

# Economic Analysis of the FiberCop Co-investment Project

## FINAL REPORT

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# Executive Summary

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Despite a high Next Generation Access (NGA) coverage of 92.7% of households, Italy lags behind in Very High Capacity Network (VHCN) roll out with a coverage of 33.7% in mid-2020 according to the Digital Agenda Scoreboard. There has been government intervention in “white areas”, i.e. areas where private parties would not consider rolling out fiber otherwise, while in other areas two companies - FiberCop (in which Flash Fiber was incorporated into) and Open Fiber – are in the process of fiber deployment. The FiberCop project was created by TIM, KKR Infrastructure, and Fastweb to build out and operate secondary fiber networks in 2,578 municipalities in “grey and black” areas in Italy (where private incentives are expected to be sufficient to roll out either one or multiple fiber networks, respectively).

Fiber deployment is socially desirable and contributes to economic growth and green objectives due to lower energy needs than prior technologies. However, at the same time, it is costly and risky, which can lead to financial constraints limiting the speed of a rollout or to monopolisation in locations, where financial risks prevent private investment into more than one infrastructure.

To increase the speed and coverage of fiber deployment while strengthening retail competition, the European Electronic Communications Code (EECC) favours co-investment projects that allow multiple companies to invest jointly in fiber networks. On one hand, this allows the sharing of costs and demand risks associated with such investment. On the other hand, it also guarantees long-term competition between multiple providers on the networks built. The precise details of the co-investment project and specificities of deployment in a country influence the trade-off between (i) lowering deployment cost and accelerating rollout and (ii) the potential risk of reducing downstream competition either between networks or on networks.

In this report, which was written with the information available at the time of publishing, we assess the features of the FiberCop joint venture based on the experience of fiber rollout in different European countries and the competition concerns that have been raised in the context of co-investment projects. We show that Article 76 EECC criteria in combination with the Body of European Regulators for Electronic Communications (BEREC) guidelines, are sufficient safeguards to address all of the competition concerns that have been raised. An analysis of the FiberCop project shows that the project both adopts characteristics that are necessary for a fast rollout and satisfies all the competition safeguards conceived in Article 76 EECC and the BEREC guidelines.

To identify features of successful rollouts of fiber, we compare the experience in several countries. This comparison provides the following lessons for designing fiber rollout schemes:

- Whether a co-investment project results in a fast fiber rollout depends on the incentive structure it creates. Successful co-investment projects offer terms which are adapted to the profile of potential co-investors, in the specific market context of the country in which they are implemented – with passive access rights appearing to be better suited to larger co-

investors, while active services are more appropriate for new entrants and smaller co-investors because they stimulate their participation more strongly.

- Co-investment schemes that provide passive access to co-investors seem to have a more positive impact on the speed and extent of fiber rollout, particularly in Spain and Portugal, which are success stories in this respect.
- Countries that adopted a 'light touch' approach to access regulation appear to have experienced more rapid fiber deployment with co-investment projects (this again holds for Spain and Portugal).
- Having local utilities or a telecom incumbent involved in a fiber rollout project can reduce the risk and cost because of their access to existing ducts and civil infrastructure.
- Regulatory hold-up must be avoided, i.e. there need to be guarantees that the regulatory authorities do not effectively change the regulations to disfavour investors once the fiber network has been rolled out.

We then compare the competition concerns that have been raised by competition authorities for various fiber rollout co-investment projects across different European jurisdictions. In particular, we find that competition authorities have raised the following potential concerns:

- Reduced infrastructure competition because relatively large operators share a network instead of rolling-out their own competing networks. Whether this can be a concern depends on how many networks could be rolled out in the counterfactual.
- Reduced competition on the shared network due to wholesale pricing terms.
- Reduced infrastructure competition on the primary network due to the incentives set by the co-investment contract for the secondary network.
- Risk of an abuse of dominance by the operator with significant market power (SMP) position because of a hold-up of co-investors after they have committed to the investment. This would include not rolling out the network as quickly as co-investors want because the operator with SMP has alternative infrastructure to reach the customers.

While these concerns can be legitimate, they do not always apply. Whether concerns need to be addressed or not from a competition perspective very much depends on the concrete market characteristics and the particular rules of the co-investment project. However, we show that the requirements of Article 76 EECC for co-investment offers takes these risks into account and creates both the investment incentives necessary to rollout a fiber network and requires the correct safeguards against potential competition concerns.

TIM's co-investment offer meets all the requirements from Article 76 EECC. It should therefore be expected to foster fiber rollout while safeguarding competition. The following characteristics are deemed critical for the application of Article 76 EECC, aimed at achieving a rapid rollout, and are met by TIM's co-investment offer:

- Only investments by operators with SMP in a new very high capacity network are covered by Article 76 EECC and generate relief from ex-ante regulation. The relief from ex-ante regulation guards against regulatory hold-up, which would lead to firms not undertaking an investment because they know their return will be reduced by regulation after the investment is sunk.

*TIM, as an operator with SMP in the Italian market, has presented a co-investment offer for the deployment of a new very high-capacity fiber optic “point-to-point” secondary access network infrastructure.*

- Participation in the co-investment must be as broad as possible, such as to allow the co-investment project access to the maximum additional funding, making it possible to rollout fiber more quickly and in additional areas. Faster rollout is made possible by co-investors assuming part of the demand risk otherwise be assumed by the primary investor and thus relaxing constraints on financing that would slow a rollout.

*TIM’s co-investment offer achieves this by offering numerous co-investment options, requiring co-investors to pledge future revenues (through a commitment to purchase a minimum number of lines on the network), or by providing additional funding upfront (through the purchase of indefeasible rights of use (IRUs) on splitters).*

- Article 76 EECC’s Equal Treatment provision on “fair, reasonable and non-discriminatory terms allowing access to the full capacity of the network” guarantees that competition on the network is preserved.

*Competition is preserved since FiberCop will treat all co-investors equally conditional on the time they join the project, thereby creating a level playing field among co-investors. The terms of TIM’s co-investment offer the same conditions for all co-investors making a similar commitment at the same time. TIM’s co-investment offer does foresee that co-investors making different commitments or participating at different times will access the network under different terms. These variations are in line with the Annex IV EECC, letter c (“A premium increasing over time shall be considered to be justified for commitments made at later stages and for new co-investors entering the co-investment after the commencement of the project, to reflect diminishing risks and to counteract any incentive to withhold capital in the earlier stages”) and BEREK guidelines. Such differentiation reflects the lower risk that later co-investors assume when they make a contribution at a time when the infrastructure has already been partly rolled out and some demand risk has been resolved.*

- To maximise competition on the network, Article 76 EECC requires further that the co-investment offer is open during the network’s lifetime and flexible as to the value and timing of their investments (allowing co-investors to adjust the value and timing of their investments as well as increasing their participation in future). This makes it possible for a wide range of operators to participate, including operators of different sizes, with different business models, as well as future entrants. It also provides operators not co-investing the option to become active on the network in the future.

*TIM’s co-investment offer complies with this condition because it is open to any operator seeking access to the network over its expected commercial lifetime. In addition, it has broad*

*flexibility in the sense that it allows operators to tailor the nature, timing, and scope of their participation to their individual needs using a ‘menu’ of options including minimum volumes of lines commitments or the acquisition of IRUs (which avoids committing to a specific number of lines in advance).*

- As a competition safeguard, Article 76 EEC requires co-investors to share in some form of control rights, referred to as “*specific rights of a structural character*”.

*TIM’s co-investment project offers such structural rights. TIM’s co-investment offer include the possibility to acquire IRU on the splitter, which is a structural model of investment. The minimum guarantee option is a fixed payment for a specified amount of the network capacity that can be used, thereby resulting in marginal of zero up to the committed volumes. This is equivalent to ownership of a share of capacity of the network.*

*Also, TIM’s co-investment offer grants co-investors co-determination rights in the rollout of the infrastructure, to be exercised in the context of a technical committee of co-investors. Co-investors will be able to submit their proposals to be discussed in the committee, in particular with respect to the geographical areas that should be priority targets for the rollout.*

The likely effect of TIM’s co-investment offer on fiber rollout and competition in Italy is therefore positive. In light of the current landscape, it can be expected that the FiberCop project will significantly increase the level of competition both at wholesale and retail level, as already observed in other EU countries (particularly in France, Spain, and Portugal) that have applied co-investment models on a large scale. At the wholesale level, increased competition will arise already by the mere virtue of FiberCop’s existence as a co-investment vehicle and as an alternative infrastructure provider to existing operators, resulting in lower wholesale prices and faster rollout of fiber.

Smaller players may grow sufficiently to have an incentive to invest in their own primary networks, which would further enhance primary network competition. At the retail level, FiberCop will also substantially improve the competitive environment due to the design of the co-investment terms, including maximal participation. Co-investors will have the strongest possible incentive to compete aggressively given their effectively zero marginal costs up to the committed volumes.

Overall, the FiberCop project is therefore designed around those attributes that have been shown to have substantial positive effects on the speed of fiber deployment while preserving maximal competition. The FiberCop project thus seems likely to materially increase fiber rollout speed in Italy and, at the same time, to preserve wholesale and retail competition.

# I. Introduction and Background

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1. Fiber<sup>1</sup> deployment is socially desirable, but at the same time costly and risky. Private incentives are not always sufficient to ensure fast and wide rollouts. Even when they are, the market does not always support multiple parallel infrastructure. In this context, the relevant policy question is how to foster fast fiber deployment while at the same time preserving or strengthening wholesale and retail competition. Allowing co-investment in fiber networks therefore involves a potential trade-off between (i) lowering deployment costs and accelerating rollout and (ii) running the risk of reducing downstream competition. The correct balance depends on the specificities of deployment in the country.
2. In this report, written with the information available at the time of drafting, we first discuss the fundamental economics underlying the need and importance of co-investment projects in high fixed-cost infrastructure industries. We then provide an overview of co-investment projects in other European countries and make an assessment of the characteristics which are likely to be important for a successful and faster fiber rollout. We also assess the effect of co-investment projects on competition, both from a theoretical economic viewpoint as well as based on precedent interventions by Competition Authorities. Finally, we tie these insights together to assess the FiberCop project and its likely impact on competition and fiber rollout in Italy.
3. In the remainder of this section, we provide – as relevant background to the FiberCop project – a brief description of the progress of digitisation and the status of fiber deployment in Italy.
4. In Section II of the report, we then discuss the drivers for the potential efficiency gains from co-investment, both from a theoretical perspective and on the basis of international comparisons. It analyses the role of market context, the interplay with sectoral regulation, and the main features of co-investment projects (design and implementation).
5. Section III discusses the effect of co-investment projects on competition. It reviews the concerns raised by European competition authorities, and the remedies that have been offered to alleviate them, and shows that the restrictions laid out in Article 76 EEC are sufficient to address such concerns.<sup>2</sup>
6. Section IV describes the main features of FiberCop and TIM's co-investment project, and discusses its likely effect on fiber rollout and competition in Italy in light of the conclusions from Section II and III. Finally, Section V concludes.

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<sup>1</sup> In this report “fiber” rollout (or deployment) refers to the FTTH network (fiber-to-the-home, also sometimes called FTTB fiber-to-the-premise), or horizontal FTTB network (fiber-to-the-building) if it is not possible to get into the building. Both FTTH and FTTB cover the part of the network after the cabinet and hence relates to secondary networks instead of the primary FTTC (fiber-to-the-cabinet) network, which is before splitting into individual cables.

<sup>2</sup> DIRECTIVE (EU) 2018/1972 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 establishing the European Electronic Communications Code.



## A. The Progress of Digitalisation in Italy

7. The European Commission monitors the EU Member States' progress in digitalization and publishes an annual report on the Digital Economy and Society Index (DESI). DESI captures in a single composite indicator several dimensions of digitalisation such as broadband coverage and take-up, digital skills of the population, use of Internet services, online presence of businesses and the development of digital public services.
8. In 2020, Italy received the fourth lowest overall DESI score of all EU countries. Since Italy's growth in the DESI between 2015 and 2020 was on par with the EU average, it has not been catching up, ranking 25<sup>th</sup>, 23<sup>rd</sup>, and 25<sup>th</sup> respectively in the years 2018, 2019, and 2020. Figure 1 shows that, on average, well-performing countries have also had high growth rates in the DESI scores, indicating why Italy has been outpaced in digital development by the other large EU economies. Italy's performance has been more in line with Eastern European EU members.

FIGURE 1: DIGITAL ECONOMY AND SOCIETY INDEX – EU MEMBER STATES' PROGRESS, 2015–2020



Source: European Commission, Digital Economy and Society Index (DESI) 2020 - Thematic chapters, Figure 1.

9. The connectivity component of the DESI score is also revealing, because connectivity is a prerequisite for the development of the population's usage and skills. It reflects coverage and take-up of different fixed and mobile technologies. In particular, the accessibility and take-up of future proof high speed access technologies will condition EU Member States' transition to a digital society. This is reflected in the objectives set by the European Union in the Gigabit Society Communication in particular, that sets the goal of providing access to connectivity offering at least 100 Mbps for all European households by 2025, upgradable to 1 Gbps.<sup>3</sup> The Commission has also set a strategic objective of Gigabit coverage

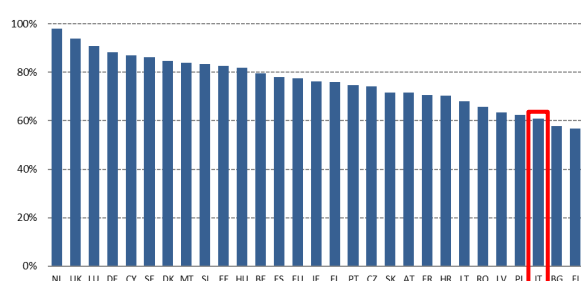
<sup>3</sup> European Commission (2016), "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society", <https://digital-strategy.ec.europa.eu/en/library/communication-connectivity-competitive-digital-single-market-towards-european-gigabit-society>, p. 8.



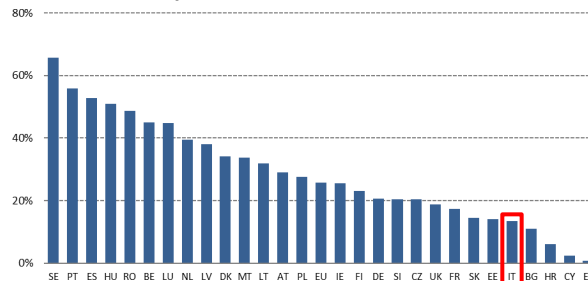
for all European households by 2030 in the Digital Compass Communication.<sup>4</sup> Italy has made the European Gigabit connectivity objectives more concrete in its recent communication “*Piano Italia a 1 Giga*”.<sup>5</sup>

10. While the 2020 DESI report highlights that Italy ranks high in mobile connectivity, for example receiving the third highest score among EU countries in terms of 5G readiness, it also shows that Italy is lagging behind in fixed very high speed connectivity.<sup>6</sup>
11. In terms of subscriptions, Italy ranks 26<sup>th</sup> out of 28 with only 61% of households taking up fixed broadband (see Figure 2). Figure 3 shows that the lag is particularly pronounced on ultrafast broadband connections; only 13% of Italian households take up fixed broadband of more than 100 Mbps, which is only half the EU average of 26%.<sup>7</sup>

**FIGURE 2: HOUSEHOLDS WITH A FIXED BROADBAND SUBSCRIPTION (% OF HOUSEHOLDS), 2019** **FIGURE 3: HOUSEHOLDS WITH A FIXED BROADBAND SUBSCRIPTION OF AT LEAST 100 MBPS (% OF HOUSEHOLDS), 2019**



Source: European Commission, Digital Economy and Society Index (DESI) 2020 - Thematic chapters, Figure 21.



Source: European Commission, Digital Economy And Society Index (Desi) 2020 - Thematic Chapters, Figure 23.

12. A potential driver for the low adoption of ultrafast broadband with speeds above 100 Mbps in Italy is the limited coverage of Very High Capacity Networks (VHCN), as we show in the following section. Italy lags behind other EU countries in the rollout of VHCN and is one of only two EU countries (along with Greece) that historically has not had a cable network that can make up for (some of) these shortfalls.

<sup>4</sup> European Commission (2021) “Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - 2030 Digital Compass: the European way for the Digital Decade”, [https://eur-lex.europa.eu/resource.html?uri=cellar:12e835e2-81af-11eb-9ac9-01aa75ed71a1.0001.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:12e835e2-81af-11eb-9ac9-01aa75ed71a1.0001.02/DOC_1&format=PDF), p. 6.

<sup>5</sup> Ministro per l'innovazione tecnologica e la transizione digitale (2021) “Piano “Italia a 1 Giga”, <https://d110erj175o600.cloudfront.net/wp-content/uploads/2021/08/07115430/consultazione.pdf>.

<sup>6</sup> In this report, we use the following definitions:

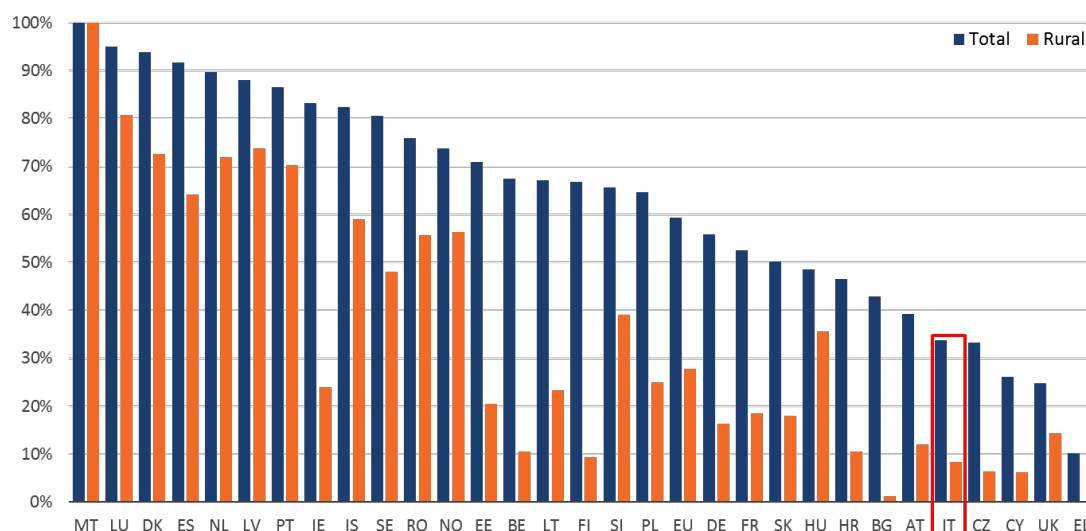
- Very high capacity network (VHCN) includes FTTH, FTTB, and next gen cable or DOCSIS 3.1 (in line with the definition from 2019 onwards in the European Commission, Digital Scoreboard, Fixed Very High Capacity Network (VHCN) coverage).
- Ultrafast broadband: access with download speed greater than 100Mbps, which is mainly FTTH, FTTB and next gen cable or DOCSIS 3.1. Also includes some VDSL/FTTC (with eventually Vectoring) when copper lines are short.
- Next Generation Access (NGA): access with download speed greater than 30Mbps, which is mainly FTTH, FTTB cable (both DOCSIS 3.0 and DOCSIS 3.1) and VDSL (Very high-speed Digital Subscriber Line)/FTTC.
- Fixed broadband includes all types of fixed access except analog.

<sup>7</sup> European Commission, “Shaping Europe’s digital future – Broadband Europe”.

## B. The Status of Fiber Deployment in Italy

13. In 2020, VHCN<sup>8</sup> were covering 33.7% of Italian households, exclusively through fiber (FTTH/FTTB). This compares with an EU-28 average of 59.3% households covered with either fiber (FTTH/FTTB) or upgraded cable (DOCSIS 3.1). In rural areas the disparity is even higher: with 8.4% coverage in Italy compared to an EU average of 27.8% (see Figure 4).

**FIGURE 4: FIXED VERY HIGH CAPACITY NETWORK (VHCN) COVERAGE (% OF HOUSEHOLDS), 2020**

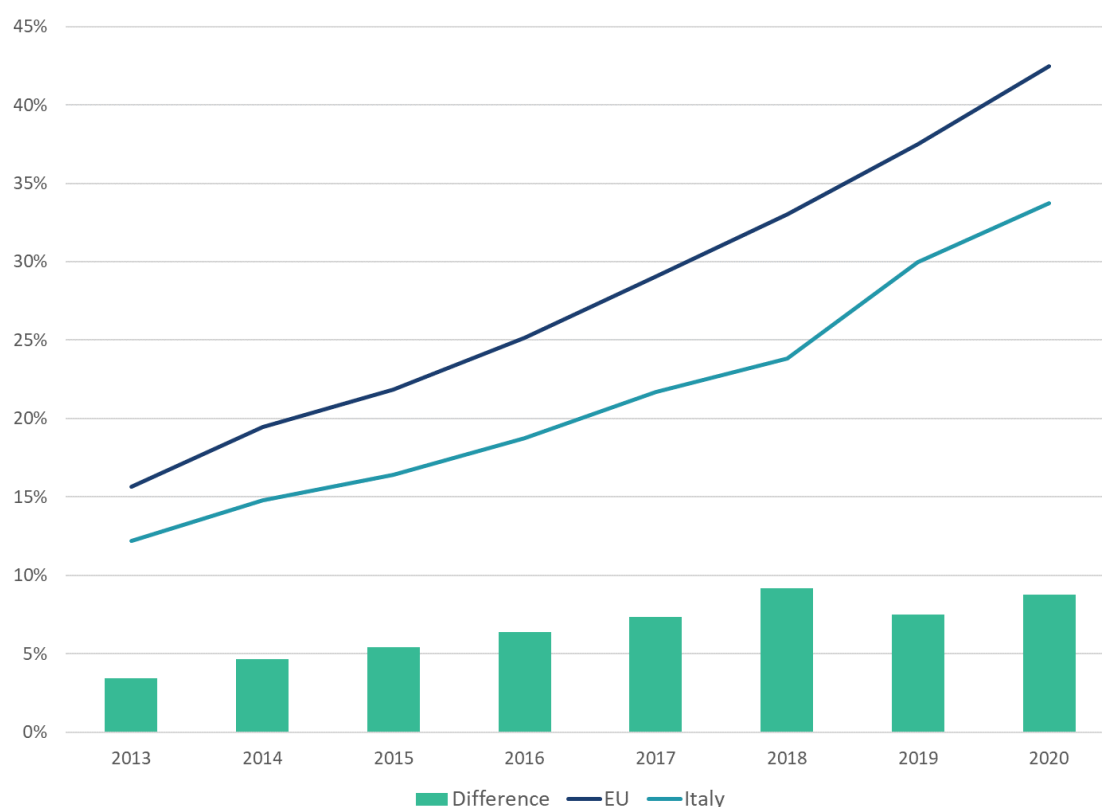


Notes and sources: Percentage of households covered by any fixed VHCN. The technologies considered are FTTH, FTTB, and Cable DOCSIS 3.1. Rural areas are defined as those with less than 100 people per km<sup>2</sup>. European Commission, Digital Scoreboard, Fixed Very High Capacity Network (VHCN) coverage.

14. The failure to close the gap between Italy and the EU average has two causes. First, due to a peculiar architecture (cabinets very close to the buildings) Italy has a high coverage of FTTC networks, which combined with the last-mile copper lines results in high NGA coverage (92.7%, above the EU average of 87.2%) able to satisfy current bandwidth demands. Second, the absence of a cable network in Italy implies that the entire VHCN coverage has to stem from FTTH/FTTB. Third fiber (FTTH) roll out itself occurred at a slower pace in Italy than in other EU countries (i.e. without taking DOCSIS 3.1 cable into account in the rest of the EU). From 2013 to 2018, the gap in fiber coverage increased nearly three-fold from 3.4% to 9.2%. After partially closing the gap in 2019 to 8%, it increased again in 2020 back to 9% (see Figure 5).

<sup>8</sup> As mentioned in footnote 6, the European Commission as part of the Commission's Digital Scoreboard, defines VHCN to include FTTH, FTTB, and Cable DOCSIS 3.1.

FIGURE 5: NATIONAL FTTP COVERAGE (% OF HOUSEHOLDS) IN ITALY AND THE EU, 2013-2020



Notes and sources: Percentage of households covered by FTTP. European Commission, Digital Scoreboard.

15. Fiber deployment efforts in Italy have so far been focused on two types of areas: (i) on the one end in very densely populated areas, like the city of Milan where roll out is the most profitable, and (ii) on the other end in “white areas”, at the initiative of public authorities. Regarding the latter, in the first phase of its Ultra-Broadband Strategic Plan adopted by the Italian government in 2015,<sup>9</sup> subsidies were provided for fiber roll out in areas that were considered to exhibit market failure. Contrary to “grey areas” or “black areas”, where sufficient incentives exist for at least one or even multiple private entities to engage in fiber rollout, the “white areas” requiring state subsidisation did not exhibit sufficient incentives to generate private entity investment in fiber rollout in a three-year horizon.<sup>10</sup> These underdeveloped areas are of significance for the Italian Ultra-Broadband Strategic Plan, as they cover approximately 25% of the Italian population.
16. In these areas, state aid is allowed in the form of different companies tendering to build networks at the lowest subsidy. The networks will be “*of public property and made available to all operators who wish to activate services for citizens and businesses*”.<sup>11</sup> Three public tenders have been organised

<sup>9</sup> Strategie Italiana Per La Banda Ultralarga, available at [https://www.mise.gov.it/images/stories/documenti/ITALIA\\_Strategia\\_BUL-Piano\\_di\\_investimenti\\_fin.pdf](https://www.mise.gov.it/images/stories/documenti/ITALIA_Strategia_BUL-Piano_di_investimenti_fin.pdf).

<sup>10</sup> Definition of fiber rollout potential for black, grey, and white areas in accordance with the classifications for NGA networks in the EC Guidelines: “Community Guidelines for the application of State aid rules in relation to rapid deployment of broadband networks”, OJ C 235 of 30.9.2009, Section 3.3, §65 onwards.

<sup>11</sup> Source: <https://bandaultralarga.italia.it/en/strategia-bul/governance/>.

between 2017 and 2019 for the rollout of fiber in white areas, all of which were awarded to Open Fiber. On 30 September 2021, work had been completed and positively tested in 1,467 municipalities, and begun in an additional 3,463 municipalities.<sup>12</sup>

17. Outside of white areas, fiber rollout has been mainly conducted by two companies:

- **Flash Fiber** was established as a joint venture between TIM (80%) and Fastweb (20%) in 2016, according to a closed co-investment model. The goal of Flash Fiber was to provide FTTH coverage to 3 million households in 29 major cities in Italy. Flash Fiber has made a significant contribution to fiber rollout in Italy, having completed its network in 2020. From its inception, its rollout plan was limited to the largest cities in Italy (i.e. very densely populated areas). The established Flash Fiber networks have been incorporated into the FiberCop co-investment project, enabling third parties to invest in and access the infrastructure.
- **Open Fiber** was established in 2015. It was originally founded as a 100% subsidiary of the state-owned electricity company Enel,<sup>13</sup> but has been converted into a 50/50 joint venture with state lender Cassa Depositi e Prestiti (CDP).<sup>14</sup> It gives network access as a wholesale-only operator. Open Fiber plans on rolling out fiber in white areas, as the winner of the public tenders, and in 271 municipalities in black areas.<sup>15</sup> Open Fiber currently has the largest coverage in Italy in black areas, whereas its rollout in white areas is lagging behind plan.

18. Both Flash Fiber and Open Fiber have thus far focused their investments in the largest black area cities. Leaving aside the problem existing in white areas (which still lack coverage due to delays in fiber rollout by Open Fiber), increasing the coverage of FTTH/FTTB in Italy requires further fiber rollout in the high-demand black area cities, as well as investments in the currently insufficiently addressed grey areas.

19. It is in this context that TIM, Fastweb, and KKR Infrastructure announced the creation of the FiberCop JV. FiberCop was founded as a co-investment vehicle to build out and to operate a secondary fiber network in 2,578 black and grey area municipalities, including the 29 cities covered by Flash Fiber. The project foresees that TIM and Flash Fiber transfer ownership of their existing secondary (copper and fiber) networks to the new entity, and that KKR infrastructure acquires a participation in the JV.

20. We discuss in Sections IV.B and IV.C in more detail how the co-investment terms of FiberCop facilitate a faster rollout of FTTH and how its conditions promote competition both between infrastructures (wholesale level) and on the infrastructure of FiberCop (retail level).

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<sup>12</sup> Source: <https://bandaultralarga.italia.it/documenti-e-dati>. We note, however, that despite the subsidies provided to Open Fiber, the deployment has been slow in white areas and has fallen significantly behind schedule.

<sup>13</sup> Enel Group, “Annual Report 2015”, available at [https://www.enel.com/content/dam/enel-com/documenti/investitori/informazioni-finanziarie/2015/annuali/en/annual-report\\_2015.pdf](https://www.enel.com/content/dam/enel-com/documenti/investitori/informazioni-finanziarie/2015/annuali/en/annual-report_2015.pdf), p. 416. Note that Enel is transferring its share of the joint venture to Macquarie, as notified to the EC. See here [https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:JOC\\_2021\\_414\\_R\\_0004&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:JOC_2021_414_R_0004&from=EN).

<sup>14</sup> Source: <https://openfiber.it/en/corporate/company/structure/>.

<sup>15</sup> Source: [https://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/ultra-fast\\_broadband\\_in\\_europe\\_-\\_francesco\\_nonno.pdf](https://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/ultra-fast_broadband_in_europe_-_francesco_nonno.pdf).

## II. Co-investment Projects and Fiber Rollout

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### A. The Effect of Co-investment on Investment Incentives

#### 1. Co-investment and the Financing of Large Infrastructure Projects

21. There are two main reasons why large-scale infrastructure projects like roads, airports, rail networks, and canal networks for inland shipping of raw materials have historically been the focus of public investment or regulatory intervention.
22. First, many of these projects have positive externalities, because they create spillover benefits which are not fully captured in the price charged for access to the infrastructure. The overall social value of such investments exceeds their value for private investors, and there would often be insufficient investment in infrastructure as a result.
23. In the case of fiber rollout, there is a public interest (i.e. externalities) to provide modern telecommunication infrastructure also in sparsely populated areas, where it is particularly costly to install.<sup>16</sup> In these cases a private company would not expect to be able to generate a sufficient return on investment to justify building out the infrastructure. However, with economic growth depending increasingly on such infrastructure and the social benefits of making rural and urban areas both participate in these growth opportunities, the social benefit to such investments exceeds the privately generated returns. In the rollout of fiber, such areas are labelled as “white areas”, where fiber deployment is at least partially financed by governments. This report does not address fiber rollout in these white areas.
24. The second reason for public intervention is that large infrastructure projects often require very large capital outlays in the face of uncertain future demand, where private companies would not be able to raise the scale of financing needed on the capital markets.<sup>17</sup> Private investment would therefore be made in smaller increments, and it commonly takes a longer time to complete deployment. The infrastructure building firms will generally have private know-how and market knowledge allowing them to better assess the likely demand for services on the network infrastructure built and the likely cash flows over the lifetime of the investment project. On the other hand, financing institutions that could provide the capital for such projects typically will not have the same knowledge about the market. There is therefore asymmetric information between a firm interested in building out the

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<sup>16</sup> Katz, R. (2012), “Impact of Broadband on the Economy”, ITU Report.

<sup>17</sup> Shortall, T., M. Bourreau, and W. Maxwell (2020), “Cooperation between Firms to Deploy Very High Capacity Networks”, CERRE Report.

infrastructure and the institution(s) providing the needed finance. Since demand is uncertain, such investments become risky due to the possibility that the firm might go bankrupt, and the provided finance is lost. This generally leads to some credit rationing, i.e. the available credit for the investor will be scaled to and limited by the own equity contribution to the project.

25. In the case of fiber, such financial constraints may hamper the speed and extent of a rollout even in areas where returns would in theory be expected to be high enough to justify private investment, i.e. grey areas and black areas. In these areas, fiber rollout may not be entirely prevented by financial constraints, but the speed of rollout may be greatly reduced because the investor can only generate financing for a smaller expansion project at any one point in time. As far as grey areas are concerned, that may also lead to lower overall coverage than from a societal viewpoint would be optimal.<sup>18</sup>
26. Governments have encouraged co-investment agreements<sup>19</sup> as a way to address such financial constraints.<sup>20</sup> The benefits of co-investment have been highlighted by the European Commission since at least 2010.<sup>21</sup> There are two ways in which co-investment agreements can increase the funds for the investment project at any point in time and thus increase the speed of infrastructure deployment.
27. First, co-investors can increase the overall own funds available to the investment project. This in turn allows the project to raise more funds from the capital markets because, overall, own funds protect lenders against default. Second, co-investment agreements can overcome the information asymmetry by pooling co-investors' industry knowledge. Indeed, the joint participation of several firms increases the confidence of potential lenders that demand will be high enough to sustain the investment.
28. In return for their participation in the project and the risk they assume, co-investors gain access to the infrastructure and contribute to shaping its deployment. While co-investing alongside other firms means that they will have to share (some of) the control over the investment, they may still benefit from gaining access to an infrastructure which has been deployed more efficiently and more rapidly.
29. For a co-investment agreement to generate such benefits and resolve the financial constraints facing private investors, it therefore has to make arrangements on the following dimensions:
  - Co-investors have to make a funding contribution to the project, thereby taking on part of the investment's risk.

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<sup>18</sup> Imagine the threshold for the investor to engage in a project is 5% expected return, below which a project becomes unattractive for the investor. A large infrastructure project which has a 5% return would then be implemented by that investor. Imagine, however, that the large infrastructure project could be split into three increments of equal size A, B, and C, with each increment exhibiting expected returns of 6%, 5%, and 4% respectively (on average, 5%). The private investor will engage in increment A and B, but not in increment C.

<sup>19</sup> Co-investment projects here are defined in the economic sense of two or more parties jointly investing into infrastructure, rather than each individual firm engaging in their own (potentially duplicative) infrastructure investments. As such, we draw conclusions regarding the economic incentives and issues of co-investment projects from a wide range of projects, not necessarily only those which would fall under the relevant Article 76 of the EEC for projects like FiberCop.

<sup>20</sup> European Electronic Communications Code, Directive 2018/1972, <https://eurlex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32018L1972&from=EN>.

<sup>21</sup> European Commission (2010) "Commission Recommendation of 20 September 2010 on regulated access to Next Generation Access Networks (NGA)".

- In return, the agreement needs to guarantee co-investors some access to the infrastructure at favourable terms of use, and to allow them to contribute to concrete decisions on the construction and maintenance of the infrastructure.
30. Note that such combination of contribution and rights for co-investors can be achieved through many different types of arrangements. In particular, a co-investor does not need to formally contribute equity and does not necessarily have to do so at the start of the project. From an economic perspective, a co-investor contributes to resolving the issue of financial constraints as long as it makes some funding contribution, takes on part of the investment risk, and has structural rights in the project.
  31. Co-investment agreements can then take many forms that will depend on the size of the project, the characteristics of potential available co-investors and the degree of asymmetry between co-investors.
  32. The simplest co-investment project would be for co-investors to contribute equity to the project and set common terms for accessing the infrastructure. This will typically take the form of a joint venture, where the co-investors each hold a share according to their equity participation and the joint venture sets the access terms for the infrastructure.
  33. Another form of upfront investment occurs where a co-investor might not take a formal equity stake in a joint venture but simply pays upfront for access to some part of the network's capacity. The co-investor then bears the risk of not being able to fill the proportion of the capacity bought and therefore bears part of the risk of the investment project. Financially this co-investment is then just like an equity instrument in a firm. Adding some control rights, for example about decision making where the network construction is prioritised or about network assurance, makes this essentially functionally equivalent to an equity participation in an economic sense.
  34. A third alternative is a co-investment participation that may not involve an upfront payment. However, a commitment to future payments to the project can also be interpreted, from an economic viewpoint, as being functionally equivalent to an equity participation. Essentially, the commitment to future payments (from a well-informed co-investor) reduces the risk of a liquidity problem in the future, thus making lending to the project less risky and hence increasing the financing that can be raised early on from the capital markets. Typically, such a commitment to future payments is combined with access to some network capacity, because the revenue commitment is justified by the expectation of future revenue from becoming an operator on the network.
  35. Co-investments that do not contribute upfront funding but are a commitment for future funding can be particularly useful for very large network rollout projects. Many of the potential operators on the network have superior information about demand they can generate, even if they may not have the liquidity to contribute meaningfully to upfront capital. When such an investment option exists, such operators can, however, secure income streams for the project in the future, thereby reducing financial rationing at the beginning of the project. Note that this is again effectively like an equity participation in an economic sense. The co-investor contributes to raising capital for the investment project overall and takes on the demand risk of winning customers to take services on the network for the capacity they acquire.
  36. Commitments to future payments in return for access to capacity thus has the advantage of enabling future operators without sufficient current liquidity for upfront funding to relax financial constraints



and share in part of the investment risk. This type of contracting mechanism was successful in the UK during the “Dash for Gas” in the 1990s, for example.<sup>22</sup> Combined Cycle Gas Turbine (CCGT) power plant investors reduced their investment risk by concluding long term fixed price gas contracts and long term electricity supply contracts to guarantee income streams over large periods of time to be able to raise money for a safe investment. The result of the “Dash for Gas” enormously increased the adoption and share of CCGT technology in electricity generation in the UK.

## 2. Co-investment and the Problem of Hold-Up

37. The economic literature provides two important insights into the drivers for successful co-investment projects. The first has to do with the regulatory context in which such projects are implemented, and the second with the inner workings of these agreements and the incentives they provide for the co-investors.

### The risk of regulatory hold-up

38. The overall impact of a co-investment agreement on incentives to invest must be assessed against the counterfactual that would be observed if no agreement took place. In the particular case of the fixed telecommunications industry, the counterfactual generally involves either no additional networks are rollout at all or some form of regulated access scheme, whereby the infrastructure owners must provide access at a regulated price. This is substantially different, for instance, from the mobile telecommunications industry, where the counterfactual potentially involves multiple operators investing in their own networks without any access obligations, reducing therefore the potential gains from co-investment arrangements.
39. The economic literature suggests that, when compared to alternative regulation methods such as access schemes, co-investment tends to boost fiber rollout in fixed telecom networks, promoting a faster deployment, wider coverage, and higher quality of the network.<sup>23</sup> Some studies look beyond investment incentives and show that co-investment agreements can also intensify competition downstream, leading to greater consumer surplus and social welfare than what would be achieved with traditional access regulation or “regulatory holidays”.<sup>24</sup>

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<sup>22</sup> See for example John Surrey (1999), “The UK as a European Laboratory for Electricity Deregulation”, *Energy & Environment*, Vol. 10, No. 2 (March 1999), pp. 147–155 (9 pages).

<sup>23</sup> Bourreau, M., S. Hoernig and W. Maxwell (2020), “Implementing Co-Investment and Network Sharing”, CERRE Report, May 2020, available at [https://cerre.eu/wp-content/uploads/2020/05/cerre\\_implementing\\_co-investment\\_and\\_network\\_sharing-26.05.2020\\_1.pdf](https://cerre.eu/wp-content/uploads/2020/05/cerre_implementing_co-investment_and_network_sharing-26.05.2020_1.pdf).

Bourreau, M., C. Cambini, and S. Hoernig (2016), “Cooperative Investment, Access, and Uncertainty”, EUI Working Papers.

Sand-Zantman, W. (2017), “Cooperation between Firms for Infrastructure”, Institut d’Economie Industrielle.

Cambini, C. (2020), “Incentivising Investment in Ultra-Fast Networks: The Role of Co-Investment Agreements”, Opinion Report.

<sup>24</sup> Lebourges, M. and J. Liang (2018), “Estimating the Impact of Co-Investment in Fiber to the Home Coverage”, 29th European Regional Conference of the International Telecommunications Society (ITS): “Towards a Digital Future: Turning Technology into Markets?”, Trento, Italy, 1<sup>st</sup>–4th August, 2018.

Bourreau, M., C. Cambini, and S. Hoernig (2016), “Cooperative Investment, Access, and Uncertainty”, EUI Working Papers.

40. The tendency of co-investment arrangements to outperform traditional access obligations in the rollout of network infrastructures is the result of at least two important effects. Firstly, access obligations necessarily decrease the incentives of operators to invest, by limiting the amount they can charge ex-post for access to the infrastructure. Secondly, given that demand for ultra-fast broadband connections is typically highly uncertain, access obligations promote opportunistic behaviour by operators, who are encouraged to wait for others to rollout fiber and decide to join the network only once demand is known (or more certain) without bearing the risk of the investor.
41. The regulatory framework therefore plays an important role in operators' decisions to participate in co-investment projects. Importantly, operators do not only consider what the framework is today, but also what they anticipate the framework will be in the future. In theory, there is a risk that sectoral regulators could adopt an approach which favours (co-)investment at early stages of the deployment, before implementing stricter access regulation once the deployment has been complete.
42. This risk, which results from the fact that investment decisions are irreversible while access regulation can be adjusted in the long run, is referred to in the economic literature as "regulatory hold-up". If regulators cannot commit in the long run to a given set of rules, it may result in lower (co-)investment than would otherwise be socially desirable.
43. Resolving the issue of regulatory hold-up is therefore a condition for the success of co-investment projects. As discussed below, the adoption in 2018 of a new regulatory framework for electronic communications<sup>25</sup> constitutes an important step in this direction.

### The incentive structure of the project

44. A further important insight from the economic literature relates to another issue of hold-up in the context of co-investment projects. Contrary to the issue described above, which involved a third party to the co-investment project, this second hold-up problem concerns the co-investors themselves, and specifically the entity in charge of deploying the infrastructure.
45. In the context of co-investment projects, the hold-up problem results from the fact that it is not always possible to write "complete contracts", i.e. contracts that would clearly specify the rights and obligations of each co-investor in all possible future scenarios. The deployment of large infrastructure entails significant uncertainty regarding implementation costs and timings, and the responsibilities of the different co-investors for additional costs or delays are not always clear. For example, the extent of the technical impediments that will be encountered when rolling out fiber in densely populated, historical city centres cannot be fully anticipated, and distinguishing genuine technical difficulties from a lack of effort is difficult.
46. Co-investors deal with these difficulties by including in their agreements minimum requirements and conflict resolution mechanisms, which aim at allocating control rights in case of unanticipated developments not covered by the contract. Such provisions do not, however, fully resolve the underlying hold-up risk.

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<sup>25</sup> European Electronic Communications Code, Directive 2018/1972,  
<https://eurlex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32018L1972&from=EN>.

47. Co-investors may have different views regarding the timing of investment decisions and the trade-off between rollout speed and costs. In the case of fiber, each co-investor will have an incentive for investments to be first directed at areas where it has a larger customer base. Additionally, the entity in charge of the deployment will have an incentive to minimise costs (as long as minimum deployment objectives are met), while co-investors providing financing have an incentive to maximise the speed of rollout.
48. Since contracts are incomplete, situations may arise in which a party can pursue its own objective while ‘holding up’ the commitment made by others. Such risk of hold-up is particularly important to consider when analysing the incentive structure that a co-investment project sets for the entity in charge of the deployment. In the case of fiber, these incentives relate to the overall speed of rollout as well as to the choice of the priority areas for deployment and to the technical characteristics of the network.
49. The design of co-investment projects is therefore an important driver for their potential success. Whether their implementation addresses this hold-up concern will determine both the level of participation of co-investors and the speed of rollout of the infrastructure.
50. In conclusion, while co-investment agreements have great potential to foster fiber rollout, their potential success depends on how potential hold-up issues are addressed in the regulatory environment and in the agreements themselves. In practice, these issues can be resolved in many different ways, and in order to better understand how specific features of a co-investment agreement may affect the successful deployment of a fiber network, it is therefore desirable to look at case-specific examples within the European Union.

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## B. Co-investment Projects in Europe and the Pace of Fiber Deployment

51. The notion of co-investment covers a wide range of projects having very different structures and pursuing different objectives. The market and regulatory context in which these projects have been implemented also differs dramatically across countries.
52. Over the past decade, there have been multiple fiber rollout co-investment projects across Europe. For our comparison, we focus on five countries where a significant number of projects have been implemented: France, Germany, Ireland, Portugal, and Spain.<sup>26</sup>
53. In terms of the speed of fiber rollout, Spain and Portugal stand out as clear success stories, with fiber coverage in these countries having consistently been well above the EU average between 2013 and 2019. France and Ireland are in a somewhat intermediate situation. In France, rollout has been much faster than on average in the EU, resulting in quick progress from an initially low level of coverage to exceeding the EU average after 2017. In Ireland, coverage is still lagging the EU average, but rollout

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<sup>26</sup> While our analysis focuses on countries outside of Italy, we also discuss relevant features of the co-investment project between TIM and Fastweb (Flash Fiber).

has been picking up at a rapid pace since the creation of the JV between Vodafone and incumbent utility ESB. Finally, Germany is the country in our sample where fiber rollout has been the slowest, with current coverage trailing the EU average by 28.7 percentage points.

54. Our aim is to determine to what extent the existence and design of co-investment projects in these countries have contributed to this outcome, and what specific features of these projects may have resulted in success or failure. Table 1 below provides an overview of the 20 projects identified in the five countries we are focussing on. For each project, it indicates (i) the type of co-investment model, (ii) the nature of the access rights (for co-investors), (iii) the identity of the co-investors, and (iv) the type of deployment area(s) (black, grey, and/or white). For each country, the table also provides information on the regulatory context and on the speed of fiber rollout.
55. The table shows only a few examples of co-investment projects taking the form of JV agreements, which mostly involve co-investments between telecom operators and utilities.<sup>27</sup> When incumbent telecom operators are involved, they tend to favour the use of one-way access models, while competitors to incumbent fixed telecom operators have typically used two-way access models. Seven projects included coverage of white areas (all combined with black/grey areas), while another six projects included both black and grey areas. Three projects only covered grey areas, all of which included the country's incumbent.

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<sup>27</sup> We note that while such co-investment agreements would not fall under Article 76 EECC, they do provide valuable insights into the economic motivation for co-investments more broadly.

TABLE 1: DETAILS OF IDENTIFIED FIBER DEPLOYMENT PROJECTS (SPAIN, PORTUGAL, IRELAND, GERMANY, AND FRANCE) <sup>28</sup>

Country	Project	Year	Model	Access Rights	Co-investors	Deployment Areas	Speed of Fiber Rollout	Country SMP Obligations
Spain	Telefónica – Orange	2018	One-way	Long term commitments in both regulated and unregulated areas for competitive prices in the latter	Telecom operators	Black/Grey	Although high compared to EU averages, in 2013 it was just 23% nationally and 3% rural coverage. Strong national increase in 2014 and clear strong growth rural coverage between 2016 and 2019.	Since 2016, Telefónica (incumbent) has to provide VULA and bitstream access to FTTH broadband in non-competitive zones (equivalent to around 30% of population according to the recent National Commission for Markets and Competition (CNMC) decision) at self-determined prices, which however remain subject to a margin squeeze test. Telefónica also has to provide access to its ducts and poles at cost-oriented prices. <sup>29</sup>
	MásMóvil – Vodafone	2018	Reciprocal	Separate deployment with reciprocal access (IRUs)	Telecom operators	Black/Grey/White		

<sup>28</sup> Note the scarcity of limited public information available on projects available to the public in some cases. Main difficulties refer to the information on type of fixed network provided to co-investors, details of one-way access, and precise area of fiber deployment.

<sup>29</sup> See <https://blog.cnmc.es/2016/02/25/la-cnmc-aprueba-la-regulacion-mayorista-de-los-mercados-de-banda-ancha/>, <https://blog.cnmc.es/2020/11/17/nueva-regulacion-para-los-mercados-de-la-fibra-consulta-publica/>, and [https://www.cnmc.es/sites/default/files/editor\\_contenidos/Notas%20de%20prensa/2021/20211015\\_NP\\_Mercados%20BA\\_CO\\_eng%20\(1\).pdf](https://www.cnmc.es/sites/default/files/editor_contenidos/Notas%20de%20prensa/2021/20211015_NP_Mercados%20BA_CO_eng%20(1).pdf).

Country	Project	Year	Model	Access Rights	Co-investors	Deployment Areas	Speed of Fiber Rollout	Country SMP Obligations
	Telefónica – Vodafone	2017	One-way	Wholesale access to Telefónica's FTTH network in exchange for Vodafone's committing to purchase minimum volumes for 5 years	Telecom operators	Black/Grey/White		
	MásMóvil – Orange	2016	Reciprocal	Separate deployment with reciprocal access: MásMóvil gets (bitstream) FTTH access (originally with limits), and additional co-invest of FTTH with asymmetric access via IRUs	Telecom operators	Black/Grey/White		
	Orange – Vodafone	2013	Reciprocal	Separate deployment with reciprocal access	Telecom operators	Black		
	Telefónica – Jazztel	2012	Reciprocal	Separate deployment with reciprocal access  Separate deployment of in-building fiber in main cities, and reciprocal access to in-building fibre in	Telecom operators	Black		

Country	Project	Year	Model	Access Rights	Co-investors	Deployment Areas	Speed of Fiber Rollout	Country SMP Obligations	
				1.5m premises built by the other party at commercial prices.					
Portugal	Vodafone – Optimus – DSTelecom	2019	Reciprocal	Information available	not	Telecom operators / wholesale providers	Black/Grey/White	High compared to EU averages; in 2013 it was already 42% nationally and 12% rural coverage. Strong increase up to 2019, and in particular since 2016 and in rural areas.	MEO has to give access to its ducts and poles at cost-oriented prices, as do other operators (obligation not only for SMP). Access to FTTH is unregulated. <sup>30</sup>
	Vodafone – Optimus	2017	Reciprocal	Separate deployment with reciprocal access	Telecom operators	Black/Grey/White			
	Vodafone – Portugal Telekom	2014	Reciprocal	Separate deployment with reciprocal access outside densely populated areas	Telecom operators	Grey			

<sup>30</sup> This access may reduce the costs of high-speed network construction by 80%, according to the Portuguese regulator ANACOM. See <https://www.anacom.pt/render.jsp?contentId=1392433>.



Country	Project	Year	Model	Access Rights	Co-investors	Deployment Areas	Speed of Fiber Rollout	Country SMP Obligations
	Vodafone – DStelecom	2014	Reciprocal	Separate deployment with reciprocal access	Telecom operators /wholesale provider	Black/Grey		
	Vodafone – Optimus	2010	Reciprocal	Separate deployment with reciprocal access	Telecom operators	Black		
Ireland	Vodafone – ESB	2015	JV	Joint deployment	Operator, local utility	Black	Low compared to EU averages; in 2013 was only 2% nationally and no rural coverage. Increase compared to 2013 is substantial, in particular since 2015–2016.	Eircom (incumbent) has to provide VULA and bitstream access, as well as access to its civil engineering infrastructure. While VULA over FTTH pricing is only subject to margin squeeze obligations, VULA based FTTC is requires cost-oriented pricing. <sup>31</sup>

<sup>31</sup> Eircom is required to give access to the following products, amongst others, by the ComReg (these obligations were revised at the end of 2018): unbundled access to the fiber loop (reasonable requests), shared access to the local loop, sub-loop unbundling and shared sub-loop unbundling, (cabinet) co-location, backhaul, and civil engineering infrastructure, including ducts where reasonable. Source: ComReg, “Market Review: Wholesale Local Access (WLA) provided at a Fixed Location. Wholesale Central Access (WCA) provided at a Fixed Location for Mass Market Products”, 19 November 2018, available at <https://www.comreg.ie/publication-download/3a-3b-market-analysis-decision>.

Country	Project	Year	Model	Access Rights	Co-investors	Deployment Areas	Speed of Fiber Rollout	Country SMP Obligations
Germany	Deutsche Telekom – EWE	2019	JV	Joint deployment	Operator, energy utility (also telecoms operator)	Black/Grey	Low compared to EU averages; in 2013 was only 4% nationally and 1% rural coverage. Small increase of only ca. 5 percentage points between 2013 and 2019 nationally and rural.	Currently, regulated local loop unbundling and Layer 2 Bitstream Access (L2 BSA) – developed by Deutsche Telekom (incumbent) – on the basis of cost orientation (LRIC, with a mark-up allowance for the L2 BSA product). FTTH bitstream is regulated in theory, but has never been enforced in practice due to limited deployment. Duct access is mandated only as an associated facility for the deployment of FTTC/VDSL, not for FTTH. The Bundesnetzagentur has recently presented a consultation document for a changed regulatory approach on FTTH. <sup>32</sup>
	Deutsche Telekom – Telefónica	2013	One-way	Upfront payment for discounts on monthly fee	Telecom operators	Black/Grey/White		

<sup>32</sup> See [https://www.bundesnetzagentur.de/SharedDocs/Downloads/EN/Areas/Telecommunications/Companies/MarketRegulation/ftth\\_fttb\\_rollout/consultation\\_document\\_ftth\\_fttb\\_rollout.pdf?blob=publicationFile&v=1](https://www.bundesnetzagentur.de/SharedDocs/Downloads/EN/Areas/Telecommunications/Companies/MarketRegulation/ftth_fttb_rollout/consultation_document_ftth_fttb_rollout.pdf?blob=publicationFile&v=1).

Country	Project	Year	Model	Access Rights	Co-investors	Deployment Areas	Speed of Fiber Rollout	Country SMP Obligations
	Deutsche Telekom – NetCologne	1Q 2021	One-way	Upfront payment for discounts on monthly fee	(Local) telecom operators	Black/Grey		
	Deutsche Telecom – various ANOs	2012	One-way	Upfront payment for a certain number of access lines in return for discounts on monthly fee <sup>33</sup>	(Local) telecom operators	Black/Grey/White		
France	Orange – Bouygues	2012	One-way	Co-financing only	Telecom operators	Black/Grey	Low compared to EU averages, in 2013 only 10% nationally and 1% rural coverage. Steady increase nationally (to 44% in 2019 and 53% in 2020) still below EU averages, and stronger rural increases since 2017 but remains low compared to EU average.	Orange (incumbent) has to provide access to its ducts and poles and copper unbundling local loops at cost-oriented prices.  In very dense areas access is mandated to other interested operators to in-building wiring at the base of the building (i.e. vertical access, not horizontal access). In less dense areas mandated access to infrastructure (FRAND access price).

<sup>33</sup> Source: <https://www.telekom.com/en/media/media-information/archive/fiber-to-the-home-dt-pushes-build-out-509334>.

Country	Project	Year	Model	Access Rights	Co-investors	Deployment Areas	Speed of Fiber Rollout	Country SMP Obligations
	Orange SFR	– 2011	Reciprocal	Separate deployment with reciprocal access outside densely populated areas (“zone AMII”): considered one-way access given geographical sharing (both were interested in the same area) <sup>34</sup>	Telecom operators	Grey		
	Orange Free	– 2011	One-way	Co-financing only where Free can invest in the number of lines needed to serve its subscribers	Telecom operators	Grey		
	SFR Bouygues	– 2010	One-way	Co-financing only with Bouygues paying 50% of the investment	Telecom operators	Black/Grey		

<sup>34</sup> Source : <http://www.iredic.fr/2011/11/29/laccord-orange-sfr-les-premices-du-deploiement-de-la-fibre-optique-au-dela-des-grandes-villes/>, [https://www.arcep.fr/fileadmin/reprise/communiqués/communiqués/2011/20111115\\_cp\\_sfr\\_orange\\_fibre.pdf](https://www.arcep.fr/fileadmin/reprise/communiqués/communiqués/2011/20111115_cp_sfr_orange_fibre.pdf).

**Notes and sources:** Most information on project, year, model, access rights, co-investors, and deployment areas comes from Cullen International, “Co-investment in fixed high-speed broadband network deployments”, CTTEU20200085, 1 October 2020. Additional information from <https://fibre.guide/deploiement/co-investissement> (France) and [https://www.grupomasmovil.com/wp-content/uploads/2018/02/180227\\_Global-agreement\\_MASMOVIL-ORANGE-FINAL.pdf](https://www.grupomasmovil.com/wp-content/uploads/2018/02/180227_Global-agreement_MASMOVIL-ORANGE-FINAL.pdf) (Spain). Speed of fiber rollout from European Commission, Broadband Coverage in Europe 2019, Final Dataset, available at [https://ec.europa.eu/newsroom/dae/document.cfm?doc\\_id=70032](https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=70032) .

56. In light of the heterogeneity of the existing projects and of the context in which they were implemented, it is difficult from the table alone to identify which specific attributes of co-investment projects imply a successful fiber rollout. In the remainder of this section, we use the theoretical framework developed in Section II.A to discuss the role and likely impact of different features on outcomes.
57. However, directly comparing the coverage levels across countries may not be considered the best approach. The Centre on Regulation in Europe (CERRE) suggests examining changes in coverage, per type of area, due to implementing co-investment agreements: *“As concerns outcomes in terms of coverage, it is difficult at this point in time to establish a causal link between co-investment regulation or voluntary agreements and fibre coverage. If any, a causal relation seems to go from lack of coverage to more rules and agreements, rather than from more agreements to higher national coverage. The reason for this is that in countries where coverage expanded rapidly, for example because of duct and pole-sharing obligations and little else in terms of regulatory intervention, such as in Portugal and Spain, these agreements were largely not deemed necessary and appeared voluntarily. On the other hand, countries such as France, which perceived a future potential lack of coverage, took the initiative to create such agreements. Thus, a reasonable evaluation of the effectiveness of measures to encourage co-investment would not be a comparison of absolute levels of coverage between countries, but a comparison of the change in the extent of coverage of different types of areas that occurred before and after the implementation of co-investment agreements (or in their absence)”* (emphasis added).<sup>35</sup>
58. Bearing this caveat in mind, this section discusses the main features of existing co-investment projects in order to identify possible ‘recipes for success’ in the various market and regulatory contexts. This covers (i) the design and implementation of the co-investment project (the type of co-investment model, and nature of the access rights to co-investors), (ii) the market context (including the identity of the co-investors and the deployment areas), and (iii) the regulatory context.

## 1. Co-investment Models

59. There are three main co-investment models formally recognized by European regulators, and the SMP operator proposing the co-investment pursuant to Article 76 EECR can choose to apply just one of the models or a combination of them (in other words, there is no obligation to include all of them in the same offer):<sup>36</sup>
- **Joint Venture (JV).** In the first model, a new company (JV) is set up and is responsible for the fiber rollout. Co-investors share ownership of the JV, and *“a common characteristic in the joint-venture*

<sup>35</sup> See Centre on Regulation in Europe (CERRE), “Implementing Co-investment and Network Sharing”, May 2020, pp. 46–47, available at [https://cerre.eu/wp-content/uploads/2020/05/cerre\\_implementing\\_co-investment\\_and\\_network\\_sharing-26.05.2020\\_1.pdf](https://cerre.eu/wp-content/uploads/2020/05/cerre_implementing_co-investment_and_network_sharing-26.05.2020_1.pdf).

<sup>36</sup> See paragraph 27 of the BEREC Guidelines to foster the consistent application of the conditions and criteria for assessing co-investments in new very high capacity network elements (Article 76 (1) and Annex IV EECR) – BoR(20)232, available at [https://berec.europa.eu/eng/document\\_register/subject\\_matter/berec/download/0/9727-berec-guidelines-to-foster-the-consistent-0.pdf](https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/9727-berec-guidelines-to-foster-the-consistent-0.pdf).

*model will normally be that the co-investors ... are entitled to participate in the decision-making process concerning new investments, upgrades of the network, entry of a new partner, etc”.*<sup>37</sup> There are relatively few examples of JVs in Europe, and only two JVs in the five countries discussed above in addition to Flash Fiber, a JV between TIM and Fastweb in Italy.

- **Separate deployment with two-way access (reciprocal access).** In the second model, there is a long-term risk sharing agreement where co-investors each deploy and operate their own network (usually in different areas), and grant each other reciprocal access. This model has been quite successful in Portugal and Spain, where most projects involving non-SMP operators are reciprocal, mostly in the form of symmetrical separate deployment agreements.
- **Co-financing with one-way access.** The third model also involves a long-term risk sharing agreement under which one co-investor builds the network and grants access to the other co-investor(s) contributing co-financing. In this model, the risk sharing occurs through long term commitments made by co-investors for a share of the capacity. In France for example, co-investment can be made by committing over increments of 5% of the lines to be covered by the network.<sup>38</sup> Spain and France were able to rollout fiber quickly employing this model, whereas Germany has been less successful at increasing FTTH coverage (however, the fiber rollout difficulties in Germany certainly should not be attributed to it following a one-way access model, but due to the reliance on FTTC and vectoring to increase available bandwidth).<sup>39</sup>

60. As explained in section II.A, any of the three co-investment models can be associated with a successful fiber rollout. The more telling feature of a co-investment model’s effect on investment relates to how it addresses the risk of hold-up.<sup>40</sup>
61. This risk is illustrated by the example of the project between SFR and Bouygues Telecom in France. Under this project, which follows a one-way access co-investment model, SFR was tasked with the deployment of fiber in certain municipalities in very densely populated areas (FTTH), while Bouygues provided co-financing. The contract between the two parties was signed in 2010 and expected to cover 2.9 million households in 22 municipalities.
62. In 2014, however, SFR was acquired by Altice Group, owner of the French cable operator Numericable. This acquisition dramatically changed SFR’s incentives to rollout fiber, as it could now rely on the existing cable network of Numericable for its retail offers. To obtain clearance for the merger from the French Competition Authority (FCA), Altice had to commit to respect SFR’s contractual obligation on fiber rollout instead of “holding up” Bouygues Telecom’s (co-)investment. Despite this requirement, in 2017 the FCA found that, following the Altice-SFR merger, fiber deployment had been much less than originally agreed upon, with only 42% of connections realised. Altice was fined for its failure to fulfil its commitments.<sup>41</sup>

<sup>37</sup> See paragraph 30 of BEREC Guidelines to foster the consistent application of the conditions and criteria for assessing co-investments in new very high capacity network elements (Article 76 (1) and Annex IV EECC) – BoR(20)232.

<sup>38</sup> Source: <https://fibre.guide/deploiement/co-investissement>.

<sup>39</sup> BEREC, “Challenges and drivers of NGA rollout and infrastructure competition”, BoR(16)171, p. 70.

<sup>40</sup> This risk of hold-up on infrastructure investment is further discussed in section III.A.3 below.

<sup>41</sup> Source: <https://www.autoritedelaconcurrence.fr/fr/decision/relative-au-respect-de-lengagement-figurant-dans-la-decision-autorisant-lacquisition-de>.



63. This example illustrates the importance of hold-up issues as a driver for success or failure of co-investment projects. Hold-up was not a concern as long as SFR and Bouygues Telecom both had incentives to rollout fiber quickly, but incentives changed when SFR was acquired by Altice. In this case, the contractual provisions on minimum requirements and conflict resolutions were not enough to prevent fiber rollout to slow down dramatically.
64. To address the issue of hold-up, the specific co-investment model is less relevant than the distinction in the BEREC guidelines<sup>42</sup> between two types of agreements: (i) agreements giving rights of a “structural nature” and (ii) other types of agreements.<sup>43</sup> Structural rights go beyond the mere rental of capacity and make it possible for co-investors to influence investment decisions and thus have safeguards over the pace and priority of the deployment when circumstances change.
65. If the co-investment model concerns a JV or a symmetrical two-way access contract, the BEREC guidelines state that the incentives are mostly aligned between the rollout entity and the other co-investors.<sup>44</sup>
66. If the co-investment model concerns a one-way access contract, making sure that the entity in charge of deploying fiber has the incentive to meet the jointly desirable rollout target is key to the success of the project. As the French example described above shows, such incentives can change over time, and the agreements should be designed in such a way that they can accommodate such changes.

## 2. Nature of the Access Rights for Co-investors

67. In return for its participation, a co-investor receives access to the shared infrastructure. The precise nature of the access rights may however differ from project to project.
68. On one end of the scale, a co-investor may get full unrestricted access to part of the passive capacity. This is typically the case in the context of the Spanish and Portuguese reciprocal access agreements, or in the French one-way access agreements. On the other end of the scale, a co-investor may secure better prices for active service. This was for example the case in the 2013 project in Germany between Deutsche Telekom and Telefónica. This project involved Deutsche Telekom upgrading 65%

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<sup>42</sup> Section 2.1.5 of BEREC Guidelines to foster the consistent application of the conditions and criteria for assessing co-investments in new very high capacity network elements (Article 76 (1) and Annex IV EECC) – BoR(20)232, available at [https://berec.europa.eu/eng/document\\_register/subject\\_matter/berec/download/0/9727-berec-guidelines-to-foster-the-consistent-0.pdf](https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/9727-berec-guidelines-to-foster-the-consistent-0.pdf).

<sup>43</sup> “[...] purchase agreements which constitute co-investments entail the acquisition of specific rights to capacity of a structural character, involving a degree of co-determination and enabling co-investors to compete effectively and sustainably in the long term in downstream markets in which the undertaking designated as having significant market power is active. By contrast, commercial access agreements that are limited to the rental of capacity do not give rise to such rights and therefore should not be considered to be co-investments”. EECC recital 198. The European Parliament and the Council adopted on 11 December 2018 directive (EU) 2018/1972 establishing the European Electronic Communications Code (the ‘EECC directive’), available at <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L1972&from=EN>.

<sup>44</sup> BEREC Guidelines, §§29–30.

of its network to FTTC and VDSL by 2016 and Telefónica migrating its Local Loop Unbundling (LLU) customer base to bitstream by 2019.<sup>45</sup>

69. Overall, fiber rollout appears to have been faster in countries with passive access schemes, such as Spain and Portugal. Conversely, in projects with active access schemes, such as those in Germany, fiber rollout has been less successful. However, this observation may simply amount to a correlation and not causation. In principle both active and passive schemes can incentivise fiber rollout equally well if carefully constructed to take incentives and hold-up problems into account.<sup>46</sup>
70. Regardless of the rollout speeds identified across the various projects, the degree of risk sharing, and incentives to invest, all types of agreements can contribute to the financing of the infrastructure. In particular, demand risk will be reduced from co-investment independently of whether the co-investor makes a commitment to passive or active access to the network.
71. In fact, the nature of the access rights appears to be related to the profile of the co-investors. On the one hand, passive access schemes are more attractive for operators with an existing customer base. For large operators, they make it possible to efficiently serve their retail customers. For medium sized operators, getting passive access to the secondary part of the network can make it profitable to rollout their own primary infrastructure, because in addition to serving their retail customers at lower costs due to owning their own primary infrastructure once rolled-out, they can then also sell active service on the wholesale market. On the other hand, discounted active access may foster participation of new entrants and smaller operators, giving them the possibility to gradually climb the ladder of investment.

### 3. Identity of the Co-investors

72. Another important feature of co-investment projects is the identity of the co-investors. Three different types of situations can be distinguished from the projects listed above:
- **Overlapping co-investment projects (with or without incumbent).** In countries like Spain or Portugal, several operators entered a series of bilateral co-investment projects, some of which involved the incumbent and some did not.
  - **Bilateral agreements with the incumbent.** In Germany and France, most co-investment projects are bilateral agreements between the incumbent and different co-investors (only one French project was between two telecom operators not including the incumbent).
  - **Non-telecom operator co-investors.** Finally, several EU countries have seen co-investment projects involving companies such as utilities together with telecom operators. For example, Ireland's state-owned electricity company ESB set up a JV with Vodafone. In Germany, Deutsche

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<sup>45</sup> Source: [https://www.bundeskartellamt.de/SharedDocs/Entscheidung/DE/Entscheidungen/Kartellverbot/2015/B7-46-13.pdf?\\_\\_blob=publicationFile&v=2](https://www.bundeskartellamt.de/SharedDocs/Entscheidung/DE/Entscheidungen/Kartellverbot/2015/B7-46-13.pdf?__blob=publicationFile&v=2).

<sup>46</sup> The reasons for slow deployment in Germany certainly go beyond the selection of the type of access scheme and have much to do with the regulatory access framework. However, the difficulties in fiber rollout in Germany are beyond the scope of this report. For detailed assessments with fiber rollout in Germany we recommend consulting the Bundesnetzagentur.

Telekom set up a JV with utility group EWE, although EWE has a telecoms operator as subsidiary.<sup>47</sup> While these are not co-investments under Article 76, they do provide helpful insights into the economic incentives for co-investments.

73. The involvement of local utilities – either by sole deployment, co-investments with the incumbent or co-investments with other operators – seems in some cases to have had a positive effect on fiber rollout. This is for example the case in Ireland, where the creation of the JV between ESB and Vodafone has been associated with an acceleration of fiber deployment. This may be explained by the fact that utilities can re-use their civil infrastructure for fiber deployment, making it significantly less risky and less cost-intensive.
74. In countries where co-investors are all telecom operators, fiber rollout is relying, at least in part, on the ducts and civil infrastructure controlled by the telecom incumbent (as owner of the copper network). Early regulation of duct access is therefore key to ensure that alternative operators will be able to successfully rollout fiber, and it is this early duct access regulation that is being credited for the successful rollout of fiber in Portugal.<sup>48</sup>

## 4. Deployment Areas

75. When it comes to the precise areas involved, this report does not cover specificities of white areas, i.e. those areas where public intervention is required since private parties would not be interested in deploying fiber. Our discussion focuses on areas where one or multiple private parties would be interested in rolling out fiber networks and we conclude that co-investment models can successfully be applied both in grey and black areas.
76. Many of the co-investment projects listed above cover grey areas. This observation is in line with expectations. Indeed, it is, by definition, economically not possible to have two networks rolled out in parallel in grey areas. In these areas, rollout can be relatively costly as they are less densely populated than black areas (where it may be possible to economically rollout multiple networks). This increases the benefit of risk and cost sharing, and therefore the incentive to participate in co-investment projects. From a competition perspective, co-investment in grey areas also reduces the risk of monopolization by guaranteeing competition on the network. When only one network is feasible in an area, an incumbent may be the only one in a position to rollout the network due to their large customer base and financial means. This is why regulators in different countries have particularly encouraged co-investment projects in grey areas. In France, in particular, the ARCEP adopted a dedicated (and mandatory) co-investment framework for “less densely populated areas”.<sup>49</sup>

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<sup>47</sup> Note that one of the owners of Open Fiber, Italy’s other fiber network, is electricity and gas distributor Enel.

<sup>48</sup> See CERRE, “Implementing Co-investment and Network Sharing”, May 2020, p. 69.

<sup>49</sup> See CERRE, “Implementing Co-investment and Network Sharing”, May 2020, p. 52.

See also ARCEP, “Décision de l’ARCEP précisant les modalités de l’accès aux lignes de communications électroniques à très haut débit en fibre optique sur l’ensemble du territoire à l’exception des zones très denses - Décision n° 2010-1312 en date du 14 décembre 2010”, December 2010, [https://www.arcep.fr/uploads/tx\\_gsavis/10-1312.pdf](https://www.arcep.fr/uploads/tx_gsavis/10-1312.pdf).

77. Co-investment also accelerates fiber rollout in black areas. In fact, many projects in Spain and Portugal, the two success stories in EU fiber rollout, cover black areas (sometimes in conjunction with grey areas). Other successful projects, like the JV between Vodafone and ESB in Ireland, are also focused on black areas. While more than one network is by definition possible in black areas, it is still the case that such rollout may not be feasible on a standalone basis for smaller operators, i.e. there is a low upper bound on the number of feasible competing networks. In most of these areas, infrastructure competition would usually not happen between more than two or three networks. As a result, co-investment can be an effective tool to foster rollout by allowing participation by smaller operators, while maintaining healthy wholesale competition.

## 5. Regulatory Context

78. Regulators may influence investment and fiber rollout by intervening upstream, through defining the conditions for access to and sharing of ducts and civil infrastructure, or by intervening downstream, through the regulation of wholesale offers for access to the different segments of the networks.
79. As explained in Section II.A, the economic literature emphasises the interplay between the effectiveness of co-investment projects and access regulation.<sup>50</sup> On the one hand, access regulation tends to reduce investment incentives since unregulated profits will naturally be higher than regulated profits.<sup>51</sup> At the same time, the absence of access regulation may foreclose non co-investors from the market as they would not be able to afford non-regulated prices. Regulators have therefore tried to strike the right balance between these different objectives.
80. Spain is an important example in this regard. Access regulation to the fiber network appears to have been limited. Although incumbent Telefónica has always been subject to duct and pole regulation, it had to provide virtual unbundled access to fiber broadband at flexible and margin-squeeze test subjected prices in non-competitive zones (VULA and bitstream access) only since 2016. In addition, there is favourable regulation of in-building cabling. In line with economic theory, this may have contributed to the success of co-investment projects and fiber rollout.
81. By contrast, Germany imposed heavier access regulation. The SMP operator Deutsche Telekom has to provide access to its ducts and broadband services including FTTH. Although regulated in theory, FTTH access has never been enforced due to its very limited deployment. Access regulation regarding local loop unbundling, however, was relaxed for VDSL+Vectoring. This increased profitability of legacy technology may have decreased incentives to invest in fiber and may at least partly explain why Germany lags behind the EU 28 average on fiber rollout.

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<sup>50</sup> Bourreau, M., S. Hoernig, and W. Maxwell (2020), “Implementing Co-Investment and Network Sharing”, CERRE Report, May 2020, available at [https://cerre.eu/wp-content/uploads/2020/05/cerre\\_implementing\\_co-investment\\_and\\_network\\_sharing-26.05.2020\\_1.pdf](https://cerre.eu/wp-content/uploads/2020/05/cerre_implementing_co-investment_and_network_sharing-26.05.2020_1.pdf).

<sup>51</sup> Bourreau, M., C. Cambini, and S. Hoernig (2016), “Cooperative Investment, Access, and Uncertainty”, EUI Working Papers.

## 6. Conclusion on Project Properties and Success of Fiber Rollout

82. Because of the heterogeneity of existing co-investment projects, and the very different market and regulatory contexts in which they have been implemented, it is not possible to make a one-to-one connection between specific features of each project and the success of a fiber rollout. However, some trends emerge from the comparison.
83. First, whether a co-investment project results in a fast fiber rollout depends on the incentive structure it sets for the entity in charge of the actual deployment. As the SFR/Bouygues Telecom project in France shows, contractual provisions will not always be sufficient to alleviate the risk of hold-up, and successful projects ensure that the incentives of all co-investors are aligned by granting some control (also in terms of certainty and transparency) to co-investors on future deployment decisions.
84. Second, successful projects offer terms which are adapted to the profile of potential co-investors, in the specific market context of the country in which they are implemented. For example, passive access rights appear to be better suited to larger co-investors, while active services will be more attractive to new entrants or smaller co-investors. As a result, the success of a project may depend on the suitability of the terms offered to the potential co-investors in the country.
85. Third, the involvement of local utilities or the telecom incumbent may reduce the risk and cost of fiber rollout, as these co-investors control the access to existing ducts and civil infrastructure. Successful projects with alternative operators seem to have occurred in countries where access to such upstream infrastructure was regulated early, as in Portugal.
86. Fourth, co-investment projects have been successful in grey areas, where only one network can be rolled out economically. However, the analysis of existing projects shows that many of them cover black areas (sometimes in conjunction with grey areas). In these black areas, infrastructure competition would usually not happen between more than two or three networks. Co-investment can be an effective tool to foster rollout by allowing participation by smaller operators, while maximising competition.
87. Finally, the regulatory context plays an important role in the success of co-investment projects. In particular, in countries that adopted a 'light touch' approach to access regulation, such as Spain, co-investment projects appear to have led to the rapid deployment of fiber.

# III. Co-investment Projects and Competition

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88. In this report we focus on co-investment projects that concern the secondary network, which means investment into the development of fiber networks for the last mile from the cabinet to the house or premises. We concentrate in this subsection on competition concerns that could arise specifically in the context of such co-investment projects.
89. Co-investment can raise three main types of competition issues. The first relates to its potential effect on competition between different networks. By making it possible for relatively large operators to share a single network rather than each rolling out their own, co-investment may in principle reduce the scope for infrastructure competition.<sup>52</sup> Whether such reduction should lead to concerns about the pace of rollout and on retail competition depends on several factors such as the number and timing of deployment of networks that would be rolled out in the counterfactual, the architecture of the shared network and the impact of allowing smaller operators to co-invest.
90. The second issue relates to competition on the shared network, which depends on the wholesale pricing terms. These terms determine the incentive of co-investors to compete and gain market share at the wholesale and retail levels. They also affect the incentive of co-investors in a secondary network to invest in their own primary network level, and therefore the extent of infrastructure competition on upstream sections of the network.
91. The third issue relates to the risk of an exploitative abuse of a dominant position by the operator with significant market power (SMP). Such abuse could take the form of investment hold-up.
92. In the remainder of this section, we first discuss these issues in the context of competition concerns raised by National Competition Authorities in various cases concerning co-investment projects for fiber deployment (Section A). We then show how the provisions of Article 76 EEC adequately address these concerns (Section B).

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## A. Overview of the Competition Concerns on Co-investment Projects Raised by NCAs

93. Table 2 shows the eight fiber co-investment projects, out of a total of 20 we have identified in Europe,<sup>53</sup> for which the relevant NCAs raised potential competition concerns. Importantly, these

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<sup>52</sup> Note that a co-investment project that rolls out its network on the footprint of an already existing (competing) network will result in infrastructure competition between both networks, as described in the previous section. Co-investment projects may also foster infrastructure competition at a different section of the network of the co-investment, as the rollout foster demand for the upstream input or downstream output.

<sup>53</sup> There are one Italian and three Swiss projects that have not been included in Section II.B.

cases did not follow the new framework for co-investment introduced with the EECC, which has as its aim to prevent the types of issues investigated by the NCAs. We order them by year of intervention and the type of concern expressed.<sup>54</sup>

**TABLE 2: CO-INVESTMENT PROJECT REVIEWED BY NCAS**

Year	Country	Project	Type of concern
2009 <sup>[1]</sup>	Switzerland	Swisscom – various local utilities <sup>[1]</sup>	Foreclosure of infrastructure competition and competition on the network
2010	France	Bouygues – SFR	Foreclosure of infrastructure competition and risk of abuse of dominance <sup>[2]</sup>
2010	Switzerland	Swisscom – Groupe E	Foreclosure of infrastructure competition and competition on the network
2011	France	Orange – SFR	Foreclosure of infrastructure competition and risk of abuse of dominance <sup>[2]</sup>
2012	Spain	Telefónica – Jazztel	Foreclosure of infrastructure competition and competition on the network
2013	Germany	Deutsche Telekom – Telefónica	Foreclosure of infrastructure competition, competition on the network, and risk of abuse of dominance
2016	Italy	Flash Fiber (TIM – Fastweb)	Foreclosure of competition on the network
2019	Germany	Deutsche Telekom – EWE <sup>[3]</sup>	Foreclosure of infrastructure competition and competition on the network

**Notes and sources:** [1] The Swisscom example in 2009 covered multiple cases. [2] Only during the subsequent Altice – SFR merger. [3] This case is currently under revision at the Federal Court of Justice after the Düsseldorf Higher Regional Court overturned the approval of the German Federal Cartel Office in 2019. Source: Cullen “Co-investment in fixed high-speed broadband network deployments”, October 2020.

94. Note that the number of competition cases concerning co-investment projects is very limited. The total number of projects identified are in their very nature skewed to the larger/more controversial

<sup>54</sup> In addition to the concerns listed in the table, some NCAs discussed the risk of coordination between co-investors. Rolling out a shared infrastructure indeed requires participants to share information on their priorities. As explained above, such pooling of information can in fact increase the benefits from co-investment, allowing investments to be first made in areas where they are most needed. In some instances, NCAs have however been concerned that information was shared beyond what was strictly necessary to achieve these benefits. These coordination concerns are not discussed in the remainder of this report.



co-investment projects (as these will draw the attention of the competition authorities). Most of these projects did not lead to intervention, and when the authorities did find a need to intervene, all concerns were addressed by remedies that we will show are effectively incorporated already in the provisions of Article 76 EEC.

95. In the following subsections, we discuss the concerns raised by NCAs in the context of each of these cases and the measures that have been proposed to remedy them. As explained above, these concerns can be grouped into three categories: concerns related to infrastructure competition, concerns related to competition on the (shared) network and hold-up concerns.

## **1. Foreclosure Concerns at the Infrastructure Level**

96. Economically and from the perspective of regulatory policy, infrastructure-based competition tends to lead to more intense competition in the long run than competition on a given network. If infrastructure competition leads to more competition than competition on the network, it seems superficially plausible that maximal fragmentation of network building efforts should be encouraged and cooperation prevented. This is wrong for at least two reasons. First, because rolling out a new infrastructure is costly and risky, it is usually not socially desirable for each operator active on the retail market to roll out its own network. Second, from the theory of co-investment, we know that cooperation may reduce delays in investment rollout due to financial constraints, so that preventing cooperation may hurt final consumers. A more sensible approach is therefore to allow cooperation as long as it does not reduce the number of networks that are likely to be built (if operators were not allowed to cooperate, also taking timing and coverage into account).
97. In the case of fiber networks, infrastructure competition between several secondary networks will not always be possible. Indeed, the cost of rolling out the secondary section of the network, which goes from the street cabinet to the premises of end customers, is particularly expensive. When population density is low economies of scale makes the construction of multiple networks economically inefficient and privately unprofitable. In the most extreme case, population density is so low – and hence cost per potential user is high relative to the expected revenues – that no private operator would consider investing into a secondary network. Such areas are classified as “white areas” and fiber rollout will only occur with state aid to the operator.
98. Similarly, infrastructure competition cannot occur in areas in which an investor in network infrastructure can only earn a normal return on investment if there is a single network. Areas in which such a situation is suspected have been classified as “grey areas”. In these areas the only competition feasible will be on the single network that can be expected to be built. Only in areas classified as “black areas” can it be expected that more than one network will be rolled out and that infrastructure competition at the secondary network level will actually occur.
99. Given that financial constraints are a central barrier to rolling out a fiber network, it is also clear that rollout of a secondary fiber network will require, at its core, companies that are financially strong in the first place. This means that cooperation of financially weaker companies among themselves or with a large, financially strong company generally will not restrict the number of networks that can be rolled out, but will only increase the ability to make the financial commitments necessary to generate a fast rollout of the network.

100. However, a potential competition concern with co-investment projects could be that so many potential operators are locked up in a single co-investment project that no competing investment can be credibly undertaken, i.e. no realistic investor coalition remains that would have the ability and incentives to build another network with the same coverage.
101. Note that this concern could be more important with exclusivity clauses, which block a co-investor from participating in a competing network construction effort. However, it could theoretically also arise from quantity commitments that are high enough to have the same effect. However, quantity commitments would only lead to such concerns in extreme cases. In particular, exclusivity of a smaller operator, who would not be pivotal for building another network, will not generate effective foreclosure of infrastructure competition.
102. Concerns about the effect of co-investment projects on infrastructure competition have been raised by NCAs in different countries. Note that, in the following examples, the co-investment projects included rollout of both primary and secondary networks, so that the discussion in these cases make little distinction between the two.<sup>55</sup>
103. In Germany, the Federal Cartel Office (FCO) was concerned that the co-investment project between Deutsche Telekom and EWE would lead to the slowdown and reduction in the expansion of alternative fiber networks in the cooperation area. The FCO assumed that, absent the co-investment, the operators would have unilaterally deployed competing networks in the cooperation area. Although the FCO accepted the JV's commitments, the Düsseldorf Higher Regional Court overturned the approval in September 2021 after a complaint by Vodafone and Deutsche Glasfaser. The decision is currently under review by the Federal Court of Justice.<sup>56</sup>
104. The basic concern can be explained by the fact that EWE is a large German electricity utility. Such utilities have been particularly important in fiber rollout projects that have competed with the leading telecom operators.<sup>57</sup> Such electric utility companies may have a cost advantage in setting up fiber networks because they can be laid down alongside the electricity network. Electricity companies have therefore seized this opportunity to open up additional income streams from fiber networks.
105. German authorities have expressed two concerns. First, the co-investment agreement included a clause that obliged the two parties not to deploy any parallel infrastructure in the "cooperation areas". The FCO expected a resulting reduction in infrastructure competition because, without the joint ventures, the parties would have tried to rollout separate networks faster in order to sign up

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<sup>55</sup> The co-investment projects that raised infrastructure competition concerns were: joint ventures (Swisscom and Groupe E in Switzerland; Flash Fiber in Italy; Deutsche Telekom and EWE in Germany), separate deployment with reciprocal wholesale access project between Orange and SFR in France, and one-way access co-investment projects between Bouygues and SFR in France.

<sup>56</sup> See for example: <https://www.lto.de/recht/kanzleien-unternehmen/k/glasfaser-ausbau-olg-duesseldorf-az-vi-kart-5-20-v-entscheidung-freigabe-bundeskartellamt-telekom-ewe-vodafone-bgh/>.

<sup>57</sup> Deutsche Telekom signed a number of agreements with local operators under so-called 'contingent price model', a type of one-way access model. As a part of the agreement, local operators make an up-front payment for a certain number of access lines, which they later can use with reduced fee. The agreements were signed all over Germany, in particular in the pilot towns in Baden-Württemberg, Hesse, Saxony, and Thuringia. See <https://www.telekom.com/en/media/media-information/archive/fiber-to-the-home-dt-pushes-build-out-509334>.

customers early in the expectation to retain more of them. The FCO conjectured that the JV would lead to lower coverage of households and a slower rollout.

106. Second, the FCO feared that the JV would target investments in areas in which competitors Vodafone and 1&1 were building competing hybrid fiber coaxial (HFC) networks. This would then deter competing networks to invest in their own infra-structure. Cooperation between the two strongest operators would enable them to respond quickly to competitors' expansion plans by using their first mover advantage. This concern is economically less understandable because the competing efforts of Vodafone and 1&1 were taking place in more densely populated areas of the JV's cooperation area. This generally would be black areas. This means that these are precisely the areas in which under unrestricted competition these competitors would be expecting infrastructure competition to take place in the absence of the transaction.
107. The FCO accepted two commitments to remedy the concerns about infrastructure competition. One was a commitment to the rollout of infrastructure that the FCO acknowledged would exceed the coverage that would be expected under competition. The remedy thus dropped the concerns on infrastructure competition because commitments to infrastructure build exceeded the expected infrastructure build under competition. Second, it put in place requirements that would protect competitors like Vodafone and 1&1 from entry by the JV in areas they were present. The FCO's aim was to allow the operators not part of the co-investment to complete rollout of their planned networks without having to face the competitive pressures of the co-investment.<sup>58</sup> We note that it is economically unclear whether this commitment would improve infrastructure competition. Infrastructure competition would depend on the JV still rolling out fiber in the areas already serviced by other operators once the commitment is no longer binding.
108. In Switzerland, the NCA opposed clauses in a joint venture agreement between Swisscom and the electricity utility Groupe E that obliged parties not to deploy any parallel infrastructure and thereby compete with the joint venture. In addition, the agreement also prevented any party to compete in the region after it withdrew from the investment. Both were viewed as preventing infrastructure competition even if the JV were to enhance the speed with which overall high coverage would be reached.
109. In the cases of Flash Fiber (Italian AGCM) and Swisscom/Groupe E, (Swiss Competition Commission) the NCAs feared that conditions of the co-investment projects could lead to foreclosure through minimum purchase obligations.
110. In the case of Flash Fiber, the AGCM expressed concerns that the co-investment would impede infrastructure competition: *"Partnership between TIM and Fastweb would represent the implementation of a broader exclusionary plan put in place by TIM in order to preclude the entry of an infrastructure competitor to the market for wholesale access services on the fixed network and,*

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<sup>58</sup> The requirements of FCO ensuring the protection of competitors' infrastructure deployment include i) obliging JV parties to deploy fiber in rural areas (minimum 25–35% of deployment) and ii) obliging JV parties to participate separately in public tenders for rural deployment. Source: [https://www.bundeskartellamt.de/SharedDocs/Entscheidung/DE/Entscheidungen/Fusionskontrolle/2020/B7-21-18.pdf?\\_\\_blob=publicationFile&v=2](https://www.bundeskartellamt.de/SharedDocs/Entscheidung/DE/Entscheidungen/Fusionskontrolle/2020/B7-21-18.pdf?__blob=publicationFile&v=2).

*in this way, protect [...] the dominant position held in this market and in the downstream market for retail services".* According to the AGCM, the market test showed that the Flash Fiber project might preclude the entry of an infrastructure competitor to the market of fixed network wholesale access services. The NCA additionally argued that IRUs with which Fastweb sold the access to its dark fiber to TIM in 6 out of 29 cities would harm competition in wholesale access services.<sup>59</sup>

111. In the case of the Swisscom/Groupe E project, the Swiss NCA claimed that the minimum purchase obligations and pricing for fiber purchase by the partners from the joint venture could restrict competition on the wholesale market. Moreover, no third operator could satisfy the quantity conditions imposed.
112. To alleviate the concerns related to wholesale market competition, the AGCM imposed obligations on the joint venture partners to introduce offers of VULA and NGA bitstream services on non-discriminatory terms. After extensive discussions with Swiss Competition Authorities, the agreement between Swisscom and Groupe E was modified to be in line with the model in the agreements between local utilities and Swisscom.<sup>60</sup>
113. These cases suggest three points. First, intervention occurs when the co-investors include the largest players with the highest probability of unilaterally building out a network in the absence of the co-investment agreement. Second, quantity commitments of the JV are considered as a means to alleviate concerns about infrastructure competition. Third, they suggest that co-investments that do not suppress parallel investments of the JV owners to those of the JV are more efficient, because they allow to cover areas that otherwise are not covered, but maintain the incentives to build out parallel networks in areas where this is feasible. These conditions on co-investment projects then preserve infrastructure competition while allowing the pooling of investment resources in areas where coverage might otherwise not develop.

## 2. Foreclosure of Competition on the Network

114. The second type of concerns raised by NCAs relates to competition between co-investors on the shared network. These concerns focus on the precise terms under which co-investors access the network they contributed to. At the retail level, this foreclosure concern is no different from standard regulatory concerns in telecommunications. The owner of the network (even if it is an indirect owner) may design the co-investment offer in such a way that it gives co-investors effectively worse conditions for access than the firm with SMP offering the access. The standard competition test for such behaviour is a margin squeeze test, i.e. it tests whether the firm with significant market power could make a positive margin at its current prices if it were to pay the same access charge as its retail competitors.

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<sup>59</sup> AGCM argued that the IRU with which Fastweb has sold access to its dark fiber to TIM in 6 out of 29 cities for another 30 years provides prices that are not subject to regulation, unlike the provisions of Fastweb's IRU for access to the cable ducts of TIM. The competition authorities claimed that its renewal could artificially raise barriers to entry for other operators, through an unjustified increase in the transfer prices of the infrastructure.

<sup>60</sup> Most of the agreements between Swisscom and local utilities (e.g. in Geneva, Bern, St. Gallen, Zurich, and Lucerne) stipulate the deployment of four fiber lines (as agreed upon in the round-table discussions), which are property of the constructing partner (i.e. the utilities). The other partner (i.e. Swisscom) gets a long-term indefeasible right of use on some fibers (so called 'layer 1 exclusivity' which gave the public utilities the right to commercialize the dark fiber).

115. In a competition assessment of access pricing in a co-investment offer it is not possible to look at a margin squeeze test because the infrastructure has not been built yet and therefore there is no incumbent price that could be used for the test. Note, however, that there are qualitative criteria that can exclude any margin squeeze. For example, if the cost structure induced by access pricing effectively leads to the co-investment commitment economically to be equivalent to a capacity purchase, such an anti-competitive risk does not exist. Further, such a foreclosure risk also does not exist after the commitment ends. The incentives for creating an alternative secondary network in black areas would continue to exist, as long as prices exceed the average incremental (annualized) costs of creating a new network.
116. In addition, NCAs have raised concerns about whether co-investors will have, under the terms of the agreement, the ability and incentive to invest in the deployment of their own primary network and be competitive also at the wholesale level.
117. A co-investment at the secondary network level can be counterintuitive from the view of the ladder of investment theory since the secondary network would be the last and most expensive step an operator trying to climb the ladder would invest in. However, the logic of co-investments in the secondary network is quite separate from considerations under the ladder of investment. There can be incentives to participate in the co-investment even if the operator does not have its own primary network simply because the participant does not have to pay for the whole secondary network. However, in this case the co-investor would have to contract for active services with one of the providers of the relevant primary networks.
118. The question is whether the incentives for infrastructure competition at the primary network level could be negatively affected by co-investment at the secondary network level. We clarify here upfront that such a case could not be made economically and therefore no specific safeguards in a co-investment contract would be needed.
119. To see this, note that the issue will not arise for a co-investor who already owns a primary network since they would obviously not be contemplating building an additional primary network in the same area. The issue could only arise for co-investors who do not already have a primary network. These investors would have an incentive to create a primary network if the incremental costs of constructing the primary network plus operational costs are lower than the expected costs of obtaining active service. If that is not the case, the price is efficient and cannot distort investment behaviour.
120. If, in addition, there are either financial constraints or constraints on how fast a customer base can be built up, the possibility of combining a co-investment in the secondary network with a contract for active services from a primary network provider will strictly increase the incentive to invest in a primary network later on. If the co-investor cannot buy active services, it does not have an incentive to invest in the secondary network because it cannot build a customer pool and cannot build out a primary network instantaneously. It is therefore in the spirit of the ladder of investment theory that with a co-investment available, the sequence of investment would be reversed to first co-invest in the secondary network and only build a primary network when the volume of customers makes that efficient. In this sense the possibility of the secondary network co-investment enhances the

incentive to later make an investment in a primary network that otherwise might not have happened.

121. Nevertheless, such foreclosure concerns have, for example, been raised by the NCA in Italy for the primary network, whereas NCAs in Switzerland and Spain were concerned about competition foreclosure on secondary networks.<sup>61</sup>
122. In case of the projects in Switzerland, NCAs were first concerned that third parties would be foreclosed, since the newly built network would be reserved for the co-investors only.<sup>62</sup> Second, the Swiss competition authorities stressed that a compensation mechanism included in the agreements between Swisscom and local utilities might harm the competition. Several agreements included a compensation mechanism in case a party's use of the network exceeded a certain threshold. The Swiss Competition Commission found that this particular clause could potentially have a softening effect on competition, since (i) parties are less incentivized to reach efficient scale and (ii) the cost of usage by third parties may increase. To alleviate these concerns, the NCAs requested commitments that can be grouped into (i) obligations on providing wholesale access to third-party operators, (ii) obligations that limit the 'exclusivity' clauses of the agreements, and (iii) commitments related to the compensation mechanism.
123. Obligations on providing the wholesale access to third-party operators include, among other things, dedicating network capacity available to all interested access takers. Furthermore, the NCA in Italy required that exchange agreements of the available rights or concession agreements of the IRU were set using transparent, non-discriminatory, fair, and reasonable conditions. In the context of other requested commitments, operators were obliged to grant non-discriminatory access to the new networks and to high-quality technical upstream services to third party companies, as seen in Germany. Moreover, there are commitments that oblige incumbents that are part of the agreement to rent access to their fiber network. For example, in the Spanish Telefonica and Jazztel co-investment, the authorities mandated access obligations to non-co-investors at the price given to co-investors plus an adequate premium for unabsorbed investment costs and risk.<sup>63</sup>
124. Obligations that limit the 'exclusivity' clauses of the agreements include, for example, limiting the contractual obligation of the parties to refrain from signing agreements with other companies in the cooperation area and induce the parties to arrange the access to the vertical segments for the third-party operators (Italy). Moreover, there are commitments that involve the denial of exclusivity (non-compete) and investment protection clauses (Switzerland). All of these obligations reduce foreclosure concerns.

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<sup>61</sup> The Italian NCA noted that the market test showed that the Flash Fiber project might preclude the entry of an infrastructure competitor to the market of fixed network wholesale access services. The Swiss and Spanish NCAs were concerned about the competition foreclosure on secondary networks.

<sup>62</sup> More precisely, for the projects between Swisscom and local utilities, the Swiss competition authorities were worried that the investment protection clauses and price control (restriction of pricing autonomy) would prevent parties from renting a fiber to third parties. In the case of the joint venture project between Swisscom and Groupe E, the authorities were also concerned that third party operators would be foreclosed, since the fiber network would be reserved for use by the partners only.

<sup>63</sup> The premium for unabsorbed investment costs was defined as WACC. The additional risk premium was set to be equivalent to that previously defined by the Spanish telecom regulator. In total the surcharge above the price paid by co-investor was 15.29%.

### 3. Hold-Up on Infrastructure Investment

125. The third potential concern a competition authority could have in co-investment arrangements is that a dominant firm maintains the full decision-making power over the investments while the co-investors commit to payments that are justified by the expected business on the network. However, when the pattern and speed of the network rollout has not been committed to, and there is no co-decision process with co-investors, hold-up problems can arise. For example, once commitments of co-investors are made, the dominant operator offering the co-investment may prioritize investments that favour itself or delay investment because it can, in the meantime, sell services over another (non-fiber) network.
126. Competition policy could intervene in such cases, treating the investment hold-up as an abuse of a dominant position. However, it may also intervene in mergers, in which a company offering the co-investment purchases other network assets that would be in competition with some planned investments.
127. In France (where access is strictly regulated), the NCA signalled concerns about potential investment hold-up with respect to two co-investment projects as a result of the merger between SFR and Altice Group, the owner of the cable operator Numericable. In particular, the NCA expected a slower deployment of fiber in the co-investment projects than previously agreed upon by the parties involved, since the co-investor SFR gained access to the pre-existing Numericable cable network. This acquisition would reduce SFR's incentive to build out fiber networks in areas in which Numericable was already present, since fiber business would primarily cannibalize revenues from the cable network of Numericable. As a result, competition from co-investors on the fiber network could also be avoided.
128. This would then lead to hold-up of SFR's co-investor in co-investment areas that overlap with the Numericable coverage. In addition, it could also avoid competition from co-investors in this area.
129. The remedies considered to allow the SFR/Altice merger tried to prevent hold-up incentives, by either eliminating the geographical overlap between Numericable areas and the co-investment projects or eliminating exclusivity clauses for co-investors in order to allow them to respond to hold-up by independently building out a fiber network in the overlap areas. These alternatives were offered to SFR with respect to the co-investment project with Orange. SFR could either swap municipalities previously allocated to SFR for fiber build out in areas with an Altice cable network or drop the exclusivity clause from the contract with Orange. SFR chose the latter.
130. In the Flash Fiber joint venture, similar concerns were raised in the AGCM market test, where respondents voiced the concern that deployment commitments set in the agreement would not be easily verifiable<sup>64</sup> and therefore investment hold-up could occur. To avoid hold-up issues, the AGCM has asked for commitments in form of binding deployment targets.

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<sup>64</sup> Comments to the proposed commitments made by Enel, Tiscali, Wind Tre, Vodafone, Open Fiber, Sky Italia, Iliad Italia, and AIIP/KPNQwest.



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## B. The Competition Safeguards for Co-Investment Offers Under Article 76 EECC and the BEREC Guidelines

131. The EECC directive, adopted on 11 December 2018, defines a harmonised and simplified framework for the regulation of electronic communications networks. With respect to VHCN rollout, the EECC directive aims at fostering investment into VHCN networks while preserving competition.<sup>65</sup>
132. Co-investment is specifically identified in the EECC directive as an essential tool to achieve these goals, as it *“offer[s] 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”* (recital 198). To increase the incentive to enter co-investment agreements, especially for SMP operators, the EECC directive allows national regulators to lift the *ex ante* obligations on SMP operators, when they offer co-investment projects.
133. However, the EECC directive aims at maintaining as much competition as possible, both through infra-structure competition where feasible as well as through maximal competition on fiber networks. For that purpose, the EECC directive qualifies agreements as “co-investment” only when they include a number of competition safeguards. These are considered sufficient requirements for such co-investment agreements to allow *“co-investors which are providers of electronic communications networks or services to compete effectively and sustainably in the long term”*. We show in this section that these conditions effectively remedy the concerns of competition authorities we have discussed in Section III.A.

### 1. The Type of Projects That May Be Covered by Article 76

134. Article 76 of the EECC concerns investment by SMP operators in a VHCN. Specifically, Article 76 only covers VHCNs that consist of *“optical fibre elements up to the end-user premises or base station”*. When technical impediments prevent the deployment of fiber up to the end-user premises, Article 76 may cover the deployment of *“optical fibre elements that are deployed up to the immediate proximity (meaning just outside) of the end-user’s premises”*.<sup>66</sup>
135. Only “new” VHCNs may be covered by Article 76. According to the BEREC guidelines, new VHCNs are projects which have been publicly announced (or substantially modified) after December 2018,

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<sup>65</sup> See recital 28 of the EECC directive: *“It is necessary to give appropriate incentives for investment in new very high capacity networks that support innovation in content-rich internet services and strengthen the international competitiveness of the Union. Such networks have enormous potential to deliver benefits to consumers and businesses across the Union. It is therefore vital to promote sustainable investment in the development of those new networks, while safeguarding competition, as bottlenecks and barriers to entry remain at the infrastructure level, and boosting consumer choice through regulatory predictability and consistency”*.

<sup>66</sup> BEREC Guidelines, §11.



when the EEC directive entered into force.<sup>67</sup> The elements of these new VHCN that may be covered by Article 76 include “completely new physical infrastructure that is built for the specific purposes of deploying a new VHCN”,<sup>68</sup> “optical fibre from the ODF to the end-user premises”,<sup>69</sup> and “the terminating segment or the sub-loop of the network”.<sup>70</sup>

136. With regards to the types of co-investment models that may be covered, Article 76 refers to “co-ownership or long-term risk sharing through co-financing or through purchase agreements giving rise to specific rights of a structural character”. These provisions cast a relatively broad net and are compatible with the main types of co-investment structures described above: JV, two-way access, and one-way access, including co-investment that consist of commitments of future revenue in return for access to a given minimum number of lines on the network.

## 2. The Minimum Requirements for Co-investment Offers Address the Potential Competition Issues

137. As explained in Section III.A, co-investment may raise three types of competition issues: concerns related to infrastructure competition, concerns related to competition on the (shared) network, and hold-up concerns. In this section, we show that the provisions of Article 76 adequately address all three issues.

### Requirements that preserve the possibility of infrastructure competition

138. The first concern relates to the risk that having operators participate in a co-investment project initiated by an SMP operator could make it less likely that other networks will be deployed, thereby reducing the scope for infrastructure competition in the long run. In other words, alternative networks would be foreclosed from the market if there is not enough demand left for secondary network access once co-investors make the decision to use the shared infrastructure.
139. It should, however, be noted that co-investors will have considered whether they should either participate in the project or if they should rely on alternative networks (including networks that they could rollout themselves). From this perspective, the outcome that there might not be enough demand left for alternative networks to be rolled out should not be construed as a competitive distortion, but instead a result of competition between the different secondary network infrastructure projects to sign up operators to contract for access to their respective networks. To the extent that participating in the co-investment project is a genuinely superior solution for operators than using other networks, then finding that other networks may not be able to capture enough demand in certain areas should not be of concern.
140. There is one possible scenario in which the SMP could distort the level playing field and stymie infrastructure competition. In such a theoretical scenario, the SMP operator would aggressively compete to attract key operators by offering them especially attractive terms for access to its own

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<sup>67</sup> BEREC Guidelines, §14.

<sup>68</sup> BEREC Guidelines, §18.

<sup>69</sup> BEREC Guidelines, §20.

<sup>70</sup> BEREC Guidelines, §21.

infrastructure. By selectively attracting these specific co-investors, the SMP operator would lower the available potential demand for alternative networks and foreclose infrastructure competition. Such a strategy would then make it possible for the SMP operator to increase its profits by charging higher access prices to all other operators.

141. To avoid SMP operators adopting such a strategy, Article 76 EEC Directive specifies that co-investment offers should include “*fair, reasonable and non-discriminatory terms allowing access to the full capacity of the network*”.<sup>71</sup> This Equal Treatment provision does not only cover the financial terms for the acquisition of the rights, but also the “*protection awarded to the co-investors by those rights*” and the “*terms of the conditions for joining and potentially terminating the co-investment agreement*”.<sup>72</sup> Equal treatment does not imply that all contractual terms have to be the same for all co-investors. It is recognized that there are differences, for example in the degree of risk taking, between different co-investors that need to be reflected in the terms. But the variation in the terms should reflect the different level of risk taken by a co-investor on the basis of “*the same objective, transparent, non-discriminatory and predictable criteria*”.<sup>73</sup> Such differentiation in the terms may reflect the timing of the co-investors’ participation, with earlier co-investors benefitting from a premium over latter ones to reflect the greater amount of risk they assume, but also the size and financial capacity of the different co-investors.
142. Under this Equal Treatment provision, the only way for a fiber project to “foreclose” other infrastructures is to offer better terms than the alternative to *all* operators. This, however, is exactly the type of outcome that infrastructure competition is meant to achieve.

### Requirements that maximise competition on the network

143. Article 76 EEC Directive also includes provisions meant to ensure that the co-investment offer allows maximal competition on the network. According to these provisions, co-investment offers should first afford all interested operators the opportunity to co-invest and allow firms that do not co-invest to become operators on the network. In particular, Article 76 creates the following criteria.<sup>74</sup>
- **Openness:** The co-investment offer should be “*open at any moment during the lifetime of the network to any provider of electronic communications networks or services*” (Article 76, Paragraph 1, Point a). According to the BEREC guidelines, this provision first implies that there should be “*no cut-off date*” set by the SMP operator<sup>75</sup> for participation in the project over the expected

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<sup>71</sup> EEC Directive, Article 76 Paragraph 1 Point b) i)

<sup>72</sup> EEC Directive, Annex IV.

<sup>73</sup> BEREC Guidelines, §56.

<sup>74</sup> Article 76 and Annex IV of the EEC Directive also require transparency in by making the offer “available and easily identified on the website of the [SMP] undertaking”, and requiring it to contain all the relevant information required by potential co-investors to make an informed decision. This includes “full detailed terms”, but also information relative to the establishment, governance, and evolution of the project. The publication of the offer should be made “in a timely manner”, and no later than six months prior to the start of the project, so as to give prospective co-investors sufficient time “to evaluate all the elements needed to take the most appropriate decision” and “to compete from the beginning with the SMP operator”. BEREC Guidelines, §107.

<sup>75</sup> An exemption from the cut-off date is provided for in case of the joint venture model.

commercial lifetime of the network.<sup>76</sup> The offer should also commit the SMP to provide “*effective access*” to all providers of electronic communications networks and/or services, through non-exclusive, transparent, fair, and non-discriminatory conditions.<sup>77</sup> We discuss below what “*non-discriminatory*” means exactly in this context. BEREC emphasizes that, for one-way access models in particular, these criteria should be met for both initial co-investors and co-investors joining the project over the course of the network lifetime.<sup>78</sup>

- **Flexibility:** The offer should allow potential co-investors to adjust the “*value and timing*” (Article 76, Paragraph 1, Point b) ii) of their participation and in particular “*to increase such participation in the future*” (Article 76, Paragraph 1, Point b) iii). Such flexibility ensures that the co-investment offer allows for the participation of operators of different size and business models, including future entrants on the relevant retail markets. When it comes to type of co-investment model used, BEREC guidelines indicate that “[c]ompared to joint-venture and reciprocal access models, one-way access models are more flexible regarding the potential for late entry of additional co-investors or regarding the potential to increase the participation of an existing co-investor”.<sup>79</sup>

144. In addition to these provisions aimed at maximising participation in the co-investment offer, the eEqual tTreatment provision described above ensures a level playing field between co-investors active on the wholesale and retail markets. In particular, the requirements that the offer should include “*fair, reasonable and non-discriminatory terms allowing access to the full capacity of the network*” makes it possible for co-investors to compete effectively and sustainably in the long term with the SMP.

### Requirements that prevent investment hold-up

145. As we have discussed, the provisions of Article 76 EEC are compatible with different models of co-investment, which all share similar risk sharing properties and contribute to addressing the issue of financial constraint. However, one difference between the various models relates to the fact that, in projects in which they hold an equity share in the entity task with the investment, co-investors will automatically hold structural rights, which allow an impact on decision making about the investments. Such structural rights are the instrument by which hold-up problems can be prevented. They prevent a firm offering the co-investment from making decisions that favour itself over other co-investors once the commitment has taken place.

146. To address the issue of hold-up, Article 76 EEC requires co-investors to share structural rights in some form, referred to as “*specific rights of a structural character*”. Recital 198 of the directive indicates that such rights “*involv[e] a degree of co-determination and enabl[e] co-investors to compete effectively and sustainably in the long term in downstream markets in which the undertaking designated as having significant market power is active. By contrast, commercial access agreements that are limited to the rental of capacity do not give rise to such rights and therefore should not be considered to be co-investments*”.

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<sup>76</sup> BEREC Guidelines, §35 and §§49–51.

<sup>77</sup> BEREC Guidelines, §35 and §49.

<sup>78</sup> BEREC Guidelines, §§39–40 and §46.

<sup>79</sup> BEREC Guidelines, §74.

147. Since these provisions reflect concerns about potential hold-up problems, they should be adjusted to the specific circumstances of the co-investment project. This is the reason why the BERC guidelines indicate that “*determining the structural nature of the one-way access model requires a case-by-case analysis*”, in which particular focus should be given to the “*degree of co-determination and/or the right to make decisions on new investments*”.<sup>80</sup>

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<sup>80</sup> BERC Guidelines, §§31–32.

## IV. The TIM Co-Investment Offer: Effects on Competition and Fiber Deployment

148. On 31 August 2020, TIM, KKR Infrastructure, and Fastweb announced their intention to create a JV to rollout fiber in Italy. The project foresees that TIM and Flash Fiber, a JV between TIM and Fastweb, transfer ownership of their existing secondary network to the new entity and that KKR Infrastructure acquires a participation in the JV. In return for these contributions, TIM (58%), KKR Infrastructure's subsidiary Teemo (37.5%), and Fastweb (4.5%) share ownership of the JV, tasked with the deployment of secondary fiber networks in new municipalities.<sup>81</sup>
149. FiberCop S.p.A. ("FiberCop") was established in November 2020, and the agreement between TIM, KKR Infrastructure, and Fastweb was completed on 1 April 2021.<sup>82</sup> FiberCop will oversee the deployment of the secondary fiber networks in 2,578 municipalities in black and grey areas in Italy.<sup>83</sup> The network will be a point-to-point semi-GPON, from the optical splitter equipment in the cabinets to the premises of end users.<sup>84</sup> FiberCop concluded a service contract with TIM, which establishes that TIM is in charge of the fiber rollout on behalf of FiberCop.
150. On 29 January 2021, TIM published a co-investment offer, allowing interested operators to contribute to the fiber rollout in the relevant municipalities by becoming co-investors in FiberCop. Amendments to the co-investment offer were published on 25 March 2021. On 22 April 2021, AGCOM launched a public consultation on FiberCop as per Article 79 EECC.<sup>85</sup> In response to the initial concerns voiced by the Italian Competition Authority (AGCM) in case I850, further amendment to the co-investment offer was submitted to the AGCM on 6 August 2021 and published by the AGCM on 7 September 2021. In summary, the co-investment offer allows operators to participate in two different ways:<sup>86</sup>
- **Co-investment through guaranteed volumes (structural purchase agreements):** Operators may co-invest in FiberCop by committing to payment for a "guaranteed" volume of lines over 10 years. The price for each line of the guaranteed volume<sup>87</sup> depends on the year in which an operator

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<sup>81</sup> Since the announcement of the co-investment agreement, Iliad has joined the project as well (in August 2021). Source: <https://www.gruppotim.it/en/press-archive/corporate/2021/CS-TIM-coinvestimento-Iliad-fiber-cop-eng.html>.

<sup>82</sup> Source: <https://www.gruppotim.it/en/press-archive/corporate/2021/PR-closing-FIBER-COP-def.html>.

<sup>83</sup> TIM announced that FiberCop will cover another 968 municipalities on June 25, 2021, in addition to the co-investment's original coverage plan of 1,610 municipalities. Source: [https://wdc.wholesale.telecomitalia.it/tw\\_news/2021/06/25/estensione-della-copertura-dell-offerta-di-co-investimento-di-tim-nella-nuova-rete-in-fibra-di-fiber-cop/](https://wdc.wholesale.telecomitalia.it/tw_news/2021/06/25/estensione-della-copertura-dell-offerta-di-co-investimento-di-tim-nella-nuova-rete-in-fibra-di-fiber-cop/).

<sup>84</sup> AGCOM press release, "AGCOM: Rete Unica, Avviato Il Market Test Sull'offerta Di Coinvestimento Di Tim", Rome, 1 April 2021, available at <https://www.agcom.it/documents/10179/22421133/Comunicato+stampa+01-04-2021/d9fcb0c6-7e22-4766-865c-5f871da8fb9e?version=1.0>.

<sup>85</sup> At the time of writing this report, the AGCOM decision had not yet been made public. For press coverage, see for example <https://www.telecompaper.com/news/agcom-launches-new-consultation-on-tims-co-investment-project-1378173>.

<sup>86</sup> Source: <https://www.gruppotim.it/en/press-archive/corporate/2021/PR-TIM-coinvestimento.html>.

<sup>87</sup> In addition, FiberCop has set a price for activation and de-activation services in the co-investment offer.

decides to co-invest, with prices being higher for later commitment to reflect the lower risk taken. Under this co-investment option, operators acquire passive access to the secondary network (semi-GPON) for the guaranteed number of lines, which – according to TIM’s initial co-investment proposal – cannot be lower than 10% of the housing units (HUs) in the chosen municipalities. Smaller operators may commit to fewer than 10% of the HUs on the condition that they rely on one of the operators at the cabinet to activate the corresponding lines.

- **Acquisition of IRUs.** Alternatively, operators may co-invest in FiberCop by acquiring an Indefeasible Right of Use (IRU) on a primary splitter at all optical cabinets in a municipality for a period of 20 years. They retain the option of buying lines later on at the same price as a co-investor with a volume commitment.<sup>88</sup> The IRU contains rights to the lines on a primary splitter and on secondary splitters in the optical cabinets, with the possibility to reach a maximum of 64 housing units (HU) per optical cabinet. In the context of the proposed amendments to the co-investment offer in response to the AGCMs concerns voiced in case I850, TIM proposed to add an entry level IRU option, allowing access to 16 lines in a smaller geographical area.<sup>89</sup>

151. Furthermore, and specifically aimed at ensuring extensive and continued primary network competition in areas where the FiberCop secondary network is rolled out, Article 2 of the commitments to address the initial AGCM concerns provides four options for primary network access to co-investors. These variants are constructed with different terms and durations so as to allow co-investors that do not yet themselves have primary networks in specific areas where they would like to nonetheless co-invest in FiberCop to select the optimal terms. The terms are also constructed in a way as to provide maximum incentives for such co-investors to become primary network infrastructure owners themselves, either through constructing their own network or acquiring existing networks in a “lease to buy” framework. The co-investment offer of FiberCop therefore actively addresses and alleviates primary network competition concerns while furthermore enable potential operators at all stages of the ladder of investment to participate in the co-investment.<sup>90</sup>

152. In this section, we explain how the co-investment terms of FiberCop facilitate a faster rollout of FTTH and how its conditions promote competition both between infrastructures (wholesale level) and on the infrastructure of FiberCop (retail level).

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## A. TIM Co-investment Offer Meets Article 76 Conditions

153. TIM, as an Operator with Significant Market Power (SMP) in the markets for wholesale local and central access services in Italy (with the exclusion of the municipality of Milan), published on 29

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<sup>88</sup> As in the volume commitment option, the price depends on the date at which the co-investment is made.

<sup>89</sup> The additional proposed amendments to the co-investment offer addressing the initial concerns voiced by the AGCM in case I850 are available at the following link: [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf). Article 5 governs the 16-line IRU.

<sup>90</sup> See Article 2 of the response to the AGCMs concerns voiced in I850 stipulates here: [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf).

January 2021 a co-investment offer, pursuant to Article 76 of the EECC directive, and notified it to the Italian Regulatory Authority (AGCOM). The offer was amended on 25 March 2021.

154. TIM's co-investment offer is for the deployment of a new very high-capacity fiber optic "point-to-point" secondary access network infrastructure (i.e. VHCN), as well as technical modifications to the existing FTTH network in the 29 Flash Fiber cities enabling third-party access under the co-investment. Therefore, the FiberCop project is eligible under Article 76 EECC.
155. The co-investment project is of the one-way access type with co-financing, in which co-investors assume part of the risk that would otherwise be assumed by TIM, either by pledging future revenues (through a commitment to purchase a minimum number of lines on the network) or by providing additional funding upfront (through the purchase of IRUs on primary splitters). TIM's offer also includes the possibility to participate in the JV shareholdings. The participation of co-investors therefore allows to rollout fiber more quickly and in additional areas.
156. The terms of TIM's co-investment offer also meet all the requirements from Article 76 EECC aimed at preserving competition.
157. First, the terms of TIM's co-investment offer are "*fair, reasonable and non-discriminatory*", and therefore preserve the possibility of infrastructure competition, as is explained in Section III.B.2. The terms of the offer are identical for all co-investors making a similar commitment at the same time. In particular, TIM's offer does not discriminate between operators that have signalled their interest early on and other potential co-investors in a similar situation.
158. TIM's co-investment offer foresees that co-investors making different commitments or participating at different times will access the network under different terms. These variations are in line with the BEREC guidelines, which provide that "*co-investors committing for different types or levels of participation or deciding to co-invest at different points in time could justifiably be offered different terms*".<sup>91</sup> In the case of TIM's offer, variations in the terms offered take the form of different prices per line (and different prices for connection and disconnection) depending on the year in which the co-investor decides to take part in the project.<sup>92</sup> Such differentiation reflects the fact that later co-investors, making a contribution at a time when the infrastructure has already been partly rolled out, assume less risk than earlier co-investors. In line with recommendations from the BEREC guidelines, the way in which the terms are adjusted depending on the co-investment date is made explicit in the offer, is based "*on the same objective, transparent, non-discriminatory and predictable criteria*"<sup>93</sup> and is meant to avoid a risk of free riding, whereby a potential co-investor would "*postpone the decision to enter into the co-investment agreement [...] for the sole reason of better terms and conditions*".<sup>94</sup>

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<sup>91</sup> BEREC Guidelines, §56.

<sup>92</sup> TIM co-investment offer, Section 6.2.

<sup>93</sup> BEREC Guidelines, §56.

<sup>94</sup> BEREC Guidelines, §57.



159. Second, TIM's co-investment offer is open and flexible, making it possible for a wide range of operators to participate and therefore maximising competition on the new network. In particular, TIM's co-investment offer is open to any operator seeking effective access to the network during the commitment period at reduced prices to compensate for the quantity risk taken on due to the investment, and at market-based prices thereafter.<sup>95</sup> The offer is also flexible in the sense that it allows operators to tailor the nature, timing and scope of their participation to their individual needs.
160. TIM's co-investment offer provides potential co-investors with a 'menu' of options, concerning either minimum volumes of lines<sup>96</sup> or the option to acquire IRUs (to avoid committing to a specific number of lines in advance). Because technical constraints impose that volume commitment cannot represent less than 10% of the HUs in the desired municipalities (or in some larger municipalities, part of the desired municipalities),<sup>97</sup> the offer also includes the option for smaller operators to commit to fewer than 10% of the HUs, on the condition that the smaller operator relies on one of the operators at the cabinet to activate the corresponding line.
161. The semi-GPON which is the focus of the co-investment represents the basic component for several other services: active services (e.g. VULA FTTH) relies on the semi-GPON and therefore commitments made by smaller co-investors (ultimately resulting in an active service) effectively contribute to increase demand certainty thus sharing the risk. Moreover, this co-investment option (acquisition of semi-GPON from FiberCop and subsequent activation) allows for the participation of smaller operators while ensuring that splitter capacity is not underutilized. As another positive consequence, because smaller operators may contract with any operators at the cabinet to activate their semi-GPON, this option will also foster wholesale competition between co-investors located at the cabinet. Hence the wide variety of options ensures that *"smaller undertakings or undertakings with less financial capacity are not discriminated against"*.<sup>98</sup>
162. Moreover, a co-investor can increase their participation in the future by increasing their co-investment or by renting more HUs if their demand is above the minimum HUs (plus a percentage of tolerance) co-invested in. Operators can decide if and when to co-invest and to tailor the scale, location, and timing of their involvement to their commercial needs. If anything, when it comes to type of co-investment model used by TIM, BEREC guidelines indicate that *"[c]ompared to joint-venture and reciprocal access models, one-way access models are more flexible regarding the*

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<sup>95</sup> To create additional certainty for the co-investment offer, Article 4 of the response to the AGCMs concerns voiced in I850 stipulates the prices to be paid by operators interested in joining after the rollout has been completed from 2026 to 2029. From 2030 onwards, access to the infrastructure will be available at market prices. See [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf).

<sup>96</sup> As the capacity does not correspond to specific physical lines but simply to a total number of lines in the area, the co-investor has access to any set of physical lines on the network without being tied to a specific subset of housing units (HUs).

<sup>97</sup> Because the space at the optical cabinet is limited, and because co-investors will rely on dedicated splitters to connect to their customers, a minimum entry threshold is necessary to avoid multiple small, and thus relatively risk-free, investments to block the capacity of a whole splitter. In this sense it is a pro-competitive measure that prevents small providers to block large shares of capacity that could be used to serve additional customers.

<sup>98</sup> BEREC Guidelines, §58.



*potential for late entry of additional co-investors or regarding the potential to increase the participation of an existing co-investor”.*<sup>99</sup>

163. Hence, the openness and flexibility of TIM’s co-investment offer maximises the scope for competition on the network, as it allows for the participation of operators of different sizes and business models as well as future entrants, and provides operators not co-investing the option to become active on the network in the future.
164. Finally, TIM’s co-investment offer contains provisions aimed at addressing potential investment hold-up issues. First, co-investors in the project will either be granted IRUs on primary splitters in each of the cabinets of the relevant municipalities (or local exchange areas), allowing them to reach up to 64 HUs (or 16 HUs) per cabinet (compared to a total number of HUs of 170 per cabinet on average) or a share of the capacity on the new network in case of a volume commitments. This allows an increasing scalability over time for alternative operators in coherence with the ladder of investment principle. This is also in line with the EECC which, for co-investment offers, requires to provide small operators the opportunity to gradually partake in the co-investment. Such access rights are equivalent to the rights that an operator rolling out its own network would get. Second, the project includes various mechanisms aimed at ensuring that FiberCop, and TIM as the service provider in charge of laying out the fiber, will meet the target from the rollout plan.<sup>100</sup>
165. In addition, TIM’s co-investment offer grants co-investors co-determination rights in the rollout of the infrastructure. According to Article 5.2 (co-determination guarantees for co-investors) of the offer, co-investors *“will be able to effectively contribute to the identification of the areas/municipalities deemed to be a priority within FiberCop’s implementation plan”*. Such co-determination rights will be exercised in the context of a technical committee of co-investors. This committee is the forum at which FiberCop will share regular updates on the rollout plan, investment priorities, and actual deployment. Co-investors will be able to submit their proposals, in particular with respect to the geographical areas that should be priority targets for the rollout. The co-investors’ technical committee will then discuss on which area(s) to focus, whether these are areas where FiberCop will at the time be the only fiber network provider (to allow consumers access to high-speed Internet), or areas where it will be the second network (where it would add value by competing with, for example, Open Fiber’s network).<sup>101</sup>
166. It follows from the above that TIM’s co-investment offer meets all of the requirements from Article 76 EECC. It should therefore be expected to foster fiber rollout while safeguarding competition in the long run. In the remainder of this section, we analyse in more detail the likely effect of FiberCop on competition and investment.

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<sup>99</sup> BEREC Guidelines, §74.

<sup>100</sup> In particular, Article 1 of the response to the AGCM’s concerns voiced in I850 ensures that the rollout of the network will respect a defined timeline. This solves from scratch the risk of investment hold-up. See [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf).

<sup>101</sup> The extent to which the FiberCop project is committed to ensuring co-investors are able to co-determine the project is further supported by Article 11 of the response to the AGCMs concerns voiced in I850, which details the technical committee that will be set up. See [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf).

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## B. Expected Impact of the FiberCop Co-investment Project on Competition

167. The competitive landscape in Italy for FTTH networks before the inception of the FiberCop co-investment project was centred around two significant players: Open Fiber and Flash Fiber. The first, Open Fiber was – by winning the three Infratel tenders<sup>102</sup> – tasked with rolling out fiber networks in white areas. As mentioned above, these are areas where no private investor has deployed or plans to deploy (over a 3-year time horizon NGA networks).
168. In addition to its task of rolling out fiber in white areas, Open Fiber is rolling out fiber in black areas (areas where multiple infrastructure operators could economically sustain overlapping networks). Open Fiber plans on rolling out fiber in around 8,000 municipalities: approximately 7,700 in white areas and 271 in black areas.<sup>103</sup> While Open Fiber acts purely as a wholesale reseller of access, it is, according to its public statements, by a large margin the biggest FTTH network operator with more than 12.6 million HUs.<sup>104</sup>
169. The second significant FTTH infrastructure player is the Flash Fiber closed co-investment project between TIM and Fastweb. Flash Fiber also has laid out a substantial fiber network in Italy, but it is limited to 29 cities.<sup>105</sup> All of these 29 cities are in black areas. On the basis of homes passed, Flash Fiber is the second largest operator, with 3 million households reached. Notably, the Flash Fiber networks in the 29 cities have been brought into FiberCop project and will, as part of the co-investment offer, be opened to co-investment opportunities. This will be made possible through a technical change to the network infrastructure, enabling other operators to easily provide access to the connected homes through co-investment.<sup>106</sup>
170. At the retail level, the market is more fragmented due to the wholesale activity of Open Fiber and Flash Fiber. Looking at NGA broadband connections, which include VDSL access, TIM is the largest player (even if with a market share in the broadband market below 40%) due to its investments in the legacy copper networks. However, when limiting the market to FTTH access, TIM's importance is substantially reduced. The below chart shows the market shares both for broadband and ultra-broadband (FTTH included) access and FTTH access only.

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<sup>102</sup> Tender No. 1 covered Abruzzo, Molise, Lombardy, Emilia-Romagna, Tuscany, and Veneto regions. Tender No. 2 covered the Piedmont, Aosta Valley, Liguria, Friuli-Venezia Giulia, Autonomous Province of Trento, Marche, Umbria, Lazio, Campania, Basilicata, and Sicily regions. Tender No. 3 covered the Calabria, Puglia, and Sardinia regions.

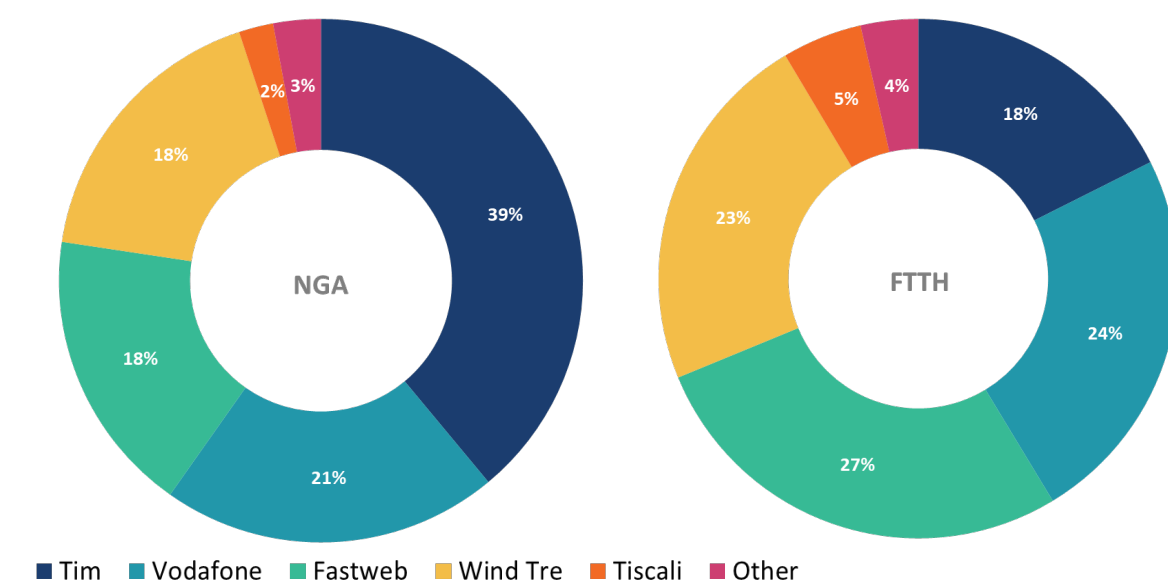
<sup>103</sup> Open Fiber, Ultra-Fast Broadband in Europe: State of play and trends - The experience of Open Fiber and the Italian case, 5 October 2020, [https://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/ultra-fast\\_broadband\\_in\\_europe\\_-\\_francesco\\_nonno.pdf](https://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/ultra-fast_broadband_in_europe_-_francesco_nonno.pdf).

<sup>104</sup> See <https://openfiber.it/media/news/ftth-council/> and <https://openfiber.it/media/comunicazione/progetti-comunicazione/italia-digitale/>.

<sup>105</sup> Flash Fiber's 29 cities are Turin, Genoa, Monza, Bergamo, Brescia, Verona, Trento, Padua, Vicenza, Venice, Parma, Reggio Emilia, Modena, Bologna, Prato, Florence, Trieste, Siena, Perugia, Ancona, Rome, Pescara, Naples, Salerno, Bari, Messina, Reggio Calabria, Catania, and Palermo.

<sup>106</sup> This is in line with BEREC guidelines (§ 14), which foresee the possibility for networks announced before the EECC to be considered part of a co-investment, provided that substantial changes are made, as in the case of FiberCop.

FIGURE 6: RETAIL MARKET SHARE BY TECHNOLOGY (BROADBAND AND ULTRABROADBAND), 03/2021



Source: AGCOM, Communications markets monitoring system, 03/2021

173. In light of the current landscape, it can be expected that the FiberCop project will significantly increase the level of the competition both in the wholesale and retail FTTH markets in Italy.
174. At the wholesale level, increased competition will arise by the presence of FiberCop's as an alternative infrastructure provider where others are already present, and by the fact that co-investors will have the possibility to offer wholesale services, therefore creating a virtuous circle of competition. FiberCop, entering the market through its fiber rollout, will induce infrastructure competition in areas where Open Fiber is already present or already planning to invest. This will most likely result not only in lower wholesale prices, but also a faster rollout of fiber as FiberCop and Open Fiber compete to achieve first mover advantages in currently unconnected areas.
175. At the retail level, FiberCop will also substantially improve the competitive environment due to the design of the co-investment terms. The flexibility provided to co-investors will ensure maximal participation, since interested players are given opportunities to enter that would otherwise not have existed. The incentive structure ensures participants commit to the maximum volumes they are willing to commit to according to their risk preferences. For those committed volumes marginal costs effectively become zero. Co-investors will, therefore, have the strongest possible incentives to compete aggressively on the network. Finally, the co-investment also provides substantial forward-looking benefits, enabling smaller operators to gain access to end customers and thereby allowing them to take the first step on the ladder of investment. Smaller operators that have not yet deployed their own network from the ODF to the CRO, may initially purchase fibre in the primary network from TIM – initially in pay-per-use and afterwards in IRU, according to the demand increase – or other providers and eventually, in a second stage, they may grow sufficiently that they have incentives to invest in their own primary networks which would further enhance primary network competition.
176. In the following subsection we further describe each of the mechanisms by which the FiberCop project fosters competition for ultrafast broadband in Italy.

## 1. The FiberCop Project Will Foster Competition

177. The FiberCop co-investment project will significantly improve the competitive environment on the Italian market for ultrafast broadband. This is the case for both the wholesale and retail market for fiber access. At the wholesale level, the immediate direct impact of the FiberCop project is the creation of a player rolling out fiber across Italy. In terms of infrastructure competition, the fiber rollout of FiberCop in some areas will directly compete with other fiber networks.
178. The infrastructure competition created by the FiberCop project is best assessed in terms of the rollout plans of FiberCop. By April 2026, FiberCop plans to rollout fiber in 2,578 municipalities across Italy. Open Fiber already has begun rolling out its network, and is thus ahead of FiberCop in terms of available infrastructure it can offer to wholesale customers. Open Fiber is already present in 2,500 municipalities (clusters A&B and C&D).<sup>107</sup> For potential retail customers, the existence of multiple fiber infrastructure operators will lead to significant benefits.
179. Wholesale operators interested in offering fiber services in these areas will now be able to decide whether to join the FiberCop investment project or whether to purchase wholesale access from Open Fiber.
180. Since the co-investment structure of FiberCop is designed to encourage maximal participation in the co-investment, the FiberCop project will maximise the potential for infrastructure competition also at the primary network level. This is because, as discussed below, co-investors will not only have the incentive to compete aggressively in the wholesale market (to fill up their committed lines), but as a result of Article 2 of the commitments to the AGCM, are also provided with options enabling the development of their own primary networks.<sup>108</sup> At the same time, the infrastructure providers (Open Fiber and FiberCop) have an incentive to aggressively compete for co-investment participants (in the case of FiberCop) and wholesale customers (in the case of Open Fiber). Both of these mechanisms will induce primary network demand.

## 2. The FiberCop Project Offers Co-investors Flexibility, Increasing Participation and Therefore Competition Ex Post

181. Optimal co-investment schemes may give multiple options for revenue commitments and risk sharing. Such options tend to be beneficial because different potential co-investors have different profiles for expected demand and risk. For example, a co-investor with high but very uncertain expected demand may be willing to contribute more liquidity upfront if FiberCop retains a large part of the demand risk. Another co-investor with low but fairly certain expected demand may prefer to assume a larger proportion of the demand risk if it can reduce the upfront liquidity contribution. Such self-selection through a wider range of co-investment options always increases the participation in co-investment and therefore contributes to a faster rollout of the network.

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<sup>107</sup> See <https://openfiber.it/app/uploads/2021/10/Analisi-impatto-economico-e-sociale-EY.pdf>, page 10.

<sup>108</sup> Article 2 of the response to the AGCM's concerns voiced in I850 specifically aims to provide various solutions to ensure that co-investment participants are able to become primary network operators in their own right in areas where they participate in the co-investment. See [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf).

182. The TIM co-investment offer creates flexibility for potential co-investors with different risk characteristics. The offer allows operators to choose the level of risk they want to take. There is not just the element that a co-investor can decide on the size of its volume commitment, but also to purchase IRUs in two options instead (covering 64 or 16 lines) or decide on the timing of its investment, as the offer allows co-investors to join the project after the initial start date. When a co-investor joins the project after the start date, some of the uncertainty has resolved, so that the risk taken on by the co-investor is lower. For this reason, the risk premium for a co-investor joining later will also be lower, i.e. the price paid per line in the volume commitment will be higher. Co-investors can decide to co-invest at different times in different areas, and to increase over time their initial commitments in the areas where they co-invested first.
183. Co-investors also have flexibility in selecting the municipalities (or local exchange area in the case of IRU) in which they wish to co-invest, with the only caveat that only entire municipalities can be selected, with the exception of large municipalities where commitments on smaller areas might be allowed to facilitate participation even further. In fact, as a result of Article 2 of the commitments to the initial concerns voiced by the AGCM in I850, the co-investment offer provides specific options to obtain primary network access (and eventually ownership) to co-investors that do not have their own primary networks in specific rollout areas, further increasing flexibility and participation incentives.<sup>109</sup>
184. Operators therefore can decide if and when to co-invest and to tailor the scale, location, and timing of their involvement to their commercial needs. Such openness and flexibility facilitate participation in the project, and strengthens its welfare enhancing effects in terms of faster fiber rollout in Italy. This conclusion is further strengthened by the upfront co-investment option that we discuss in the next section.
185. The co-investment offer is also pro-competitive by giving the co-investing operator considerable flexibility concerning the set of customers they can reach for a given capacity commitment. While the commitment offer is a structural capacity sale in the sense that the operator faces zero marginal cost up to the committed volume when selling to end customers, this capacity does not correspond to specific physical lines as in a standard IRU model, in which rights of use are acquired on a specific basket of lines/HUs. The commitment under the FiberCop co-investment agreement gives the co-investor access to a total number of lines, which can be any set of physical lines on the network. This feature of the co-investment project is pro-competitive because it does not tie each co-investor to a specific subset of HUs. Instead any co-investor can potentially serve any HU at zero marginal costs (in the relevant network areas and within the limit of their volume commitment plus a tolerance volume).

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<sup>109</sup> See Article 2 of the response to the AGCMs concerns voiced in I850 at [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf).

### 3. The Co-investment Terms Create High Incentive for Co-investors to Compete Due to Zero Marginal Costs on Committed Volumes

186. As discussed previously, the FiberCop co-investment requires co-investors to commit to take guaranteed volumes as part of the risk sharing characteristic which defines co-investment projects. For any volume below the guaranteed volume, the co-investor makes *the same total* payment to FiberCop (per line price multiplied by the guaranteed volume). This is a *fixed* payment, which does not depend (up to the commitment amount) on the volume actually sold to end consumers. The marginal costs faced by the co-investor up to the guaranteed volume are therefore zero.
187. This mechanism is strictly equivalent to acquiring a share of network capacity of the co-investment contract.<sup>110</sup> The fact that the price for such capacity is based on a per line price and paid gradually over time does not affect the incentive properties of the scheme. Co-investors will have the highest possible incentive to compete aggressively to fill up the capacity they committed to.
188. Furthermore, the co-investment offer is structured in such a way as to give co-investors an incentive to commit to guaranteed volumes close to their sales expectations, such as to receive the discounted co-investment price for the totality for their sales expectation. In other words, it incentivises co-investors to commit to as much guaranteed volume as their willingness to take on risk ex ante allows, and for all of those volumes the zero marginal costs ex post applies. As indeed expectations ex ante may even be exceeded ex post, co-investors requiring more than its guaranteed (committed) volume, plus the tolerance, will have the possibility to further increase its volume commitment for the following years. Again for those additional committed volumes the marginal costs will be zero. The cost structure as designed by the co-investment offer therefore achieves maximal incentives for competition amongst the co-investors and with other market players.
189. Furthermore, FiberCop's FTTH network architecture is specifically designed to promote competition between co-investors. Point-to-point connectivity, with primary and secondary splitting capacity at the cabinet, allows easy reallocation of a line from one operator to another. This means the costs of switching operators are reduced.<sup>111</sup> Other network structures where secondary splitters are located closer to the building (as in Flash Fiber municipalities) were designed for an environment with a fixed expected number of operators. The choice of network structure is therefore optimal for the goal of permitting competition and inducing flexible participation by many co-investors.
190. In its December 2020 decision,<sup>112</sup> the AGCM expressed the concern that the per line price could increase for customers acquired beyond the commitment volume. However, the co-investment

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<sup>110</sup> The incentive properties are exactly the same as capacity divestments known from remedies in mergers between MNOs in the mobile telecom sector.

<sup>111</sup> In fact, Article 10 of the response to the AGCM's concerns voiced in I850 gives co-investors the ability to themselves handle connections of new clients, while Article 7 ensures that individual co-investors self-manage the termination at the premises. Both commitments ensure less dependence on a centralized mechanic to client connection and thereby increase connection efficiency and flexibility. See [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf).

<sup>112</sup> See <https://agcm.it/dotcmsdoc/allegati-news/I850%20avvio.pdf>.

offer is structured to give co-investors an incentive to commit to guaranteed volumes close to their sales expectations. In addition, a co-investor requiring more than 110% of its guaranteed volume will have the possibility to increase its volume commitment for the following years at a price that still reflects a risk premium. While the co-investor price will be higher on subsequent commitments or later sales to end customers, this price difference reflects a smaller risk premium because the co-investor faces lower risk when some of the uncertainty has resolved. In any case, to address AGCM's concern, TIM proposed to raise the tolerance level to 15% in order to allow more flexibility to co-investors.<sup>113</sup>

191. The condition that IRUs can be requested for at most two primary splitters per optical cabinet does not significantly limit the co-investors' ability to compete either. First, two primary splitters are enough for a co-investor to acquire 128 customers per cabinet, which represent more than three quarter of the total number of HUs on average. Second, this limit makes it impossible for a co-investor to foreclose competition in certain areas by acquiring a large number of IRUs, leaving capacity available on the network for additional co-investor willing to join later on. Third, in any case, a co-investor is allowed to request additional primary splitters, beyond the first two, based on a feasibility study and following the principle of "first come, first served".

#### **4. The FiberCop Project Has Long Lasting Benefits by Enabling Firms to Climb the Ladder of Investment**

192. The FiberCop co-investment project also alleviates the Ladder of Investment (LoI) concerns currently unaddressed by the market, which hinders particularly smaller players from becoming end-to-end network infrastructure operators in their own right. In the case of fiber rollout, the LoI approach suggests that co-investment in the secondary network would allow a smaller operator to build up a customer base without much own upfront investment by relying on access to other operators' primary networks. Once the customer base is sufficiently large, rolling out its own primary infrastructure can be justified and financed. The co-investment offer thus represents an opportunity to build a customer base for co-investors without a primary network and increases the chance of these operators building their own primary network in future.
193. Indeed, for a decade, regulatory policy – both at the EU and the national level – has been guided by the LoI principle to enable a stepwise network buildout also for smaller players.<sup>114</sup> The LoI approach recognises that *“due to the high risk involved in investments with a high share of sunk costs, alternative operators are likely to follow a step-by-step approach, continuously expanding their customer base and infrastructure investments. The initial availability of the incumbent's infrastructure at low prices will make it easier for alternative operators to enter the market and develop a customer base. Equipped with a customer base, uncertainty is considerably reduced, and the operator may then be ready to take further investments”*.<sup>115</sup> Essentially, the LoI argument

<sup>113</sup> See Article 6 of the response to the AGCMs concerns voiced in I850 at [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf).

<sup>114</sup> See Cave M, Vogelsang I (2003), “How access pricing and entry interact”, *Telecommunications Policy*, 27 (10–11): 717–727. And also Cave M (2006), “Encouraging infrastructure competition via the ladder of investment”, *Telecommunications Policy* 30 (3–4): 223–237

<sup>115</sup> European Regulators Group (2004).



stresses that it is very difficult to finance infrastructure investments before a sufficient customer base can be relied on to provide an income stream on the basis of which financing can be obtained.

194. If co-investors had to meet their commitment by buying access through their own primary network, operators that do not already own an existing primary network would be *de facto* excluded from the co-investment offer until they had built out that network. No such operator would consider co-investing in FiberCop, as it would be paying for secondary access it cannot use in the short run. To alleviate this issue, the FiberCop co-investment project allows co-investors that do not yet have their own primary network to obtain primary network access with the perspective of building their own or acquiring it in a “lease and buy” framework. The proposed mechanism enables the co-investor to acquire the primary network fibers after three years of pay-per-use. This solution makes it possible for operators to start marketing services to meet their commitments for the secondary network while building their own primary network to support their business.<sup>116</sup>
195. The FiberCop project can only have a positive effect on the co-investors’ incentives to deploy their own primary access network. As previously mentioned, for co-investors the volume commitment reduces their marginal costs in the secondary network to zero, which increases the incentive to invest in the primary network relative to a situation where there are higher marginal costs of access to the secondary network. Essentially the margin gained from customers won increases because of the co-investment, thus increasing the return from an investment in the primary network. If rollout of a primary network was worthwhile before the co-investment project then it must be even more profitable when the cost of secondary network access is lowered.<sup>117</sup> At the margin, operators who did not consider building a primary network before the co-investment now have an incentive to build their own primary network.

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## C. Impact of the FiberCop Co-investment Project on Fiber Rollout

196. In this section we tie together the established understanding of co-investment projects gained in Section II with the specific terms of the FiberCop project to make an assessment of the likely impact the FiberCop project will have on fiber rollout in Italy. For that, we systematically assess the FiberCop project in terms of its co-investment model, the nature of access rights given to co-investors, the identity and type of co-investors, the regulatory context, and the areas in which fiber will be deployed. Based on the degree of success in terms of a faster fiber rollout other countries experienced, and linking it back to these dimensions, we draw conclusions as to whether the

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<sup>116</sup> See Article 2 of the response to the AGCMs concerns voiced in I850 at [https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21\\_all.pdf](https://www.agcm.it/dotcmsdoc/bollettini/2021/36-21_all.pdf).

<sup>117</sup> It can be estimated that the secondary network accounts for around 2/3 of the total investment cost of an FTTH network (primary and secondary). The co-investment project therefore facilitates infrastructure competition by offering (passive) access to the part of the network which is most difficult and costly to replicate, while fostering incentives to deploy primary infrastructure. Moreover, the current primary network infrastructure landscape in Italy seems already far developed (other operators beyond TIM have invested in primary networks). This situation, coupled with the increased incentives the FiberCop project will provide for further roll out, makes unlikely that the primary network infrastructure is a bottleneck of concern.



circumstances and design of FiberCop indicate the project to be a likely success in terms of fast fiber rollout.

197. Starting from the type of co-investment model, the FiberCop co-investment is a mix between the joint venture and the one-way access models. Indeed, the likely effect a one-way access model co-investment project has on fiber rollout cannot be deduced simply from it being one-way per se, but rather is largely determined by how well the project is structured to deal with incentive issues that can arise between the asymmetric responsibilities of the co-investors. In FiberCop, while TIM will be responsible for the fiber rollout, the co-investor committee will jointly discuss rollout priorities and implementation. Furthermore, KKR's purely financial stake in the project will result in a market-driven oversight mechanism that ensures to provide the right incentives to rollout fiber quickly.
198. Additionally, while both active and passive access co-investment schemes are fundamentally able to foster fiber rollout, the country comparison seems to indicate that so far co-investment schemes that provide passive access to their co-investors, rather than active services, seem to have a more positive impact on fiber rollout. This becomes particularly evident in the success stories found in Spain and Portugal.<sup>118</sup> Indeed, FiberCop's core co-investment mechanism is passive access through committing to substantial volumes or by obtaining IRUs. Simply due to the substantial size of the necessary commitments, these co-investment choices are aimed at gaining participation from the relatively larger telecoms operators. Importantly, however, the FiberCop project actually even goes beyond the traditional purely passive access model and offers what effectively amounts to active access (passive commitment with the possibility to refer to any co-investors for the active service) for investors unable to agree to the substantial commitments required in the volume commitment option or IRU option. Be it due to uncertainty or financial restrictions of (smaller) co-investors, for those co-investors the additional offered option to receive active access provides a great opportunity to participate in the rollout of fiber in Italy. This gives them the first step on the Ladder of Investment, which likely results in a more heterogeneous competitive landscape in the future. As higher participation increases the likelihood of the co-investment project being successful, this dual model further enhances the likelihood that the FiberCop co-investment project will result in faster fiber rollout.
199. A further factor that seems likely to contribute to the success of fast fiber rollout due to the FiberCop project is that much of the existing infrastructure, such as ducts and cabinet placements of TIM, can be re-used. As we have seen in countries where utilities have been able to successfully rollout fiber, the benefit of re-using their existing infrastructure for fiber deployment made rollout significantly less risky and less cost-intensive, as these investments usually take up the largest part of total cost. For FiberCop, therefore, the access to duct and civil infrastructure is likely to contribute to a faster rollout of fiber than if such engineering works would have to be undertaken from scratch.
200. Another important factor more generally seems to be the regulatory framework applied to the co-investment project. The success stories found again in Spain and Portugal have been mainly commercial agreements between partners that are not subject to ex ante (heavy) regulation. As the FiberCop co-investment project meets the criteria set forth under Article 76 of the EECC, it too

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<sup>118</sup> See section II.B.

would remain unregulated. This ensures that the private investor incentives remain intact, in expectation contributing significantly to faster rollout of fiber across Italy.

201. In terms of deployment areas, as previously discussed, the FiberCop project covers both grey and black areas. In grey areas customers under market self-regulating circumstances cannot expect to see more than one fiber network rolled out. However, in those areas the FiberCop project will allow – both at the wholesale and retail levels – multiple operators to compete using the same network.
202. In black areas, co-investment projects have also shown to drive faster rollout. These areas are likely to be the most attractive for the co-investors, and as new technology is made available to retail and wholesale consumers, getting to market early provides significant benefits. This is particularly the case if a co-investment vehicle with multiple co-investors is rolling out the new technology, since the co-investment project's risk sharing attributes result in each co-investor only bearing a share of the risk arising from demand uncertainty. Again, it therefore seems likely that the FiberCop co-investment project will contribute to a faster rollout of fiber in black areas, as well.
203. Overall, it therefore seems that the FiberCop project is designed in a way to create maximal incentives to participate while having mechanisms in place that minimise frictions amongst the co-investors. These attributes have been shown to have substantial positive effects on the speed of fiber deployment. It thus seems likely that the FiberCop project will materially increase the speed at which Italy will have fiber access than if the project would not have been implemented.<sup>119</sup>

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<sup>119</sup> According to fiber coverage forecasts prepared by IDATE, by 2026 Italy will more than triple its fiber coverage rate with respect to September 2019, with the number of subscriptions rising more than eleven-fold. FiberCop contributes significantly to the surge as one of the leading fiber deployment programs in Italy. Source: <https://d110erj175o600.cloudfront.net/wp-content/uploads/2021/03/19140953/FTTH-Council-Europe-Forecast-for-EUROPE-2020-2026-AFTER-COVID19-FINAL-Published-Version.pdf>.

## V. Conclusion

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204. Italy clearly lags behind in Very High Capacity Network (VHCN) rollout compared to the rest of Europe. There has been government intervention in white areas where private parties would not consider rolling out fiber otherwise, while in other areas two companies Flash Fiber and Open Fiber have been rolling out fiber. FiberCop was founded by TIM, KKR Infrastructure, and Fastweb to build out and operate secondary fiber networks in 2,578 municipalities in black and grey areas in Italy (where multiple or one fiber network can be expected to be rolled out, respectively).
205. As fiber deployment is socially desirable yet also costly and risky, the speed of rollout may not be sufficient and incentives do not always support multiple parallel infrastructure, creating a risk of monopolisation. To both foster fiber deployment and strengthen retail competition, the EECC favours using co-investment projects to encourage multiple companies to invest jointly in a fiber network, and to share the risk and reward associated with such investment. The precise details of the co-investment project and specificities of deployment in the country will influence the trade-off between (i) lowering deployment cost and accelerating rollout on the one hand and (ii) the potential risk of reducing downstream competition on the other hand.
206. In this report we have described the incentive issues in fiber rollouts and the potential competition concerns. We have shown that these are addressed by the safeguards of Article 76 EECC and that FiberCop satisfies these conditions. Based on an analysis of the FiberCop co-investment project and namely of TIM's co-investment offer we come to the conclusion that it satisfies all of the criteria that one would want to satisfy to achieve a fast fiber rollout while preserving maximal infrastructure competition as well as competition on the network.