



# Investment sharing in broadband networks

Carlo Cambini<sup>a,\*</sup>, Virginia Silvestri<sup>b</sup>

<sup>a</sup> Politecnico di Torino, DIGEP, Italy

<sup>b</sup> European University Institute—FSR, Italy



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## ABSTRACT

This paper presents a model of competition between an incumbent firm and an Other Licensed Operator (OLO) in the broadband market, where the incumbent has an investment option to build a Next Generation network (NGN) and it can do so by making an investment sharing agreement with the OLO, or alone. Two different kinds of investment sharing contractual forms are analyzed, a basic investment sharing, where no side-payment is given for the use of the NGN between co-investors, and joint-venture, where a side-payment is set by the co-investing firms. Results show that investment sharing can potentially be beneficial in terms of competition and investments, but the number of firms involved matters and so does the choice of the NGN access price, for insiders and outsiders of the agreement. Even when the presence of firms outside of the agreement force insiders to compete more fiercely, there might be a concern with the potential exclusion of the outsiders from the NGN.

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## 1. Introduction

The telecommunications markets currently face a period of widespread debate about the deployment of the so-called Next Generation Networks (NGNs). These networks represent a decisive progress in the telecommunications technology, due to their enhanced possibilities in offering faster transmission, and thereof services which demand more capacity and faster connectivity, such as interactive TV-centric and gaming broadband services, IP-based and high definition TV.

The issue of NGN deployment acquires a status of social interest at European and national level, due to the recognized importance of telecommunications infrastructures for economic growth (Czernich, Falck, Kretschmer, & Woessmann, 2011; Koutroumpis, 2009; Röller & Waverman, 2001).<sup>1</sup> The European Commission dedicated a special effort to the development of digital markets in the European arena, setting ambitious targets in the document “A Digital Agenda for Europe” (COM, 2010a 245; COM, 2010b 6223).<sup>2</sup> The issues related to the roll-out of new access fiber networks and the replacement of the existing copper networks regard mainly the high sunk costs for the construction and the uncertainty of returns due to market and regulatory risk. For these reasons, telecommunications operators are deterred from investing in such new technology. The European Commission and the national telecommunications authorities face new regulatory challenges with respect to the previous market scenario with only copper networks. The challenge is now not only to ensure that viable competition is

\* Corresponding author. Tel.: +39 011 564 7292; fax: +39 0115 6472 99.

E-mail addresses: [carlo.cambini@polito.it](mailto:carlo.cambini@polito.it) (C. Cambini), [virginia.silvestri@eui.eu](mailto:virginia.silvestri@eui.eu) (V. Silvestri).

<sup>1</sup> Koutroumpis (2009) shows that the average impact of broadband infrastructure on GDP is 0.63% (for the EU-15, 2002–2007), that is the 16.92% of total growth of this period. Czernich et al. (2011) show that a 10 percentage point in broadband penetration increases annual per-capita GDP growth by 0.9% to 1.5%.

<sup>2</sup> In particular, the goal is to provide all European households with a broadband access of 30 MBit/s and at least half of all European households with a broadband access of 100 MBit/s by the year 2020.

working in the market, but also that conditions are such that investment incentives are stimulated. The classic trade-off between static efficiency and dynamic efficiency emerges.

Much of the debate on supply side policies focuses on what kind of access regulation should be set for the NGN and the rules regarding co-investment agreements between firms (Bourreau, Cambini, & Hoernig, 2012a; Bourreau, Cambini, & Hoernig, 2012b). In fact, given the market and regulatory risks and the extensive investment requirements for the NGN roll-out, the opportunities of cooperative joint investments have recently become a prominent topic of discussion. Such co-investments are believed to possibly be a solution to the asymmetric risk allocation, which slows down the NGN roll-out, and to the financial constraints faced by firms. The discussion over co-investment agreements regards their effective superiority in terms of social outcomes and what rules for such agreements should be set to avoid potential anti-competitive consequences or, more generally, to maximize their social benefit. To this aim, a special attention must be devoted to the access conditions between partners: compensations mechanisms, exchange of information, non-discrimination clauses. It is also important to consider what is the number of players in the market compared to what is the number of co-investment partners.<sup>3</sup> European national authorities are adjusting their regulatory frameworks to include provisions regarding such co-investment agreements between telecommunications operators to avoid inefficient investment duplications and at the same time potential anticompetitive consequences from cooperation between firms. One of the most sophisticated set of rules in this respect is represented by the French regulation. In France, in the “high-density areas”, the regulatory authorities have set the following procedure for the NGN roll-out: (i) the initiator should first identify which other market operators are interested in co-funding the NGN investment; (ii) if no other firms participated in the investment effort, the investing firm is forced to give access at “reasonable and non-discriminatory condition”; (iii) if at least one other firm participated in the investment effort, they are forced to give access to late entrants, but the access price should be inclusive of a “risk premium” (Arcep, 2009; Bourreau, Cambini, & Hoernig, 2010).

A thorough analysis of these relevant factors regarding co-investment agreements for the NGN roll-out is still missing in the economic literature on regulation and investment in telecommunications; this paper aims at filling this gap.

Existing papers address the impact of access regulation on NGN investment in different perspectives (see for a survey, Cambini and Jiang, 2009).<sup>4</sup> Nitsche and Wiethaus (2011) compare different regulatory regimes regarding the effects on investment incentives, the competition intensity and the resulting consumer surplus in a two-stage Cournot model with two firms, a vertically integrated incumbent and an access seeking entrant, in a context with demand uncertainty. Risk sharing is one of the regimes they look at in their analysis, but it is considered in a reduced-form fashion, in which the two co-investing firms share the cost of the investment and then do not have to make any further side payment for the use of the NGN. However, they conclude that risk sharing can be particularly beneficial both in terms of investment incentives and consumer welfare. Cambini and Silvestri (2012) use a similar model to Nitsche and Wiethaus (2011), but analyze a dynamic framework with vertically differentiated firms. The paper extends the previous analysis and finds similar results regarding the potential benefits of risk sharing agreements. Nitsche and Wiethaus (2010) also wrote a White Paper that contains a discussion over possible extensions of their basic model, and an overview of the results when considering alternative approaches to risk sharing. In particular, they focus on different compensation mechanisms between the co-investing firms, each time considering separately: the presence of asymmetry between co-investing firms (market share asymmetry or risk commitment asymmetry); the presence of outsiders without access to the agreement; and the effect of changing the number of outsiders and insiders to the agreement on the final outcome of the model. Interestingly, Nitsche and Wiethaus (2010) also consider the potentially depressing effect on NGN investment incentives of a non-margin squeeze obligation, in case the investment turned out to be unsuccessful, while the other relevant papers assume no regulation at retail level. However, their discussion does not contain any analytical solution and the chance to have outsiders with access to the NGN is only discussed, because their model could not give an insightful numerical solution to the case.

Among the vast literature on network investment and regulation in telecommunications, there are few papers addressing directly the effect of different forms of co-investment agreements. Inderst and Peitz (2012) analyze the role of different contract types and access regulation on innovation and competition in NGN investment. In their model, an incumbent and an alternative operator (other licensed operator—OLO hereafter) can possibly invest in building a NGN, cooperatively or on a stand-alone fashion. They show that access contracts signed after the investment deployment lead less often to the duplication of investment and a wider roll-out, compared to a market where it is not possible to sign access contracts. In comparison to such ex post contracts, contracts signed before the investment deployment lead to an even wider roll-out and to a less frequent duplication of investments. However, both types of contracts can be used to dampen competition. Bender (2011) examines a model inspired by Nitsche and Wiethaus (2011) but in a framework with horizontal product differentiation with price competition between an investing and an access seeking firm. In a context of uncertainty about the success of the NGN, he compares regulatory regimes with symmetric and asymmetric risk allocation, where the firms always have the opportunity to cooperate and jointly roll-out the NGN. Notably, he also analyses whether the firms are willing to cooperate in the investment deployment, as they cannot be forced to do so by regulatory authorities. However, he does not look into the different possible forms of compensation schemes for the use of NGN in the co-investment

<sup>3</sup> All of these factors are examined related to their impact in terms of potential anti-competitive behavior of the partner firms in the Report on Co-investment Agreements published by BEREC (2012).

<sup>4</sup> Additional papers recently analyze how access rules affect the migration from an old “copper” to a new NGN infrastructure. See for example Brito, Pereira, and Varela (2010) and Bourreau, Cambini, and Doğan (2012).

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