



Strategic online banking adoption

Rubén Hernández-Murillo^{a,*}, Gerard Llobet^b, Roberto Fuentes^c

^a Federal Reserve Bank of St. Louis, P.O. Box 442 St. Louis, MO 63166-0442, United States

^b CEMFI, Casado del Alisal 5, Madrid, Spain

^c Farnindustria, Serrano 116, Madrid, Spain

ARTICLE INFO

Article history:

Received 26 March 2009

Accepted 10 March 2010

Available online 15 March 2010

JEL classification:

O31

G21

L10

C41

Keywords:

Duration models

Technological adoption

Online banking

Competition

ABSTRACT

In this paper we study the determinants of banks' decisions to adopt a transactional website for their customers. Using a panel of commercial banks in the United States for the period 2003–2006, we show that although bank-specific characteristics are important determinants of banks' adoption decisions, competition also plays a prominent role. The extent of competition is related to the geographic overlap of banks in different markets and their relative market share in terms of deposits. In particular, banks adopt online banking services earlier in markets where their competitors have already adopted this technology. This paper is one of the first to construct local banking markets using the geographic market definitions delimited by the CASSIDI[®] Database compiled at the Federal Reserve Bank of St. Louis.

© 2010 Elsevier B.V. All rights reserved.

1. Introduction

The arrival of the Internet not only spurred the development of new industries but it also changed the business model of many others, including the banking sector in the United States. In 1995, the Security First Network Bank was the first Internet-only bank created. Around the same time, Wells Fargo was the first brick-and-mortar bank to establish its online presence. For most of the remaining banks, however, online presence in the first few years simply meant only the creation of a static corporate website. Banks soon started to develop software applications that first allowed customers to access their accounts and later allowed them to perform financial operations online. By the end of 2003, more than half of the commercial banks in the United States offered some online banking services to their customers.

This paper analyzes the determinants of a bank's decision to adopt online banking. In particular, we focus on the strategic considerations of this adoption, mainly in response to the adoption decisions of competitors in the same market. We show that banks that operate in markets where competitors have already adopted online banking tend to adopt online banking services earlier. This

effect persists even after controlling for the standard measures of the degree of competition in the market and other market characteristics. Bank-specific measures, such as size, as well as standard measures of a bank's financial health are also important determinants.

A considerable segment of the literature, particularly in the field of industrial organization, regards the optimal adoption of new technologies by a firm. For example, Oster (1982) studies the introduction of the basic oxygen furnace used in steel making. She approaches this decision as technologically driven, independent of the decisions made by competitors.¹ Later papers have introduced strategic considerations, mainly through the use of the Herfindahl index as a summary statistic of the intensity of competition. In the banking industry this strategic component is studied in Hannan and McDowell (1984) and Hannan and McDowell (1987) in the adoption of automated teller machines (ATMs), and in Akhavan et al. (2005) for the adoption of credit scoring.²

¹ Rose and Joskow (1990) study adoption decisions in markets where firms are local monopolies. In this case, the assumption that strategic interactions are absent is rather natural.

² Also in the context of ATMs, Saloner and Shepard (1995) and Gowrisankaran and Stavins (2004) study the network effects that technology adoption entails. Pennings and Harianto (1992) study the effect of the information technology accumulation in banks and the linkage across institutions in the adoption of video banking.

* Corresponding author. Tel.: +1 314 444 8588; fax: +1 314 444 8731.

E-mail addresses: Ruben.Hernandez@stls.frb.org (R. Hernández-Murillo), llobet@cemfi.es (G. Llobet), rfuentes@farnindustria.es (R. Fuentes).

Karshenas and Stoneman (1993) summarize the determinants of the decisions to adopt a new technology in a competitive context.³ These determinants are structured around four different mechanisms: *rank*, *stock*, *order*, and *epidemic effects*. Rank effects, mainly related to firm size, stem from the fact that adoption costs typically increase less than proportionally with the size of the firm and decrease over time. As a result, firms adopt according to their size: Larger firms adopt the new technology earlier. Stock effects relate to the idea that the benefits from adopting a new technology depend strategically on the number of firms that have already adopted it. Order effects arise when the return from adoption depends on the order in which firms have adopted – for example, because of preemption motives: Firms might adopt a new technology early to make later adoption unprofitable to competitors. Finally, epidemic effects assume that the diffusion of new technologies is faster when more firms have adopted them.

The decision to provide online banking services is different from the replacement of an existing technology studied in the classical examples in the adoption literature. Instead, online banking coexists with the traditional channels that include not only bank branches but also telephone banking. For example, opening a new account requires the customer to visit the bank branch, and this is also (together with ATMs) the main way to withdraw or deposit money. At the same time, online banking reduces the cost of providing a wide variety of products to customers. Whether different channels substitute for or complement each other is an empirical question. Corrocher (2006) for example, finds that in Italy online banking and physical presence (measured as branching intensity) are substitutes. One interpretation is that, for less-established banks (with fewer branches), online banking is a more efficient way to access new clients. In a sample of US banks in the late 1990s, however, DeYoung et al. (2007) find that branching intensity and online banking are complementary and show that online banking adoption positively affects the bank's future performance.⁴

Despite the importance of online banking, the literature on its adoption is still scarce. Very few papers have studied the demand for these services. One example is Chang (2003), who studies the consumer adoption decision of this technology in South Korea. The author infers that risk aversion and customer inertia make bank investments in this new technology unlikely to be profitable. She concludes that bank adoption might arise as a result of its positive reputation effects or preemptive motivations toward competitors.

Studies regarding the supply side for the United States include those by Furst et al. (2001), Nickerson and Sullivan (2003), and Sullivan and Wang (2005). Furst et al. (2001) study the determinants of adoption using a cross section of banks for 1999. The authors do not include strategic considerations. They show that profitability, bank size, presence in urban markets, and membership in a bank holding company are all positive and good predictors of the decision to adopt new online banking services.

Nickerson and Sullivan (2003) embed the strategic decision regarding the adoption of online banking in a real options environment. Their theoretical model shows that market leaders are more likely to adopt online services if competition consists of small firms or if uncertainty in the demand is small. They confirm these hypotheses by also using a cross section for 1999. Sullivan and Wang (2005) study the pattern of diffusion of technological innovations in different states. They propose a theoretical model that

is later tested using observations at the statewide level. They estimate slower adoption patterns for states where per capita income is lower, Internet access is more scarce, or banks are older. More important, adoption is also slower in states where banks are smaller. To the extent that rank effects make big banks more likely to adopt, the authors interpret this last result as supportive of the existence of epidemic effects, since smaller banks could learn from them.

Our paper departs from the previous literature in that we measure the strategic decision of institutions to adopt online banking as a response to the adoption decisions of their competitors. In the terminology introduced earlier, we measure the total *stock* and *order effects*. In principle, the increasing adoption of online banking is not an indication of a positive effect on the adoption probability of the late adopters, as most adoptions are likely to be driven by the rapid decrease in the cost of providing this service. In principle, two opposing strategic forces might shape the adoption decision. On the one hand, an increasing number of adoptions by competitors reduces the profits from implementing the technology and might delay adoption. On the other hand, the profits from not adopting might be reduced to a larger or smaller extent depending on the importance of this additional service to customers. Which force dominates and whether this force operates in a different direction for different kinds of banks is the empirical question we want to address. Overall, our results show that the decline in profits from not adopting online banking dominates, as the probability of banks' adoption increases in response to the adoption by competitors.

To quantify these effects we use a dataset on online adoption that has become available only recently. Starting in 2003, the Federal Deposit Insurance Corporation (FDIC) asked institutions to indicate in their quarterly *Call Reports* whether their websites allowed customers to execute transactions.⁵ We complement this dataset with information at the bank level using the *Summary of Deposits* (also from the FDIC), and demand characteristics obtained from the US Census Bureau. Compared with other papers in the literature, we benefit from the construction of a panel that allows us to estimate a hazard model of the time until the adoption decision.

To the extent that we are interested in determining the strategic component of adoption, it is essential to identify the relevant market in which banks operate and the competitors they face. Unfortunately, there is no obvious way to delimit this competition. Many banks compete at a national level, others at the state level, and finally, many small banks are local. For this reason, to isolate the effect of online presence we adapt the concept of *multimarket contact* (MMC) used in papers such as Evans and Kessides (1994) for the airline industry. This index is designed to weigh the characteristics of each competitor according to how close a substitute their product is for a competitor's product. In the banking industry, two banks can be considered closer substitutes if, among other things, their network of branches overlaps more often. In the sample and period we analyze, a large majority of the banks that have not adopted Internet banking are small and operate in local markets for which competition is still geographically localized and whose clientele is, for the most part, formed by retail depositors and small business borrowers.⁶

Our MMC index is constructed as a weighted sum of indicator functions for a bank's competitors at the local-market level. The indicator is 1 if the competitor has adopted online banking, and its weight corresponds to the share of the deposits that the competitor holds in this market. The MMC index averages the values

³ See Geroski (2000) and Hoppe (2002) for a review of the theoretical literature.

⁴ This division has also arisen in the study of the adoption of ATMs in relation to the number of branches. Whereas Ingham and Thompson (1993) find that ATMs and physical branches are substitutes, Saloner and Shepard (1995) obtain the opposite result.

⁵ Call Reports also track the presence of an internet website since 1999.

⁶ See Coccorese (2009) and Hannan and Prager (2009) for recent studies regarding the behavior of local banks and the effects of geographically diversified competitors, respectively.

متن کامل مقاله

دریافت فوری ←

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