

# Demand estimation and consumer welfare in the banking industry<sup>☆</sup>

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## Abstract

This paper estimates a structural demand model for commercial bank deposit services in order to measure the effects on consumers given dramatic changes in bank services throughout US branching deregulation in the 1990s. Following the discrete choice literature, consumer decisions are based on prices and bank characteristics. Consumers are found to respond to deposit rates, and to a lesser extent, to account fees, in choosing a depository institution. Moreover, consumers respond favorably to the branch staffing and geographic density, as well as to the bank's age, size, and geographic diversification. Consumers in most markets experience a slight increase in welfare throughout the period.

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## 1. Introduction

Following the removal of regulatory barriers to the geographic expansion of the banking firm, the US banking industry experienced considerable growth and consolidation in the 1990s, with significant entry and exit. In particular, the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act allowed for nationwide branching by letting banks open branches in almost any US state, and as such dramatically changed the strategic possibilities of the firms in the industry.

The purpose of this paper is to measure the impact on consumer welfare following significant changes in banking services in the period. In order to measure consumer welfare, I develop a structural model of demand for commercial bank deposit services that allows not only for the changes observed in prices, but also those in service charac-

teristics, such as the size of the branch network and the geographic diversification.

While what interests us here is the effect of these changes on consumers, regardless of their cause, it is nevertheless interesting to review the background related to the removal of geographic restrictions in banking. While no causal relationship can be established, the Riegle-Neal Act of 1994 is likely to have played an important role in the expansion of branch networks and other changes in bank prices and services throughout the 1990s. For many years, firms and government agents debated about the best regulatory framework regarding the geographic expanse of a bank's activities. Those in favor of deregulation usually argued that it would bring greater efficiency and competition among banks, with resulting benefits to consumers. Those against deregulation commonly alleged that the removal of geographic restrictions would lead to highly concentrated banking markets and high profits in detriment of consumer welfare. In terms of the theory, support can be found for both views based on the different assumptions one is willing to make about bank competition, such as the degree of product differentiation and the nature of the production technology. In previous empirical research,

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the lifting of geographic restrictions in banking has been linked to an improvement of economic conditions (Jayaratne and Strahan, 1996); bank performance and efficiency (Jayaratne and Strahan, 1998; Stiroh and Strahan, 2002); increase in service quality, costs and fees accompanied with no effect on market structure (Dick, 2006); significant bank entry (Amel and Liang, 1992); and an increase in bank stability (Calomiris, 2000). In terms of the political process of the phasing out of the heavy geographic regulation on banking activities, Kroszner and Strahan (1999) find that small banks were the most resistant to branching deregulation and therefore the most likely to suffer from it.

The industrial organization literature has gone a long way in recent times in the estimation of structural models of demand that take into account product differentiation, and, given their microfoundations, are particularly useful to address the effects from changes in policy or the market environment. This paper estimates a discrete choice model of demand for banking services by making use of some of these techniques. While this paper was the first to implement this machinery to banking, much work has been reported recently applying it to answer other important policy questions in the industry. Adams et al. (2007) estimate deposit demand for banks as well as thrifts in order to determine whether they are close substitutes, an important question for antitrust regulation given its implications for the definition of the relevant geographic market. In her exploration of ATM networks, Ishii (2005) estimates a structural model of deposit demand and bank behavior in order to determine the effects of surcharges – fees charged to unaffiliated customers – on demand, ATM investment and competition. Along a similar vein, Knittel and Stango (2004) estimate a deposit demand to determine the effects of ATM-fee induced incompatibility on ATM deployment.

Given a variety of banks in a market – defined as a Metropolitan Statistical Area – a consumer is assumed to choose one bank for deposit services. This decision depends on the prices offered by the bank, checking account fees and deposit interest rates paid, and non-price characteristics such as the size of the branch network, branch personnel, and geographic diversification. As a result, the model can capture the net effect on consumers from the changes in all of these features throughout the period.

Following the discrete choice literature, consumer preferences for bank services are identified from aggregate market shares across markets in the US by assuming a distribution for the unobserved consumer taste. The discrete choice approach, by defining consumer preferences over characteristics as opposed to actual products or firms, incorporates product differentiation explicitly while avoiding the estimation of a large number of substitution parameters across firms. The model is estimated for the US commercial banking sector over 1993–1999, using a data set that combines information from several industry sources. The Riegle-Neal branching deregulation occurred between 1994 and 1997. This sample is chosen as 1993 pre-dates the deregulation and 1999 follows it, thereby allowing

for changes in banking services to take place, while keeping the link with deregulation strong.

Based on the estimation of logit-based models, the results indicate that consumers respond to deposit rates, and to a lesser extent, to account fees, in choosing a depository institution. Moreover, consumer demand responds favorably to the staffing and geographic density of local branches, as well as to the age, size, and geographic diversification of banks. The paper also finds important differences across markets in the demand for banking services, with higher income areas being more responsive to prices and bank size, and less to location characteristics, relative to lower income areas. This could be related to a number of factors, such as competition being less fierce and branch networks smaller in lower income areas.

In light of the changes in bank services throughout the period, I find that the net effect on consumer welfare is positive in most markets. The consumer in the median market experienced a gain in welfare of \$0.005–0.01 per dollar (depending on the model), representing an annual gain of \$8–18 for a consumer with an average deposit balance. Even in markets where prices increased, the improvement in service characteristics usually made up for the detrimental effect of the price increase. As consumers are found to value several bank attributes other than price, this exercise is at least suggestive of the bias that might arise in welfare inferences based solely on prices and concentration measures. In particular, the usual policy approach of focusing on the price effects in the case of mergers might need to acquire a broader perspective.

The paper is organized as follows. Section 2 provides an overview of the banking industry and the deregulation. In Section 3, the empirical framework is outlined. In Section 4, I describe the data and estimation. Results are presented in Section 5, while Section 6 concludes.

## 2. The US banking industry: An overview

Throughout the last three decades, and particularly in the 1990s, the US banking industry underwent several changes in both its structure and regulation. Regulatory restrictions affecting the ability of banks to diversify geographically and the range of products offered decreased dramatically. Deregulation of unit banking and limited branch banking occurred gradually throughout 1970–1994.<sup>1</sup> In 1994, the Riegle-Neal Interstate Banking and Branching Efficiency Act was passed, permitting nationwide branching as of June 1997. As states had the option to “opt in” earlier than the June 1997 federal deadline, the Act became effective gradually among the US states between 1994 and 1997.<sup>2</sup> Banks

<sup>1</sup> Intrastate branching deregulation began in some states even before the 1970s, while interstate banking (through Banking holding companies) started as early as 1978. See Berger et al. (1995) for the evolution of the industry throughout 1979–1994.

<sup>2</sup> Only Texas and Montana opted out of the federal regulation, though allowing for interstate branching with neighboring states.

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