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Product differentiation and efficiencies in the retail banking industry

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ABSTRACT

We empirically quantify the welfare implications of bank entry in the United States between 2000 and 2008. We use a fully structural framework that combines a differentiated demand model with an endogenous product model to investigate the market outcomes. We find no evidence for under- or over-entry. Compared with the socially efficient outcome, there is a mild welfare loss resulting from banks entering wrong locations in product space. Compared with the observed outcome, consumer surplus drops by 20–38% and bank profits decline by 48–59% when banks are homogeneous. Therefore product differentiation significantly improves welfare under free entry.

1. Introduction

Economic theories predict that markets can sometimes deliver an inefficient number of products (see, e.g., Dixit and Stiglitz, 1977 and Mankiw and Whinston, 1986). In a homogenous product market, free entry can lead to more products than socially optimal. When an entrant causes incumbent firms to reduce output (i.e., business-stealing externality), the private benefit to the marginal entrant may be greater than the social benefit and result in a wasteful duplication of fixed entry costs. The same intuition applies partially to a differentiated product market. When firms produce differentiated products, the marginal entrant generates an additional externality by increasing product variety. The trade-off between the business-stealing and product-variety externalities, as well as the toughness of price competition, determines the efficient number of products in the market. Berry and Waldfogel (1999) empirically demonstrate over-entry and substantial welfare loss in homogenous product markets. However, only a limited number of studies look at differentiated product markets.[1]

We investigate the welfare implication of differentiated entry in the retail banking industry. Since the Riegle–Neal Banking and Branching Efficiency Act of 1994, banks have been actively extending their retail branches. In most areas, traditional local banks (a.k.a. single-market banks) now face competition from branches of banks operating across wide geographic areas (a.k.a. multimarket banks).[2] While the new players in a local market may benefit consumers by offering diversified choices at attractive prices, the social benefit of liberalizing entry is ambiguous. According to Bancography's survey, the average land and construction costs to open a new branch approached 2 million dollars in 2003.[3] There is no guarantee that the benefits brought by entry exceed

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[1] A few exceptions include Maruyama (2011), Dutta (2011), Eizenberg (2013), and Seim and Waldfogel (2013).

[2] Though the services provided by a single-market bank are quite different from those provided by a multimarket bank, both banks are valued by consumers with different needs. The branch network of multimarket banks is attractive to individual depositors that travel often and to business depositors with multiple offices in different locations. Casual observations suggest that multimarket banks usually offer various add-on services (e.g., online bill pay, wealth management, corporate business, etc.) or use promotional activities (e.g., cash back) to attract and retain clients. On the other hand, single-market banks tend to provide branch services tailored to local customers. For example, local banks are more likely to rely on personal judgment and existing bank-customer relationship to determine a customer's credit worthiness, while multimarket banks use uniform policies (e.g., scorecard) to screen customers. It is likely that a customer of a local bank was previously declined services by a multimarket bank or vice versa.

[3] Source: http://www.bancography.com/downloads/Bancology0803.pdf. In our sample, an average bank has 1.8 branches, suggesting a 3.6 million dollar cost just for land and construction. The fixed entry cost may be much higher.

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the costs. In this paper, we empirically specify and estimate an industry model of retail banking to evaluate differentiated entry.[4]

We model and estimate consumer demand, bank pricing and entry decisions using a dataset from 2000 to 2008. On the demand side, we estimate a discrete consumer choice model, focusing on the distinction between single-market banks (S) and multimarket banks (M).[5] On the supply side, we derive the operating profit for both types of banks using a Bertrand–Nash pricing model. We then combine the pricing model with a differentiated entry model to derive the fixed entry cost, while taking into account that competition is more intense among the same type of banks. Holding the parameter estimates fixed, we evaluate the socially efficient outcomes and the outcomes when banks are homogeneous. Finally, we compare the observed outcomes to both the efficient and the homogenous scenarios.

Our estimates imply that the retail banking market is highly segmented. The cross price elasticity between a single-market bank and a multimarket bank is much smaller compared to that between two single-market banks or two multimarket banks. We find no significant evidence for over- or under-entry. While the market outcomes under free entry are efficient in most cases, we find mild deadweight loss caused by banks entering into the wrong location in product space in 13–15% of the markets. We also find that product differentiation substantially improves the social welfare. Compared to the surplus implied by the observed outcomes in our data, average bank profit drops by almost 50% and average consumer surplus (CS) declines by 20–38% if only one type of bank is allowed to operate.[6]Overall, both consumers and banks benefit significantly from differentiated entry.

Our paper is built on a small literature of bank competition. On the demand side, Dick (2008) estimates a nested logit demand model and emphasizes the distinction between single- and multimarket banks. She finds that the market is highly segmented and the cross price elasticity between a single- and a multimarket bank is relatively small. Adams et al. (2007) examine the demand for deposit institutions using a model that allows more flexible substitution patterns. Their findings confirm that single- and multimarket banks compete in different market segments. While both Dick (2008) and Adams et al. (2007) focus on consumer surplus, they don't explicitly model the entry decisions of banks. On the supply side, Cohen and Mazzeo (2007) investigate the endogenous operating decision of single- and multimarket banks and thrift institutions. They find that competition is much more intensive among banks in the same market segment. However, their model is based on a reduced form profit specification for banks, which prohibits welfare analysis. We propose an empirical framework that combines a differentiated demand model similar to Dick (2008) with an endogenous product model similar to Cohen and Mazzeo (2007). Since our endogenous product model is based on structural profits implied by the demand estimates and profit maximization prices, we are able to perform full welfare analysis. Complementary to other studies on retail banking, we focus on a more recent time period and shed light on new market developments.

This paper proceeds as follows. Section 2 sets up the model and illustrates estimation details. Section 3 describes the data and discusses the unit of observation. Section 4 presents results. And Section 5 concludes, with implications for future work.

2. Model

2.1. Demand model

The differentiation between single- and multimarket banks is captured by a nested logit demand model. Following Adams et al. (2007) and Dick (2008), consumer i in market m in year t will choose either a single bank for depository services or no services from any bank. Let $j = 1 \ldots J^{mt}$ represent the set of banks in a given geographic market year. Consumer i's utility from an account in bank j is:

$$u_{ij}^{mt} = \alpha\left(y_i^{mt} + p_j^{mt}\right) + x_j^{mt}\beta + \xi_j^{mt} + \zeta_{jg}^{mt} + (1-\sigma)\epsilon_{ij}^{mt} \tag{1}$$

If consumer i decides not to use any bank, she chooses an outside option u_{io}^{mt}. The outside option includes an account at a thrift institution, credit union, brokerage, or no account at all. We normalize the utility from choosing the outside option to be zero. The consumer chooses one option from the choice set $\{1 \ldots J^{mt}\}$ to maximize her utility. [7]

In our utility specification, p_j^{mt} is the deposit interest rate offered by bank j and y_i^{mt} is consumer i's income.[8] x_j^{mt} is a set of bank characteristics measuring j's quality. For example, we include branch density in x_j^{mt} to proxy how easy it is for consumers to access bank services. We also include the number of employees to capture the idea that the waiting time is shorter when banks employ more workers.

ξ_j^{mt} is other bank quality that is valued by consumers but is not observed by the econometrician. The unobserved quality ξ_j^{mt} causes the interest rate to be endogenous. For example, banks with higher unobserved quality may offer a lower interest rate and bias the estimate of α downward. Given the panel structure of our data, we decompose the component $\xi_j^{mt} = \theta^m + \eta^t + \upsilon_j^{mt}$. θ^m is a market specific time invariant component that applies to all banks in the same market. η^t is a time specific component common to all banks in a given year and υ_j^{mt} is a bank and market specific component that varies over time. We use instrumental variables (IVs) with fixed effects to deal with the price endogeneity in our empirical analysis.

$\zeta_{jg}^{mt} + (1-\sigma)\epsilon_{ij}^{mt}$ is the nested logit error term, where $0 < \sigma < 1$ is a parameter to be estimated. σ captures the correlation in preference within the same group of banks. We divide banks into two groups: single-market (S) and multimarket (M) (i.e., $g \in \{S, M\}$). When σ approaches one, banks in the same group are perfect substitutes. When $\sigma = 0$, there is no distinction in preferences between banks in or outside the same group. In this case, the demand model simplifies to a multinomial logit model.

Let s_j^{mt} denote bank j's market and s_0^{mt} denote the market share of the outside option. Following Berry (1994), we derive the nested logit demand model from consumers' utility maximization as follows:

[4] The Riegle–Neal Act relaxed the regulatory entry barriers. However, the goal of the paper is to understand the welfare implication of differentiated entry, not the welfare consequence of the Act. Since free entry equilibrium may take years to establish, our sample period starts 6 years after the Act, in 2000.

[5] We do not include thrift institutions in our analysis, since empirical evidence has documented that (1) thrifts are small compared to banks and (2) thrifts do not generally compete in the same market. For example, Amel and Starr-McCluer (2002) find that thrifts, savings banks, and credit unions comprised less than 6% of deposits in 1999. Both Adams et al. (2007) and Ho and Ishii (2011) estimate very small cross-interest rate elasticities between banks and thrift institutions. Cohen and Mazzeo (2007) find that the presence of thrift institutions reduces a bank's margin by a negligible amount compared to bank competitors. Amel and Hannan (1999) estimate a residual deposit supply and find that nonbank financial institutions should not be included as participants in antitrust bank merger analysis.

[6] In our counterfactual simulation, both consumers and banks are allowed to re-optimize their choices.

[7] Like existing papers on bank demand, we take a partial equilibrium approach and focus only on the deposit market.

[8] Note that the income y_i will drop out of the utility specification when consumer i compares across alternative products $j \in \{0, 1 \ldots J^{mt}\}$ in the choice set. Nevertheless, we explicitly specify y_i^{mt} in the utility function to highlight the interpretation of α as marginal utility of income.