) as providers directly compete using the same 80/20 product, but $\gamma>0$ only if 40/10 services are also considered substitutes for 80/20 services.

Table 1: Results from estimation of price reaction equation

Panel data: *860/688 observations, made up of 172 observations on each of 5 providers*	**Competitor price for 40/10**	**… significance**	**Competitor price for 80/20**	**… significance**	**Constant**
Prices for 40/10 Services					
Fixed Effects (FE) model	0.0227		0.3726	****	17.3592
Random Effects (RE) model	-0.0248		0.3843	****	18.1098
Prices for 80/20 Services					
Fixed Effects (FE) model	-0.1619		0.8330	****	14.3454
Random Effects (RE) model	-0.1670		0.8342	****	14.4258

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
**** Significant at 0.1% level

The data is pooled into a panel dataset with only variations in the constant α_i between providers. Estimation is carried out using Fixed Effects (FE) and Random Effects (RE) models, where the effects are the constant terms (α_i, either fixed or drawn from a statistically random distribution). In this context we expect the FE model to be more appropriate (since there is not a "random distribution of providers"). However, in practise the results are essentially the same between the two different estimation methods.

The results show that when pricing 80/20 services, the price of competitors' 80/20 services is extremely important. Providers will attempt to track competitor prices; e.g. a provider will respond to a £1 change in the competitive price by changing its own price by £0.83 in the same direction. Generally, the results conform closely to our *a priori* hypothesis with a statistically significant value of β close to 1.0. However, 40/10 service prices have no statistically significant influence on 80/20 prices, i.e. γ is not statistically significant from zero.

This shows that for 80/20 services, providers do price according to competitors' prices for the same product but do not take significant account of prices for 40/10 services.

For 40/10 services however, most providers are concerned to maintain a discount against 80/20.

4.4 Demand Model Introduction

This section reports on the demand equation that models the number of gross additions to each of the Sky and Vodafone network for a particular service (e.g. 80/20) as a function of:

- Each operator's own prices for the service;
- "Competitive prices" for the same service from other providers
- "Competitive prices" for a potentially substitute services (40/10) provided by either of the modelled operators or another provider.

Demand is measured by Gross Additions as this is closest to actual consumer decisions to join the network based on available information such as current prices. Gross additions are customers from any source, including upgrades/downgrades by existing customers of a different speed.

We define the "competitive price" as the minimum price charged by other providers in the market. Prices are calculated as the monthly rental plus a proportion of any connection fee (5.79%)[6]. Altering this proportion within a plausible range of 0-10% makes little difference to the results or conclusion of the analysis.

The model equations take the form:

$$\log GA40_{i,t} = \alpha_{40,i} + \Sigma_s (\beta_{40,s}\, P40_{i,t-s}) + \Sigma_s (\gamma_{40,s}\, P40\_comp_{i,t-s}) + \Sigma_s (\delta_{40,s}\, P80\_comp_{i,t-s}) + f_{40}(t) + u_{40,i,t}$$

$$\log GA80_{i,t} = \alpha_{80,i} + \Sigma_s (\beta_{80,s}\, P80_{i,t-s}) + \Sigma_s (\gamma_{80,s}\, P80\_comp_{i,t-s}) + \Sigma_s (\delta_{80,s}\, P40\_comp_{i,t-s}) + f_{80}(t) + u_{80,i,t}$$

where:

$GA40_{i,t}$ and $GA80_{i,t}$	are the gross additions of provider *i* (i.e. Vodafone or Sky) for its 40/10 and 80/20 service respectively in week *t*;
$P40_{i,t}$ and $P80_{i,t}$	are prices of provider *i* for its 40/10 and 80/20 services respectively in week *t*;
$P40\_comp_{i,t}$ and $P80\_comp_{i,t}$	are the minimum of prices charged by all providers for 40/10 and 80/20 services respectively in week *t*;

[6] The connection fee proportion was calculated to be the monthly amount when spread over 18 months at an interest rate 5.5%. A typical contract has an 18 month duration, and the 5.5% interest rate corresponds to the HM Treasury Green Book Social Time Preference (3.5%) plus 2% Bank of England Inflation Target. From these assumptions we add 5.79% of any connection fee to each monthly rental.

$\alpha_{40,i}$, β_{40}, γ_{40} and $\alpha_{80,i}$, β_{80}, γ_{80}	are estimated model parameters. *β,* γ and δ correspond to own- and cross-price elasticities – either directly in the case of a log-log specification, or indirectly in the case of a log-linear specification;
$f_{40}(t)$ and $f_{80}(t)$	are functions of other short and long term factors that affect demand;
$u_{40,i,t}$ *and* $u_{80,i,t}$	are the model residuals for the 40/10 and 80/20 equations respectively in week *t*.

The model tests the sensitivity of demand (gross additions) to changes in the price of the same product (own price elasticity) and the prices of both the same product from other providers and potentially substitutable products from the same or other providers (cross price elasticities).[7]

A priori, we expect *β* to be large negative (own price elasticity) and δ to be positive (competitive cross price elasticity for the same product). *γ* will only differ from zero if the demand for one product (e.g. 80/20) is affected by the price for the other (40/10).

The model has been tested in both log-log and log-linear specifications. In the former case all price elasticities are constant (and equate to the *β,* and *γ* parameters). In the latter price elasticities vary in direct proportion to the price, i.e. elasticities rise as prices rise and fall as prices fall. The idea that consumers become less price sensitive as prices fall (and *vice-versa*) has intuitive appeal. Mathematically a current price elasticity in a log-linear specification is the product of the parameter and the current price level. In trial models the log-linear specification gave a slightly better fit and so has been adopted in all results shown, although in practice the choice of specification made no difference to the substantive results or conclusions.

Trial models indicated that demand responds to price with lags of 0-3 weeks. Consequently, this lag structure was used in the models.

Other short and long term factors will affect demand for broadband services and it is not realistic to capture all these in a single equation. To model these effects we include: (i) a time trend to capture long term factors such as the increasing utility of broadband for social and economic inclusion; and

[7] We do distinguish between the cross-price effect for a potential substitute product provided by the same provider or provided by a competitor. This is because (other than Sky since May 2019) providers have tended to keep a relatively constant pricing relationship between their own 80/20 and 40/10 services, making difficult the estimation of a “within company” cross price elasticity.

(ii) an autoregressive error term to capture short term transient factors that affect demand other than pricing[8].

A summary of the results is shown in Table 2 below, which shows results in line with our expectations that GEA 40/10 services do not compete with GEA 80/20 services.

Table 2: Implied parameters from model estimates summary

Implied price elasticities	Demand for 40/10 services		Demand for 80/20 services	
Own price	Negative as expected	Significant at 0.1% level	Negative as expected	Significant at 0.1% level
Other 40/10 prices	Negative & positive	Not significant	Positive	Not significant
Other 80/20 prices	Positive	Significant and not significant	Negative & positive	Not significant

4.4.1 Data and Results: Sky

[✂]

4.4.2 Upgrades and Downgrades

[✂]

4.4.3 Data and Results: Vodafone

[✂]

[8] Inspection of the residual correlogram (autocorrelation and partial autocorrelation functions) suggested an AR(1) process, whilst the Dickey-Fuller test provided no indication of a unit root at a 1% significance level.

5 CONCLUSION AND POLICY IMPLICATIONS

Anchor product pricing as a means to control the price of superior non-anchor products is an accepted policy in the UK, the EU and Australia. The effectiveness of the policy is not questioned in the report. Rather, in this report we have assessed whether retail products based on GEA 40/10 are an effective anchor or whether demand for higher speed products based on GEA 80/20 is now independent of slower speed products. As wholesale demand for GEA 40/10 and GEA 80/20 is derived from retail demand any anchoring effect in the retail market would be passed down to the wholesale market.

The analysis has found that:

- UK broadband providers set prices of GEA 80/20 based services taking account of competitors' 80/20 based services, but that they take no significant account of rivals' 40/10 based services;
- Demand for 80/20 based services for each of the two operators whose data are analysed (Sky and Vodafone) is found to be independent of the price of 40/10 based services.

As demand for wholesale products is derived from demand for retail products, our conclusion from the model is that GEA 40/10 is no longer an effective anchor product and this will remain the case over the period covered by the WFTMR (2021 – 2026). If GEA 40/10 remains the only regulated product, Openreach would have the incentive and ability to set prices for GEA 80/20 above the competitive level unconstrained by either direct price regulation or an effective anchor product.

Ofcom has previously acknowledged that a "floating anchor" may be needed to mitigate the risks that the anchor product fails to remain an effective price constraint. The analysis in this paper suggests that Ofcom should adopt a floating anchor for the WFTMR and set GEA 80/20 as the anchor product for the period 2021 – 2026. Should it choose to remain with GEA 40/10 as the anchor there is a risk that Openreach will raise the price of GEA 80/20 above the competitive level with attendant harm to competition and economic welfare.

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