

# Chapter XVI

## Competition in Broadband Provision and the Digital Divide

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### ABSTRACT

*This chapter examines the supply of DSL broadband by the incumbent local exchange company (LEC) in five U.S. states in the earlier years of deployment. Our empirical analysis shows that income, other demographics, and cost factors are important determinants of entry and availability. After controlling for other factors, the racial characteristics of the area do not affect DSL provision. Active competition in broadband from competitive LECs reduces deployment of DSL by the incumbent, but potential competition from competitive LECs has the opposite effect. Competition from cable companies also negatively influences the incumbent's decision to supply DSL. Our objective in gauging the importance of the various factors is to highlight the important drivers of broadband provision for policymakers.*

### INTRODUCTION

The worldwide explosion in the growth of broadband infrastructure is allowing countries to enjoy productivity gains in industries that heavily use communications. Consumers also are deriving increased benefits from the availability of broadband connection to the Internet, as the technology speeds up some applications (e.g., downloading music) and creates entirely new possibilities (e.g., telemedicine).<sup>1</sup> Households typically connect to

the Internet through digital subscriber line (DSL) service provided on their telephone line or through cable modem service. Although broadband technology of these and other types is diffusing rapidly, some policymakers in the U.S. and abroad are concerned that not all regions within countries are receiving broadband access at the same time. The phenomenon of unequally diffusing information and communication technology is known as the “digital divide.” The digital divide in the United States takes the form of a well-documented gap

in computer and Internet usage between richer and poorer households, majority and minority groups, and urban and rural areas (Newberger, 2001; NTIA, 2002; Mills & Whitacre, 2003; Fairlie, 2004). Broadband Internet access has become one of the latest aspects of the digital divide to be discussed, examined, and lamented in arenas of public policy.

In the early years of broadband Internet adoption, the U.S. Department of Commerce (NTIA, 2000) issued an influential report showing that black and Hispanic households had less access to broadband Internet access than did white households. The report also found that households in rural areas were less likely than urban households to subscribe to broadband access, and that lower-income households lagged the subscription rates of more affluent households. The U.S. Federal Communications Commission (FCC) opined that low subscription to broadband services in rural, low-income, and minority areas was due at least in part to a lack of availability (FCC, 2000a). Since availability—the supply of broadband infrastructure by communications providers—is necessary for the household to subscribe to broadband service, fundamental analysis of the broadband digital divide must begin on the supply side.

What are the determinants of the supply side of the digital divide? Both the demographic characteristics of the territory and competition among broadband service providers play a role in entry in the broadband market. The racial composition and income of a market may influence broadband supply directly through overt discrimination (sometimes called “redlining” in the U.S.) on the part of the providers, or more likely, according to the profit maximization hypothesis (Prieger 2003), through reducing the demand in an area (and therefore the profit) perceived by a potential supplier. Competition in local communications also affects broadband access. For example, incumbent telephone and cable companies may be more likely to provide broadband access to “meet the competition” when they face broadband competitors (the competitive stimulus hypothesis). On the other hand, if potential entrants deem a market large enough to support one broadband provider

but not two, then the availability of cable modem service (for example) will discourage deployment of DSL (the carrying capacity, or market size, hypothesis modeled by Bresnahan & Reiss, 1987). If competition is an important driver of broadband availability, then policy efforts to close the digital divide should encourage competition. Although the data we examine are from the U.S., the public policy concerns of the digital divide and the issue of the role of competition in broadband rollout are universal.

In this chapter, we examine the supply of DSL broadband by the incumbent local exchange company (LEC) in five Midwestern states in the U.S. Our objective is to gauge the importance in the DSL entry decision of the various markets and competitive factors discussed above. The findings in this study show that there is no evidence that race *per se* matters in the supply of DSL once the impact of the income of the area is removed. However, household income does matter, with lower-income areas receiving less access. We also find that the education levels, average length of commute, size of firms in the area, and costs affect the deployment of DSL. The effect of competition in the area is in accord with the carrying capacity hypothesis.

## LITERATURE REVIEW

A growing body of literature exists on the determinants of broadband availability in an area. Our study has the advantage of examining a precise geographical market for DSL deployment—the wire center serving area. This allows us to gather exact demographic characteristics of the markets, as would be considered by the decision makers at the potential broadband providers. Previous studies in the economics literature looking at deployment throughout the U.S. typically examine postal service code areas<sup>2</sup> (Flamm, 2005; Xiao & Orazem, 2005; Grubestic & Murray, 2004; Prieger 2003) or counties (Gillett & Lehr, 1999), neither of which conform to telecommunications geography. Gabel and Kwan (2001) also use the wire center serving area as the unit of observation. Studies considering broadband diffusion within a state

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