Branch Banking, Bank Competition, and Financial Stability

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It is often argued that branching stabilizes banking systems by facilitating diversification of bank portfolios; however, previous empirical research on the Great Depression cannot be reconciled with this view. Analyses using state-level data find that states allowing branch banking had lower failure rates, while those examining individual banks find that branch banks were more likely to fail. We argue that an alternative hypothesis can reconcile these seemingly disparate findings. Using data on national banks from the 1920s and 1930s, we show that branch banking increases competition and forces weak banks to exit the banking system. This consolidation strengthens the system as a whole without necessarily strengthening the branch banks themselves.

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Branch Banking, Bank Competition, and Financial Stability

One of the foundations of the theoretical literature on banking regulation is that branch banking leads to more stable banking systems by enabling banks to better diversify their assets and widen their depositor base (Gart 1994, Hubbard 1994). This conventional wisdom has been used to argue that historical banking crises in the United States, especially those of the 1930s, would have been less severe had the U.S. permitted widespread branch banking (Friedman and Schwartz 1963, Calomiris 2000). The empirical literature examining banking stability in the Great Depression, however, has not universally confirmed this prediction. In fact, this research presents a paradox. Studies using aggregate bank failure data from the Depression find that states that allowed branch banking had lower failure rates than those that only allowed unit banking (Wheelock 1995, Mitchener 2000a, 2000b), while studies using individual bank data find that banks that had branches were more likely to fail than unit (or single office) banks (Calomiris and Mason 2000, Carlson 2001).

In this paper, we resolve this empirical puzzle by focusing on an alternative channel through which branch banking affects financial stability: increased competition. Our hypothesis is that, faced with heightened competition, banks that are only marginally profitable are forced out of the banking system either through merger or voluntary liquidation. As these weaker banks close, the overall stability of a state's banking system improves through consolidation.

This explanation allows us to reconcile the paradox of the Great Depression, as there could be lower failure rates in states allowing branch banking without the branch banks themselves being the strongest banks. This new view suggests that at the onset of

the Great Depression, there were still many weak banks in states prohibiting branch banking; the real shock of the 1930s caused many of these to fail. However, in states that permitted branching, weak banks had been pruned from the system, and failures were consequently lower at the systemwide level. Our hypothesis also fills a void in the broader literature on financial stability. According to Allen and Gale (2000), the relationship between stability and competition has received little previous attention.[1]

Our hypothesis has several testable propositions, including one that enables us to discriminate our view from the diversification hypothesis. First, if branching does remove weaker banks from the system, then states that permit branch banking should experience higher merger and voluntary liquidation rates and lower entry rates than states prohibiting branching. Second, if the lower failure rate in branch banking states are the result of weak banks exiting the system rather than diversification, then failure rates should be more strongly related to a measure of prior consolidation within the banking industry than an indicator of branch banking.

Since our hypothesis emphasizes changes in the competitive environment of banking induced by the onset of branching, it is necessary to test our model using data from a period when branch banking was relatively new and expanding in scope. Moreover, because we want to test how branching influences the stability of banking systems, we also need to examine a period when there were numerous failures. In this respect, the experience of the U.S. banking system from 1920-30 is ideal since branching was in its infancy, but expanding rapidly (Figure 1), and because the 1920s were

[1] "On the one hand, there are many models of competition in the literature including models of bank regulation in a competitive environment. On the other hand, there is a well-developed literature on bank crises…But there is little on the impact of competition on stability." (Allen and Gale, 2000, p.268).

characterized by a large number of bank failures (Figure 2).[2] Moreover, studying this period allows us to compare our results to existing research, which has used data from the 1920s and 1930s to draw conclusions about the effects of branching.

Our empirical results support the predictions of the competition hypothesis. States that adopted branching laws experienced more mergers and voluntary liquidations and less entry during the 1920s. We also find that, although there was significant consolidation in the banking sector in states allowing branch banking, profits were lower on average in these states, suggesting that branching led to increased competition rather than monopoly power. To test whether branching reduced failures, we first confirm that our data produce the usual state level result that states allowing branches statewide had lower failure rates. Then we include an index of prior consolidation and find, as predicted by the competition hypothesis, that this measure outperforms the branching indicator. Thus, industry consolidation and the removal of weak and inefficient unit banks from the system are shown to be a better predictor of failure rates than measures of branch banking.[3]

The paper proceeds as follows. Section 2 discusses the previous literature on branching and financial stability. In section 3, we present our hypothesis for resolving the existing puzzle in the literature. The next section tests the consolidation hypothesis and some of its implications for bank competition and financial stability. Section 5 provides concluding remarks.

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[2] Chapman and Westerfield (1942) describe how the issue of branch banking gained national attention during the 1920s, in part because it was spreading rapidly in states such as California and prompting federal regulators to reconsider their longstanding prohibitions against it.

[3] We also compare the results of our hypothesis with an alternative: that branching increases the ability of banks to merge rather than fail by providing a larger pool of prospective merger partners. We thank Joe Mason for suggesting this alternative.

Section 2. The Effects of Branch Banking on Financial Stability

An argument commonly articulated in the literature is that branch banking stabilizes banking systems by reducing their vulnerability to local economic shocks: branching enables banks to diversify their loans and deposits over a wider geographical area or customer base.[4] Restrictions on branching have been linked to the instability of banking systems. Calomiris (2000) argues that bank failures were more prevalent in regions of the United States without branch banking as well as in countries lacking it. Friedman and Schwartz (1963) suggest that the absence of branching in the U.S. increased the severity of the banking panics during the Great Depression. Moreover, they argue that the U.S. experience stands in contrast to Canada, which experienced banking distress during the Depression but not widespread failures and a collapse of its banking system.[5] The view that branch banking stabilizes banking systems through diversification is in fact an old argument. In the 1920s, it was used by proponents of branch banking to encourage state legislators to adopt laws legalizing branch banking (Preston, 1924 and Southworth, 1928).

Studies examining the effects of branching at the aggregate level generally support the hypothesis that allowing branch banking increases systemic stability. Wheelock (1995) studies the relationship of different regulations on bank failure rates in different states during the years 1929-1932 and finds that states that allowed branch

[4] Studies by Wacht (1968) and Lauch and Murphy (1970) find reduced variance in deposit flows for branch banks. Cherin and Melcher (1988) find that branching has moderating effects on asset returns.

banking tended to have lower failure rates. Mitchener (2000a, 2000b) further examines state- and county-level bank failure rates. Controlling for economic fundamentals and differences in both state supervision and regulation, he also finds that states with legalized branching had lower failure rates during the Depression. Comparing 25 different countries during the Great Depression, Grossman (1994) finds that those with large branching networks were less likely to experience banking crises. And using data from the postwar period in the U.S., Rose and Scott (1978) find that bank failures from 1946-75 were concentrated in states limiting or prohibiting branch banking.[6] Although these studies (using aggregate data) find a positive correlation between branch banking and financial stability, they do not establish a direct link between the purported benefits of diversification of loan portfolios and the deposit base to financial stability.[7]

Studies using data on individual banks operating in the 1920s and 1930s paint a different picture of the effects that branching has on the survivorship of individual banks, and they cast doubt on the common view that the stabilizing benefits of branching operate via increased diversification opportunities. Calomiris and Mason (2000) find that, during the Depression, Federal Reserve members that were branch banks tended to fail sooner than unit banks. Also using data on individual state banks from this period, Carlson

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[5] Drummond (1991) and White (1983) make a similar argument. Kryzanowski and Roberts (1993), however, find that nationwide branch banking did not prevent banks in Canada from becoming technically insolvent.

[6] Many of these studies also include some measure of bank concentration as an explanatory variable. Although none of them interacts branch banking and their measure of concentration, it is possible that these two effects worked together to influence failure rates. In section 4, we relate our consolidation hypothesis to the issue of banking concentration. Our emphasis, however, differs in that we are testing whether changes in bank concentration are an outcome of branching laws, and whether this in turn affected bank profitability.

[7] Wheelock (1995) attributes the positive correlation between restrictions on branch banking and failure rates to limited diversification. Similarly Alston, Grove, and Wheelock (1994) also consider the impact of branching legislation on bank failures, and emphasize that branching may reduce a bank's susceptibility to distress in a particular area; however, they do not find that the ratio of (non-home-office) branches to total banks helps to explain the cross-state variation in failure rates during the 1920s.

(2001) examines three states where branch banking was relatively widespread and finds that branched banks were more likely to fail than unit banks. Furthermore, he rejects some potential reasons for this phenomenon including insufficient diversification and over-expansion on the part of banks. Instead, he finds that branch banks used diversification to reduce their reserves rather than lower the risk of their portfolios – a strategy that worked poorly during the global shock of the Great Depression.

Whereas the evidence using aggregated data suggests that branch banking stabilizes banking systems (which, although not a direct test, could be viewed as consistent with the diversification hypothesis), the studies using individual data point in the other direction (and are inconsistent with the diversification view). The next section therefore proposes an alternative hypothesis in an attempt to reconcile these conflicting results.

Section 3. Branch Banking and Competition

During the 1920s, the number of branches operated by banks more than doubled, increasing from 508 in 1920 to 1,131 in 1930 (Federal Reserve 1931, vol. 2).[8] We hypothesize that this expansion of branching networks increased the level of competition in states that allowed branching to occur. As a result, banks that were only marginally profitable prior to the increase in competition would not be profitable with the increase in

[8] This represents an increase in the number of branches operated outside the city of the home office. Banks also operated branches within the city of the home office. The number of these branches tripled between 1920 and 1930, rising to 2,391 at the end of the period. It is not clear that branches in the city of the home office provided the same opportunities for diversification as branches outside the home office. Thus, in the discussion of the hypothesis, the term branching will refer to the branches located outside the city of the home office.

competition. In turn, these banks would likely merge with existing banks or voluntarily liquidate.[9] Also, because of the increased level of competition that branching induces, it is likely that fewer banks would be able to find a profitable niche and enter the market. With the exit of the weakest banks and less entry of new banks, the economic viability of average bank would increase, and the rate of failure for banks within that state would decline.

Why should these competitive forces apply to changes in branching laws and not simply to new banks that emerged in the 1920s? First, banks with branches were more cost-effective than new unit banks because jobs at different branches could be consolidated and performed at the head office, reducing operating costs (Federal Reserve 1931, vol. 2, p. 224). Second, start up costs were lower for new branches than full service banks, reducing barriers to entry. In some states, this included lower charter capital requirements for branches than full-service banks (Southworth, 1928). Third, new branches that were set up in previously restricted markets were likely more adept at realizing higher rates of return than a comparable new unit bank since branches could transfer deposits out of the local market to regions where capital was in higher demand. The ability to obtain a cost advantage through branching and realize higher rates of return thus made entry into existing local markets easier for branch banks than new unit banks.

The competitive forces that branch banking unleashed were not only limited to large cities. Indeed, branch banking may have been instrumental in bringing banking and banking competition to small towns. In 1931 (the only year for which we have been able to locate the distribution of branches by town size), nearly half of all branches outside the

[9] Alternatively the management could keep the bank open until it failed. This seems unlikely, however, as it would involve a loss on the part of investors; selling or liquidating the bank prior to failure would not.

home-office city were located in towns of less than 2,500 people (Table 1). Figure 3 shows the locations of branches outside the home office. Moreover, the Federal Reserve suggests that important rural banking networks (measured in terms of the size of banks and share of the state's total assets) existed in states such as North and South Carolina, and these systems had been created, at least in part, through consolidation (Federal Reserve, 1931, pp.214).

Laws that permitted statewide branching applied only to state-chartered banks whereas the data we use to test the competition hypothesis are for national banks. The logic of our hypothesis, however, still applies to national banks since they would be subject to increased competition from the state banks that were allowed to establish branches.[10] Indeed, since the vast majority of national banks did not have branches, a sample consisting of national banks may in fact be better for examining whether branch banking affects competition because any observed or unobserved channels through which branching might affect both competition and diversification are likely to be less of a problem in a sample with fewer branched banks.[11]

It has been shown by Calomiris and Mason (2000), among others, that new banks and less profitable banks were most likely to fail during the Great Depression. A key component of our hypothesis is that fewer of these banks would exist in states that allowed branch banking because the competitive pressures associated with the rise of branch banking networks, prior to the Depression, would have forced weak banks to exit

[10] Additionally, state banks that converted into national banks were permitted to keep branches they had established while they were state banks, enabling branch banks to become national banks through a legal technicality.

[11] Excluding California, the country's nearly 8,000 nationally chartered banks operated 18 branches outside the home-office city in 1925. By 1930 the number of branches had risen slightly to 27 (Federal Reserve Board of Governors, 1943).

from the banking system and reduced the number of entries. In states without the competitive pressures of branch banking, more weak banks would still exist at the start of the Depression and these states would therefore have more banks that would be likely to fail during the subsequent downturn. This interpretation is consistent with the findings in Mitchener (2000a, 2000b) and Wheelock (1995): states allowing branch banking would have had lower failure rates than those prohibiting it. And it would also be true even though it was not necessarily the case that branch banks were the survivors.

The hypothesis that a banking system with branching is more diversified and therefore more stable than a banking system with only unit banks presupposes that the two systems are in equilibrium. When examining the 1920s and 1930s, however, it is more consistent to consider an argument about what happens as the system is transitioning from a unit banking equilibrium to a branch banking equilibrium. Our hypothesis emphasizes how the expansion of branch banking *within* a state can increase stability by pruning out inefficient banks through mergers and voluntary liquidations, and is consistent with recent research examining the effects of the introduction of interstate branching (Berger, Demsetz, and Strahan, 1999).

Our hypothesis stands in contrast to one of the longstanding populist arguments lodged against branch banking. Opponents of branch banking have often complained that it was a form of cartelization that would result in consolidation of the industry and reduced competition, and that its growth would reduce the viability of businesses in small communities by siphoning funds to urbanized areas. Such sentiments were widely expressed in the first quarter of the 20th century – when branching was spreading

rapidly.[12] While the spread of branch banking may lead to consolidation, the effects on competition are not as clear as opponents of branching suggest. In fact, the economic theory or private-interest view of regulation argues that branching restrictions are used to protect inefficient, local monopolies and restrict competition.[13] The result of these intrastate regulations was less than full-scale competition in local deposit and loan markets. As Chapman and Westerfield (1942, p.233) described the situation in the 1920s and 1930s:

> "Country bankers foresee danger to themselves in the possibility of inroads into their areas of operation, should the larger institutions of the cities be permitted to establish branches and compete with them in their area on equal terms. They know that such a policy would result in a reduction of interest rates in their towns and that their chances for the profitable use of their funds might be somewhat diminished unless they were prepared to go as far as their new rivals in serving customers cheaply. The alleged apprehension of unit bankers as to the monopolistic character of branch banking is, to say the least, selfish. What really motivates them is their desire to preserve their local monopolies and escape the competition of the more effective branch banks."

Our hypothesis is sympathetic to this view of regulatory impediments. It is also analogous to one that has been made in the context of global financial services industry: just as foreign banks have brought necessary competition to inefficient domestic markets (Folkerts-Landau and Lindgren, 1998), branch banking can introduce greater competition to local markets, improving the cost and delivery of services to customers and the safety of the banking system by forcing inefficient banks to merge or go out of business.

[12] See, for example, the discussion in Chapman and Westerfield (1942, p.10) and Willit (1930) for numerous examples of this view.
[13] See Kroszner and Strahan (1998, 2000), Mitchener (2000c), and Chapman and Westerfield (1942).

Section 4. Testing the Competition/Consolidation Hypothesis

This section tests several predictions of our hypothesis using data on national banks from the 1920s and the first two years of the Depression. First, we test whether the number of mergers and voluntary liquidations was higher (and the number of entrants lower) in states that permitted branch banking. We then test whether other factors related to competition and consolidation including the number of banks per capita and the profitability of different banks are related to branching regulation. Finally, we test whether the "exit/no entrance" rate better explains failure rates than simply whether branch banking was allowed. To implement this last test, we start by reproducing the standard aggregate data result that statewide branching is negatively associated with bank failures. We then construct an index that measures the extent of consolidation in the state's bank system. The index is then used in the failure rate regression and we test whether it is significant and whether the indicator for being a state that allows branch banking becomes insignificant.

A. Mergers, Voluntary Liquidations, and Entry in Branch Banking States

Our first test examines industry consolidation – whether there were more mergers, voluntary liquidations, and fewer entries for national banks in states that allowed branch banking.[14] Table 2 summarizes the data on bank entries and exits for national banks over

[14] Wheelock (1992, p.815) suggests that this may have occurred in the 1920s, but does not formally test this notion: "Like most Midwestern states, Kansas was a unit banking state during the 1920s, with over 1,000 small banks in operation…Had branching restrictions been removed those counties might have experienced greater consolidation, through either mergers or failures."

the sample period of 1921-30, and groups the data by branching law. (Appendix Table 1 describes the sources for our data.) As the last column of the table shows, during the 1920s, states permitting statewide branching averaged more mergers and voluntary liquidations and had fewer new entries into the banking system than states limiting branching (to the city or county level), prohibiting branching, or having no law with respect to branching. The results are most striking for mergers and voluntary liquidations.

To explore these results further, we regress the number of exits and entries for national banks on dummies for the prevailing law regarding branching and year dummies over our full sample as well as subperiods. Based on the states' laws during the previous year, the states are classified into one of four categories: those prohibiting branching, those allowing limited branching (generally branches within the city or county of the home office), those allowing statewide branching, and those having no laws with respect to branching. In states where the *de jure* situation differs from the *de facto* situation (such as West Virginia where the laws allowed branching but the state banking commissioner refused all applications to establish branches), the *de facto* situation is used instead of the *de jure*. Detailed information on state branching laws (including whether the *de jure* situation was used) is shown in Appendix Table 2.

Since exits and entries take on only discrete integer values, and are bounded below by zero, we analyze the number of exits and entries employing count data analysis rather than using other estimation procedures such as ordinary least squares.[15] Moreover,

[15] Count data analysis assumes that the dependent variable was generated through a Poisson process. Determining the effect of the independent variables involves maximizing the log-likelihood function $\sum_{i=1}^{n}\left\{y_i X_i'\beta - \exp\left(X_i'\beta\right) - \ln y_i!\right\}$ where y is the dependent variable vector, X is the matrix of independent variables, β is the coefficient vector, and n is the number of observations. When analyzing counts, it is important to control for the size of the population from which the counts are produced. In the

since entries and exits are truncated at zero rather than censored at zero, using Tobit would produce biased estimates.[16] For exits, we find that a Poisson distribution provides a good fit; however, for entries, the variance greatly exceeds the mean, so we correct for this overdispersion in the data using a negative binomial distribution. The coefficients can be interpreted as the percentage change in the dependent variable (number of entries or exits divided by the log of the number of banks in the state) due to a one-unit change in the independent variable.

The estimated coefficients support the hypothesis that branch banking leads to increased mergers and consolidation in a state's banking system. During the 1920s, states that allowed branch banking had more voluntary liquidations than other states (Table 3). The evidence is strongest during the first half of the decade and is significant over the full sample period. The point estimate for the full sample period suggests that states permitting branch banking had 33 percent more voluntary liquidations per log bank than states where branching was prohibited.

Statewide branching appears also to have impacted mergers significantly during the 1920s. The count data analysis displayed in Table 4 shows that states permitting unrestricted branching had more mergers during the 1920s. The coefficient on the statewide branching variable over the entire sample period suggests that states permitting statewide branching had 31 percent more mergers per log bank each year than those prohibiting it. Finally, Table 5 shows that states permitting branching networks had lower

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Poisson distribution the rate of "arrival" is constant so that the number of arrivals depends on the population size. Increasing the population by a certain percent should increase the number of arrivals by the same percent. In the estimation procedure above, this is equivalent to imposing the constraint that the effect of the log of the population is equal to 1. For a detailed treatment of count data analysis see Cameron and Trivedi (1998).

[16] See Plassman and Tideman (2001).

rates of entry during the 1920s, around half the number of entries per log bank than states forbidding branching. However, in contrast to the findings for voluntary liquidations, the effect of statewide branching on entry is stronger during the second half of the 1920s than the first half.[17] (The number of entries per log bank in statewide branching states during the second half of the decade was only about one-third that of other states.) This may reflect the fact that the differences in mean rates of entry based on branching laws are less pronounced in the 1920s compared to either voluntary liquidations or mergers (as shown in Table 2). Or, it may reflect a response by entrepreneurs to seek out new markets (where previously high profits had been generated by geographical monopolies) before significant consolidation occurred (driven by mergers and voluntary liquidations) as a result of branching.

Another more general way of testing the effects that branch banking had on consolidation is to examine whether states with branch banking laws had fewer banks per capita and whether these states had larger declines in the number of banks over the decade. The first two columns of Table 6 present results from regressing banks per capita on indicators of state branching laws and year dummies. The OLS estimates show that states permitting statewide branching had fewer banks per capita during the 1920s (Table 6). The next two columns of Table 6 show a regression of the percentage change in the number of banks over the decade on branching laws. Again, we find that states permitting statewide branching had more consolidation. These results are consistent with previous research, which has shown that the percentage change in banks per capita in the 1920s

[17] The shift in the effects of branch banking on exits and entrances coincides with the shift in bank failures patterns observed by Allston, Grove, and Wheelock (1994).

was greatest in states where branching expanded the most (Wheelock, 1993).[18] Because we additionally find that branch banking tends to increase mergers and voluntary liquidations, we are fairly confident that the reduction in the number of banks per capita in a state was caused by branch banking.

B. Consolidation and Increased Competition versus Monopoly Power

Although the results presented in the previous section support the view that branch banking increases consolidation in the banking industry, it is unclear whether this consolidation led to a more competitive banking system or a monopolistic banking system. For example, when banks are forbidden from establishing branches, it artificially segments the market and enables unit banks to develop monopolies within particular localities. The immediate impact of branching is that it introduces competition into these geographically segmented markets. If banks that were previously insulated from the cool winds of competition are acquired or forced out of the market as a result of this increased competition, it is possible that the surviving banks in turn acquire monopoly power. This was one of the concerns of those who lobbied against more permissive branching laws in the 1920s: the end result of liberalization would simply be further concentration in the banking industry. To investigate further how statewide branching affects the competitive environment of a state's banking system, we examine the relationship between branching and two additional measures: banking sector concentration and bank profits.

[18] Our results are also consistent with Berger, Kashyap, Scalise (1995), who show that the introduction of nationwide banking beginning in the 1980s accelerated the reduction in the number and market share of small bank organizations for the period of recent regulatory liberalization.

We first test whether states allowing branch banking had more concentrated banking sectors by regressing bank concentration on indicators of the state banking laws and year dummies for two periods: 1921-1930 and 1926-1930.[19] The first measure of concentration is essentially a Herfindahl index, constructed by computing the share of national banks in a particular size category (based on loans and investments) and weighting the size categories by loan and investment volume. We use the mean of the size category of national banks as the value of the national bank's size rather than the national bank's actual size, which is unknown. Data on bank size (described in Appendix Table 1) are only available for 1926-30, so the results for this measure of banking are presented for this period. The second measure is a four-firm concentration ratio based on the largest four national banks in each state for each year of our sample. We calculate this measure for 1921-1930. Using either measure, our OLS estimates show that states permitting branch banking tended to have more concentrated banking sectors (Table 7).

Next, we examine how branch banking affects bank profits. Since national banks were all regulated at the national level by the Office of the Comptroller of Currency and were largely restricted in their ability to have branches, differences in the level of competition that they faced would be a significant factor in creating differences in profit levels between states. Finding lower profits in states that allowed branch banking would indicate that the national banks faced heavier competition from state banks in these locations as a result of branching.[20]

[19] The sample periods are constrained by the availability of data for constructing the two measures of banking industry consolidation.

[20] Lower profitability may also result from higher merger costs; however, due to branching restrictions on nationally-chartered banks, this interpretation is more likely to apply to state banks than the national banks in our sample. Alternatively, national banks may have higher profits if branching leads to so much industry consolidation that the surviving banks are able to generate oligopoly profits. Higher profits may also result if competition has forced a sufficient number of inefficient national banks from the banking system.

To test how branching laws affect profitability, we use profit data on national banks that are available from 1926-30 and that are decomposed by both size category (based on loans and investments) and by state. The data are grouped into seven profit intervals, using the percentage return to capital as the measure of profitability.[21] Because the categories are ordered but the distance between them is not constant, an ordered logit is estimated using weights equal to the number of banks in each size category earning a given level of profits. The independent variables are bank size and dummies indicating the states' laws regarding branch banking.

Table 8 shows that states allowing statewide branch banking tended to have lower profits than states prohibiting it. The signs on the statewide branching coefficients shown in tables 7 and 8 suggest that branching appears to have increased concentration, but not to the point where branch banking networks acquired monopoly power. Our findings are also consistent with Berger, Kashyap, and Scalise (1995), who view the removal of geographic restrictions as likely reducing the exercise of market power (by unleashing more actual or potential customers into local markets) and improving allocative efficiency (by enabling resources to flow more easily toward activities that yielded higher returns and more efficient producers).

C. Branch Banking and Financial Stability

We now test whether the consolidation caused by statewide branching is responsible for the lower failures found in states allowing branch banking. We construct

[21] These categories are: deficit of 6% or more, deficit of 5.9% to 0 %, profit of less than 3%, profit of 3% to 5.9%, profit of 6% to 8.9%, profit of 9% to 11.9%, and profit of 12% and over.

an annual index of consolidation to measure the degree to which inefficient banks have exited a state's banking system and then observe how the index affects a regression of bank failures on branching.

Our consolidation index is a weighted sum of the fraction of banks in state *i* that experience voluntary liquidations, *L,* and mergers, *M,* minus the share of banks entering the system, *E*. The index takes the form:

$$(1) \quad C_{it} = \sum_{t-4}^{t-1} [w_{Lt} L_{it} + w_{Mt} M_{it} - w_{Et} E_{it}] .$$

Failures are not included as we assume that they are not directly related to consolidation.[22] Because the index for year *t* is meant to capture consolidation that occurred in previous years, the index is comprised of entries and exits during the previous four years.[23] Different weights are assigned to the number of entries per year and to the number of exits per year. These weights reflect the view (and our preliminary findings in Section 4A) that branch banking may have initially induced more mergers and voluntary liquidations as shake out in the industry occurred early in the decade, and then discouraged entry as the decade preceded. Thus exits earlier in the decade receive more weight than current exits, and more recent entrants receive more weight than those that occurred four years prior. These results, however, are robust to a variety of weights.[24]

To test whether consolidation in a state's banking sector, induced by branch banking, improves the stability of banking systems, we analyze the relationship between

[22] For this reason, we also do not simply use the change in the number of banks.
[23] Similar results are obtained as long as three or more prior years are included in the index.

branch banking and failure rates with and without the inclusion of this index. We examine bank failures for 1926-1930, which are indexed by state and size category over this sample period. Our data thus permit us to control for bank size – a factor that has been associated with the probability of failures in previous studies (Calomiris and Mason 2000, Carlson 2001, White 1984).[25] Figure 4 shows the distribution of banks and failures by bank size category. We estimate the number of failures using count data analysis, adjusting for the number of banks in the state. We drop bank size/state categories that contain only 1 or 2 banks, as including these categories increase the noise of the estimates. Estimates using bank size/state categories with 1 or 2 banks are still significant at conventional levels, though to a lesser degree.

We include the branching regime, bank size dummies, year dummies, and measures for agricultural and business sector distress to control for differences in real shocks across states. In particular, to capture differences in business conditions across states, a measure of lagged business failures is computed. We include two variables to capture state-level differences in agricultural conditions as much of the banking distress in the 1920s was associated with predominantly agricultural states: (1) an index of lagged farm real estate farm prices and farm foreclosure (bankruptcies) rates. Following Wicker's (1996) finding that the bank panic of 1930 was a regional event caused by the failures of Caldwell and Company, we also include an indicator variable for whether the state had banks failures associated with the failure of Caldwell and Company in 1930.

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[24] The weights used are $w_{L,t-1} = w_{M,t-1} = 0.25$, $w_{L,t-2} = w_{M,t-2} = 0.5$, $w_{L,t-3} = w_{M,t-3} = 1$, $w_{L,t-4} = w_{M,t-4} = 1$, $w_{E,t-1} = 1$, $w_{E,t-2} = 4$, $w_{E,t-3} = 4$, $w_{E,t-4} = 1$.

[25] Larger banks may be more stable because of their greater ability to spread risks, coordinate emergency assistance with other banks, and reduced propensity to spread contagion when the banking sector is subjected to external shocks.

The econometric results support the hypothesis that branch banking improves financial stability by weeding out inefficient banks through increased competition and consolidation. When the index of bank consolidation is not included (Table 9), states permitting branch banking had lower failure rates (about 50 percent fewer failures per log bank). This negative relationship is similar to the results shown in previous studies using aggregate data on bank failures, and exists even when differences in the size of banks are included in the regression. However, when the index of bank consolidation is included as an additional covariate, then branch banking no longer has any predictive power regarding failure rates. This finding has two important implications. First, diversification cannot explain the improved stability of state banking systems; otherwise, the coefficient should still be statistically significant. Second, the fact that the consolidation index is *negatively* associated with failures (an increase in the index of one standard deviation reduces the number of failures per log bank by 22 percent) and is statistically significant suggests that consolidation in the banking industry (which occurred to a greater extent in states permitting branch banking) stabilized state banking systems in the 1920s and 1930s. This relationship persists and is robust to the inclusion of differences in real factors, including agricultural distress, which has previously been identified as the main determinant of bank failures in the 1920s.[26] Moreover, our results confirm what some economic historians have suggested, but not shown. As White (1985) contends, "The number of small banks in rural areas needed to be reduced, and the mergers assisted the weaker institutions with less pain than the massive failures that followed. Unfortunately, this development was stifled by regulations in most states that forbade branch banking."

[26] Alston, Grove, and Wheelock (1994) identified agricultural distress as the most important factor in explaining differences in bank failures across states during the 1920s.

D. Testing the Role of Mergers

Another possibility is that branching decreases failures by facilitating an alternative to failure, namely merging with another bank. Branching facilitates mergers by expanding the pool of possible merger partners from banks within a city to all state-chartered banks within the state. We test this hypothesis by constructing an index of the ease with which banks might merge. This index is the number of mergers divided by the total number of bank exits (mergers, failures, and voluntary liquidations). When the lagged ease-of-merger index is included in the bank failure regression without the consolidation index (Table 10), it is not significant and the statewide branch-banking indicator remains significant. When both the ease-of-merger index and the consolidation index are included, the consolidation index is statistically significant and negative in sign while the ease-of- merger index is still not significant. Moreover, the branch-banking indicator becomes insignificant as it did in our previous regressions when the consolidation index was included. This suggests that, although the increased pool of prospective merger partners may have played a role in reducing bank failures, the consolidation of the banking sector produced by branching was more important.

Section 5. Conclusion

This paper revises our understanding of how branching affects financial stability. We argue that states that permitted statewide branching experienced lower failure rates

during the 1920s and the Depression, not because branch banks were more diversified, but because branching laws transformed the competitive environment. Branching laws increased the level of competition by breaking up local geographic monopolies and encouraging consolidation by forcing inefficient banks to merge or exit the system. Using data on national banks from the 1920s, we find that branch-banking states had more voluntary liquidations and mergers, which in turn led to lower failure rates during this period. Branch banking was therefore positively associated with improved systemic stability, but not for the reasons that have been traditionally emphasized.

The well-documented response of unit bankers in the 1920s to the growth of branch banking was to lobby state and federal governments to legally limit it from spreading. This behavior appears consistent with the evidence presented here and with the economic theory of regulation. Branching was increasing competition in states where it was permitted and eroding the monopoly profits of unit bankers that had previously benefited from an entry barrier that had been removed.

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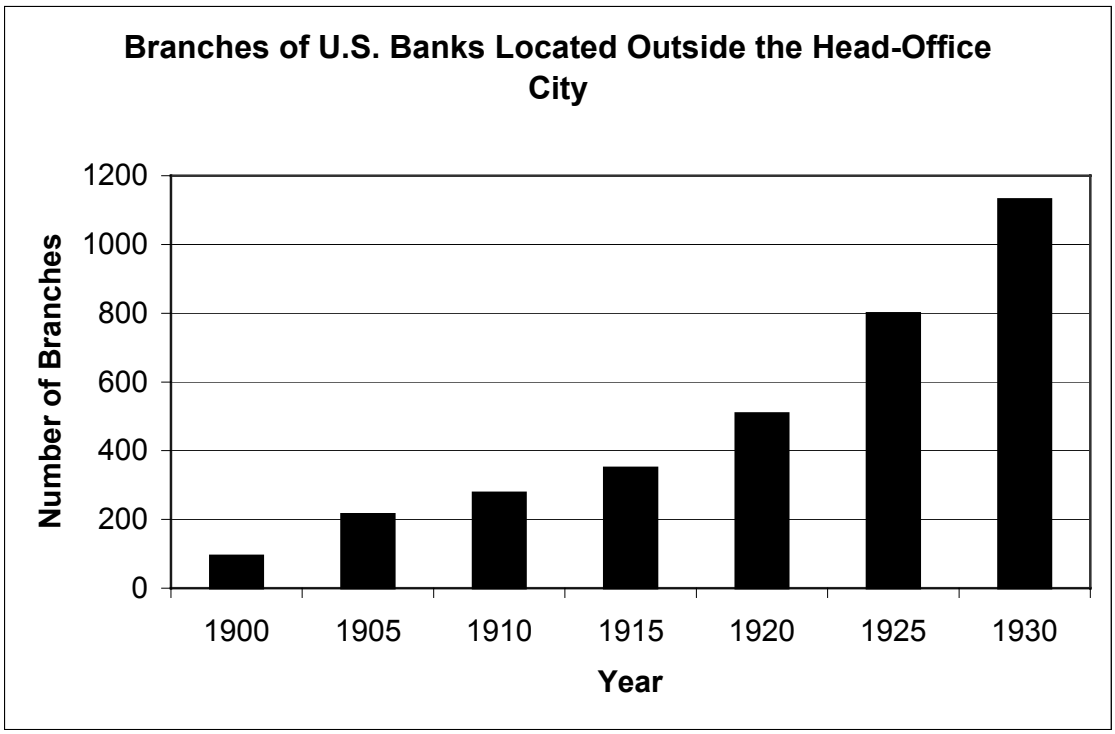
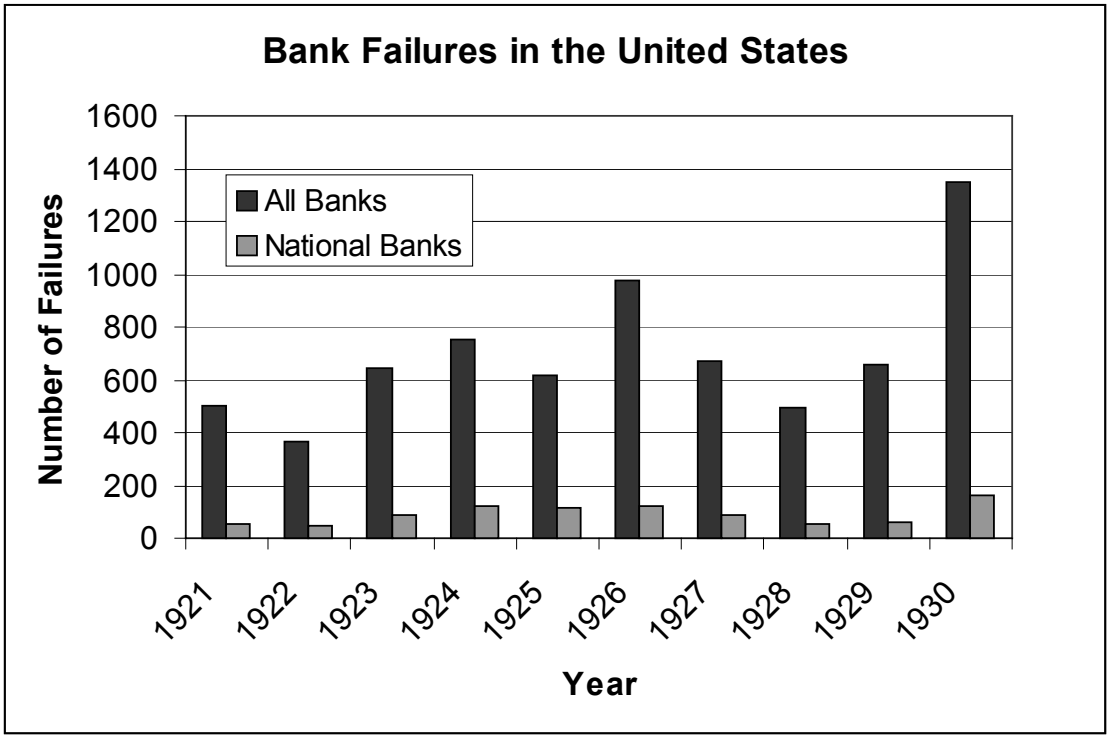
Figure 1



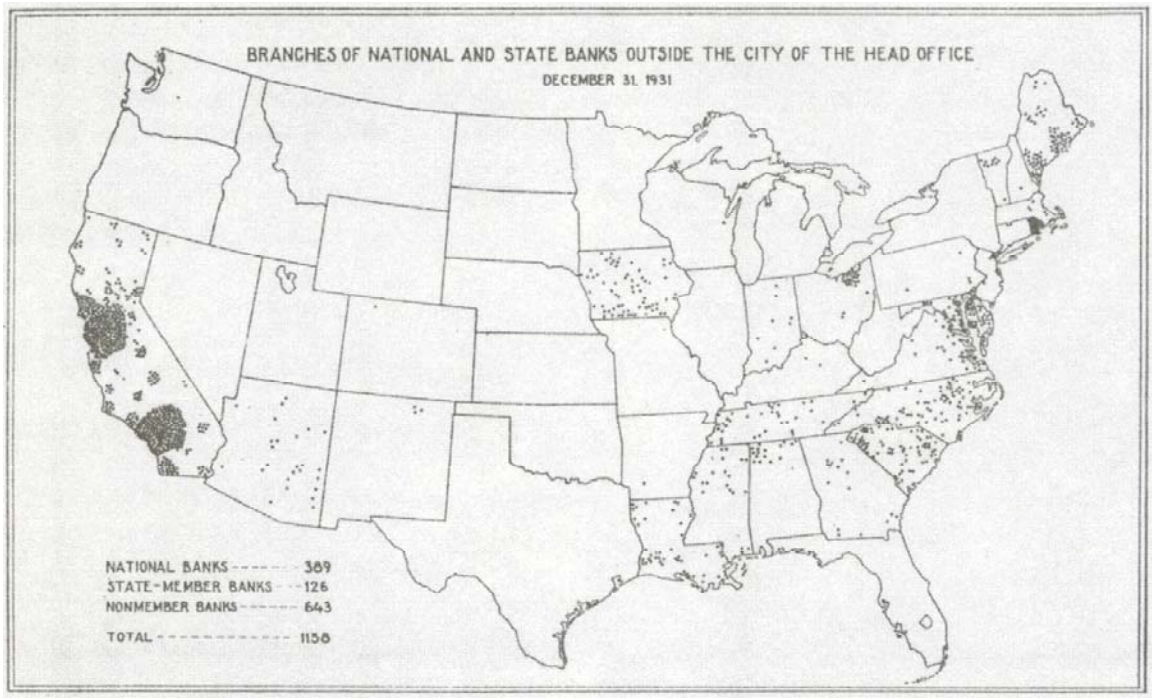
Source: Federal Reserve Board (1931), vol. 2

Figure 2



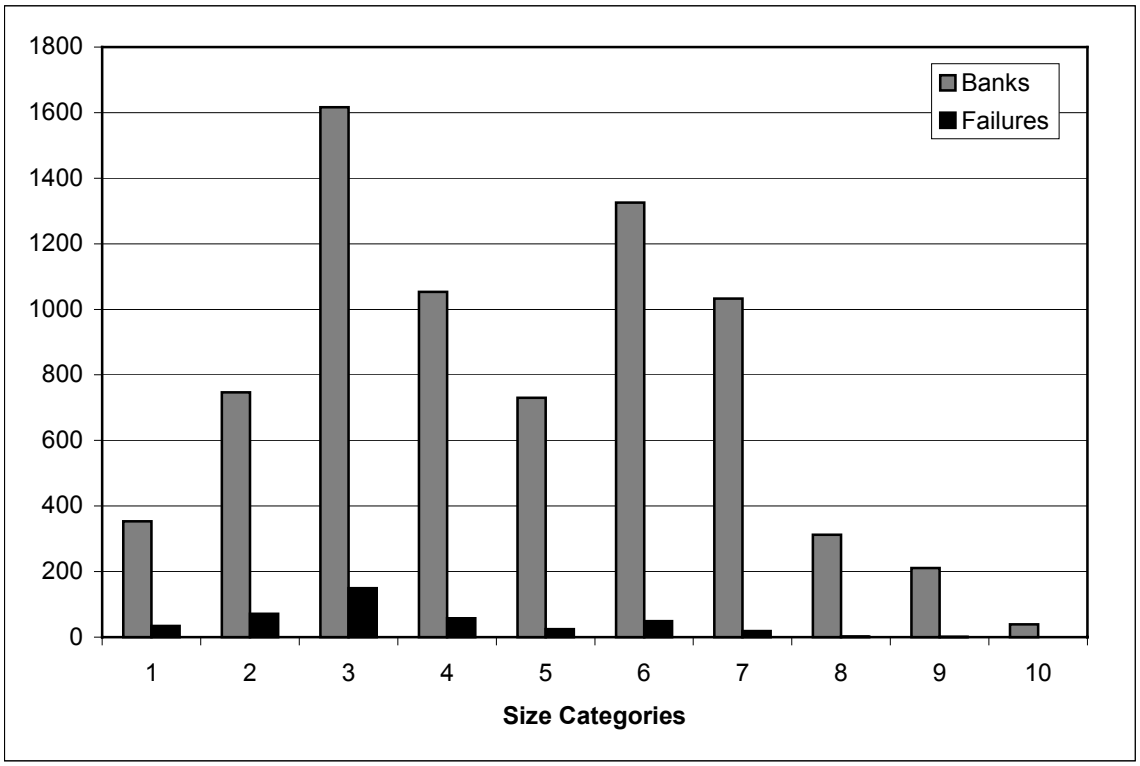
Source: Federal Reserve Board (1943)

Figure 3 – Branches of National and State Banks outside the City of the Head Office (December 31, 1931)



Source: Federal Reserve Board (1931, Vol. 2, p.17)
Note: In California there are numerous branches in the metropolitan areas centering around San Francisco and Los Angeles, but technically outside their city limits. On the map the dots extend far beyond the territory in which the branches are actually located around these cities.

Figure 4 – Annual Average Number of National Banks and Bank Failures by Size Category



Sources and Notes: Comptroller of the Currency (various years) and Federal Reserve Board (1931). Annual averages are constructed over the period 1926-1930. Size categories are: category 1 - under $150,000; category 2 - $150,000-$250,000; category 3 - $250,000-$500,000; category 4 - $500,000-$750,000; category 5 - $750,000-$1,000,000; category 6 - $1,000,000-$2,000,000; category 7 - $2,000,000-$5,000,000; category 8 - ($5,000,000-$10,000,000; category 9 - $10,000,000-$50,000,000; category 10 - $50,000,000 and over.

Table 1 – The Distribution of Bank Branches by Town Population (1931)

	Branches Outside Home Office City		Branches Inside Home Office City		All Branches	
Town Population	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
Under 500	189	16.32	2	0.09	191	5.73
500-1,000	173	14.94	0	0.00	173	5.19
1,000-2,500	207	17.88	7	0.32	214	6.42
2,500-5,000	134	11.57	7	0.32	141	4.23
5,000-10,000	107	9.24	9	0.41	116	3.48
10,000-25,000	91	7.86	27	1.24	118	3.54
25,000-50,000	46	3.97	63	2.90	109	3.27
50,000-100,000	60	5.18	132	6.07	192	5.76
100,000+	151	13.04	1929	88.65	2080	62.39
Total	1158	100	2176	100	3334	100

Source: Federal Reserve Board (1931), vol. 2.

Table 2 – Summary Statistics for National Banks

		1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	Average
No Law	Number of states	11	11	11	9	9	9	9	7	6	5	8.7
	Average number of banks	175.9	188.4	181.7	159.3	153.3	143.0	138.4	142.6	154.3	121.6	159.6
	Average voluntary liquidation rate	0.8	0.9	1.7	2.6	2.1	1.8	2.2	1.5	5.2	4.5	2.1
	Average merger rate	0.7	1.2	1.9	2.2	2.0	1.8	2.4	1.8	5.1	3.5	2.0
	Average entry rate	1.3	2.8	2.2	1.4	1.7	1.2	1.1	0.7	2.0	3.1	1.7
Unit	Number of states	19	19	19	19	19	19	20	23	23	23	20.3
	Average number of banks	167.0	168.5	168.3	168.8	171.4	161.3	151.7	143.5	139.2	141.9	157.2
	Average voluntary liquidation rate	0.8	1.7	1.8	1.4	2.6	1.9	2.0	2.5	3.1	4.8	2.3
	Average merger rate	0.4	1.2	2.0	1.6	2.3	2.5	2.2	2.3	3.1	4.1	2.2
	Average entry rate	2.0	2.1	1.5	1.6	2.6	3.1	1.2	1.5	2.4	1.9	1.9
Limited Branching	Number of states	7	7	7	9	9	9	9	9	10	11	8.7
	Average number of banks	281.9	282.3	284.6	268.4	272.2	267.8	269.2	269.3	243.2	225.5	264.2
	Average voluntary liquidation rate	2.3	1.1	0.9	1.9	0.5	1.3	1.2	1.8	1.9	2.2	1.6
	Average merger rate	1.2	1.0	0.7	1.7	0.6	1.2	1.3	1.9	1.9	2.0	1.4
	Average entry rate	2.3	1.2	2.6	3.7	2.4	2.7	1.4	2.2	2.0	1.3	2.2
Statewide Branching	Number of states	11	11	11	11	11	11	10	9	9	9	10.3
	Average number of banks	97.5	96.2	95.0	92.4	91.6	85.1	86.0	84.1	80.1	74.4	88.8
	Average voluntary liquidation rate	1.0	2.2	1.9	3.1	2.5	5.1	2.7	3.8	6.3	8.2	3.6
	Average merger rate	0.6	1.6	2.2	3.4	1.6	4.1	2.9	4.4	7.2	6.0	3.3
	Average entry rate	1.7	3.6	1.6	1.4	2.6	1.1	0.9	0.7	2.0	0.2	1.6

Sources and Notes: Rates are computed using data from the *Annual Report of the Comptroller of the Currency* (1921-1930). Rates are expressed as percentages of existing banks. Within category rates are unweighted averages of state rates. The last column shows the average of the yearly observations over the entire sample period, 1921-1930.

Table 3 – Effect of Branching on Voluntary Liquidations.

Dependent variable: The count of voluntary liquidations in a state per year divided by the log of the number of banks in the state.

	Full Sample (1921-1930)	Early 1920s (1921-1926)	Late 1920s (1925-1930)
Intercept	-1.84 ***	-1.89 ***	-1.44 ***
	(0.27)	*(0.30)*	*(0.24)*
Population	0.24 ***	0.25 ***	0.25 ***
	(0.03)	*(0.04)*	*(0.03)*
No Law	0.69 ***	0.66 ***	0.81 ***
	(0.16)	*(0.23)*	*(0.20)*
Statewide Branching	0.33 **	0.46 **	0.25
	(0.15)	*(0.22)*	*(0.18)*
Limited Branching	-0.94 ***	-0.83 ***	-1.08 ***
	(0.21)	*(0.32)*	*(0.25)*
1922	0.16	0.16	
	(0.33)	*(0.33)*	
1923	0.30	0.30	
	(0.32)	*(0.32)*	
1924	0.62 **	0.61 **	
	(0.31)	*(0.31)*	
1925	0.41	0.39	
	(0.32)	*(0.32)*	
1926	0.63 **	0.61 **	0.23
	(0.31)	*(0.31)*	*(0.28)*
1927	0.67 **		0.27
	(0.30)		*(0.27)*
1928	0.65 **		0.26
	(0.31)		*(0.28)*
1929	1.01 ***		0.62 **
	(0.29)		*(0.26)*
1930	1.22 ***		0.83 ***
	(0.28)		*(0.25)*
Observations	480	288	288
Log-Likelihood	-374.8	-218.2	-231.4
Mean dependent variable: 0.62			
Mean voluntary liquidations: 3.2			
Mean log(banks in operation): 4.6			

Note. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are in parentheses. Data on voluntary liquidations are from the *Annual Report of the Comptroller of the Currency* (1921-1930). Data on branching laws are from the Federal Reserve Board (1931), and population is from the 1930 Census. The omitted branching group is states that prohibited branching. The first year in each sample period is the omitted year from the regression. Observations in the ratio regression are weighted by state population.

Table 4 – Effects of Branching on Mergers

Dependent variable: The count of mergers in a state per year divided by the log of the number of banks in the state.

	Full Sample (1921-1930)	Early 1920s (1921-1926)	Late 1920s (1925-1930)
	Count	Count	Count
Intercept	-2.36 ***	-2.40 ***	-1.52 ***
	(*0.34)*	(*0.36)*	(*0.25)*
Population	0.25 ***	0.26 ***	0.25 ***
	(*0.03)*	(*0.04)*	(*0.03)*
No Law	0.72 ***	0.71 ***	0.78 ***
	(*0.17)*	(*0.23)*	(*0.21)*
Statewide Branching	0.31 **	0.36	0.23
	(*0.16)*	(*0.23)*	(*0.19)*
Limited Branching	-0.98 ***	-0.96 ***	-1.05 ***
	(*0.22)*	(*0.34)*	(*0.25)*
1922	0.66 *	0.66 *	
	(*0.39)*	(*0.39)*	
1923	0.96 ***	0.96 ***	
	(*0.37)*	(*0.37)*	
1924	1.08 ***	1.08 ***	
	(*0.37)*	(*0.37)*	
1925	0.84 **	0.83 **	
	(*0.38)*	(*0.38)*	
1926	1.13 ***	1.12 ***	0.29
	(*0.37)*	(*0.37)*	(*0.28)*
1927	1.24 ***		0.41
	(*0.36)*		(*0.28)*
1928	1.15 ***		0.32
	(*0.37)*		(*0.28)*
1929	1.59 ***		0.76 ***
	(*0.35)*		(*0.26)*
1930	1.53 ***		0.70 ***
	(*0.35)*		(*0.26)*
Observations	480	288	288
Log-Likelihood	--367.6	-209.2	-232.1
Mean dependent variable: 0.59			
Mean number of mergers: 3.1			
Mean log(banks in operation): 4.6			

Note. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are in parentheses. Data on mergers are from the *Annual Report of the Comptroller of the Currency* (1921-1930). Data on branching laws are from the Federal Reserve Board (1931) and population is from the 1930 Census. The omitted branching group is states that prohibited branching. The first year in each sample period is the omitted year from the regression. Observations in the ratio regression are weighted by state population.

Table 5 – Effect of Branching on Entry

Dependent variable: The count of new banks in a state per year divided by the log of the number of banks in the state.

	Full Sample (1921-1930)	Early 1920s (1921-1926)	Late 1920s (1925-1930)
Intercept	-1.10 ***	-1.22 ***	-0.63 ***
	(0.23)	*(0.26)*	*(0.21)*
Population	0.26 ***	0.27 ***	0.26 ***
	(0.03)	*(0.04)*	*(0.03)*
No Law	0.27	0.37 *	-0.10
	(0.18)	*(0.22)*	*(0.29)*
Statewide Branching	-0.34 *	-0.18	-0.61 **
	(0.19)	*(0.24)*	*(0.27)*
Limited Branching	-0.46 **	-0.38	-0.63 **
	(0.20)	*(0.26)*	*(0.25)*
1922	0.31	0.32	
	(0.26)	*(0.28)*	
1923	0.07	0.07	
	(0.27)	*(0.29)*	
1924	-0.21	-0.22	
	(0.29)	*(0.31)*	
1925	0.33	0.33	
	(0.26)	*(0.28)*	
1926	-0.09	-0.09	-0.42
	(0.29)	*(0.30)*	*(0.26)*
1927	-0.34		-0.67 **
	(0.30)		*(0.28)*
1928	-0.47		-0.82 ***
	(0.31)		*(0.29)*
1929	-0.20		-0.56 **
	(0.29)		*(0.27)*
1930	-0.44		-0.82 ***
	(0.31)		*(0.29)*
Dispersion	0.23	0.36	0.18
	(0.07)	*0.10*	*(0.09)*
Observations	480	288	288
Log-Likelihood	-350.7	-210.5	-199.9
Mean dependent variable: 0.62			
Mean number of entries: 3.4			
Mean log(banks in operation): 4.6			

Note. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are in parentheses. Data on new banks are from the *Annual Report of the Comptroller of the Currency* (1921-1930). Data on branching laws are from the Federal Reserve Board (1931), and population is from the 1930 Census. The omitted branching group is states that prohibited branching. The first year in each sample period is the omitted year from the regression. Observations in the ratio regression are weighted by state population.

Table 6 – Branching and the Dispersion of Banks

	Banks Per Capita (Sample Period: 1921-1930)		Percent Change in the Number of Banks (Sample Period: 1922-1930)	
	Coefficient Estimate	S.E.	Coefficient Estimate	S.E.
Intercept	0.93 ***	*(0.06)*	0.02	*(0.01)*
No Law	0.73 ***	*(0.05)*	-0.01	*(0.01)*
Statewide Branching	-0.30 ***	*(0.04)*	-0.02 *	*(0.01)*
Limited Branching	-0.21 ***	*(0.04)*	0.02 **	*(0.01)*
1922	0.00	*(0.07)*		
1923	-0.04	*(0.07)*	-0.03 **	*(0.01)*
1924	-0.09	*(0.07)*	-0.04 ***	*(0.01)*
1925	-0.12 *	*(0.07)*	-0.03 *	*(0.01)*
1926	-0.17 **	*(0.07)*	-0.06	*(0.01)*
1927	-0.20 ***	*(0.07)*	-0.03 **	*(0.01)*
1928	-0.23 ***	*(0.07)*	-0.03 **	*(0.01)*
1929	-0.26 ***	*(0.07)*	-0.05 ***	*(0.01)*
1930	-0.29 ***	*(0.07)*	-0.05 ***	*(0.01)*
Observations	476		431	
Adjusted R-square	0.35		0.05	

Note. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively. Estimated using ordinary least squares. Information on the number of bank and on branching laws is from the Federal Reserve Board (1931), and population is from the 1930 Census. The omitted branching group is branches prohibited. The first year in each time period is the omitted year.

Table 7 – Branching and Industry Concentration

Dependent variable: concentration indexes

Variable	Herfindahl Index (Sample: 1926-1930) Coefficient Estimate	S.E.	Four-firm Concentration Index (Sample: 1921-1930) Coefficient Estimate	S.E.
Intercept	1543.60 ***	*(33.0)*	0.39 ***	*(0.02)*
Population	-121.53 ***	*(5.8)*	-0.02 ***	*(0.00)*
No Law	120.44 ***	*(33.9)*	-0.13 ***	*(0.02)*
Statewide Branching	217.64 ***	*(35.5)*	0.05 ***	*(0.02)*
Limited Branching	-550.45 ***	*(39.1)*	0.01	*(0.02)*
1922			0.04	*(0.03)*
1923			-0.01	*(0.03)*
1924			0.00	*(0.03)*
1925			0.02	*(0.03)*
1926	-45.19	*(39.4)*	0.03	*(0.03)*
1927	30.29	*(39.4)*	0.05 *	*(0.03)*
1928			0.06 *	*(0.03)*
1929	50.3919	*(39.3)*	0.05 *	*(0.03)*
1930	98.6049 **	*(39.3)*	0.09 ***	*(0.03)*
Observations	2399		479	
Adjusted R-square	0.23		0.17	

Note. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively. Estimated using ordinary least squares. Information on the number of bank, size distribution and on branching laws is from the Federal Reserve Board (1931). Four-firm concentration index derived from Polk's Bank Directory (various years) and the Comptroller of the Currency (various years). Population is from the 1930 Census. The omitted branching group is branches prohibited. The first year in each time period is the omitted year.

Table 8 – Branching and Profitability, 1926 - 1930

Dependent variable: Profit level of banks in different size categories in a state and by year.

Variable	Coefficient Estimate	S.E.
Limited Branching	0.17***	*(0.02)*
Statewide Branching	-0.13***	*(0.04)*
No Law	-0.08***	*(0.03)*
Size Category 1	-1.34***	*(0.05)*
Size Category 2	-0.86***	*(0.04)*
Size Category 3	-0.47***	*(0.03)*
Size Category 4	-0.16***	*(0.03)*
Size Category 5	-0.14***	*(0.04)*
Size Category 7	0.21***	*(0.03)*
Size Category 8	0.28***	*(0.05)*
Size Category 9	0.35***	*(0.06)*
Size Category 10	0.65***	*(0.13)*
1926	-0.04	*(0.03)*
1927	-0.04	*(0.03)*
1929	-0.17***	*(0.03)*
1930	-0.96***	*(0.03)*
Intercept 7	-1.44***	*(0.03)*
Intercept 6	-0.47***	*(0.03)*
Intercept 5	0.57***	*(0.03)*
Intercept 4	1.47***	*(0.03)*
Intercept 3	2.20***	*(0.03)*
Intercept 2	3.25***	*(0.04)*
Observations (weighted)	37105	
Log-Likelihood	-67719	

Note. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively. Estimated using an ordered logit. All information is from the Federal Reserve Board (1931). The dependent variable is an ordered variable indicating the level of profitability weighted by the number of banks that reported earning that level of profits. Weighted observations is the number of observations multiplied by their respective weights. There are 8682 unweighted observations. The omitted branching group is branches prohibited. Size category 6 and the year 1928 are also omitted.

Table 9 – Effects of Branching on National Bank Failures, 1926 - 1930

Dependent Variable: Number of failing banks in each group divided by the log of the number of banks in a group (where a group is a set of banks in a similar size category in a state and by year)

	Without Consolidation Index		With Consolidation Index	
	Coefficient Estimate	S.E.	Coefficient Estimate	S.E.
Intercept	-3.17 ***	*(0.56)*	-3.26 ***	*(0.56)*
No Law	0.07	*(0.30)*	0.09	*(0.30)*
Statewide Branching	**-0.49 ***	***(0.30)***	**-0.41**	***(0.30)***
Limited Branching	-1.04 ***	*(0.34)*	-1.14 ***	*(0.35)*
Consolidation Index			**-1.16 ****	***(0.57)***
Herfindahl Index	-2.65	*(2.02)*	-2.94	*(2.06)*
Business Fail Rate	-0.17	*(0.31)*	-0.17	*(0.31)*
Farm Price Index	-16.53 ***	*(3.72)*	-16.05 ***	*(3.73)*
Size Category 1	0.39	*(0.39)*	0.41	*(0.39)*
Size Category 2	0.57	*(0.36)*	0.57	*(0.36)*
Size Category 3	0.86 ***	*(0.33)*	0.86 ***	*(0.33)*
Size Category 4	0.25	*(0.37)*	0.26	*(0.37)*
Size Category 5	-0.65	*(0.48)*	-0.66	*(0.48)*
Size Category 7	-0.63	*(0.46)*	-0.63	*(0.46)*
Size Category 8	-2.12 *	*(1.08)*	-2.11 *	*(1.08)*
Size Category 9	-1.58 *	*(0.85)*	-1.62 *	*(0.86)*
Size Category 10	-21.79	*(99.0)*	-21.80	*(99.0)*
1927	-0.17	*(0.40)*	-0.16	*(0.40)*
1928	0.30	*(0.40)*	0.28	*(0.40)*
1929	0.72 *	*(0.38)*	0.76 **	*(0.38)*
1930	1.57 ***	*(0.33)*	1.65 ***	*(0.33)*
Caldwell Indicator	0.71 *	*(0.40)*	0.73 *	*(0.40)*
Observations	1688		1688	
Log-Likelihood	-343.7		-341.8	
Mean dependent variable: 0.065				
Mean number of failures: 0.20				
Mean (log banks in operation): 2.5				

Note. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively. Estimated using count data analysis. Information on the number of bank, size distribution and on branching laws is from the Federal Reserve Board (1931). Other sources are: Population from the 1930 Census, business failure rate from the U.S. Department of Commerce, and farm prices and farm foreclosures are from the Department of Agriculture (1939) and (1936) respectively. The omitted branching group is branches prohibited. Size category 6 and the year 1926 are also omitted.

Table 10 – Effects of Branching on National Bank Failures, 1926 - 1930

Dependent Variable: Number of failing banks in each group divided by the log of the number of banks in a group (where a group is a set of banks in a similar size category in a state and by year)

	Without Consolidation Index		With Consolidation Index	
	Coefficient Estimate	S.E.	Coefficient Estimate	S.E.
Intercept	-3.00 ***	*(0.59)*	-3.11 ***	*(0.59)*
No Law	0.18	*(0.30)*	0.19	*(0.30)*
Statewide Branching	**-0.51 ***	***(0.31)***	**-0.43**	***(0.32)***
Limited Branching	-1.01 ***	*(0.36)*	-1.09 ***	*(0.36)*
Ease-of-Merger Index	**-0.65**	***(0.56)***	**-0.50**	***(0.57)***
Consolidation Index			**-1.00 ***	***(0.59)***
Herfindahl Index	-24.52	*(21.8)*	-28.17	*(22.3)*
Business Fail Rate	-0.17	*(0.32)*	-0.16	*(0.32)*
Farm Price Index	-15.75 ***	*(3.95)*	-15.19 ***	*(3.94)*
Size Category 1	0.37	*(0.40)*	0.39	*(0.40)*
Size Category 2	0.56	*(0.37)*	0.55	*(0.37)*
Size Category 3	0.90 ***	*(0.34)*	0.91 ***	*(0.34)*
Size Category 4	0.26	*(0.38)*	0.26	*(0.38)*
Size Category 5	-0.65	*(0.51)*	-0.66	*(0.51)*
Size Category 7	-0.57	*(0.48)*	-0.58	*(0.48)*
Size Category 8	-2.08 *	*(1.12)*	-2.07 *	*(1.12)*
Size Category 9	-1.69 *	*(0.93)*	-1.72 *	*(0.93)*
Size Category 10	-21.80	*(99.9)*	-21.83	*(99.9)*
1927	-0.10	*(0.40)*	-0.10	*(0.40)*
1928	0.30	*(0.42)*	0.26	*(0.42)*
1929	0.72 *	*(0.40)*	0.75 *	*(0.40)*
1930	1.66 ***	*(0.35)*	1.71 ***	*(0.35)*
Caldwell Indicator	0.66	*(0.41)*	0.66	*(0.41)*
Observations	2014		2014	
Log-Likelihood	-441.9		-443.7	
Mean dependent variable: 0.065				
Mean number of failures: 0.20				
Mean (log banks in operation): 2.5				

Note. The symbols (***), (**), and (*) indicate statistical significance at the 1, 5, and 10 percent level, respectively. Estimated using count data analysis. Information on the number of bank, size distribution and on branching laws is from the Federal Reserve Board (1931). Other sources are: Population from the 1930 Census, business failure rate from the U.S. Department of Commerce, and farm prices and farm foreclosures are from the Department of Agriculture (1939) and (1936) respectively. The omitted branching group is branches prohibited. Size category 6 and the year 1926 are also omitted.

Appendix Table 1. Data Sources

Two main sets of data are employed. The first consists of state-level aggregate data on national banks, covering the period 1921-1930. These data are used to compare the prevalence of entry and exits between states with different branching regimes. Information on number of banks, mergers, voluntary liquidations, and new banks are compiled using the *Annual Report of the Comptroller of the Currency* (1921-1930).

The second contains additional information on national banks in each state between 1926 and 1930. These data are drawn from the Federal Reserve Board of Governors' (1931) *Report on Branch, Chain and Group Banking, Volume 9: Bank Profits* and further categorize banks by size (based on the sum of loans and investments). This source also includes the information on bank profits by size category. Data from this Fed report are also used for the construction of the Herfindahl index of banking concentration. The four-firm bank concentration index is calculated using data on the four largest national banks in each state from Polk's Bank Directory (various years).

Bank failures for 1926-1930 are taken from the *Annual Report of the Comptroller of the Currency* (1932, table 43, pp.208-28) and the Comptroller of the Currency's *Statements of National Banks* (1925-1929), and are matched to the appropriate size category for the appropriate state using the information contained in Federal Reserve Board of Governors (1931).

State bank data are matched to branching laws and to indicators of state economic activity. Information on the branching laws for each state are from the Federal Reserve's *Report on Branch, Chain and Group Banking, Volume 2: Branch Banking in the United States*. This reports the developments in each state's branch banking laws from 1909 until 1931. Detailed information on state branching laws (including whether the *de jure* rather than the *de facto* situation was used) is shown in Appendix Table 2. Business failures and population estimates are from the U.S. Department of Commerce, *Statistical Abstract of the United States* (various years). The index of lagged farm real estate farm prices are from U.S. Department of Agriculture (1939) and farm foreclosure (bankruptcies) rates are computed using data from U.S. Department of Agriculture (1936).

Appendix Table 2. Branch Banking Laws

State	Type	Notes
Alabama	Unit	A few banks have branches
Arizona	Statewide	Branching had been practiced before law came into effect
Arkansas	Unit	State commissioner authorizes a few "exceptions"
California	Statewide	Branching had been practiced before law came into effect
Colorado	Unit	
Connecticut	Unit	
Delaware	Statewide	If charter allows
Florida	Unit	
Georgia	Multiple	Branching allowed until 1927, banned until 1929 when it is permitted in Savannah and Atlanta
Idaho	Unit	
Illinois	Unit	
Indiana	Unit	
Iowa	Unit	
Kansas	No Law	Law against enacted in 1929
Kentucky	Statewide*	In 1902 the banking authority stated that law did not authorize, but "was not construed as prohibitive." In 1909 the courts say the banks can't have branches but can have "offices to receive deposits and pay checks or transact other necessary duties not requiring special discretion or business acumen." Observers at the time noted little difference between these agencies and branches.
Louisiana	Limited	2 branches in the same parish
Maine	Limited	Only in the same county
Maryland	Statewide	Branching had been practiced before law came into effect
Massachusetts	Limited	Trusts can have branches in the same city, but prior to 1928 were limited to one branch
Michigan	Limited*	No law - but a lot of branches in the city of the head office
Minnesota	Unit	
Mississippi	Limited	
Missouri	Unit	
Montana	Unit	No law prior to 1927
Nebraska	Unit	

Table 2, continued

Nevada	Unit	
New Hampshire	No Law	Commissioner was not aware of any law prohibiting branching
New Jersey	Limited	
New Mexico	Unit	Allows "mercantile corporation which maintains a banking department to continue operations at its branches." A clause in the law specifically for a particular corporation.
New York	Limited	Branching within cities of 50,000
North Carolina	Statewide	Branching had been practiced before law came into effect
North Dakota	No Law	Though the law was construed as not permitting them
Ohio	Limited	In contiguous communities
Oklahoma	No Law	
Oregon	Unit	
Pennsylvania	Limited	Branches are only permitted in places where national banks have branches already – prior to 1927 had been in city of home office
Rhode Island	Statewide	
South Carolina	Statewide*	No law per se, but instead what the capital requirements would be should the bank have branches
South Dakota	No Law	
Tennessee	Limited	Law somewhat unclear - branches permitted, but limited to the county of the banks' home office.
Texas	Unit	
Utah	Unit	
Vermont	Multiple	Law changed in 1929. Prior to the change, branches were "not authorized." The change allowed banks to establish "agencies" which were branches in all but name
Virginia	Statewide*	In 1922 authorized for anywhere, in 1928 restricted to cities of 50,000. Considered statewide because of the number of branches in place prior to the restriction.
Washington	Unit	
West Virginia	Unit*	Technically allowed by law from 1925-1929 however the commissioner of banking did not permit them
Wisconsin	Unit	
Wyoming	Multiple	Law of 1921 says banks' articles of incorporation (AoI) state the "place or places where its offices be located" while the 1926 law has the AoI state the "place where its office..."

Note: All types are as indicated by law (*de jure)* except were indicated by a * in which case the *de facto* type is used. Please consult the table for the reason the *de jure* is not used.
Source. Federal Reserve Board of Governors (1931), *Report of the Branch, Chain, and Group Banking Committee*, Volume 9.