The Law and Economics of Co-Investment in FTTB/H Networks♦

Emanuel Kollmann*

Abstract

Allowing co-investments instead of or alongside access regulation is seen by economists and policymakers as a way to incentivize investment in broadband access networks by incumbent telecommunications network operators. Co-investment is intended to better distribute investment risks between incumbents, other investors, and access seekers while at the same time enabling infrastructure-based competition. Since 2018, European legislation not only contains specific rules on how co-investments can influence market regulation but also a general exemption from regulatory obligations for co-investments that meet certain conditions. These conditions, however, have been criticized as being too similar to access regulation and not a true co-investment approach. This paper adds to this discussion by reviewing the relevant economic literature on co-investment and analyzing in detail the relevant rules of the EECC. I conclude that although the conditions applicable to co-investment are relatively strict, there remains a scope of application in regional niche markets with strong regulatory approaches and difficult investment conditions.

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* University of Mannheim, School of Law and Economics (Department of Law) and Leibniz Centre for European Economic Research (ZEW), Mannheim; E-Mail: emanuel.kollmann@uni-mannheim.de.

I. Introduction

The extensive deployment of fibre-based broadband infrastructure up to the end-users' premises (Fibre to the Home/Building, FTTH/B) remains an ongoing concern of European digital policy. Currently, the European Union aims at providing all end users at a fixed location with gigabit networks by 2030 (European Parliament and Council 2022). However, due to fundamental political decisions and a lack of available public funding the majority of the necessary financing must be provided by the private sector. Most of the capital expenditure will be required to replace the old copper-based "local loops" in the access networks with modern fibre-based infrastructure (Plückebaum and Ockenfels 2020, p. 38). A task that, *inter alia*, falls upon the incumbent operators in the EU member states. These operators face a regulatory framework that obliges them to share parts of their infrastructure with competitors. First introduced in the 1990s, these regulatory obligations are largely maintained by the current regulatory framework – the 2018 Directive establishing the "European Electronic Communications Code (EECC)".[1]

Although regulation has been softened over the years in the face of increasing infrastructure-based competition, it still applies to the access networks (European Commission 2020). In an environment increasingly focused on investment in broadband deployment rather than on creating (service-based) competition by means of mandatory access, however, access obligations are increasingly seen as a hindrance to incumbent network operators' incentives to invest. Access obligations can potentially prevent companies from achieving sufficient returns on investment by limiting access prices, and they can lead to an inappropriate distribution of investment risks by allowing access seekers to participate in successful investments while the investor must bear the risk of failure alone.

Thus, among other approaches, the European lawmakers intended to soften access obligations for newly built "Very High Capacity Networks" (VHCN) in the EECC. This includes specific rules on how market-driven co-investments can influence regulatory decisions adopted by the National Regulatory Agencies (NRAs). In this context, the term co-investment describes the joint investment by network operators in broadband networks, while competing in the downstream wholesale and end-user markets. Such sharing of investment costs and risks typically takes the form of a joint network construction e.g. as part of a joint venture. Nevertheless, mere access contracts can also constitute co-investments under certain conditions. This is particularly true in the case of two-sided access contracts, where all co-investors build their own infrastructure and subsequently grant each other reciprocal access ("swapping"). One-sided access contracts can have a similar risk-sharing effect if they are structured in such a way that makes access seekers assume some of the investors' investment risk e.g. by purchasing

[1] Directive [EU] 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, OJ L 321, 36, 17.12.2018, p. 36 – 214.

a fixed amount of capacity irrespective of their success in the end-user market or by committing to long-term contracts. The risk-sharing effect occurs primarily when the commitment to access, capacity and/or timing is made prior to the investment, so that the investor has the possibility to anticipate utilization of the infrastructure and returns on investment.

Compared to singular investment, co-investment allows investment costs to be shared, reducing initial investment and better distribution of investment risks while granting full access to the infrastructure. This lowers investment risks for co-investors while maintaining business opportunities in downstream markets. Reducing the initial investment required to access infrastructure also lowers the barriers to market entry for smaller network operators who otherwise could not afford to build a network on their own. If the co-investment agreement is designed to give all co-investors full access to the new infrastructure, it could lead to more infrastructure-based competition, especially in areas where multiple competing networks could not be operated sustainably. In this way, it could transform potential "grey areas" to "black areas" with sustainable infrastructure competition.

Due to these effects, co-investment is considered as an alternative to classical access regulation (Balmer 2014, p. 85; Briglauer et al. 2017, p. 952; Bourreau et al. 2018, pp. 79–80). Nevertheless, close cooperation among competing infrastructure providers also poses competitive risks in the form of higher market concentration, possible collusion, and reduction in infrastructure competition in areas where competing networks would otherwise have a business case.

Several contributions have analysed the EECC as a whole including its provisions applicable to co-investment from an economic (Briglauer and Cambini 2017; Briglauer et al. 2017; Vogelsang 2019) or legal (de Streel and Hocepied 2019; van Dujvenvoorde 2020) point of view. This paper adds to that literature by reviewing the relevant economic contributions on co-investment and providing a detailed analysis of the rules on co-investment against the findings therein. The remainder is structured as follows: Part II reviews the economic literature on co-investment, Part III describes the regulatory provisions on co-investment incorporated in the EECC; Part IV contains an analysis of these rules, the results of which are summarized in the conclusion in Part V.

II. Literature

So far, there are mainly theoretical contributions focussing on the general impact of co-investment on investment incentives and competition on the one hand and the effect of additional regulatory obligations on the other. The first paper to explore the basic effect of co-investment is by Nitsche and Wiethaus (2011). They model a market with a regulated incumbent operating a legacy network who can invest in non-duplicable next generation networks (NGN) under uncertainty. The entry of alternative investors to the NGN market is determined by four alternative regulatory settings: (i) long run incremental cost regulation (LRIC): the incumbent may pass-on investment costs to the entrant via the access price only

if the NGN is successful; (ii) fully distributed costs regulation (FDC): the undertaking may recoup investment costs through the access price regardless of the NGN's market success; (iii) risk-sharing: telecom operators jointly deploy and share the cost of NGN, after the roll-out each investor has full access to the network; (iv) regulatory holiday: there is no mandated access to NGN meaning the incumbent can set the access price without regulatory oversight, mandated access to the old network remains. The authors show that the level of investment depends on the chosen regulatory model. Regulatory holidays and FDC induce most investments. LRIC has the lowest level of investment. However, due to elevated investment and intense competition in the end-user market, risk-sharing leads to the highest consumer surplus.

Similar questions are addressed by Cambini and Silvestri (2012) who examine a market with a vertically integrated incumbent who may invest in NGN with uncertain returns. One access seeker has the choice to migrate from an existing legacy network to an NGN and compete in the retail market. Migration is enabled by three alternative regulatory models: (i) full regulation where the access charges to the legacy network and NGN are regulated; (ii) partial regulation where only the access charge to the legacy network is regulated[2], and (iii) risk sharing. Their results show as well that partial regulation leads to the highest level of investment, while risk sharing yields the highest level of consumer surplus due to the strong combination of increased investment incentives and end-user competition.

The Investment enhancing effect is also shown by Inderst and Peitz (2012a, 2012b) in a model with two network operators that can compete at the end-user level but also have the possibility to enter into access agreements. The authors show that the possibility to conclude such agreements already enhances the investment incentive of at least one operator and leads to less duplication of infrastructure. This effect is amplified if such access agreements can be entered into prior to the investment – a situation similar to co-investment.[3] This outcome is confirmed by Bourreau et al. (2020a) who show that access agreements concluded prior to investment reduce uncertainty thus enhancing investment.

The impact of the design of the risk-sharing agreement is studied by Cambini and Silvestri (2013) in a setting where the vertically integrated incumbent has the choice to invest in NGN either alone or by concluding a risk sharing agreement with an alternative network operator. The authors show that the level of competition is lower, if the risk sharing obliges the co-investors to pay access prices on top of their initial investment (they call this a "joint venture"). The level of investment, however, is higher compared to simple risk sharing without access prices. They also show that, without mandated access, co-investors have an incentive to exclude external access seekers.

Several regulatory conditions for co-investments are discussed to mitigate these incentives. Some of these are studied by Bourreau et al. (2018) who create a greenfield model with an incumbent firm

[2] This corresponds to the "regulatory holidays" of Nitsche and Wiethaus (2011).

[3] For an extension of this model considering uncertainty see Inderst and Peitz (2014).

investing in new infrastructure and an entrant that can compete in areas where infrastructure is deployed. The authors focus on the outcome of three regulatory models: (i) access regulation to incumbents' networks for a regulated price; (ii) pure co-investment meaning that the entrant can only demand access by incurring half of the investment cost and (iii) co-investment with access, where the entrant can choose between co-investment and access in different areas. The model shows that (pure) co-investment enhances investment and competition in the areas where the entrant demands entry by co-investment. Where the entrant decides against co-investment, it also leads to monopolistic areas and rising retail prices. This, however, mainly applies to areas that would not have been covered at all under access regulation. Contrastingly, co-investment with access reduces the incumbents' incentive to invest because the entrant can apply a wait-and-see strategy. Co-investment without access is particularly beneficial when demand uncertainty is high. It leads to the highest social welfare. Co-investment with access still leads to a higher welfare compared to access-only regulation. Possible collusion between firms can be detrimental to welfare but can also increase it in some cases if it leads to higher coverage. Building on this model Bourreau et al. (2021) show that an obligation to keep the co-investment agreement open to allow for later entry of co-investors negatively affects the investment incentive. This effect can be mitigated by requiring late entrants to pay a risk premium.

In summary, economic theory indicates three main findings. Allowing co-investment can have investment-enhancing effects. At the same time, close cooperation of network operators can be detrimental to (service-based) competition by creating incentives to exclude external access seekers. Regulatory remedies that address concentration tendencies, such as mandating long-term network access or accessibility of the co-investment agreement, in turn have negative effects on the investment incentives. Thus, theoretical contributions suggest that the general trade-off between static and dynamic efficiency inherent to all regulatory approaches in the telecommunications sector also applies to co-investments. However, in the case of co-investment, it may come at a smaller price compared to classical access regulation, considering the indicated higher investment incentives while still maintaining adequate levels of competition (Krämer and Schnurr 2014, pp. 1169–1170).

Confirmation for these findings is scarce, however. Krämer and Vogelsang (2016) study incentives for collusive behaviour between co-investors in a laboratory experiment. Participants in the experiment could invest in networks and then compete in the end-user market. In this setting, allowing co-investment did not lead to a significant increase in investment, but instead to significantly higher tacit collusion than in other scenarios. Tacit collusion became stronger the more co-investment occurred.

The only empirical assessment of co-investment concerns the French regulatory approach adopted by ARCEP.[4] It requires operators of in-house infrastructure in densely populated areas to provide risk-sharing access to newly built infrastructure and to parts of the infrastructure outside of the building

[4] Autorité des Régulation des Communications Électroniques et des Postes.

(ARCEP 2009). In less densely populated areas, this applies to larger parts of the network (ARCEP 2010). On the basis of datasets from 2015 - 2018 from these less densely populated areas Aimene et al. (2021) assess the effects of such co-investment on FTTH adoption and competition. They show that co-investment – where it occurred – led to an increase in FTTH-adoption by 7.9 % and to increased competition by reducing the incumbents market share by 5.9 %.

Tenbrock (2013) studied the practical relevance of cooperative investment in broadband infrastructure in German districts. He conducted a survey showing that cooperative investments take please in roughly one-third of German districts. However, such investments were typically agreed upon between a telecommunications network operator on one side and a utility on the other. Subsequently, only the telecommunications network operator offered end-user services.

"Real" co-investments between competing telecommunications network operators are much more infrequent. Nevertheless, in some European countries market-driven cooperations have developed on a larger scale.[5] This is especially true for Spain and Portugal where several "swapping" agreements have been concluded over the years (Bourreau et al. 2020b, p. 70). Other co-investments surfaced in the Netherlands (Webb 2015, p. 8), Italy (AGCM 2018) and in Germany (BKartA 2019a, 2019b). In Switzerland, a cooperative approach to the deployment of multifibre networks by the incumbent operator Swisscom has led to a temporary waiver of access regulation (Ilic et al. 2009, p. 34).

III. Co-Investment under the EECC

1. Regulatory Questions

The regulatory approach for telecommunications networks in the EU still heavily relies on the asymmetric imposition of remedies on undertakings designated as having significant market power (SMP) to ensure non-discriminatory access to their networks.[6] The relevant markets, however, are reduced to two (European Commission 2020), both of which relate to the access network, be it copper or fibre-based. Thus, regulatory questions only arise in cases of co-investment in local access networks involving a SMP-undertaking. All other cooperative investments are subject exclusively to competition law (Art. 101 TFEU).

In designing a regulatory framework for co-investment, the first question to be addressed is that of necessary regulatory incentives. The most significant possible measure in this regard is the removal of access regulation in the case of co-investment in order create incentives for the participation of the SMP-

[5] For an overview see BEREC (2012, pp. 2–37).

[6] In some exceptional cases symmetric access obligations affecting all network operators are possible as well, cf. Art. 61 EECC.

undertaking and the (otherwise non-regulated) other co-investors. This corresponds to the question of whether co-investment can be a substitute for mandated access regulation.

If so, the corollary question is what regulatory conditions must be met for a co-investment to be considered sufficient to replace access regulation. Prior to the adoption of the EECC, the discussion revolved around three possible types of remedies: First, openness of the co-investment agreement to outsiders. This condition can be applied both at the time of concluding the co-investment agreement and in the long term allowing alternative network operators to participate in the investment after the initial investment has been made or even after the network has been built. This is intended to prevent the discrimination against alternative operators and to ensure the lowering of barriers to market entry associated with co-investment. It has, however, a negative effect on investment incentives as indicated by Bourreau et al. (2021) because external network operators can apply a wait-and-see strategy and do not have to assume the whole investment risk (Briglauer et al. 2017, p. 951). This problem could be remedied through the payment of a risk premium by later entrants, however. In any case, such an obligation is considered less onerous than traditional mandated access regulation (Vogelsang 2019, p. 4).

Nevertheless, secondly, mandated network access is also discussed in the case of co-investment. Although seen as detrimental to investment incentives (Bourreau et al. 2018) because it incentivizes opportunistic behaviour by competitors even more than an obligation of the co-investment agreement to remain open long-term, access is seen as a means to remove incentives to exclude third parties from co-investment (Cambini and Silvestri 2013).

The third possible condition is a requirement that at least one "participant" be involved in the co-investment. This addresses the question whether the access regulation should already be waived in the presence of a co-investment offer or only if another co-investor has entered the agreement. Requiring the latter could eliminate unattractive pseudo-offers made only to obtain a regulatory exemption but are unattractive to competing network operators (Berkeley Research Group 2017, p. 39). It also ensures the realisation of the competition-enhancing effects of the co-investment agreement. It is, however, also considered to be detrimental to the investment incentives of the SMP-undertaking rendering it dependent on his competitor's ability and willingness to co-invest.

2. Co-Investment in the regulatory framework

Under the EECC regulatory framework, co-investments become relevant in two cases: First, they can influence decisions adopted by an NRA in the three steps of the regulatory process (market definition,

market analysis and imposition of remedies[7]). Second, Art. 76 EECC contains a more specific rule exempting networks built via co-investments from regulatory obligations if certain criteria are met.

a) Market Regulation

Depending on their impact on competitive conditions, co-investments may already influence the (regional) market definition. If a co-investment leads to sufficiently homogenous competition within the footprint of its newly established network distinguishable from neighbouring areas in which the prevailing conditions of competition are significantly different, the definition of a local market may be required (European Commission 2018, at 48-49.). This is particularly true if the co-investment covers only a limited territory and the conditions outside of this territory remain unaffected.

If the co-investment gives rise to sustainable competition in this local market, it may also lead to deregulation even without the application of specific rules.[8]. More specifically: as part of the market analysis, the NRA assesses if the market structure tends towards effective competition within the relevant time horizon.[9] This assessment can be influenced by a co-investment e.g. by enabling the co-investors to compete in downstream markets based on infrastructure or by lowering the barriers to entry into the infrastructure market for smaller network operators.

The imposition of regulatory obligations has not only been subject to the influence of co-investment since the adoption of the EECC. The preceding Framework Directive[10] already obliged NRAs to promote efficient investment by *inter alia* "*permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment, whilst ensuring* […] *competition in the market"*.[11] The old Framework, however, did not contain specific directive-level rules on how to implement this mandate. More detailed guidance could only be found in Commission recommendations which – although to be taken into utmost account by NRAs[12] – are non-binding. The EECC perpetuates this rule[13] but also more specifically obliges NRAs to consider co-investment when imposing regulatory obligations in general[14], when deciding upon access[15] and price control obligations.[16]

[7] Artt. 64 et seqq. EECC.
[8] Rec. 170 EECC.
[9] Art. 67 *para.* 1 *subp.* 2 (b) EECC.
[10] Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services, OJ L 108, 24.4.2002, p. 33 – 50.
[11] Art. 8 *para.* 5 (d) Framework Directive.
[12] Art. 38 *para.* 2 EECC.
[13] Art. 3 *para.* 3 (d) EECC.
[14] Art. 68 *para*. 6 *subp*. 1 EECC.
[15] Art. 73 *para*. 2 (f) EECC.
[16] Indirectly by Art. 74 *para*. 1 *subp*. 2 EECC.

b) Regulatory Exemption: Art. 76 EECC

Far beyond the mere obligation to consider co-investment when imposing regulatory obligations, Art. 76 EECC contains a mandatory regulatory exemption for co-investments that meet certain criteria. Under this provision, SMP-undertakings may offer commitments to open up the deployment of new VHCNs to co-investment.[17] If the offer meets certain conditions the NRA must make the commitment binding and not impose any access obligation as long as at least one co-investor has accepted the offer.[18]

The general purpose of this novel regulatory approach is set out in the recitals. Co-investments are generally viewed as positive because they "*offer significant benefits in terms of pooling of costs and risks, enabling smaller-scale undertakings to invest on economically rational terms and thus promoting sustainable, long-term competition, including in areas where infrastructure-based competition might not be efficient*".[19] The regulatory framework thus adopts the ideas outlined above of co-investments being able to enhance investment incentives by sharing costs and risks of broadband deployment and enabling infrastructure competition where it might otherwise not be feasible by lowering barriers to market entry.

aa) Scope of Application

The EECC describes co-investment paradigmatically as "co-*ownership or long-term risk sharing through co-financing or through purchase agreements giving rise to specific rights of a structural character*".[20] Thus, Art. 76 EECC applies to joint investment directly in infrastructure or via a joint venture (co-ownership) but also to other forms of (long-term) risk-sharing by co-financing and purchase agreements. Access agreements are considered a co-investment if they give rise to specific rights of a structural character. Such structural character requires a "*degree of co-determination and enabling co-investors to compete effectively and sustainably in the long term*".[21] In light of the purpose of Art. 76 EECC, such structural character exists if the design of the co-investment agreement forces a co-investor to participate in the investment cost and risks and enables him to compete on the end-user market in a manner that approximates that of an independent infrastructure operator. A structural character can thus arise either through direct or corporate ownership (BEREC 2020, at 29 - 30), or – in particular in the case of granting one-way access – through long-term financial schemes that foresee upfront payments, minimum purchase obligations, and volume discounts, or take the form of purchase agreements through indefeasible rights of use (BEREC 2020, at 31).

[17] Art. 76 *para.* 1 *subp.* 1 EECC.
[18] Art. 76 *para.* 2 *subp.* 1 EECC.
[19] Rec. 198 EECC.
[20] Art. 76 *para.* 1 *subp.* 1 EECC.
[21] Rec. 198 EECC.

Art. 76 EECC applies only to co-investments in VHCN "*that* [consist] *of optical fibre elements up to the end-user premises or base station*", hence FTTB/H-networks but not hybrid solutions such as Fibre to the Curb (FTTC) or Fibre to the last Amplifier (FTTLA). This breach of the principle of technology neutrality[22] is the result of a political compromise. The initial Commission draft had intended to apply the rules to all co-investments in VHCN. In contrast, the European Parliament regarded co-investment as a threat to competition and limited the application of the rule to FTTH/B-networks as a necessary precautionary measure (European Parliamentary Research Service 2018, p. 9).

bb) Safeguards for Competition

If such a co-investment is the subject of a commitment offer, the NRA is obliged to test whether it fulfils the competition safeguards contained in Art. 76 *para.* 1 *subp.* 2 and Annex IV EECC. They aim to ensure the positive effects of the co-investment on competition by securing accessibility and a competition-friendly design of the co-investment offer, and to prevent adverse effects on (service-based) competition by ensuring access for third parties.

The accessibility of the co-investment offer is ensured by requiring it to be open at any moment during the lifetime of the network.[23] The duration of this obligation is limited only by the time of bindingness of the commitment (7 years[24]). Access to co-investment must be granted on a non-discriminatory basis.[25] This does not mean that all co-investors need to have exactly the same conditions for access, but any differentiations must adequately reflect the timing and extent of the participation in the investment risk. Late co-investors can be obliged to pay a risk premium.[26] Furthermore, the form of joining the co-investment may vary over time. In particular, if the initial co-investors form a joint venture or conclude a swapping agreement, late access may prove difficult. In this case, late co-investors may be referred to one-way access with structural character. To ease participation further, co-investors need to be granted some flexibility regarding the extent of participation[27] and the shares of the co-investment need to be sellable.[28] The actual accessibility of the co-investment offer is also ensured by transparency requirements regarding the timely publication of the co-investment offer.[29] This is to give potential co-investors sufficient time to evaluate participation in the co-investment and prevent an information advantage and leading edge for the SMP-undertaking.

[22] Cf. Art. 3 *para.* 4 (c) EECC.
[23] Art. 76 *para.* 1 *subp.* 2 (a) EECC.
[24] Art. 79 *para.* 3 *subp.* 2 EECC, the bindingness may be prolonged: Art. 79 *para.* 4 EECC.
[25] Annex IV (a) EECC.
[26] Annex IV (c) EECC.
[27] Art. 76 *para.* 1 *subp.* 2 (b) (ii), (iii) EECC.
[28] Annex IV (c) EECC.
[29] Art. 76 *para.* 1, *subp.* 2 (c); Annex IV (b) EECC.

The co-investment offer must be designed in such a way as to enable "*co-investors* […] *to compete effectively and sustainably in the long term in downstream markets*".[30] This requires a competition-friendly design of the co-investment offer, in particular by mandating fair, reasonable and non-discriminatory (FRAND) terms allowing access to the full capacity of the network.[31] This has several implications: First, it restricts the usage of exclusivity and non-competition clauses in favour of individual co-investors, especially the SMP-undertaking. Second, all access products need to be made available to all co-investors on FRAND terms. Restrictions are only possible on the basis of technical network architecture issues that apply equally to all co-investors. (BEREC 2020, at 84, 87). Third, the pricing of access products must be in accordance with FRAND conditions and a competition-friendly design as well. Differentiations among the co-investors are only permitted based on differences in the requested access product or form, extent, and timing of the participation in the co-investment. In addition, excessive internal pricing that could remove competition between co-investors by influencing pricing in the end-user markets is prohibited.

The obligation to provide access for third parties not participating in the co-investment[32] intends to prevent collusion between co-investors and to ensure the existence of sustainable wholesale offers even if (former) suppliers of competitive wholesale access have joined forces in the co-investment. It also further lowers the barriers to market entry for very small undertakings that cannot afford to participate in the co-investment (European Commission 2016, p. 19). The obligation is subject to a "*mechanism of adaption"* consisting of three steps: first, immediately after the investment, regulated or commercial access rights must be maintained as before the co-investment. Access of this form can be provided either using the new VHCN elements or via an old network that is not switched off (BEREC 2020, at 126).[33] If access is migrated to the new network, it must be comparable to the access previously offered. Second, the mechanism of adaption applies. It grants external access seekers a right to access to the new VHCN infrastructure after a certain period of time. The transition and timing of the offer must take into account the investment risks of the co-investors. The co-investors have the right to market the higher quality of FTTB/H access exclusively at first before sharing it with access seekers. The duration of this phase of exclusivity depends on the investment risk of the respective co-investment (BEREC (2020, at 132) proposes a maximum of 5 years). Access to the new infrastructure must be granted on "*transparent and non-discriminatory terms*"[34]. Different conditions for co-investors and access seekers are permissible in the long run, if they reflect the co-investors' investment risks such as the risk of investment failure in general but also the risk of having to write off part of the individual investment if market success fails

[30] Art. 76 *para.* 1 *subp.* 2 (

[31] Art. 76 *para.* 1 *subp.* 2 (b) (i) EECC.

[32] Art. 76 *para.* 1 *subp.* 2 (d) EECC.

[33] Apart from a migration process (Art. 81 EECC), regulated access rights to the old infrastructure needs to be maintained anyway.

[34] Art. 76 *para.* 1 *subp.* 2 (d) EECC.

to materialise. Thus, the pricing – but not the quality – of access products may always differ between co-investors and access seekers.

cc) NRA decision

Unlike when imposing regulatory obligations, NRAs do not enjoy general regulatory discretion when assessing co-investments under Art. 76 EECC. On the contrary, NRAs cannot apply conditions other than those previously mentioned. Nor can they impose any other regulatory obligations in relation to the co-investment. Their decision is limited to assessing compliance with the competition safeguards. Nevertheless, as indicated by the wording[35] the NRAs have a discretion when deciding whether these criteria are met.

If the NRA concludes that the co-investment offer complies with these conditions, it must make the commitment offer binding for seven years[36] and waive or not impose any other regulatory obligations. The latter, however, only applies if at least one potential co-investor has accepted the offer. If that is not (yet) the case, the NRA shall only make the commitment offer binding. The regulatory waiver is granted as soon as a co-investor joins the agreement.[37] It applies to all SMP-obligations[38] but not to symmetrical access obligations under the EECC or the Broadband Cost Reduction Directive.[39] Only in the case of "*significant competition problems on specific markets*" may an NRA impose obligations by way of derogation from the general rule. This applies in particular to niche markets that do not have the same level of competition as the mass market. Therefore, this rule is not a general means to correcting the regulatory waiver if the co-investment does not produce the intended competitive advantages.

IV. Analysis

With Art. 76 EECC, the European legislator has opted for a much more static approach to regulation. Co-investments that comply with the relevant criteria are regarded by law as sufficiently addressing the competitive problems identified in the market analysis, without further consideration of the individual market situation. For the first time, European law contains a blanket rule for a specific business model and does not leave the decision on its impact to the discretion of the NRAs. This approach differs greatly from the one taken previously in the Framework Directive, which contained only a very general mandate to consider co-investments and make them possible from a regulatory law perspective. More specific instructions could only be found in non-binding recommendations and guidelines of the Commission,

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[35] „*if it concludes* […]" (Art. 76 *para.* 2 *subp.* 1 EECC).
[36] Art. 79 *para.* 3 *subp.* 2 EECC.
[37] Rec. 199 EECC.
[38] Artt. 69 – 81 EECC.
[39] Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks, OJ L 155, 23.5.2014, p. 1–14.

leaving much decision-making power with member states' NRAs. With Art. 76 EECC, this authority has shifted from the NRAs to the European legislature. The strong legal consequence and detailed conditions for co-investments are already incorporated at the directive level in the EECC. NRAs are left with only a certain degree of discretion in assessing whether these conditions are met.

Thus, it was also the task of the European legislator to find a suitable compromise to solve the trade-off between investment incentives and (service-based) competition. On one hand, the EECC adopts the economic theory that co-investments promote investment incentives and (infrastructure-based) competition. It therefore exempts them from regulatory obligations. On the other hand, European lawmakers included every single regulatory remedy, that were discussed previously both politically and in economic and regulatory literature. However, in economic theory these safeguards for (service-based) competition have been shown to be detrimental to investment incentives. To mitigate this effect, all obligations are designed in a way to strongly consider investment risks when designing access rights of co-investors and access seekers. This applies to the internal access rights and their pricing, which may take into account the timing and extent of the co-investors' participation in the investment. Access for third parties not participating in the co-investment can be even less favourable. In addition to considering investment risk, access seekers may be obliged to pay a risk premium to maintain incentives to participate in the co-investment. Furthermore, in the initial phase of deploying new infrastructure, third parties do not have to be granted access at all, if the old network still offers access. Only through the mechanism of adaption do co-investors have to grant access to access seekers not involved in the co-investment after a period of exclusivity.

The regulatory framework applicable to co-investment thus enables access models that not only give the infrastructure investors a head start, but also take much greater account of investment risk. This allows for intensive differentiation between co-investors and access seekers according to the individual investment risk assumed.

V. Conclusion

After all, what remains for co-investment under European law? On the one hand, the EECC contains very specific rules for considering co-investments when applying the general regulatory framework. On the other, Art. 76 EECC provides for a regulatory exemption for co-investments that meet certain conditions. These conditions have been criticized in the economic literature as being too similar to access

regulation and not a true co-investment approach (Briglauer and Vogelsang 2017, p. 145; Briglauer et al. 2017, p. 952; Vogelsang 2019, p. 4).[40]

Considering the limited applicability of Art. 76 EECC, the scope of the conditions could be appropriate, however. The regulatory waiver only applies to FTTH/B-networks of SMP-undertakings. It is, therefore, only relevant in markets with regulated access to this type of network. Only in markets where NRAs apply a regulatory approach that is more intense than the conditions in Art. 76 EECC, will it provide regulatory relief. Considering that most NRAs seek to ease access and (cost-based) price regulation to fibre-based networks in general to incentivise investment, this is unlikely to be the case in broadly defined nationwide markets in most member states. In the case of a more regionalized market definition, however, individual local markets with low competitive pressure could surface where only one – or even no – network could be economically viable (e.g. rural markets). In such markets, NRAs could still impose intensive regulatory obligations, which could be effectively waivered by Art. 76 EECC and replaced by the conditions applicable to co-investments. In such markets, co-investments are a useful instrument to incentivise investment and foster infrastructure competition if properly designed. Due to limited competitive pressure, however, co-investments could also lead to collusion and more concentration which would be remedied by the regulatory conditions of Art. 76 EECC. Thus, Art. 76 EECC could be a useful instrument to incentivise co-investment in more rural regions with low infrastructure-based competition and demand uncertainty as well as low economies of scale and scope, which make the sustainable building of (competing) FTTB/H-networks difficult.

In these markets, the SMP-undertaking not only has the option to build its new network cooperatively with one or more partners but can also opt for one-way access. In that case, initial "co-investors" who, for example conclude long-time contracts or purchase capacity irrespective of their own market success before building the network, must be granted the same access conditions as the SMP-undertaking's retail business. For late co-investors and mere access seekers that do not want to join the co-investment, Art. 76 EECC provides for a detailed differentiation according to the individual investment risk assumed.

The complete regulatory framework for co-investment under European regulatory law thus consists of three levels depending on the competitive environment. Co-investments concluded on a purely voluntary basis in markets that already tend towards effective competition will not be regulated. They are subject only to the restrictions of general competition law. In regulated markets with lesser competition problems, where NRAs apply softer regulation to FTTH/B Networks to incentivise investment, Art. 76 EECC does not provide an incentive for co-investment. Market-driven co-investments concluded on

[40] The EECC itself also considers the effect of co-investment on the market analysis as the primary incentive for concluding such agreements, cf. Rec. 170 EECC.

such markets may influence the general regulatory process and must be considered accordingly by NRAs. Only in strongly regulated (local) markets with severe competition problems and limited incentive for investment, Art. 76 EECC has the potential to provide effective regulatory relief from stricter regulatory obligations applied in such markets and may serve as an incentive to co-invest. In the case of singular investments, it can be a basis for an access regime that distinguishes between different groups of co-investors and access seekers according to the investment risk assumed through the access agreement.

References

Aimene, Louise; Lebourges, Marc; Liang, Julienne (2021): Estimating the impact of co-investment on Fiber to the Home adoption and competition. *Telecommunications Policy* 45, Article 102139.

Autoritá Garante della Concorrenza e del Mercato (AGCM) (2018): Flash fiber: Telecom and Fastweb's engagement ensure greater infrastructural competition and more efficency. Available online at https://en.agcm.it/en/media/detail?id=36440180-135e-44f3-88f0-d7f221b88aae, checked on 20.02.2023.

Autorité de Régulation des Communications Électroniques et des Postes (ARCEP) (2009), Décision of 22.12.2009, case number 2009-1106.

Autorité de Régulation des Communications Électroniques et des Postes (ARCEP) (2010), Décision of 14.12.2010, case number 2010-1312.

Balmer, Roberto (2014): Geographic regulation and cooperative investment in next generation broadband networks. Rio de Janeiro. Available online at http://hdl.handle.net/10419/106889, checked on 20.02.2023.

Berkeley Research Group (2017): Co-Investment and commercial offers. Available online at https://www.thinkbrg.com/newsroom-publications-coinvestment-commercial-offers.html, checked on 20.02.2023.

Bourreau, Marc; Cambini, Carlo; Hoernig, Steffen (2018): Cooperative Investment, Access, and Uncertainty. *Int. J. Ind. Organ.* 56, pp. 78–106.

Bourreau, Marc; Cambini, Carlo; Hoernig, Steffen; Vogelsang, Ingo (2020a): Fiber investment and access under uncertainty: long-term contracts, risk premia, and access options. *J. Regul. Econ.* 57 (2), pp. 105–117.

Bourreau, Marc; Cambini, Carlo; Hoernig, Steffen; Vogelsang, Ingo (2021): Co-investment, uncertainty, and opportunism: ex-Ante and ex-Post remedies. *Inf. Econ. Policy* 54, Article 100913.

Bourreau, Marc; Hoernig, Steffen; Maxwell, Winston (2020b): Implementing Co-Investment and Network Sharing. Brüssel. Available online at https://cerre.eu/publications/telecom-co-investment-network-sharing-study/, checked on 20.02.2023.

Briglauer, Wolfgang; Cambini, Carlo (2017): The Role of Regulation in Incentivizing Investment in New Communications Infrastructure. Available online at ftp.zew.de/pub/zew-docs/gutachten/BriglauerCambiniDeutscheTelekomApril2017.pdf, checked on 20.02.2023.

Briglauer, Wolfgang; Cambini, Carlo; Fetzer, Thomas; Hüschelrath, Kai (2017): The European Electronic Communications Code: A critical appraisal with a focus on incentivizing investment in next generation broadband networks. *Telecommunications Policy* 41, pp. 948–961.

Briglauer, Wolfgang; Vogelsang, Ingo (2017): A regulatory roadmap to incentivize investment in new high-speed broadband networks. *Communications & Strategies* 106 (2), pp. 143–160.

Bundeskartellamt (BKartA) (2019a), Beschluss of 05.12.2019, case number B7-21/18.

Bundeskartellamt (BKartA) (2019b), Beschluss of 30.12.2019, case number B7-21/18.

Cambini, Carlo; Silvestri, Virginia (2012): Technology investment and alternative regulatory regimes with demand uncertainty. *Inf. Econ. Policy* 24, pp. 212–230.

Cambini, Carlo; Silvestri, Virginia (2013): Investment sharing in broadband networks. In *Telecommunications Policy* 37, pp. 861–878.

de Streel, Alexandre; Hocepied, Christian (2019): The Regulation of Electronic Communications Networks and Services. In Laurent Garzaniti, Matthew O'Regan, Alexandre de Streel, Peggy Valcke (Eds.): Electronic Communications, Audiovisual Services and the Internet. EU Competition Law & Regulation. 4. Edition. London: Sweet & Maxwell, pp. 25–123.

European Commission (2016): Proposal for a Directive of the European Parliament and of the Council establishing the European Electronic Communications Code (Recast) (COM(2016) 590).

European Commission (2018): Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services OJ C 159 of 07. 05. 2018, p. 1 – 15

European Commission (2020): Recommendation (EU) 2020/2245 of 18 December 2020 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive (EU) 2018/1972 of the European Parliament and of the Council establishing the European Electronic Communications Code, OJ L 439, 29.12.2020, p. 23–31.

European Parliament and the Council (2022): Decision (EU) 2022/2481 of 14 December 2022 establishing the Digital Decade Policy Programme 2030, OJ L 323, 19.12.2022, p. 4–26.

European Parliamentary Research Service (2018): Briefing: EU electronic communications code and co-investment. Available online at http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/614693/EPRS_BRI(2018)614693_EN.pdf, checked on 20.02.2023.

Body of European Regulators for Electronic Communications (BEREC) (2012): Report on Co-investment and SMP in NGA networks (BoR (12) 41).

Body of European Regulators for Electronic Communications (BEREC) (2020): Guidelines to foster the consistent application of the conditions and criteria for assessing new very high capacity network elements (Article 76 (1) and Annex IV EECC) (BoR (20) 232).

Ilic, Dragan; Neumann, Karl-Heinz; Plückebaum, Thomas (2009): The Economics of Next Generation Access - Addendum. WIK Consult. Available online at https://www.wik.org/uploads/media/Ecta_Study_Addendum_2009.pdf, checked on 20.02.2023.

Inderst, Roman; Peitz, Martin (2012a): Market Asymmetries and Investments in Next Generation Access Networks. *Rev. Netw. Econ.* 11 (1), pp. 1–25.

Inderst, Roman; Peitz, Martin (2012b): Network investment, access and competition. *Telecommunications Policy* 36, pp. 407–418.

Inderst, Roman; Peitz, Martin (2014): Investment under uncertainty and regulation of new access networks. *Inf. Econ. Policy* 26, pp. 28–41.

Krämer, Jan; Schnurr, Daniel (2014): A unified framework for open access regulation of telecommunications infrastructure: Review of the economic literature and policy guidelines. *Telecommunications Policy* 38 (11), pp. 1160–1179.

Krämer, Jan; Vogelsang, Ingo (2016): Co-Investments and Tacit Collusion in Regulated Network Industries: Experimental Evidence. *Rev. Netw. Econ.* 15, pp. 35–61.

Nitsche, Rainer; Wiethaus, Lars (2011): Access regulation and investment in next generation networks — A ranking of regulatory regimes. *Int. J. Ind. Organ.* 29 (2), pp. 263–272.

Plückebaum, Thomas; Ockenfels, Martin (2020): Kosten und andere Hemmnisse der Migration von Kupfer- auf Glasfasernetze. WIK Diskussionsbeitrag, Bad Honnef. Available online at https://www.wik.org/uploads/media/WIK_Diskussionsbeitrag_Nr_457_01.pdf, checked on 20.02.2023.

Tenbrock, Sebastian (2013): Der Glasfaserausbau in Deutschland. Eine empirische Untersuchung der Ausgestaltungsformen und Kooperationsvarianten. Aachen: Shaker.

van Dujvenvoorde, Gera P. (2020): Towards Implementation of the European Union Telecom Code: Ex Ante Reflections. *C.T.L.R.* 26, pp. 205–215.

Vogelsang, Ingo (2019): Has Europe missed the endgame of telecommunications policy? *Telecommunications Policy* 43, pp. 1–10.

Webb, Malcolm (2015): Accelerating Broadband Deployment through Network Sharing and Co-investment. GSR discussion paper. International Telecommunication Union (ITU). Available online at https://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2015/Discussion_papers_and_Presentations/Discussionpaper_networksharing.pdf, checked on 20.02.2023.