Out-of-State Entry and the Cost Efficiency of Local Commercial Banks

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Abstract The Riegle-Neal Act allows commercial banks to operate with complete freedom across state lines beginning in June 1997. In an attempt to gauge the impact that full interstate banking will have on the industry, we examine bank performance data from states that passed interstate banking laws prior to the Riegle-Neal Act. We estimate cost inefficiency for banks that operated exclusively in local markets in 1992, then regress those estimates on the intensity of out-of-state activity in those markets during that year.

In the years immediately following the removal of barriers to out-of-state banks, we find that increased entry is associated with increased inefficiency for local banks. However, this appears to be a short-run phenomenon only -- in markets that have allowed out-of-state entry for at least six years, we find that inefficiency declines in response to increased entry. On average, cost inefficiency at local banks declines by about 3 percent for each additional year that banks face interstate competition.

What do our results portend for the performance of local banks under the Riegle-Neal Act? Interstate competition is already well under way in many metropolitan markets because of state-by-state reciprocal compacts. For local banks in these markets, Riegle-Neal will likely enhance the forces of competition by expanding the number of potential entrants. In markets for which Riegle-Neal marks the first introduction of interstate competition, our results suggest that interstate competition will gradually deliver substantial gains in cost efficiency over the course of the next decade.

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Introduction

Financial services firms in the U.S. have faced dramatic increases in competitive rivalry over the past decade. The erosion of laws limiting the geographic scope of commercial banking organizations has profoundly changed the nature of this competition. Intrastate branching and interstate banking restrictions have been eliminated or relaxed in most states, enabling large or growing commercial banks to enter an increasing number of geographic markets. The most aggressive among these organizations have developed nearly nationwide retail banking profiles.

Aided by federal legislation, this geographic expansion is likely to continue, and perhaps accelerate, in the near future. The Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 removed federal restrictions on interstate banking as of September 29, 1995, and will remove federal restrictions on interstate branching on June 1, 1997.[1] As these provisions become fully effective, state legislatures, banking interests, policy makers, and economists continue to debate the competitive consequences of geographic deregulation.

The debate over the impact of Riegle-Neal is particularly germane for metropolitan areas where clusters of small banks face potential entry by large, out-of-state institutions. Opponents of interstate banking argue that small local banks will not be able to compete with large out-of-state banks. They contend that local markets will grow more concentrated, and banks with large market shares will be able to increase fees on services, increase rates on loans, and decrease rates on deposits. Opponents also argue that reductions in competitive rivalry will reduce banks' incentives to operate efficiently. In addition, opponents claim that

[1] The Riegle-Neal Act includes a provision that allows individual states to "opt-out" of the law. States taking advantage of this option include Texas, whose legislature voted to opt-out until 1999. The Montana legislature is likely to opt-out until 2001, and the Colorado legislature passed an opt-out bill that was vetoed by the governor. As of May 1996, 24 states had decided to implement the Riegle-Neal provisions early, while 14 states had not yet made an official commitment. See "Opt In? Opt Out? It Probably Doesn't Matter," American Banker, 5-14-96, and "Montana Groups: Branch Statewide, Hold Off Opting In Until 2001," American Banker, 12-20-96.

the loss of local control will allow savings to be siphoned from small markets with less lucrative investment opportunities to large metropolitan centers with more vital economic climates. Reduced access to financial services in these areas may hit small businesses particularly hard, because these firms have few alternative sources of credit.

Supporters of interstate banking envision a much different scenario. They believe that interstate banking and branching will lead to more competitive banking markets in which depository institutions will have to operate efficiently or exit the market. Market concentration will be less of a problem because, with greater geographic mobility, the potential for entry will be a stronger deterrent. In general, supporters of the Riegle-Neal Act believe that increased competitive rivalry will generally improve the quality and availability of all types of financial services.

Although the Riegle-Neal Act is the most far-reaching legislation allowing banking companies to operate across state lines, it was not the first law to authorize interstate banking or branching. Laws passed earlier by state legislatures allow out-of-state bank holding companies to gain entry into most states simply by acquiring an existing bank, usually with the stipulation that the holding company's home state afforded reciprocal privileges. As the number of states authorizing reciprocal compacts expanded in the 1980s and 1990s, more and more banking companies gained access to markets in other states.[2]

To test the validity of arguments for and against interstate banking and branching, we examine the performance of small, local banks operating in metropolitan areas into which out-of-state entry was permitted prior to the enactment of the Riegle-Neal Act. In particular, we

[2] Laws vary across states. Some states only allow entry by holding companies from bordering states, some prohibit out-of-state banks from establishing or purchasing de novo subsidiaries, and some make special exceptions for out-of-state acquisitions of failing banks. Typically, state laws at first permitted limited opportunities for entry, but relaxed these restrictions over time. For more details, see Amel (1993) and Calem (1993).

test whether these banks became more cost efficient in response to entry by out-of-state institutions allowed by state legislation. As long as market conditions are reasonably competitive, improved cost efficiency should be associated with greater quantities of financial services, higher quality financial services, lower prices for financial services, or all three. By investigating these data, we are able to make some inferences about the likely impact of the Riegle-Neal Act on local banking markets.

In Section 1 we discuss some of the previous research examining the impact of out-of-state entry on local banking markets. In Section 2 we estimate an efficient cost frontier for a cross section of U.S. commercial banks in 1992, and use the estimated frontier to generate a measure of cost inefficiency for banks that operate primarily in local banking markets. In Section 3 we test whether the cost efficiency of these local banks is related to the amount of competition they face, or could potentially face, from out-of-state banking companies. In Section 4 we present the results of these tests. In the years immediately following the removal of barriers to out-of-state banks, we find that increased entry is associated with increased inefficiency for local banks. However, this appears to be a short-run phenomenon only -- in markets that have allowed out-of-state entry for at least six years, we find that inefficiency declines in response to increased entry. On average, cost inefficiency at local banks declines by about 3 percent for each additional year that banks face interstate competition. In Section 5 we draw our main conclusions: (a) in markets for which Riegle-Neal marks the introduction of interstate competition, local banks are likely to experience gradual but substantial gains in cost efficiency, and (b) in markets where interstate competition has already begun, Riegle-Neal will likely enhance competition by expanding the number of potential entrants.

1. Related Research

There is little evidence that interstate banking and branching has reduced competition in banking markets. Savage (1993) found no significant increase in the concentration of banking markets over the past decade due to the elimination of branching restrictions. Thomas (1991) investigated the impact of interstate banking on competition in Florida markets, and found that interstate branching increased the rate at which new banks were chartered in local banking markets. Calem and Nakamura (1995) showed that branch banking in densely populated urban markets tends to enhance competition in outlying geographic areas without reducing it in urban centers.

Opponents of interstate banking argue that the number of small banks will fall, leading to fewer loans, at higher prices, for small businesses. Unquestionably, small banks originate a disproportionately large share of small business loans.[3] Nevertheless, several studies have concluded that entry by out-of-state institutions has not seriously affected small business lending. For example, Rose (1993) found that, even though interstate banking resulted in fewer banking organizations, and increased aggregate bank concentration, no significant decrease in credit extended to small manufacturing firms occurred. Whalen (1995) found similar levels of small business lending among in-state banks and out-of-state entrants in Illinois, Kentucky, and Montana. Moreover, he found that out-of-state entrants charged lower rates to small businesses than did in-state lenders, despite that fact that the out-of-state banks incurred relatively higher marginal costs. Strahan and Weston (1996) examined how bank mergers altered the pattern of small business lending between 1993 and 1995, and concluded

[3] For information on small bank lending to small businesses, see Bauer and Cromwell (1989), U.S. General Accounting Office, Interstate Banking: Benefits and Risks of Removing Regulatory Restrictions (1993), and U.S. Congress, "Impact of Bank Reform Proposals on Consumers," Hearing before the Subcommittee on Consumer Affairs and Coinage, Committee on Banking, Finance, and Urban Affairs, House of Representatives, April 10, 1991.

that future consolidation will not adversely affect credit availability to small businesses.

Proponents of interstate banking often argue that geographic expansion will allow banks to diversify their deposit and lending bases, thereby allowing banking companies to reduce risk, increase returns, or both. Existing studies have found no evidence to support this contention. Chong (1991) and Hughes, Lang, Mester and Moon (1996) found that geographic diversification can make a bank more risky in addition to increasing its profitability. Rose and Wolken (1990) measured the cumulative change in local market share over time for both independent banks and subsidiaries of geographically diversified banking companies. They concluded that affiliation with a diversified parent generally provided no significant long-term competitive advantage. Goldberg and Hanweck (1988) compared institutions that were operating across state lines (grandfathered by the Bank Holding Company Act of 1956) with other local institutions of similar size, and found no significant differences in performance, market share, or efficiency between the two groups of banks.

Another set of studies suggests that the presence of out-of-state banks in local markets will enhance market efficiency. Adkisson and Fraser (1990) found higher acquisition premiums for institutions in states that permitted geographic expansions, and also concluded that markets to which out-of-state depository institutions had easy access were more competitive. Rhoades and Rutz (1982) found that the presence of a multi-bank holding company (MBHC) in a local market had a positive effect on inter-firm rivalry, particularly on non-price competition. Marlow (1982) observed lower mortgage interest rates in local markets into which branch banking institutions had expanded. Laderman and Pozdena (1991) concluded that actual and potential competition were greater in states that allowed interstate banking.

Whatever the competitive impact of nationwide banking and branching, however, it is

likely to occur slowly. Recent experience in states that have already opted-in to the Riegle-Neal Act suggests a slow structural adjustment to nationwide branching.[4] McLaughlin (1995) studied the responses of bank holding companies between 1988 and 1993 to changes in state laws concerning geographic expansion. She found that banking companies quickly consolidated their existing bank affiliates within states, but expanded across state boundaries more slowly. Calem (1993) investigated the decline in small banks over roughly the same time period, and concluded that the relaxation of restrictions on intrastate branching had more to do with this trend than did the more recent relaxation of interstate banking regulations.

2. Estimating Cost Inefficiency

We begin our empirical investigation by estimating an efficient cost frontier for 3,997 U.S. commercial banks that were headquartered in metropolitan statistical areas (MSAs) in 1992. The cost frontier embodies 'best-practices' banking techniques, i.e., the lowest possible level of expenses at which a bank can still produce its chosen output levels, holding the prices of its inputs constant. Once we have estimated the efficient frontier, we generate estimates of cost inefficiency for a subset of 'local' banks, i.e., banks that operate most or all of their branches within a single MSA. Finally, we run regressions to test whether cost inefficiency is related to the length of time that local banks have faced competition from out-of-state banks, or with the share of the local market captured by out-of-state banks.

We use 1992 data because, although most of the states had by that time passed laws permitting some form of out-of-state entry, these laws were still relatively new in a number of states.[5] Consequently, 1992 data allows us to observe local banks that have been competing

[4] See "Branching: A Trickle Instead of a Flood," American Banker, 7-18-96.

[5] By 1992, some form of out-of-state entry had been permitted for at least eight years in 11 states; for between six and seven years in 20 states; and for less than six years in 17 states. See Amel (1995) for further details.

against out-of-state institutions for over a decade, as well as other local banks that have not yet fully adjusted to the new competitive environment. We limit our data to urban banks for a number of reasons: out-of-state banks typically enter urban markets; agricultural lending is an important product for rural banks but not for urban banks; and rural banks use different distribution channels (e.g., fewer branch locations) than do urban banks.

We use a Fourier-flexible functional form, which combines a standard translog functional form with a non-parametric Fourier functional form, to specify the cost function. McAllister and McManus (1993), Berger, Leusner, and Mingo (1994), Berger and DeYoung (1995), and Mitchell and Onvural (1996) all have found that the Fourier-flexible form dominates the translog for banking cost data. We estimate the following cost function:

$$
\begin{aligned}
\ln C \;=\; & \alpha_0 + \sum_{j}^{5} \beta_j \ln Y_j + \frac{1}{2}\sum_{j}^{5}\sum_{k}^{5} \beta_{jk} \ln Y_j \ln Y_k + \sum_{m}^{3} \gamma_m \ln W_m \\
& + \frac{1}{2}\sum_{m}^{3}\sum_{n}^{3} \gamma_{mn} \ln W_m \ln W_n + \sum_{j}^{5}\sum_{m}^{3} \rho_{jm} \ln Y_j \ln W_m \\
& + \sum_{j=1}^{8} [\delta_j \cos Z_j + \theta_j \sin Z_j] + \sum_{j=1}^{8}\sum_{k=1}^{8} [\delta_{jk} \cos(Z_j + Z_k) + \theta_{jk} \sin(Z_j + Z_k)] \\
& + \sum_{j=1}^{8}\sum_{k=j}^{8}\sum_{l=k}^{8} [\delta_{jkl} \cos(Z_j + Z_k + Z_l) + \theta_{jkl} \sin(Z_j + Z_k + Z_l)] + \eta
\end{aligned}
$$

where C is total (interest plus noninterest) expense; Y is a vector of outputs including commercial loans, consumer loans, real estate loans, transactions deposits, and fee-based income; and W is a vector of input prices including the prices of labor, physical capital, and

borrowed funds.[6] Following Berger, Leusner, and Mingo (1994), the Z terms are functions that re-scale the $\ln Y_j$ and the $\ln W_m$ terms so that they fall on the interval $[.1*2\pi , .9*2\pi]$. Descriptive statistics for the cost function variables are displayed in Table 1. All data come from the 1992 Reports of Condition and Income (call reports).

We estimate this cost frontier using the econometric frontier approach (EFA) introduced by Aigner, Lovell, and Schmidt (1977) and Jondrow, Lovell, Materov, and Schmidt (1982). In the EFA approach, the error term η in the cost function is a composite expression, $\eta = \ln U + \ln V$, where $\ln U$ captures cost inefficiency and is distributed as a truncated normal variable, and $\ln V$ captures random error and is distributed as a normal variable.[7] We use maximum likelihood estimation techniques, and impose the standard symmetry and homogeneity restrictions on the translog portion of the model.[8] For the average bank in our overall sample of 3,997 banks, the estimated cost inefficiency term $\ln U$ equals .3144. Transforming this result into percentage terms, the average urban bank in 1992 incurred expenses that were about 37 percent higher than those of an otherwise similar bank that operated on the efficient cost frontier.[9]

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[6] Transactions deposits include demand deposits, NOW accounts, automatic transfer service accounts, and telephone and pre-authorized transfer accounts. Fee-based income equals gross noninterest income less both service charges on deposit accounts and gains (losses) from securities and foreign exchange trading. Fee-based income is included to control for activities other than deposits and loans, such as off-balance sheet activities and trust services. The price of labor equals salaries and benefits divided by the number of full-time equivalent workers. The price of physical capital equals expenditures on equipment and premises divided by the book value of physical assets. The price of borrowed funds equals total interest expense divided by total borrowed funds less demand deposits.

[7] Stevenson (1980) has shown that the assumption of a truncated normal inefficiency distribution is more general and more flexible than the assumption of a half normal distribution. Berger and DeYoung (1995) show that the truncated normal distribution results in lower estimates of average inefficiency for banks than does the half normal, but that the rank efficiency order of banks remains virtually identical across distributions.

[8] Factor share equations were omitted because application of the usual cross-equation restrictions imposes the assumption that the given input proportions were the allocatively efficient ones (see Berger 1993, p. 266).

[9] Subtracting 1 from the anti-log of $\ln U$ yields this result: $\exp(.3144) - 1 = .3694$. This transformation undoes the double log form imposed on the data in the translog portion of the cost function.

3. The Relationship between Cost Inefficiency and Out-of-State Entry

Although we begin by estimating cost inefficiency for all urban banks in 1992, we are most interested in the performance of urban banks located in states that allowed out-of-state entry prior to 1992. Accordingly, we limit the remainder of our analysis to two subsamples of banks in 1992: (a) the 1,864 banks with 100 percent of their branch offices in a single MSA and (b) the 2,090 banks that drew at least 80 percent of their deposits from branch offices in a single MSA, but also operated a small percentage of their branches in other MSAs or counties. These subsamples contain only local banks, i.e., those banks that opponents of interstate banking believe to be most vulnerable to competition from out-of-state entrants.

Descriptive statistics for the banks in subsample (a) are displayed in Table 2. Note that lnU ranges widely between .0282 and .9527, with a mean of .3380 and a standard deviation of .1377. Our objective is to determine whether, and to what degree, this variation in cost inefficiency is associated with differences in competition from out-of-state entrants. To make this determination, we estimate the following equation for both subsamples (a) and (b) using OLS techniques:[10]

$$\begin{aligned} \ln U_i = {} & \alpha_0 + \beta_1 * \ln AGE_i + \beta_2 * OUTSHARE_i + \beta_3 * \ln AGE_i * OUTSHARE_i \\ & + \beta_4 * \ln ASSETS_i + \beta_5 * ASSETGR_i + \beta_6 * FAILASST_i + \beta_7 * CR3_i \\ & + \beta_8 * NATIONAL_i + \beta_9 * BHC_i + \beta_{10} * UNRATE_i + \epsilon_i \end{aligned}$$

AGE is the number of years that have passed since bank I's home state permitted some form of out-of-state entry. We use the natural log of AGE in the regressions because any changes in market performance are most likely to occur in the years immediately after barriers to interstate entry are lifted, with diminishing effects in later years. lnAGE enters the

[10] Tobit estimation techniques yield nearly identical regression results (not shown).

regression by itself and also interactively with OUTSHARE, the share of local market deposits held by out-of-state banking institutions in 1992. The (double-log) partial derivative $\partial \ln U / \partial \ln AGE = \beta_1 + \beta_3 * OUTSHARE$ is the elasticity of cost inefficiency with respect to AGE. A negative sign on this derivative indicates that the average local bank becomes more cost efficient the longer it has been exposed to the potential for out-of-state entry, holding OUTSHARE constant. The (semi-log) partial derivative $\partial \ln U / \partial OUTSHARE = \beta_2 + \beta_3 * \ln AGE$ is the proportional change in cost inefficiency for a unit change in market share. A negative sign on this derivative indicates that the average local bank becomes more efficient as out-of-state market share increases, holding AGE constant.

We include a number of variables to control for economic and regulatory conditions. FAILASST is the annual average of failed bank assets to total banking assets in each MSA, measured over the period of time that out-of-state entry was permitted. Since inefficient banks are more likely than efficient banks to fail in the face of out-of-state competition, interbank average cost inefficiency may be lower in MSAs that have experienced substantial out-of-state entry. We include FAILASST to control for this phenomenon. CR3 is the 3-firm concentration ratio, a proxy for the degree of competition in each MSA. We include CR3 to control for the possibility that, as described by Leibenstein 1966, firms with market power will exhibit high amounts of cost inefficiency because they face little competitive pressure to control expenses. NATIONAL is a dummy variable equal to one in states that initially allowed entry from banks in any state, and equal to zero if entry was initially limited to banks from states in a single region. UNRATE is the rate of unemployment in bank i's MSA.

We also include several bank-specific control variables in the regressions. lnASSETS is the natural log of total assets held by bank i, and controls for relationships between bank size and bank performance that were incompletely specified in the cost function. ASSETGR is

the percentage increase in bank i's assets between 1989 and 1992, and controls for disruptions in efficiency caused by above average growth, e.g., the acquisition of other banks. BHC is a dummy variable equal to 1 if bank i is an affiliate of a bank holding company, and is included to test whether members of bank holding companies are more successful than independent banks in the post-interstate banking environment.

4. Results

The results of the OLS regressions are displayed in Table 3. The coefficients on lnAGE and lnAGE*OUTSHAREare both negative and statistically significant, suggesting not only that local banks exposed to the threat of out-of-state entry become more cost efficient over time (i.e., with increases in AGE), but also that these improvements occur more rapidly as actual entry becomes more intense (i.e., with increases in OUTSHARE). Evaluating $\partial lnU/\partial lnAGE$ at the means of the data yields the elasticity of local bank efficiency with respect to time, which equals -.1924 for regression [1]. Transforming this result into percentage terms, an additional year of exposure to out-of-state competition is associated with about a 3 percent reduction in cost inefficiency for the average local bank, holding out-of-state market share constant.[11] Although this annual reduction in cost inefficiency is small, the cumulative effect over time can be substantial. For example, an additional three years of exposure to out-of-state competition is associated with an 11 percent reduction in cost inefficiency for the average local bank, again holding out-of-state market share constant.[12]

Opponents of interstate banking argue that concentrations of out-of-state banks will

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[11] At the means of the data, a one year increase in AGE from 6.17 to 7.17 years is a 16 percent increase. Multiplying this increase by the elasticity -.1924 yields the result. Results were similar for regression [2].

[12] A three year increase in AGE from 5.17 to 8.17 years is a 58 percent increase. Multiplying this increase by the elasticity -.1924 yields the result.

have deleterious effects on local banking markets, and a number of states limit the share of statewide deposits that can be held by out-of-state banks.[13] Consistent with these concerns, the coefficient on OUTSHARE is positive and significant, suggesting that an increase in out-of-state market share depresses local bank efficiency. This coefficient, however, only captures the average relationship between OUTSHARE and lnU across MSAs that, in 1992, had been exposed to interstate banking for varying amounts of time. Table 4 shows that the impact of out-of-state market share on local bank efficiency depends on how much time local banks have had to adjust to out-of-state entry.

For banks in local markets just beginning to experience out-of-state competition, marginal increases in out-of-state market share are associated with increases in cost inefficiency. Evaluated for AGE=3.21 (two standard deviations below the sample mean), the partial derivative ∂lnU/∂OUTSHARE=.0040. Thus, an additional two and one-half market share points held by out-of-state banks (an approximate 10 percent increase from the sample mean) is associated with about a one percent increase in cost inefficiency at the average local bank.[14] In contrast, the regression yields qualitatively different results for local markets in which out-of-state entry had been permitted for a longer period of time. Evaluated for AGE=9.13 (two standard deviations above the sample mean), ∂lnU/∂OUTSHARE=-.0025. For these markets, an additional two and one-half market share points held by out-of-state banks is associated with about a six-tenths of one percent decrease in cost inefficiency for the average bank.[15]

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[13] Amel (1993) documents these state-level market share ceilings.

[14] This result is obtained by multiplying .0040 by 2.5, the increase in OUTSHARE. Equation [2] yielded similar results.

[15] We also estimated an alternative version of equation [1] that used a linear AGE variable in place of lnAGE (not shown). The linear results are comparable to the natural log results. In particular, ∂lnU/∂OUTSHARE was positive for small values of AGE, negative for large values of AGE, and zero at approximately AGE=7.

There are a number of reasons that entry by out-of-state banks could initially impose costs on local institutions. Out-of-state holding companies typically enter the local market by purchasing an existing local bank. Buying out existing managers, merging back office systems, and undertaking the marketing efforts necessary to establish name recognition and retain depositors can temporarily disrupt operations and raise costs at these banks. Moreover, other local banks may increase their marketing expenditures in an attempt to steal customers away from the entrants. For local banks that purchase branch locations sold by the new entrant, converting these branches also requires additional expenditures. Our results suggest that these disruptions fade away over time as local banks adjust to interstate competition and as the cost-reducing effects of branch closings, lay-offs, and other cost-cutting efforts take effect.

A number of control variables have statistically significant coefficients. The coefficient on lnASSETS is negative, an indication that cost inefficiency declines with bank size. Although this is certainly a plausible relationship -- large banks should be better able than small banks to attract and retain high quality managers -- there is no consensus on this issue in the bank cost efficiency literature. Berger, Hunter, and Time (1993) review the evidence on this issue. The coefficient on CR3 is positive, suggesting that banks in concentrated markets do not fully exploit their market power. This result is consistent with Leibenstein's (1966) original characterization of X-inefficiency as slack managerial performance in the presence of market power. The coefficient on FAILASST is negative, indicating that the banks that exited local markets after out-of-state entry began tended to be relatively inefficient banks. Controlling for this result bolsters our main finding, i.e., competition from out-of-state institutions improves local market efficiency not only because it causes poorly operated banks to fail (it does, and we control for it), but also because it forces

banks that remain in the market to become more cost efficient. The coefficient on BHC is negative, which suggests that affiliates of bank holding companies have an efficiency advantage over independent banks in local markets. The coefficients on ASSETGR, UNRATE, and NATIONAL all are statistically nonsignificant. Both of the regressions have relatively low goodness-of-fit, with adjusted R-squares of about 13 percent.[16] Because the dependent variable in these regressions is an estimated error term from another model, and is not an observed random variable, providing a good statistical fit is difficult.

5. Conclusions

In June 1997, the Riegle-Neal Act will allow U.S. commercial banks to bank freely and branch freely across state lines, ending over a half century of federal restrictions that limited interstate competition among banks. Banking interests, policy makers, and financial economists are anxious to observe the impact that unfettered geographic growth will have on interbank rivalry and banking market efficiency. Opponents of interstate banking have argued that small local banks may be at a competitive disadvantage against large out-of-state institutions, resulting in increasingly concentrated local banking markets. If this occurs, opponents argue, financial services will become less available and more expensive, especially for small businesses and retail customers. They also claim that large out-of-state banks will siphon financial capital away from local markets. In contrast, supporters of interstate banking

[16] Given the ad hoc nature of the regression model, we use two tests for significant specification bias. One of the tests used is called RESET (regression specification errors test). In its simplest form, the procedure involves re-running the regression with the square of the predicted value of the dependent variable added as a regressor. If the coefficient on this added variable is not significantly different from zero, then the null hypothesis of no-specification-error cannot be rejected (Ramsey 1969, and Ramsey and Schmidt 1976). We conducted this test for all of regressions in Tables 3 and 4, and could not reject the null hypothesis in any of the regressions at any meaningful level of significance. We also used the White (1980) specification test. The t-statistics reported in Tables 3 and 4 use White's heteroscedasticity corrected covariance matrix whenever the White test rejects the specification at the 5 percent level. The White specification test could not reject the specification at 5 percent level in any of the regressions.

foresee increasingly more competitive banking markets in which inefficient depository institutions that do not offer reasonably priced, high quality financial services risk acquisition or failure.

To test the validity of arguments for and against interstate banking and branching, we examine data from states that passed interstate banking laws prior to the Riegle-Neal Act. Limiting our focus to local banks that operated branches primarily in single MSAs in 1992, we generate estimates of frontier cost inefficiency for each bank and then regress these estimates on a variety of other economic and financial variables. In the years immediately following the removal of barriers to out-of-state banks, we find that increased entry is associated with increased inefficiency for local banks. However, in markets that have allowed out-of-state entry for at least six years, we find that inefficiency declines in response to increased entry. On average, cost inefficiency at local banks declines by about 3 percent for each additional year that banks face interstate competition.

What do our results portend for the performance of local banks under the Riegle-Neal Act? Interstate competition is already well under way in many metropolitan markets because of state-by-state reciprocal compacts. For local banks in these markets, the forces of competition have already begun to identify and eliminate inefficiency, although Riegle-Neal may enhance these trends by expanding the number of potential entrants. Our results are most relevant for banks operating in markets for which Riegle-Neal marks the first introduction of interstate competition. For local banks in these markets, our results suggest that interstate competition will gradually deliver substantial gains in cost efficiency over the course of the next decade.

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Table 1

Descriptive Statistics -- Cost Frontier Variables*

			Percentage of Assets	
	Mean	Standard Deviation	Mean	Standard Deviation
Price of Labor ($ thousands)	31.69	7.56	--	--
Price of Capital (%)	0.44	0.55	--	--
Price of Funds (%)	0.05	0.17	--	--
Commercial Loans ($ millions)	17.13	30.55	10.69	7.88
Consumer Loans ($ millions)	20.09	204.39	40.76	17.14
Real Estate Loans ($ millions)	47.49	69.38	31.50	13.80
Transactions Deposits ($ millions)	38.93	54.30	27.19	9.53
Fee-Based Income ($ millions)	1.06	3.07	0.63	2.11
Total Costs ($ millions)	10.22	13.56	7.18	2.01

* Data for 3,997 U.S. Commercial Banks in Metropolitan Statistical Areas in 1992.

Table 2

Descriptive Statistics -- Ordinary Least Squares Regression Variables*

	Mean	Standard Deviation	Minimum	Maximum
Cost Inefficiency (lnU)	.3380	.1377	.0282	.9527
Age (years since law changed)	6.17	1.48	1	11
lnAGE	1.78	0.31	0	2.39
Assets ($ thousands)	147.44	198.55	2,920	2,009,390
lnASSETS	11.31	1.05	7.98	14.51
ASSETGR (%)	21.62	8.11	-2.73	28.65
OUTSHARE (%)	24.74	22.30	0	96.64
CR3	.5690	.1392	.3256	.9950
FAILASST (%)	2.86	5.82	0	47.58
BHC (dummy)	0.71	0.45	0	1
NATIONAL (dummy)	0.07	0.25	0	1
UNRATE (%)	6.93	1.40	2.90	11.40

* Data for 1,864 U.S. Commercial Banks with 100% of their deposits in a single Metropolitan Statistical Area in 1992.

Table 3

OLS Regressions Results*

Independent Variables	Dependent Variable: Cost Inefficiency (lnU)			
	[1] Banks with 100 percent of deposits in the same MSA		[2] Banks with 80 percent of deposits in the same MSA	
	Coefficient estimate	t-statistic	Coefficient estimate	t-statistic
Intercept	.1145	11.30***	.1230	16.70***
lnAGE	-.0394	2.23**	-.0352	2.82***
OUTSHARE	.0112	3.01***	.0088	4.67***
lnAGE*OUTSHARE	-.0062	2.45**	-.0053	3.68***
lnASSETS	-.0026	4.64***	-.0038	5.02***
ASSETGR	.3158	0.92	.3062	1.26
CR3	.0124	1.90*	.0136	3.83***
FAILASST	-.0134	1.87*	-.0324	2.03**
BHC	-.0042	3.34***	-.0057	1.83*
NATIONAL	-.0213	1.06	-.0363	1.04
UNRATE	-.0090	1.39	-.0158	1.06
adjusted R^2	.1258		.1377	
N	1,864		2,090	

*Data includes only U.S. commercial banks in Metropolitan Statistical Areas (MSAs) located in States that allowed out-of-state entry in 1992. ***, **, and * indicate different from zero at the 1, 5, and 10 percent levels of significance, respectively.

Table 4

The Impact of a 2½ Point Increase in Out-of-State Market Share on Cost Inefficiency*

AGE	AGE	lnAGE	∂lnU/∂OUTSHAR	% Change in lnU
mean - 2 std. dev.	3.21	1.17	0.0040	1.00%
mean - 1 std. dev.	4.69	1.55	0.0016	0.40%
mean	6.17	1.82	-0.0001	-0.03%
mean + 1 std. dev.	7.65	2.03	-0.0014	-0.35%
mean + 2 std. dev.	9.13	2.21	-0.0025	-0.63%

*Results are evaluated at the means of the data for banks with 100 percent of their deposits in a single Metropolitan Statistical Area.