Chapter XLVI
Explaining Patterns of Broadband Development in OECD Countries

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ABSTRACT

The aim of this chapter is to provide some insights about the explaining patterns of broadband deployment and adoption. This problem is addressed by examining them in the light of the results of an exhaustive cross-national empirical analysis that uses a comprehensive panel data set from the 30 OECD countries with more than 40 features. The results suggest that technological competition and the low cost of deploying infrastructures on one side, and the predisposition to use new technologies as well as some social indicators on the other, appear to be the key drivers for broadband deployment and adoption, respectively.

INTRODUCTION

In recent years, it has generally been accepted that the development of broadband as a means to promote new interactive and advanced applications is supposed to be the basis of what is called the *knowledge-based* economies and societies. Nevertheless, recent studies confirm that broadband penetration rates are only significant in developed countries and, what is more, that broadband adoption lags behind in rural and remote areas worldwide, even in developed countries (OECD, 2003c). As a consequence, the economic and social gap between those who are able to enjoy the benefits of these new technologies and those who do not is widening throughout the world.

This fact has led most governments to consider broadband availability and affordability as an objective of social cohesion, and most of them released action plans in the 1990s. The analysis of these policies shows that there is a wide range of alternatives, mainly due to the novelty of policies of this type and heterogeneous types of factors that should be considered (economic, social, and technical factors) (Cava & Alabau, 2003; Cava & Alabau, 2006; Falch, 2004). This situation leads to difficult choices for policy makers that usually lack practical experience on this issue.

In this context, the aim of this chapter is to provide some useful insights about the main constraints and motivators for broadband development and thus help to identify which policies could be

most effective to promote broadband deployment and adoption.

To this end, this chapter starts from the historical experience and uses a set of cross-national empirical data from the 30 Organization for Economic Cooperation and Development (OECD) countries from the years 2000 to 2002. The empirical study extends the work done in Cava and Alabau (2006). In particular, it follows a methodological approach to alleviate some of the weaknesses found, and introduces the use a nonlinear regression technique, multivariate adaptive regression splines (MARS). This technique allows accurate nonlinear and robust estimates and fully interpretable results.

This chapter presents the main components of this research study, which are structured as follows. In the second section, existing literature is reviewed and some weaknesses of previous works are identified. Then the third section describes the characteristics of the panel data and, in the forth section, the methodology followed and the multivariate adaptive regression splines regression technique (MARS) are presented. The fifth section examines the results obtained from the empirical analysis. This section is divided into two parts which are the analysis of supply-side factors in broadband deployment and the analysis of the joint influence of supply and demand-side factors in broadband adoption. Finally, in sixth section are the results discussion, along with some suggestions for future research.

LITERATURE REVIEW

A growing number of studies about the development of broadband networks and services have become available in latest years. Two main research approaches can be distinguished, the case study method and the empirical analysis. The case study method explores the factors that could have influenced broadband development from a qualitative point of view. Some research studies analyze only one success case such as South Korea to explore what are the key explaining factors (Lau, Kim, & Atkin, 2005). Other studies however, use this research approach to obtain some conclusions after the comparison of different cases. This is the methodology followed in extensive cross-national analysis such as those presented in OECD (2001) and BDRC Ltd. (2001), where the situation in different countries is compared to find common patters that could explain broadband development. This is also the research method in Lee and Chan-Olmsted (2004a) to identify the key explaining factors that have contributed to South Korea's competitive broadband environment, compared to the United States.

Regarding the influence of political choices, some studies deal with regulatory and political implications on broadband. In a recent work (Frieden, 2005) Canada, Japan, Korea, and the United States best practices are examined with an eye toward determining the optimal mix of legislative, regulatory, and investment initiatives. In Lee and Chan-Olmsted (2004b), the impact of different policies to encourage broadband awareness, availability, and adoption in rural Scotland are analyzed through influence diagrams.

The studies that follow the empirical approach broach the broadband problem by using empirical data, modelling, and statistical techniques. Some of them use econometric analysis to estimate broadband and Internet demand considering that broadband infrastructure is already available (Rappoport, Kridel, Taylor, & Alleman, 2003). Other studies such as Gabel and Kwan (2000) and Grubesic and Murray (2002) examine the role of both supply and demand factors using a statistically valid sample of customer locations. Other studies explore the geographical differences in broadband provision and adoption considering the effects of socioeconomic and demographic differences, both at regional level (Grubesic, 2004), or at cross-national level (Bauer, Kim, & Wildman, 2003; Garcia-Murillo & Gabel, 2003).

The political and regulatory implications are only indirectly analyzed in empirical studies by including the effects of the public actions as variables in the models. Thus in Gillet, Lehr, and Osorio (2004), a taxonomy of local government initiatives in the United States is offered, and some preliminary empirical results for a sample of communities with municipal electric utilities are