Available online at www.sciencedirect.com
ScienceDirect
J. Finan. Intermediation 17 (2008) 229–255
Journal of Financial Intermediation
www.elsevier.com/locate/jfi

The output and profit contribution of information technology and advertising investments in banks ☆

Alfredo Martín-Oliver [a,*], Vicente Salas-Fumás [b]

[a] *Banco de España, Spain*
[b] *Universidad de Zaragoza, Spain*

Received 16 March 2007
Available online 23 December 2007

Abstract

This paper examines the contribution of investments in Information Technology (IT) and in advertising to the output and profits of Spanish banks, in the period 1983–2003. We find that the growth in the stock of IT capital explains one third of output growth of banks, and that an additional investment in IT of one million euros may be substituted for twenty-five workers. The paper also finds that advertising investments increase the demand for bank services with an elasticity of 0.22 for deposits and 0.11 for loans. For all the assets considered, the null hypothesis that banks use the profit-maximizing amount of services per period cannot be rejected with the data.
© 2008 Elsevier Inc. All rights reserved.

JEL classification: G21; D24

Keywords: IT capital; Advertising; Output growth; Rate of return; Banks

1. Introduction

Information technology (IT) and advertising capital increasingly substitute physical capital and labor in the production and sale of banking services. Data on Spanish banks used in this paper show that the average stock of IT capital per bank, in 2003, is ten times larger than what it was in 1983; in the same period, the average stock of capital accumulated through advertis-

☆ This paper is the sole responsibility of its authors and the views represented here do not necessarily reflect those of the Banco de España.

* Corresponding author at: C/Alcalá 48, 28014 Madrid, Spain. Fax: +34 91 338 6102.
E-mail address: alfredo.martin@bde.es (A. Martín-Oliver).

1042-9573/$ – see front matter © 2008 Elsevier Inc. All rights reserved.
doi:10.1016/j.jfi.2007.10.001

ing expenditures has been multiplied by a factor of 2.4. However, the average stock of physical capital, and the average number of employees per bank in year 2003, is 1.6 times that of 1983. Economics and business scholars have expressed concern about the true contribution of large investments in IT capital to the productivity and profitability of firms,[1] but, somewhat surprisingly, the consequences of the shift toward a more intensive use of immaterial assets in banks have not been given much attention in the literature.[2]

This paper models the multi-branch, multi-asset banking firm and examines contributions to the productivity and profitability of services from labor, and from a list of capital inputs, including physical (branches), information technology (IT) and advertising capital. The model specifies if a particular input is valuable for the bank because it increases production (i.e. it is a production function input), because it increases the demand for loans or the supply of deposits for a given price, or both. We use data from the confidential accounting statements of Spanish banks during the period 1983–2003, to test the assumptions on the production technology, on the demand function of bank services, and on the profit-maximizing conditions of the use of services from labor and capital inputs. In the process, the paper provides estimates of the production and demand elasticity of input services, and of the price elasticity of demand for bank loans and deposits. In addition to providing new evidence on the contribution to productivity and profitability of investment in immaterial inputs of IT and advertising, the paper also tests for scale economies at the branch and at the bank level.

The paper contributes to the literature on the productive efficiency and efficient resource allocations of banking firms (see e.g. Berger et al., 1997) in several ways. First, it expands the list of banks' operating inputs considered in previous research (labor and physical capital), adding the capital services from IT and advertising capital. The stocks of capital inputs are valued at replacement cost and the services used in production or in increasing demand are valued at the users' costs of capital (financial opportunity costs plus depreciation). Second, the paper presents a new formulation the production technology of banking services at the branch and the bank level (Leontieff-type production function), which is tested for constant returns to scale at the branch and at the bank level. Third, the production function of banks is estimated using the *GMM*-system method (Blundell and Bond, 1998); the use of standard panel data econometric techniques in production functions estimation gives unreasonably low estimates of the elasticity of output to capital and, consequently, leads to erroneous conclusions about the existence of constant returns to scale in production (Griliches and Mairesse, 1998).[3]

[1] The so-called "productivity paradox," namely the apparent small contribution of large investments in computers and information technologies (IT), to aggregate productivity growth in developed economies (see e.g. Brynjolfsson, 1993; for a review), fostered the use of firm-level data to investigate whether IT capital did in fact contribute to the efficiency and profitability of firms (Lichtenberg, 1995; Brynjolfsson and Hitt 1995, 1996; Dewan and Min, 1997; Brynjolfsson et al., 2002). The controversy about IT and growth has been even more intense at the macro level; see for example Oliner and Sichel (2000), for a review. Lim et al. (2004) provide a general assessment of research findings on the effects of IT investment in firm performance before, and after, the mid nineteen-nineties.

[2] The papers on the consequences of IT investments in banking we are aware of are Parsons et al. (1993) in Canadian banking, Prasad and Harker (1997) in US retail banking, Casolaro and Gobbi (2004) in Italian banking and Beccalli (2007) for a sample of European banks. Beccalli (2007) also refers to reports from the Council of Economic Advisors and the McKinsey Global Institute that find weak links between IT spending and productivity for US banks. Pinho (2000) documents the increase in advertising expenditures by Portuguese banks after the market was liberalized.

[3] The existing research in the topic also includes several papers on the efficiency of Spanish banks, Grifell-Tatjé and Lovell (1996), Kumbhakar et al. (2001), Lovell and Pastor (1997), Maudos (1996). None of them focus on the particular issues of contribution to output and value of bank assets addressed in our paper.

دریافت فوری ← متن کامل مقاله

ISIArticles
مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات