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Why Does Institution Size Matter for Banking Market Competition?

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Abstract

There is growing evidence showing that large and small banks differ in how they service small businesses and consumers. Large, multimarket banks (LMBs) have more standardized operations and set prices that are uniform across local markets while small banks have greater autonomy to price according to local market conditions. LMBs also differ by having better access to wholesale sources of funding. This paper presents a model of spatial competition where small, single-market banks compete with LMBs that operate in multiple markets. It shows that a greater presence of LMBs in relatively concentrated markets tends to promote competition for non-deposit services. Moreover, greater multi-market contact among LMBs leads to a further reduction in market prices, a result that is counter to the predictions of linked-oligopoly theory. If LMBs have significant funding advantages relative to smaller banks, then entry by LMBs promotes competition in retail lending markets but harms competition in retail deposit markets. The model provides a logical explanation for recent empirical evidence documenting the competitive effects of LMBs.

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I. Introduction

Recently, the banking industry has experienced rapid consolidation in many countries. For banks in the United States, corporate restructurings have been driven by advances in information technology and by a loosening of geographic restrictions on branching and acquisitions. The number of U.S. commercial banks declined from 14,469 in 1984 to 8,062 in 2001, while the average asset size of banks has more than tripled over this period, from $262 million to $807 million.[1] Much research has analyzed the competitive effects of such bank consolidation, especially how mergers impact potentially vulnerable customers, such as small businesses and consumers.

Although U.S. banks have become fewer in number and larger on average, there has been no similar trend in the concentration of local banking markets. The Herfindahl-Hirschman Index (HHI) of commercial banks' deposit shares in Metropolitan Statistical Areas (MSAs) has averaged about the same as before the merger wave.[2] This suggests that the major impact of bank consolidation has been not to increase market concentration but to broaden the geographic scope of bank operations. While some horizontal mergers (acquisitions involving two banks in the same market) have occurred, much of bank consolidation has resulted from market-extension mergers (acquisitions involving two banks in different markets).

As a result of such market-extension mergers, large multimarket banking organizations (LMBs) increasingly compete with smaller community banks in many local markets. While an LMB's entry via acquisition may not directly change market concentration, there has been concern that small businesses and retail bank customers will be impacted. Recent research such as Haynes, Ou, and Berney (1999), Cole, Golmberg, and White (2003), and Berger, Miller, Petersen, Rajan, and Stein (2001) document that LMBs tend to operate differently from smaller

[1] Asset sizes are measured as inflation-adjusted 2001 dollars.
[2] See Rhoades (2000) for documentation of this fact.

banks. LMBs' activities are more standardized. For example, their lending decisions are often based on a borrower's "hard" publicly-available financial information. In contrast, smaller banks tend to base lending on "soft" information such as the borrower's "character." This difference in operations has led to much empirical work examining whether LMBs are less willing to serve more opaque borrowers, such as small businesses.

The current paper analyzes the competitive effects of market-extension mergers that leave market concentration unchanged but that increase the presence of LMBs. Our approach takes account of two characteristics of LMBs: their greater standardization and their better access to wholesale funding. The aspect of standardization emphasized in our analysis is LMBs' tendency to price retail banking services uniformly across many local markets, a behavior documented by empirical studies such as Radecki (1998) and Heitfield (1999). Other empirical studies, such as Kashyap and Stein (2000), Campello (2002), and Bassett and Brady (2002), find evidence that small banks are dependent on an inelastic supply of insured, retail deposits whereas LMBs can tap an often lower-cost source of uninsured, wholesale funding. The goal of our paper is to understand how these two differences between LMBs and their smaller bank rivals affect competition when LMBs command a growing presence in local banking markets.

We present a model of spatial competition where some (small) banks operate in a single local market but where other LMBs operate in multiple markets. A small bank is able to set its price for a given financial service based on the particular competitive conditions that it faces in its single market. In contrast, an LMB must price its service uniformly for multiple markets, and this price will reflect the average of competitive conditions in these markets as well as a possible LMB funding cost advantage. The model's Bertrand-Nash equilibrium shows that prices set by banks in a particular market depend on not only the market's concentration but also the market's distribution of LMBs and small banks.

Most importantly, our model provides a theoretical explanation for recent empirical evidence documenting that banks' prices depend not only on market concentration but also on the distribution of the market's large and small banks, what Berger, Rosen, and Udell (2002) refer to as the market's "size-structure." They find that small business loan rates tend to be lower in markets dominated by small banks but where LMBs are present, implying that LMBs promote loan market competition. In contrast, Hannan and Prager (2003) find that a greater presence of LMBs typically leads to less competition in retail deposit markets. Our model provides a positive theory for these two seemingly opposite results and for other empirical studies documenting the effect of LMBs on the profitability of small banks.

The plan of the paper is as follows. The next section reviews related research on how large and small banks differ with regard to lending and deposit services and to their funding opportunities. It also discusses prior work examining how bank size, as well as multi-market contact between banks, affects local market competition. Section III presents a multi-market model of spatial-competition and solves for the equilibrium prices charged by both single-market (small) banks and multi-market banks (LMBs). It shows how bank size, achieved via market-extension mergers, can have an independent influence on local market prices, even though such mergers leave local market concentration unchanged. In Section IV, the theory's predictions are discussed in light of the existing empirical evidence. Section V contains concluding remarks.

II. Related Research on Bank Size and Banking Market Competition

Our paper is related to two strands of the banking literature. The first is research documenting differences in the operations of large and small banks. The second includes studies analyzing how differences in bank size and multimarket contact affect local market competition. We discuss each of these in turn.

II.A Differences in Large and Small Bank Lending and Deposit Services

As the size and geographic scope of many banks have increased, research has inquired whether large and small banks differ in how they service small businesses and consumers. Operational differences might be expected from theories of organizational diseconomies such as

Williamson (1967) and Stein (2002). Relative to a small bank, in an LMB there is greater potential for loss of control between top management and branch-level operations. The greater hierarchy of large organizations makes monitoring the decisions of lower-level employees difficult, especially when judgments are based on “soft” information. As a result, LMB managers may establish explicit rules for operational-level decisions rather than allow employee discretion. Hence, at LMBs, decisions regarding the approval and pricing of loans to small businesses and consumers are more likely to be based on “hard” information, such financial statement data and credit histories. In contrast, the simpler organization form of small banks would allow such decisions to be based on knowledge of the borrower’s “character” and of local market conditions.

Empirical evidence supports the notion that large and small banks operate differently when it comes to small business lending. Using firm-level data from the 1993 National Survey of Small Business Finance (NSSBF), Cole, Goldberg, and White (2003) find that the approval of a small business’s loan is predicted by the firm’s financial statement data when the firm applies for a loan at a large bank. In contrast, such loan approvals are predicted by proxies for pre-existing bank-firm relationships when the firm applies for a loan at a small bank. Berger, Miller, Petersen, Rajan, and Stein (2002) and Haynes, Ou, and Berney (1999) also find that LMBs are more likely to require financial records from small business loan applicants while smaller banks are better able to act on soft information.

These results are consistent with LMBs’ increased use of credit scoring models for approving and pricing loans. A survey by Whiteman (1998) indicates that more than two-thirds of large banks, but only 12 % of small banks, use credit scoring when making small business loans. Another 1998 survey of 99 LMBs by the Federal Reserve Bank of Atlanta found that 63 % of these banks currently used credit scoring for small business lending and an additional 11 % planned to implement such a program over the next year and one-half.[3] Of those banks using

[3] See Frame, Srinivasan, and Woosely (2001).

scoring, 42 % of them automatically approved or rejected loans, and over 32 % of them set the loan's terms (interest rate), based on the business's credit score.

There also is evidence that LMBs allow less discretion by local market employees when it comes to pricing consumer loans and deposits.[4] Radecki (1998) states that many LMBs have centralized their management structure and organized operations along business, rather than geographic, lines. This consolidation of decision-making leads LMBs to set rates on consumer loans and deposits that are uniform across states and often entire regions of the country.[5] Using March 1997 survey data from *Bank Rate Monitor*, Inc. (BRM), he documents that an LMB typically quotes the same rate in different cities (MSAs) throughout a state and sometimes throughout an even wider area.[6]

In Table 1, we present BRM data similar to that analyzed by Radecki (1998), but for a more recent and widespread survey taken in November 2002. The table lists rates quoted by individual banks in 132 MSAs, as well as the HHI for each of these MSAs.[7] The table gives rates for unsecured personal loans and for one-year Certificates of Deposit quoted by all banks that were surveyed by BRM in more than one MSA.[8] The table clearly shows that these LMBs tend to quote uniform rates on a statewide and, in some cases, a regional basis. This uniform pricing occurs even though there may be significant differences in market concentration across MSAs.

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[4] At both LMBs and small banks, decisions regarding the approval or rejection of consumer loans such as credit cards, personal loans, auto loans, and mortgages are commonly based on credit scoring models. While the authors are not aware of data on the usage of credit scoring models for consumer loans, it is likely that LMBs rely more heavily on these models than small banks.

[5] This centralization of management was made easier by the passage of the Reigle-Neal Act in 1994. Prior to its passage, a multi-state holding company had to maintain a separately chartered bank subsidiary for its operations in each state. The Act permitted a holding company to convert its separate bank subsidiaries to a single bank having interstate branches.

[6] His evidence is consistent with 1989-1997 BRM data on consumer loan rates used by Kahn, Pennacchi, and Sopranzetti (2003). For their sample banks operating in 10 large MSAs, loan rate quotes by a given bank were uniform statewide after 1994.

[7] The HHI is based on the deposits of commercial banks' branches located in the MSA. The deposit data comes from the FDIC's June 2002 *Summary of Deposits*. BRM tends to survey the largest banks in the largest MSAs. The mean (median) value of the HHI for BRM's 132 MSAs is 1433 (1299). Currently, the United States has roughly 330 MSAs, and smaller MSAs tend to have higher concentration.

[8] The personal loan rates are for an unsecured loan of $3,000. The quoted CD rates are for a minimum deposit of $1,000.

Radecki (1998) concludes that such evidence is indicative of a market for consumer banking services that has expanded beyond the MSA to a market that extends to the state or regional level. However, Heitfield (1999) argues that such a conclusion is unwarranted. To make the case that two MSAs belong in the same geographic market, one should be able to show relative uniformity among the interest rates offered by different LMBs in both MSAs, as well as among smaller banks operating in only one of the two MSAs. However, the BRM data fail to bear this out. First, the data show that an LMB may quote a uniform rate across a given set of MSAs, but another LMB may quote a significantly different rate across the same set of MSAs.[9] Second, the rates quoted by small banks that operate in a single MSA can differ significantly across MSAs within the same state or region. Heitfield's (1999) empirical tests using BRM data find that retail deposit markets are most likely limited to MSAs. Subsequent tests by Heitfield and Prager (2002) using Call Report data on interest rates paid for NOW accounts and MMDAs also find that markets are smaller than statewide.

A general conclusion from these studies on small business lending and consumer services is that LMBs allow relatively little autonomy to operational-level employees. Compared to smaller banks, they standardize loan approval/rejection decisions and the pricing of small loans and deposits. The evidence points to LMBs setting uniform prices over large geographic areas, even though these areas may include several local markets having varying degrees of competition.

Related to retail deposit pricing, prior research has highlighted another difference between large and small banks. As documented by Bassett and Brady (2002), retail deposits are a much larger share of total liabilities at small banks relative to LMBs, whereas LMBs rely much

[9] For example, Table 1 shows that Wells Fargo charges a 16.38 % personal loan rate in 10 California MSAs while Washington Mutual charges a 14.00 % personal loan rate in these same MSAs. In two of these California MSAs, U.S. Bank charges a 17.50 % personal loan rate. In both Charlotte and Greensboro North Carolina MSAs, Bank of America, Wachovia, and BB&T quote one-year CD rates of 1.10 %, 1.25 %, and 1.45 %, respectively.

more on uninsured and wholesale sources of funding.[10] Most small banks lack access to many wholesale, uninsured funding sources available to LMBs. Institutional investors may favor LMBs because of their greater transparency and/or the belief that LMBs are "too big to fail." As a result, small banks may consider the interest rate paid on retail deposits as their marginal cost of financing loans whereas LMBs consider their marginal funding cost to be a wholesale rate, such as LIBOR.[11] Indirect evidence that small banks face limited financing opportunities stems from the several empirical studies testing for a "bank-lending channel" of monetary policy.[12] This work consistently finds that during monetary contractions, small banks, but not large banks, have difficulty funding loans, a result consistent with small banks facing financing constraints due to a dependence on retail deposits.

II.B Bank Size, Multimarket Contact, and Competition in Local Markets

As noted earlier, bank consolidation has not affected dramatically local market concentration, on average. Through market-extension mergers, consolidation's primary impact has been a reduction in small banks and an increase the geographic scope of large banks. This observation would naturally lead one to inquire whether differences in the sizes of institutions in a market affect competition, controlling for other factors such as market concentration.

Prior research has identified some explanations for why an LMB's effect on market competition may differ relative to that of a smaller bank. Edwards (1955) notes that larger firms can draw on substantial resources that enable them to engage in predatory or disciplinary pricing. Related to this "deep pockets" argument, possible economies of scale and scope can give large firms with even small local market shares the power to deter smaller firms from exercising

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[10] For example, defining an LMB as a top 100 bank ranked by asset size and a small bank as one below the top 1,000, in the year 2000 small banks' average proportion of assets funded by small time deposits was almost three times that of LMBs. In contrast, the category of "other liabilities," which are primarily wholesale sources of funding, financed 33.2 % of LMBs' assets but only 3.2 % of small banks' assets.
[11] That small banks use retail deposits as a marginal source of funding is consistent with evidence in Bassett and Brady (2002) showing that the average difference between small banks' and large banks' rates paid on small time deposits is positively correlated with the average difference between small banks' and large banks' growth rates.
[12] See Kashyap and Stein (2000), Jayaratne and Morgan (2000), Kishnan and Opiela (2000), and Campello (2002).

market power.[13] Edwards (1955) also discusses another channel through which large firms may impact market competition: a "linked oligopoly" effect. This hypothesis predicts that a larger number of local market contacts among firms increases the incentives for these firms to collude, rather than compete. The rationale is that if a firm deviates from the collusive price in a given local market, its rivals can retaliate not only in that market but in other local markets as well. As applied to LBDs, the hypothesis implies that they should compete less as the geographic overlap of their operations increase.

However, theoretical work examining this hypothesis, such as Mester (1987), Bernheim and Whinston (1990), and Scott (1993) reveals that the likelihood of collusion depends on the assumed behavior of dominant firms. Alternative assumptions can lead to equilibria that do not imply collusion. Indeed, empirical studies that specifically measure the number of market contracts between competing banks find mixed results in terms of their effects on competition. For example, Heggestad and Rhoades (1978) and Pilloff (1999a) find multimarket contact has a small anti-competitive effect, while Whitehead and Luytjes (1984) find a pro-competitive relationship. Examining the multimarket contact of California Savings and Loan Institutions (S&Ls), Mester (1987) finds that when high concentration is accompanied by a high degree of multimarket contact among S&Ls, their behavior is more competitive than it would otherwise be.

Empirical results also are mixed regarding whether the presence of LMBs affects the profitability of small "community" banks. Whalen (2001) defines community banks as having at least 67 % of their deposits in a single MSA and having total assets less than $500 million.[14] For each MSA where these small banks are located, he calculates measures of LMB presence as either the number of LMBs operating in the MSA or the LBDs' share of the MSA's total

[13] See Landes and Posner (1981).
[14] By restricting the sample to banks having most of their deposits in a single MSA, one can be confident that most of the bank's profits derive from that MSA. Profitability is measured as the pre-tax return on average assets.

deposits.[15] Controlling for various factors such as the market's HHI, he finds that over the 1995-1999 period a community bank's profitability is significantly lower when LMBs have a greater presence in its MSA. Unlike Whalen (2001) who examines the profitability of small banks in (urban) MSAs, Pilloff (1999b) analyzes the 1995-1996 profitability of small banks located in non-MSA rural counties. His evidence is contrary in that the presence of LMBs is associated with a higher profitability of rural banks. However, an earlier study by Wolken and Rose (1991) does support Whalen (2001). Their data from 1985 covers both MSAs and non-MSA counties in eight unit banking states. They find that the presence of competitors whose primary operations where outside of the local market reduced the profitability of the local market's dominant bank.

A recent paper by Berger, Rosen, and Udell (2002) analyzes how the interest rate paid on a small business's line of credit relates to the size distribution of banks in the business's local market.[16] They define a local market's "size structure" as the distribution of market shares of different size classes of banks, whether or not bank size is achieved entirely in that local market. Such a definition allows them to analyze whether LMBs compete differently from small local institutions. Using data from the 1993 NSSBF, and controlling for variables related to a firm's risk and to the concentration of the market, they find that in markets where small banks have at least a 25 % share of total deposits, small business loan rates are lower when there is a greater presence of large banks (LMBs) in the market. In other words, LMBs appear to increase lending competition in markets where small banks have a sizeable presence. The authors' interpretation is that as LMBs enter uncompetitive, small bank dominated markets via market-extension mergers, competition is gradually increased and interest rates on loans fall.

Pilloff and Rhoades (2000) analyze the relationship between LMB presence and deposit market shares. They examine the change, over the period 1990 to 1996, in the deposit market shares of 52 LMBs for each of those MSAs in which the LMBs operated and in which the LMBs

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[15] A number of definitions for LMB are used. The results are strongest when an LMB is an out-of-state holding company operating interstate branches and having total assets exceeding $50 billion.

[16] The local market is defined as the small business's MSA or its non-MSA rural county.

made no acquisitions during the period. The logic of this analysis was to examine whether an LMB gained, at the expense of smaller banks, in those MSAs where the LMB made no horizontal mergers or entered via a market-extension merger during the sample period. The result of their study is that LBDs generally had difficulty maintaining, much less increasing, their deposit shares, implying that LMBs were not a competitive force in these markets.

It is important to discuss one additional study by Prager and Hannan (2003), since it is most related to the current paper. The authors employ a model of spatial competition similar to Barros (1999) to examine how single-market banks set retail deposit interest rates when LMBs are present. Assuming that LMBs' deposit rates are exogenous but uniform across local markets, their model predicts that the rate paid on LMBs' retail deposits has a positive effect on the deposit rates paid by single-market banks, and that this effect is greater the larger is the LMBs' share of the local market. Their empirical results using NOW and MMDA interest rates paid by single-market banks supports these conclusions. They find that the effect of local market concentration on rates paid by single-market banks diminishes as LMBs' share of the local market rises. That is, small banks' rates become more similar to those of LMBs the greater is the presence of LMBs. However, consistent with Pilloff and Rhoades (2000), their empirical estimates predict that in more than 95 % of the markets in their sample, greater LMB presence would lead to lower NOW account rates paid by single-market banks, primarily because LMB pay lower rates on NOWs.

The conclusion from these empirical studies is that a greater presence of LMBs appears to promote competition in small business lending, but reduce competition in retail deposits. This is consistent with the mixed evidence regarding whether a greater LMB presence affects the overall profitability of small community banks.

III. A Theory of Banking Market Size Structure and Price Competition

This section considers a model that takes seriously the empirical finding that LMBs standardize their pricing of banking services over multiple, geographically-dispersed markets. It also accounts for the likelihood that LMBs' greater standardization and easier access to wholesale funding affects their costs of providing these services. The goal of our analysis is a positive theory of the effects of "size structure" on banking market competition.

The model that follows extends the Salop (1979) circular city model of market competition to account for multiple banking markets. Individual markets can vary due to differences in their numbers of banks and the distribution of LMBs and small banks. An "LMB" is defined as a bank that operates in multiple markets whereas a "small" bank is one whose operations are confined to a single market. Similar to Prager and Hannan (2003) and Barros (1999), our model assumes that LMBs set prices uniformly across markets. However, unlike these previous studies, we derive the equilibrium prices charged by both LMBs and small banks, and study how market-extension mergers affect prices in the merger partners' two markets.[17]

We first review the basic Salop model and then consider how a single market-extension merger affects the price of a non-deposit banking service, such as a consumer loan, small business loan, loan commitment, or loan guarantee. Next, the effects of multiple market-extension mergers are studied. Lastly, we analyze how mergers impact retail deposit interest rates. We will demonstrate that LMBs can have an effect on competition in retail deposits that is exactly opposite the their effect on competition in non-deposit services.

[17] Our model also differs from Prager and Hannan (2003) and Barros (1999) in that we assume banks are located symmetrically around a market and that each bank can observe the prices set by the neighboring banks with which it competes. In contrast, these other models assume that banks are randomly located around a market and that a bank cannot observe its neighboring banks' distances or prices. These models solve for the deposit rate set by a single market bank that maximizes its expected profits, taking the rates of LMBs as given.

III.A The Basic Model

To set the stage for analyzing pricing differences between different types of banks, we start by applying the standard circular city model of Salop (1979) to a situation where all banks are assumed to be identical. Later, we analyze the effects of some banks having multi-market operations that may have resulted from inter-market mergers.

A particular banking market is characterized by a continuum of consumers, each of whom choose to purchase an inelastic quantity of a particular non-deposit banking service. These consumers are located uniformly around a circle of unit perimeter, and their total aggregate demand for the banking service is assumed to be of unit measure. Initially, it is assumed that there are n identical banks located equidistantly around this circle, so that the distance between each bank is $1/n$.[18] These banks have the same technology for producing the financial service at a constant marginal cost of c per unit supplied.

To obtain this service from a particular bank, consumers are assumed to incur a transportation cost equal to t per unit distance traveled to that bank.[19] This cost may include not only the direct costs of transportation and the value of time spent on traveling, but also indirect costs such as a lesser availability of Automated Teller Machine (ATM) services.[20] For simplicity, we consider only linear transportation costs and assume that the costs are small in the sense that they do not exceed the gross surplus from consuming the banking service. This assumption

[18] These individual banks are best interpreted as individual bank offices or branches, with each bank having only a single office or branch in a given market. The focus of this paper is on inter-market linkages rather than the determinants of the market shares of individual banks that might result from intra-market mergers. Therefore, our model does not consider the possibility that banks may have multiple operations (locations) in a single market.

[19] Empirical evidence suggests that small businesses and consumers prefer banks that are located near to them. Using 1993 NSSBF data, Petersen and Rajan (2002) report that the median distance between a small business and its bank lender is 5 miles. Kwast, Starr-McCluer, and Wolken (1997) report that, based on the Federal Reserve's 1992 Survey of Consumer Finance, the median distance between a household and its bank is 2 miles for checking accounts and 3 miles for savings accounts and certificates of deposit.

[20] While consumers may use ATMs of banks from which they do not purchases services, these "non-member" consumers typically face surcharges. Massoud and Bernhardt (2002) provide an explanation why banks set non-member surcharges on ATM services.

implies that a given bank has a comparative advantage in serving customers that are closest to it. In this environment, a given bank competes for customers with only its two neighboring banks.

Let P_i be the price charged by bank *i* for the non-deposit financial service, and let P_{i-1} and P_{i+1} be the prices charged by its two neighboring banks.[21] This situation is illustrated in Figure 1. Then a consumer located between bank *i*-1 and bank *i* and who is a distance x_- from bank *i* would be indifferent between obtaining the service from bank *i*-1 and bank *i* if

$$P_i + tx_- = P_{i-1} + t\left(\frac{1}{n} - x_-\right) \tag{1}$$

Similarly, a consumer located between bank *i* and bank *i*+1 and who is a distance x_+ from bank *i* would be indifferent between obtaining the service from bank *i* and bank *i*+1 if

$$P_i + tx_+ = P_{i+1} + t\left(\frac{1}{n} - x_+\right) \tag{2}$$

Therefore, given these prices, bank *i*'s total demand is $x_- + x_+$. Using equations (1) and (2), bank *i* faces the demand curve of

$$D_i\left(P_i, P_{i-1}, P_{i+1}\right) = x_- + x_+ = \frac{1}{t}\left(\frac{P_{i-1} + P_{i+1}}{2} - P_i\right) + \frac{1}{n} \tag{3}$$

and its profit maximization problem is

$$\underset{P_i}{\text{Max}} \;\; \left(P_i - c\right)\left[\frac{1}{t}\left(\frac{P_{i-1} + P_{i+1}}{2} - P_i\right) + \frac{1}{n}\right] \tag{4}$$

which leads to the solution

$$P_i = \frac{1}{2}\left(\frac{P_{i-1} + P_{i+1}}{2}\right) + \frac{1}{2}\left(c + \frac{t}{n}\right) \tag{5}$$

Thus we see that the optimal price charged by bank *i* equals one half of the average price of its competitors plus one half the sum of its marginal cost plus the transportation costs of its

[21] If the financial service is a small business or consumer loan, P_i may be interpreted as the interest rate on the loan offered by bank *i*.

consumers. Clearly, given that the n banks are identical, a symmetric Bertrand-Nash equilibrium is one where $P_i = P_{i-1} = P_{i+1}$ in equation (5). Hence, in equilibrium, we have

$$P_i = c + \frac{t}{n} \tag{6}$$

III.B Multi-Market Operations

We now allow a bank to operate in multiple markets. Such a situation could result from a market-extension merger that does not change the compositions of individual banking markets in the sense that there continues to be the same number of banks spaced equidistantly around the circular city. The main effects of such a merger are that the merged bank is now operating in two markets, rather than just one, and that it is now larger. Consistent with empirical evidence, it is assumed that mergers lead to standardization in the provision and pricing of financial services.

Specifically, it is assumed that the (now larger) merged bank becomes an LMB, and its marginal cost of providing a unit of the financial service changes to c_b from the previous level of c. If the merger results in cost savings because the now larger merged banks can fund services at a lower wholesale rate or because redundant activities of the merged banks can be eliminated, then $c_b < c$, which clearly is a benefit to the merged banks. Benefits to geographic expansion are supported by empirical evidence.[22] Such an economy of scale could come from having one set, rather than two sets, of personnel and capital expenditures dedicated to carrying-out marketing (advertising) activities, determining loan approval criteria (credit scoring), and making pricing decisions. In particular, the merged bank may find it advantageous to have a single "pricing committee" that sets standardized loan and deposit rates and to operate a single internet web site where these rates are advertised. In terms of our model, this standardization of financial service pricing means that the merged bank is constrained to set a single price for multiple local markets.

[22] Empirical evidence by Hugh, Lang, Mester, and Moon (1999) documents improved performance for banks that engage in interstate expansion. Jayaratne and Strahan (1997) provide evidence of improvements in bank efficiency after states removed intrastate branching restrictions.

Hence, while mergers may lead to cost reductions, the loss of freedom to set different prices in different markets is a disadvantage.

III.B.1 A Single Market-Extension Merger

Now assume that local bank i=1 is merged with a bank operating in a different circular city that has $m < n$ banks. We refer to the original market with n banks as competitive market N and the other local market having m banks as concentrated market M. Without loss of generality, assume that the merged bank (LMB) in market M is also bank i=1. Bank 1's marginal cost changes from c to c_b due to post-merger elimination of redundant activities and/or access to lower wholesale funding. However, bank 1's price in markets N and M now must be uniform and will be different from that given in equation (5). Moreover, bank 1's uniform pricing will change the equilibrium prices set by the other banks in the two markets.

Assuming, for now, that each of the other banks in the two markets are small (non-merged) banks, we solve for a Nash equilibrium where all banks set profit maximizing prices taking their neighboring banks' prices as given. As will be demonstrated, the equilibrium prices set by the small banks in a given market are no longer equal but differ depending on their distance from the single LMB (bank 1).[23] However, we do impose symmetry in that two small banks that are equidistant from the LMB will charge the same equilibrium price. This situation is illustrated in Figure 1 for the case of a market with a total of eight banks.

We first examine the profit maximization problem for the single LMB, then the profit maximization problems for the smaller banks in both markets, and, finally, the equilibrium prices consistent with each bank's optimization. LMB 1 maximizes the joint profit from operating in

[23] Our model assumes that small banks' post-merger locations around the circle remain the same as before the merger. This implies that a small bank's equilibrium price and profit depend on its distance from the LMB. We justify this assumption by viewing the model's results as a short-run equilibrium where a bank faces costs of adjusting its location. In a longer run, small banks might be assumed to move to asymmetric points around the circle such that their profits are identical. This alternative equilibrium would not change the qualitative nature of our model's results regarding the impact of mergers on the average prices of small banks. Of course, a longer run equilibrium might also consider banks' entry and exit decisions in each market.

both markets, taking as given the prices of its neighboring banks. Let P_2^N and P_n^N be the prices of its two neighboring banks in market *N*, while P_2^M and P_m^M are the prices of its neighboring banks in market *M*. Given the aforementioned symmetry in the pricing of small banks that are equidistant from LMB 1, we simplify the analysis by assuming that $P_n^N = P_2^N$ and $P_m^M = P_2^M$. Hence, generalizing equation (3), the total demand faced by LMB 1 is

$$D_1\left(P_1, P_2^N, P_2^M\right) = \frac{1}{t}\left(P_2^N - P_1\right) + \frac{1}{n} + \frac{1}{t}\left(P_2^M - P_1\right) + \frac{1}{m} \tag{7}$$

and its profit maximization problem is

$$\underset{P_1}{\text{Max}} \quad \left(P_1 - c_b\right)\left[\frac{1}{t}\left(P_2^N + P_2^M - 2P_1\right) + \frac{1}{n} + \frac{1}{m}\right] \tag{8}$$

which results in the solution

$$P_1 = \frac{1}{2}\left(\frac{P_2^N + P_2^M}{2}\right) + \frac{1}{2}\left(c_b + \frac{t}{2}\left[\frac{1}{n} + \frac{1}{m}\right]\right) \tag{9}$$

so that LMB 1's price depends on those of its neighboring banks in both local markets as well as the numbers of banks in both markets. Its price is a compromise between the prices that would be individually optimal in each market since it is an average of the prices of its neighboring banks in the two markets, $\frac{1}{2}\left(P_2^N + P_2^M\right)$, and an average of the reciprocals of the numbers of banks in the two markets, $\frac{1}{2}\left[\frac{1}{n} + \frac{1}{m}\right]$.

Turning next to the profit maximization problems of the small banks in each market, the problem faced by banks in market *N* continues to be of the form in (4) and the solution is given by equation (5).[24] However, unlike the basic situation analyzed in section III.A, $P_{i-1} \neq P_i \neq P_{i+1}$ since these bank's prices will differ depending on their distances from LMB 1. As shown in the Appendix, these small bank prices can be written in terms of LMB 1's price as

[24] The solution for small banks in market *M* is identical but with *m* replacing *n*.

$$P_i = \left(1-\delta_{i,n}\right)\left(c+\frac{t}{n}\right)+\delta_{i,n}P_1 \;, \quad i = 2,\ldots,n. \tag{10}$$

where for the case that n is an even number[25]

$$\delta_{i,n} \equiv \frac{\left(2+\sqrt{3}\right)^{\frac{n}{2}+1-i}+\left(2-\sqrt{3}\right)^{\frac{n}{2}+1-i}}{\left(2+\sqrt{3}\right)^{\frac{n}{2}}+\left(2-\sqrt{3}\right)^{\frac{n}{2}}} \tag{11}$$

Equation (10) shows that small bank i's price is a weighted average of the standard Salop model price, $(c + t/n)$, and the price charged by LMB 1, with $\delta_{i,n}$ being the weight on P_1. As shown in the Appendix, $\delta_{i,n}$ is a declining function of i over the range from $i = 2$ to $i = n/2 + 1$, the mid-point of the circle, and it satisfies the symmetry conditions: $\delta_{2,n}=\delta_{n,n}$, $\delta_{3,n}=\delta_{n-1,n}$,…, $\delta_{n/2,n}=\delta_{n/2+2,n}$. Thus, as one would expect, the price of a small bank is less affected by LMB 1 the farther is the small bank's distance from LMB 1.

Moreover, the Appendix shows that for a given distance from LMB 1, a small bank's price is less sensitive to the LMB's price the greater is the total number of banks in the market, that is, $\partial\delta_{i,n}/\partial n < 0$. For example, since $n > m$, then $0 < \delta_{2,n} < \delta_{2,m} < 1$. Therefore, the presence of the LMB has a larger impact in the concentrated market for two reasons: first, there are fewer banks so that the average distance between any small bank and the LMB is less; second, for any given distance, a small bank's price depends relatively more on the LMB in the concentrated market.

The final step in determining the banks' equilibrium prices is to solve for LMB 1's price given the form of the prices of its neighboring banks in both markets N and M. Substituting equation (10) with $i = 2$ into equation (9) yields the equilibrium price of the LMB.

$$P_1 = \frac{1}{4-\delta_{2,n}-\delta_{2,m}}\left[c\left(2-\delta_{2,n}-\delta_{2,m}\right)+2c_b+t\left(\frac{2-\delta_{2,m}}{m}+\frac{2-\delta_{2,n}}{n}\right)\right] \tag{12}$$

[25] The case of n being an odd number is discussed in the Appendix.

The price of any small bank in either market can then be found by substituting (12) into (10). In particular, the banks neighboring the merged bank in markets *M* and *N* are

$$P_2^M = \frac{1}{4-\delta_{2,n}-\delta_{2,m}}\left[\left(4-3\delta_{2,m}-\delta_{2,n}\right)\left(c+\frac{t}{m}\right)+2\delta_{2,m}\left(c_b+\frac{t}{n}\right)+t\delta_{2,n}\delta_{2,m}\left(\frac{1}{m}-\frac{1}{n}\right)\right] \quad (13)$$

and

$$P_2^N = \frac{1}{4-\delta_{2,n}-\delta_{2,m}}\left[\left(4-3\delta_{2,n}-\delta_{2,m}\right)\left(c+\frac{t}{n}\right)+2\delta_{2,n}\left(c_b+\frac{t}{m}\right)+t\delta_{2,n}\delta_{2,m}\left(\frac{1}{n}-\frac{1}{m}\right)\right] \quad (14)$$

A comparison of these prices leads to the following proposition.

Proposition 1. *Consider a single market-extension merger that occurs between market M with m total banks and market N with n > m total banks. The price charged by the LMB is lower than those of the smaller banks in the concentrated market M. However, this LMB charges a price that is higher than any of the smaller banks in the competitive market N if its marginal cost advantage is sufficiently small, that is, if* $c - c_b < \frac{1}{2}t\left(2-\delta_{2,m}\right)\left(\frac{1}{m}-\frac{1}{n}\right)$.

Proof: See the Appendix.

The intuition behind this result is clear. Assuming a relatively small cost advantage, the LMB's price falls in between the equilibrium prices charged by small banks in the competitive market *N* and the concentrated market *M*. The presence of this LMB does affect the small banks' equilibrium prices, especially the prices of banks that are a short distance away. The effect is to narrow the differences in prices between the two groups: the prices in market *M* become more competitive while the prices in market *N* become less.

III.B.2 Multiple Market-Extension Mergers

In this section, we generalize the previous results to consider the situation where multiple merged banks operate in a single market. It is natural to think that with a loosening of geographic restrictions on mergers and branching, that banks would have an incentive to enter more concentrated, more "unbanked" markets. Therefore, the focus of our attention will be how greater numbers of LMBs affect the pricing of the less-competitive market, *M*.

Our modeling of multiple LMBs in market *M* is characterized by the following symmetry. First, it is assumed that these LMBs are at points equidistant around the circle and that there are an equivalent number of small banks between each LMB bank.[26] Second, the LMBs are similar to each other in that they operate in different alternative markets that have identical market structures or that they all operate in the same alternative market.[27] These two assumptions imply that in a symmetric equilibrium, the LMBs' prices are the same. In addition, there will be symmetric pricing for each group of small banks located in between two LMBs. These assumptions are illustrated in Figure 2 for the case of a market with a total of eight banks and with two LMBs (charging prices P_1 and P_5).

The symmetry assumptions allow us to generalize the results from our previous analysis of a market with one LMB to the current situation of multiple LMBs. This is because each "cluster" of small banks between two LMBs face a similar situation to that of the small banks in a market having only a single LMB. To see this, let us assume that bank 1 is an LMB, that the total number of banks in the market is m, and that there are a total of $k \geq 1$ identical LMBs in the market. So that there is an equivalent number of small banks located in between each LMB, and that each grouping of small banks is an odd number, we also assume that $m = k(1+g)$ where $g = (m/k)-1$ is an odd integer representing the number of small banks in between each pair of LMBs.[28]

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[26] The assumption of LMBs being positioned equidistantly around the circle turns out to provide them the highest equilibrium profits in market *M*. This is because their equilibrium price is less than those of the small banks, so that their profits are highest when their neighboring banks are small ones rather than other LMBs. Hence, in a more complete model where banks choose their merger partners, our symmetry assumption could be justified as an equilibrium result.

[27] These alternative market possibilities will be detailed below.

[28] Of course this implies that the total number of banks in the market is even. As discussed earlier, pricing for an even number of small banks in between each LMB can be handled as in the case of a market with only one LMB but an odd number of total banks.

In this case, the prices of the small banks i=2,…,(m/k), which are the small banks in the first group, are given by[29]

$$P_i = \left(1-\delta_{i,m/k}\right)\left(c+\frac{t}{m}\right)+\delta_{i,m/k}P_1 \ , \quad i = 2,\ldots, m/k \qquad (15)$$

Equation (15) is identical to equation (10) but with $\delta_{i,m/k}$ replacing $\delta_{i,n}$. The price of a small bank continues to be a weighted average of the standard Salop model price, (c + t/m), and the price of LMBs, P_1. As before, $\delta_{i,m/k}$, the weight on P_1, is a function of only the distance between the small bank and its closest LMB. Effectively, for a given LMB price, P_1, each small bank in this market with multiple LMBs faces a situation that is identical to that of a market with m/k total banks and one LMB. Obviously, the greater is the number of LMBs, k, the greater is the impact of these LMBs' price on the smaller banks.[30]

To solve for the equilibrium prices of each bank in market M, we need to consider the LMBs' pricing problem. This requires a specification of these banks' alternative markets. Two different polar cases are modeled. Under Alternative I, we assume that each LMB in market M operates in another market of size n where it is the only LMB in that market. Thus, the only market where these LMBs come into contact is market M. Under Alternative II, the assumption is that each LMB in market M operates in the same additional market of size n. Hence, under this assumption, the LMBs contact each other in two different markets. Figure 3 provides market diagrams for Alternatives I and II.

For either alternative, an LMB's pricing rule continues to be given by equation (9). However, under Alternative I, the form of the price of its neighboring bank in market M differs,

[29] The derivation of (15) is nearly identical to that of the previous case where there is only one LMB in the market.
[30] Recall that $\partial\delta_{i,n}/\partial n < 0$ which implies that $\partial\delta_{i,m/k}/\partial k > 0$.

and this price, P_2^M, is now given by equation (15) for i = 2. This leads to the following equilibrium prices of the LMBs and their neighboring small banks in each market:[31]

$$P_1 = \frac{1}{4-\delta_{2,n}-\delta_{2,m/k}}\left[c\left(2-\delta_{2,n}-\delta_{2,m/k}\right)+2c_b+t\left(\frac{2-\delta_{2,m/k}}{m}+\frac{2-\delta_{2,n}}{n}\right)\right] \tag{16}$$

$$P_2^M = \frac{1}{4-\delta_{2,n}-\delta_{2,m/k}}\left[\left(4-3\delta_{2,m/k}-\delta_{2,n}\right)\left(c+\frac{t}{m}\right)+2\delta_{2,m/k}\left(c_b+\frac{t}{n}\right)+t\delta_{2,n}\delta_{2,m/k}\left(\frac{1}{m}-\frac{1}{n}\right)\right] \tag{17}$$

$$P_2^N = \frac{1}{4-\delta_{2,n}-\delta_{2,m/k}}\left[\left(4-3\delta_{2,n}-\delta_{2,m/k}\right)\left(c+\frac{t}{n}\right)+2\delta_{2,n}\left(c_b+\frac{t}{m}\right)+t\delta_{2,n}\delta_{2,m/k}\left(\frac{1}{n}-\frac{1}{m}\right)\right] \tag{18}$$

These equilibrium prices allow us to state the following proposition.

Proposition 2: *Consider a market, M, with an even number of banks equal to m. Let k of these banks be LMBs that are located equidistantly around the market circle, where* $1 \le k \le m/2$. *Each of these LMBs is assumed to operate in a different outside market having n > m total banks of which the other n-*1 *banks operate solely in that market. Then the equilibrium prices of all banks in market M decline as the number of LMBs, k, increases. Mergers lower prices in the outside markets if and only if* $c - c_b > \frac{1}{2}t\left(2-\delta_{2,m/k}\right)\left(\frac{1}{m}-\frac{1}{n}\right)$*, a condition that is more likely to hold as k increases.*

Proof: See the Appendix.

As shown in the Appendix, the equilibrium price of the LMBs, P_1, is lower the greater is the number of LMBs. Hence, relative to the single market-extension merger analyzed in the previous case, prices are lower in any of the two markets linked by a merger. Moreover, since

[31] The solution is isomorphic to the previous case with $\delta_{2,m/k}$ replacing $\delta_{2,m}$.

$\partial\delta_{2,m/k}/\partial k > 0$, it becomes more likely that $c - c_b > \frac{1}{2}t\left(2-\delta_{2,m/k}\right)\left(\frac{1}{m}-\frac{1}{n}\right)$ which would imply that mergers also lower prices not only in market *M* but also in each of the outside markets as well.

Under Alternative II where all of the LMBs in market *M* operate in the same outside market *N* having a total of *n* banks, an increase in mergers has direct effects on both markets. Similar to market *M*, we assume that in market *N* the LMBs are at points equidistant around the circle and that there is an equivalent odd number of small banks located between each merged bank.[32] A derivation nearly identical to those of the previous cases lead to the following equilibrium prices:

$$P_1 = \frac{1}{4-\delta_{2,n/k}-\delta_{2,m/k}}\left[c\left(2-\delta_{2,n/k}-\delta_{2,m/k}\right)+2c_b+t\left(\frac{2-\delta_{2,m/k}}{m}+\frac{2-\delta_{2,n/k}}{n}\right)\right] \qquad (19)$$

$$P_2^M = \frac{1}{4-\delta_{2,n/k}-\delta_{2,m/k}}\left[\left(4-3\delta_{2,m/k}-\delta_{2,n/k}\right)\left(c+\frac{t}{m}\right)+2\delta_{2,m/k}\left(c_b+\frac{t}{n}\right)+t\delta_{2,n/k}\delta_{2,m/k}\left(\frac{1}{m}-\frac{1}{n}\right)\right] \qquad (20)$$

$$P_2^N = \frac{1}{4-\delta_{2,n/k}-\delta_{2,m/k}}\left[\left(4-3\delta_{2,n/k}-\delta_{2,m/k}\right)\left(c+\frac{t}{n}\right)+2\delta_{2,n/k}\left(c_b+\frac{t}{m}\right)+t\delta_{2,n/k}\delta_{2,m/k}\left(\frac{1}{n}-\frac{1}{m}\right)\right] \qquad (21)$$

Straightforward calculations based on these equilibrium prices lead to the following proposition.

Proposition 3: *Consider two markets, M and N, having even numbers of banks equal to m and n, respectively. Let k of the banks in each market be LMBs that operate in both markets and are located equidistantly around each market's circle, where* $1 \le k \le m/2 < n/2$. *Then the equilibrium prices of all banks in market M decline as the number of LMBs, k, increases. Mergers lower prices in market N if and only if* $c - c_b > \frac{1}{2}t\left(2-\delta_{2,m/k}\right)\left(\frac{1}{m}-\frac{1}{n}\right)$*, a condition that is more likely to hold as k increases. Moreover, compared to the merger environment described*

[32] That is, $n = k(1+g')$ where g' is an odd integer.

in Proposition 2, *the prices of all banks in market M are lower and the prices of all banks in market N are lower if* $c - c_b > \frac{1}{2}t\left(2 - \delta_{2,m/k}\right)\left(\frac{1}{m} - \frac{1}{n}\right)$.

Proof: See the Appendix.

The message of Proposition 3 is that the qualitative effects of market-extension mergers are the same under Alternatives I and II. However, when the LMBs all come from the same outside market (Alternative II), these mergers have an even greater impact in reducing the prices in the more concentrated market *M*. The intuition behind this result is that the LMBs are now competing on two fronts, rather than one. Though these LMBs need not be neighbors to each other in either market, their pricing decisions are transmitted to one another via the small banks that separate them.

If mergers lead to sufficient costs advantages such that $c - c_b > \frac{1}{2}t\left(2 - \delta_{2,m/k}\right)\left(\frac{1}{m} - \frac{1}{n}\right)$ so that prices fall even in the less concentrated market *N*, then Alternative II's greater impact on reducing prices also transfers to market *N*. However, as discussed in the Appendix, when $c - c_b < \frac{1}{2}t\left(2 - \delta_{2,m/k}\right)\left(\frac{1}{m} - \frac{1}{n}\right)$, the relative impact of the two alternatives on the prices of market *N*'s small banks depends on these banks' distances from an LMB.

Our model's major result is that market-extension mergers reduce the prices of non-deposit services in relatively concentrated markets, even though local market concentration is unchanged. Hence, it predicts lower non-deposit prices for concentrated markets the greater is the entry by LMBs (who operate in other, more competitive markets). Ceteris paribus, for relatively concentrated markets, the profitability of small, community banks will tend to fall when LMBs enter their market via acquisitions.

III.C The Impact of Mergers on Retail Deposit Interest Rates

Previously, it was argued that if LMBs have access to wholesale funding but small banks do not, a market-extension merger would decrease the cost of providing a non-deposit banking service, that is, $c_b < c$. However, the availability of wholesale funding has a different effect on pricing when the service is, itself, a source of funding. Such is the case for retail bank deposits.

To see this, consider a minor extension of the previous model where consumers choose to deposit at bank *i* if this bank's retail deposit rate, r_i, gives the consumer the highest return after transportation costs. Let r_L be a bank's rate of return that it can earn from investing deposits, and let c_r be the bank's non-interest cost of maintaining the retail deposit account.[33] For simplicity, r_L and c_r are assumed to be the same for all banks. In addition, let r_1 be the retail deposit interest rate paid by LMB 1. Then, analogous to equation (15), small bank *i*'s retail deposit interest rate in market *M* that contains *m* total banks and *k* LMBs is

$$r_i = \left(1-\delta_{i,m/k}\right)\left(r_L - c_r - \frac{t}{m}\right) + \delta_{i,m/k} r_1 \ , \quad i = 2,\ldots, m/k \tag{22}$$

What may differ for the case of retail deposits is the form of LMB 1's rate, r_1. If LMBs have access to wholesale funding at the rate r_w, then under Alternative II, the rate they pay on retail deposits must satisfy[34]

$$r_1 = \min\left[r_w - c_r \ , \ \ r_L - c_r - \frac{t}{m}\left(\frac{2-\delta_{2,m/k}}{4-\delta_{2,n/k}-\delta_{2,m/k}}\right) - \frac{t}{n}\left(\frac{2-\delta_{2,n/k}}{4-\delta_{2,n/k}-\delta_{2,m/k}}\right)\right] \tag{23}$$

since it would not be a profit-maximizing strategy for them to pay more, net of account maintenance costs, than the wholesale rate. This leads to the following proposition.

Proposition 4: *Consider two markets, M and N, having even numbers of banks equal to m and n, respectively. Let k of the banks in each market be LMBs that operate in both markets and are located equidistantly around each market's circle, where* $1 \le k \le m/2 < n/2$. *Then the equilibrium interest rates on retail deposits in market N decline as the number of LMBs, k,*

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[33] r_L can be interpreted as the bank's return on loans net of loan administration costs, while c_r would include the costs of sending account statements to depositors.

[34] It is assumed that wholesale funding involves no non-interest costs of maintaining an account. The second argument on the right-hand side of (23) is analogous to equation (19) but with $c = c_b$ replaced by r_L-c_r and t replaced with $-t$. The form of r_1 for Alternative I is the same as (23) but with $\delta_{2,n/k}$ replaced by $\delta_{2,n}$.

increases. In market M, mergers increase retail deposit rates if $r_w > (r_L - t/m)$ *and decrease retail deposit rates if* $r_w < (r_L - t/m)$.

Proof: From inspection of equation (23) and (22) and the fact that $\partial\delta_{i,m/k}/\partial k > 0$.

Most interestingly, Proposition 4 predicts that when LMBs have a significant funding advantage relative to smaller banks, that is, $r_w < (r_L - t/m)$, an increased presence of LMBs via market-extension mergers actually decreases competition in all retail deposit markets. Hence, the competitive effect of LMBs is exactly opposite to their effect in small business and consumer loan markets. Recall from Propositions 2 and 3 that an increased presence of LMBs lowers prices of a non-deposit banking service in both competitive and concentrated markets if $c - c_b > \frac{1}{2}t\left(2-\delta_{2,m/k}\right)\left(\frac{1}{m}-\frac{1}{n}\right)$. Such as situation is more likely to occur when $c - c_b$ is large because LMBs can fund this service at a low wholesale rate. Hence, when there is a significant difference between wholesale and retail funding rates, LMBs will tend to promote competition in non-deposit services such as small business and consumer loan markets but reduce competition in retail deposit markets. Consequently, market extension mergers may benefit retail borrowers but harm retail depositors.

IV. Discussion of the Results

Our model assumes that each LMB competes in two markets of equal total size, that is, consumers' aggregate demand for banking services has unit measure in both markets. As a result, equation (9) shows that an LMB sets a price that is a simple arithmetic average of the two profit-maximizing prices for each market. In reality, LMBs operate in both large and small local markets, and a slight generalization of our model having markets of unequal sizes (densities) would show that an LMB's price becomes a weighted average of the two markets' profit maximizing prices and is more heavily weighted to the larger market having greater demand.

Since most LMBs have a disproportionate share of their operations in major metropolitan areas, this generalized theory predicts that their prices should be closer to the profit maximizing prices of those markets, rather than smaller markets. Importantly, the larger cities where LMBs dominate also tend to be less concentrated than smaller MSAs and non-MSA rural counties.[35] Therefore, at least for non-deposit services, one expects to see LMBs having the greatest influence on promoting competition in relatively small, concentrated markets, where smaller banks tend to be more common. This may explain why Berger, Rosen, and Udell (2002) find that LMBs reduce small business loan rates primarily in markets where small banks have at least a 25 % market share. It is likely that these situations typically occur in relatively concentrated markets where LMBs charge lower prices than the smaller banks.

As noted earlier, the greater is the wholesale funding advantage enjoyed by LMBs, the greater does their presence promote competition in non-deposit banking services, such as small business and consumer loans. However, a significant LMB funding advantage has the opposite impact on deposit markets. LMBs will not compete aggressively for retail deposits if they have lower-cost wholesale funding available. Indeed, *Bank Rate Monitor* (BRM) survey data on rates paid on certificates of deposit (CDs) are consistent with a LMB funding advantage because large bank CD rates tend to be significantly lower than those of small banks.

This evidence is reported in Table 2. Banks surveyed by BRM on November 20, 2002 were divided into small banks, defined as having total deposits less than $2 billion, and large banks, defined as having total deposits greater than $10 billion. The top panel of the table shows that the mean and median CD rates paid by the 69 small banks were much higher than those of the 48 large banks. This panel also lists the equivalent maturity LIBOR for the BRM survey date as well as the average of LIBORs for the previous week. The average and median CD rate paid by large banks is always less than its equivalent maturity LIBOR, while, with the exception of the

[35] As reported in Kahn, Pennacchi, and Sopranzetti (2003) and Rhoades (2000), the average commercial bank HHI over the 1988 to 1997 period for the 10 largest MSAs, all MSAs, and all non-MSA rural counties were 1373, 1994, and 4228, respectively.

three-month maturity, the average and median CD rate paid by small banks is always greater than its equivalent maturity LIBOR.

The bottom panel of Table 2 provides similar evidence but controls for possible differences in the types of markets where small and large banks operate. For each of the small banks surveyed BRM, the spread between the small bank's CD rate and the average of the CD rates paid by the large banks in this small bank's local market was computed. The average spreads based on this market-by-market calculation are significantly positive at better than a 99 % confidence level for each CD maturity.[36] This is clear evidence that LMBs do not compete aggressively for retail CDs.

It is not surprising that LMBs would tend to set their retail CD rates to approximately a wholesale rate minus the retail account's maintenance cost, that is, $r_w - c_r$. A profit maximizing LMB should choose its quantities of wholesale and retail liabilities such that their marginal costs are equal, assuming that both are issued in positive amounts. Given that most LMBs are observed to issue substantial amounts of wholesale liabilities at a relatively fixed rate of r_w, the marginal cost of retail liabilities, $r_1 + c_r$, would need to equal this wholesale rate. If, instead, $r_1 + c_r > r_w$, the LMB could reduce its total cost of financing by substituting wholesale for retail funding until the marginal costs are equal. Such a strategy is not available to smaller banks that are excluded from wholesale markets, which justifies their setting higher retail deposit rates.

Our model's prediction that a greater presence of LMBs having access to wholesale funding lowers smaller banks' retail deposit rates is consistent with Prager and Hannan's (2003) empirical findings. They estimate that in 95 % of the markets in their sample, an increased presence of LMBs would lower the interest rates paid by small banks on NOW accounts. Our model can also explain much of the findings of Pilloff and Rhoades (2000) who analyze the change in LMBs' shares of local market deposits over the 1990 to 1996 period. They find that

[36] The spreads were positive for 64 of 71 three-month CD observations, 71 of 76 six-month CD observations, and 74 of 76 twelve-month CD observations.

LMBs retained their market shares of total deposits in urban markets but lost market shares of deposits in rural markets. Moreover, LMBs' market share losses were especially great in markets with high deposit growth. If one considers that urban markets are the source of LMBs' wholesale deposit funding while only retail deposits are obtained in rural markets, then LMBs' lack of competitiveness in rural markets would be expected. In addition, markets with high deposit growth can indicate that smaller competitors find it profitable to raise local market retail deposit rates to fund greater local lending. Note that LMBs would not be expected to raise their retail rates, but could still finance more local loans with out-of-market wholesale funding.

Finally, our model gives a rationale for the mixed results of studies examining how a small bank's profitability varies with the presence of LMBs in its local market. Whalen (2001) finds that LMBs lower the profitability of small banks in (urban) MSAs, while Pilloff (1999b) finds that LMBs raise the profitability of small banks located in non-MSA rural counties. It may be that small banks in rural markets, where profitability tends to be strongly related deposit gathering opportunities rather than lending opportunities, experience a net benefit from LMBs' lack of retail deposit competition.

V. Concluding Remarks

This paper ties together two recent areas of banking research. The first is a growing body of evidence showing that large, multimarket banks employ standards that do not vary across local markets. They tend to price uniformly across large geographic areas, while smaller banks with greater autonomy price according to local market conditions. LMBs also differ from their smaller rivals in their ability to access wholesale financing. The second research area examines whether the distribution of large and small banks in a local market has an effect on competition that is independent of traditional measures of market concentration. While there is some evidence that a greater LMB presence promotes competition in small business lending, their greater presence appears to reduce competition for retail deposits.

Our theory of multimarket competition shows that if LMBs do price uniformly across markets and if they have a significant funding advantage, their prices for non-deposit services will be lower than their smaller bank competitors, especially in more concentrated markets. Furthermore, the greater the presence of LMBs and the greater the number of outside markets in which they compete, the lower will be the equilibrium prices in the local market. Interestingly, when LMBs have a significant funding advantage, their effect on retail deposit market competition is just the opposite of that for non-deposit services such as retail loans. If LMBs have access to lower-cost wholesale funding, they will not compete aggressively for higher-cost retail deposits. As a result, their smaller rivals pay lower rates on retail deposits. In summary, market-extension mergers that increase the scope of LMBs are likely to benefit small business and consumer borrowers, but to harm retail depositors.

While our analysis has been in the context of the banking markets, our theory is applicable to any industry where some competitors operate in multiple markets and set prices uniformly. For example, our model could be applied to a chain store retailer whose centralized management sets identical prices over a wide geographic area that covers both concentrated and competitive markets.[37] Such firms would enhance competition primarily in concentrated markets, forcing a lowering of prices by single-market competitors. As in our analysis of banking, the general effect of multi-market competitors is to reduce the variation in prices across competitive and concentrated markets. An obvious antitrust implication is that regulators should be less concerned if a multi-market firm setting uniform prices owns a large local market share.

[37] Examples might include Wal-Mart, Home Depot, and Starbucks.

Appendix

A. The Prices of Small Banks in a Market with a Single LMB

Suppose there are a total n banks competing in a local market with one LMB located at $i = 1$. Hence, banks $i = 2, \ldots, n$ are small banks. Their optimal prices satisfy equation (5) which can be written in the form of a second order difference equation.

$$P_{i+1} - 4P_i + P_{i-1} + 2\left(c + \frac{t}{n}\right) = 0 \qquad \text{(A.1)}$$

This can be re-written using the backward operator as

$$\left(1 - 4B + B^2\right)P_i + 2\left(c + \frac{t}{n}\right) = 0 \qquad \text{(A.2)}$$

for $i = 3, \ldots, n$. The roots to the quadratic equation for the backward operator are $B = 2 \pm \sqrt{3}$. Also, note that a particular solution to equation (A.1) is $P_i = c + t/n$. Therefore, the general solution to (A.1) takes the form

$$P_i = \alpha_1\left(2 + \sqrt{3}\right)^i + \alpha_2\left(2 - \sqrt{3}\right)^i + c + \frac{t}{n} \qquad \text{(A.3)}$$

where the constants α_1 and α_2 must be determined subject to two boundary conditions. One boundary condition results from the price set by the large, merged bank i=1, which, initially, we take as exogenous

$$P_1 = \alpha_1\left(2 + \sqrt{3}\right) + \alpha_2\left(2 - \sqrt{3}\right) + c + \frac{t}{n} \qquad \text{(A.4)}$$

The second boundary condition results from imposition of the symmetry property for the one or two banks that are farthest away from LMB 1. When n is an even number, the single farthest bank is $i = n/2 + 1$.[38] For this bank, symmetry implies that the prices of its two neighbors, P_{i-1} and P_{i+1}, are the same. Hence, equation (5) becomes

[38] For example, if there were $n = 4$ banks in the market, then $i = n/2 + 1 = 3$ would be the single bank farthest from LMB 1.

$$P_{\frac{n}{2}+1} = \frac{1}{2} P_{\frac{n}{2}} + \frac{1}{2}\left(c + \frac{t}{n}\right), \qquad n \text{ even.} \tag{A.5}$$

When n is an odd number, there are two banks farthest away from LMB 1, banks $i = (n+1)/2$ and $i = (n+1)/2 + 1$. If equation (5) is written down for each of these two banks, and the symmetry condition $P_{\frac{n+1}{2}+2} = P_{\frac{n+1}{2}-1}$ is imposed, then solving these two equations for $P_{\frac{n+1}{2}}$ results in the boundary condition

$$P_{\frac{n+1}{2}} = \frac{1}{3} P_{\frac{n+1}{2}-1} + \frac{2}{3}\left(c + \frac{t}{n}\right), \qquad n \text{ odd.} \tag{A.6}$$

It what follows, we derive the solution assuming that n is even.[39] Therefore, in addition to (A.4), the second boundary condition is based on (A.5). Substituting (A.3) into (A.5) and simplifying leads to a proportional relationship between α_1 and α_2:

$$\alpha_2 = \alpha_1 \left(\frac{2+\sqrt{3}}{2-\sqrt{3}}\right)^{\frac{n}{2}+1} \tag{A.7}$$

Using (A.7) to substitute for α_2 in boundary condition (A.4), one obtains

$$\begin{aligned} P_1 &= \alpha_1\left(2+\sqrt{3}\right) + \alpha_1\left(\frac{2+\sqrt{3}}{2-\sqrt{3}}\right)^{\frac{n}{2}+1}\left(2-\sqrt{3}\right) + c + \frac{t}{n} \\ &= \alpha_1\left(2+\sqrt{3}\right)\left[1 + \left(\frac{2+\sqrt{3}}{2-\sqrt{3}}\right)^{\frac{n}{2}}\right] + c + \frac{t}{n} \end{aligned} \tag{A.8}$$

or

[39] The case of n odd is similar but uses condition (A.6) rather than (A.5).

$$\alpha_1 = \frac{P_1 - \left(c + \frac{t}{n}\right)}{\left(2+\sqrt{3}\right)\left[1 + \left(\frac{2+\sqrt{3}}{2-\sqrt{3}}\right)^{\frac{n}{2}}\right]} \tag{A.9}$$

Using (A.7) and (A.9) to substitute for α_1 and α_2 in (A.3), we obtain the solution

$$P_i = \left(1-\delta_{i,n}\right)\left(c + \frac{t}{n}\right) + \delta_{i,n} P_1 \ , \quad i = 1, \ldots, n. \tag{A.10}$$

where

$$\delta_{i,n} \equiv \frac{\left(2+\sqrt{3}\right)^{\frac{n}{2}+1-i} + \left(2-\sqrt{3}\right)^{\frac{n}{2}+1-i}}{\left(2+\sqrt{3}\right)^{\frac{n}{2}} + \left(2-\sqrt{3}\right)^{\frac{n}{2}}} \tag{A.11}$$

Note that (A.11) satisfies the symmetry conditions: $\delta_{2,n}=\delta_{n,n}$, $\delta_{3,n}=\delta_{n\text{-}1,n}$,…, $\delta_{n/2,n}=\delta_{n/2+2,n}$. Its derivative with respect to i is

$$\frac{\partial \delta_{i,n}}{\partial i} = \frac{\ln\left(2+\sqrt{3}\right)}{\left(2+\sqrt{3}\right)^{\frac{n}{2}} + \left(2-\sqrt{3}\right)^{\frac{n}{2}}}\left[\left(2-\sqrt{3}\right)^{\frac{n}{2}+1-i} - \left(2+\sqrt{3}\right)^{\frac{n}{2}+1-i}\right] \tag{A.12}$$

Since $0 < \left(2-\sqrt{3}\right) = \left(2+\sqrt{3}\right)^{-1} < 1 < \left(2+\sqrt{3}\right)$, $\partial\delta_{i,n}/\partial i < 0$ over the range from $i = 2$ to $i = n/2 + 1$, the mid-point of the circle. This implies that the small bank's weight on LMB 1's price declines the further is its distance from LMB 1. The derivative of (A.11) with respect to n is

$$\frac{\partial \delta_{i,n}}{\partial n} = \frac{\ln\left(2+\sqrt{3}\right)}{\left[\left(2+\sqrt{3}\right)^{\frac{n}{2}} + \left(2-\sqrt{3}\right)^{\frac{n}{2}}\right]^2}\left[\left(2-\sqrt{3}\right)^{i-1} - \left(2+\sqrt{3}\right)^{i-1}\right] \tag{A.13}$$

Since $i = 2,\ldots,n$ for the small banks, $\partial\delta_{i,n}/\partial n < 0$. This means that the price charged by a small bank of a given distance $i - 1$ from LMB 1 will have a smaller weight on LMB 1's price the more competitive is the market. In other words, keeping distance constant, LMB 1's price has less impact on a small bank's price the greater is the number of small banks in the market.

B. Proof of Proposition 1:

The difference between the prices of small bank 2 and LMB 1 in the concentrated market *M* is

$$P_2^M - P_1 = \frac{t\left(1-\delta_{2,m}\right)}{(4-\delta_{2,n}-\delta_{2,m})}\left[2\left(c-c_b\right)+\left(2-\delta_{2,n}\right)t\left(\frac{1}{m}-\frac{1}{n}\right)\right] \tag{A.14}$$

which is positive since $m < n$, $0<\delta_{2,n}<\delta_{2,m}<1$, and $c_b \le c$. Since $\delta_{i,m}$ is a declining function of a small bank's distance from the LMB, the prices of the other small banks in market *M* are relatively higher the farther are their distances from LMB 1.

Similarly, the difference between the prices of small bank 2 and LMB 1 in the competitive market *N* is

$$P_2^N - P_1 = \frac{t\left(1-\delta_{2,n}\right)}{(4-\delta_{2,n}-\delta_{2,m})}\left[2\left(c-c_b\right)-\left(2-\delta_{2,m}\right)t\left(\frac{1}{m}-\frac{1}{n}\right)\right] \tag{A.15}$$

which is negative if $c-c_b<\frac{t}{2}\left(2-\delta_{2,m}\right)\left(\frac{1}{m}-\frac{1}{n}\right)$. Thus, if this cost condition holds, the prices of the small banks in market *N* are higher than that of the LMB.

C. Proof of Proposition 2

Straightforward calculations show that the derivative of the LMB's price in equation (16) with respect to $\delta_{2,m/k}$ is

$$\frac{\partial P_1}{\partial \delta_{2,m/k}} = -\frac{c-c_b+t\left(2-\delta_{2,n}\right)\left[\frac{1}{m}-\frac{1}{n}\right]}{\left(4-\delta_{2,n}-\delta_{2,m/k}\right)^2}<0. \tag{A.16}$$

Therefore, since $\partial\delta_{2,m/k}/\partial k > 0$, this implies that $\partial P_1/\partial k < 0$. Hence, the price charged by the LMB under Alternative I is smaller the larger is the number of LMBs operating in market *M*.

Accordingly, since the small banks' weights on LMB 1's price are increasing functions of *k*, that is, $\partial\delta_{i,m/k}/\partial k > 0$, then both the small banks' and LMBs' prices in market *M* are lower the greater is *k*.

Using equations (18) and (16) to examine the effect of these mergers in the other markets having *n* banks, prices will rise if $P_2^N - P_1 < 0$. This occurs if $c - c_b < \frac{t}{2}\left(2 - \delta_{2,m/k}\right)\left(\frac{1}{m} - \frac{1}{n}\right)$. Compared to the case of a single market-extension merger, this condition is less likely to hold since $\partial\delta_{2,m/k}/\partial k > 0$. Therefore, the greater the number of market-extension mergers in market *M*, the lower are these mergers' effects in raising prices the linked markets. It is possible that for *k* sufficiently large, mergers could lead to falling prices in these markets.

D. Proof of Proposition 3

Comparing equations (16) and (19), we see that relative to Alternative I, the equilibrium price of the LMBs under Alternative II is the same except that $\delta_{2,n/k}$ replaces $\delta_{2,n}$. Note that $\delta_{2,n/k} > \delta_{2,n}$ for $k > 1$, and also note that

$$\frac{\partial P_1}{\partial \delta_{2,n/k}} = -\frac{c - c_b + t\left(2 - \delta_{2,m/k}\right)\left[\frac{1}{m} - \frac{1}{n}\right]}{\left(4 - \delta_{2,n/k} - \delta_{2,m/k}\right)^2} < 0 . \qquad \text{(A.17)}$$

which implies that the equilibrium price of the LMBs is lower under Alternative II than it is under Alternative I. Therefore, it also is the case that the prices of all banks in market *M* are lower under Alternative II relative to Alternative I. Regarding the prices of banks in market *N*, note that the difference $P_2^N - P_1$ is

$$P_2^N - P_1 = \frac{t\left(1 - \delta_{2,n/k}\right)}{\left(4 - \delta_{2,n/k} - \delta_{2,m/k}\right)}\left[2\left(c - c_b\right) - \left(2 - \delta_{2,m/k}\right)t\left(\frac{1}{m} - \frac{1}{n}\right)\right] \qquad \text{(A.18)}$$

As with Alternative I, $P_2^N - P_1$ is positive if and only if $c - c_b > \frac{t}{2}\left(2 - \delta_{2,m/k}\right)\left(\frac{1}{m} - \frac{1}{n}\right)$.

However, the difference $P_2^N - P_1$ is a decreasing function of $\delta_{2,n/k}$, and, since $\partial\delta_{2,n/k}/\partial k > 0$, this price difference is less relative to the situation in Alternative I. If it is the case that $c - c_b > \frac{t}{2}\left(2 - \delta_{2,m/k}\right)\left(\frac{1}{m} - \frac{1}{n}\right)$, so that $P_2^N - P_1 > 0$, then we can conclude that the prices of all banks in market *N* are lower under Alternative II relative to Alternative I. However, if $c - c_b < \frac{t}{2}\left(2 - \delta_{2,m/k}\right)\left(\frac{1}{m} - \frac{1}{n}\right)$, so that $P_2^N - P_1 < 0$, we can conclude that the prices of the small banks in market *N* that are direct neighbors of the merged banks, P_2^N, are lower under Alternative II relative to Alternative I. However, the other small banks in market *N* will have lower prices, and there are more small banks that are not neighbors of an LMB under Alternative I. Therefore, it may or may not be the case that the average small bank price in market *N* is lower under Alternative I versus Alternative II.

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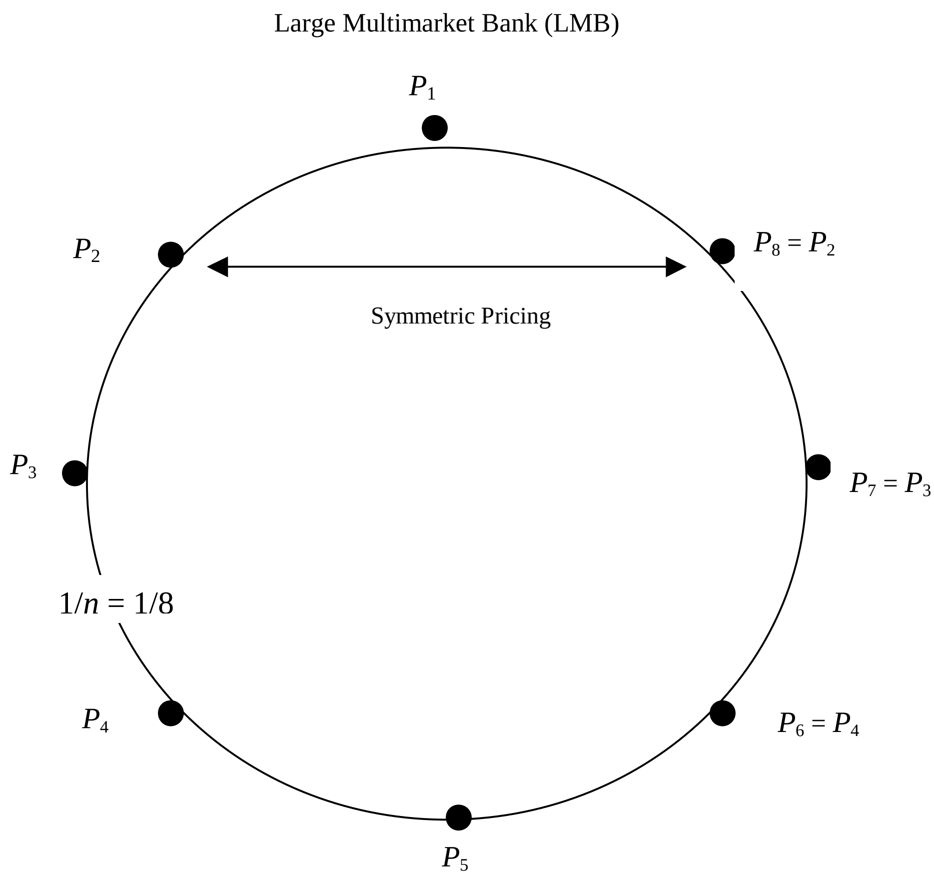


Figure 1. A Circular City with a Single LMB

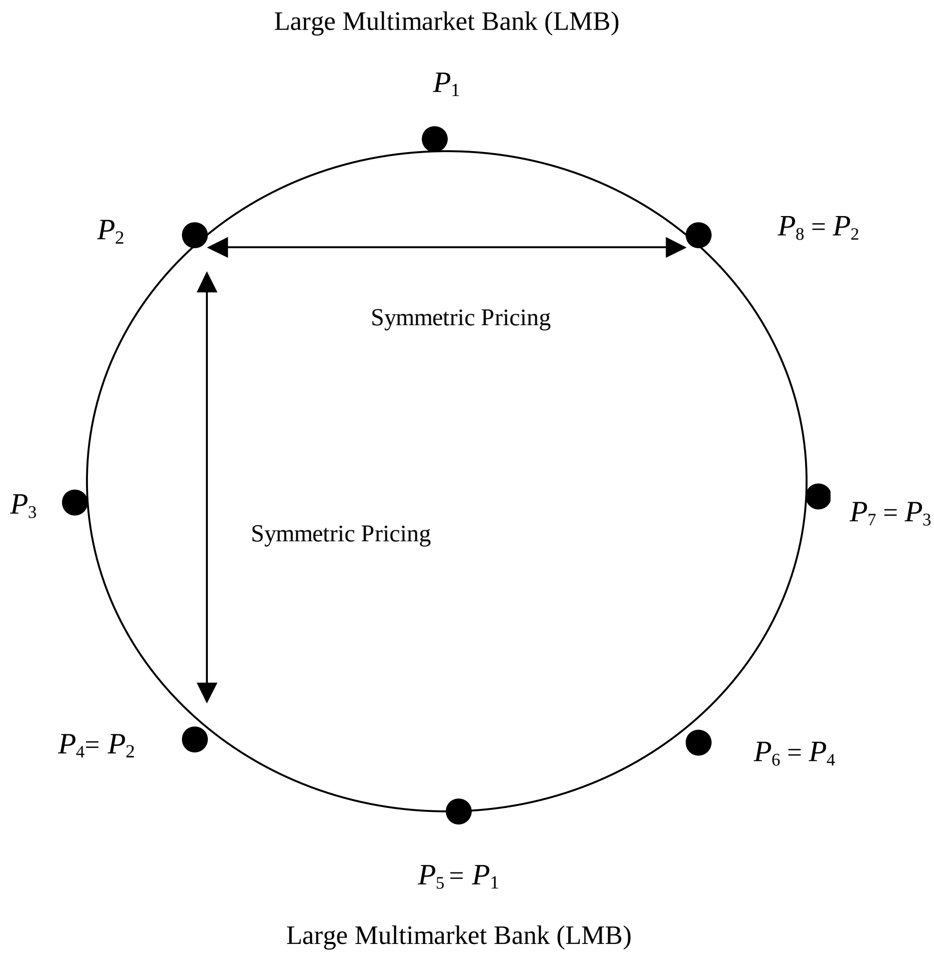
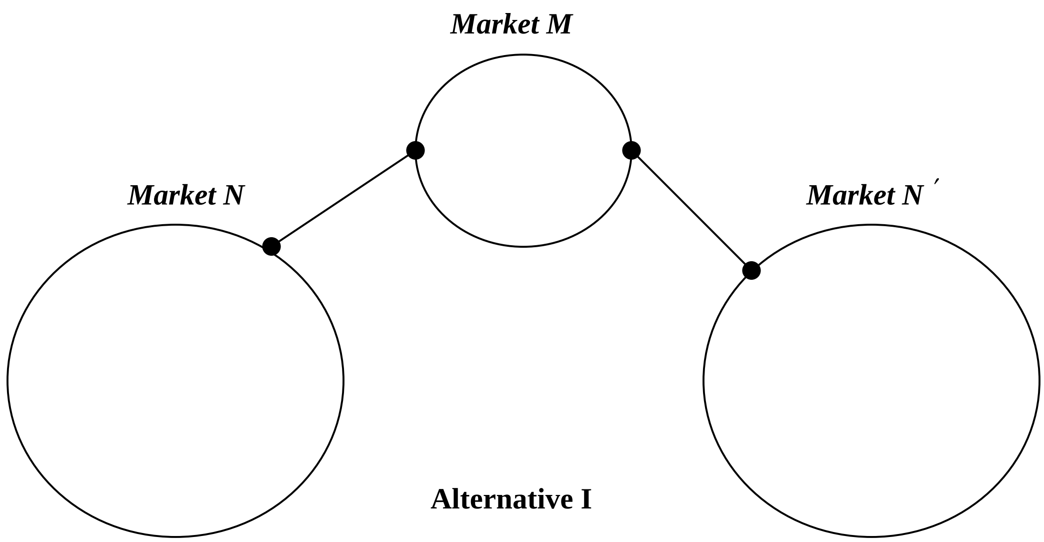
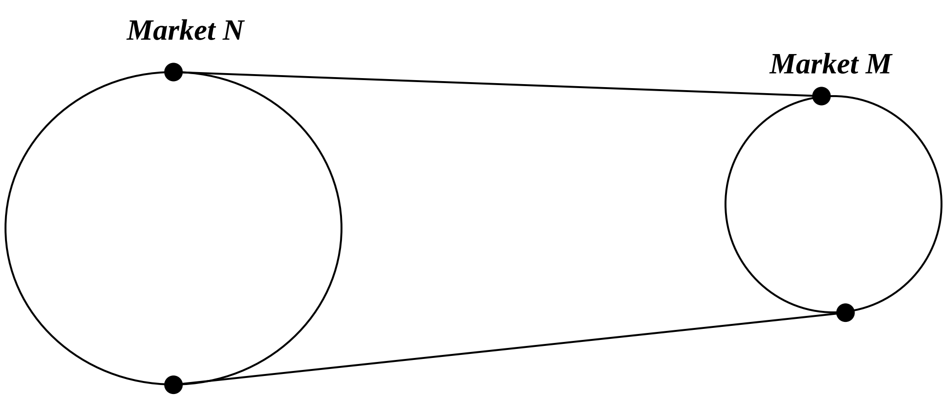


Figure 2. A Circular City with Two LMBs



Alternative I



Alternative II

Figure 3. Alternative Types of Market-Extension Mergers

Alternative I shows an example of two LMBs that operate in a market *M* that has a total of *m* banks. These LMBs also operate in similar but different markets (*N* and *N′*) each of which has a total of *n* banks. Alternative II shows an example of two LMBs that operate in market *M* and that also operate in the same market *N*.

Table 1 Personal Loan and One-Year CD Interest Rates

Bank	State	City	HHI	Personal Loan Rate	1Year CD Rate
Allfirst Bank	MD	Baltimore	927.53	12.49	1.70
Allfirst Bank	PA	Harrisburg-Lebanon	829.02	12.49	1.70
Allfirst Bank	PA	Lancaster	1164.52	12.49	1.70
Allfirst Bank	PA	Reading	1604.89	12.49	1.70
Allfirst Bank	PA	York	1383.00	12.49	1.70
AmSouth Bank	AL	Birmingham	1251.10	16.55	1.10
AmSouth Bank	AL	Huntsville	1219.61	16.55	1.10
AmSouth Bank	AL	Mobile	1811.26	16.55	1.10
AmSouth Bank	FL	Fort Myers	1158.39	16.49	0.95
AmSouth Bank	FL	Naples	1009.60	16.49	0.95
AmSouth Bank	FL	St. Petersburg-Tampa	1163.27	16.49	0.95
AmSouth Bank	MS	Jackson	2187.11	16.67	1.25
AmSouth Bank	TN	Chattanooga	1363.50	17.55	1.00
AmSouth Bank	TN	Knoxville	1029.52	17.55	1.00
AmSouth Bank	TN	Nashville	1080.38	17.55	1.00
BancFirst	OK	Oklahoma City	623.10	13.75	1.80
BancFirst	OK	Tulsa	1099.38	13.75	1.80
Bank of America	AR	Little Rock	956.14		1.10
Bank of America	AZ	Phoenix-Mesa	1761.83		1.30
Bank of America	AZ	Tucson	1647.02		1.30
Bank of America	CA	Bakersfield	1399.73		1.35
Bank of America	CA	Fresno	1114.48		1.35
Bank of America	CA	L.A.	857.68		1.35
Bank of America	CA	Modesto	951.30		1.35
Bank of America	CA	Oakland	1071.91		1.35
Bank of America	CA	Riverside-San Bernardino	912.76		1.35
Bank of America	CA	Sacramento	1000.27		1.35
Bank of America	CA	San Diego	1076.89		1.35
Bank of America	CA	San Francisco-Bay Area	1764.38		1.35
Bank of America	CA	San Jose-Silicon Valley	1006.57		1.35
Bank of America	CA	Santa Barbara	1260.33		1.35
Bank of America	CA	Santa Rosa-Sonoma County	868.78		1.35
Bank of America	CA	Stockton-Lodi	3694.60		1.35
Bank of America	CA	Ventura County	1235.80		1.35
Bank of America	DC	Washington-DC-MD-VA-WV	732.73		1.30
Bank of America	FL	Daytona Beach	1512.39		1.10
Bank of America	FL	Fort Lauderdale	1224.96		1.10
Bank of America	FL	Fort Myers	1158.39		1.10
Bank of America	FL	Jacksonville	2018.75		1.10
Bank of America	FL	Melbourne-Titusville-Palm Bay	1525.46		1.10
Bank of America	FL	Miami	722.23		1.10
Bank of America	FL	Naples	1009.60		1.10
Bank of America	FL	Orlando	1402.00		1.10
Bank of America	FL	Sarasota-Bradenton	1140.97		1.10
Bank of America	FL	St. Petersburg-Tampa	1163.27		1.10
Bank of America	FL	Tallahassee	1268.78		1.10
Bank of America	FL	West Palm Beach	1046.71		1.10
Bank of America	GA	Atlanta	1189.19		1.10
Bank of America	GA	Augusta	1373.36		1.10
Bank of America	GA	Savannah	1702.70		1.10
Bank of America	KS	Lawrence	1564.83		1.10
Bank of America	KS	Wichita	960.18		1.10
Bank of America	MD	Baltimore	927.53		1.30
Bank of America	MO	Kansas City	525.34		1.15
Bank of America	MO	Springfield	721.65		1.15
Bank of America	MO	St. Louis	859.60		1.15
Bank of America	NC	Charlotte	3191.05		1.10
Bank of America	NC	Greensboro	1773.80		1.10
Bank of America	NM	Albuquerque	1798.74		1.25
Bank of America	NV	Las Vegas	1399.20		1.25
Bank of America	NV	Reno/Carson City	1906.78		1.25
Bank of America	OK	Oklahoma City	623.10		1.10
Bank of America	OK	Tulsa	1099.38		1.10
Bank of America	OR	Portland	1534.42		1.20
Bank of America	SC	Charleston	1290.78		1.10

Bank	State	City	HHI	Personal Loan Rate	1Year CD Rate
Bank of America	SC	Columbia	1790.78		1.10
Bank of America	SC	Greenville-Spartanburg	1063.85		1.10
Bank of America	TN	Chattanooga	1363.50		1.10
Bank of America	TN	Memphis	1880.30		1.10
Bank of America	TN	Nashville	1080.38		1.10
Bank of America	TX	Austin-San Marcos	983.03		1.10
Bank of America	TX	Dallas	1030.65		1.10
Bank of America	TX	Fort Worth	803.01		1.10
Bank of America	TX	Houston	1488.64		1.10
Bank of America	TX	McAllen-Edinburg	1481.74		1.10
Bank of America	TX	San Antonio	2240.05		1.10
Bank of America	VA	Richmond	1606.76		1.25
Bank of America	VA	Roanoke	1312.70		1.25
Bank of America	WA	Seattle-Tacoma	1519.62		1.20
Bank of Oklahoma	OK	Oklahoma City	623.10	17.25	1.31
Bank of Oklahoma	OK	Tulsa	1099.38	17.25	1.31
Bank of the West	CA	Sacramento	1000.27	18.50	
Bank of the West	NM	Albuquerque	1798.74	18.50	1.35
Bank One	AZ	Phoenix-Mesa	1761.83	13.90	0.75
Bank One	AZ	Tucson	1647.02	13.90	0.75
Bank One	CO	Boulder	941.86	12.50	0.75
Bank One	CO	Denver	956.66	12.50	0.75
Bank One	CO	Greeley	921.61	12.50	0.75
Bank One	IL	Chicago	667.83	12.25	0.75
Bank One	IL	Rockford	1238.10	12.25	0.75
Bank One	LA	Baton Rouge	2006.88	13.15	0.75
Bank One	LA	New Orleans	1511.30	13.15	0.75
Bank One	MI	Detroit	1625.32	12.75	0.75
Bank One	MI	Grand Rapids	1491.80	12.75	0.75
Bank One	OH	Akron	1346.61	12.50	0.90
Bank One	OH	Canton-Massillon	1425.62	12.50	0.90
Bank One	OH	Cleveland	1429.67	12.50	0.90
Bank One	OH	Columbus	1624.98	12.50	0.90
Bank One	OH	Dayton	1233.72	12.50	0.90
Bank One	OH	Youngstown-Warren	1123.82	12.50	0.90
Bank One	TX	Austin-San Marcos	983.03	13.65	0.90
Bank One	TX	Dallas	1030.65	13.65	0.90
Bank One	TX	Fort Worth	803.01	13.65	0.90
Bank One	TX	Houston	1488.64	13.65	0.90
Bank One	TX	San Antonio	2240.05	13.65	0.90
Bank One	UT	Salt Lake City	5267.45	11.25	0.75
Bank One	WI	Madison	826.76	12.20	0.90
Bank One	IN	Fort Wayne	933.84	12.25	0.75
Bank One	IN	Indianapolis	1328.78	12.25	0.75
Bank One	KY	Lexington	819.04	13.65	0.75
Bank One	KY	Louisville	1171.77	13.65	0.75
Bank One	OK	Oklahoma City	623.10	12.75	0.75
Bank One	OK	Tulsa	1099.38	12.75	0.75
Bank One	WV	Charleston	1804.67	13.00	0.75
Bank One	WI	Milwaukee	1312.85	12.20	0.90
BankAtlantic	FL	Daytona Beach	1512.39	17.50	1.90
BankAtlantic	FL	Fort Lauderdale	1224.96	17.50	1.90
BankAtlantic	FL	Miami	722.23	17.50	1.90
BankUnited	FL	Fort Lauderdale	1224.96		2.25
BankUnited	FL	Miami	722.23		2.25
BB&T	GA	Atlanta	1189.19	16.00	1.45
BB&T	MD	Baltimore	927.53	16.00	1.50
BB&T	NC	Charlotte	3191.05	16.00	1.45
BB&T	NC	Greensboro	1773.80	16.00	1.45
BB&T	NC	Raleigh-Durham-Chapel Hill	1569.67	16.00	1.45
BB&T	WV	Charleston	1804.67	16.00	1.55
BB&T	SC	Charleston	1290.78	16.85	1.20
BB&T	SC	Columbia	1790.78	16.85	1.20
BB&T	SC	Greenville-Spartanburg	1063.85	16.85	1.20
BB&T	VA	Richmond	1606.76	16.00	1.45
BB&T	VA	Roanoke	1312.70	16.00	1.45
California Federal Bank	CA	Bakersfield	1399.73		1.65

Bank	State	City	HHI	Personal Loan Rate	1Year CD Rate
California Federal Bank	CA	Fresno	1114.48		1.65
California Federal Bank	CA	L.A.	857.68		1.65
California Federal Bank	CA	Oakland	1071.91		1.65
California Federal Bank	CA	Riverside-San Bernardino	912.76		1.65
California Federal Bank	CA	Sacramento	1000.27		1.65
California Federal Bank	CA	San Diego	1076.89		1.65
California Federal Bank	CA	San Bay-Bay Area	1764.38		1.65
California Federal Bank	CA	San Jose-Silicon Valley	1006.57		1.65
California Federal Bank	CA	Ventura County	1235.80		1.65
California Federal Bank	NV	Las Vegas	1399.20		1.65
California Federal Bank	NV	Reno/Carson City	1906.78		1.65
Cambridge Savings Bank	AL	Mobile	1811.26	15.00	
Cambridge Savings Bank	MA	Boston	1268.43	15.00	
Capitol Federal Savings Bank	MO	Kansas City	525.34	14.00	2.00
Capitol Federal Savings Bank	KS	Lawrence	1564.83	14.00	2.00
Capitol Federal Savings Bank	KS	Wichita	960.18	14.00	2.00
Central Carolina Bank	NC	Greensboro	1773.80	11.50	
Central Carolina Bank	NC	Raleigh-Durham-Chapel Hill	1569.67	11.50	
Central Carolina Bank	SC	Greenville-Spartanburg	1063.85	11.50	
Chase Bank	NY	New York	1704.05		1.40
Chase Bank	NY	Rochester	1408.15		1.40
Chase Bank	NY	Syracuse	944.26		1.40
Chase Bank	TX	Austin-San Marcos	983.03		1.40
Chase Bank	TX	Dallas	1030.65		1.40
Chase Bank	TX	Houston	1488.64		1.40
Chase Bank	TX	McAllen-Edinburg	1481.74		1.40
Chevy Chase Bank	DC	Washington-DC-MD-VA-WV	732.73	15.25	1.86
Chevy Chase Bank	MD	Baltimore	927.53	15.25	1.86
Chevy Chase Bank	VA	Richmond	1606.76	15.25	
Chevy Chase Bank	VA	Roanoke	1312.70	15.25	
Citibank	CA	San Bay-Bay Area	1764.38	19.50	
Citibank	DC	Washington-DC-MD-VA-WV	732.73	17.50	
Citibank	FL	Fort Lauderdale	1224.96	17.50	
Citibank	FL	Miami	722.23	17.50	
Citibank	IL	Chicago	667.83	17.50	
Citibank	NY	Buffalo	2291.58	17.50	
Citibank	NY	New York	1704.05	17.50	
Citibank	NY	Rochester	1408.15	17.50	
Citizens Bank	DE	Wilmington	1921.88		2.00
Citizens Bank	PA	Harrisburg-Lebanon	829.02		2.00
Citizens Bank	PA	Philadelphia	862.76		2.00
Citizens Bank	PA	Pittsburgh	1267.66		2.00
Citizens Bank	PA	Scranton-Wilkes	847.70		2.00
Citizens Bank	MA	Boston	1268.43		1.75
Citizens Bank	RI	Providence	2112.27		1.75
City National Bank	CA	L.A.	857.68		1.46
City National Bank	WV	Charleston	1804.67		1.45
Comerica Bank	CA	Fresno	1114.48		1.25
Comerica Bank	CA	L.A.	857.68		1.25
Comerica Bank	MI	Detroit	1625.32	18.00	1.15
Comerica Bank	MI	Grand Rapids	1491.80	18.00	1.15
Comerica Bank	MI	Kalamazoo-Battle Creek	1294.21	18.00	1.15
Comerica Bank	MI	Lansing-E. Lansing	889.11	18.00	1.15
Comerica Bank	TX	Dallas	1030.65	11.99	1.00
Commerce Bank	MO	Kansas City	525.34	12.60	1.25
Commerce Bank	MO	St. Louis	859.60	12.35	1.25
Commerce Bank	PA	Philadelphia	862.76	12.25	1.50
Commerce Bank	FL	Fort Lauderdale	1224.96	17.50	0.90
Commerce Bank	FL	Miami	722.23	17.50	0.90
Commerce Bank	FL	West Palm Beach	1046.71	17.50	
Commercial Federal Bank	CO	Denver	956.66	12.99	2.00
Commercial Federal Bank	IA	Davenport	650.42	12.99	2.00
Commercial Federal Bank	IA	Des Moines	1420.85	12.99	2.00
Commercial Federal Bank	KS	Lawrence	1564.83	12.99	2.00
Commercial Federal Bank	KS	Wichita	960.18	12.99	2.00
Commercial Federal Bank	MO	Kansas City	525.34	12.99	2.00
Commercial Federal Bank	NE	Omaha	1470.53	12.99	2.00

Bank	State	City	HHI	Personal Loan Rate	1Year CD Rate
Community First National Bank	ND	Fargo	2014.67		2.00
Community First National Bank	WY	Casper-Cheyenne	4742.57		1.60
Compass Bank	AL	Birmingham	1251.10	17.74	2.00
Compass Bank	AL	Huntsville	1219.61	17.74	2.00
Compass Bank	AL	Mobile	1811.26	17.74	2.00
Compass Bank	AZ	Phoenix-Mesa	1761.83	17.74	1.55
Compass Bank	CO	Denver	956.66	17.74	1.70
Compass Bank	FL	Jacksonville	2018.75	17.49	1.65
Compass Bank	TX	Austin-San Marcos	983.03	17.74	1.45
Compass Bank	TX	Dallas	1030.65	17.74	1.45
Dollar Bank, FSB	OH	Cleveland	1429.67	15.99	1.35
Dollar Bank, FSB	PA	Pittsburgh	1267.66	15.99	1.35
Earthstar Bank	PA	Allentown-Bethlehem	1060.78	12.50	
Earthstar Bank	PA	Harrisburg-Lebanon	829.02	12.50	
Earthstar Bank	PA	Lancaster	1164.52	12.50	
Earthstar Bank	PA	Philadelphia	862.76	12.50	
Earthstar Bank	PA	Pittsburgh	1267.66	12.50	
Earthstar Bank	PA	Reading	1604.89	12.50	
Earthstar Bank	PA	Scranton-Wilkes	847.70	12.50	
Earthstar Bank	PA	York	1383.00	12.50	
Downey S&LA	CA	L.A.	857.68		1.65
Downey S&LA	CA	San Diego	1076.89		1.65
Fifth Third Bank	IL	Chicago	667.83	13.99	1.65
Fifth Third Bank	IL	Rockford	1238.10	13.99	1.65
Fifth Third Bank	IN	Evansville	2893.43	16.50	1.60
Fifth Third Bank	IN	Indianapolis	1328.78	16.50	1.60
Fifth Third Bank	KY	Louisville	1171.77	16.49	1.60
Fifth Third Bank	MI	Grand Rapids	1491.80	13.74	1.75
Fifth Third Bank	MI	Lansing-E. Lansing	889.11	13.74	1.75
Fifth Third Bank	OH	Akron	1346.61	13.99	1.50
Fifth Third Bank	OH	Cincinnati	1563.17	13.99	1.50
Fifth Third Bank	OH	Cleveland	1429.67	13.99	1.50
Fifth Third Bank	OH	Columbus	1624.98	14.24	1.50
Fifth Third Bank	OH	Dayton	1233.72	14.99	1.50
Fifth Third Bank	OH	Toledo	1516.99	13.99	1.50
Fifth Third Bank	OH	Cincinnati	1563.17	13.99	
First Fed Svgs Bk of Am	MA	Boston	1268.43	13.50	
First Fed Svgs Bk of Am	RI	Providence	2112.27	13.50	
First Niagara Bank	NY	Buffalo	2291.58	12.99	
First Niagara Bank	NY	Rochester	1408.15	12.99	
First Tennessee Bank	TN	Chattanooga	1363.50	11.99	1.45
First Tennessee Bank	TN	Knoxville	1029.52	11.99	1.45
First Tennessee Bank	TN	Memphis	1880.30	11.99	1.45
Flagstar Bank, FSB	MI	Grand Rapids	1491.80	13.00	2.50
Flagstar Bank, FSB	MI	Detroit	1625.32	13.00	2.50
Fleet Bank	ME	Portland	1908.91		1.01
Fleet Bank	NJ	Atlantic City/Cape May	1032.11		1.01
Fleet Bank	NJ	Monmouth/Ocean	961.66		1.01
Fleet Bank	NJ	Trenton-Princeton	1213.93		1.01
Fleet Bank	PA	Allentown-Bethlehem	1060.78		1.01
Fleet Bank	PA	Philadelphia	862.76		1.01
Fleet National Bank	MA	Boston	1268.43		1.01
Fleet National Bank	NY	Albany	1159.11		1.01
Fleet National Bank	NY	Buffalo	2291.58		1.01
Fleet National Bank	NY	Rochester	1408.15		1.01
Fleet National Bank	NY	Syracuse	944.26		1.01
Fleet National Bank	RI	Providence	2112.27		1.01
Fulton Bank	PA	Lancaster	1164.52	13.49	
Fulton Bank	PA	York	1383.00	13.49	
Hibernia National Bank	LA	Baton Rouge	2006.88	14.90	1.20
Hibernia National Bank	LA	New Orleans	1511.30	14.90	1.20
HSBC Bank USA	NY	Albany	1159.11	13.24	1.15
HSBC Bank USA	NY	Buffalo	2291.58	13.24	1.15
HSBC Bank USA	NY	New York	1704.05	13.24	1.15
HSBC Bank USA	NY	Rochester	1408.15	13.24	1.15
HSBC Bank USA	NY	Syracuse	944.26	13.24	1.15
Huntington Bank	MI	Grand Rapids	1491.80	14.25	0.89

Bank	State	City	HHI	Personal Loan Rate	1Year CD Rate
Huntington Bank	OH	Cincinnati	1563.17	13.99	0.89
Huntington Bank	OH	Cleveland	1429.67	13.74	0.89
Huntington Bank	OH	Columbus	1624.98	14.25	0.89
KeyBank	AK	Anchorage	3002.52	12.00	0.55
KeyBank	CO	Colorado Springs	963.21	12.00	0.55
KeyBank	ID	Boise	1611.64	12.00	0.75
KeyBank	ME	Portland	1908.91	12.00	0.55
KeyBank	NY	Albany	1159.11	12.00	0.75
KeyBank	NY	Buffalo	2291.58	12.00	0.75
KeyBank	NY	Rochester	1408.15	12.00	0.75
KeyBank	NY	Syracuse	944.26	12.00	0.75
KeyBank	OH	Akron	1346.61	12.00	0.75
KeyBank	OH	Canton-Massillon	1425.62	12.00	0.75
KeyBank	OH	Cleveland	1429.67	12.00	0.75
KeyBank	OH	Dayton	1233.72	12.00	0.75
KeyBank	OH	Toledo	1516.99	12.00	0.75
KeyBank	OH	Youngstown-Warren	1123.82	12.00	0.75
KeyBank	OR	Portland	1534.42	12.00	0.55
KeyBank	UT	Salt Lake City	5267.45	12.00	0.55
KeyBank	VT	Burlington	2522.34	12.00	1.05
KeyBank	WA	Seattle-Tacoma	1519.62	12.00	0.55
LaSalle Bank	IL	Chicago	667.83		1.25
LaSalle Bank	IL	Rockford	1238.10		1.25
Liberty Savings Bank, F.S.B.	CO	Denver	956.66	15.00	1.90
Liberty Savings Bank, F.S.B.	OH	Dayton	1233.72	15.00	2.25
Local Oklahoma Bank	OK	Oklahoma City	623.10	14.00	1.90
Local Oklahoma Bank	OK	Tulsa	1099.38	14.00	1.90
M&I Bank	AZ	Phoenix-Mesa	1761.83		0.70
M&I Bank	WI	Madison	826.76	12.55	0.70
M&I Bank	WI	Milwaukee	1312.85	12.55	0.70
M&I Bank	WI	Racine	1206.12	12.55	0.70
M&I Bank	MN	Minneapolis-St. Paul	1936.34		0.70
M&T Bank	NY	Albany	1159.11	12.74	1.25
M&T Bank	NY	Buffalo	2291.58	12.74	1.25
M&T Bank	NY	Rochester	1408.15	12.74	1.25
M&T Bank	NY	Syracuse	944.26	12.74	1.25
M&T Bank	PA	Harrisburg-Lebanon	829.02	12.74	1.25
M&T Bank	PA	Scranton-Wilkes	847.70	12.74	1.25
MidFirst Bank	OK	Oklahoma City	623.10	18.00	1.80
MidFirst Bank	OK	Tulsa	1099.38	18.00	1.80
Mutual Savings Bank	WI	Madison	826.76		1.75
Mutual Savings Bank	WI	Milwaukee	1312.85		1.75
National Bank of Commerce	TN	Knoxville	1029.52	11.50	1.60
National Bank of Commerce	TN	Memphis	1880.30	11.50	1.60
National City Bank	IN	Fort Wayne	933.84	15.25	1.00
National City Bank	IN	Indianapolis	1328.78	15.25	1.00
National City Bank	MI	Detroit	1625.32	15.00	1.00
National City Bank	MI	Grand Rapids	1491.80	15.25	1.00
National City Bank	MI	Kalamazoo-Battle Creek	1294.21	15.00	1.00
National City Bank	MI	Lansing-E. Lansing	889.11	15.00	1.00
National City Bank	MI	Saginaw-Bay City-Midland	1337.73	15.00	1.00
National City Bank	OH	Cleveland	1429.67	15.25	0.95
National City Bank	OH	Columbus	1624.98	13.25	0.95
National City Bank	OH	Dayton	1233.72	13.25	0.95
National City Bank	OH	Youngstown-Warren	1123.82	15.25	0.95
National City Bank	KY	Lexington	819.04	15.25	1.00
National City Bank	KY	Louisville	1171.77	15.25	1.00
National City Bank	PA	Pittsburgh	1267.66	15.25	1.05
Nevada State Bank	NV	Las Vegas	1399.20	11.03	1.25
Nevada State Bank	NV	Reno/Carson City	1906.78	11.03	1.25
North Shore Bank	WI	Milwaukee	1312.85	12.99	1.75
North Shore Bank	WI	Racine	1206.12	12.99	1.75
Ocean Bank	FL	Fort Lauderdale	1224.96	16.00	
Ocean Bank	FL	Miami	722.23	16.00	
PNC Bank	DE	Wilmington	1921.88	13.24	0.85
PNC Bank	KY	Lexington	819.04	13.24	0.85
PNC Bank	KY	Louisville	1171.77	13.24	0.85

Bank	State	City	HHI	Personal Loan Rate	1Year CD Rate
PNC Bank	NJ	Atlantic City/Cape May	1032.11	13.24	0.75
PNC Bank	NJ	Monmouth/Ocean	961.66	13.24	0.75
PNC Bank	NJ	Trenton-Princeton	1213.93	13.24	0.75
PNC Bank	OH	Cincinnati	1563.17	13.24	0.60
PNC Bank	PA	Harrisburg-Lebanon	829.02	13.24	0.85
PNC Bank	PA	Philadelphia	862.76	13.24	0.75
PNC Bank	PA	Pittsburgh	1267.66	13.24	0.85
PNC Bank	PA	Scranton-Wilkes	847.70	13.24	0.75
Regions Bank	AL	Birmingham	1251.10	11.38	1.55
Regions Bank	AL	Huntsville	1219.61	11.38	1.55
Regions Bank	AL	Mobile	1811.26	13.75	1.62
Regions Bank	AR	Little Rock	956.14	9.75	1.50
Regions Bank	GA	Atlanta	1189.19	9.75	1.55
Regions Bank	LA	New Orleans	1511.30	9.75	1.55
SouthTrust Bank	AL	Birmingham	1251.10	14.75	1.40
SouthTrust Bank	AL	Huntsville	1219.61	14.75	1.40
SouthTrust Bank	AL	Mobile	1811.26	14.75	1.45
SouthTrust Bank	FL	Jacksonville	2018.75	15.25	1.40
SouthTrust Bank	FL	Melbourne-Titusville-Palm Bay	1525.46	15.25	1.40
SouthTrust Bank	FL	Orlando	1402.00	15.25	1.40
SouthTrust Bank	FL	Sarasota-Bradenton	1140.97	15.25	1.40
SouthTrust Bank	FL	St. Petersburg-Tampa	1163.27	15.25	1.40
SouthTrust Bank	FL	Tallahassee	1268.78	15.25	1.40
SouthTrust Bank	GA	Atlanta	1189.19	14.50	1.45
SouthTrust Bank	GA	Augusta	1373.36	14.50	1.45
Sovereign Bank	MA	Boston	1268.43	17.99	1.90
Sovereign Bank	PA	Allentown-Bethlehem	1060.78	17.99	1.90
Sovereign Bank	PA	Lancaster	1164.52	17.99	1.90
Sovereign Bank	PA	Philadelphia	862.76	17.99	1.90
Sovereign Bank	PA	Reading	1604.89	17.99	1.90
Sovereign Bank	RI	Providence	2112.27	17.99	1.90
Standard Federal Bank	MI	Ann Arbor	703.69	16.50	1.25
Standard Federal Bank	MI	Detroit	1625.32	16.50	1.25
Standard Federal Bank	MI	Grand Rapids	1491.80	16.50	1.25
Standard Federal Bank	MI	Kalamazoo-Battle Creek	1294.21	16.50	1.25
Standard Federal Bank	MI	Lansing-E. Lansing	889.11	16.50	1.25
Standard Federal Bank	MI	Saginaw-Bay City-Midland	1337.73	16.50	1.25
SunTrust Bank	DC	Washington-DC-MD-VA-WV	732.73	14.25	1.35
SunTrust Bank	FL	Jacksonville	2018.75	12.82	1.30
SunTrust Bank	FL	Melbourne-Titusville-Palm Bay	1525.46	12.60	1.25
SunTrust Bank	FL	Miami	722.23	16.25	1.20
SunTrust Bank	FL	Orlando	1402.00	12.60	1.25
SunTrust Bank	FL	St. Petersburg-Tampa	1163.27	15.15	1.25
SunTrust Bank	FL	West Palm Beach	1046.71	13.20	1.25
SunTrust Bank	GA	Atlanta	1189.19	11.00	1.30
SunTrust Bank	MD	Baltimore	927.53	14.25	1.35
SunTrust Bank	TN	Chattanooga	1363.50		1.30
SunTrust Bank	TN	Knoxville	1029.52	9.63	1.30
SunTrust Bank	TN	Nashville	1080.38	10.50	1.30
SunTrust Bank	VA	Richmond	1606.76	14.25	1.35
SunTrust Bank	VA	Roanoke	1312.70	14.25	1.35
U.S. Bank	AR	Little Rock	956.14	11.00	1.15
U.S. Bank	CA	Sacramento	1000.27	17.50	0.99
U.S. Bank	CA	San Diego	1076.89	17.50	0.99
U.S. Bank	CO	Denver	956.66	14.99	0.99
U.S. Bank	IA	Davenport	650.42	14.00	1.35
U.S. Bank	IA	Des Moines	1420.85	14.00	1.35
U.S. Bank	ID	Boise	1611.64	13.40	0.99
U.S. Bank	KS	Lawrence	1564.83	14.00	1.20
U.S. Bank	MN	Minneapolis-St. Paul	1936.34	12.75	1.25
U.S. Bank	MO	Kansas City	525.34	14.00	1.20
U.S. Bank	MO	Springfield	721.65	12.99	1.20
U.S. Bank	MO	St. Louis	859.60	12.99	1.10
U.S. Bank	MT	Billings	1674.75	14.50	1.10
U.S. Bank	ND	Fargo	2014.67	14.90	1.20
U.S. Bank	NE	Omaha	1470.53	14.49	1.25
U.S. Bank	NV	Las Vegas	1399.20	16.99	0.99

Bank	State	City	HHI	Personal Loan Rate	1Year CD Rate
U.S. Bank	OH	Cincinnati	1563.17	15.99	1.65
U.S. Bank	OH	Cleveland	1429.67	14.49	1.50
U.S. Bank	OH	Columbus	1624.98	14.49	1.65
U.S. Bank	OH	Dayton	1233.72	15.99	1.65
U.S. Bank	OR	Portland	1534.42	13.99	0.99
U.S. Bank	TN	Nashville	1080.38	14.49	1.65
U.S. Bank	UT	Salt Lake City	5267.45	15.49	0.99
U.S. Bank	WA	Seattle-Tacoma	1519.62	14.75	1.00
U.S. Bank	WI	Madison	826.76	12.05	1.20
U.S. Bank	WI	Milwaukee	1312.85	12.05	1.20
U.S. Bank	WI	Racine	1206.12	12.05	1.20
Union Bank	CA	Bakersfield	1399.73	16.50	0.50
Union Bank	CA	Fresno	1114.48	16.50	0.50
Union Bank	CA	L.A.	857.68	16.50	0.50
Union Bank	CA	Oakland	1071.91	16.50	0.50
Union Bank	CA	Sacramento	1000.27	16.50	0.50
Union Bank	CA	San Diego	1076.89	16.50	0.50
Union Bank	CA	San Bay-Bay Area	1764.38	16.50	0.50
Union Bank	CA	San Jose-Silicon Valley	1006.57	16.50	0.50
Union Planters Bank	FL	Fort Lauderdale	1224.96	18.00	1.30
Union Planters Bank	FL	Miami	722.23	18.00	1.30
Union Planters Bank	IN	Indianapolis	1328.78	15.00	1.30
Union Planters Bank	MO	Springfield	721.65	12.50	1.30
Union Planters Bank	MO	St. Louis	859.60	12.50	1.30
Union Planters Bank	TN	Memphis	1880.30	12.49	1.25
Union Planters Bank	TN	Nashville	1080.38	12.49	1.25
Vectra Bank Colorado	CO	Denver	956.66	14.00	1.65
Vectra Bank Colorado	CO	Greeley	921.61	14.00	1.65
Wachovia Bank	FL	West Palm Beach	1046.71	13.74	1.25
Wachovia Bank	GA	Atlanta	1189.19	13.74	1.25
Wachovia Bank	GA	Savannah	1702.70	13.74	1.25
Wachovia Bank	NC	Charlotte	3191.05	13.74	1.25
Wachovia Bank	NC	Greensboro	1773.80	13.74	1.25
Wachovia Bank	NC	Raleigh-Durham-Chapel Hill	1569.67	13.74	1.25
Wachovia Bank	SC	Charleston	1290.78	16.00	1.25
Wachovia Bank	SC	Columbia	1790.78	16.00	1.25
Wachovia Bank	SC	Greenville-Spartanburg	1063.85	16.00	1.25
Wachovia Bank	VA	Richmond	1606.76	16.00	1.25
Wachovia Bank	DC	Washington-DC-MD-VA-WV	732.73		1.25
Wachovia Bank	DE	Wilmington	1921.88		1.25
Wachovia Bank	FL	Daytona Beach	1512.39		1.25
Wachovia Bank	FL	Fort Lauderdale	1224.96		1.25
Wachovia Bank	FL	Fort Myers	1158.39		1.25
Wachovia Bank	FL	Jacksonville	2018.75		1.25
Wachovia Bank	FL	Miami	722.23		1.25
Wachovia Bank	FL	Naples	1009.60		1.25
Wachovia Bank	FL	Orlando	1402.00		1.25
Wachovia Bank	FL	Sarasota-Bradenton	1140.97		1.25
Wachovia Bank	FL	St. Petersburg-Tampa	1163.27		1.25
Wachovia Bank	GA	Augusta	1373.36		1.25
Wachovia Bank	MD	Baltimore	927.53		1.25
Wachovia Bank	NJ	Atlantic City/Cape May	1032.11		1.25
Wachovia Bank	NJ	Monmouth/Ocean	961.66		1.25
Wachovia Bank	NJ	Trenton-Princeton	1213.93		1.25
Wachovia Bank	PA	Harrisburg-Lebanon	829.02		1.25
Wachovia Bank	PA	Lancaster	1164.52		1.25
Wachovia Bank	PA	Philadelphia	862.76		1.25
Wachovia Bank	PA	Reading	1604.89		1.25
Wachovia Bank	PA	Scranton-Wilkes	847.70		1.25
Wachovia Bank	PA	York	1383.00		1.25
Wachovia Bank	VA	Roanoke	1312.70		1.25
Washington Mutual Bank	CA	Bakersfield	1399.73	14.00	
Washington Mutual Bank	CA	Fresno	1114.48	14.00	
Washington Mutual Bank	CA	L.A.	857.68	14.00	
Washington Mutual Bank	CA	Modesto	951.30	14.00	
Washington Mutual Bank	CA	Oakland	1071.91	14.00	
Washington Mutual Bank	CA	Riverside-San Bernardino	912.76	14.00	

Bank	State	City	HHI	Personal Loan Rate	1Year CD Rate
Washington Mutual Bank	CA	Sacramento	1000.27	14.00	
Washington Mutual Bank	CA	San Diego	1076.89	14.00	
Washington Mutual Bank	CA	San Bay-Bay Area	1764.38	14.00	
Washington Mutual Bank	CA	San Jose-Silicon Valley	1006.57	14.00	
Washington Mutual Bank	CA	Santa Barbara	1260.33	14.00	
Washington Mutual Bank	CA	Santa Rosa-Sonoma County	868.78	14.00	
Washington Mutual Bank	CA	Stockton-Lodi	3694.60	14.00	
Washington Mutual Bank	CA	Ventura County	1235.80	14.00	
Washington Mutual Bank	FL	Fort Lauderdale	1224.96	15.74	1.40
Washington Mutual Bank	FL	Melbourne-Titusville-Palm Bay	1525.46	15.74	1.40
Washington Mutual Bank	FL	Miami	722.23	15.74	1.40
Washington Mutual Bank	FL	Orlando	1402.00	15.74	1.40
Washington Mutual Bank	FL	West Palm Beach	1046.71	15.74	1.40
Washington Mutual Bank	NY	New York	1704.05	15.50	1.45
Washington Mutual Bank	OR	Portland	1534.42		1.40
Washington Mutual Bank	TX	Dallas	1030.65	14.25	1.30
Washington Mutual Bank	TX	Houston	1488.64	14.25	1.30
Washington Mutual Bank	UT	Salt Lake City	5267.45	14.00	1.25
Washington Mutual Bank	WA	Seattle-Tacoma	1519.62		1.40
Waypoint Bank	PA	Harrisburg-Lebanon	829.02	13.24	1.35
Waypoint Bank	PA	York	1383.00	13.24	1.35
Wells Fargo Bank	AK	Anchorage	3002.52	12.15	1.51
Wells Fargo Bank	AZ	Phoenix-Mesa	1761.83	18.75	1.10
Wells Fargo Bank	CA	L.A.	857.68	16.38	1.40
Wells Fargo Bank	CA	Oakland	1071.91	16.38	1.40
Wells Fargo Bank	CA	Riverside-San Bernardino	912.76	16.38	1.40
Wells Fargo Bank	CA	Sacramento	1000.27	16.38	1.40
Wells Fargo Bank	CA	San Diego	1076.89	16.38	1.40
Wells Fargo Bank	CA	San Bay-Bay Area	1764.38	16.38	1.40
Wells Fargo Bank	CA	San Jose-Silicon Valley	1006.57	16.38	1.40
Wells Fargo Bank	CA	Santa Barbara	1260.33	16.38	1.40
Wells Fargo Bank	CA	Santa Rosa-Sonoma County	868.78	16.38	1.40
Wells Fargo Bank	CA	Ventura County	1235.80	16.38	1.40
Wells Fargo Bank	CO	Boulder	941.86	15.88	1.25
Wells Fargo Bank	CO	Colorado Springs	963.21	15.88	1.25
Wells Fargo Bank	CO	Denver	956.66	15.88	1.25
Wells Fargo Bank	CO	Greeley	921.61	15.88	1.25
Wells Fargo Bank	IA	Des Moines	1420.85	13.75	0.40
Wells Fargo Bank	ID	Boise	1611.64	16.00	1.10
Wells Fargo Bank	MN	Minneapolis-St. Paul	1936.34	14.50	1.25
Wells Fargo Bank	MT	Billings	1674.75	10.24	1.51
Wells Fargo Bank	ND	Fargo	2014.67	9.24	1.51
Wells Fargo Bank	NE	Omaha	1470.53	9.60	0.40
Wells Fargo Bank	NM	Albuquerque	1798.74	16.38	1.04
Wells Fargo Bank	NV	Las Vegas	1399.20	15.75	1.25
Wells Fargo Bank	NV	Reno/Carson City	1906.78	15.75	1.25
Wells Fargo Bank	OR	Portland	1534.42	15.88	1.25
Wells Fargo Bank	TX	Austin-San Marcos	983.03	13.88	1.20
Wells Fargo Bank	TX	Houston	1488.64	13.88	1.20
Wells Fargo Bank	TX	San Antonio	2240.05	13.88	1.20
Wells Fargo Bank	UT	Salt Lake City	5267.45		1.20
Wells Fargo Bank	WA	Seattle-Tacoma	1519.62	15.75	1.25
Wells Fargo Bank	WY	Casper-Cheyenne	4742.57	14.88	0.25
Woodforest National Bank	TX	Austin-San Marcos	983.03	12.00	
Woodforest National Bank	TX	Dallas	1030.65	12.00	1.60
Woodforest National Bank	TX	El Paso	2015.15	12.00	
Woodforest National Bank	TX	Fort Worth	803.01	12.00	1.60
Woodforest National Bank	TX	Houston	1488.64	12.00	1.60
Woodforest National Bank	TX	McAllen-Edinburg	1481.74	12.00	
Woodforest National Bank	TX	San Antonio	2240.05	12.00	1.60

Note: Interest rate data is from *Bankrate.com* for November 20, 2002. Listed are rates for all banks that were surveyed by *Bankrate* in at least two different MSAs. The Herfindahl-Hirschman Index (HHI) is based on the deposits of commercial banks' branches located in the MSA. The deposit data comes from the FDIC's June 2002 *Summary of Deposits*.

Table 2

CD Rates and CD Spreads for Small Banks and Large Banks

	Small Bank CD Rates			**Large Bank CD Rates**			**LIBOR**	
Maturity	Mean	(obs)	Median	Mean	(obs)	Median	Survey Date	Average of Previous Week
3-month	1.37	(65)	1.31	1.06	(48)	1.10	1.42	1.41
6-month	1.55	(69)	1.50	1.14	(48)	1.15	1.44	1.43
12-month	1.86	(69)	1.76	1.31	(48)	1.27	1.62	1.60

	Spread between Small Bank and Large Bank CD Rates			**Test of Difference from Zero *p*-values**	
	Mean	(obs)	Median	*t*-Test	Wilcoxon *Z*-Test
CD 3-month	0.32	(71)	0.29	0.00***	0.00***
CD 6-month	0.41	(76)	0.40	0.00***	0.00***
CD 12-month	0.56	(76)	0.52	0.00***	0.00***

*** indicates significance at the 1 percent level.

Note: Data on banks' certificate of deposit (CD) rates are from a November 20, 2002 survey by *Bankrate.com*. CD rates are annual percentage yields (APY) on deposits of $1,000. Small banks are defined as having total deposits less than $2 billion while large banks are defined as having total deposits greater than $10 billion. The average (median) total deposits for small banks is $865 million ($797 million). The average (median) total deposits for large banks is $49.1 billion ($24.1 billion). The CD rate spreads between small banks and large banks are computed as the rate paid by each small bank less the average of the rates paid by large banks in the small bank's local market. In a few cases, small banks were surveyed in more than one market. Data on London Inter-Bank Offered Rates (LIBOR) is from the British Bankers' Association.