

Chapter XXIX

Broadband Access and Broadband-Based Applications: An Empirical Study of the Determinants of Adoption Among Italian SMEs

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ABSTRACT

Why do some small and medium enterprises (SMEs) adopt Internet broadband technologies (high-speed connection and complementary applications) and others do not? This chapter aims at analyzing the issue through an econometric investigation. Relying on the (thin) previous empirical literature on the topic and focusing on a large and representative sample of Italian SMEs, we analyze the determinants of broadband connection and adoption of complementary applications. Results of the econometric analysis reveal that: (i) among firm-specific characteristics, size and the firm's need to communicate are major determinants both of broadband connection and use of complementary applications, while indicators of firm efficiency and of the competitive pressure suffered from the SME positively affect only the number of used applications, while not exerting any impact on the decision to connect; (ii) among location-specific characteristics, the level of telecommunications infrastructure positively influences both connection and applications use, while the presence within the local labor market of young and skilled workforce makes SMEs adopt more applications; (iii) time-specific variables like those related to the actual and future price of the high-speed Internet connection affect SMEs' decision to adopt broadband. These findings have important implications for suppliers and policy makers.

INTRODUCTION

Broadband access to communication networks plays a crucial role for economic development. In particular, it is very important for small and medium enterprises (SMEs), in so far as it provides this type of firm with efficient and permanent connectivity to the global market at a price that many SMEs could not previously afford (OECD, 2003). This has generated a policy debate on how to stimulate rapid and widespread adoption of broadband access technologies. However, policy interventions can be effective only if adoption determinants are well understood.

Previous studies analyzed the most significant factors which influence SMEs' adoption of Internet and broadband, highlighting that SMEs may encounter severe obstacles mainly related to firm-specific and environmental-specific characteristics (see, among others, Arbore & Ordanini, 2006; Mehrrens, Cragg, & Mills, 2001). In particular, managers' IT knowledge, as well as firm size, seems to positively affect SMEs' adoption of broadband technologies. For what concerns environmental factors, external pressure on the organization (from customers or trading partners) to adopt the technology, are likely to have positive effects on firms' decision. Furthermore, the geographical area where firms are located further influences availability of broadband connection and consequently SMEs' decision to adopt (Prieger, 2003).

Moreover, the adoption by SMEs of broadband connection is likely to have a negligible economic impact at firm level by and of itself. In order to generate positive feedbacks on firm productivity and, more generally, on firm performances, it has to be associated with the adoption of complementary advanced communications (e.g., virtual private network, VoIP, video-conference) and management (e.g., customer relationship management, supply chain management, human resource, and administration management systems) applications that allow firms to radically change the way they do business. In fact, broadband access like other ICTs, is a general-purpose and enabling technology (Bresnahan & Trajtenberg, 1995) whose benefits can be fully captured only if it is used by adopting

SMEs both to carry out the same transactions or activities in a more efficient way and also as an instrumental means to generate and develop new transactions and activities (Bertschek & Kaiser, 2004; Preissl, 1995). In turn, for most economic organizations a necessary condition for an effective deployment of the above mentioned applications involves deep changes in their management. It follows that as interesting as the analysis of the determinants of the adoption by SMEs of Internet broadband access is the study of the factors that foster or hinder firms' adoption of broadband-based applications, including firms' ability to transform their organizational structure and managerial practices.¹

The chapter investigates both aspects: on one hand, we analyze the factors affecting the adoption by SMEs of broadband connection; on the other hand, we investigate the determinants of the adoption of broadband-based applications, once firms have adopted a broadband connection. The contribution focuses on Italy, where SMEs traditionally account for most of the wealth produced in the national economic system, and, in line with the extant empirical literature on the topic, gives special attention to firm- and location-specific factors as fundamental drivers of adoption. After a descriptive illustration of the diffusion of broadband connection and broadband-based applications among Italian SMEs, we study the determinants of their adoption through the estimates of a series of econometric models. For this purpose we take advantage of a new longitudinal dataset composed of 904 Italian SMEs (i.e., number of employees comprised between 10 and 249), that operate in both manufacturing and service sectors (excluding public administration, finance, and insurance). The sample is stratified by industry, size class, and geographical area so as to be representative of the Italian population of SMEs, and it contains detailed survey-based information on firm-specific characteristics and about firms' adoption of broadband connection and broadband-based applications over the period from 1998 to 2005.

The analysis highlights a number of interesting findings. As to the adoption of broadband connection, the econometric results highlight that larger

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