Issues of price regulation for FttH/B-based wholesale products in the context of the rollout of high-capacity fibre infrastructures

– Consultation document –

Courtesy translation

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1 Preliminary remarks

The quickening process of digitisation and networking of economy and society plays a major role in shaping the innovative capacity and competitiveness of Germany as a location for business and industry and in determining the communication and participation options available to citizens. The basis for this far-reaching change is the provision of sustainable, high-capacity telecommunications infrastructure to all customers throughout Germany. Against this backdrop, the creation of a gigabit optical fibre network or a gigabit-ready infrastructure by 2025 2025 is being promoted by both the German Federal Ministry for Economic Affairs and Energy (BMWi) in its programme *Digitale Strategie 2025* (Digital Strategy 2025) and by the German Federal Ministry of Transport and Digital Infrastructure (BMVI) in the recently adopted key issues paper *Zukunftsoffensive Gigabit-Deutschland* (Future initiative Gigabit Germany).

To realise this goal, a regulatory environment which promotes investment and innovation and provides incentives for companies to take investment risks is required. The Bundesnetzagentur shares the view that, in order to achieve this goal, alternative approaches to access and price regulation must be developed and discussed with market participants and interested parties in an unbiased process on a timely basis.

The Bundesnetzagentur will also closely examine the topic of cooperation models as well as the fundamental question of whether or not access services which are provided via a new technology such as fibre to the home/building (FttH/B) should even be subject to regulation. To address this question the market analysis procedure legally required is already under way and is being vigorously pursued; in particular, the issue of regional differentiation is likely to play an important role in this context. The questionnaires developed for the collection of all relevant data will be sent to market participants shortly. However, the process from start to finish is likely to be relatively lengthy due to the complex procedures required by European law. One of the reasons for launching this current public consultation process is therefore to enable framework conditions which speed up the rollout of FttH.

The fact that this consultation document examines various options as to *“how”* the future regulation of FttH/B could be designed is entirely without prejudice to the issue of *“whether”* the markets in question should be subject to sector-specific regulation. To ensure the highest possible degree of transparency and predictability of any regulatory measures which are to be subject to further development, it seems appropriate at this juncture to engage – without prior assumptions – in dialogue with the market about the various approaches which could potentially be taken. In doing so, this document intentionally covers a wide range of options, from strict cost orientation to a limitation of regulation to transparency obligations only. The latter could be conceivable in different forms; the possibility of a temporary reduction in regulation, for example, would therefore also have to be discussed in this context.

It is in the legitimate interest of all parties concerned to maintain the highest possible degree of planning certainty through transparently communicated and foreseeable regulatory practice. At the same time, however, it must be conceded that the growing complexity of market and technological developments supports greater flexibility of regulation, which gives rise to a conflict of interests between predictability on the one hand and customised, targeted

measures on the other. This conflict cannot be resolved entirely due to the necessary degree of differentiation (resulting from the diversity of market conditions) of regulatory requirements, which must always be limited to the necessary level. The purpose of this draft consultation document is to establish a joint understanding of the challenges ahead of us on the one hand and to pave the way for consistent, expedient and reliable guidelines on the regulatory treatment of new optical fibre networks on the other.

According to expert estimates, the cost of a nationwide rollout of optical fibre would run into the high tens of billions of euros. At the same time, the corresponding investments are clearly associated with relatively high risks, particularly in more sparsely populated and cost-intensive regions. While the market twenty years ago, ie shortly before it was fully opened up, was essentially characterised by secure levels of demand, even amortisation of infrastructure investments and thus a comparatively low level of uncertainty (at least for the former monopoly undertaking), the same cannot currently be said for the planned expansion of gigabit-ready networks in any of these three respects. However, this problem can be qualified in the long run or could shift in favour of investing enterprises over time when viewed from the perspective of a complete migration of existing networks to a higher-value infrastructure.

With regard to the role of regulation, it should be noted that regulation cannot make investments profitable if there is no corresponding business case. Nonetheless, it is of paramount importance that regulatory instruments are deployed in such a way so as not to negatively impact efficient investment projects and thus harness the potential of private sector investment in the best possible way, without restricting customer choice. In doing so, it is important to ensure that the calculations of network operators and investors are not distorted by regulation and that they are not worse off in terms of the profitability of new networks than they would be in a scenario without regulation. In order to support market-driven network expansion from a regulatory perspective and thus minimise the need for public funding, it will ultimately be necessary to adopt a flexible approach to addressing the gradual increase in user willingness to pay and thus facilitating faster market penetration. After all, if the price level and therefore the options for amortising network expansion costs were to be inappropriately limited by over-regulation, this would adversely affect the attractiveness of sound infrastructure investments which should, in principle, be worthwhile from both an economic and a commercial perspective.

In addition to customers' willingness to pay, another important determinant of the profitability of optical fibre expansion projects is the realised degree of network utilisation. Cooperation models whereby access is granted on a voluntary and non-discriminatory basis can increase network utilisation and thus afford a contribution to network expansion. However, the example of France, where such models are already implemented on the market, shows that an extremely precise and long-term approach to regulation is required to establish a corresponding framework for successful cooperation.

The telecommunications sector is characterised by an extremely complex and dynamic market environment. As a result of the constantly changing market conditions, regulatory concepts and regulatory instruments require ongoing adjustment. A general principle when doing so is to limit the scope of regulation to the required extent. Thus, markets have been

exempted from regulation in recent years, the intensity of regulation has been reduced by switching from ex-ante to ex-post price regulation, and regionalised considerations have been taken into account. This flexible use of regulatory instruments in line with market requirements must be maintained during the transition to high-capacity fibre infrastructures. Various fundamental regulatory approaches, as provided for by the legal framework, will be tested as part of any decision requiring the weighing of interests, and will also have to be evaluated in future to assess, among other things, the possible impact on infrastructure.

Based on the dynamic development of competition, which is not least due to regulation, it seems appropriate to re-examine fundamental regulatory issues and discuss these without any prior assumptions in an open process involving all relevant parties. The aim of the consultation process is to develop a concept which, in the interests of all market stakeholders, enables the rollout of high-capacity networks as quickly and extensively as possible in a competitive environment. In this context, a strong case can be made for granting non-discriminatory network access also to newly emerging network bottlenecks in order to ensure that consumer choice is not restricted.

Against this backdrop, this consultation document seeks to initiate a discussion about the ways in which regulation can contribute to adequately taking account of the considerable increase in investment costs and the uncertainty associated with the FttH/B[1] rollout (also towards a FttC rollout) by granting a greater degree of freedom while, at the same time, safeguarding the intensity of competition. Specifically, the requirements for future wholesale regulations will initially be outlined in chapter 2, a number of possible conceptual approaches will be presented in broad terms in chapter 3, and the functioning of these approaches and the resulting possible arguments for and against their use will be examined in chapter 4. The underlying premises of the various conceptual alternatives, and issues of compatibility with the applicable legal framework will subsequently be addressed in chapter 5. The consultation document will conclude with a few closing remarks in chapter 6.

The individual chapters are followed by questions which the Bundesnetzagentur hopes to use to collect comprehensive feedback, particularly from affected market stakeholders. The aim of this process is to draw conclusions from the feedback received and, on the basis thereof, derive information on the appropriate future price regulation of FttH/B-based wholesale products. This should include criteria, application conditions and general defining features which will then be used as a basis for discussions and, where appropriate, fleshed out in the Ruling Chamber proceedings. In this connection, the abstract guidelines envisaged here for the price regulation of fibre access lines cannot serve as a substitute for individual assessments. After all, decisions about the application of regulatory measures are never made on a general or abstract basis, but rather on the basis of the individual considerations to be weighed up in specific cases. That said, providing an explanation of the underlying concept can help to create sufficient clarity regarding regulatory framework conditions in the medium and long term and thus significantly improve the investment climate.

[1] FttB is the term used to describe optical fibre access lines which go to the boundary of the building; with such lines, the cabling in the building can be realised using various materials such as copper lines. With FttH access lines, the optical fibre reaches the boundary of the subscriber's living space. By contrast, FttC access lines are based largely on copper lines. Typically, the optical fibre reaches the sub-loop distribution frame; from there, copper lines are used, usually in connection with VDSL and vectoring.

It should also be noted that the discussions arising in this context cannot be viewed in isolation from the European Commission's proposals on revising the European legal framework for electronic communication. However, the considerations presented in this document already show parallels with the mechanisms proposed in the recast and already anchored in the recommendation on non-discrimination obligations and costing methodologies; thus, there should be no underlying conflicts in this respect. Irrespective of this, the findings of this consultation should – where necessary – be taken into account in the design of Germany's future legal framework, even though this framework already provides extensive scope for the design of suitable regulatory measures.

In terms of next steps, the intention is to await the requested feedback before deciding how best to proceed. In principle, however, the plan is to continue the dialogue initiated through this process on the regulatory treatment of new fibre-based access networks. Further written consultations on selected aspects of access and price regulation will be advisable in this regard – for example, on the specific *methodological design of the economic replicability test*, an issue addressed in this consultation document by examining initial considerations and questions. The aim is to thus enhance the transparency and predictability of regulatory actions and actively provide impetus for the expedient further development and flexibilisation of regulatory approaches, with a view to realising the objectives of expanding gigabit-ready networks in the best possible way and facilitating equitable competition in the interest of users.

2 Requirements for wholesale regulation

If a telecommunications market is deemed in need of regulation due to an undertaking having a dominant market position – which can be associated with negative effects for the end user in particular – the Bundesnetzagentur can select a suitable and appropriate regulatory instrument to address the problem on the market. Key instruments for wholesale regulation are the obligation to grant network access and the regulation of the prices to be paid for network access.

This section focuses on the requirements and objectives which must be met by wholesale regulation and on the particular challenges associated with the regulation of pure fibre-based wholesale products.

2.1 Regulatory objectives in telecommunications

When making any decision on access and price obligations, the Bundesnetzagentur always takes into account their effects on reaching the regulatory objectives. These objectives, which are anchored in section 2 of the Telecommunications Act (TKG), include, in particular, ensuring equal-opportunity and workable competition, accelerating the deployment of high-performance public telecommunications networks and safeguarding consumer interests. These regulatory objectives are generally considered to be of equal importance; thus, no aim should be prioritised when making regulatory decisions. Furthermore, the objectives should not be considered as being separate issues; but instead they exist in an interdependent relationship with each other. For example, it can be assumed that a competitive market structure provides crucial impetus for infrastructure investments; this means that measures which contribute to securing fair competition are also expected to have a positive effect on business investment.[2]

To achieve these objectives in the best possible way, the Bundesnetzagentur has at its disposal a wide variety of instruments for access and price regulation. Because these instruments can be used flexibly, it is possible to decide on appropriate regulatory obligations based on the specific market conditions. In doing so, regulation – and specifically the intervention intensity of the instruments used – must always be limited to the required extent in accordance with the principle of proportionality.

2.2 Challenges associated with wholesale regulation in the context of the deployment of fibre-based access networks

Particular challenges associated with the current transition to a high-capacity infrastructure relate to the provision of undistorted incentives for infrastructure rollout in an environment characterised by a wide variety of market and competitive developments. In view of the

[2] BEREC report “Challenges and drivers of NGA rollout and infrastructure competition”, BoR (16) 171, pages 31 ff, published on 6 October 2016, available at: http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/6488-berec-report-challenges-and-drivers-of-nga-rollout-and-infrastructure-competition.

anticipated bottleneck nature of the high-capacity fibre access networks to be rolled out, it can be argued that regulation based on suitable access products and prices could be an appropriate way to continue to safeguard choices for consumers.

2.2.1 Hypothetically competitive prices and incentives for efficient investment

When designing measures to regulate price, the desired price level of wholesale prices is generally determined on the basis of the price which would be set in a competitive market. This is the price level deemed suitable to ensure fair, sustainable and undistorted competition. Prices which fall short of the hypothetically competitive level could lead to, for example, the underestimation of investment risks. This, in turn, could affect the investment incentives for undertakings potentially interested in the rollout. Conversely, if prices were set at a level much higher than the hypothetically competitive price, market entry could potentially be hampered by high entry barriers on the telecommunications market. This would also have an adverse effect on downstream retail markets, as alternative providers would no longer be able to offer their products on these markets at competitive rates due to the high prices for access products. There would also be an increased risk of the infrastructure operator benefiting from cross-subsidisation potential, which could distort competition. A vertically integrated undertaking could in this case use the additional revenue generated at the wholesale level to gain advantages in other areas – particularly on the retail market – and to make competitors' offers unprofitable. This would transpire if regulatory measures did not ensure that the margin between the wholesale price and the retail price was sufficient to enable competitors to replicate the corresponding retail product.

2.2.2 Cost and demand-side uncertainty of network rollout

Up to now, the point of reference for wholesale regulation has been access products which are provided via existing (primarily) copper-based networks. Hereinafter, these are understood to be networks which, (at least) behind the sub-loop distribution frame, are based on copper lines (eg TAL[3], ADSL/VDSL BSA[4]). However, given the rapid development of digital services and the corresponding increase in data usage, the nationwide rollout of optical fibre to the home/building (FttH/B) is expected to play a very important role, at least in the medium to long term. However, experts estimate that nationwide total investment reaching into the high tens of billions of euros will be required to realise corresponding infrastructure investments. At the same time, these investments are currently surrounded by a great deal of uncertainty for undertakings potentially interested in the rollout. Such uncertainty is reflected, for example, in the realisable penetration rate. The migration path chosen by the respective undertakings also plays a major role in this connection. For example, the former monopoly undertaking still has the largest customer base and therefore has the potential to utilise a higher speed network more quickly and subject to little risk by

[3] A subscriber line (TAL) refers to the merging of lines which lead from the main distribution frame in the network of the access network operator to subscriber connecting units on the premises of the subscriber (end user), usually through the sub-loop distribution frame and distribution point.

[4] Bitstream access (BSA) is a contiguous service consisting of a broadband connection and broadband data transport which is provided with variable speeds, quality and usage. Depending on the transmission rate, it is possible to differentiate between ADSL connections (downstream transmission rates of between 1,028 and 16,000 Kbit/s) and VDSL connections (downstream transmission rates of between 16,000 and 50,000 Kbit/s).

migrating its customers to this network. However, during the course of market liberalisation (based on regulatory measures) other providers have also managed to carve out a position for themselves on the market and establish a customer base (in some cases with a regional focus). Having attained a certain economic size, this has, in turn, provided an important springboard for future infrastructure investments, which is now likely to generate additional impetus for sustainable competitive developments and network rollout activities. Thus, access regulation has created an important basis for further infrastructure investment. This applies in particular to regional network operators who launched their business models on the basis of subscriber lines and are now investing in fibre networks.

Nevertheless, increased demand for fibre connections is also required to this end. There are currently initial signs of an increased willingness to pay for high-capacity broadband products. However, it is likely that, in the short to medium term, it would be difficult to enforce considerable price hikes for such products in large parts of the market. This will continue to be true for as long as the majority of end users are unable to perceive any significant additional benefit of high-capacity broadband access products compared with conventional (copper-based) access products.

2.2.3 Regional aspects

As a result of differing market conditions, the risks of amortisation can vary greatly from one region to another. A major challenge in this regard is the fact that the population density in the various parts of Germany also varies greatly. Unlike in some other European countries, the majority of the population is not concentrated in a few urban areas; instead, a relatively high number of households live in rural and semi-urban areas, making nationwide network rollout more cost-intensive. The respective regional development of the competition, especially between different infrastructures, also plays an important role in providing incentives for rolling out fibre networks. For example, the existence of alternative infrastructures (e.g. cable), via which high-capacity connections are already provided, can influence the investment activities of competing companies in different ways. On the one hand, undertakings potentially interested in expansion could have an incentive to also invest in high-capacity connections to enable them to compete with alternative infrastructure owners. On the other hand, the existence of such alternative infrastructure could also act as a deterrent for competitors and cause them to focus their investment activities on other regions in which they would not (yet) face such intense intermodal competition and could therefore realise higher penetration rates more easily.

Questions

1. What are the economic framework conditions for the rollout of high-capacity network infrastructures?

a. How do you expect demand and willingness to pay to develop in the medium and long term?

b. What timeframe do you consider appropriate for the amortisation of investments in FttH/B networks? To what extent is the timeframe currently assumed influenced by forecasts of technological and competitive developments?

c. Irrespective of any regulatory requirements, what course of amortisation would you expect over the timeframe referred to in question 1. b. for investments in FttH/B networks (eg in terms of depreciation for accounting purposes)? In this connection, how would you assess - from today's perspective - the uncertainties surrounding the underlying premises of this approach (in terms of the development of willingness to pay, technologies and market relationships)?

d. Beyond this, what uncertainties are associated with the specific risks of investments in FttH/B networks (eg emergence of parallel alternative or duplicate infrastructures)?

e. What are the regional costs (differences in cost) of the rollout of high-capacity network infrastructures? What main circumstances (eg population density, surface quality) and other factors (eg laying methods) influence regional differences in cost? What are the *specific risks* of FttH/B rollout (eg competition, demand) and, where appropriate, to what extent do these differ depending on regional factors (eg competition, demand)?

f. Are there any major differences between FttH and FttB with respect to the above-mentioned considerations?

g. What degree of coverage and take-up do you consider likely for the various infrastructures in 2020, 2025, 2030, and 2040 (FttC, FttH/B, HFC, 5G, etc)?

h. What market structures do you consider likely with regard to infrastructures on the one hand and service level on the other, and what market structures do you consider to be efficient from a macroeconomic viewpoint?

3 Overview of approaches to wholesale regulation

As outlined above, price regulation measures aim to set the price at the level of the hypothetically competitive price, thus facilitating achievement of the specified regulatory objectives in the best possible way. Various conceptual approaches can be envisaged to establish this price level on the market, the broad lines of which are also provided by the national and/or European legal framework. This chapter begins by looking at three different fundamental forms of wholesale regulation in section 3.1. Section 3.2 then explores specific aspects of wholesale regulation which can be used for special business models (risk sharing and wholesale-only).

3.1 Fundamental conceptual alternatives

The following sub-sections examine the underlying methodology of three different regulatory concepts – cost-oriented price regulation, the replicability approach, and limitation of regulation to transparency obligations only.

3.1.1 Cost-oriented price regulation

One option is to determine cost-oriented prices for specific wholesale products. These regulated wholesale prices then serve as a point of departure for retail prices. This process may be characterised as a kind of bottom-up regulation[5], as the upstream, regulated wholesale prices provide important impetus for the retail prices determined by undertakings. This concept largely corresponds with the practice pursued hitherto to regulate the price of copper-based access products, according to which the wholesale price prevailing on a competitive market is approximated by means of the "cost of efficient service provision". This approach has proved successful due largely to the very low level of uncertainty regarding the amortisation of existing networks given that demand was relatively stable and the willingness to pay was relatively well known. The level of uncertainty with regard to network investment has also been low. The cost of efficient service provision as the upper limit of the wholesale price has therefore been set based on a constant amortisation rate (annuity) (i.e. the sum of depreciation and interest on capital employed (period costs) remains constant over time) and without taking into account regionally differentiated rollout costs.

However, the legal framework provides considerable scope when determining the cost of efficient service provision, which could be relevant with respect to the challenges outlined in chapter 2 related with the FttH/B rollout to be undertaken. Inter alia, the framework allows freedom of choice with regard to the economically appropriate accounting depreciation method. Furthermore, in connection with the construction of next-generation networks in particular, section 32(3) para 3 TKG allows for specific risks to be taken into account. The

[5] In this context, the terms "bottom-up" and "top-down" are not used in a cost accounting sense. Here, they are simply used to illustrate the direction in which wholesale and retail prices are determined: while the cost-oriented price regulation method requires wholesale prices to be determined first and subsequently fed into the calculation of retail prices, the replicability approach requires retail prices to be calculated first (based on the willingness to pay and competitive relationships) and then used to derive maximum upstream wholesale prices with the help of a margin.

relevant provisions of the TKG also do not preclude a regionally differentiated approach to costs.[6] However, consideration of these aspects would make the determination of wholesale access prices much more complex, as discussed in more detail in chapter 4.

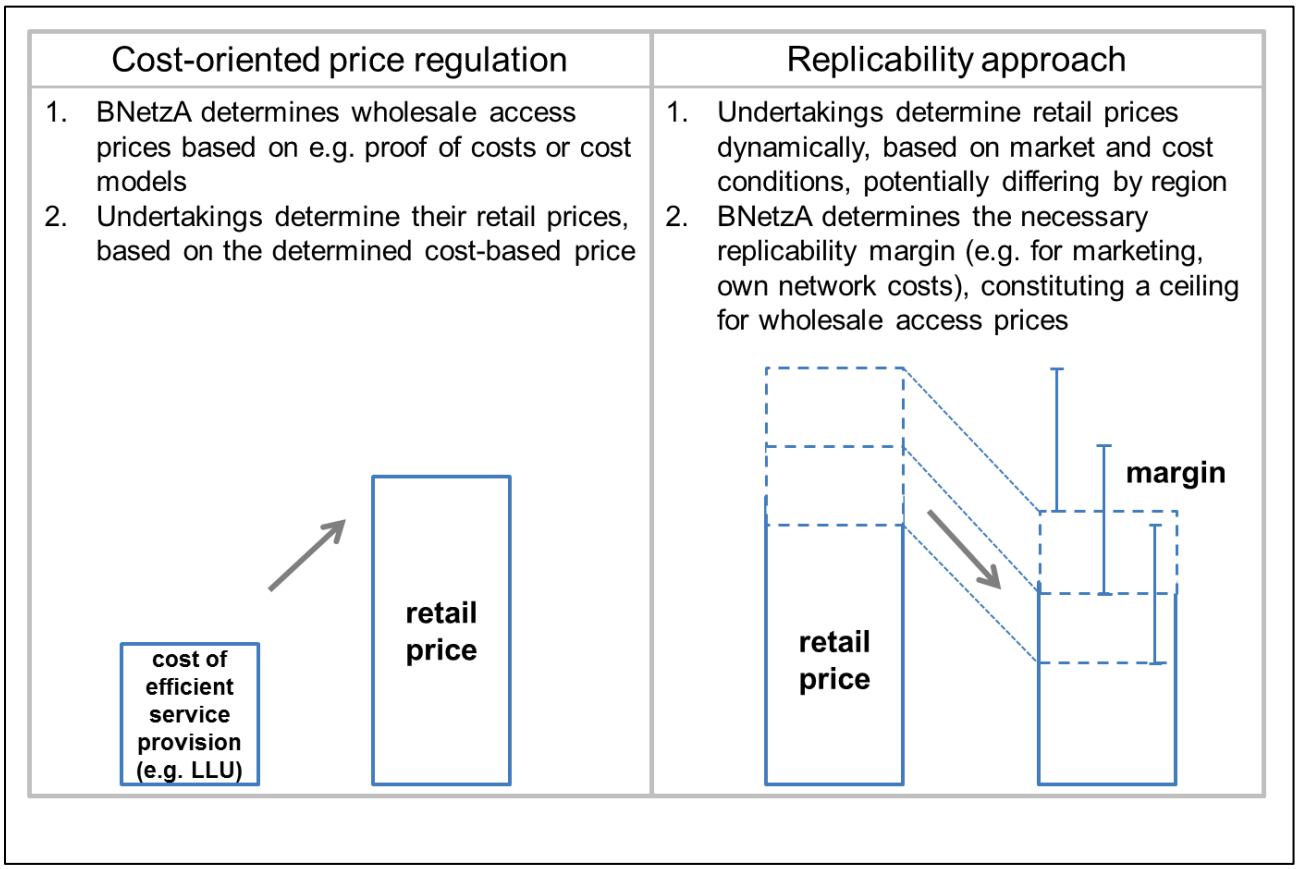
3.1.2 Replicability approach

The replicability approach is another conceptual approach used to determine a competitive wholesale price level. It differs conceptually from the above-mentioned approach in that the underlying premise is that the wholesale prices of access products derive from retail prices. Retail prices reflect a number of assessments as well as information exclusively available to undertakings on the structure and development of the market and demand. By taking end customer prices as the starting point for determining the wholesale price, the replicability approach – unlike the cost of efficient service provision approach outlined above – can be broadly described as a top-down approach.[7] Next to the imposition of obligations ensuring technical replicability, economic replicability is guaranteed for efficient competitors by maintaining a sufficient margin between the retail prices and corresponding wholesale prices of the SMP-undertaking. Based on the assumption that the prerequisites for technical replicability have been met, the following remarks focus primarily on issues relating to economic replicability.

Starting with the hypothesis that the retail price level is competitive, correctly determining the margin to be maintained should also result in a competitive wholesale price level. Because undertakings calculate retail prices dynamically on the basis of market conditions, this also implies that, owing to the additional price-setting flexibility, wholesale and retail prices can develop dynamically by region and over time in line with the willingness to pay of end users predicted and realised by undertakings. Figure 1 schematically depicts both the cost-oriented price regulation approach and the replicability approach.

[6] According to section 31(3), the SMP-undertaking submits an application as part of the price approval process, including all documents required for approval, at least ten weeks before expiry of the term of the last approved prices. In principle, the undertaking can then freely choose whether to apply for regionally – or possibly also temporally – differentiated prices accompanied by corresponding supporting evidence.
[7] See footnote 5.

Figure 1: Schematic comparison of cost-oriented price regulation and replicability approach.



3.1.3 Limitation of regulation to transparency obligations only

Finally, another option for dealing with wholesale products is to impose no price regulation at all and limit regulatory obligations to transparency only. The transparency obligation is one of the remedies provided for by articles 9 to 13 of the Access Directive[8] in the event of an undertaking being designated as having significant market power. In order for a transparency obligation to be imposed without any other regulatory measures, the sole imposition of transparency obligations must be deemed *suitable*[9] for achieving the relevant regulatory aims. In particular, the transparency obligation must be considered suitable for resolving the competition problem previously identified in the market analysis. However, imposing an obligation on the SMP-undertaking to publish *"all such information as is required for use of the relevant access services and/or facilities"*[10], which includes access prices, merely constitutes an obligation to provide information on prices; it does not provide for any control of these. It is entirely possible that transparency obligations could therefore fail to resolve the competition problem if actual prices were to render the use of access services (potentially provided voluntarily) economically infeasible for competitors.

[8] Article 8 of the Access Directive provides for the imposition of one or more of the following equally important regulatory measures: "obligation of transparency", "obligation of non-discrimination", "obligation of accounting separation", "obligations of access to, and use of, specific network facilities" and "price control and cost accounting obligations".
[9] The suitability of a regulatory measure – and its necessity and appropriateness pursuant to the principle of proportionality – is checked within the framework of each regulatory order.
[10] See section 20 TKG.

3.2 Selected aspects with respect to specific business models

The considerations dealt with in chapter 3.1 generally assume a vertically integrated undertaking that will finance the network expansion itself and thus bear all associated risks. However, this chapter is also to offer a brief overview of how wholesale regulation could be structured or adapted, should the business model turn out to be different. The focus in this context will be on risk-sharing models in which multiple undertakings finance the network expansion – and thus carry the risks – jointly, as well as wholesale-only models, in which undertakings are functionally and vertically separated.

3.2.1 Risk-sharing models

Risk-sharing models[11] allow the risks involved in network expansion activities to be spread across multiple undertakings. They serve to reduce uncertainties regarding the future development of demand and the amortisation of investments for the undertaking carrying out the work. Risk-sharing models provide a framework for considering the introduction of contracts with variable durations, as well as the agreement of upfront payments. Upfront payments are used as a way for competitors to make an early contribution to covering investment costs, which reduces the risk to which the investing undertaking is exposed. A range of configuration options can give individual undertakings the opportunity to assume the risks to a greater or lesser extent, depending on their strategic orientation and business model, and to pay higher or lower access prices as a result. However, from a regulatory perspective, it must be ensured that risk-sharing models in which an SMP-undertaking carries out the infrastructure expansion and wholesale access seekers contribute to the investment risk to differing extents do not result in individual access seekers being favoured over others unless justifiable on objectively legitimate grounds.

Risk-sharing models can generally be regulated both using a bottom-up or a top-down approach (in accordance with the approaches described in 3.1). In the case of bottom-up regulation based on the costs of efficient service provision, the cost-oriented rates under a replicability approach and the margin yield to be granted would in each case be set depending on the extent of the risk assumed.[12]

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[11] See also Bundesnetzagentur (2010), 'Eckpunkte über die regulatorischen Rahmenbedingungen für die Weiterentwicklung moderner Telekommunikationsnetze und die Schaffung einer leistungsfähigen Breitbandinfrastruktur' (Key elements on the regulatory framework for further developing modern telecommunications networks and creating a powerful broadband infrastructure), March 2010, available at (German-language document) https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Breitband/NGA_NGN/NGA_Eckpunkte/NGA_Eckpunkte_Id16268pdf.pdf?__blob=publicationFile&v=2 ; Bundesnetzagentur (2009), 'Hinweise zur konsistenten Entgeltregulierung i.S.d. § 27 Abs. 2 TKG' (Indications on consistent price regulation as defined in section 27(2) of the TKG, 4 November 2009, available at (German-language document) https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Marktregulierung/Massstaebe_Methoden/Konsistenzgebot/konsistenteEntgeltregulierung/-HinweiseEndfassungId17597pdf.pdf?__blob=publicationFile&v=2

[12] Under top-down regulation, replicability could be safeguarded by orienting the wholesale price considered in the review to actually observed conduct in the market. If replicability were to be ensured solely by applying the lower wholesale price, competitors who have opted to assume a lower risk would not be able to keep up with reductions in retail prices by undertakings that assume a higher risk and thus pay a lower wholesale price. This could result

3.2.2 Wholesale-only

Further, regulation could be deliberately structured to favour the business models of vertically separated undertakings that, although being active on the wholesale market and holding SMP, are not active on the retail market (either directly via own and associated companies or indirectly via exclusivity arrangements with other companies) by making access obligations less stringent than for vertically integrated undertakings with a dominant market position. This lower level of market intervention compared with cost-based price regulation could, in this case, provide positive stimulus for the infrastructure expansion without having negative effects on competition.

A wholesale-only carrier has a vested interest in ensuring its own networks are actually used, in order to recoup the costs of building and operating the network. As such, the incentives for discriminating between different undertakings active at the retail level are likely to be substantially lower. Furthermore, the dangers of inflated wholesale prices – in particular whilst customer willingness to pay is still relatively low – are likely to be minimal because this would hinder market-driven offerings and prevent the required level of network utilisation from being achieved. Access regulation – which remains necessary owing to the bottleneck character of the infrastructure – could in such cases be made less intrusive as the risk of anti-competitive behaviour among wholesale-only carriers is generally likely to be lower overall than for vertically integrated network operators.[13]

As a result, simply the obligation to offer access on fair, appropriate and non-discriminatory terms could prove to be suitable and adequate for meeting the regulatory objectives and eliminating the competitive issue. The European Commission's proposed Council Directive on reviewing the regulatory framework for telecommunications (hereinafter: the Code) also points in this direction.[14] Under the proposed Code, access obligations pursuant to Article 70 on civil engineering and/or Article 71 on the local loop, as relevant, may be imposed on undertakings active exclusively at a wholesale level with significant market power in a specific wholesale market and who do not maintain exclusivity arrangements with other undertakings active in the retail market; however, there is to be no cost-oriented price regulation for these undertakings.

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in network operators being squeezed out of the market, even when they hold large market shares and a strong competitive presence. By contrast, if the reference wholesale prices were to be set at the higher rate, this could put the undertaking carrying out the network expansion work at a disadvantage. It could be unable to match price reductions by competitors if this meant exposing other efficient competitors who pay higher wholesale prices to price squeezing. In order to address this problem adequately, the type of risk sharing assumed for an efficient competitor should, as a rule, be derived from the market itself; a combination of the possible rates can also be considered as the basis for the wholesale price.

[13] See Bundesnetzagentur (2010), Eckpunkte über die regulatorischen Rahmenbedingungen für die Weiterentwicklung moderner Telekommunikationsnetze und die Schaffung einer leistungsfähigen Breitbandinfrastruktur (German-language document: Key elements on the regulatory framework for further developing modern telecommunications networks and creating a powerful broadband infrastructure), page 20f.

[14] Article 77 and recital 190 of the Proposal for a Directive of the European Parliament and of the Council establishing the European Electronic Communications Code, as amended on 12 October 2016, available at: http://ec.europa.eu/transparency/regdoc/rep/1/2016/DE/1-2016-590-DE-F1-1.PDF (German-language document) / https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-590-EN-F1-1.PDF (English-language document).

However, it could be complicated in practice to answer the question of whether the rates and terms at which access is offered can be considered fair, reasonable and non-discriminatory. For example, it can be very difficult to find a clear-cut boundary between, e.g., what is a reasonable charge and what is a just unreasonable charge.

Further, it would be necessary at all times to ensure that more extensive intervention options were in place, including for vertically separate, market-dominant undertakings, in case of the (renewed) appearance of competition issues, which have a negative effect on end users in particular. While wholesale-only network operators are generally more likely to have a greater vested interest in ensuring high network utilisation and thus to structure access charges so as to provide a basis for costing readily marketable end-user products, it is at the same time not possible to rule out the possibility that abusive price-setting practices also arise under this structure, should end-user demand rise sharply over time. In such cases it would be vital to be in a position to counter such developments effectively in order to protect consumer interests adequately.

However, at present, wholesale-only carriers are still the exception in the market; their networks are predominantly local in nature. Here, then, one option could be to improve market conditions, especially with respect to planning certainty, both for investors and for consumers of wholesale-only networks.

Questions

2. Which approaches to wholesale (price) regulation should be implemented under current law and which alternative concepts would call for a change to the legal framework?

a. Assuming a given need for regulation and significant market power, which regulatory approach requires the least intervention? Would simply applying a transparency obligation with no accompanying access obligation be financially constructive?

b. What is your view of the proposal in the Code to restrict regulation for dominant wholesale-only network operators to ensuring fair, reasonable and non-discriminatory access terms? How could this kind of approach be implemented?

c. In your view, what other regulatory approaches could be considered? What other alternatives exist to ensure the original costing of an investing undertaking is mapped in the best way possible?

4 Mechanisms, pros and cons of the different alternatives in the context of rolling out fibre access networks

As already described in chapter 2, the main challenges inherent in rolling out high-capacity infrastructure are the specific risks that accompany (and result from) only gradually rising demand and willingness to pay, as well as rollout costs that vary from region to region. This next section looks at how each of these factors are considered under the different options for price regulation outlined in chapter 3 to determine which concept for regulating prices in connection with the rollout of fibre access networks could make the biggest contribution to meeting regulatory objectives.

4.1 Only gradually rising demand and willingness to pay

Major uncertainties at present with respect to the development of demand and the willingness to pay make it extremely complicated to determine the amortisation schedule and period for investments in building a high-capacity fibre network. Eliminating relevant distinctions and assuming constant amortisation over the period of use (annuity) as it is the existing practice in determining the costs of efficient service provision, the total from depreciation and interest on capital employed (period costs) would be spread evenly over the period of use. However, as with the existing copper networks, this would assume that customer numbers and willingness to pay also remained fairly constant for FttH/B investments. The danger of using this approach is that low demand, especially in the first years, would inflate the period costs per line actually used, which would lead to prices so high that they would be unlikely to be offset by end users' willingness to pay. Such static amortisation calculations under the concept of costs of efficient service provision would thus not give sufficient consideration to the pricing flexibility needed by undertakings in connection with the infrastructure expansion.

The above approach could be made more dynamic by distinguishing yearly differences in expected end user demand and willingness to pay when calculating the period costs. This would prevent rates from being set far beyond the willingness to pay of most end users in the first years after investment due to extremely high period costs. Instead, it would allow lower prices to stimulate demand for high-capacity lines. A steady rise in demand would mean that amortisation could be spread in later years over higher customer numbers, which offers a good argument for increasing the amortisation sum to be offset in the individual years over time along with demand. This also applies with respect to the expected rise over time in willingness to pay, as the higher retail prices achievable in later years would also cover higher period costs.

A bottom-up approach to regulation based on the costs of efficient service provision would require the calculation of period costs to incorporate reliable forecasts of the development in demand and changes in willingness to pay over the entire amortisation period. This would require a forward-looking calculation of the respective costs on the basis of dynamic customer numbers to be carried out, which would pose a major challenge in this approach. Incorrect assumptions could have negative effects on investment incentives, as, especially in

the first years, they could lead to costs being offset for which no corresponding proceeds had (yet) been generated.

In contrast to the approach based on the costs of efficient service provision, a replicability approach would not require the Bundesnetzagentur to produce a forecast of development in demand. Rather, competing undertakings that have the deepest knowledge of micro-developments on the market would decide flexibly on retail price levels and could make differentiated allowances for dynamic developments in demand and willingness to pay. As a result, if, for example, these factors were to increase, retail prices and thus associated wholesale prices would also rise. As such regulation would place no general restrictions on revenue opportunities, the result could be prices that harmonise flexibly with the respective market conditions and allow maximum possible amortisation. The question thus arises as to whether this would make it possible to manage the balancing act of ensuring additional flexibility and incentives for investing undertakings on the one hand, and preserving the established intensity of competition on the other.

However, the replicability approach could result in wholesale and retail prices being subject to major fluctuations over time. Yet if these price changes reflected as accurately as possible the rising willingness over the course of time to pay for higher performing networks, then greater volatility from an economic perspective can be seen in a positive light.

In contrast, limiting regulation to a transparency obligation only would allow the undertaking investing in the expansion to act entirely freely, including when structuring wholesale prices. As the undertaking would only be required to provide the party requesting access with the information necessary to utilise wholesale services, both the wholesale and the retail prices could be set flexibly. As a result, it would be possible to take dynamic changes in demand and willingness to pay into consideration using differentiated retail prices, as it is also the case with the replicability approach. However, this could put the undertaking investing in the expansion in a position to make competitor products unprofitable by heavily inflating the prices for access services. Squeezing competitors from the market in this manner would severely restrict the range of retail products, which, in turn, would carry the risk of price increases and thus could potentially have a negative impact on consumers.

4.2 Specific risks

As already explained, the uncertainties inherent in deploying fibre networks make it extremely difficult to calculate the investment risks compared with the risk assessment for existing copper networks. It is particularly difficult at present to estimate the speed at which demand and willingness to pay will rise and how the competitive situation on the infrastructure of the market-dominant undertaking, as well as between different infrastructures, will develop.

Within the scope of determining the costs of efficient service provision, the Bundesnetzagentur generally calculates the imputed interest rate for wholesale services that (largely) use existing copper infrastructure as weighted average cost of capital (WACC). A capital asset pricing model (CAPM) is used to determine the return on equity. The specific investment-related risk are derived from the capital market on the basis of the CAPM. The

industry-specific market risk (beta), the market risk premium and the risk-free interest rate form the central components of this model. The beta is estimated on the basis of a comparative group of reference undertakings. The market risk premium is determined on the basis of historical return time series, and the risk-free interest rate is calculated on the basis of the effective yield on federal government bonds.

If the Bundesnetzagentur were also to determine the costs of efficient service provision for fibre wholesale products, existing imponderables would require a specific interest rate for fibre to be set that is likely to be higher than the interest rate estimated for existing copper infrastructure. This was also the finding of a scientific report to determine the imputed interest rate, commissioned by the Bundesnetzagentur in 2010. The report states that when assessing the investment risk in relation to the deployment of fibre networks, uncertainties in particular with respect to demand, network expansion costs, technical progress, the market dynamic and the evolving competitive situation should be considered; this would require the imputed interest for fibre-based wholesale services to be estimated and set separately.[15] Although it would in principle be possible to use a capital asset pricing model to also determine the interest rate for fibre, this computation would be fraught with various methodological difficulties. For example, one problem is that the systematic risk of FttH/B investments would be very difficult to determine as the empirical estimate of beta would require the existence of at least one listed company that focussed entirely (or at least to a material extent) on the activities under consideration. However, incorrectly estimating the risk-related interest rate would open up a major risk of creating skewed investment incentives, which could have a negative effect on investments in FttH/B. In addition, the risks may vary over the course of time and across different regions. As a result, specific interest rates would ideally have to be determined for different investment dates and locations. Calculating these risks within the scope of determining the costs of efficient service provision thus appears to be extremely complex and hardly possible to put into practice.

In contrast to determining the costs of efficient service provision by the Bundesnetzagentur, the replicability approach would require the undertakings to consider to which specific risks (under certain circumstances this also includes regionally diverging risks) an investment would expose them. Flexible retail price-setting – at least in competitive areas – could also adequately cover the risks associated with the fibre network expansion. There is thus a good argument that the high degrees of freedom that would be granted to investing undertakings under the replicability approach would take adequate account of the problem of the

[15] See Stehle, Wissenschaftliches Gutachten zur Ermittlung des kalkulatorischen Zinssatzes, der den spezifischen Risiken des Breitbandausbaus Rechnung trägt (Scientific report on determining the imputed interest rate that accounts for the specific risks of the broadband expansion), November 2010, (German-language document)
https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Marktregulierung/Massstaebe_Methoden/Kapitalkostensatz/Gutachten_gesamt_241110.pdf?__blob=publicationFile&v=3; see also The Brattle Group, Review of approaches to estimate a reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization – A study prepared for the European Commission DG Communications Networks, Content & Technology, 2016, page 12, https://bookshop.europa.eu/en/review-of-approaches-to-estimate-a-reasonable-rate-of-return-for-investments-in-telecoms-networks-in-regulatory-proceedings-and-options-for-eu-harmonization-pbKK0416408/downloads/KK-04-16-408-EN-N/KK0416408ENN_002.pdf;pgid=GSPefJMEtXBSR0dT6jbGakZD0000PKSJOEuH;sid=ZWFr-0WsUGxr2B3Y_KD1XCeJKAJ1iedvGTE=?FileName=KK0416408ENN_002.pdf&SKU=KK0416408ENN_PDF&CatalogueNumber=KK-04-16-408-EN-N.

investment risk being difficult to estimate and possibly fluctuating over time, and as a result provide efficient incentives for the infrastructure expansion. This could, in principle, also result in undertakings overestimating the investment risks in selected areas, which would be reflected in inflated retail prices and could also indirectly result in higher wholesale prices. However, even if this were to happen, the replicability approach would ensure the existence of a reasonable margin between retail prices and wholesale prices, with the result that the end-user product could still be replicated by efficient competitors. If the investing undertaking were only required to meet transparency obligations, the unrestricted price-setting flexibility would also in principle have the advantage that the risk calculated for a specific investment could be reflected in the wholesale prices.

However, the question arises as to whether, as described above under 4.1, this would simultaneously carry a significant risk of squeezing competitors from the market and damaging consumers.

4.3 Regional rollout costs

Up until now, the Bundesnetzagentur has not made any concessions to regional variations when determining wholesale prices based on the costs of efficient service provision but, rather, has approved standard wholesale prices nationwide as it was applied for by the SMP-undertaking. In terms of the fibre network expansion, calculating the average national costs would mean that investments still to be made were at risk of being uneconomical in areas where the rates were set at a lower level than the costs. Taking regional differences in costs into consideration and thus specifying regional distinctions in wholesale prices would require sub-national regions to be demarcated. The problem with this is that it would be very difficult for the Bundesnetzagentur to correctly determine existing regional costs (or cost differences), form adequately differentiated clusters, and put this into operation. In addition, when applying the concept of the costs of efficient service provision, the number of clusters within which different wholesale prices were to be determined based on regional costs would not necessarily correspond to the number of rate increments at retail level. This would substantially increase the complexity of price-squeeze tests to determine the existence of a reasonable margin between wholesale prices and retail prices. On the other hand, incorrect estimates would carry a substantial risk of wholesale prices being set too high or too low and could result in the distortion of competition.

In contrast, under the replicability approach the Bundesnetzagentur would not carry out a regionally differentiated determination of expansion costs. Instead, the undertakings themselves could flexibly structure charges to budget for regional differences in costs and correct any incorrect estimates much faster. Although this could result in greater price differences between regions at both retail and wholesale level, this would appear to be economically justified if it meant that higher expansion costs especially in rural areas were reflected.

Nevertheless, it is to be expected that even under the replicability approach areas will remain in which there is unlikely to be any commercial investment in expansion activities either short or long term as the costs significantly outweigh the willingness to pay for the foreseeable future. However, this situation is not related to the regulatory approach that is chosen. As

mentioned at the start, regulation cannot make a project profitable if is not profitable in the absence of regulatory intervention. The arguments outlined here tend to suggest that the replicability approach would create more market-driven investments and utilise the potential for this to a greater extent. This is because, as a general rule, the approach gives undertakings unaltered incentives to realise commercially viable expansion projects versus a scenario in which no regulation is applied.

The application of a replicability approach is likely conditional on retail prices being considered to be competitive due to sufficient competitive pressure. At present, the assumption is that, to a large extent, (mainly) copper-based wholesale products or other infrastructures (e.g. cable) are generating the required price pressure. However, it might become necessary to introduce a differentiated price-level abuse control in areas where no such competitive pressure exists.[16]

Although this would increase the complexity of this approach, not least from a regulatory perspective, it would at the same time ensure that retail prices remained at a competitive level and still give undertakings a relatively high degree of price flexibility.

In principle, with regard to limiting regulation to a transparency obligation the same assessment made in relation to the other factors also applies to here: A transparency obligation would not impose any restrictions on undertakings with respect to setting prices and as such would allow regional costs and market conditions to be taken into account flexibly. However, this advantage could be outweighed by the considerable risk of distortions of competition.

Questions

3. How do the effects of the different approaches to (price) regulation for FttH/B-based wholesale products differ with respect to the regulatory objectives?

Price regulation based on the costs of efficient service provision

a. How do you rate the difficulties (outlined above) in determining adequately nuanced rates based on the costs of efficient service provision?

b. In view of the imponderables and forecast uncertainties described, what are the challenges involved in correctly incorporating dynamic developments in demand and willingness to pay into the calculation of period costs?

c. What are the practical difficulties of determining 'correctly' or adequately nuanced specific investment risks? Would differentiation based on time and/or regional

[16] The specific requirements for the replicability approach are examined in chapter 5.

variations be appropriate and operationally implementable?

d. What challenges do you see with an approach that efficiently maps different regional expansion costs using nuanced prices?What negative consequences would arise as a result of 'incorrectly' or inadequately nuanced prices based on the costs of efficient service provision?

e. What are the advantages of applying wholesale prices based on the costs of efficient service provision?

Replicability approach

f. What difficulties would arise as a result of applying the replicability approach?

g. How would the potential volatility of wholesale prices be rated under the replicability approach?

h. What consequences could be expected if inflated wholesale prices were to result from difficulties in determining the correct margin/the retail price to be used as a reference? In contrast, what would be the consequences of setting wholesale prices too low?

i. What are the advantages of wholesale prices calculated based on the retail price, i.e. calculated top-down under the replicability approach, for example with respect to greater market proximity?

Limiting regulation to transparency obligations only

j. What effects on regulatory objectives could be expected if no price regulation control mechanisms were to be imposed at all?

General view

k. To what extent are regionally nuanced prices at retail and wholesale level seen as constructive or problematic?

l. To what extent do the different approaches offer a balanced degree of planning certainty both short and long term? Which alternative approach is most favourable with respect to the investment climate, the development of competition and consumer interests?

5 Prerequisites for application of the regulatory approaches

The debate surrounding the possible adaptation of regulation has been triggered by a change in the initial situation: The new challenges in connection with the to be rolled out fibre infrastructures – described in particular in chapter 2 – compared with the existing networks provide vital impetus for reviewing how these infrastructures are dealt with in a regulatory context, as well as for a potential adaptation of regulation in line with the changed situation. Unlike when the copper-based access network was built, the expansion of FttH/B networks is not being carried out under state-backed monopoly conditions but, rather, is being financed largely from commercial sources. In addition, while in the past fluctuations in demand were lower, resulting mainly from very limited migration of some customers to cable-network or mobile-only infrastructures, the imponderables outlined above with respect to the demand for lines in the FttH/B infrastructures are far greater. Irrespective of the principle of technology neutrality[17], regulation must give due consideration to these specific uncertainties in order to best support the expansion of high-capacity FttH/B infrastructures.

Against this backdrop, the basic concept of various approaches to wholesale regulation was discussed previously and their possible effects as regards the particular challenges faced in connection with the expansion of high-capacity fibre networks were outlined. Further, there is also a need for discussions on whether and to what extent and/or which assumptions apply generally to the use of the alternatives outlined. At this point, then, the first step is to discuss which conditions must be met – with respect to information and to the market situation – in order to implement the various approaches to price regulation (section 5.1). The next step is to review whether the current legal framework in principle allows the concepts to be applied (section 5.2).

[17] The principle of technology-neutrality is laid down in section 1 of the TKG and refers back to Directive 2002/21/EC. Recital (18) states: "The requirement for Member States to ensure that national regulatory authorities take the utmost account of the desirability of making regulation technologically neutral, that is to say that it neither imposes nor discriminates in favour of the use of a particular type of technology, does not preclude the taking of proportionate steps to promote certain specific services where this is justified (…)". Koerber clarifies, that this premise was not intended to put new technologies at a disadvantage compared with other technologies as a result of the transferral of regulatory decisions. The call for technology-neutral regulation was not absolute, but, rather, was to be seen relative to the need to establish regulation that was as technologically neutral as possible. Technology neutrality had neither a self-serving objective nor was it a regulatory goal, but was rather (simply) a principle to be taken into account when creating state mechanisms to pursue clearly defined regulatory goals (see also Koerber, Thorsten (2008) in Zeitschrift für Wettbewerbsrecht (Journal of Competition Law), issue 2/2008, pages 146–169). In this sense, then, an alternative regulatory approach in the context of FttH/B-rollout could well be justified in view of both the regulatory goal of accelerating the expansion of high-capacity telecommunications networks and the particular challenges faced in connection with such rollout. Koerber also says that where procedural discrimination does not constitute substantive competitive corruption (i.e. where investment incentives are not skewed in favour of a peer technology), then there is no breach of the principle of technology neutrality.

5.1 Conditions for application of different approaches to wholesale regulation

This next section outlines the conditions required for the effective implementation of cost-oriented price regulation and the replicability approach.

5.1.1 Cost-oriented price regulation

With respect to the determination of access prices, regulation based on the costs of efficient service provision requires definable cost parameters, i.e. ideally, information on investment levels, risk, demand and willingness to pay is available differentiated by region and time. If this is the case, then the approach is in principle suited to safeguarding competitive wholesale prices and thus has the indirect effect of preventing retail prices from rising beyond a competitive level. However, it is doubtful as to whether these extensive information requirements are met in full in the context of the deployment of fibre access networks with respect to the factors mentioned: As described in chapter 4, statements regarding material parameters could only be made on the basis of extremely high forecast uncertainties, meaning that the risk of introducing a bias in wholesale pricing in the market as a result would be correspondingly high.

5.1.2 Replicability approach

In the case of the replicability approach[18], competitive retail prices p the point of reference for the regulation of wholesale prices. The existence of demonstrable competitive pressure on

[18] The theoretical basis for this form of price-setting, which allows for a replicability of retail products by efficient competitors in the context of provisioning a key wholesale service, can be found in a number of papers published by Baumol from the mid-1980s onwards. In Baumol/Sidak (1994), Toward Competition in Local Telephony (available at: https://www.aei.org/wp-content/uploads/2014/07/-toward-competition-in-local-telephony_102104117761.pdf), the authors specifically address the telecommunications sector.
Baumol/Sidak describe how the setting of the access price for wholesale telephony products is fraught with difficulties as – in terms of access, at least – the infrastructure is in most cases provided by just one undertaking but used by both the infrastructure owner and rival undertakings to offer a retail product. If the infrastructure owner implicitly charges its own retail arm a lower price for using the infrastructure than it charges its rivals, this can substantially inhibit the rivals' competitiveness. On the other hand, if the regulator sets the access price too low, this can result in inefficient competitors gaining retail market shares. Baumol and Sidak call their price-setting rule for access as the input component of a retail product the efficient component-pricing rule (ECPR), or the parity principle. According to this rule, the optimum price for granting access (called the efficient component price) is derived from the marginal costs of actually providing access (such as additional administration charges, additional costs from wear and tear, etc.) and the profits lost as a result of granting access, i.e. the opportunity costs of the SMP operators. To determine the amount of lost profit, the total marginal costs of providing the retail product (i.e. including the marketing costs and costs of operating the network, etc., on top of the infrastructure costs) are deducted from the SMP operator's price for the corresponding retail product. The remaining net profit contributes to covering the SMP operator's fixed network costs. Thus, to completely recompense the SMP operator for granting access, the access charge must also cover this lost net profit. The authors make reference to the fact that, under this price-setting rule, competitors are also forced to compensate the SMP-undertaking for monopoly profits. However, this problem did not stem from the ECPR but, rather, the lack of price control mechanisms at retail level: So, the first step would be to ensure that no monopolistic price-setting flexibility could be exploited on the retail level; in a second step, the application of the ECPR would then result in the compensation of competitive profits only. To safeguard economic efficiency, then, the operator to provide the retail product over the infrastructure should be the one who can offer it the cheapest. If the SMP provider's rivals are less efficient at providing the components required for the retail product alongside access, the costs will not be covered; such an undertaking does not enter the market. However, if the rival undertaking is more efficient at assembling the final retail product, it can undercut the retail price of the SMP operator; according to the authors, the less efficient infrastructure owner would only offer products on the wholesale market but no longer on the

retail prices driven by infrastructure competition is therefore likely to be a general criterion for implementation. Alternatively, this competitive pressure on retail prices could also stem from the regulated wholesale price of another access product. As described in section 3.1.2, price-setting for fibre-only wholesale products is dependent not least on end costumers' willingness to pay for fibre-based products. This, in turn, is also dependent on how highly end users rate the additional benefits compared with mainly copper-based products – at least while copper- and fibre-based retail products are still closely interchangeable. As such, the price of fibre-based wholesale products can, temporarily at least, be restricted using an effective 'copper anchor price'. As a close substitution relationship between mainly copper-based and fibre-based retail products can be assumed at present – taking into also account the comparatively low demand for very high-bit-rate lines – it is likely that retail prices are currently being constrained even in areas where no alternative (cable) infrastructure is in place. However, this type of substitution could lessen over time if the benefits of a high-bit-rate line increase for the end user. If this were the case, it would be necessary – provided that the copper network will continue to exist for the foreseeable future – to determine whether the resulting retail price damping is sufficient or whether it can be safeguarded by alternative infrastructures. However, adequate damping of retail prices as a result of copper-based wholesale products and/or alternative infrastructures can be assumed at present, with the result that excessive customer prices are unlikely to gain a foothold on the market in the medium term. Nevertheless, the question arises as to what would happen if the copper network were to be dismantled or deactivated.

5.1.3 Replicability approach with an additional differentiated price level abuse control

If retail prices are not being sufficiently constrained by alternative infrastructures or a copper anchor price, it would, however, need to be ensured that SMP-undertakings are not abusing their position by levying excessively high wholesale access rates. Pursuant to section 28(1) para. 1 of the TKG, an abusive price level is assumed when the SMP-undertaking is levying and agreeing rates, which prevail solely as a result of its dominant position in the market. These include, in particular, rates that are *substantially* higher than rates charged in a competitive market. In current practice, the rates are based on the costs of efficient service provision which is the hypothetically competitive price. However, within the framework of the replicability approach supplemented by a differentiated price abuse control, a refined and more market-oriented value may need to be used that takes regional cost differentials, specific risks and uncertainties and dynamics adequately into account. Yet, at least for the foreseeable future, there is merely a very small risk of abusive prices being charged since mainly copper-based wholesale products and alternative infrastructures exert competitive pressure on retail prices. Consequently, there will probably be no need for additional, differentiated price-level abuse controls for the time being.

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retail market. As such, the ECPR price-setting model ensures that only efficient undertakings remain in the retail market.

5.2 Compatibility of conceptual alternatives with the existing national and European legal framework

Regulation of wholesale products and services is based on the regulations set forth in the European and national legal framework. At national level, the provisions set forth in the TKG apply. In addition, the EU legal acts also apply directly to national legislation and application of the law (in the form of regulations) and indirectly (in the form of directives and recommendations).

The above-mentioned alternatives of the regulation of wholesale products and services are to be examined in the following in order to establish if they are compatible with the existing legal framework – i.e. the system of national and European provisions. As such, the alternatives will initially be measured against the provisions of the TKG and then against those of the European legal framework. In terms of European legal provisions, special focus will be placed on compatibility with the *Commission Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment* which contains concrete proposals for the price regulation of NGA infrastructures.

5.2.1 Compatibility of the cost of efficient service provision approach with the legal framework

The general objective of access price regulation is to ensure that the level of prices levied corresponds to the hypothetically level of prices charged in a market in which effective competition exists. In order to achieve this price level, it is at the discretion of the Bundesnetzagentur to decide which method to use to this end. In the past, this hypothetically competitive price was achieved with the help of cost orientation for a number of important wholesale products. In order to ensure that the price levied does not exceed the costs of efficient service provision, one option is to impose cost-oriented prices that are subject to approval under section 31(1) para. 1 of the TKG. As outlined in chapter 3, the regulator has a certain amount of leeway in specifically determining the costs of efficient service provision (depreciation method, risk-adjusted interest rates, regionalisation).[19] Under certain circumstances, it may also be sufficient to examine the rates subject to approval pursuant to section 28 of the TKG to ensure that the rates levied do not significantly exceed the costs of efficient service provision.

5.2.2 Compatibility of the replicability approach with the legal framework

As outlined in detail in chapter 4, it may be difficult to determine cost-oriented prices given that major uncertainties (e.g. no constant amortisation, specific temporal and regional risks) can render it difficult to determine costs. Given that the competitive retail level provides a direct starting point, the replicability approach may, under these circumstances, be suitable nonetheless for establishing a wholesale price level that would prevail if there was effective

[19] The relevant EU provisions governing cost-oriented price regulation are set forth in Article 13 of the Access Directive.

competition in the market. In terms of procedural details, section 31(2) para. 2 of the TKG, in principle, creates the possibility of approving rates based on the mere method of replicability, if it proves to be more suitable than cost orientation. In that respect, it is conceivable that the price examination pursuant to section 28 of the TKG would merely address the economic replicability rather than a (strict) cost orientation directly. Regarding the expansion of FttH/B access networks, this could suggest that context-specific modifications to the current application practice outlined in section 28 might be advisable.[20]

In areas where retail prices are being sufficiently constrained, there may not be any need to carry out price level-abuse controls pursuant to section 28(1) para. 1 of the TKG. Since in those areas, market conditions establish a competitive level of retail prices (which can certainly vary from region to region), ensuring a sufficient replicability margin also guaranties a competitive level of wholesale prices. The answer to the question whether abusive pricing exists would hence frequently be "no". A strict anti-competitive pricing control in which the abusive price level is determined on the basis of costs set on a nationwide basis (and which are neither differentiated by region nor by time) would in any case contravene the pricing flexibility associated with the replicability approach.

Figure 2 below illustrates once more how modifying the application of section 28(1) of the TKG could create the possibility of safeguarding replicability alone, without simultaneously insisting that non-differentiated costs of efficient service provision (including,, where applicable, a mark-up depending on the specific market conditions) are met, differently from the recent decision taken on mainly copper-based layer-2 bitstream access,.[21]

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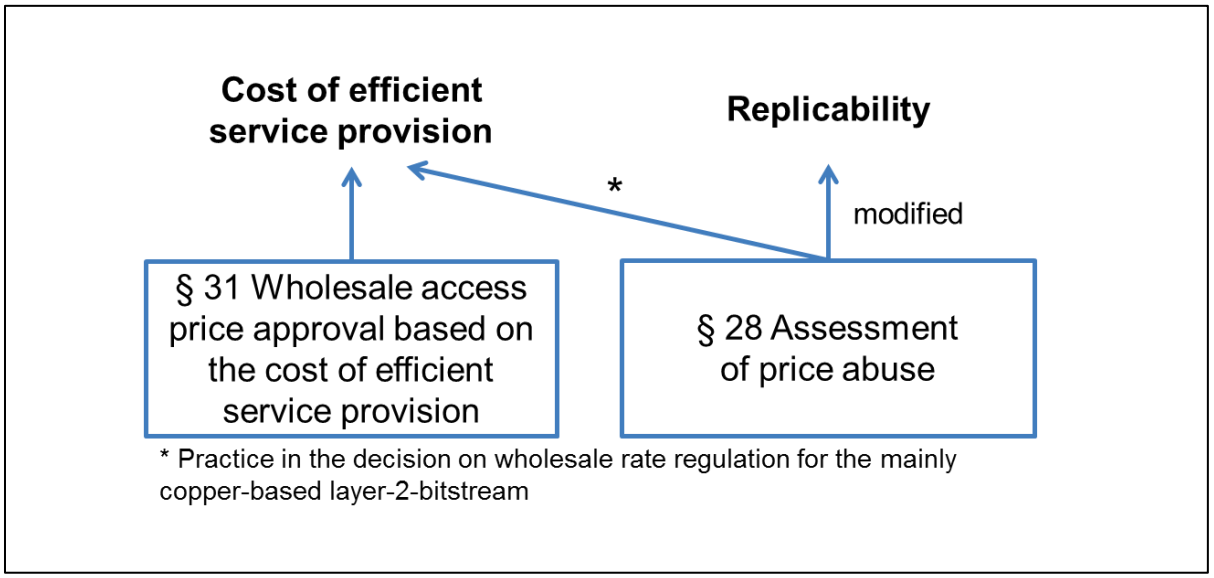
[20] This consultation document deals primarily with the methods of access regulation and price regulation at the wholesale level. As far as the proposed modified application of the examination pursuant to section 28 of the TKG is concerned, which is also of paramount importance in the retail market regulation, it needs to be ensured that any modification would be applied consistently at the wholesale and retail level.

[21] This illustrates that the flexibilisation of price regulations discussed in this consultation document is less concerned with the question whether the measures set forth in section 28 or section 31 of the TKG apply but more with the question in which way the criteria referred to in section 28 can be applied adequately and sufficiently flexible. For, whereas section 28 of the TKG can provide the opportunity, under certain circumstances, to ensure the costs of efficient service provision (determined and undifferentiated) are exceeded at most to a minimal extent, it now needs to be examined, in particular, to what extent a modified application of the criteria outlined in section 28 could facilitate further expedient flexibilisation of price regulation. In this regard, this discussion does not aim at distinguishing between ex-ante and ex-post regulation; it reaches even further because in the context outlined, it is all about the additional options that exist within the framework of ex-post *criteria*.

In addition to the layer addressing the criteria, a distinction also needs to be made between ex-ante and ex-post regulation that is derived directly from the meaning of the word. Ex-ante (sector specific) approval applies *before* prices enter into force, ex-post (sector specific) control does not apply until *after* prices have been introduced in the market – regardless of any clearly anti-competitive price control that may need to be carried out. Whereas a significant substantive differentiation may take effect particularly in relation to retail prices, this is less unequivocal for wholesale prices because controversial rates are typically made subject to a regulatory review and the result of such review can apply retroactively in cast of doubt. Against this backdrop, all market players have a common interest in resolving conflicts about the level of rates to charge in good time. This is one reason why the market players tend to consider any additional (time) scope in setting wholesale prices to be less important. This also explains why the time dimension is deliberately ignored in this consultation document particularly since the discussion mentioned here about the issues of applying price-abuse checks can be conducted regardless of whether these criteria are ultimately linked to an ex-ante approval obligation, a notification obligation or merely to an ex-post review.

Last but not least, it needs to be pointed out that the distinction made between ex-ante and ex-post regulation in the European context implies yet another differentiation. In EU parlance, all measures relating to sector-specific regulation are referred to as "ex-ante" because the respective obligations are imposed from the outset within the framework of regulatory ordinances whereas ex-post regulation refers to the application of competition law.

Figure 2: Context-specific modification of the price-levelabuse control pursuant to section 28 of the TKG in connection with the replicability approach vis-à-vis the application practice used in relation to copper-based layer-2-bitstream access.



In the event that anti-competitive retail prices are being charged, by contrast, this would, as mentioned in the foregoing, mean that greater importance would be attached to the price review set forth in section 28(1) para. 1 of the TKG with a view to preventing anti-competitive pricing. Since in such a setting, it cannot be adequately ensured through competition in the retail market that the level of retail and wholesale prices charged are not excessively high, additional price controls would continue to be indispensable. However, it would need to be ensured that the price review is undertaken in a more differentiated way in the here addressed context of FttH/B-based wholesale products, taking into account the hitherto very close orientation to the nationwide costs of efficient service provision, calculating a constant amortisation contribution and carrying out a standardised risk assessment.

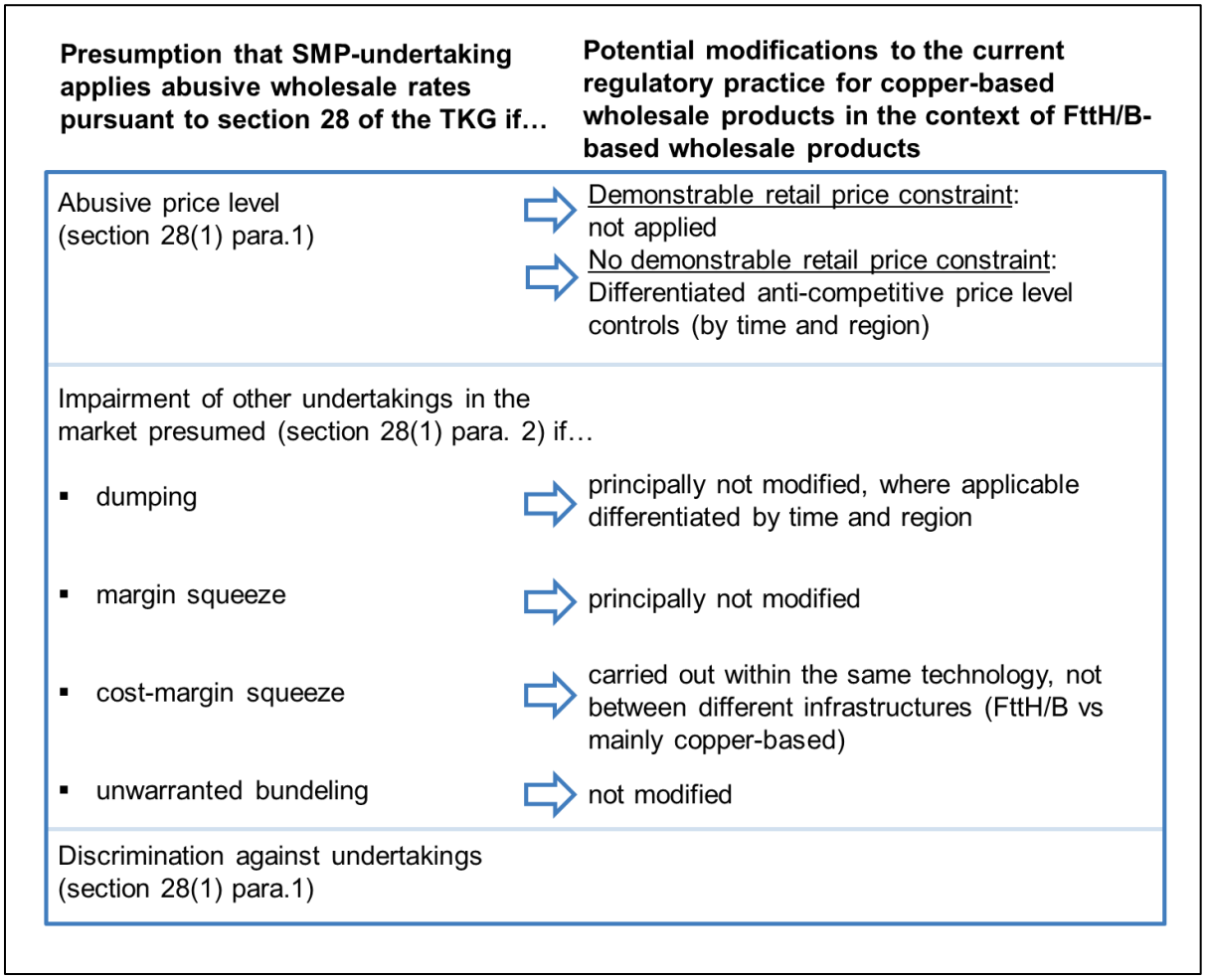
Furthermore, pursuant to section 28(1) para. 2 of the TKG, it is also to be examined whether the SMP-undertaking is levying rates that considerably impair the competitive opportunities of other undertakings in a telecommunications market. Anti-competitive conduct as defined here, does not however, apply if the conduct is objectively justified. Abuse within the meaning of section 28(1) para 1 is presumed in particular if the rates levied for the service in question do not cover its long run incremental costs (price dumping). In principle, price dumping would be presumed to exist if the wholesale rates levied were lower than the incremental costs incurred by the provision of the relevant service. The pricing flexibility which the replicability approach offers could, in principle, enable undertakings rolling out FttH/B to reduce the retail prices to a level that facilitates market penetration during the product rollout phase. The obligation to maintain a reasonable margin between the retail rates and wholesale rates levied that is associated with the replicability test would therefore mean, at least temporarily, that the wholesale prices could also drop to a level beneath the long run incremental costs of the provision of the relevant service – assuming the period costs remain constant.

It therefore becomes apparent that in this context, a differentiated examination of whether dumping is in place that takes a dynamic amortisation of infrastructure costs into account

based on consumers' anticipated increasing willingness to pay over time, would offer greater scope. Since the concept of replicability is aimed particularly at taking regional cost differentials and the gradually increasing willingness to pay of consumers into account, this results in a long-term, regionally differentiated assessment to be undertaken to establish whether anti-competitive conduct exists within the meaning of section 28(2) para.1 of the TKG. It would need to be established in particular whether the periodic costs predicted by the undertaking for the respective region based on anticipated demand and willingness to pay would cover costs over the entire amortisation period. For, only if this was not the case for the foreseeable future, should it be assumed that dumping exists. This means market penetration pricing strategies should only be characterised as anti-competitive based on those above-mentioned restrictive assumptions, provided that wholesale customers are also benefitting from them.

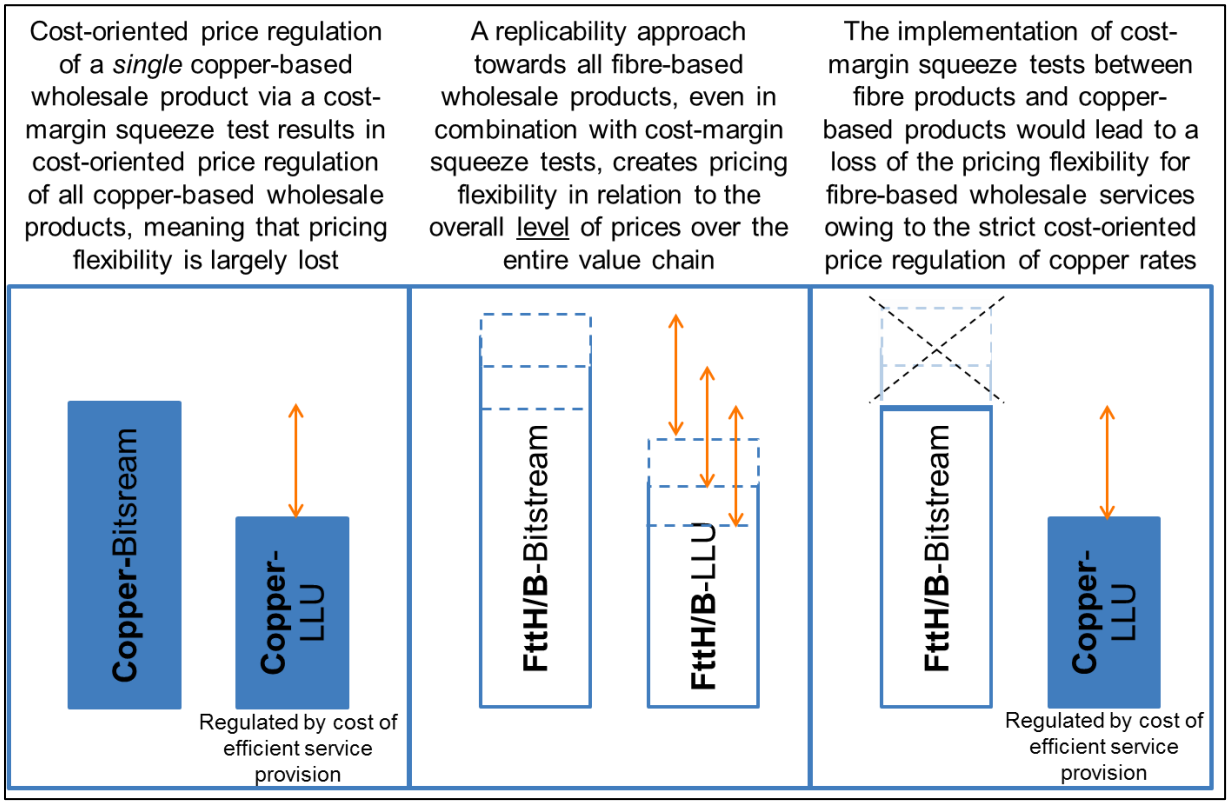
The margin squeeze test carried out within the framework of section 28 of the TKG is the focus of the replicability approach in conceptual terms, meaning that a margin squeeze is generally prevented by reviews carried out to ensure the margins defined by the regulatory authority are adhered to. In principle, this does not affect the cost-margin squeeze tests for FttH/B-based products in methodical terms which are as of today already carried out for mainly copper-based products. Cost-margin squeeze tests ensure in particular that the difference in value added between the various wholesale products and services is adequately reflected in the relevant differences in wholesale prices. They therefore make an important contribution to safeguarding consistency between the rates charged for wholesale products at the various stages of the value creation chain and to preventing efficient business models from being placed at a disadvantage.

Figure 3: Price abuse controls pursuant to section 28 of the TKG and possible modifications with a view to the potential application of the replicability approach for FTTH/B-based wholesale products.



In the past, cost-margin squeeze tests have made an important contribution towards ensuring that the price structure of (mainly) copper-based wholesale products was based on the established cost orientation method. The key characteristic of the replicability approach is the additional pricing flexibility it gives undertakings. In order to ensure this intended flexibility is actually leveraged, it is important to ensure a distinction is made between cost-oriented and replicability-oriented wholesale products when carrying out cost-margin squeeze tests. As Figure 4 (left and centre) shows, it is possible to maintain flexible pricing while simultaneously maintaining consistency between rates levied for different wholesale products along the value-added chain so long as cost-margin tests are carried out within the same technology (mainly copper-based infrastructures on the one hand and FttH/B infrastructures on the other). Combining both kinds of infrastructures would, however, be inconsistent with the basic concept of the replicability approach (Figure 4, right).

Figure 4: Cost-margin squeeze system in respect of cost-oriented price regulation and the replicability approach



The provisions set forth in EU law also envisage departing from the approval of rates based on the costs of efficient service provision and moving towards replicability-based price control under certain conditions. The Commission Recommendation of consistent non-discrimination obligations and costing methodologies presents the economic replicability tests as an alternative to price regulation that can be applied when a demonstrable constraint on retail prices results from a "copper anchor" or alternative infrastructures. The Code proposed by the EU Commission to reform the legal framework for the telecommunications industry has incorporated the ideas outlined in the above-mentioned recommendation with the intention of transposing them more effectively into binding law. However, it is not clear when a demonstrable retail price constraint is presumed to exist in accordance with the Recommendation and the Code.

5.2.3 Compatibility of the limitation of regulation to transparency obligations only with the legal framework

As outlined in chapter 3, lifting price regulation and imposing only a transparency obligation seems, in principle, to be compatible with the current legal framework. It is at the discretion of the Ruling Chamber to decide which of the remedies being part of the catalogue of measures it imposes in a regulatory order. In particular, it would need to be shown in its considerations that the mere imposition of a transparency obligation is sufficient to eliminate competitive problems prevailing in the market in which the SMP-undertaking operates. As a rule, however, this is a requirement that is difficult to meet. Given that the market analysis preceding the regulatory order reveals that there is a need for sector-specific market regulation, this means that (1) high and non-transitory barriers to market entry are present,

(2) the market structures does not tend towards effective competition within a relevant time horizon, and the (3) competition law alone proves insufficient to address the market failures concerned (three-criteria-test). It remains at least questionable whether imposing the obligation to provide information in a transparent manner on the SMP-undertaking would be sufficient to remedy such market failure.

Questions

4. Under what conditions would it be adequate to not impose price regulation based on the costs of efficient service provision in favour, for instance, of the replicability approach?

a. What expectations do you have regarding the level of price pressure exerted by alternative infrastructures and/or by alternative wholesale products that are price regulated based on the costs of efficient service provision in the short, medium and long term?

b. What importance should be attached to the substitutability of (mainly) copper-based and fibre-based wholesale products over time?

c. Are (5G) mobile services also expected to exert a demonstrable price pressure on FttH/B-based retail products in the medium to longer term?

d. What extent of price pressure – created by alternative infrastructures and/or by alternative wholesale products that are price regulated on the basis of the costs of efficient service provision – is deemed sufficient to refrain from imposing rates based on the costs of efficient service provision for FttH/B-based access products? What role will the continued existence of the copper network play in this context?

e. How will it be possible to "demonstrate" the extent of such price pressure or price constraint within the meaning of the Recommendation on non-discrimination obligations and costing methodologies (or, in the future, in accordance with the proposal of the new Code)?

f. Should the regulatory concepts and methods applied vary regionally depending on the extent to which competitive situations and hence pricing constraints vary by region?

g. Under what assumptions does it seem necessary and adequate to supplement the replicability approach with a differentiated price-level abuse control (that may, if applicable, vary at regional level)?

5. What adjustments would need to be made with regard to the application of the method set forth in section 28 of the TKG if a replicability-based approach was adopted?

a. If the application of the replicability approach was, in principle, deemed appropriate in respect of FttH/B-based wholesale products, how could additional price level abuse controls be organised in the most adequate methodological way? In this event, what benefits would sector-specific price level abuse controls have over price controls in competition law in terms of adopting a consistent overall concept?

b. Is there any need for adjustments to the application of cost-margin squeeze tests in the presumed context? Do you agree with the above-mentioned arguments in favour of carrying out separate cost-margin-squeeze tests for (mainly) copper-based wholesale products on the one hand and FttH/B-based products on the other?

Against the backdrop that (as one possible option) much greater importance would be attached to the replicability test or margin squeeze test with a view to safeguarding competition, the question arises what method of margin squeeze test would be used under such different premises? A separate consultation is intended to be arranged at a later date so that all the relevant details can be discussed. Notwithstanding this, a few key conceptual aspects shall be addressed in the following in order to provide stakeholders with a first opportunity to submit comments at this early stage. Comments received could serve as a basis for further considerations on how the margin determination can be organised.

c. What assumptions should be made in determining costs in respect of the required margin in relation to the efficiency benchmark? Within the meaning of the Commission Recommendation on non-discrimination obligations and costing methodologies, is the cost situation of SMP-undertakings relevant (EEO-test) or does it merely provide a starting point for determining the margin? Under what conditions and to what extent would it be appropriate to take into account the specific cost situation of efficient operators competing with the SMP-undertaking ("adjusted EEO")?

d. On the basis of which criteria should the retail products relevant for the replicability tests be chosen? Should each individual product be assessed, in principle, or should the assessment be based on a combination of products if efficient competitors do also / are also able to offer combined products? What approach should be adopted in determining and adhering to a reasonable margin for promotion offers that are available? How could the reasonable margin be derived despite the growing complexity of retail products resulting from product bundling? How should TV and Pay-TV offers, for instance, be treated in the calculations?

e. Based on what criteria should the wholesale products corresponding to the underlying retail products be determined?

f. How can the level of individual risk-sharing of wholesale users be taken adequately into account in the context of of risk-sharing models (cf. section 3.2.1) when the reasonable margin between retail and wholesale prices is determined?

g. When choosing relevant retail and wholesale products, to what extent should such consideration be regional?

6 Closing remarks

The foregoing reflections demonstrate that the telecommunications market – and hence regulation – are facing profound changes. Uncertainties that obviously exist in respect of the nationwide expansion of fibre-based access networks render it necessary to put the mechanisms successfully applied in regulating the already existing networks to the test. As such, the common goal must be to ensure the regulatory framework is capable of meeting future requirements, i.e. to make it flexible and to adapt it to new circumstances where necessary.

Without pre-empting the outcome of the consultation process, it is becoming more and more clear, given the growing complexity of competitive conditions and the uncertainties associated with them, that it would be wise to take a chance on market solutions and to ensure regulation focuses on its role of safeguarding competition. In particular, sufficient incentives need to be created for economically viable investment. One option would be to use the level of retail prices to determine wholesale prices. With this in mind, it needs to be discussed within the consultation process whether greater emphasis should be placed on the replicability approach in respect of FttH/B-based wholesale products, potentially serving as a "mediatory solution" between the strict orientation to the costs of efficient service provision on the one hand and calls for a complete lifting of regulation for new investment in FttH/B on the other. In this regard, it needs to be established whether the evolution of well-established margin tests could succeed in creating a maximum of reliability in guaranteeing effective competition by offering methodical continuity on the one hand and a maximum of efficient incentives for investing companies by offering additional degrees of freedom on the other.

The aim of this consultation process is to explore the scope of a system that is much more flexible – in temporal terms (dynamic demand trend), in geographical terms (regional cost differentials) and in mapping specific risks in line with market requirements (take-up, competitive situation). After all, a more flexible und market-oriented approach could help to create a stable regulatory environment as well as an attractive investment climate for all companies deploying fibre infrastructure.