The Benefits of Branching Deregulation

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The Riegle-Neal Interstate Banking and Branching Efficiency Act, implemented in June 1997, enables banks to establish branches and buy other banks across the country. This legislation is the final stage of a quarter-century-long effort to relax geographic limits on banks. As recently as 1975, no state allowed out-of-state bank holding companies (BHCs) to buy in-state banks, and only fourteen states permitted statewide branching. By 1990, all states but Hawaii allowed out-of-state BHCs to buy in-state banks, and all but three states allowed statewide branching. The Riegle-Neal Act removes the remaining restrictions by permitting banks and BHCs to cross state lines freely.[1]

Although the effects of the recent federal legislation will be known only over time, we can study the impact of geographic restrictions on the banking industry by examining an earlier stage of the deregulatory process.

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The states were most active in removing geographic limits on banks in the fifteen years from 1978 to 1992. By observing the changes in banking that followed the state initiatives, we can learn much about the impact of these limits.[2] Previous research has suggested that geographic restrictions destabilized the banking system by creating small, poorly diversified banks that were vulnerable to bank runs and portfolio shocks (Calomiris 1993). In this article, we focus instead on the effect of the restrictions on the efficiency of the banking system.

We find that bank efficiency improved greatly once branching restrictions were lifted. Loan losses and operating costs fell sharply, and the reduction in banks' costs was largely passed along to bank borrowers in the form of lower loan rates. The relaxation of state limits on interstate banking was also followed by improvements in bank performance, but the gains were smaller and the evidence of a causal relationship less robust.

Our analysis suggests that much of the efficiency improvement brought about by branching was attributable

to a selection process whereby better performing banks expanded at the expense of poorer performers. It appears that the branching restrictions acted as a ceiling on the size of well-managed banks, preventing their expansion and retarding a process of industry evolution in which less efficient firms routinely lose ground to more efficient ones.

While the improvements to the banking system following deregulation helped bank customers directly, we also find important benefits to the rest of the economy. In particular, state economies grew significantly faster once branching was allowed—in part, we suggest, because deregulation permitted the expansion of those banks that were best able to route savings to the most productive uses. Although it is uncertain whether the observed acceleration in economic growth will last beyond ten years, the stimulative effect of branching deregulation on the economy has been considerable.

A Brief History of Geographic Restrictions on Banking

States began imposing limits on branch office locations in the nineteenth century. Such limits were intended in part to prevent unscrupulous bankers from "choosing inaccessible office sites to deter customers from redeeming . . . circulating

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banknotes" (Kane 1996, p. 142). Geographic limits were also justified by the political argument that allowing banks to expand their operations freely could lead to an excessive concentration of financial power. Appearing before Congress in 1939, the Secretary of the Independent Bankers Association warned that branch banking would "destroy a banking system that is distinctively American and replace it with a foreign system . . . a system that is monopolistic,

undemocratic and with tinges of fascism" (Chapman and Westerfield 1942, p. 238).

Inefficient banks probably supported these restrictions because they prevented competition from other banks. Economides, Hubbard, and Palia (1995) show that states with many weakly capitalized small banks favored the 1927 McFadden Act, which gave states the authority to regulate national banks' branching powers. The states themselves often benefited from exercising control over the supply of bank charters and the expansion of branch banking. Massachusetts and Delaware, for instance, received a majority of their state revenues from bank regulation in the early nineteenth century (Sylla, Legler, and Wallis 1987).

Geographic restrictions may not have seriously constrained the banking industry before the appearance of large corporations that required large-scale, multi-state banking services. Rapid industrialization and the growth of transcontinental railroads after the Civil War, however, created firms whose need for comprehensive corporate financial services could not be met adequately by the existing system of fragmented unit banks. In response, banks formed "chain banks"—an alliance of several banks whose principal ownership rested with the same group of investors—after 1890. A few years later, "banking groups"—banks owned directly by a holding company—were created in an effort to get around branching restrictions (Calomiris 1993).

Nevertheless, branching restrictions persisted, and as late as 1975 only fourteen states allowed statewide branching. Twelve states prohibited branching altogether, and the remainder imposed restrictions of varying severity. Pennsylvania was representative of a partially restrictive state. Until 1982, Pennsylvania banks were allowed to branch only in the county where their head offices were located and in contiguous counties.

In addition to facing restrictions on in-state branching, banks have traditionally been limited in their ability to cross state lines. The Douglas Amendment to the 1956 Bank Holding Company Act prohibited a BHC from acquiring banks outside the state where it was headquartered unless the target bank's state permitted such acquisitions. Since no state allowed such

transactions in 1956, the amendment effectively barred interstate banking organizations. Although states had the option to allow out-of-state BHCs to enter, none exercised that right until 1978, when Maine permitted such transactions. Even then, however, little changed: the Maine statute allowed an out-of-state BHC to buy a Maine bank only if the home state of the acquiring BHC permitted Maine-based BHCs the reciprocal right to buy banks there; since no other state allowed such entry, interstate bank organizations could not be formed. Banks could not in fact cross state borders until 1982, when Alaska, Massachusetts, and New York permitted out-of-state BHCs to enter.

MOVES TOWARD DEREGULATION

Maine's 1978 move to permit entry by out-of-state BHCs marked the beginning of a fifteen-year period in which the states relaxed barriers to bank expansion.[3] By the end of 1992, the state-level deregulatory process was essentially completed: all states but Arkansas, Iowa, and Minnesota allowed statewide branching, and all states but Hawaii permitted out-of-state BHCs to enter.

Table 1 chronicles the steps taken by individual states to eliminate geographic restrictions.[4] The first column presents the year in which each state authorized branching by means of merger and acquisition.[5] The second column reports the year in which each state first permitted interstate banking. In some cases, choosing a date for the authorization of branching was difficult, because the states often deregulated only gradually. In most cases, the date selected reflects the time at which the state finished the branching deregulation process.[6] In four cases, however, we chose dates earlier than the literal end of the process of deregulation because the remaining restrictions did not appear to impose a meaningful constraint on branching.[7]

FORCES OF CHANGE

Several developments contributed to the removal of the geographic barriers to bank expansion. In the mid-1980s, the Office of the Comptroller of the Currency took advantage of a clause in the 1864 National Bank Act to allow nationally chartered banks to branch freely in those states where thrifts did not face branching restrictions. The Comptroller's action was instrumental in introducing statewide branching in

Table 1
THE STATES REMOVE RESTRICTIONS ON GEOGRAPHIC EXPANSION

State	Intrastate Branching Deregulated	Interstate Banking Deregulated
Alabama	1981	1987
Alaska	Before 1970	1982
Arizona	Before 1970	1986
Arkansas	1994	1989
California	Before 1970	1987
Colorado	1991	1988
Connecticut	1980	1983
Delaware	Before 1970	1988
District of Columbia	Before 1970	1985
Florida	1988	1985
Georgia	1983	1985
Hawaii	1986	—
Idaho	Before 1970	1985
Illinois	1988	1986
Indiana	1989	1986
Iowa	—	1991
Kansas	1987	1992
Kentucky	1990	1984
Louisiana	1988	1987
Maine	1975	1978
Maryland	Before 1970	1985
Massachusetts	1984	1983
Michigan	1987	1986
Minnesota	1993	1986
Mississippi	1986	1988
Missouri	1990	1986
Montana	1990	1993
Nebraska	1985	1990
Nevada	Before 1970	1985
New Hampshire	1987	1987
New Jersey	1977	1986
New Mexico	1991	1989
New York	1976	1982
North Carolina	Before 1970	1985
North Dakota	1987	1991
Ohio	1979	1985
Oklahoma	1988	1987
Oregon	1985	1986
Pennsylvania	1982	1986
Rhode Island	Before 1970	1984
South Carolina	Before 1970	1986
South Dakota	Before 1970	1983
Tennessee	1985	1985
Texas	1988	1987
Utah	1981	1984
Vermont	1970	1988
Virginia	1978	1985
Washington	1985	1987
West Virginia	1987	1988
Wisconsin	1990	1987
Wyoming	1988	1987

Source: Chronology is based on information in Amel (1993).

Note: Before the passage of the Riegle-Neal Act, Iowa had not deregulated intrastate branching and Hawaii had not deregulated interstate banking.

several southern states. Another impetus behind deregulation may have been the rash of bank and thrift failures in the 1980s, which increased public awareness of the advantages of large, well-diversified banks (Kane 1996).

Kroszner and Strahan (1997) suggest that the emergence of new technologies in both deposit taking and lending encouraged the elimination of geographic barriers by changing the nature of banking markets. For instance, the introduction of the automated teller machine in the late 1970s and the

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The initiative to relax restrictions on interstate banking came primarily from larger banking organizations that were well equipped to pursue lower funding costs and better lending opportunities in neighboring states.

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development of money market mutual funds increased competitiveness in deposit markets. As a result, branching and interstate banking restrictions could no longer offer the same degree of protection from competition, making it less likely that banks would lobby for the preservation of these rules. At the same time, new information technologies diminished the value of the specialized knowledge that long-established local bankers might have had about the risks of borrowers in the community. This change enhanced the ability of banks to lend in more distant markets. Thus, a situation developed in which protected banks' incentive to defend restrictions on branching and interstate banking diminished over time, while expansion-minded banks' desire to see the restrictions fall increased.

The initiative to relax restrictions on interstate banking came primarily from larger banking organizations that were well equipped to pursue lower funding costs and better lending opportunities in neighboring states. Their efforts may have succeeded in the 1980s because it became apparent that banks and nonbanks were already practicing interstate banking. As Savage (1993) argues, "the proliferation of loan production offices, nonbank subsidiaries of

bank holding companies, nonbank banks, and interstate thrift institutions, the widespread use of credit cards, and the provision of financial services by nonfinancial firms not subject to geographic limitations all made the traditional restrictions on the geographic expansion of banks more difficult to explain and justify. If so many financial services could be provided across state lines by these various means, why shouldn't deposit-taking institutions be allowed to expand as well?"

The breakdown of the geographic constraints on banks over the last twenty years has had a significant impact on the industry. Branching deregulation has prompted banks to enter new markets (Amel and Liang 1992), persuaded BHCs to consolidate their subsidiaries into branches (McLaughlin 1995), and forced smaller institutions to exit banking (Calem 1994). Interstate banking activity has increased dramatically, boosting the percentage of deposits held by out-of-state BHCs in the typical state from 2 percent to 28 percent between 1979 and 1994 (Berger, Kashyap, and Scalise 1995). Interstate banking has also intensified the demands placed on bank management: the compensation of managers is now tied more closely to bank performance, and the turnover rate among banks' chief executive officers has increased (Hubbard and Palia 1995).

In addition to prompting changes in the organization of the industry and the behavior of individual banks, deregulation has had profound effects on the overall performance of the banking system. The next section looks at the impact of deregulation on two components of bank performance: the costs of providing services and the prices charged customers for those services.

DEREGULATION, COST EFFICIENCY, AND PRICES

Did banks perform better when they were permitted to operate statewide branch networks and to build multistate bank holding companies? We investigate this question by examining whether bank costs—as measured by loan losses (net loan charge-offs divided by total loans) and noninterest costs (noninterest expenses divided by total assets)—declined after deregulation, creating a more effi-

cient system. We also examine changes in loan prices (interest income on loans and leases divided by total loans and leases) to determine whether bank customers are better off following deregulation. We look at state-level data for the 1978-92 period to summarize the impact of deregulation on the overall performance of the banking system.

To understand how we arrive at our measures of the cost efficiency of the banking system, consider New York in 1978. We construct the charge-offs ratio by dividing the sum of loans charged off by all banks operating in New York in 1978 by the sum of all loans held by New York banks in 1978. We construct similar aggregates for the noninterest expense and loan price variables in each state and year in the sample.[8] The data for these performance measures are derived from the year-end Reports of Condition and Income, filed by all banks with the federal banking agencies.

We use regression techniques to estimate the impact of deregulation on bank costs and loan prices. (For a detailed discussion of these calculations, see Box 1.) The regression methods allow us to control for other factors that might influence our measures of bank cost and loan prices—most notably, the health of the state's economy. Bank costs, particularly those related to loan defaults, generally move with the business cycle: borrowers tend to pay off loans during boom times but are less able to do so during recessions. If states deregulated branching and interstate banking during hard times, average measures of costs could improve after deregulation as states' economies recovered from recession. A simple before-and-after comparison of bank performance would show an improvement in bank loan portfolios and profitability after deregulation, but these advances would largely reflect the timing of deregulation. We address this possibility by controlling

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BOX 1: AN EMPIRICAL MODEL OF BANK PERFORMANCE

Using the dates of deregulation reported in Table 1, we construct two indicator variables equal to 1 for states permitting branching and interstate banking. We then use these indicator variables to estimate the effects of the policy changes in the following regression model:

$$y_{t,i} = \alpha_t + \beta_i + \gamma_1 branch_{t,i} + \gamma_2 bank_{t,i} + \varepsilon_{t,i} \, ,$$

where $y_{t,i}$ equals one of our two cost measures or our measure of loan prices in the ith state in year t, $branch_{t,i}$ is an indicator equal to 1 for states without restrictions on branching, and $bank_{t,i}$ is an indicator equal to 1 for states that have entered into an interstate banking agreement.

In this specification, β_i measures the state-specific component of banking performance, α_t measures the effects of the national business cycle at time t, and γ_1 and γ_2 measure the changes in performance stemming from the two types of deregulation. In constructing the deregulation indicators, we drop the year in which the deregulation went into effect. We also drop Delaware and South Dakota from the analysis entirely. These two states experienced a dramatic expansion in their banking sectors during the 1980s when credit card operations relocated there to take advantage of liberal usury laws. As a result, performance

measures for banks in these two states do not reflect their branching laws, but rather the health and profitability of the credit card business.

We then use the regression model to construct average predicted values for our two cost measures and our measure of loan prices in different regulatory environments. Consider charge-offs. We estimate the predicted value of this variable for each state and year for each of three regulatory configurations: one in which both branching and interstate banking are fully regulated ($branch_{t,i} = 0$ and $bank_{t,i} = 0$), one in which branching is permitted but interstate banking is not ($branch_{t,i} = 1$ and $bank_{t,i} = 0$), and one in which both branching and interstate banking are permitted ($branch_{t,i} = 1$ and $bank_{t,i} = 1$). This gives us a panel of predicted values for each state and year in each of the three regulatory environments. We then compute the simple average predicted charge-off ratio (across states and years) for each regulatory configuration and report each of those three averages in Chart 1 in the text. The statistical significance reported in the text is derived by testing the hypothesis that γ_1 and γ_2 estimated from the above regression equal zero.

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for the national business cycle in our regressions.[9]

Our analysis suggests that loan losses, noninterest expenses, and loan rates decreased significantly once statewide branching was allowed—even after we adjust for the influence of the business cycle on bank performance and for persistent cross-state differences in bank performance.[10] Chart 1 reports the average levels of the cost and price measures that would have been observed during the 1978-92 sample period under three alternative regulatory regimes: (1) restrictions in place on both branching and interstate banking, (2) branching

Chart 1

Costs and Interest Rates Are Lower in Deregulated Environments

Percent

Ratio of Loan Charge-offs to Total Loans
1.2%
0.6%
0.4%

Ratio of Noninterest Expenses to Assets
3.5%
3.3%
3.3%

Yield on Loans
11.5%
11.1%
10.8%

Branching and interstate banking prohibited | Branching permitted; interstate banking prohibited | Branching and interstate banking permitted

Source: Authors' calculations, based on data from Federal Financial Institutions Examination Council, Reports of Condition and Income.

Note: Chart shows the average level of price and performance measures that would have been observed in the 1978-92 period had all states been subject to the regulatory regimes identified along the x-axis.

permitted but interstate banking prohibited, and (3) both branching and interstate banking permitted. The top panel suggests that if no state had allowed either statewide branching or interstate banking between 1978 and 1992, the ratio of charge-offs to total loans in the typical state in a typical year would have been 1.2 percent. Had all states allowed statewide branching but prohibited interstate banking in our sample period, average charge-offs in the typical state would have fallen by half, to 0.6 percent.[11] The ratio of noninterest expenses to assets would have fallen from 3.5 percent to 3.3 percent if branching had been permitted throughout the period (middle panel). It appears that most of these reduced costs were passed along to bank borrowers in the form of lower loan rates, which in our estimates declined from 11.5 percent to 11.1 percent on average (bottom panel).[12] Each of these improvements is statistically significant at the 5 percent level.[13]

Foes of bank deregulation and consolidation have argued that the increasing concentration in the banking industry could enhance market power. While measures of concentration at both the state and national levels have increased in recent years following deregulation, concentration at local levels has remained remarkably constant (Rhoades 1996). If enhanced market power were a problem, we would see both increased concentration and higher prices at the local level following deregulation, neither of which has occurred. It is true that our estimates indicate that bank costs have fallen more than revenues, suggesting an increase in industry profitability. Similarly, estimates of the impact of deregulation on banks' return on equity and return on assets in another study (Jayaratne and Strahan forthcoming) showed small increases in profitability that were sometimes statistically significant (at the 10 percent level) and sometimes not. Nevertheless, it appears that most, or perhaps all, of the cost reductions from deregulation are passed along to customers. There is little evidence that deregulation has increased market power.

Our regression analysis also shows that some modest improvements in bank performance have followed the introduction of interstate banking. Although operating costs do not decline at all (Chart 1, middle panel), charge-offs fall from 0.6 to 0.4 percent of total loans when interstate banking is allowed in addition to statewide
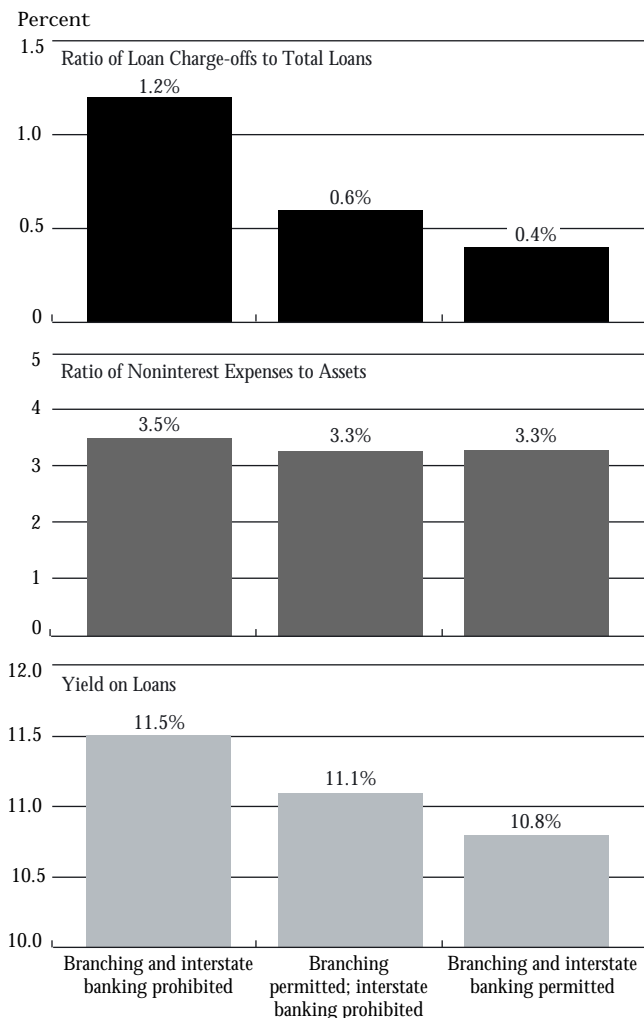
branching (top panel), and the average interest rate falls from 11.1 percent to 10.8 percent (bottom panel).

The evidence of gains following interstate banking deregulation, however, is much less robust than the evidence of improvements following branching deregulation. When we control for state business cycles (by including lags of state-level personal income growth) as well as national business cycles, we see no statistically significant improvements following interstate banking. This finding suggests that the observed gains might stem from favorable banking conditions at the time of deregulation rather than from deregulation itself. Alternatively, robust evidence of performance improvements following interstate banking may be lacking because most states entered interstate banking agreements around the same time, making it difficult to distinguish the effects of deregulation from the effects of other changes. Because of this statistical problem, we cannot determine whether interstate banking had a significant impact on bank performance. Consequently, we focus on branching deregulation in the remainder of the article.

ROBUSTNESS OF THE PERFORMANCE IMPROVEMENTS

A possible explanation for the observed reduction in loan losses and loan rates is that banks made fewer risky loans following branching deregulation. If the output mix of banks changed from riskier to safer loans following deregulation, then we might expect to observe declines in both loan losses and loan rates. Changes in banks' output could also explain declines in noninterest expenses if, for instance, banks provided fewer checking accounts (which are relatively costly for banks to maintain) following deregulation. To investigate this possibility, we estimate the effects of deregulation on noninterest expenses, loan losses, and loan prices while controlling for banks' output mix. In each case, we find that the improvements in costs and the reductions in loan losses and loan prices after branching deregulation remain statistically significant even after controlling for the output mix. We also find no decrease in two risky loan categories—credit cards and commercial loans—following branch deregulation, suggesting that banks did not shift to safer loans after deregulation.[14]

It is possible, however, that within each loan category banks are making safer loans after deregulation than they did before. So, even though the volume of credit card loans and commercial loans has remained fairly constant, after deregulation the loans themselves may be less risky. This is unlikely for two reasons. First, evidence suggests that, if anything, banks *increased* their risk taking after geographic deregulation because eliminating entry barriers reduced banks' franchise value (Keeley 1990). Second, as we indicate below, banks with higher profits and fewer loan losses grew faster than banks with lower profits and more loan losses once branching was permitted. Declines in loan losses seem to reflect not a change in the inherent riskiness of the pool of borrowers but better screening and monitoring of borrowers by the banking system.

We have established that bank performance in the average state improved following statewide branching. But did banks in only a few states experience improvements, or was the phenomenon widespread? To answer this question, we look at the changes in bank cost efficiency in individual states (Chart 2). Specifically, we plot the change in banks' ratio of charge-offs to total loans before and after deregulation relative to the corresponding change for the group of states that did not deregulate their branching laws during the period. This "control group" of states is used to remove the

Chart 2

Loan Charge-offs Fall after Branching Deregulation in All but Two States
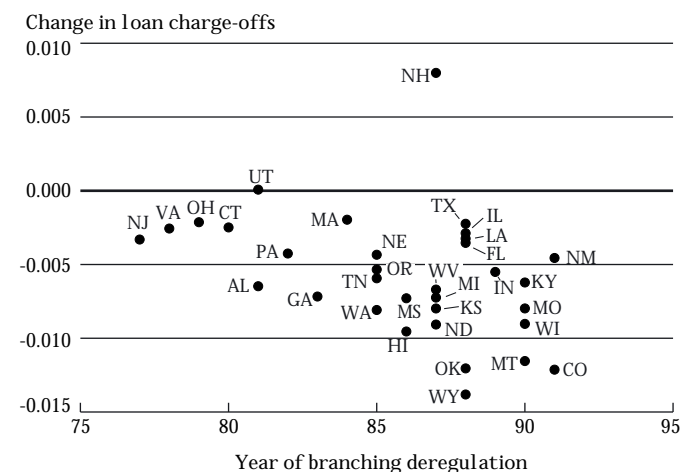
Source: Authors' calculations, based on data from the Federal Financial Institutions Examination Council, Reports of Condition and Income.

effects of nationwide shocks to bank performance. The control group consists of the eleven states that are identified in Table 1 as having deregulated in or before 1970 and the three that are identified as not having deregulated as of 1992.[15]

Reductions in loan losses following branching deregulation are widespread; in all states but New Hampshire and Utah, charge-offs decline after deregulation relative to the change in charge-offs experienced by states that did not deregulate branching during the period.

The change in loan charge-offs for each of the thirty-three deregulating states appears as a single point plotted above the year of deregulation for that state; multiple points appear above a year when more than one state deregulated in that year. Consider the example of Pennsylvania, represented by the single point plotted in 1982. This state's mean charge-off ratio rose by about 0.3 percentage point after deregulation in 1982, while all states that did not change policy in 1982 experienced a 0.7 percentage point increase in charge-offs after 1982. We therefore report a relative decline in charge-offs of 0.4 percentage point for Pennsylvania.

As the chart shows, reductions in loan losses following branching deregulation are widespread; in all states but New Hampshire and Utah, charge-offs decline after deregulation relative to the change in charge-offs experienced by states that did not deregulate branching during the period. Similar pictures emerge for both loan prices and noninterest expenses. For loan prices, we find declines following branching deregulation in twenty-five cases out of thirty-three. Again, New Hampshire is a significant outlier.[16] We find that noninterest expenses fall in nineteen out of the twenty-four deregulating states available for this analysis, again relative to the control group of states.

WHY DEREGULATION IMPROVES BANK EFFICIENCY

Limits on bank expansion could have had adverse effects on efficiency in banking for at least three reasons. First, prohibitions on branching and interstate banking may have limited the opportunity for the best run banks to grow. In unregulated markets, more efficient firms have a natural tendency to gain market share over their less productive competitors, an outcome that will increase average efficiency as the industry evolves over time. By preventing better run banks from establishing branches, and by preventing BHCs from expanding across state lines, these regulations may have retarded this natural evolution. After the geographical constraints were lifted, the more efficient banks may have expanded, thereby improving the performance of the average banking asset. We call this the *selection hypothesis.*

Second, limited restrictions on geographic expansion may have weakened the discipline that markets usually place on managers of corporations. When interstate banking is prohibited, managers worry less about takeovers. Because their jobs are more secure, they may also be less motivated to increase shareholder value, maximize efficiency, and minimize costs. According to this *disciplining hypothesis,* efficiency in banking improves after deregulation because managers are forced to increase shareholder value in order to preserve their jobs. Note that the disciplining hypothesis predicts that all

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Prohibitions on branching and interstate banking may have limited the opportunity for the best run banks to grow.

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banks will improve their performance following deregulation, since managers at all banks will come under greater pressure. By contrast, the selection hypothesis predicts that the more efficient banks will gain market share, not that the efficiency of all individual banks will improve.

A third possible reason why efficiency might improve following deregulation is that barriers to geographic expansion prevent banks from operating at the

most efficient size. There is some evidence, for instance, that small banks can reduce average costs by expanding up to about $500 million in total assets (Berger, Hunter, and Timme 1993). According to the *economies of scale hypothesis*, the efficiency of the banking system will improve after deregulation as small banks grow and reduce costs. Of course, according to this view, all of the benefits come from changes occurring at the lower end of the bank size distribution. Since small banks hold a relatively small share of total banking assets, these benefits would likely be small.

Which of these three explanations best accounts for the efficiency gains observed following deregulation? We can rule out the economies of scale explanation on two grounds. First, there is scant evidence of scale economies in banking beyond about $500 million in total assets (Berger, Hunter, and Timme 1993). The large improvements that we have found in the state-level aggregates cannot plausibly be attributed to the fact that small banks are moving closer to the optimal scale. In 1980, for instance, banks with under $500 million in assets (in 1994 dollars) held less than 30 percent of total assets in the banking system. Second, we have estimated the change in our performance measures following branching deregulation for small banks (those with assets under $100 million) and large banks separately. We find that the improvements are greater for large banks than for small, a finding inconsistent with the economies of scale explanation.[17]

More difficult to evaluate is the hypothesis that management discipline accounts for the beneficial effects of branching deregulation. Because we lack good measures of the degree of managerial effort at banks, we cannot test this hypothesis directly. Nevertheless, we cannot reject the possibility that disciplining played some role in the improved efficiency of banks. Hubbard and Palia (1995) find evidence of greater managerial discipline following interstate banking: the turnover rate for banks' chief executive officers rises and the pay-performance relation tightens once states allow interstate banking. Hubbard and Palia contend that these changes result from a more active market for corporate control after deregulation. Such changes may well have disciplined management to improve bank performance, although neither this article nor the Hubbard and Palia study establishes this point.

The remaining explanation for bank efficiency gains, the selection hypothesis, can readily be tested. To do so, we examine whether better run banking companies grow faster than their less efficient rivals following branching deregulation. First, we classify banks on the basis of their profitability just before deregulation. We then observe the change in the market share after deregulation for the high-profit banking companies. If the selection hypothesis is correct, we should find that profitable banks increase their market share at the expense of unprofitable banks following deregulation.

Specifically, for each state, we first rank banking companies from highest to lowest according to their return on equity at the end of the year prior to the year of deregulation. Next, we go down that ranking until we reach a bank that, together with all previous banks, accounts for 50 percent of the state's bank assets. The banking companies in this group constitute our high-profit firms.[18] We then calculate the group's share of state bank assets five years after branching deregulation.[19] As implied by the selection hypothesis, we find that the high-profit banking companies grow faster after branching deregulation (Table 2, row 1); their share of banking assets increases, on average, by 8.5 percentage points (from 51.3 percent to 59.8 percent)—a statistically significant increase.[20]

Table 2

BETTER BANKS INCREASE THEIR MARKET SHARE
AFTER BRANCHING DEREGULATION

	Initial Market Share of High-Profit Banks (Percent)	Market Share of High-Profit Banks Six Years Later (Percent)	Increase in Share (Percentage Point Change)
Post-deregulation period	51.3	59.8	8.5 (3.91)**
Pre-deregulation period	49.9	51.7	1.8 (0.99)

Source: Authors' calculations, based on data from Federal Financial Institutions Examination Council, Reports of Condition and Income.

Notes: The table reports the change in the share of total bank assets held by that half of the banking companies with the highest return on equity at the beginning of the specified six-year period. The post-deregulation period begins the year before the year of deregulation; the pre-deregulation period begins seven years before the year of deregulation. The t-statistic reported below the market share change for each period tests the hypothesis that the change equals zero.

*Statistically significant at the 10 percent level.

**Statistically significant at the 5 percent level.

Of course, we would expect banks enjoying high profits and good loan portfolios to grow relatively faster at all times, even when branching restrictions are in place. In other words, the fact that banks with good balance sheets grow faster than less profitable banks need not indicate that deregulation caused the weaker banks to lose ground. To isolate the effects of deregulation on selection, we compare the differential growth rates of high- and low-profit banks in a deregulated environment with the same differential growth rates in a regulated environment.[21]

A striking contrast is evident in the growth rates achieved in regulated and deregulated environments (Table 2). High-profit banks increase their market share by only 1.8 percentage points (from 49.9 to 51.7 percent) in the average state over the pre-deregulation period (Table 2, row 2). This change is so small that we cannot reject the possibility that high-profit banks do not increase their market share at all over the six-year period before deregulation (that is, 1.8 percent

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is not a statistically significant change). In the post-deregulation period, by contrast, the market share of the high-profit banks rises sharply. In sum, the evidence in Table 2 strongly supports the hypothesis that branching deregulation forced a process of selection whereby weaker banks lost ground to better run banks.[22]

DEREGULATION AND ECONOMIC GROWTH

Thus far we have argued that relaxation of geographic restrictions improved the performance of the banking system, enhancing the efficiency of the average bank asset and

improving bank lending. How did these changes affect the rest of the economy? Earlier research has shown that countries with better developed banking systems grow faster because savings are channeled into the highest-return investments (King and Levine 1993). Banks can help to route savings to the most productive uses in two ways. First, they provide information about the profit potential of different businesses, channeling savings toward good projects and away from bad. Second, banks monitor those firms with which they have lending relationships to ensure that bank funds are put to proper use (Diamond 1984).[23]

Branching deregulation should enhance the ability of banks to direct savings to the best projects and to oversee the successful execution of those projects. As we have seen, banks function better after branching deregulation, and their loan losses decrease sharply. The selection hypothesis suggests that these improvements occur because banks that are better able to screen and monitor loans are able to expand their operations at the expense of less effectively managed banks after deregulation. As a result, the economy can grow faster because savings flow more consistently into profitable investment opportunities.

THE EFFECT ON STATE ECONOMIES

To investigate whether state-level rates of economic growth did in fact increase following branching deregulation,[24] we estimate the change in the average growth rate of two measures of economic activity: real per capita personal income and real per capita gross state product.[25] These two measures differ somewhat in concept: Personal income reflects the income of a state's residents, providing a measure of residents' welfare. Gross state product, by contrast, measures the total incomes of factors of production located within the state, allowing us to assess the economic activity that actually occurs there.[26] As in our estimates of the effects of branching deregulation on bank performance, we control for both business cycle effects and the effects of differences in the long-run growth rate across states.[27] Our tests of the effects of branching deregulation on the state economies show a significant acceleration in growth: annual personal income grows about 0.51 percent-

age point faster after branching deregulation, and gross state product, about 0.69 percentage point faster (Table 3, row 1). This acceleration is not only statistically significant at the 5 percent level but is also economically "large" relative to the 1.6 percent annual average growth rate of real per capita personal income over the sample period.

Of course, there is uncertainty associated with this estimate—with a 5 percent probability of error, we can only be confident that personal income growth increased somewhere between 0.06 and 0.97 percentage point. Moreover, these figures are estimated under the assumption that the growth pickup persists indefinitely. One possibility is that the economy benefits for a few years as the banking system becomes more efficient, then growth returns to the level that prevailed before the policy change.

We disentangle the short- and long-run effects of deregulation on growth by assessing the average growth rate following deregulation during three distinct time periods (Table 3, rows 2-4). We measure the change in the growth rate during the first five years after branching deregulation, the change in growth relative to the years before deregulation during years five to ten, and the change from years eleven and beyond. We find that the beneficial effects of the policy change are greatest during the first ten years. Personal income growth accelerates by 0.35 percentage point in the first five years and by 0.37 percentage point in the next five

	Change in Personal Income Growth (Percentage Point)	Change in Gross State Product Growth (Percentage Point)
(1) Overall increase in growth	0.51	0.69
	(2.22)**	(2.09)**
(2) Increase in growth, years 1-5	0.35	0.60
	(1.75)*	(2.07)**
(3) Increase in growth, years 5-10	0.37	0.65
	(1.85)*	(2.41)**
(4) Increase in growth, years 10+	0.17	0.67
	(0.89)	(2.48)**

Source: Jayaratne and Strahan (1996), Tables 2 and 5, rows 3 and 7.

Note: The t-statistics are given in parentheses.

*Statistically significant at the 10 percent level.

**Statistically significant at the 5 percent level.

years. But after ten years, our estimate of the growth effect falls to 0.17 percentage point and is no longer statistically significant. In the gross state product series, however, the increases in growth appear to last beyond ten years. (See Box 2 for a detailed discussion of the growth regressions used to generate these results.)

Annual personal income grows about 0.51 percentage point faster after branching deregulation, and gross state product, about 0.69 percentage point faster.

Overall, we lack conclusive evidence on whether the growth effects persist beyond ten years. This limitation is not surprising, however, since we observe only about ten years of growth experience after deregulation for most states. Nevertheless, even if the observed increases in growth do not continue indefinitely, the short-run effects appear to be large.[28]

ROBUSTNESS OF THE GROWTH ACCELERATION
Did many states experience a growth pickup in the wake of branching deregulation or was the change concentrated among a few? To evaluate whether the effects were widespread, we offer a state-by-state assessment of the growth in personal income. Chart 3 plots the average change in growth for each of the thirty-five states that deregulated their branching restrictions relative to the average change in growth for the nonderegulating states. (The latter group of states, as in Chart 2, is used to control for nationwide changes in growth.) Like Chart 2, Chart 3 plots these growth changes by the year of deregulation.

The growth acceleration following deregulation is clearly a general phenomenon. Twenty-nine of the thirty-five states that deregulated performed better than the nonderegulators. (The exceptions are New Hampshire, Florida, Michigan, Kansas, Colorado, and New Mexico.) Even when the deregulating states experienced growth declines following

branching, the nonderegulators generally fared even worse. This pattern suggests that when a downturn was occurring in the national business cycle at the time of branching deregulation, the downturn was at least partly offset by the positive effects of statewide branching.

We have shown that rates of economic growth increased following branching deregulation. The increase is both statistically large, which suggests that we can be confident that it is not the result of chance, and economically large, which suggests that over time economic welfare would be raised dramatically as a consequence of the accelerated growth. The growth acceleration is also widespread, benefiting twenty-nine of the thirty-five deregulating states. The remaining question, however, is whether deregulation actually caused the growth pickup. Establishing causal relationships is always difficult in empirical economics because researchers cannot run controlled

Personal Income Growth Rates Accelerate after Branching Deregulation in All but Six States
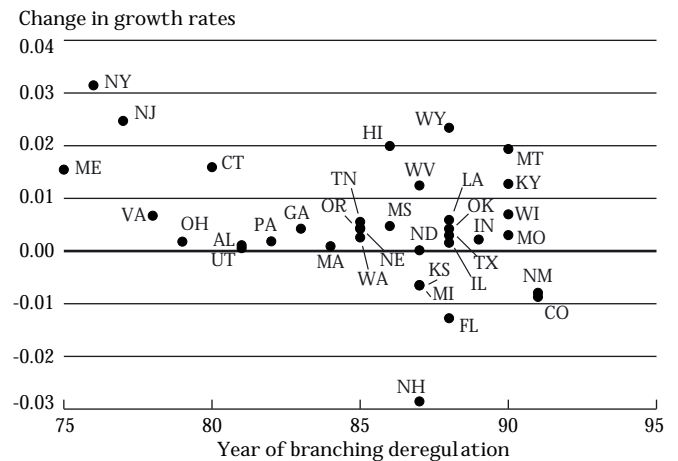
Source: Authors' calculations.

BOX 2: AN EMPIRICAL MODEL OF GROWTH

To estimate the effects of branching deregulation on growth, we use the following model:

$$
\begin{aligned}
Y_{t,i} \big/ Y_{t-1,i} = {} & \alpha_t + \gamma^5 D^5_{t,i} + \gamma^{10} D^{10}_{t,i} + \gamma^{10^+} D^{10^+}_{t,i} \\
& + \mu_1 [Y_{t-1,i} \big/ Y_{t-2,i}] + \mu_2 [Y_{t-2,i} \big/ Y_{t-3,i}] \\
& + \mu_3 [Y_{t-3,i} \big/ Y_{t-4,i}] + \delta Y_{t-1,i} + \varepsilon_{t,i} \ ,
\end{aligned}
$$

where $Y_{t,i}$ is a measure of real per capita income (output), $D^5_{t,i}$ is a branching indicator equal to 1 for states that allowed statewide branching at most five years ago, $D^{10}_{t,i}$ is a branching indicator equal to 1 for states that allowed statewide branching six to ten years ago, and $D^{10^+}_{t,i}$ is a branching indicator equal to 1 for states that allowed statewide branching more than ten years ago.

In this specification, the γ coefficients measure the increase in per capita economic growth stemming from branching deregulation at different time periods. The α_t terms measure the common, economy-wide shocks to growth such as the national business cycle. The μ terms capture the effects of the state-specific business cycle, and δ reflects the extent to which poorer states grow faster (the "convergence effect" observed in Barro and Sala-I-Martin [1992]).

We estimate the model with a variety of different specifications. The simplest uses ordinary least squares (OLS). The model is also estimated by weighted least squares (WLS), with weights proportional to the size of the state economy at the beginning of the period. We use WLS because measurement error in state economic data—particularly in data relating to interstate commerce—is likely to be greater for smaller states. Smaller states are also more likely to depend on a limited number of industries, leading to greater susceptibility to industry-specific shocks. In all cases we report heteroskedasticity-consistent standard errors (White 1980).

While there is no a priori reason to suspect that regional business cycles will introduce a bias, we also present estimates from an augmented version of the above model allowing the time effects (that is, the business cycle effects) to vary across four broad regions of the United States. This specification is included mainly as a robustness check. Table 1 in the text shows that many states in the South and Midwest deregulated around the same time, leading to the possibility that regional business cycle effects drive the estimate of the growth effect coefficients. To control for the regional business

BOX 2: AN EMPIRICAL MODEL OF GROWTH *(Continued)*

cycle, we modified the above model slightly by interacting the year-fixed effect with four regional indicator variables (for the Northeast, South, West, and Midwest).

The table below presents the results of estimating

these models. Almost all specifications show that the increase in growth after branching deregulation lasts up to ten years, but only half the models show a growth increase beyond ten years.

STATE ECONOMIES GROW MORE RAPIDLY AFTER BRANCHING DEREGULATION

	Growth Effect: Years 1-5 (1)	Growth Effect: Years 6-10 (2)	Growth Effect: Years 10+ (3)	Growth$_{t-1}$ (4)	Growth$_{t-2}$ (5)	Growth$_{t-3}$ (6)	Lag of Per Capita Income (7)	Adjusted R^2 (8)
GROWTH BASED ON PERSONAL INCOME								
Basic model, OLS	0.59**	0.86**	0.34	0.14*	-0.03	-0.04	-0.38**	0.52%
	(0.23)	(0.23)	(0.22)	(0.08)	(0.06)	(0.08)	(0.13)	(1,015)
Basic model, WLS	0.61**	0.86**	0.34**	0.20**	0.06	0.04	-0.29**	0.73%
	(0.21)	(0.22)	(0.16)	(0.05)	(0.04)	(0.04)	(0.08)	(1,015)
Regional effects, OLS	0.35	0.37*	0.17	0.08	-0.03	0.02	-0.29**	0.64%
	(0.20)	(0.20)	(0.19)	(0.08)	(0.07)	(0.08)	(0.11)	(974)
Regional effects, WLS	0.31**	0.38**	0.21	0.16**	0.04	0.07	-0.28**	0.79%
	(0.16)	(0.19)	(0.13)	(0.05)	(0.04)	(0.05)	(0.09)	(974)
GROWTH BASED ON GROSS STATE PRODUCT								
Basic model, OLS	0.77**	0.94**	0.63**	0.21**	0.09*	0.03	-0.07**	0.41%
	(0.30)	(0.30)	(0.27)	(0.06)	(0.05)	(0.07)	(0.03)	(521)
Basic model, WLS	0.64**	0.83**	0.48*	0.21**	0.13**	0.06	-0.09**	0.62%
	(0.26)	(0.33)	(0.26)	(0.05)	(0.06)	(0.07)	(0.03)	(521)
Regional effects, OLS	0.60**	0.65**	0.67**	0.15**	0.06	0.07	-0.04*	0.50%
	(0.29)	(0.27)	(0.27)	(0.06)	(0.05)	(0.07)	(0.02)	(500)
Regional effects, WLS	0.43**	0.57**	0.59**	0.23**	0.11**	0.08	-0.08**	0.69%
	(0.21)	(0.24)	(0.24)	(0.04)	(0.04)	(0.07)	(0.03)	(500)

Source: Jayaratne and Strahan (1996), Table 5.

Notes: The table presents estimates of the increase in state economic growth following relaxation of intrastate branching restrictions. Delaware is dropped from all regressions used to produce these estimates while Alaska and Hawaii are dropped from the regressions with regional effects. In addition, the year in which each state deregulated was dropped. Growth data for personal income are from 1972-92 and for state product from 1981-91 (three years are lost with the addition of the lagged dependent variables). In column 8, the number of observations appears in parentheses below the R^2. In columns 1-7, standard errors appear in parentheses below the coefficients. Reported standard errors are heteroskedasticity-consistent (White 1980). The coefficients on the branching indicators and the lag of income are multiplied by 100.

*Statistically significant at the 10 percent level.

**Statistically significant at the 5 percent level.

experiments. Nevertheless, we must consider other factors that could explain our finding. One possibility is that state governments instituted a variety of new policies at the same time that they deregulated their banking systems. If so, these policy changes could be responsible for the improved growth performance.

We find no evidence of such coincident policy changes. The political control of state governments did not

change significantly around the time of branching deregulation. In only two cases out of thirty-five did control of both houses of the state legislature and the governorship pass from one political party to the other during the four-year election cycle leading up to branching deregulation. The political affiliation of both houses of the state legislature changed only six times out of thirty-five during the four-year window before branching deregulation.

Moreover, even after controlling for two measures of state fiscal policy—the ratio of public investment by the state government to total income and the ratio of tax receipts by the state government to total income—we continue to find a significant growth acceleration after branching deregulation. Our tests suggest that there were no changes in states' tax and other fiscal policies that coincided with branching deregulation and that could explain the observed increase in state economic growth following statewide branching.

Another possible explanation for our finding is that state legislatures relaxed branching restrictions in anticipation of faster growth and the need to finance attractive projects. Why might this be the case? Perhaps when a state has strong growth prospects, potential bank borrowers pressure state governments to deregulate their banking systems. But if states deregulated branching rules because they anticipated the need to finance a future economic boom, then we should see a sharp rise in bank lending following deregulation. Jayaratne and Strahan (1996) demonstrate, however, that no increase in lending occurred. Moreover, the growth effects of branching deregulation remain largely unchanged even after we control for loan growth.

Finally, we consider the possibility that some unobserved set of technological changes led to branching deregulation, improved bank performance, and increased economic growth. For example, increased competition from nonbank financial institutions clearly helped to spur the removal of barriers to branching. Perhaps such financial innovations also forced banks to improve their performance and boosted states' economic growth. Two considerations, however, lead us to discount this possibility. First, if this explanation were true, we would see an improvement in bank performance and increased economic growth immediately before, as well as after, deregulation. Our data show no such pattern.[29] Second, any technological changes that occurred around the time of deregulation should have affected all states. In that case, we should not see any improvement in bank performance nor any increase in economic growth in deregulating states relative to nonderegulating states. Our data, of course, provided clear evidence of such differences in the experiences of the states.

To summarize, the large increase in bank loan quality in conjunction with little or no change in loan growth suggests that the increase in states' economic growth was at least partly due to statewide branching. The improvements in banking stemming from selection (and possibly disciplining) appear to have had important beneficial effects on the economy.

CONCLUSION

Restrictions on bank branching have proved to be very costly. By preventing the more efficient banks from expanding at the expense of their less efficient rivals, these restrictions retarded the "natural" evolution of the industry. As our analysis has shown, once state branching restrictions were lifted, the efficiency of the banking system improved as the better banks expanded into new markets. Bank borrowers benefited from lower loan rates, while the overall economy grew faster as banks did a better job separating the good projects from the bad and monitoring firms after lending relationships had been established. State restrictions on interstate banking may have created similar constraints, although our statistical procedure has a harder time identifying such effects.

The Riegle-Neal Act removes the remaining geographic barriers to bank expansion and permits the creation of multistate banking franchises. This federal legislation may produce benefits similar to those achieved through state deregulation—reduced bank costs, lower loan rates, and accelerated economic growth. Nevertheless, it is possible that the latitude given banks to create branches and buy out-of-state banks over the last two decades may have already weeded out weaker institutions and exhausted the benefits of geographic deregulation. Whether there is additional room for improved efficiency through the process of selection remains to be seen.

ENDNOTES

1. Although the act gives each state the right to prevent out-of-state banks from owning branches there, only Texas and Montana have chosen to do so.

2. Several types of geographic restrictions have been imposed over the years on banks, but this article focuses on limits on banks' ability to establish branches within their home states and on limits on BHCs' ability to acquire banks outside their home states. We do not consider other restrictions, such as those prohibiting the formation of multibank BHCs, primarily because we lack the necessary data.

3. Although some states removed barriers to branching before 1978 (see Table l), most of the state deregulatory activity was concentrated in the 1978-92 period. The focus on this period also enables us to take advantage of the greater availability of bank data after 1978.

4. We include Delaware and South Dakota in Table 1, but we exclude them from our analysis (see Box 1).

5. Many states also permitted de novo branching after permitting banks to branch through mergers and acquisitions. We do not emphasize de novo branching powers because bank expansion into new markets generally occurs through the purchase of whole banks or branches of banks located in those new markets, not through the opening of new branches.

6. Information on the timing of states' deregulatory initiatives is taken from Amel (1993).

7. For instance, in 1982 Pennsylvania passed a law permitting banks to branch in the home office county, in a contiguous county, in a bicontiguous county, or in the counties of Allegheny, Delaware, Montgomery, and Philadelphia. In 1990, Pennsylvania permitted unrestricted branching statewide. In the results presented below, we assume that by 1982 Pennsylvania permitted intrastate branching (despite the fact that the process was not finished until eight years later) because the effect of the 1982 law brought Pennsylvania so close to complete intrastate branch freedom. We follow a similar practice for Ohio, Virginia, and Washington. Our results are not sensitive to the alternative dating of deregulation in these four states.

8. The noninterest expense variable equals total noninterest expenses incurred by all banks in a state divided by total banking assets held by banks in that state. The loan price variable equals interest earned on all loans and leases in a state divided by total loans plus leases held on bank balance sheets in that state.

9. When we control for the state business cycle, the estimated effects of statewide branching decrease but are still both statistically significant and economically important.

10. The long-run average level of bank loan losses may differ across states because banks operating in states dominated by particularly high-risk industries will exhibit higher loan losses. Oil states such as Texas, Alaska, and Louisiana, for instance, exhibited loan losses that exceeded the national average during our sample period. Improvements in loan quality after deregulation could therefore reflect a tendency for states dominated by high-risk industries to deregulate their branching and interstate banking restrictions later than the typical state. We accounted for this possibility by controlling for persistent cross-state differences in bank performance.

11. We find declines in loan loss provisions and nonperforming loans of similar magnitude following branching deregulation. See Jayaratne and Strahan (forthcoming).

12. We find no change in deposit interest rates following deregulation, however. All of the cost declines seem to be passed along to bank borrowers rather than depositors.

13. The estimates of the effects of deregulation on our performance measures are based on a regression model that assumes that the changes occur immediately following deregulation and are permanent. Because we have only five to ten years of experience after deregulation for most states, we cannot be sure that these effects will continue indefinitely. Nevertheless, we find that the observed improvements in bank performance persist more than five years after branching deregulation.

14. These results are reported in Jayaratne and Strahan (forthcoming).

15. New York and Maine are dropped from this analysis because they deregulated before loan charge-off data became available. As noted earlier, Delaware and South Dakota are dropped throughout the analysis.

16. New Hampshire eliminated its branching restrictions in 1987, just before the beginning of the New England banking crisis. This sequence of events might explain why bank performance is observed to deteriorate after deregulation.

17. These results are available on request.

18. When we substitute loan charge-offs for return on equity as a measure of bank quality, we obtain similar results. To conserve space, however, we do not include these results in this article. In addition, we do not include noninterest expenses in this analysis, because the data are available beginning only in 1984. The lack of earlier data means that we can conduct the exercise in Table 2 for only three deregulating states using noninterest expense data.

19. We chose this window length because most of the observed changes in bank structure occurred within five years after branching deregulation.

Note 19 continued

For example, nearly two-thirds of the 30 percent increase in the state-level bank asset concentration occurred within five years after branching deregulation. Similar results are reported in Berger, Kashyap, and Scalise (1995), who find that most changes to bank structure occur within five years after geographic deregulation. (Some states entered interstate banking agreements during the five-year window. For these states, we use the year just prior to the year in which the state entered the interstate banking agreement as the end of the window. We dropped four states—West Virginia, Tennessee, Oregon, and New Hampshire—that entered interstate banking agreements in the same year or one year after branching was deregulated.)

20. Although high-profit banks are defined to have 50 percent of a state's bank assets at the beginning of the deregulation period, we can only approximate this target because no group of banks in a state will contain exactly one half of that state's total bank assets. Thus, in Table 2, high-profit banks are shown to have 51.3 percent of the average state's bank assets, not 50 percent.

21. We define high-profit banking companies before deregulation in much the same way we defined high-profit banking companies after deregulation. Banking companies are identified as high-profit on the basis of their return on equity at the end of the year seven years before the year of deregulation. We then measure their change in market share over the next six years.

22. Recall that we found only weak evidence that overall bank profits increased after branching deregulation. This earlier finding does not conflict with the fact that high-profit banks grew faster than low-profit banks. Two forces are operating. Because the high-profit banks tend to grow at the expense of their less efficient competitors after deregulation, aggregate profits should increase, all else being equal. At the same time, however, because the high-profit banks are likely to have achieved their superior growth rates in part by charging customers less, aggregate profits should drop. These two forces are approximately offsetting: thus, overall profits changed little following deregulation.

23. For instance, banks write loan covenants that restrict firms' ability to engage in certain activities during periods of financial distress. The

writing and exercising of such covenants allow banks to monitor their borrowers effectively (Morgan 1995).

24. We focus here on branching deregulation, rather than interstate banking, because once we controlled for the business cycle, we found sharp improvements in bank performance associated with statewide branching but not with interstate banking. Although we looked for evidence of changes in economic growth associated with interstate banking, we found none.

25. Statistics on personal income and gross state product are published annually by the U.S. Department of Commerce. Annual state population figures are from the U.S. Bureau of the Census. We convert nominal personal income to constant dollars using a national price deflator, the consumer price index.

26. The difference between personal income and gross state product is apparent in how the two measures treat capital income. Capital income is allocated to personal income according to the state of residence of the owner of capital, while for gross state product, capital income is allocated according to the physical location of the capital itself. Real per capita personal income grew 1.6 percent per year during our analysis period (1972-92), while gross state product grew 1.4 percent per year between 1978 and 1992. (Because the Commerce Department changed the base year for the industry price deflators in 1977, we could not construct a consistent growth series prior to 1978 using gross state product.)

27. To control for regional business cycle effects, we include a set of time dummy variables that vary across four broad regions. For details, see Jayaratne and Strahan (1996), Table 2.

28. Note that there are theoretical reasons to believe that reductions in financial market frictions can increase the steady-state growth rate of the economy. For a survey of the relevant models, see Galetovic (1994) and Pagano (1993).

29. These results are available from the authors upon request.

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