WIK-Consult • Report

Study for CityFibre

Impact of labelling on full fibre adoption

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1 Executive Summary

The context

The UK Government and Ofcom have both established a strategic objective to drive widespread deployment of full fibre and other gigabit-capable broadband networks, to support the growing connectivity needs of the nations, and to enable economic growth and social opportunity.

The UK Government is targeting a minimum of 85% coverage of gigabit-capable broadband by 2025, with an ambition to achieve as close to 100% as possible.[1] Meanwhile, in line with its 2016 DCR strategy to promote fibre investment, one of Ofcom's five strategic objectives for 2021/22 is to "support ongoing investment in faster broadband", with "promoting fibre roll-out" remaining a key area of focus.[2]

Available data suggests that full fibre coverage is growing rapidly,[3] with 18% of UK households (5.1 million) able to access full fibre as of December 2020. However, take-up of full fibre is still lagging behind, with only 25% of consumers in full fibre areas taking the service.[4] This means that full fibre lines account for as little as 4.5% of all broadband lines nationally.

Since the business case for deploying new broadband networks depends heavily on take-up,[5] achieving widespread deployment of gigabit-capable broadband will only occur if there is an expectation that people will use the services once (or soon after) they are available. This means that any barriers that act to reduce or slow down take-up will undermine the prospects of achieving the UK Government and Ofcom's gigabit broadband investment objectives.

Reduced levels of network deployment and take-up (where available) mean that consumers and businesses that would wish to make use of advanced connectivity services, will miss out on the benefits from doing so.[6] This is noted by the Government in its 2018 Future Telecoms Infrastructure Review: "As full fibre networks are rolled out, maximising the number of end users will secure the full benefits of the technology."[7]

1 HM Treasury, National Infrastructure Strategy, November 2020. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938539/NIS_Report_Web_Accessible.pdf
2 Consultation: Ofcom's Plan of Work 2021/22. Available at: https://www.ofcom.org.uk/consultations-and-statements/category-2/plan-of-work-2021-22
3 Cf. Ofcom, Connected Nations [end of] 2020 report and Summer 2020 update. Available at: https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research
4 Idem. Page 27
5 See for example, discussion of modelling by WIK-Consult on the relationship between take-up and profitability / viability of network deployment in WIK et al (2016) Regulatory, in particular access regimes for network investment in Europe. Available at: https://op.europa.eu/en/publication-detail/-/publication/c0da75d9-9a8c-11e6-9bca-01aa75ed71a1
6 Such benefits are elaborated, for example in the WIK (2018) study for Ofcom Benefits of Ultrafast Broadband. Available at: https://www.ofcom.org.uk/__data/assets/pdf_file/0016/111481/WIK-Consult-report-The-Benefits-of-Ultrafast-Broadband-Deployment.pdf
7 DCMS, Future Telecoms Infrastructure Review. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/732496/Future_Telecoms_Infrastructure_Review.pdf

In view of this, policy-makers are increasingly focusing their attention on how to support take-up. In August 2020, Digital Infrastructure Minister Matt Warman launched a taskforce, GigaTAG, "to encourage further take-up of gigabit broadband services".[8] Similarly Ofcom, which sits on GigaTAG, has an ongoing objective of "supporting the take-up of higher-speed services", alongside the key objectives of "getting everyone connected" and "fairness for customers".[9]

In GigaTAG's interim report (published December 2020)[10] low levels of awareness of gigabit-capable services and a poor understanding of the benefits are identified as key barriers to adoption. GigaTAG states that "improving awareness of gigabit capable broadband is a critical first step"[11] to encouraging take-up and discusses a number of potential solutions. Among these are the development of "clear and consistent terminology" and "labelling systems to present simple, clear and consistent information".[12] GigaTAG, however, highlights that more research is needed to understand whether labelling would be effective in the UK market.

This study contributes to the need for more research, and provides evidence of the scale of consumers' confusion as well as evidence on the effectiveness of a labelling scheme in the UK broadband market in addressing this confusion, in order to support the achievement of GigaTAG's stated objectives of promoting take-up of full fibre and other gigabit-capable networks.

In order to consider these questions, we conducted a consumer survey alongside a conjoint study,[13] to test how consumers react to different marketing terminology and the use of labels via "choice screens".

The study involved a representative sample of 3,000 consumers, each of whom spent around 15 minutes answering questions and choosing from amongst hypothetical broadband offers. The fieldwork was conducted by YouGov, while the survey was designed and the results analysed by WIK-Consult.

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8 DCMS, press release "Gigabit broadband rollout milestone reached". Available at: https://www.gov.uk/government/news/gigabit-broadband-rollout-milestone-reached

9 Ofcom. (2020). 'Ofcom's proposed plan of work 2021/22' [Link]

10 GigaTAG (2020), Interim Report, December 2020. Available at: https://aaf1a18515da0e792f78-c27fdabe952dfc357fe25ebf5c8897ee.ssl.cf5.rackcdn.com/2249/GigaTAG+Interim+Report.pdf?v=1608208282000.

11 Ibid.

12 GigaTAG (2020), Interim Report, December 2020. Available at: https://aaf1a18515da0e792f78-c27fdabe952dfc357fe25ebf5c8897ee.ssl.cf5.rackcdn.com/2249/GigaTAG+Interim+Report.pdf?v=1608208282000.

13 Conjoint surveys are a well-established tool in market research which is used to reveal actual consumer preferences rather than relying only on consumers' statements as regards their preferences. In a conjoint survey respondents are presented with a number of purchasing decisions. Each choice set consists of different variants of a product. In this case, the product variants were elaborated by combining different attributes (e.g. download speed) and levels (e.g. 67 Mbps) in a semi-random manner (certain restrictions were imposed to avoid presenting combinations of product attributes that would not be realistic or technically feasible). The respondents are then asked to select which product variant in each choice set they prefer and if they would actually buy it. Repeating this multiple times and varying the options across choice sets allows the real preferences of consumers to be revealed.

The results show that there is widespread confusion amongst consumers today, and that this appears to be the result of certain broadband terminology used within marketing which affects consumers' ability to make informed and rational choices about which broadband service will best meet their needs.

The study also shows that the introduction of a labelling scheme alongside an information campaign, would make a significant contribution to addressing confusion and expand take-up of full fibre in particular, as well as expanding the take-up of other gigabit-capable products.

The results of the study are discussed below.

Consumers are confused about broadband marketing terminology

In regard to consumer confusion, the key results of the study are:

Result 1: While over half of all respondents claimed to have "full fibre" already, at least 8 out of 10 of those do not yet have full fibre in their area.

Result 2: Almost half of consumers claim not to know what 'superfast', 'ultrafast' and 'gigabit' mean. Those who did provide their understanding of what these terms mean significantly overestimated the speeds offered by 'superfast' and 'ultrafast' connections e.g. respondents on average claimed that 'superfast' broadband equates to a speed of 500 Mbps, when Ofcom in fact define it as speeds of up-to 30 Mbps.

A key finding from the survey is that many consumers do not know whether they genuinely have full fibre. Over half of respondents (52%) claim to already take a full fibre service. However, we know that 8 out of 10 of these live in areas where full fibre is not yet available.[14] This may artificially depress demand for full fibre, since consumers who believe that they already benefit from the technology will see no benefit in switching to a full fibre provider.

Consumers are also confused by the terminology used to designate speed in broadband marketing. For example, almost half of the consumers surveyed said that they did not know what was meant by the terms "Superfast", "Ultrafast" and "Gigabit".

Of those which claimed to know the meaning of those terms, "Gigabit" was the best understood, but respondents significantly over-estimated the speeds implied by "superfast" and "ultrafast". For example 35% of all respondents said that "superfast" implies speeds of more than 250 Mbps when Ofcom defines this term as meaning

14 Based on data from respondents to the conjoint survey as regards their physical location (i.e. postcode) which could then be cross checked with Ofcom fibre coverage data. Available at: https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research/connected-nations-2019/data-downloads

speeds of more than 30 Mbps. The over-estimation of bandwidths associated with terms such as “superfast”, could limit demand for full fibre and other gigabit-capable technologies by reducing the degree to which Gigabit technologies are perceived as offering additional capabilities over part copper networks.

Overall, the results of the survey and conjoint analysis reveal a high degree of confusion amongst consumers, which may translate into reduced take-up of full fibre, and a loss in consumer welfare as consumers face challenges in making choices which reflect their true preferences.

Effect of a labelling scheme

In regard to the effect of introducing a label, the key results of the study are:

Result 3: Introducing a label together with an information campaign has a substantial positive impact on the take-up of full fibre, with take-up increasing by approximately 40%.

Result 4: Labelling seems to be effective at promoting take-up of full fibre across all UK broadband consumers, i.e. would support purchasing decisions across all different demographics of broadband consumers.

Result 5: 61% of participants to the study considered that the label presented was informative and helped them when making purchasing decisions. For those who had the information treatment to explain more about the label, the impact was greater, with 68% claiming it helped informed their decisions.

Labelling has been identified as a potential solution to address consumer confusion in a range of settings including energy efficiency, and nutrition. In 2018 the Italian telecom regulatory authority introduced a labelling scheme aimed at helping consumers to understand the characteristics and underlying quality associated with different broadband technologies, and thereby support consumers in making informed purchasing decisions.

In order to test the efficacy of introducing a broadband label in the UK market, we designed a label and assessed via a conjoint analysis the impact of this label on take-up of full fibre. We also assessed what would be the effect of complementing the introduction of a label with an information campaign to promote understanding of the label. To this end, prior to displaying the product options, we provided half of the participants in the study group with additional information about the underlying technologies of different broadband offers and how these technologies are reflected in the label. Providing this information to only half of the participants allowed us to

distinguish between the effect of the label alone and the effect of providing complementary information to guide its use.

In designing a label we were conscious that the exact parameters and presentation of a label are likely to have an impact on consumer understanding and take-up. We were also aware that should a policy decision be taken to introduce a label, extensive cross-industry discussion about the features of that label would be necessary, ahead of a final label being designed by marketing professionals.

The intention of this study, however, was to test the impact of "a" label on understanding and take-up of full fibre, rather than to test the relative merits of different features of specific labels. The label we used was therefore deliberately simplified and the information presented to consumers was technologically oriented rather than being based on more easy to understand and consumer-friendly language that might be adopted in practice. Our hypothesis was that, if the evidence suggested that a simplified label would help drive take-up of full fibre, then further work could be undertaken to define what would be the optimal form of labelling (and information campaign) to ensure full consumer understanding and aid informed decision making

The evidence from the conjoint analysis shows clearly that the use of a broadband labelling scheme coupled with an information campaign could materially boost take-up of full fibre and gigabit broadband in the UK.

The conjoint study found that when a label was included as part of the marketing for full fibre broadband, and when this label was accompanied by a clear information treatment to explain to consumers what the label indicated, take-up of full fibre increased by 40%.

Similarly, our study finds that demand for other gigabit-capable connections could be boosted by up to 30% as a result of introducing a label. In contrast, a label made no positive impact on take-up of other broadband technologies such as for basic copper broadband.

Interestingly, the increase in take-up for full fibre and gigabit-capable technologies as a result of introducing a label, comes from consumers who already have a preference for the two higher quality connections but would not choose to buy them in the absence of the label. In other words, these consumers appear to be aware already that these services offer some benefits, but are unable (in the absence of a label) to have sufficient conviction about what is really being offered and its benefits to actually make the purchase.

This suggests that a label can serve as a clear signal and (if backed by a trusted source) can increase trust in the advertised product, triggering a purchase amongst consumers who may previously have been reluctant to commit.

As such, the key value of labelling appears to be in reducing consumers' uncertainty when deciding between offers, by acting as a reliable and trustworthy signal as regards the underlying technology and the quality characteristics associated with certain services. This can empower consumers to more effectively identify the service that best matches their preferences and be confident in their ultimate purchasing decision.

It should also be noted that the effect of labelling and associated information does not differ between different consumer groups. Consumer subgroups of different ages, gender and usage behaviours all react in the same manner. This is promising since a regulatory remedy should be effective not only for specific subgroups but the whole of the UK.

Even allowing for variations in impact that may arise from the specific parameters and design of any eventual label, the scale of the evidence in this study suggests that the introduction of a labelling system would be an effective remedy to alleviate consumers' confusion and promote the take-up of full fibre and other gigabit-capable connections.

2 Introduction

The UK Government is targeting a minimum of 85% coverage of gigabit-capable broadband by 2025, with an ambition to get as close to 100% as possible.[15] Although the deployment of full fibre – widely considered the 'gold standard' broadband technology[16] – has been growing rapidly, and increased by 8% from 2019-2020[17] to 18% of households (5.1 million),[18] the UK continues to lag behind other European countries in full fibre coverage. For instance, more than 40% full fibre coverage has been achieved across Europe as a whole, with over 70% in countries such as Sweden and Spain.

In addition to low levels of existing full fibre deployment, the UK also appears to be far behind other countries when it comes to take-up of full fibre (i.e. how many people take it once it is available). Ofcom has estimated that take-up of full fibre in 2020 amounted to only 4.5% of broadband lines across the country,[19] which means that only 25% of households for which full fibre is available subscribed to the service. As noted in a 2020 report by WIK-Consult for the Broadband Stakeholder Group,[20] promoting more widespread adoption of Gigabit broadband, including full fibre, is essential to supporting the business case for commercial deployment.

Although the COVID pandemic has led to a significant increase in demand for capacity, and highlighted the importance of resilient high bandwidth connections for home working as well as online education and healthcare,[21] this has not fed through to higher take-up thus far. Ofcom (2020) notes that there may be a number of reasons for this reticence, including higher price sensitivity in light of the economic impacts of COVID as well as barriers to the organisational process of connecting new customers to the fibre

15 https://www.gov.uk/government/publications/national-infrastructure-strategy
16 In the 2017 budget Philip Hammond MP, then Chancellor of the Exchequer, said 'Full-fibre is the gold standard for fast and reliable broadband.' (Link) This is supported by multiple sources, for instance, the 2018 National Infrastructure Commission's National Infrastructure Assessment notes that 'Full Fibre, a connection without any copper, is the best available broadband technology on the horizon.' (Link, page 21). A December 2020 House of Commons Library Briefing reiterated this point, stating that 'Full-fibre is also the most reliable broadband technology currently available. Full-fibre connections experience fewer operating faults than copper-based networks and are cheaper to maintain and operate. Full Fibre connections are also less likely to slow down when many people use the network.' (Link, page 7). Finally, Ofcom itself has recognised that 'Full-fibre broadband connections can deliver much faster speeds than copper – up to one gigabit per second. They are also up to five times more reliable, and less likely to slow down when lots of people use them at the same time.' [Link]
17 Cf. Ofcom, Connected Nations [end of] 2020 report and Summer 2020 update. Available at: https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research
18 WIK (2020), Moving to a fibre-enabled UK: International experiences on barriers to gigabit adoption. Available at: http://www.broadbanduk.org/wp-content/uploads/2020/06/WIK-report_BSG_02062020_final.pdf
19 Ofcom (2020), Connected Nations 2020. Ibid.
20 http://www.broadbanduk.org/2020/06/04/bsg-report-moving-to-a-fibre-enabled-uk-international-experiences-on-barriers-to-gigabit-adoption/
21 EY (2020). Broadband quality and resilience: a key consumer concern during COVID-19. Available at: https://assets.ey.com/content/dam/ey-sites/ey-com/en_uk/topics/tmt/ey-broadband-quality-and-resilience.pdf

network.[22] However, another reason may be that there is consumer confusion (stemming from a lack of general knowledge) about different broadband technologies, their advantages and respective shortcomings.[23]

In contrast, consumers in Sweden, which has a much higher rate of take-up of full fibre broadband, appear to be considerably more aware of the benefits of full fibre and have noticed the difference in performance compared with their previous technology. For example, in a representative consumer survey conducted on behalf of WIK-Consult in 2017, 94% of non-full fibre users in Sweden said that they would consider subscribing to full fibre if it was made available in their area. More than 70% of customers which switched to full fibre noticed the difference compared with their previous technology, and 83% of customers taking full fibre declared themselves to be satisfied with their connections compared with 72% of cable customers and 52% of basic copper broadband customers.[24]

As discussed in the WIK (2020) study for the Broadband Stakeholder Group, a lack of standardised used of terminology could be a potential source of confusion amongst UK consumers.

In addition, while Ofcom precisely defines the term 'superfast' (at least 30 Mbps), as well as 'ultrafast' (at least 300 Mbps) and the term 'Gigabit' by definition is reserved for services offering speeds of at least 1,000 Mbps, these terms are not always used consistently by ISPs. Instead the use of hyperbolic terms such as 'lightningfast', 'hyperfast' or 'brilliant' are commonplace in broadband advertisements. Such terms may further contribute to confusion and undermine consumers' ability to evaluate how available offers compare, with each other, and with their current connection.

The problem of low take-up of full fibre and other gigabit-capable products in the UK, as well as the factors we outline here that may contribute to that problem, have been recognised by the Gigabit Take-Up Advisory Group (GigaTAG), which was established by DCMS in August 2020 to "encourage further take-up of gigabit broadband services". In its own words, the GigaTAG "wants to encourage migration to gigabit-capable networks and the adoption of gigabit-capable services (i.e. services at or around 1,000 Mbps), where consumers and businesses can benefit from them, as soon as possible."[25]

GigaTAG has already identified that "Lack of awareness of gigabit-capable broadband" including "lack of clarity as to how it differs to other connections", is a key barrier to adoption. In its Interim report it proposes "clear and consistent terminology and practical

22 For example, stores and call centres had to temporarily close or limit their capacities and customers might have shied away from having an engineer at home, who is needed to install a full fibre connection.
23 Gigabit Take-up Advisory Group: Interim Report – December 2020.
24 https://www.ftthcouncil.eu/documents/20180129_RA_FTTH_CE_Valencia_WORKSHOP-update.pdf
25 GigaTAG Interim Report, Available at: https://aaf1a18515da0e792f78-c27fdabe952dfc357fe25ebf5c8897ee.ssl.cf5.rackcdn.com/2249/GigaTAG+Interim+Report.pdf?v=1608208282000

use-cases for gigabit-capable broadband", as well as information campaigns and a labelling system as emerging solutions to these barriers.[26] In other countries, similar interventions have been proposed and some measures have been already implemented.[27]

For example, France forbids the use of the term "fibre" in advertising materials for tariffs that are not full fibre (i.e. do not rely on fibre to the premise)[28] and a similar (although non-binding) practice has been established in Ireland. Pre-marketing and information campaigns on full fibre technologies by commercial providers targeting rural areas in Germany and France have also shown promise in boosting take-up rates.[29]

The National Regulatory Authority in Italy (AGCOM) has mandated the use of a label for all broadband advertising since 2018. This label is based on the concept of a traffic light, with three tiers (red, amber, green), as depicted in Figure 1.[30]

Figure 1: Italian broadband label (AGCOM)

The label aims to enable customers to clearly compare broadband tariffs on the basis of the underlying quality characteristics. To this end, a green label is reserved for full fibre (FTTP) only, yellow is used for part fibre (FTTC) tariffs and red is used for copper and low speed wireless solutions.

26 Ibid.
27 See WIK (2020), 'Identifying European Best Practice in Fibre Advertising,' for a more comprehensive overview of different measures in different countries. Available at: https://www.wik.org/fileadmin/Studien/2020/Study_-_Identifying_European_Best_Practice_in_Fibre_Advertising_-_FTTH_Conference.pdf
28 https://www.legifrance.gouv.fr/loda/id/JORFTEXT000028320204/2021-01-21/
29 BSG/WIK(2020). Ibid.
30 Allegato C alla delibera n. 292/18/CONS.

Similar colour-coded labels are also widespread in the context of energy efficiency in electrical goods[31] as well as nutrition on food,[32] and there is evidence that such labelling schemes have been effective, for example in steering consumers to more healthy choices and eating behaviours.[33] In principle a labelling system might also seem an attractive solution to address confusion around the capabilities of different broadband offers.

However, thus far, to our knowledge no studies have been conducted on the degree to which advertising terminology may be affecting the purchasing behaviour of UK broadband consumers, or on the impact that strategies such as labelling (or other solutions) may have on take-up amongst different types of consumer groups.[34]

In this study, we seek to answer these questions based on a representative survey of UK consumers, and a conjoint analysis, which reveals via multiple choice questions how consumers' purchasing decisions are affected by changes in marketing language, as well as core broadband product attributes and the potential use of a labelling system.

- Chapter 3 discusses the design of the survey and conjoint analysis;[35]
- Chapter 4 presents key findings, as regards consumer confusion and the effect of a labelling scheme; and
- Chapter 5 sets out our overall conclusions.

31 See for example the EU energy efficiency label. Available at: https://ec.europa.eu/info/news/focus-new-generation-eu-energy-labels-2020-aug-13_en

32 It is mandatory in the EU for example to include nutrition labelling on many kinds of pre-packed foods. See https://ec.europa.eu/food/safety/labelling_nutrition/labelling_legislation/nutrition-labelling_en

33 Cecchini, Michele, and Laura Warin. "Impact of food labelling systems on food choices and eating behaviours: a systematic review and meta-analysis of randomized studies." Obesity reviews 17, no. 3 (2016): 201-210. See also Tarabella and Voinea "Advantages and limitation of the front-of-package labelling systems in guiding consumers' healthy food choice". Available at: https://core.ac.uk/download/pdf/26805562.pdf

34 For example, GigaTAG proposes to focus on the large intermediate group between classic early adopters and those that are likely to retain their current connections as long as possible GigaTAG (2020). Ibid.

35 Further details of the survey design are included in the Annexes.

3 Study design

There were two key objectives of this research: firstly to assess the degree to which UK consumers are confused about the terminology used in marketing and understand how this affects their purchasing decisions; and secondly to evaluate the impact on take-up of full fibre and gigabit broadband from introducing a label to signal the quality of different underlying technologies.

In this context, this study directly addresses the need for more research on this topic as expressed by GigaTAG (2020) in its interim report.[36]

The study is based on a representative consumer survey as well as a conjoint analysis. Conjoint analysis[37] is an important tool used in market research and involves analysing consumers' responses to multiple choice questions to reveal how their purchasing decisions are affected by changes in marketing language and core broadband product attributes, such as price and download speed.

The survey covered 3,000 respondents identifying as (co-) decision makers for their household internet contract, and was conducted by YouGov between 13-17 Nov 2020. On average, participants took 15 minutes to participate in the study. WIK-Consult contributed to the survey design and analysed the results.

Within the conjoint portion of the survey, participants were presented with 15 choice screens each showing 4 hypothetical broadband offers. Each offer was composed of three core product attributes: i) a product name, ii) speed and iii) (monthly) price. These product attributes were chosen because they are regularly included in broadband advertising and on price comparison websites in the UK. Within each choice screen, some broadband offers also included a fourth component, a label.

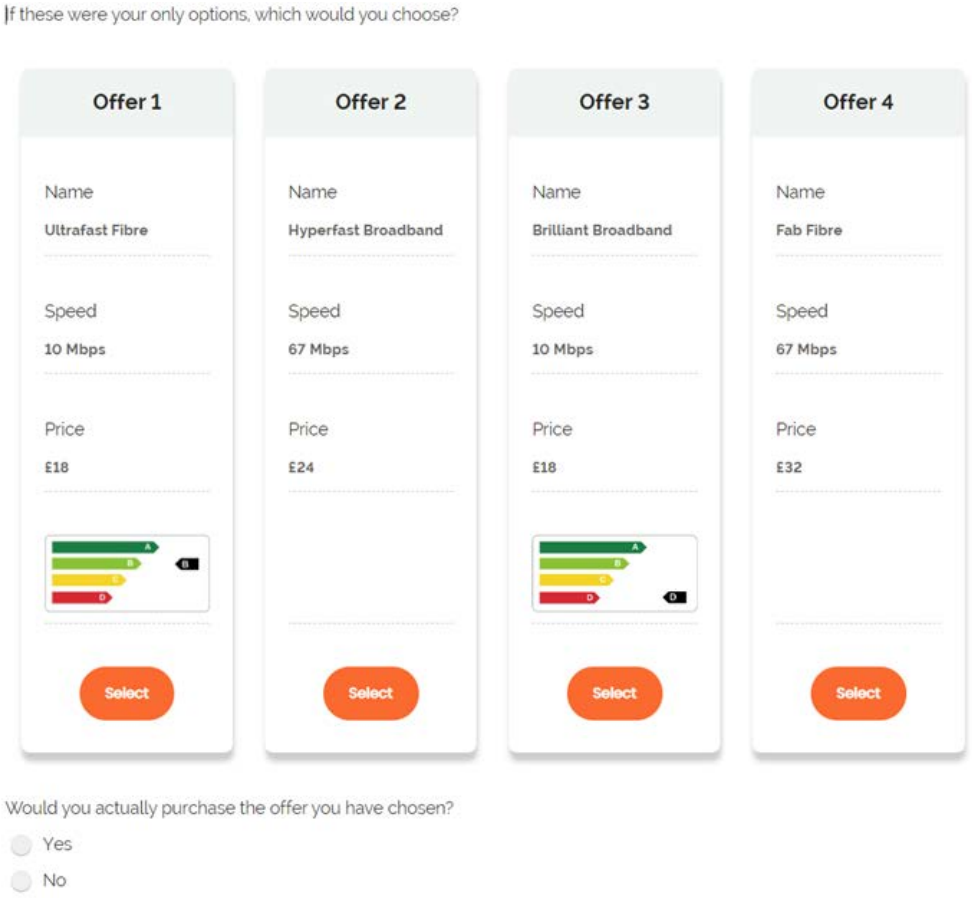
Respondents were asked to select their preferred option within each group by clicking the "Select"-button. Afterwards, they were asked to indicate if they would actually purchase the option they had identified as their preferred option.

36 GigaTAG (2020), Interim Report, December 2020. Available at: https://aaf1a18515da0e792f78-c27fdabe952dfc357fe25ebf5c8897ee.ssl.cf5.rackcdn.com/2249/GigaTAG+Interim+Report.pdf?v=1608208282000.

37 In a conjoint survey, respondents are presented with a number of purchasing decisions involving a selection between different variants of a product. In this case, the product variants were elaborated by combining different attributes (e.g. download speed) and levels (e.g. 67 Mbps) in a semi-random manner (certain restrictions were imposed to avoid presenting combinations of product attributed that would not be realistic or technically feasible). The respondents are then asked to select which product variant in each choice set they prefer and if they would actually buy it. Repeating this multiple times and varying the options across choice sets allows the real preferences of consumers to be revealed.

The figure below shows an example of the choice screens used during the conjoint study:

Figure 2: Example of a choice screen used in the conjoint study

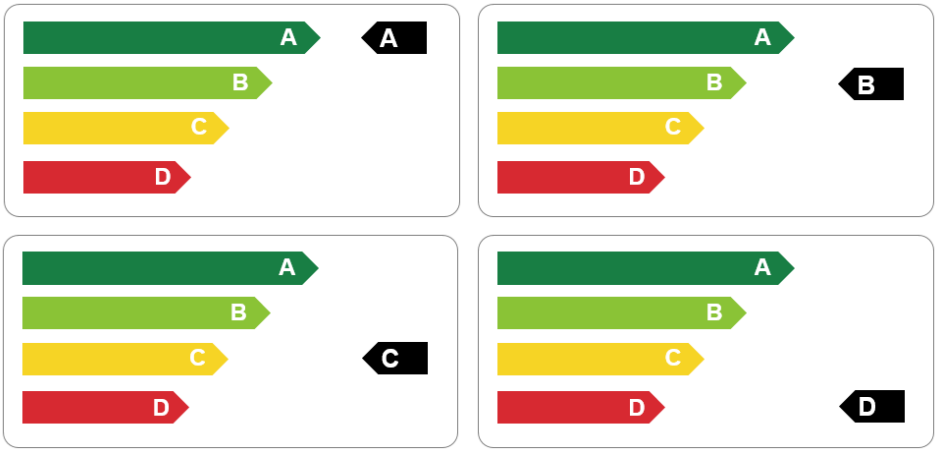


In order to assess the effects of different marketing terms on purchasing decisions, the names of the offers were constructed by combining a *hyperbolic prefix* – based on a set of eight widely used marketing terms like 'Hyperfast', 'Brilliant' and 'Fab' – with a *suffix* of either 'Fibre' or 'Broadband'. As such there were 16 randomized name variants used in the study.

For some offers, a broadband label was displayed (for example see offers 1 and 3 in Figure 2, above). In designing the label used in the survey, we were conscious that the exact parameters and presentation of a label are likely to have an impact on consumer understanding and therefore purchasing decisions. We were also aware that, should a policy decision be taken to introduce a label, extensive discussion about the features of that label would be likely, and the label would then go on to be designed by marketing professionals. The intention of this study was therefore to test the impact of "a" label on understanding and take-up rather than to test the relative merits of different features of specific labels.

The label was designed so as to indicate, in a simple and clear way, the quality of the underlying access technology from one of four categories (A to D). The label was designed with multiple levels, and colour scales with bars of decreasing size. A graphical representation of the label used for the survey (with its four possible variants) is displayed below in Figure 3.

Figure 3: The simplified label design used in the conjoint study



To minimise any risk of bias in the study, we made the deliberate decision to omit text or contextual information within the label itself.[38] However as noted above, given that any eventual labelling scheme that might be introduced would go through testing and refinement (i.e. to include text descriptors of the various 'levels') to provide the greatest clarity possible for consumers, the effects of the label as assessed in this study could be considered to be conservative.

The following table shows the range of names, prices, speeds and label-categories displayed to consumers in the choice screens.

Table 1: Attributes of the broadband offers

Attribute		Levels
Name	Prefix	Brilliant, Fast, Fab, Superfast, Lightningfast, Ultrafast, Hyperfast, Gigafast
	Suffix	Fibre, Broadband
Speed		10 Mbps - 1,000 Mbps
Price		£18 - £48
Label		0, A, B, C, D

38 A more detailed discussion on the design of the label follows in Section 4.2.

In order to determine the relative impact of different broadband attributes on consumers' choices in a conjoint analysis, we systemically varied the attributes during the survey. In doing so, we restricted the range of attributes displayed so that they would reflect only plausible combinations corresponding to real-world offers in the UK,[39] while ensuring that sufficient variation remained in price-performance ratios to allow a statistical analysis of the effect of the attributes on consumers' choices.

In order to test the impact of providing consumers with clear information about what the label means (i.e. as part of an information/educational campaign), half of the respondents to the conjoint (the 'information treatment group') were shown information regarding the different broadband technologies and the corresponding label categories before starting the multiple choice exercise. In other words, while the broadband label was displayed to all respondents, it was only explained to the information treatment group. This design decision allowed us to statistically disentangle the effect of a label from the effect of an information campaign, thereby enabling us to quantify the effects on take-up of full fibre and gigabit broadband of a potential label with and without associated information.

Consumers receiving the information treatment were told that category A stands for 'Full Fibre broadband', B stands for 'TV-Cable and High-Speed Copper broadband, C for 'Mixed Fibre/Copper broadband'' and D for 'Basic Copper broadband'. Each label category was briefly explained as regards the technology used, the corresponding connection speeds and stability and reference was made to common use-cases (e.g. streaming, downloading). Furthermore, the categories were displayed in randomized order, to mitigate any possible response bias due to order effects. The exact information provided to participants of the treatment group can be found in Figure 13 of Annex B.

As with the label, we deliberately chose to use factual technical information as opposed to more consumer-friendly non-technical language in the corresponding information. Should a label and information campaign be introduced in the UK, we would expect a high degree of design and marketing input to ensure the text was as consumer friendly as possible. The impact of the information campaign used here, should therefore be viewed as conservative.

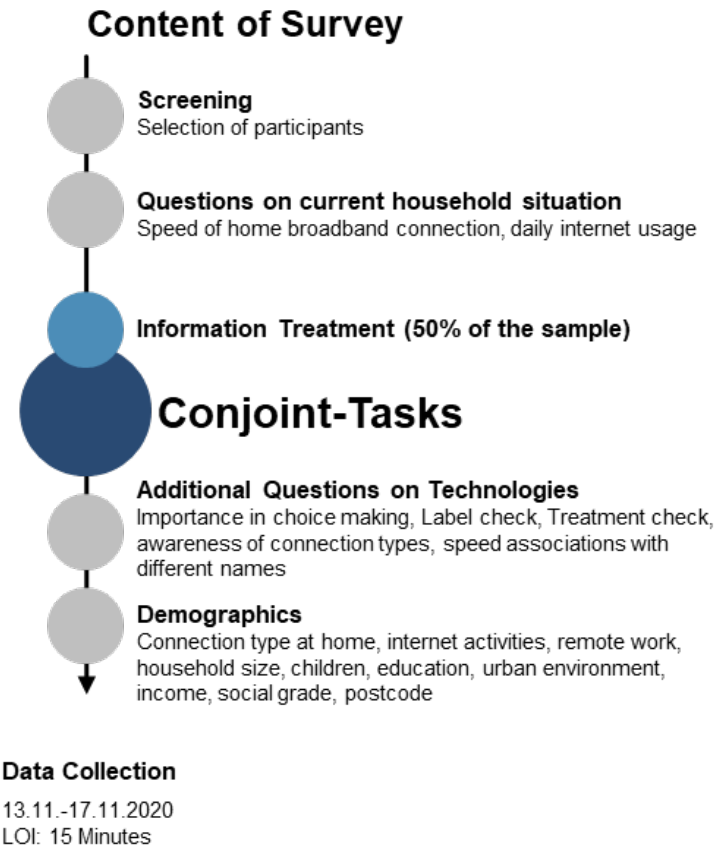
In addition to the conjoint portion of the study, consumers were asked a number of simple multiple choice questions. This included questions concerning demographics, Internet usage, prior knowledge about broadband types and speeds, and the perceived usefulness of the presented label and information. Some of these questions were asked at the start of the survey, before the respondent proceeded to the conjoint questions (i.e. the choice screens). After completing the conjoint there were a number of additional multiple-choice survey questions.

39 Please refer to Annex A for full details on the possible values and combination restrictions that were made.

This three stage design is common in the design of conjoint analyses and is intended to control the degree of knowledge and experience consumers have at different points in the process. Naturally, questions that directly refer to a participants behaviour during the conjoint tasks, can only be asked after the conjoint has been completed. In a similar manner, questions that might forewarn consumers about some of the elements that are being tested through the conjoint were not asked prior to the choice decisions given the obvious risk of biasing the results.

The staging of questions within the online survey is shown in the following figure.

Figure 4: Staging of questions within the online survey



4 Key Findings

In this chapter we discuss the main findings from the research, with a particular focus on what the survey and conjoint analysis tells us about:

1. The degree of consumer confusion around broadband technologies and attributes; and
2. The effects on consumer choices of introducing a label, with and without an associated information campaign.

4.1 Consumer confusion

A key finding from the research is that consumers show a high degree of confusion around broadband technologies and attributes and are not readily able to distinguish offers based on prevailing marketing practices.

4.1.1 Full fibre availability and recognisability

The most striking indicator of consumer confusion can be seen in consumers' claims regarding take-up of full fibre. At the time we conducted the online survey, full fibre was available to 14% of all UK households (4.2 million). As part of the study, we asked participants which type of Internet connection they have at home.[40]

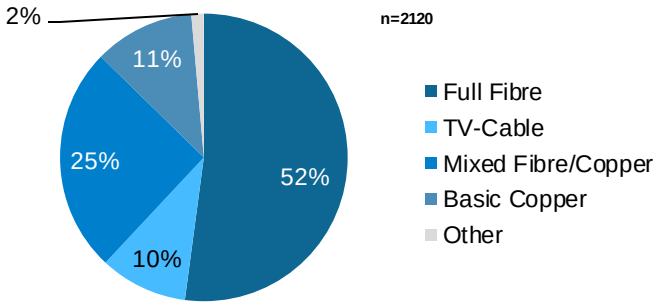
The options presented were based on the underlying technologies; full fibre, TV-cable, mixed fibre/copper and basic copper. We also included the option of 'Don`t know'.

Of those who answered this question (n=2120) more than half (52%) claimed to have full fibre already. Figure 5 shows the proportion of consumers claiming to have each type of technology.

40 Ofcom (2020), Connected Nations Update – Summer 2020. Available at: https://www.ofcom.org.uk/__data/assets/pdf_file/0017/202571/connected-nations-summer-update-2020.pdf

Figure 5: Survey respondents' claims regarding existing internet technology[41]

Question: *What type of Internet connection do you have at home?*



A first noteworthy point is that the proportions of each technology claimed by consumers in the survey differ significantly from the proportions of connections by technology type as reported by Ofcom. For example, while more than half of respondents answering the question claimed to have full fibre, Ofcom's own data suggests that full fibre accounts for only 4.5% of broadband connections.

To understand the degree of consumers' confusion with respect to full fibre, we also gathered information on the geographic location of survey respondents (based on their postcode, which is associated with their account profile on the YouGov system) and is also part of the screening process to secure a nationally representative sample.[42]

We were able to compare this information with data from Ofcom on UK full fibre coverage (at a postcode level), as set out in the 2020 Connected Nations Update – Summer 2020.[43] With this additional data we were able to cross-check whether full fibre was actually available in the postcode area of each participant.

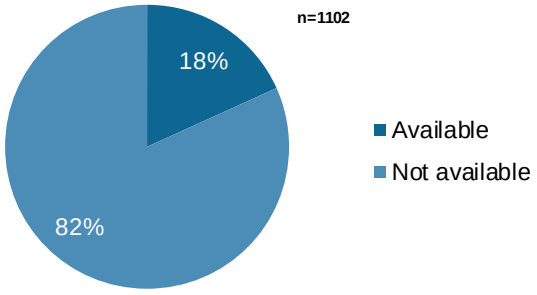
We found that amongst the 52% of consumers (n=1102) who claimed to have full fibre, the technology was in fact only available to 18% of them. As shown in Figure 6, this implies that 8 out of 10 (82%) of those consumers who claimed to have subscribed to full fibre already, could not have done so in reality.

41 The graphic displays the results of the survey question: [connection_type] "What type of internet connection do you have at home?", see also Annex B.

42 The postcode matching was conducted internally by YouGov and no personal information on participants entered the analysis. Observations are anonymous and cannot be traced back to specific individuals.

43 Ofcom (2020), Connected Nations update: Summer 2020, Fixed postcode data set. Available at: https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research/connected-nations-update-summer-2020

Figure 6: Availability of full fibre for those respondents who claim to have it



Furthermore, it is reasonable to assume that not all the 18% of respondents who (on average) live in an area where full fibre is available, are actually taking a full fibre service. As such the observed level of confusion should be interpreted as a conservative lower bound as it defines just the minimum of consumers who incorrectly stated that they had subscribed to full fibre.

This can be seen from the fact that there was a take-up rate of only 3% for full fibre tariffs in the UK in September 2019,[44] even though it was already available to 12% of all households at that time,[45] [46] which implies that only around 25% of subscribers that could choose a full fibre connection actually have taken it up.

We summarise the first result with respect to consumer confusion as follows:

Result 1: While over half of all respondents claimed to have "full fibre" already, at least 8 out of 10 of those do not yet have full fibre in their area

From an economic perspective this implies that the majority of consumers seem not to be able to recognise the underlying technology of their broadband connection, and also that they materially overestimate their underlying technology, incorrectly believing that they already have full fibre.

Hence, the survey evidence establishes that a significant proportion of UK broadband consumers suffer from mistaken impressions about the availability of full fibre in their

44 WIK-Consult (2020), Moving to a fibre-enabled UK: International experiences on barriers to gigabit adoption, Report for Broadband Stakeholder Group. Available at: http://www.broadbanduk.org/wp-content/uploads/2020/06/WIK-report_BSG_02062020_final.pdf

45 Ofcom (2020), Connected Nations Update – Summer 2020. Available at: https://www.ofcom.org.uk/__data/assets/pdf_file/0017/202571/connected-nations-summer-update-2020.pdf

46 However, based on the available data we cannot observe the true underlying technology of the respondents' broadband connection and, hence, we cannot further quantify the full extent of full fibre consumer confusion. Nevertheless, it is reasonable to assume that the proportion of confused consumers significantly exceeds the conservative lower bound of 82%.

area. This offers one possible explanation for the relatively low take-up of full fibre in the UK compared to other European countries, and also highlights that there may be a risk of a misallocation of consumer spending in the market. Consumers who have an inherent preference for full fibre connections are not able to identify the corresponding offers based on the information available to them, and thus cannot make an informed purchasing decision that reflects their preferences.

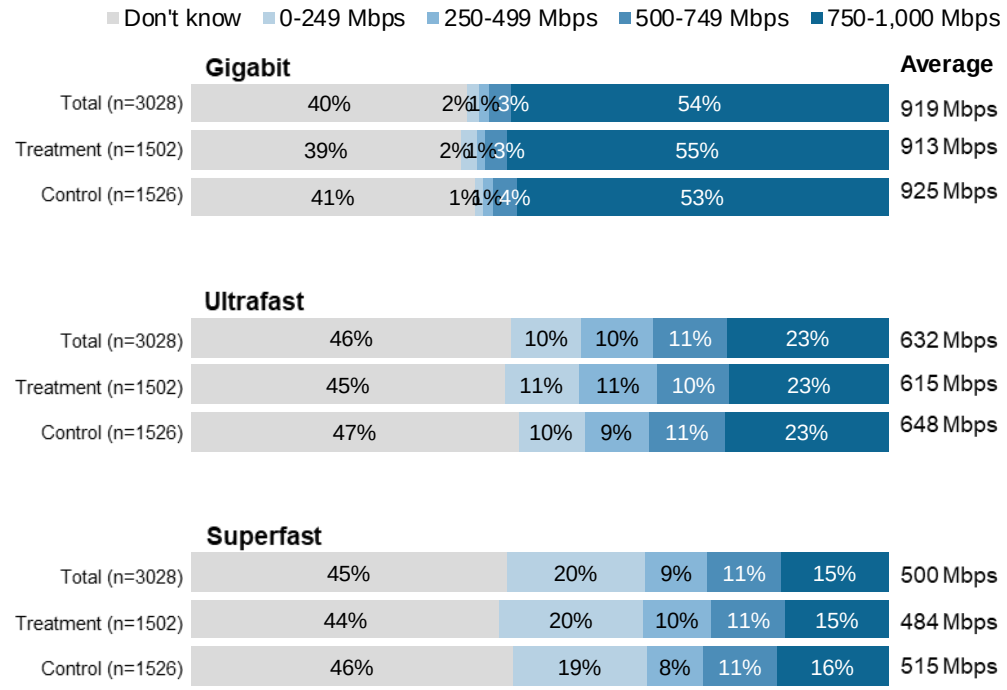
If at least some of those UK consumers incorrectly claiming to have full fibre would place material value on having full fibre, this situation would imply losses in consumers' welfare. Interventions that are specifically tailored to empower consumers to correctly identify the underlying access technology of different broadband tariffs would appear to be particularly effective in addressing this type of confusion in consumers that may have a preference for full fibre.

4.1.2 Misunderstanding of speed related terms

The second area where we sought to test consumers' understanding was in regard to the verbal descriptions used in broadband marketing to signal the speed/bandwidth of the service. A large number of advertised broadband offers include a term which is clearly intended to provide an indication of the offered speed. This includes expressions which are officially classified by Ofcom, such as 'superfast' and 'ultrafast', as well as other terms used to market broadband such as, 'fast', 'lightningfast' or 'hyperfast'.

In the survey we sought to gauge participants' understanding of the speed indicated by officially defined terms. Specifically, participants were asked to attribute a speed level to 'superfast'-, 'ultrafast'- and 'gigabit'-speeds, respectively. This question was visualized by a slider which could be placed within the range of 0 to 1,000 Mbps. Figure 7 displays the results from this exercise.

Figure 7: Understanding of speed related terms[47]



The most striking result is the large proportion of participants that chose the option 'Don't know', and as such were not able to infer any information from the terminology with respect to download speeds. This applies to almost half of participants in cases of 'superfast' (45%) and 'ultrafast'-speeds (46%) and to 40% in the case of 'gigabit'-speeds.

These high levels of mis-understanding even persisted in the treatment group, which had been informed about the underlying access technologies used to provide broadband Internet and their associated performance.[48]

As regards the responses from consumers who did indicate a speed-level we see that 'superfast' and 'ultrafast' are commonly misunderstood and that speed-levels are significantly overestimated by consumers. While Ofcom defines 'superfast' as

47 The graphic displays the results of the survey questions [attribution_1], [attribution_2] and [attribution_3]. The corresponding questions were: "If a broadband package offers gigabit-/ ultrafast-/ superfast-speeds, what does this equate to?", see also Annex B.

48 The information treatment was conducted before participants answered the attribution questions. Due to this, the information provided in this treatment could have influenced the given answers. However, this is not the case as Figure 7 indicates. This is not surprising since the information treatment did not mention the speed related terms of 'gigabit', 'ultrafast', 'superfast' explicitly. Nevertheless, it provided general information on the underlying technologies and associated product characteristics such as speed. However, this kind of information does not seem to alleviate this aspect of consumer confusion which we deem to be a noteworthy result in itself.

connections offering at least 30 Mbps, on average participants stated that ”superfast” implies speeds of 500 Mbps, with 26% of respondents stating that ‘superfast’ implied speeds of over 500 Mbps.

Similar confusion can be seen for ‘ultrafast’ which Ofcom defines as connections of at least 300 Mbps.[49] On average, respondents stated that ”ultrafast” implies speeds of 632 Mbps, with 23% of respondents stated that the term referred to speeds of over 750 Mbps.

‘Gigabit’ was the best understood term, and is generally understood as referring to download speeds of at least 1,000 Mbps. On average consumers responding indicated that Gigabit implied 919 Mbps.

Thus, the evidence reveals that there is a substantial misunderstanding of speed related terminology, especially as regards download speeds below the level of ‘gigabit’.

We summarise these findings as follows:

Result 2: Almost half of consumers claim not to know what ‘superfast’, ‘ultrafast’ and ‘gigabit’ mean. Those who did provide their understanding of what these terms mean significantly overestimated the speeds offered by ‘superfast’ and ‘ultrafast’ connections e.g. respondents on average claimed that ‘superfast’ broadband equates to a speed of 500 Mbps, when Ofcom in fact define it as speeds of up-to 30 Mbps.

From an economic perspective this overestimation of speeds (for sub-Gigabit connections) carries a significant risk. If consumers think that a ‘superfast’ connection to which they subscribed already offers speeds of 500 Mbps, their evaluation of actual full fibre tariffs becomes biased. Specifically, the attractiveness of a full fibre service offering ‘only’ twice the speed (i.e. 1,000 Mbps) will not appear as attractive as it would do if consumers understood that the difference in speed is in fact 30 fold (30 Mbps vs 1,000 Mbps). Misunderstanding of this kind may materially depress take-up of full fibre offers.

49 Ofcom (2019), Ultrafast broadband now available to most UK properties. Available at: https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/ultrafast-broadband-now-available-most-uk-properties

4.2 Assessing the impact of a label as an indication of the overall quality of a broadband offer

GigaTAG (2020) notes in its interim report that labelling systems could be one option to improve consumers' understanding of gigabit-capable broadband through simple and clear presentation of information. However, they also highlight that more research is needed on whether labelling would be effective in the UK market. This study addresses this need and provides the first evidence on the effectiveness of a possible labelling scheme in the UK broadband market.

The design of the label used in this study is based on a multi-level label and has been kept very plain and simple. Since the focus of the study is to test whether "a" label is effective or not, we abstained from adding any additional features that could confound the effect of a predominantly visual stimulus. For example, if the label had included additional text or symbols, we could not disentangle to which extent the observed behaviour was driven by the fact that participants saw a label vs the effect of additional label features. Further research could be conducted to explore the effectiveness of different label features and variants. The specific design has already been displayed in Figure 3.

We opted for a label design that segments broadband connections into four tiers. The ranking of the tiers is shown in three ways: First, the category names from A to D, second, the length of the category bars and, lastly, the colour scale from dark green to red. The green colour has only been applied to categories which represent gigabit-capable technologies.

Although, in reality, such a labelling system would be accompanied by an information campaign to educate consumers, the label was designed in a way that uninformed consumers could also implicitly infer useful information from its design.

To further qualify the effect of a label in combination with an information campaign we exposed half of the respondents to an information treatment prior to the choice tasks. This mimics an information campaign to educate consumers about a broadband label in a real world scenario and allows an assessment of how the label effect differs between uninformed and informed consumers. We deliberately kept the information as plain and factually accurate as possible, rather than introducing any marketing language, to prevent this impacting the outcome. Participants who were part of the treatment group saw the label in advance, received information on broadband technologies in general and how different connection types map to each label category (i.e. A to D).[50] With this

50 The information provided to participants of the treatment group entailed the following categorization and descriptions of connection types. Category A: "Full Fibre broadband", Category B: "TV-Cable and High-Speed Copper broadband", Category C: "Mixed Fibre/Copper broadband", Category D: "Basic Copper broadband". Additional information on the precise design of the information treatment can be found in Annex B.

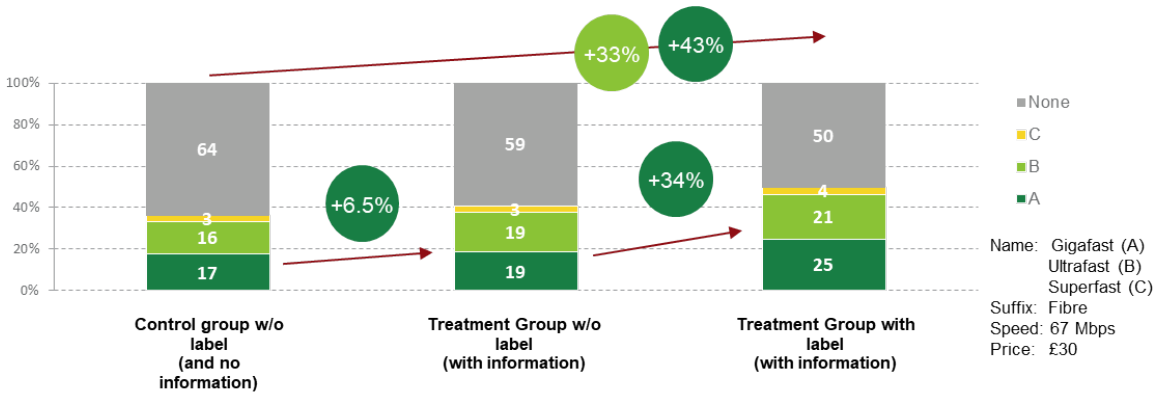
sample split we could distinguish the effect of the information provided from that of the label.

4.2.1 The effect of labelling

To analyse the effect of the label, we compared product configurations that include offers in the categories A, B and C.[51] The label's effect on choice shares, that is, the take-up of the different connection types, is shown in Figure 8.[52]

The introduction of the label paired with an information treatment proves to be very effective in promoting the take-up of full fibre and other gigabit-capable connections. The combination of these two measures leads to an increase in the take-up rate of full fibre (type A) by up to 43% and of other gigabit-capable (type B) connections by up to 33%. As regards the effects of the information campaign, providing information to participants in the absence of a label itself seems to increase full fibre take-up by approx. 6.5%.

Figure 8: Effect of labelling on take-up



Another way of looking at it is that while adding information alone boosts take-up of full fibre by 6.5%, adding the label expands take-up of full fibre by an additional 34%. The

51 We excluded tariffs of category D from this label comparison in order to focus on the main effects in the context of tariffs predominantly advertised in the UK market. Nevertheless, we conducted additional robustness checks in Annex C that include tariffs of category D. None of the robustness checks produced qualitatively different results with respect to the beneficial effect of a label on full fibre take-up.

52 Specifically, for the results in Figure 8 the following values of product attributes were chosen: *Name* (=Gigafast, Ultrafast, Superfast), *Suffix* (=Fibre), *Speed* (=67 Mbps), *Price* (=£30). Other configurations with variation in the *Speed* and *Price* attribute were also conducted. None of these robustness checks provided qualitatively different results with respect to full fibre take-up (choice shares of category A).). Further information on these robustness checks can be found in Annex C (Figure 14 to Figure 16).

label even increases full fibre take-up for consumers in the control group, which had not received any information concerning the label by 24%.[53]

The question arises from where the additional demand for full fibre and gigabit-capable connections is coming, given that the demand for sub-gigabit-capable connection types remains unaffected. To answer this question we rely on two additional inputs provided by participants when they completed their conjoint choice tasks.

First, participants had to indicate their preference for an offer and then, secondly, indicate whether they would actually buy their preferred option (see Figure 2). The proportion of participants who stated that they would not in practice purchase their preferred option is shown within the 'None' category in Figure 8.

Strikingly, this proportion of participants decreases substantially when consumers are given the information treatment and even more so when the label is used. Hence, the combined intervention of information and label motivates more participants to actually buy their preferred offer.

Full fibre and other gigabit-capable connections in particular benefit from this influx of buying power, while the purchasing decisions for other connections (type C) remains constant. Thus, we conclude that the beneficial effect of labelling stems primarily from an expansion of the market demand for gigabit capable offers. The two main results concerning the effect of labelling are summarised below.

Result 3: Introducing a label together with an information campaign has a substantial positive impact on the take-up of full fibre, with take-up increasing by approximately 40%.

A further important feature of the label's effect is that it does not change participants' preferences with respect to their preferred connection type. This becomes clear if one excludes the 'None' option and only accounts for participants' preference inputs from the conjoint tasks, irrespective of whether they are willing to translate this into a purchase of their preferred option. A visualization of this can be found in Figure 18 in Annex C.

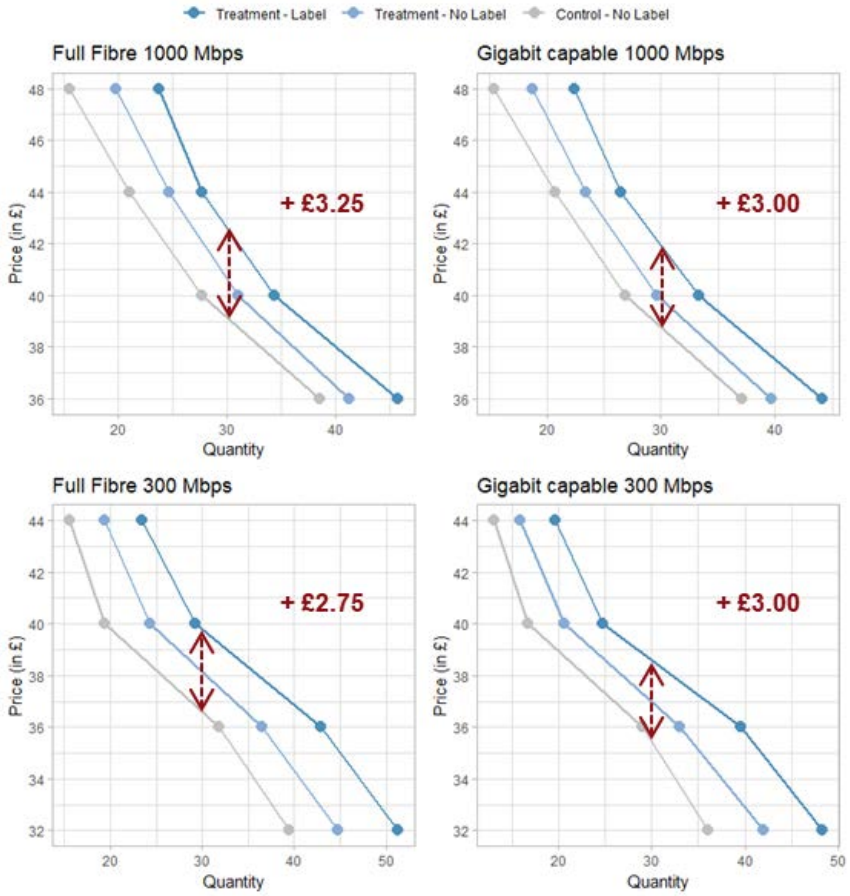
Since, consumers' preferences for a given connection type remain unaffected, the introduction of a label should not raise concerns with respect to a distortion of consumer preferences in a way that would be detrimental for consumers' welfare. In fact, the label is purely welfare enhancing as it empowers consumers to correctly identify the underlying connection types of different tariffs and to purchase their preferred option.

53 The label effect for uninformed consumers is derived by the comparison of the control group with and without the label. See Figure 17 in Annex C for further information on this analysis.

Hence, it plays the role of a nudging device in the sense of Thaler & Sunstein (2008) to steer participants to an action that is beneficial to them in the long run.[54]

Another way of thinking about the impact of a label is on the willingness to pay of consumers. To this end, we visualise the effect of labelling on the estimated demand functions of respondents in our sample. Since we observe participants' aggregated purchasing decisions, we can derive the demand functions for offers of a specific speed and underlying connection type. For the sake of simplicity, the following analysis is restricted to full fibre and gigabit-capable connections for the two highest speed levels of 300 Mbps and 1,000 Mbps. The graphs of these estimated demand functions are displayed in Figure 9.

Figure 9: Effect of labelling on willingness to pay



The previous result of an increase in demand for full fibre and other gigabit capable connections is reflected in the rightward shift of these demand functions. The curve for

54 Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness.* Yale University Press.

participants of the treatment group without the label (light blue) lies to the right of that of the control group (grey). If a label is present, the demand curve (dark blue) lies even farther to the right. This signifies that for a given price level, there is more take-up. Alternatively, the same effect can also be interpreted as an increase in consumers' willingness to pay. If the quantity is kept constant, the difference in willingness to pay for the product manifests itself as the vertical spread between the different demand curves.

In the present case, we fix the amount of purchased broadband tariffs to be at 30 total units which is close to the mean demand for the four displayed product configurations and provides a reasonable comparison benchmark. The vertical distance between the grey and the blue line would equate to a price difference of approx. £2.75 to £3.25. Thus, the introduction of labelling in combination with an information campaign would motivate consumers to spend approximately £3 more each month for a full fibre or gigabit-capable connection. This would amount to an increase in yearly spending of £36.

We can derive further insights by looking into the effects of the label on different subsamples of participants. An important finding is that the effect of the labelling scheme does not differ significantly for subgroups of different ages, gender and usage behaviours. The take-up of full fibre and other gigabit capable tariffs increases across all these groups. This is a promising result as well, since policy makers should be interested in interventions that prove to be effective not only for a small subset but for the UK's consumer population as whole. In this context, a broadband labelling scheme appears to be a promising measure. This finding is summarised as follows.

Result 4: Labelling seems to be effective at promoting take-up of full fibre across all UK broadband consumers, i.e. would support purchasing decisions across all different demographics of broadband consumers.

In light of these results, the question may arise as to why such a basic label seems to be so successful? Why are consumers willing to buy more, or equivalently pay more, for the same service which offers just the same attributes but is now displayed with a label? This question, among others, is answered in the following section which also elaborates on what the labelling communicates and what kind of information is drawn from it by participants.

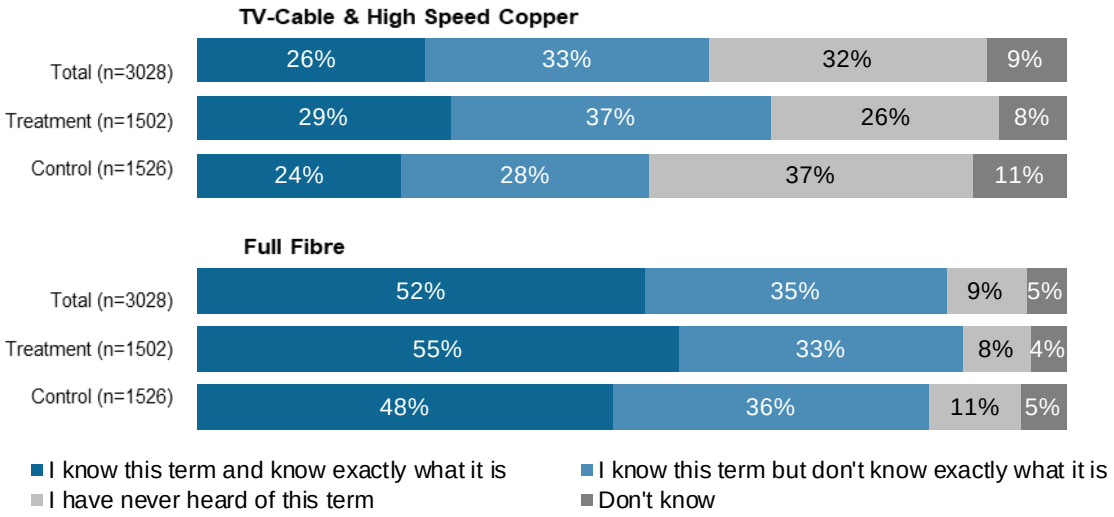
4.2.2 The role of information and the value of the label

The guiding principle behind the introduction of a labelling scheme is to provide consumers with a reliable signal which supports them in making informed purchasing decision. This empowerment of consumers could be facilitated by an information campaign, which educates participants on how to extract (additional) valuable information from the label.

As different generations of broadband technology have different quality attributes, having some understanding of the underlying telecommunications technology used in the provision of broadband services could help consumers to distinguish between the capabilities of different offers. In order to assess the baseline level of knowledge, we asked via a survey question whether specific connection types were known to survey participants. The distribution of answers is displayed in Figure 10 below.

Figure 10: The understanding of broadband technologies[55]

Question: *Which of the following terms that describe Internet connection types have you ever heard of?*



We focused the analysis on the two connection types that are positively affected by the labelling i.e. full fibre and other gigabit capable connections (referred to as 'TV-Cable and High Speed Copper' in our study). Around half of respondents claimed not to know the exact meaning of the term, and this increased to more than three quarters for "TV-cable and high speed copper". Providing information reduced the proportion of consumers not knowing the exact meaning of the terms (or not knowing the terms at all) by 4 percentage points (full fibre) and 14 percentage points (gigabit capable), respectively. Hence, the information treatment increases the number of participants who understand the technology involved and can now build their preferences based upon this additional knowledge.

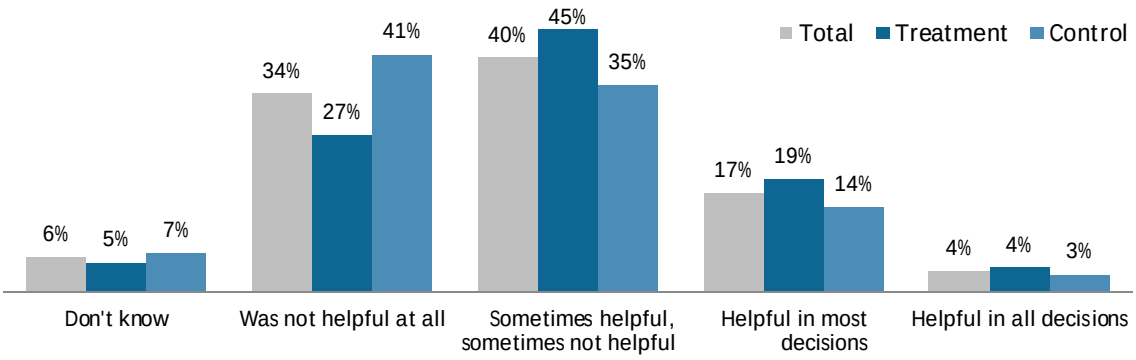
55 The graphic displays the results of the survey question: [connection_type_eval] "Which of the following terms that describe Internet connection types have you ever heard of?". The specific connection types that were addressed are [_1] 'Basic Copper broadband', [_2] 'Mixed Fibre/ Copper broadband', [_3] 'TV-Cable & High Speed Copper broadband, [_4] 'Full Fibre broadband'. See also Annex B.

While the information treatment enables consumers to form their preferences and helps them to assess which kind of connection type they want, there is still the possibility that they are not able to reliably identify the desired broadband tariff. This is exactly where the remedial effect of the label applies. Without the signalling effect of the label, consumers would have to depend on tariff attributes such as speed, the name or even the pricing range to decipher the technology on which an offer is based. However, the name and pricing range may not clearly reflect the underlying technology. A labelling scheme alleviates this dependency on other product attributes and reveals the true underlying connection type in a manner which is uniform across different offers and thus may generate a degree of trust. In turn, by providing clear information about product types it should empower consumers to choose the broadband tariff which most closely matches their preference.

In order to assess consumers' perception of the utility of the labelling system, we asked them to evaluate to what extent the label was helpful in their decision making. The answers are displayed in Figure 11 below.

Figure 11: The perceived helpfulness of the label[56]

Question*: Did you find the label helpful or not helpful when deciding for an offer?*



The important insight from this figure is the proportion of participants that find the label helpful in at least some situations, that is, the combined shares of the three answering options to the right. In this case, 61% of all participants considered that the label was helpful in at least some situations, and this figure was even higher (68%) in the treatment group as they had been provided with information on what the label indicates.

It should be noted that this could be considered a conservative estimate, because participants were exposed to the label for only approximately 15 minutes, whereas in a

56 The graphic displays the results of the survey question: [label_check] "Did you find the label helpful or not helpful when deciding for an offer?", see also Annex B.

real world setting, consumers might have longer to familiarise themselves with the label and also have more time than was allowed in the multiple choice element of the survey to consider and make a purchasing decision. Hence, the promising results of this rather static analysis might be even more pronounced in a long-term real world setting. Moreover, the actual label used would have undergone extensive testing and refinement to boost its impact.

Result 5: 61% of participants to the study considered that the label presented was informative and helped them when making purchasing decisions. For those who had the information treatment to explain more about the label, the impact was greater, with 68% claiming it helped informed their decisions.

Against this background, it is not surprising that the combined remedy of an information campaign and labelling is effective in increasing awareness of different solutions and encouraging take-up of more performant technologies. By reducing uncertainty in the market, a combined strategy of a label accompanied with information should reduce the risk of consumers choosing a broadband tariff that does not match their preferences. From an economic perspective this strategy should also address losses in consumer welfare that may be caused by suboptimal purchasing decisions.

This additional consumer surplus can also be seen in the price that consumers are willing to pay. Through the label, consumers receive an implicit “information rent”, such that they are willing to pay more for an otherwise identical full fibre connection just because the label is being displayed (and thus there is greater confidence that what is promised will live up to their expectations). In this way, a portion of the label’s positive effect is passed on to ISPs providing full fibre and other gigabit-capable access technologies. Hence, both the demand and supply side of the UK’s broadband market would benefit from the reduction of consumer confusion and the current level of uncertainty. This can be interpreted as a Pareto-improvement compared to today’s situation which would benefit the overall welfare realised in this market.

5 Conclusions

This study is the first of its kind and provides much needed evidence on the degree of consumer confusion in the UK broadband market and the effectiveness of a label to address this confusion and drive take-up of full fibre and gigabit capable broadband.

Our study has found that a high proportion of UK broadband consumers wrongly assume that they are already subscribed to a full fibre connection. This may go some way to explaining why take-up of fibre is low in the UK, even in areas where it has been available for some time. Consumers who are under the wrong impression that they already have a full fibre connection may be more likely to remain with their current service, even if they inherently prefer a full fibre connection and would switch to such a connection if they knew that their existing connection was not full fibre.

In addition, consumers seem to have difficulties in understanding the hyperbolic terminology which is often used in marketing material to signify fast download speeds. While the term of 'gigabit' is widely understood, 'superfast' and 'ultrafast' are not. Consumers over-estimate the associated speeds of these two terms by a substantial margin. Hence, consumers' perception of the quality difference between the different connection types is not accurate and the potential benefits that would be possible through full fibre may consequently be under-estimated. This could offer another explanation as to why the take-up of full fibre is today relatively low. All these results underpin the need to take action to address consumer confusion as a means to support the achievement of the UK's digital infrastructure ambitions.

Labelling offers a clear and understandable signal of quality in a variety of market environments in which consumer purchasing decisions are negatively impacted by confusion and uncertainty. While the specific design of a label may require further research, this study presents the first robust evidence for the effects of a broadband labelling system. The results of our research suggest that, especially if combined with an information campaign, a broadband label could cut through much of the prevailing confusion, empowering consumers to make informed decisions which would provide the much needed stimulus for the adoption of full fibre and other gigabit-capable technologies in the UK.

Based on changes in purchasing intentions, we estimate that take-up of full fibre connections could be increased by approximately 40% if a label is displayed alongside broadband offers, along with an information campaign. Similarly, our study finds that demand for other gigabit-capable connections could be boosted by 30% whereas other technologies are not affected. The additional demand for these two connection types comes from consumers who already have a preference for the two higher quality connections but would not choose to buy them in the absence of the label.

The main contribution and value of labelling is that it reduces the uncertainty when deciding between offers and reveals the true underlying connection type. This empowers consumers to choose a tariff that most closely matches their preferences. This results in increased consumer welfare from which broadband operators also profit.

The benefit to broadband operators becomes apparent when considering the impact on willingness to pay. The positive effect on take-up is equivalent to an increase in consumers' willingness to pay for an identical full fibre or gigabit-capable tariff by £2.75 to £3.25 every month. Hence, both the demand and supply side would benefit from addressing confusion and uncertainty in the broadband market.

It should also be noted that the effect of labelling and associated information does not differ between different consumer groups. Consumer subgroups of different ages, gender and usage behaviours all react in the same manner. This is promising since a regulatory remedy should be effective not only for specific subgroups but the whole of the UK.

The evidence in this study suggests that the introduction of a labelling system would be an effective remedy to alleviate consumers' confusion and promote the take-up of full fibre and other gigabit-capable connections.

Annexes

This section provides additional material and supplementary explanations on the following topics:

- Annex A: Methodology for the conjoint analysis;
- Annex B: Survey design, information provided to the treatment group;
- Annex C: Additional analyses and robustness checks.

Annex A: Methodology

The guiding principle of the conjoint design is to include tariff options that are as close as possible to their real world counterparts. The attribute ranges presented in Table 1 are therefore inspired by actual UK broadband offers. In practice, while the specific attribute ranges of broadband tariffs are easily visible to consumers, the specific connection types on which they rely are not. Naturally, this obfuscation must be factored into the study design. For the analysis, however, one needs a clear indicator that can be used to signal the connection type on which a tariff is based, while at the same time, not revealing that information to consumers.

Given our hypothesis of consumer confusion with respect to the language used in tariff names, the most elegant way to achieve this, is to impose a strict mapping of the hyperbolic *Prefix* of a tariff name to specific connection types. Through this design choice, specific connection types can be identified in the analysis while the information is not immediately observable by participants. The mapping of specific levels of the *Prefix* attribute to connection types is again based on real world tariff examples. In this manner, prefixes of 'Superfast' and 'Fab' are used for Mixed Fibre/ Copper connections (category C), 'Ultrafast' and 'Lightningfast' are matched to gigabit-capable connections of TV-Cable & High-Speed Copper (B) and 'Gigafast' and 'Hyperfast' are reserved for full fibre (A). The full mapping and other feasible combinations of the attribute levels can be derived from Figure 12.

Figure 12: Combination matrix of attribute levels

				Suffix		Price				Speed					Label				
				Fibre	Broadband	Price Point 1	Price Point 2	Price Point 3	Price Point 4	10	35	67	300	1000	0	A	B	C	D
Connection Type	A	Name	Gigafast																
			Hyperfast																
	B		Ultrafast																
			Lightningfast																
	C		Superfast																
			Fab																
	D		Fast																
			Brilliant																
			Own-Category combination - excluded by default																
			Non-feasible combination - technology restriction or label layout																

As specific connection types are identifiable for the purposes of the analysis, they also have to satisfy actual characteristics that are rooted in the restrictions of the infrastructure concerned. Therefore, Basic Copper connection (D) can only provide the *Speed* attribute level of 10 Mbps, category C the levels of 10, 35 and 67 Mbps while B and A can offer all levels of the entire range of speeds up to 1,000 Mbps (see Figure 12). The survey was programmed such that Every connection type had the potential to

be displayed without a label or a visible label of the matching connection type (0, A, B, C, D). Lastly, we did not witness a Basic Copper (ADSL) broadband offer in reality whose tariff name included the term 'Fibre'. Therefore, we excluded this combination.

Contrary to the attributes mentioned above, the range of the *Price* attribute is in reality not determined by the different connection types but rather by the offered *Speed* level of the tariff. Hence, the design incorporates this relationship by defining 4 specific price points which depend on the realised *Speed* level. Again, the implemented price intervals for the specific speed levels are based on real world broadband tariffs. The difference between price points increases for the three highest speed levels from a £2 to £4 increment to account also for the increased price variance in tariffs of higher quality. The specific price ranges are displayed below in Table 2.

Table 2: Price points by speed level

		Conditional Pricing by Speed Level			
		Price Point 1	Price Point 2	Price Point 3	Price Point 4
Speed	10	18	20	22	24
	35	22	24	26	28
	67	24	28	32	36
	300	32	36	40	44
	1000	36	40	44	48

Note that with this implementation the price level depends directly on the offered speed level, and due to this relationship, the price is not entirely independent from the underlying connection types since they directly determine which speed levels may occur. Hence, a very high price may be linked to the higher speed of the tariff and might also be an indication of an underlying technology of the categories B and A. The indicative value of the price attribute (of the underlying technology) is therefore preserved, while at the same time price is not a perfect predictor for the connection type since price points substantially overlap between speed and therefore connection types. Thus, the design of the present study is well suited to capture the real world features of the UK's broadband market while providing enough structure to enable us to address the research questions with respect to the take-up of specific connection types under different scenarios.

Annex B: Survey design and information treatment

The conjoint study was conducted by YouGov with a nationally representative sample of 3,028 participants from the 13th -17th November 2020. The length of the entire intervention was approximately 15 minutes. The chronological progression of the survey is shown in Figure 4.

During the information treatment, half of the respondents received information on the underlying telecommunications infrastructure and how this infrastructure and connection types relates to the label. In addition they saw the label prior to the purchasing decision task so they could have an impression of the design in advance. The additional information presented alongside the label is displayed below in Figure 13.

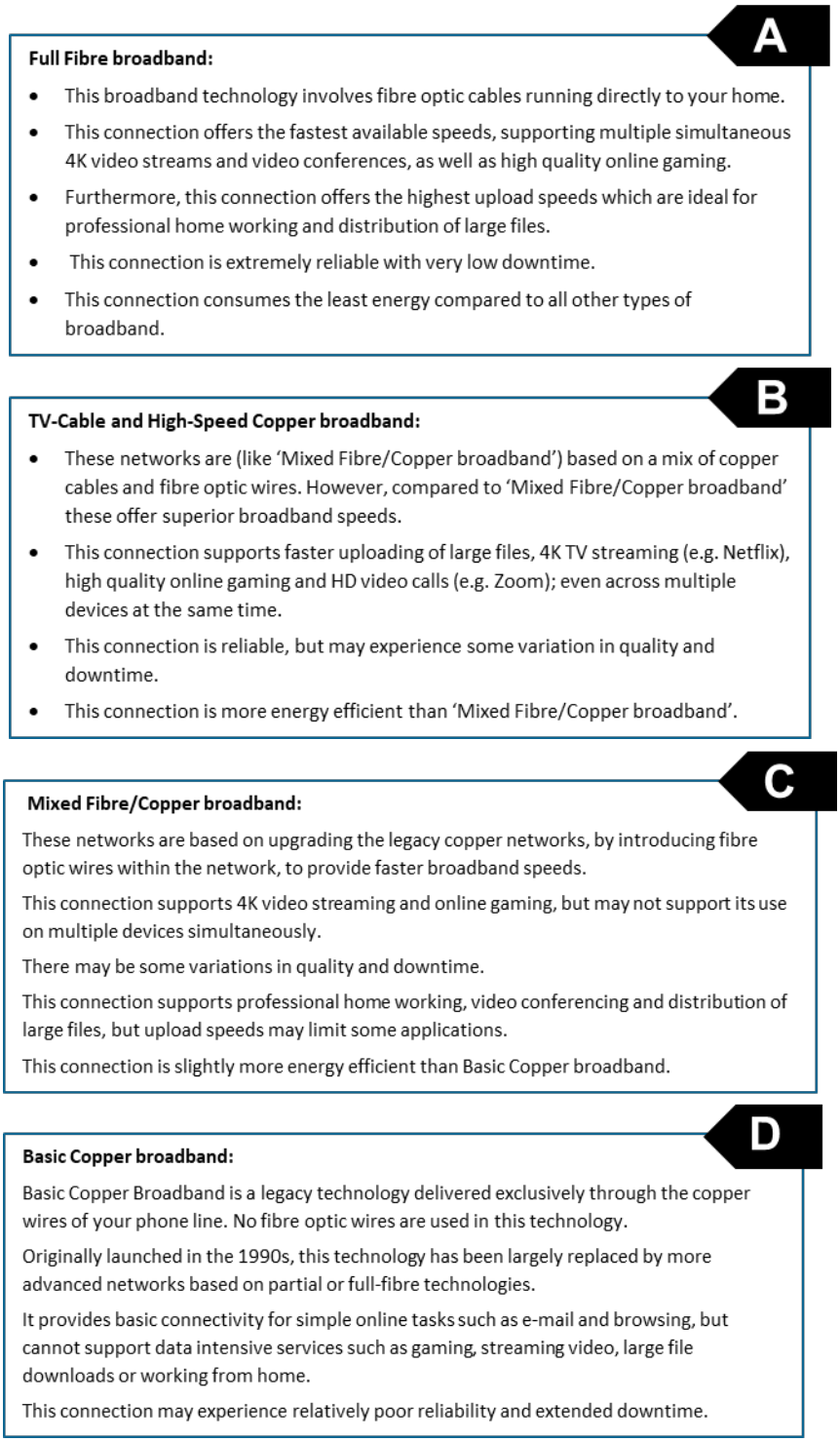
The order in which the label and the information on the different connection type categories were displayed is randomized. Due to this randomization process, the analysis can abstract from any potential order effect that might bias the results. The literature in the field of behavioural economics has established that participants' attention towards provided information in experimental scenarios can be biased in multiple directions.[57]

Firstly, the concept of consumer fatigue implies that participants become less attentive to information over the course of an experimental study. In the present setting this would imply that more attention is spent on the specific connection type whose information is presented to them first.

Secondly, another behavioural bias acts in the opposite manner. Participants regularly remember the last impression of a sequence of information best. Again, applied to the setting of this study, this would imply that the information on the connection type which is presented last would be the most prominent one. Since it is increasingly difficult to account for these biases ex-post, the randomized information sequence has been chosen to ensure that if these biases are indeed present, they will be cancelled out due to the large sample size.

57 The evidence for fatigue and other ordering biases in economic experimental settings is numerous. Two of the most prominent studies which show this are Campbell, D., Boeri, M., Doherty, E., & Hutchinson, W. G. (2015). Learning, fatigue and preference formation in discrete choice experiments. *Journal of Economic Behavior & Organization*, *119*, 345-363; and Savage, S. J., & Waldman, D. M. (2008). Learning and fatigue during choice experiments: a comparison of online and mail survey modes. *Journal of Applied Econometrics*, *23*(3), 351-371.

Figure 13: Information presented in information treatment



The questions included in the survey and answering options are shown below.

Screening questions to build the representative gross sample:

1.

[birthday] On what day of the month were you born?

[birthmonth] In what month were you born? Please enter a numeric value e.g. 8 for August, 11 for November etc.

[birthyear] In what year were you born?

2.

[gender] Are you...?

<1> Male
<2> Female

3.

[region] Which area of the UK do you live in?

<1> North East
<2> North West
<3> Yorkshire and the Humber
<4> East Midlands
<5> West Midlands
<6> East of England
<7> London
<8> South East
<9> South West
<10> Wales
<11> Scotland
<12> Northern Ireland

4.

[internet_connection] Do you currently have a fixed broadband connection at home?

<1> Yes
<2> No
<96 fixed xor> Don't know

#screenout if not 1 in internet_connection

5.

[decision_maker] What is your role in the decision of what broadband service to purchase and from whom?

<1> I am the sole decision maker
<2> I decide together with someone else (e.g. partner or housemate)
<3> Someone else decides, I am not involved (e.g. partner or landlord sorts it)
<777> Don't know

#screenout if not 1 or 2 in decision_maker

Introduction:

This survey is of different topics, and the results will be used to inform our client.

Your YouGov Account will be credited with 50 points for completing the survey.

We have tested the survey and found that, on average it takes around 15 minutes to complete. This time may vary depending on factors such as your Internet connection speed and the answers you give.

Current household situation:

6.

[speed] What is the approximate advertised (i.e. "headline") speed of your home broadband connection?

<1> 10 Mbps
<2> 40 Mbps
<3> 70 Mbps
<4> 100 Mbps
<5> 150 Mbps
<6> 300 Mbps
<7> 500 Mbps
<8> 1000 Mbps
<777> Don't know

7.

[speed_evaluation] Which one, if any, of the following download speeds is fastest?

<1> 1 Gbps
<2> 1 Mbps
<3> 1 Kbps
<4 fixed> They are all the same
<777 fixed> Don't know

8.

[internet_daily_usage] Approximately how much time per day, excluding work, do you typically spend on the internet, across all devices (e.g. computer, phone and tablet)?

<1> Less than 1 hour
<2> 1-2 hours
<3> 2-4 hours
<4> 4-6 hours
<5> 6-8 hours
<6> more than 8 hours
<96 fixed xor> Don't know

Information treatment:

9.

On the following pages, we will describe all of the below labels in more detail. The labels inform about the types of broadband technologies and their characteristics. The labels express a ranking of the broadband technologies in terms of overall quality in ascending order from D to A. The subsequent information is presented in a <randomized> order.

#show label_all.jpg

The following screens 10 to 13 were shown in randomised order.

10.

#show label_full-fibre.jpg

[treat_text1] Full Fibre broadband:

- **This broadband technology involves fibre optic cables running directly to your home.**
- **This connection offers the fastest available speeds, supporting multiple simultaneous 4K video streams and video conferences, as well as high quality online gaming.**
- **Furthermore, this connection offers the highest upload speeds which are ideal for professional home working and distribution of large files.**
- **This connection is extremely reliable with very low downtime.**
- **This connection consumes the least energy compared to all other types of broadband.**

11.

#show label_high-speed-copper.jpg

[treat_text2] TV-Cable and High-Speed Copper broadband:

- **These networks are (like Mixed Fibre/Copper broadband) based on a mix of copper cables and fibre optic wires. However, compared to Mixed Fibre/Copper broadband these offer superior broadband speeds.**
- **This connection supports faster uploading of large files, 4K TV streaming (e.g. Netflix), high quality online gaming and HD video calls (e.g. Zoom); even across multiple devices at the same time.**
- **This connection is reliable, but may experience some variation in quality and downtime.**
- **This connection is more energy efficient than Mixed Fibre/Copper broadband.**

12.

#show label_mixed-copper.jpg

[treat_text3] Mixed Fibre/Copper broadband:

- **These networks are based on upgrading the legacy copper networks, by introducing fibre optic wires within the network, to provide faster broadband speeds.**
- **This connection supports 4K video streaming and online gaming, but may not support its use on multiple devices simultaneously.**
- **There may be some variations in quality and downtime.**
- **This connection supports professional home working, video conferencing and distribution of large files, but upload speeds may limit some applications.**
- **This connection is slightly more energy efficient than Basic Copper broadband.**

13.

#show label_basic-copper.jpg

[treat_text4] Basic Copper broadband:

- **Basic Copper Broadband is a legacy technology delivered exclusively through the copper wires of your phone line. No fibre optic wires are used in this technology.**
- **Originally launched in the 1990s, this technology has been largely replaced by more advanced networks based on partial or full-fibre technologies.**
- **It provides basic connectivity for simple online tasks such as e-mail and browsing, but cannot support data intensive services such as gaming, streaming video, large file downloads or working from home.**
- **This connection may experience relatively poor reliability and extended downtime.**

Introduction into conjoint choices:

14.

On the following pages, we will show you a series of broadband options. These options include:

- **The name of the broadband product**
- **The average download speed (in Mbps)**
- **The price per month (in £)**
- **In some cases, a label will be displayed**

We will show you four different options on each page. Please read the offers thoroughly, and choose the option that is most attractive to you. Please also indicate whether you would really purchase this option or not.

Conjoint choices are made at this stage.

Questions after participants made their purchasing decisions:

15.

[importance] What factor was in general most important for you in making your choices?

<1> Name
<2> Speed
<3> Price
<4> Label
<777> Don't know

16.

[label_check] Did you find the label helpful or not helpful when deciding for an offer?

<1> Was not helpful at all
<2> Sometimes helpful, sometimes not helpful
<3> Helpful in most decisions
<4> Helpful in all decisions
<777> Don't know

17.

[treatment_check] Did the information provided about the label (prior to the options being presented to you) help you when making your choices?

<1> Not at all
<2> In some questions it did, in others it didn't
<3> In most questions
<4> In all questions
<777> Don't know

18.

[connection_type_eval] Which of the following terms that describe Internet connection types have you ever heard of?

[connection_type_eval_1] Basic Copper broadband

[connection_type_eval_2] Mixed Fibre/Copper broadband

[connection_type_eval_3] TV-Cable and High-Speed Copper broadband

[connection_type_eval_4] Full Fibre broadband

<1> I have never heard of this term
<2> I know this term but don't know exactly what it is
<3> I know this term and know exactly what it is
<777> Don't know

19.

[attribution_1] If a broadband package offers ultrafast speeds, what does this equate to?

<left> 1 Mbps
<right> 1,000 Mbps
<777> Don't know

20.

[attribution_2] If a broadband package offers gigabit-speeds, what does this equate to?

<left> 1 Mbps
<right> 1,000 Mbps
<777> Don't know

21.

[attribution_3] If a broadband package offers superfast speeds, what does this equate to?

<left> 1 Mbps
<right> 1,000 Mbps
<777> Don't know

Demographics:

22.

[connection_type] What type of Internet connection do you have at home?

<1> Basic Copper broadband
<2> Mixed Fibre/Copper broadband
<3> TV-Cable and High-Speed Copper broadband
<4> Full Fibre broadband
<555> Other: _____ #opentext
<777> Don't know

23.

[internet_activities] Thinking about your Internet usage at home, which, if any, of the following activities do you use the Internet for?

<1> Email
<2> Generally browsing the Internet
<3> Online banking
<4> Accessing news and sport websites
<5> Accessing social networking websites
<6> Buying/ browsing goods online (e.g. books, music, clothing, groceries)
<7> Buying/ browsing services online (e.g. food delivery, transportation)
<8> Downloading of games, movies, TV shows, videos, media, etc.
<9> Streaming of games, movies, TV shows, videos, media, etc.
<10> Uploading images/ videos to social networks
<11> Storing files, photos or other documents using cloud based apps (e.g., DropBox, Google Drive, etc.)
<12> Playing games
<666 fixed xor> None of these
<777 fixed xor> Don't know

24.

[remote_work] How often, if at all, do you or members of your household usually use your Internet at home for working remotely?

<1> Never
<2> Less than 1 day per month
<3> 1 to 3 days per month
<4> 1 to 2 days per week
<5> 3 or 4 days per week
<6> 5 days per week or more often
<777> Don't know

25.

[profile_household_size] How many people, including yourself, are there in your household? Please include both adults and children.

<1> 1
<2> 2
<3> 3
<4> 4
<5> 5
<6> 6
<7> 7
<8> 8 or more
<9> Don't know
<10> Prefer not to say

26.

[profile_household_children] How many of the people in your household are under 18?

<1> 0
<2> 1
<3> 2
<4> 3
<5> 4
<6> 5 or more
<8> Don't know
<9> Prefer not to say

27.

[profile_education_level] What is the highest educational or work-related qualification you have?

<1> No formal qualifications
<2> Youth training certificate/skillseekers
<3> Recognised trade apprenticeship completed
<4> Clerical and commercial
<5> City & Guilds certificate
<6> City & Guilds certificate – advanced
<7> ONC
<8> CSE grades 2-5
<9> CSE grade 1, GCE O level, GCSE, School Certificate
<10> Scottish Ordinary/ Lower Certificate
<11> GCE A level or Higher Certificate
<12> Scottish Higher Certificate
<13> Nursing qualification (e.g. SEN, SRN, SCM, RGN)
<14> Teaching qualification (not degree)
<15> University diploma
<16> University or CNAA first degree (e.g. BA, B.Sc, B.Ed)
<17> University or CNAA higher degree (e.g. M.Sc, Ph.D)
<18> Other technical, professional or higher qualification
<19> Don't know
<20> Prefer not to say

28.

[ONS_urban] ONS area type

<1> Urban
<2> Town and Fringe
<3> Rural
<4> Uncoded

29.

[profile_gross_household] Gross HOUSEHOLD income is the combined income of all those earners in a household from all sources, including wages, salaries, or rents and before tax deductions. What is your gross household income?

<1> under £5,000 per year
<2> £5,000 to £9,999 per year
<3> £10,000 to £14,999 per year
<4> £15,000 to £19,999 per year
<5> £20,000 to £24,999 per year
<6> £25,000 to £29,999 per year
<7> £30,000 to £34,999 per year
<8> £35,000 to £39,999 per year
<9> £40,000 to £44,999 per year
<10> £45,000 to £49,999 per year
<11> £50,000 to £59,999 per year
<12> £60,000 to £69,999 per year
<13> £70,000 to £99,999 per year
<14> £100,000 to £149,999 per year
<15> £150,000 and over
<16> Don't know
<17> Prefer not to answer

30.

[profile_socialgrade_cie] Social Grade (Chief Income Earner) A / B / C1 / C2 / D / E

31.

[postcode] Postcode

End of the survey.

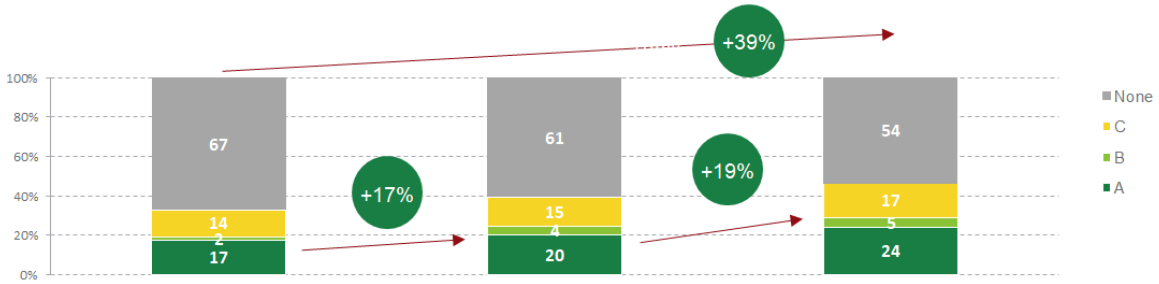
Annex C: Robustness checks

This section provides additional analyses on the main results presented in this study. All of these additional analyses are based on the quantitative conjoint part of the survey and underpin the conclusion that the main results are robust to variations in other variables.

Labelling's effect on take-up

The positive effect of labelling is inherently linked to the information provided in the information treatment. This combination of interventions is found to impact the take-up of full fibre connections substantially. Figure 8 in Section 4.2.1 displays this for an example selection of products and displays an increase in full fibre take-up of approximately 40%. This quantification, however, is not unique to these products. It is confirmed in numerous other market scenarios, some of which are displayed below. In Figure 14 and Figure 15 the speed attribute of the category types of A and B are varied and the prices are adapted to the mean level of the price interval. Again, we observe that the proportions of the separate effects of information campaign and label might differ, the overall combined effect, however, does not. In each of these scenarios we observe a comparable increase in full fibre take-up by 39% and 45%, respectively.

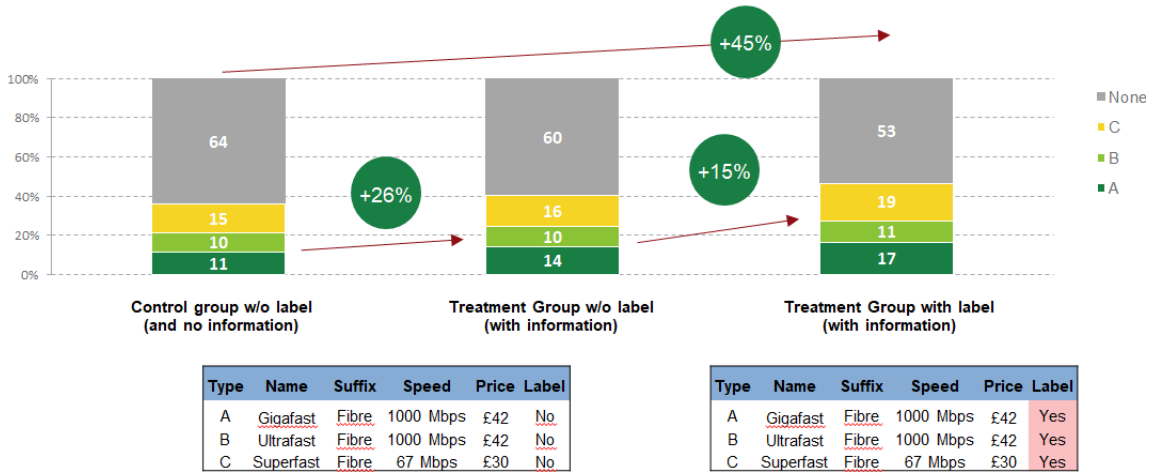
Figure 14: Effect of labelling on take-up I



Type	Name	Suffix	Speed	Price	Label
A	Gigafast	Fibre	300 Mbps	£38	No
B	Ultrafast	Fibre	300 Mbps	£38	No
C	Superfast	Fibre	67 Mbps	£30	No

Type	Name	Suffix	Speed	Price	Label
A	Gigafast	Fibre	300 Mbps	£38	Yes
B	Ultrafast	Fibre	300 Mbps	£38	Yes
C	Superfast	Fibre	67 Mbps	£30	Yes

Figure 15: Effect of labelling on take-up II

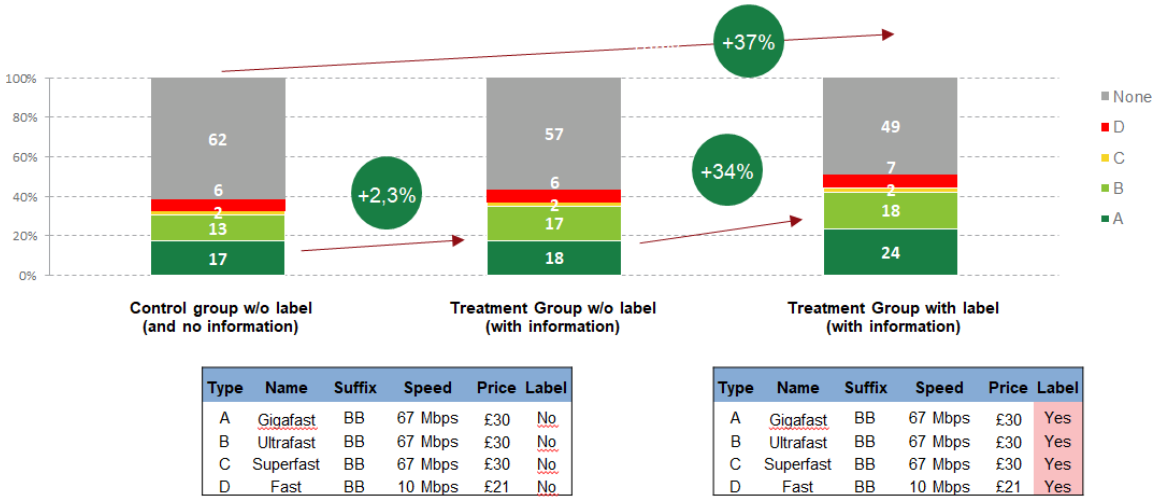


Type	Name	Suffix	Speed	Price	Label
A	Gigafast	Fibre	1000 Mbps	£42	No
B	Ultrafast	Fibre	1000 Mbps	£42	No
C	Superfast	Fibre	67 Mbps	£30	No

Type	Name	Suffix	Speed	Price	Label
A	Gigafast	Fibre	1000 Mbps	£42	Yes
B	Ultrafast	Fibre	1000 Mbps	£42	Yes
C	Superfast	Fibre	67 Mbps	£30	Yes

This effect is also robust against variation in the number of broadband tariffs included in the market scenario. The scenario shown in Figure 16 includes an additional broadband offer based on connection type D ('Basic Copper broadband' or ADSL). Again, the combined effect of information treatment and labelling increases full fibre take-up substantially by a comparable 37% margin.

Figure 16: Effect of labelling on take-up III

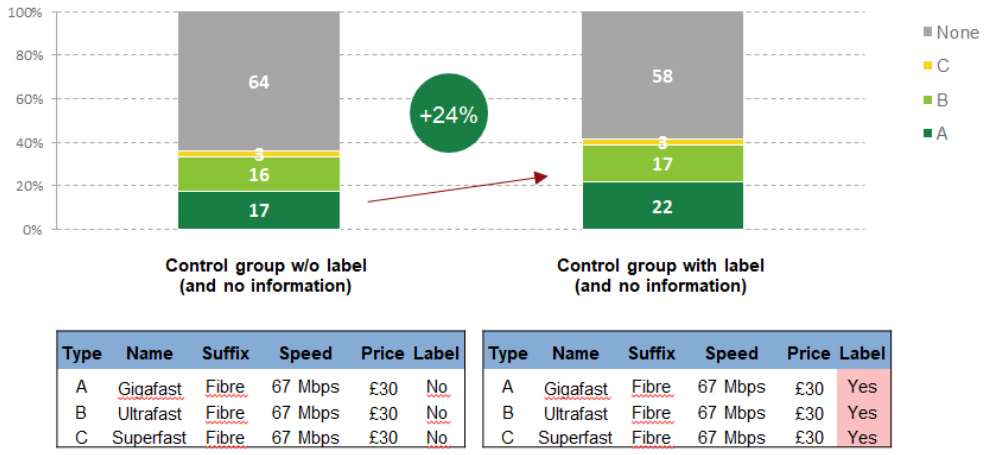


Type	Name	Suffix	Speed	Price	Label
A	Gigafast	BB	67 Mbps	£30	No
B	Ultrafast	BB	67 Mbps	£30	No
C	Superfast	BB	67 Mbps	£30	No
D	Fast	BB	10 Mbps	£21	No

Type	Name	Suffix	Speed	Price	Label
A	Gigafast	BB	67 Mbps	£30	Yes
B	Ultrafast	BB	67 Mbps	£30	Yes
C	Superfast	BB	67 Mbps	£30	Yes
D	Fast	BB	10 Mbps	£21	Yes

While the effect of the information treatment and that of the label complement each other, it is also worthwhile examining the effect of the label alone. This can be achieved by investigating the label's effect for participants that have not seen any information about it before making their choices – the control group. This group sees the label as an additional feature of the displayed offers without knowing anything about its meaning. Hence, the consequential change in the purchasing behaviour of those participants can completely be attributed to the individual's perception of the label's colour scheme, the letters (A, B, C, D) or the size of the bars. Even for these unbiased and uninformed consumers, the label is able to promote the take-up rate of full fibre tariffs by 24%. Figure 17 displays this below.

Figure 17: Effect of labelling on take-up for uninformed consumers



Type	Name	Suffix	Speed	Price	Label
A	Gigafast	Fibre	67 Mbps	£30	No
B	Ultrafast	Fibre	67 Mbps	£30	No
C	Superfast	Fibre	67 Mbps	£30	No

Type	Name	Suffix	Speed	Price	Label
A	Gigafast	Fibre	67 Mbps	£30	Yes
B	Ultrafast	Fibre	67 Mbps	£30	Yes
C	Superfast	Fibre	67 Mbps	£30	Yes

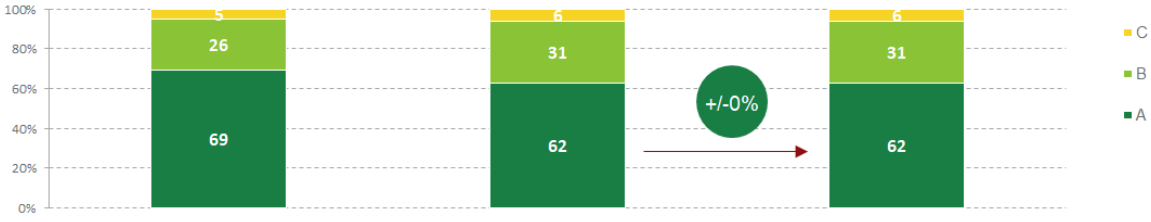
Labelling's effect on the formation of consumer preferences

The nature of the positive take-up effect of labelling as a market size increasing effect has been elaborated upon in Section 4.2.1. Consumers who previously did not translate their preference for a full fibre connection into a purchasing decision, now do so more frequently if a label is displayed. Those consumers who expressed their preference for any given connection type but did not purchase a tariff are summarized within the 'None' category of the respective figures.

In the main part of this study it is argued that labelling just reveals the true connection type of the offered tariffs but does not change the specific preferences of the participants. Hence, labelling does not distort consumers' preferences and therefore cannot negatively impact a consumer's welfare. This becomes clear in Figure 18 which removes the 'None' category and only shows consumers' preferences independently of whether they also purchase their preferred product. Here it becomes evident that the

information treatment effectively educates consumers and they therefore update their preferences slightly. However, the introduction of labelling is neutral in this regard and does not influence preferences at all.

Figure 18: Effect of labelling on preferences



Type	Name	Suffix	Speed	Price	Label
A	Gigafast	Fibre	67 Mbps	£30	No
B	Ultrafast	Fibre	67 Mbps	£30	No
C	Superfast	Fibre	67 Mbps	£30	No

Type	Name	Suffix	Speed	Price	Label
A	Gigafast	Fibre	67 Mbps	£30	Yes
B	Ultrafast	Fibre	67 Mbps	£30	Yes
C	Superfast	Fibre	67 Mbps	£30	Yes