



The long-run effects of copper-loop unbundling and the implications for fiber



Robert W. Crandall^{a,b}, Jeffrey A. Eisenach^{b,c,*}, Allan T. Ingraham^b

^a Brookings Institution, 1775 Massachusetts Ave, NW, Washington, DC 20036, USA

^b Navigant Economics LLC, 1200 19th Street, NW, Suite 850, Washington, DC 20036, USA

^c George Mason University Law School, 3301 Fairfax Drive, Arlington, VA 22201, USA

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ABSTRACT

Policies mandating unbundling of copper telecommunications networks have now been in place for more than 15 years, and it is thus becoming possible to study their long-run effects. This paper reviews the existing evidence on the effects of copper unbundling, and presents new empirical results based on regression analyses of broadband penetration in OECD countries from 2001 to 2010. The results show that the long-run effect of copper unbundling on household broadband penetration rates is negative, a finding which is consistent with previous research, including with research suggesting that copper unbundling has slowed the deployment of FTTP infrastructures, especially in Europe. Based on an analysis of the similarities and differences between the unbundling of copper networks and fiber networks, the paper concludes that mandated unbundling of fiber networks would likely deter deployment of Next Generation Access networks (NGAs).

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1. Introduction

It has now been more than 15 years since Hong Kong imposed the first network unbundling requirement on an incumbent telephone company.¹ Since then, unbundling of copper-based networks has become a staple of telecommunications regulatory policy throughout much of the developed world. Unbundling played a central role in U.S. telecom policy for several years, beginning with the Telecommunications Act of 1996. Europe followed suit in 1998,² and while implementation was phased in over time, nearly all European states now have some form of copper unbundling requirement. Similarly, unbundling has been adopted – albeit in different forms and flavors – in most developed Pacific Rim countries, including Australia, Japan, New Zealand and South Korea.

With the deployment of fiber-to-the-premises (FTTP) infrastructures, regulators are now considering whether to extend unbundling regulations to these new next generation access (NGA) fiber-optic networks, and if so, how. A few nations have already adopted fiber unbundling rules, the issue is now front and center in Europe and Asia, and it has even become a topic of discussion in the U.S., which decided in 2003 not to require fiber unbundling.³

* Corresponding author at: Navigant Economics, 1200 19th Street, NW, Suite 850, Washington, DC 20036 USA. Tel.: +1 202 448 9029; fax: +1 202 973 2401.

E-mail addresses: rcrandall@brookings.edu (R.W. Crandall), jeff.eisenach@naviganteconomics.com (J.A. Eisenach), allan.ingraham@naviganteconomics.com (A.T. Ingraham).

¹ See Office of the Telecommunications Authority, Hong Kong Government (1995).

² See European Commission (1998, 2000). As discussed below, a few European states had adopted unbundling requirements prior to the EC's adoption of unbundling as an EU-wide policy.

³ See Federal Communications Commission (2003).

The premise in this paper is that fifteen years of experience with copper unbundling can and should inform the debate over whether to unbundle fiber. The conclusions are, first, that the available empirical evidence shows that copper unbundling has likely reduced, and certainly has not improved, consumer welfare; and, second, that to the extent the issues associated with fiber unbundling differ from those associated with copper, the differences weigh against mandating fiber unbundling.

The first section below discusses the theoretical basis for mandatory unbundling, describes some of the implementation issues regulators have confronted in adopting and enforcing unbundling regulations, and advances a four-part framework for assessing implementation issues associated with unbundling. It also explains the theoretical basis for the hypothesis that unbundling might increase broadband penetration in the short run (by lowering retail prices) but reduce it in the longer-run (by deterring investment).

The following section briefly reviews the literature on the effects of copper unbundling, and then summarizes new empirical results derived from OECD panel data over a ten-year period (from 2001 to 2010). The quantitative evidence is most consistent with the hypothesis that unbundling has had little or no effect on broadband penetration in the short run, but has reduced penetration in the long run.

The last section of the paper explains why unbundling of fiber networks is likely to lead to results no better than, and in all likelihood worse than, the effects of copper unbundling. First, and importantly, the copper networks that were unbundled for the most part had already been built when unbundling rules were applied, so that the effects of unbundling on investment were minimized. Second, fiber unbundling poses significant engineering and network design issues above and beyond those associated with copper which could raise costs and increase the likelihood of regulatory error. Third, the competitive benefits of unbundling are likely smaller today than when copper unbundling was first adopted due to increased intermodal competition from cable and wireless. Taken together with the evidence on copper unbundling, these factors suggest that mandatory fiber unbundling is unlikely to improve economic welfare.

2. Theories of network unbundling

Throughout most of the 20th century, telecommunications services were provided by a single carrier, either owned by the government or privately owned and regulated as a public utility. By the 1970s, it became clear that competition was possible in at least some parts of the network. Competition developed first in consumer premises equipment and long-distance services, and, to a limited extent, fixed-wire local telecommunications in core areas of major cities.⁴ For the most part, however, competition in local fixed-wire, mass-market voice communications remained impractical in the era of plain old telephone service because of the prohibitive cost of duplicating any significant portion of the established incumbent's copper network.

By the early 1990s, technologies and markets had evolved further to the point where competition became feasible for many aspects of local communication services. Network unbundling was advanced as a means of permitting competition in the replicable portions of the network, even if particular network elements (for example, the last mile of twisted-pair copper) still could not economically be replicated. Unbundling forces owners of non-competitive network elements to grant competitors access to their monopoly facilities at regulated wholesale prices. By mandating resale, regulators seek to preserve the economies of scale or density associated with monopoly telecommunications networks, while at the same time achieving the low prices, differentiated choices and rapid innovation generated by retail competition. On the other hand, the practical challenges of implementing unbundling policies are formidable, and the potential for unintended harm is significant. There is an extensive body of literature exploring all of these issues in great detail; below is a brief summary of the major arguments.

2.1. The theoretical case for network unbundling

The case for unbundling assumes, first, that some aspects of the market for telecommunications services – for example, ISP services – are potentially competitive, while others – for example, the last mile connection to individual premises – cannot economically be replicated. If the last-mile monopolist is permitted to do so, it may under certain circumstances seek to foreclose competition in the competitive aspects of the market by denying competitors access to the local loop, or by charging a prohibitive price.⁵ Unbundling seeks to head off such anticompetitive behavior by forcing access to the non-replicable portions of the network at efficient prices.⁶

The economic benefits of unbundling, if successfully implemented, fall into three broad categories. First, in the most static sense, unbundling should result in lower retail prices (relative to the prices charged by an unregulated monopolist) simply as a result of forcing the network monopolist to charge less than the monopoly price for the non-replicable portions of its network. Second, in the medium- and long-run, it is hoped that competition in the market for the replicable aspects of the service will result in lower costs (and thus prices), beneficial product differentiation, and increased innovation, while the avoidance of uneconomic network duplication reduces total costs. Third, assuming technological or economic factors make it possible over time to replicate ever more network elements, unbundling is hypothesized to create a ladder of

⁴ See eg., Brock, 2002.

⁵ The incentives of even a monopolist to restrict competition in this way are fact-dependent. See eg., Farrell and Weiser (2003).

⁶ For an overview of the arguments, see generally, Organization for Economic Co-operation and Development (2003).

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