



The effect of heterogeneous risk on the early adoption of Internet banking technologies

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Available online 2 November 2005

Abstract

Financial service providers have increasingly offered customers new remote access to such services, with Internet banking being the latest example. While Internet banking has been available for years, the early adoption by customers of this technology was disappointing to most. This paper examines the demand for remote access to banking accounts by consumers and finds that when the technology is new, the traditional risk return models including variables allowing for heterogeneous risk add power in modeling the adoption decision. Perceived risks in Internet banking are seen to be responsible for some of the hesitation to adopt. Ironically, older consumers are found to be less likely to adopt Internet banking regardless of their risk tolerances. However, younger consumers are found to be early adopters only when they have relatively high levels of risk tolerance.

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JEL classification: D8; D12; D81; G2; G21

Keywords: Internet banking; Retail banking; Consumer choice; Perceived risk; Heterogeneous risk

1. Introduction

Financial service customers are getting further away from the providers of those services. Petersen and Rajan (2002) found that small business lending, which has been the

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specialty of local relationship lenders, has been moving further from their customers over time, due in part to remote banking technologies. Remote access technologies in financial services have long been used to increase the geographic market of the financial service provider. Hannan and McDowell (1990) showed that banks adopted ATMs in order to expand their market share or protect their market against those banks that offered ATMs. Similar arguments have been made about other forms of remote banking technologies by Bouckaert and Degryse (1995) and Degryse (1996).

New technologies may also reduce costs. Daniel et al. (1973) were one of the first to show evidence that the production function of banks was improved through technology adoption. Hunter and Timme (1986, 1991) found that technology did improve industry wide scale economies, which explains why Humphrey and Pulley (1997) found that larger banks were more likely to replace people with technology than were smaller ones when forced to restructure their costs. Wheelock and Wilson (1999) investigated both productivity and efficiency at banks and found declining technical efficiency. The primary reason for this inefficiency of banks was the uneven application of technology among all banks; the most efficient banks were those that adopted new technologies.

However there are disadvantages of new remote access technologies. Pennathur (2001) found that Internet banking increased operational, legal and reputation risks, and increased competition. But, financial service consolidation is increasingly dependent on consumers accepting and adopting remote access technologies.

This paper examines the role perceived risk plays in the early adoption decision of new remote access technologies. We focus on the adoption decision from the perspective of the retail banking customer, as opposed to the commercial bank perspective as is traditionally considered (see Furst et al., 2000). We ask what would cause a retail customer to adopt Internet banking soon after its introduction. We find that when a technology is new, risk is likely to be heterogeneous and this heterogeneity leads to divergent optimal adoption strategies. In Section 2, we present the theoretical model that, shows how consumers maximize their utility in selecting new technologies. In Section 3, we develop a methodology of applying this model to consumer adoption of Internet banking. In Section 4, we present our empirical results. In Section 5, we summarize and conclude.

2. Theoretical framework

The main object of this paper is to better understand the adoption decision from the consumer's standpoint. This section uses micro-economic theory of consumer utility maximization to model how consumers decide whether or not to adopt a new remote access technology. We will assume that consumers derive utility from their traditional bank accounts according to the utility function $f(x)$. Since traditional accounts have been around for so long, consumers are relatively certain of the utility they will derive from them.

As remote banking technologies are added to the account delivery mix, the utility derived can increase or decrease according to the marginal function $h(x)$. Consumers are not certain of the outcome of their using a remote access account. The source of the uncertainty is twofold. First, the technology itself poses risks of unauthorized access. And second, the consumer may be uncertain about their ability to use it. The nature of the uncertainty itself may differ depending on the remote access service being used. We assume now k distinct uncertain possibilities. Some of these outcomes only affect one service. The first outcome ($j = 1$) is what happens when all technologies work correctly. Fur-

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