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Seeking the links between competition and telecommunications investments

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ABSTRACT

This paper empirically analyzes the relationship between competition and investments in the telecommunications industries of OECD countries. The impact of market opening on infrastructure investments is a critical ingredient for regulatory reviews, but the literature findings on this subject are quite mixed. The paper employs various methods to find out whether pro-entry regulation and competition had any significant effect. As a first investigation, we seek unknown breakpoints in countries' investment series. Market opening and unbundling obligations are found to be temporally associated with investment breaks only in some countries, and both upward and downward shifts are detected. In order to understand causes behind cross-country heterogeneity, a micro-econometric model of incumbent's investments is estimated. Neither unbundling obligations nor competition intensity, alone, have a significant effect, but they spur incumbent's investments in combination. Overall, our results support the view that competition does not depress investments at firm and country levels. Conditionally on their ability to foster competition, unbundling obligations play a positive role.

1. Introduction

This paper addresses the relationship between competition and investment in telecommunications, with a focus on developed countries. This issue has been at the center of policy debates since the mid-Eighties. Nevertheless the empirical research on the subject has been less continuous, and has not yielded compelling evidence.

It is generally acknowledged that competitive markets foster sector static efficiency, but their potential for dynamic efficiency remains a questionable issue. In particular, competition in telecommunications markets depends on pro-entry regulations. While fostering entrants' investments, measures as access regulation and unbundling obligations have been argued to hinder the incumbent's incentives to invest (Valletti, 2003; Pindyck, 2007; Cave, 2014). An in-depth analysis of the issue is also necessary to design broadband policies. Service-based competition was initially viewed as a stepping stone towards the roll-out of broadband networks (Cave & Vogelsang, 2003; Bourreau & Doğan, 2006). Questions then arose on the validity of the ladder-of-investment paradigm (Avenali, Matteucci, & Reverberi, 2010; Cambini, Hoernig, & Bohlin, 2012),

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especially if transition to fiber networks is the goal (Cave, 2014). Nowadays facility-based competition (FBC) is more commonly seen as an antecedent of Next Generation Networks.[1]

Eventually, after more than two decades of liberalization experiences, an ex-post assessment of the issue can be made, as the datasets that exist today cover a fairly large number of years. At the same time, gauging the effect of competition on investment in the telecommunications sector is still a challenge. The first empirical difficulty arises with the need to model the market opening process comprehensively. Absent alternative platforms such as cable networks, competition depends on regulations that make entry possible (Bouckaert, Van Dijk, & Verboven, 2010; Grajek & Röller, 2012; Cave, 2014). Second, confounding factors may be present, because the market opening process intertwines with other reforms, the most prominent of which is incumbent privatization (Lestage, Flacher, Kim, Kim, & Kim, 2013). Finally, investment feeds back on product market competition, in two main ways. The modernization of networks opens the way to service innovation, which in turn determines the market structure. Another reverse link may arise from pro-entry regulations, which have periodically been adjusted on the basis of concerns for investment (Armstrong & Sappington, 2006; Sadowski, Nucciarelli, & deRooij, 2009). In short, competition, policy instruments and investment are connected by a "complicated web of positive and negative effects" (Bauer, 2010). The empirical strategy should complement competition indicators with privatization and regulation indicators, and should allow for the possible endogeneity of independent variables.

It is thus no wonder that the available empirical evidence on the subject is inconclusive (Section 2). The relatively small number of econometric analyses that were performed in the decade following the pioneering cross-country study by Ros (1999) did not find a significant influence of competition on network investment. Later analyses instead found that entry deregulation spurs country-level investments, at least if certain accompanying measures are introduced (Wallsten, 2001; Fink, Mattoo, & Rathindran, 2003; Li & Xu, 2004; Alesina, Ardagna, Nicoletti, & Schiantarelli, 2005). Turning attention to the firm level, incumbent investments were initially considered not to be affected by product market competition (Bortolotti, D'Souza, Fantini, & Megginson, 2002; Jung, Gayle, & Lehman, 2008), but a recent article by Lesteage et al. (2013) has shown that competition has different effects on investment when incumbent ownership is taken into account. Finally, pro-entry regulations have been proven to have a null or negative effect on investment for both the incumbent and individual entrants (Grajek & Röller, 2012).

The research illustrated in the remainder of this paper adopts a neutral view of the relationship between competition and telecommunications investment. It also takes a wider perspective than other analyses on the same subject (e.g. Lestage et al., 2013), which generally privilege the in-depth investigation of a single theoretical question and use a single econometric approach. The present paper instead exploits multiple empirical models and methods, in an attempt to glean information on possible regularities in the competition–investment relationship at country and firm levels. Three very broad research questions are addressed:

- Does progress towards competitive markets determine telecommunications investments?
- Is pro-entry regulation a driver of infrastructure investments per se, or conditionally on its ability to spur competition?
- Is an accompanying measure as privatization necessary for competition to have an impact on investment?

Our first step was a retrospective and naïve look at the evolution of country-level telecommunications investments in 18 OECD economies. We have looked for unknown breakpoints in investment time series from 1975 to 2007, and discussed whether upward and downward shifts can be associated to the market opening events (Section 3). In order to remove the possible aggregation bias that arises from entrants' investments and the deployment of mobile networks, we then focused on the market leader, i.e. the incumbent, and controlled for the diffusion of mobile communications (Sections 4 and 5). The empirical analysis has been carried out on a sample of 29 incumbents from OECD countries (1993–2008). The causality relationship between firm-level investment and competition indicators, and the presence of unit roots have been explored, since reverse causality and non-stationarity of indicators cannot be excluded. Finally, micro-econometric models of firm-level investment have been specified and estimated through dynamic panel methods. The Bond–Meghir model takes into account endogeneity problems and offers a thorough representation of investment determinants at the firm level. As such, it has the potential to control confounding factors, and to insulate the effect of pro-entry regulation and competition on investment.

The paper is organized as follows. After a review of the previous empirical studies on competition, reforms and investment (Section 2), the structural break analysis is presented (Section 3). The empirical strategy adopted to model the incumbent's investment is then discussed (Section 4). The empirical findings are then reported and discussed (Section 5). Finally, some concluding remarks are presented (Section 6).

2. Literature review

This section synthesizes the most relevant theories on competition and investments for telecommunications. It then surveys results obtained by the extant empirical literature, with an emphasis on firm-level studies that investigate incumbents' investments.

[1] Since 2003, the US has shifted from network-sharing regulations towards a market-driven approach (Bauer, 2010). Supply-side aids can only be granted by the European Union governments to areas that are underserved or served only by one broadband network operator, provided that the eligibility criteria are met, while competitive areas are excluded from such policies (Sadowski, Nucciarelli & deRooij, 2009; European Commission, 2013).