Competition and the Use of Discretion in Financial Reporting: Evidence from Community Banks[☆]

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Abstract

This paper studies managers' use of discretion in accounting as a tool to deter entry. Using state-level changes in branching regulation under the Interstate Banking and Branching Efficiency Act (IBBEA), I find geographically-constrained community banks increased their loss provisions and appeared less profitable when faced with the threat of entry by competitors. Consistent with an entry-deterrence objective, the effect is stronger for banks in concentrated markets. Additional tests help rule out alternative explanations that the observed increase in provisions was driven by local market conditions or by regulators, given their mandate to ensure safety and soundness of the financial system. I complement my analyses with survey-based evidence. Findings from the survey confirm the premise that banks prefer to locate in markets where incumbents have high profitability and low credit losses, and that banks use competitors' financial statements in analyzing their competition.

Keywords: Financial Reporting, Product Market Competition, Entry Deterrence, Community Banking, Regulator Incentives, Loss Provisioning

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1. Introduction

Product market competition is widely seen as a positive force, resulting in efficient allocation of resources, cost reduction, and increased innovation. As early as 1776, Adam Smith in *The Wealth of Nations* stated, "Monopoly ... is a great enemy to good management." The belief that competition has benefits has influenced many deregulation initiatives around the world. However, policies designed to promote competition may be rendered ineffective if firms devise strategies to deter entry into their markets. This paper studies the use of discretion in accounting as a tool to deter entry. I seek to answer the following question: Do firms hide profits as an entry-deterrence strategy?

A large and mainly theoretical literature in economics deals with entry-deterrence strategies employed by incumbents (Spence, 1977; Dixit, 1979, 1980; Milgrom and Roberts, 1982). However, as Smiley (1988) suggests, economists have neglected certain commonly used tactics, such as hiding profits. In a survey of marketing executives, Smiley finds 31% of all survey respondents cited hiding profits as a frequently used entry-deterrence strategy, compared to 7% who cited capacity expansion and 6% to 7% who cited limit pricing, two strategies that have been extensively studied in the economics literature. Although the accounting literature has studied firm incentives to hide profits during import relief investigations (Jones, 1991) and labor union contract negotiations (Liberty and Zimmerman, 1986), less is known about firms' incentives to reduce profitability as a strategy to deter entry.[1]

The limited amount of empirical work in the entry deterrence literature is driven by the difficulty in identifying the threat of competition separately from an actual increase in competition (Goolsbee and Syverson, 2008). I achieve variation in the threat of competition prior to entry, separately from an increase in competition following entry, by exploiting the setting of interstate branch banking deregulation under the Interstate Banking and Branching Efficiency Act (IBBEA) of 1994. This Act reduced barriers to entry for banks seeking to establish branches across state lines. I focus on the period prior to adoption of state-level restrictions to interstate branching, when regulation was

[1] Work on segment reporting finds segment disclosure is less likely in industries with low barriers to entry (Leuz, 2004) or high abnormal profits (Harris, 1998). The voluntary disclosure literature generally finds that under the threat of competition, firms increase voluntary disclosure and the tone of disclosure becomes more negative (Darrough and Stoughton, 1990; Burks et al., 2017).

announced but not effective. Typically, regulation was passed by the state legislature or announced in the press one to two years before it took effect. This identification strategy helps differentiate between the threat of competition and an actual increase in competition. It reduces concerns that actions taken in response to an actual increase in competition could be driving the results.

The IBBEA allowed banks to engage in interstate branching, subject to certain state-level restrictions. Although federal law authorized banks to branch into any state, states could impose anti-competitive restrictions to prevent entry by outside banks. The magnitude and timing of such restrictions adopted, and subsequently abandoned, varied by state. State-level variation in the relaxation of restrictions provides for temporal and spatial variation in the threat of competition, reducing concerns that factors specific to a period or region could be driving the results. To identify banks most likely to be affected by the change in regulation, I restrict the sample to community banks that tend to be small, compete on fewer dimensions, and have limited geographic reach.[2] These banks are most likely to face an increase in competition from the entry of larger players into their local markets.

Community banks are mainly engaged in traditional banking activities, such as lending and taking deposits, borne out by the fact that over 80% of their revenue consists of net interest income. Due to the focus on traditional banking, loan loss provisions are a large accrual for a community bank, one over which management has considerable discretion. Loan loss provisions indicate a bank's expectation of future loan losses and include management's private information. Because banks are required to provision for loan losses based on loss-causing events,[3] this accrual becomes a leading indicator of local market credit quality and a barometer of future prospects for banks in that market. For instance, consider a situation in which a bank is the primary lender

[2]Community banks mainly compete for consumer and small business loans and deposits, as opposed to large banks that, would also compete for investment banking services, trading, brokerage and transaction services, as well as large corporate lending.

[3]Under the Incurred Loss Model, the loss-causing events may not yet have resulted in non-accruing loans. However, the borrower should have experienced the loss-causing event and thereby "incurred" the loss. Provisioning is subject to the condition that losses can be reasonably estimated. The current standard (FAS 5) therefore limits the information used to before the date of issuance of financial statements. This information could be public (e.g., unemployment rates in the local market) or private, known only to the manager. New rules for loan loss provisioning (see FASB Exposure Draft: Proposed Accounting Standards Update ASC 825-15, Financial Instruments – Credit Losses) will require an estimation of expected losses over the life of the loan; that is, managers will be required to use information beyond the date of the financial statements. The new proposed standard will likely increase the amount of discretion managers have in setting loan loss provisions.

for households in a county where a majority of the population works at a factory. If the factory shuts down, the bank is required to make provisions for expected losses, because the loss has been incurred, even though none of its customers may yet have defaulted on their payments. A recent study by Khan and Ozel (2016) supports this argument. Their paper finds that loan loss provisions contain information that is incremental to leading indicators of local market economic activity. Because loan loss provisions contain information about future market conditions, incumbent banks could increase provisions and appear less profitable in order to deter entry.[4]

To study the effect of an increase in the threat of competition on banks' loss-provisioning, I conduct two main analyses within a difference-in-differences framework. In the first, I use a sample of community banks from states that reduced restrictions to interstate branching. I find that banks increase their loan loss provisions and appear less profitable one to two years before the deregulation event, the period in which deregulation was announced but not effective. The year of deregulation varies across states, reducing concerns that year- or state-specific factors may be driving the result. In the second analysis, I focus on banks from Texas and, as a control group, use a matched sample of banks from states with a similar degree of openness to interstate branching. Focusing on Texas allows for better identification, because local market conditions are less likely to have caused the deregulation event. Texas initially opted out of the IBBEA. The state later eased restrictions to interstate branch banking in response to a court ruling that permitted out-of-state banks to circumvent its ban on interstate branching.[5] Similar to the first analysis, I find that banks in Texas increased loan loss provisions in the anticipation period, before the regulation changed but after it was announced. The results hold when I use a matched control sample, suggesting time-specific factors are not driving the results.

To further support the main hypothesis that managers' entry-deterrence motive drives the observed increase in provisions, I study the effect in concentrated markets. Firms in concentrated markets have larger excess rents to protect and hence a greater incentive to deter entry. I find the increase in loan loss provisions in the anticipation period is larger for banks in concentrated markets. This finding is consistent with managers' use of discretion to deter entry.

[4]Banks looking to get acquired could have different incentives. I abstract away from any acquisition-related incentives by removing the year of acquisition or failure and maintaining a constant sample for the period of study.

[5]See *Texas to Let State Banks Branch Interstate*, American Banker, May 15, 1998.

I also hypothesize that public banks, which face additional capital-market related incentives to appear more profitable, would increase provisions less than private banks. However, I find that publicly listed banks increase their provisions to a greater extent. A reason for this finding could be that public banks are larger and have greater excess rents to protect; therefore, the entry-deterrence objective is stronger than any capital market-related incentives. Furthermore, compared to the general population of listed firms and large banks, publicly-listed community banks are much smaller and thinly traded. Capital market-related pressures might not be as salient for them.[6]

I attempt to rule out alternative explanations for the observed increase in loan loss provisions in the anticipation period. There are two main alternative explanations. First, firm economics around the threat of entry could have resulted in increased loan loss provisions. This scenario could be driven by changes in local market conditions or by actions managers take in anticipation of entry that are unrelated to a discretionary increase in loan loss provisions. Such actions could include expanding loans to borrowers with lower credit quality. Second, regulators, anticipating that banks have an incentive to take on more risk but being unable to directly observe managers' actions, could require that banks increase provisions.

To rule out the explanation that the effect could be driven solely by firm economics, I rely on trends in the spatial correlation of loan loss provisions. Loan loss provisions of banks that are located closer together are more strongly correlated than banks that are located farther apart, because banks in a local market (county) face similar economic conditions that drive the profitability of their loan portfolio. Conversations with community bankers revealed the correlation could also be driven by banks' evaluating their performance against peers. Such benchmarking is motivated by the need to assess banks' own performance, as well as avoid regulatory attention. The bank with the lowest level of provisions in a local market generally attracts additional scrutiny by the regulator.

I find that loan loss provisions of banks in a local market are spatially correlated. In the anticipation period, within-county correlations do not increase in strength, however, there is an increase in the strength of between-county correlation. If changes in local conditions or firm economics related to local market conditions were driving the increase in provisions, then I would have expected

[6]The small sample size of public banks (3.6% of total sample) prevents me from conducting more granular tests.

to find stronger within-county correlation in the anticipation period. An increase in the strength of between-county correlation suggests strategic behavior by managers as they set provisions relative to a neighboring county.

The increase in between-county correlation could also be attributed to regulators who anticipate that banks may have an incentive to change lending strategies and take on more risk in the anticipatory period. Given this incentive, regulators may require that all banks in a deregulated state increase provisions. The findings from the spatial analysis suggest factors related to local market conditions could not have driven the observed increase in provisions.

The next set of tests relate to ruling out the second alternative explanation that the regulator could be driving the results. I conduct two tests to assess regulators' use of discretion. The first test uses the regulatory leniency index of Agarwal et al. (2014), who identify strict and lenient state regulators based on their rating of state-chartered banks, relative to federal regulators. Although I find that stricter regulators induce greater loss provisioning, I do not find significantly different results in anticipation of competition. In the second test, I use distance from the regulators' office as a measure of regulatory attention (Kedia and Rajgopal, 2011). I find that banks located closer to the regulators' offices increase provisions more in the face of an increased threat of competition and the increase is non-linear. This finding is consistent with regulators driving increased provisioning.

To further differentiate between the effect of the manager and regulator, I exploit variation between counties in Texas to identify banks that have a greater incentive to increase provisions to deter entry. Financial statements of competitors provide incremental information over economic indicators, such as population growth and household income, in aiding market-expansion decisions. Therefore banks in counties similar to neighboring counties, based on economic indicators, are more likely to increase their loss provisions to deter entry. I use this insight to identify banks that have a greater incentive to look less profitable. Using a measure of between-county variability based on household income, I find that banks in counties similar to their neighboring counties are more likely to increase provisions. This result provides further evidence in support of the hypothesis that managers increase provisions to deter entry. The result holds when controlling for distance to the regulators' offices, indicating regulators' actions are not driving the result.

Finally, I test whether the strategy was successful in deterring entry. I find a weak negative correlation at the county level between counties that witnessed an increase in provisions and an

ex-post increase in branch density. However, conclusively interpreting these results as evidence of success of the strategy is challenging because no valid counterfactual exists. I cannot observe what entry would have been had banks not increased their provisions.

I conduct several robustness checks. To test whether future losses are driving the results, I use the synthetic control methodology as described by Abadie and Gardeazabal (2003). I construct a synthetic state by optimizing over a set of states such that the pre-treatment characteristics of the synthetic state closely approximate those of the real state. I use banks in the state of Texas to conduct this analysis. I find that, relative to the synthetic control, non-performing assets in Texas increased after deregulation. However, this growth in non-performing assets does not explain the increase in loss provisions in the period in which the threat of competition intensifies. I also conduct a falsification test by randomly assigning a pseudo year of treatment to the states in the sample and estimating the main regression. I repeat the assignment 1,000 times and find no significant results.

The analyses in this study is based on the premise that entrants use incumbents' financial statements in making entry decisions. While this is a plausible assumption, it is possible that entrants rely on other sources of information to guide their decisions. Further, there is little systematic evidence on factors banks assess in making entry decisions, or actions they take in response to competition.[7] To address these concerns, I conducted a survey of community bankers. I administered the survey with the help the American Bankers' Association, whose staffers sent the survey to their networks of corporate-level executives at community banks. The networks included a group of 100 CFOs who were participants at a CFO conference, a group of 99 CEOs, a marketing network with 650 members, and a network of approximately 1,000 CFOs. The survey response rate varied between 2.9% and 7.0%, depending on the subsample. Details related to survey design and execution, as well as a discussion of response rates, are presented in Appendix A.

Survey results indicate a majority of respondents (94%) use financial-statement information to analyze current and expected competition. The survey approach is beneficial because I can directly ask bankers not only which factors they consider important while making entry decisions

[7] An exception is Dedman and Lennox (2009) who survey private companies in UK and find that firms are more liklely to withhold information when perceived competition is high.

but also which ones they think their competitors consider crucial. For instance, I asked community bankers the following question: "What factors do you think competitor banks assess before entering into your local market?" Seventy-five percent of all survey respondents cited incumbent banks' profitability and the credit quality of their loan portfolio to be "very relevant" or "relevant" factors. These factors were rated higher than others, such as existing branch density, proximity, and availability of talent, but lower than economic indicators, such as population and economic growth. I then asked bankers how they would rate a market for attractiveness of entry based on incumbents' profitability and credit quality. An overwhelming number (greater than 85%) replied that they would prefer to enter markets where incumbents had high profitability and low credit losses. On being asked what percentage of the industry knowingly over- or under-reserved for loan losses, only five percent of respondents indicated that no banks in the industry misrepresented loan loss provisions. The survey data complement the main analyses, and support the hypothesis that banks increase provisions and appear less profitable to deter entry into their local markets.

Dou et al. (2017) use a similar setting in their study and explore the effect of competition on banks' loan loss provisioning. Their paper focuses on the period after the change in regulation and finds that loan loss provisions decline in the period following deregulation. By contrast, I focus on the anticipation period prior to the change allowing me to study firm response to an increase in the threat of competition, as opposed to an actual increase in competition. Also, Dou et al. restrict their sample to banks on state borders. The focus on banks on borders limits generalizability of the results, as banks on border counties were exposed to competition from outside banks regardless of the change in regulation.[8] In untabulated analysis, I find a negative correlation between loan loss provisions (adjusted for controls) following deregulation and growth in branches. This finding is consistent with accrual reversals following entry.

This paper contributes to two main streams of literature. First, it contributes to the literature on entry-deterrence by empirically exploring the use of profit-hiding as an entry-deterrence strategy. Limited empirical work in entry deterrence is largely driven by the difficulty in identifying a threat

[8]Banks on state borders were exposed to interstate branching, irrespective of changes in restrictions brought about by the Act. National banks could circumvent state-level bans on interstate branching by using the 30-mile rule. This rule allowed a bank to move its headquarters across state lines without giving up existing branches. A limitation was that the new office could not be located more than 30 miles from the limits of the city, town, or village where the old main office was located. Although the rule was enacted in 1866, banks started using it more widely in the 1990s.

of competition separately from an actual increase in competition (Goolsbee and Syverson, 2008). Second, it contributes to the accounting literature on loan loss provisioning by studying managers' use of discretion in loss provisioning under the threat of competition. Though the literature on bank loss provisioning is substantial (Beatty and Liao, 2014), limited work has investigated the effect of competition on loss provisioning. The magnitude of discretion is likely to increase with the adoption of the proposed Current Expected Credit Loss (CECL) model,[9] making exploration of the conditions under which discretion can influence provisioning behavior timely and relevant. Also, prior work has primarily considered managers' use of discretion in setting loan loss provisions and has largely overlooked the influence of regulators. By exploring the effect of regulators in bank loss provisioning, this study also contributes to the limited empirical work on regulatory discretion (Agarwal et al., 2014; Costello et al., 2016).

Although this study uses a sample of community banks, the arguments presented in the paper are not unique to banking, but are general and may apply to other industries. The focus on community banks improves the internal validity of the study. As opposed to a cross-industry study, it reduces concerns that variation in industry-level factors could be driving the results. Also, the setting allows for a clean distinction between the threat of competition and an actual increase in competition.

The paper is organized as follows. Section 2 presents the institutional background. Section 3 develops the empirical predictions. Section 4 presents the sample, research design, and discussion of results. Section 5 discusses and presents evidence to rule out alternative explanations. Section 6 presents additional analyses and robustness tests, and Section 7 concludes. Figures, tables, variable definitions, and survey results are provided in the appendices.

2. Institutional Background

The IBBEA was passed in September 1994 and dealt with both interstate banking (effective 1995) and interstate branching (effective June 1, 1997). However, by 1994, most states already allowed out-of-state bank holding companies to own in-state banks. Therefore, the landmark event

[9] See FASB Exposure Draft: Proposed Accounting Standards Update ASC 825-15, Financial Instruments – Credit Losses.

of the regulation permitted interstate branching, which was not allowed in most states prior to the passage of this act.[10]

Outside banks could branch into a state by acquiring a bank and converting it into a branch, acquiring branches of incumbent banks, or by establishing new branches (de novo entry). Even though federal law permitted interstate branching, states had considerable flexibility in preventing branching by outside banks. First, states could altogether opt out of the interstate branching provisions of the IBBEA before the date the Act became effective. Second, states could employ more restrictive stipulations with respect to certain provisions that fell within the purview of state law. The main provisions states could use to impose anticompetitive barriers were (1) the minimum age of the target institution, (2) de novo interstate branching, (3) the acquisition of individual branches, and (4) a statewide deposit cap. Rice and Strahan (2010) construct an index based on these four provisions. The index is set to zero for states that are most open to entry by out-of-state banks and increases by one when the state adds any of the four barriers to entry. Therefore, the index ranges from a minimum of zero (least restrictive) to four (most restrictive).

I use changes in this index as a measure of change in the threat of competition. Individual states varied in their timing for removing obstacles to interstate branching, providing temporal and geographic variation in the threat of competition.

3. Empirical Predictions

Deregulation of interstate branch banking led to an increased threat of entry by outside competitors into local banking markets. Congressional hearing records show many community bankers opposed deregulation.[11] Their arguments related to perceived unfairness in the competition. Community banks argued that larger banks had access to lower-cost funds, which was an unfair advantage. Further, although too-big-to-fail banks would be bailed out by the FDIC, uninsured depositors of community banks would lose their deposits in the event of a failure. Larger banks, with greater financial resources, could initially charge lower fees and hike fees once they had driven

[10] In 1994, only 62 out-of-state branches existed, whereas by 2005, the number had risen to 24,728, which was 37.28% of all domestic branches (Johnson and Rice, 2008).

[11] See "Interstate banking and branching - Hearing before the subcommittee on financial institutions supervision, regulation and deposit insurance of the committee on banking, finance and urban affairs." Sourced from https://babel.hathitrust.org .

out competition.

Community banks argued that banks whose headquarters were farther from local markets would be less likely to meet local demands for credit and would be less interested in making small loans, hurting small businesses. They were concerned that large banks could use the local market as a source of funding to obtain deposits that would then be used elsewhere, hurting local investment and growth.

However, not all community bankers opposed deregulation of interstate branching. Large and community banks tend to serve different customer bases and compete on different dimensions, and a community bank may not be threatened by the presence of larger banks. Therefore, whether community banks would have employed strategies to keep larger players out of their local markets is not clear. In the following quote, sourced from the 1993 congressional hearings records, a community banker from the state of New York argues:

> Due to the unique role of a community bank, I have not felt the negative impact of consolidation, and do not believe that further consolidations, which would increase the presence of larger banks in our area, will negatively affect our financed growth and success ...[I] am not concerned about their presence as much as I might be by another independently owned community bank operating across the street.[12]

As discussed in Section 1, because provisioning is in response to loss-causing events, loan loss provisions are a leading indicator of local market credit quality. In recent work, Khan and Ozel (2016) show loan loss provisions contain information that is incremental to leading indicators of local market economic activity. A reason for this is that, while economic indices generally accumulate publicly available information, banks collect non-public information from borrowers. Such information could include data on tax returns, uses of credit lines, and limit violations (Minnis and Sutherland, 2017; Norden and Weber, 2010) as well as soft information collected through lending relationships (Petersen and Rajan, 1994).

Prior literature (Amel and Liang, 1997) and survey-based evidence suggest entering banks prefer to locate in markets where incumbents have high profitability and low credit losses. Survey

[12]Paul Settelmeyer, President, Bank of Great Neck, New York. At the time, Bank of Great Neck had assets of $135 million and 28 full-time employees.

respondents were asked how they would rate markets for entry based on incumbents' profitability and credit quality.[13] Eighty-five percent of them rated markets where incumbents had high profitability as "Very Attractive" and "Attractive" for de novo entry based on a five-point scale. The corresponding number for entry based on mergers and acquisitions was 88%. Survey respondents were also asked how they would rate markets for entry based on incumbents' credit losses. A majority (98% for de novo entry and 94% for entry through M&A) indicated they would prefer to not to locate in markets where incumbent banks had high credit losses.

Analysis of competitors' financial statements is common practice in the banking industry. For instance, 94% of survey respondents indicated they used financial statements of competitors to analyze competition. These banks assessed information on competitors' profitability, loan growth and composition, capital ratios, funding costs, and credit losses.[14]

Entrant banks' preference to locate in markets with profitable incumbents and banks' use of competitors' financial statements suggests incumbents have an incentive to bias their earnings downward. The argument is as follows. An entrant prefers to locate in markets where incumbents are profitable and have low credit losses. Moreover, the potential entrant uses incumbents' financial statements to assess whether incumbents in the local market are profitable and whether the underlying borrowers are creditworthy. Knowing this, the incumbent biases its financial statements to make the local market appear less attractive and thereby discourages the entrant from locating there. In equilibrium, the strategy might have no effect on entry, because entrants would rationally expect manipulation and revise their estimates of future market profitability. However, given that entrants expect manipulation, rational incumbents may be trapped into increasing provisions to appear less profitable. For incumbents to employ such a strategy, it is sufficient that they think entrants employ financial-statement numbers in making entry decisions, regardless of whether they do so.

The above discussion suggests the following hypothesis.

H1: Incumbent banks will increase provisions to appear less profitable in the face of an increased threat of competition.

[13] Please see Appendix A, survey questions 11 and 12.
[14] Please see Appendix A, survey questions 13 and 14.

A critical aspect of bank competition is asymmetric information, both between the borrower and the lending (inside) bank, as well as between the inside bank and any competing (outside) banks. Given their monitoring role (Diamond, 1984; Rajan, 1992), inside banks are able to acquire superior quality information about borrowers' creditworthiness. Because of this informational advantage, inside banks can charge an information rent to captive borrowers (Von Thadden, 2004; Sharpe, 1990; Schenone, 2009).

Entrants in this setting are larger banks, and they have a cost advantage over incumbents. Large banks have access to wholesale sources of funding and may also be able to direct deposits from branches in different locations. Therefore, the entrant in this setting has a cost advantage, whereas the incumbent has an informational advantage. Dell'Ariccia and Marquez (2004) show the incumbent will lose market share as long as the cost advantage is sufficiently high and the informational advantage not as strong. However, anecdotal evidence suggests a cost advantage can translate to an informational advantage.[15]

Incumbent banks with large informational advantages, as is the case in concentrated markets, are likely to increase provisions more to protect their information rents. Further, in more dispersed markets, the financial statements of each incumbent bank conveys less information about the underlying market conditions, making it less worthwhile to bias earnings.

The above discussion suggests the following hypothesis.

H1a: Banks in concentrated markets will increase provisions more in the face of an increased threat of competition.

Managers of publicly listed banks face additional capital markets-related incentives to inflate their stock price. Such an action may be aimed at preventing takeover, using overvalued stock to execute a takeover, or gaining a lower cost of capital. Further, competition can increase the precision of, and create pressure on, managerial incentive contracts, which may lead to manipulation of outcome measures associated with such contracts. The presence of such incentives suggests the cost of manipulating to look less profitable would be higher for managers of publicly listed firms; therefore, such firms would decrease earnings less in the face of an increased threat of competition.

[15]For instance, consider Wells Fargo's foray into Koreatown, Los Angeles. Wells Fargo could make inroads into this market by hiring the CEO of its competitor and bankers who spoke Korean.

Prior work has explored incentives of private and public firms to manage earnings. However, the evidence has been mixed. Beatty et al. (2002) find public banks manipulate earnings more, whereas Burgstahler et al. (2006) find private firms manage earnings more, suggesting capital markets either induce increased earnings informativeness, or firms with less informative earnings are screened out in the IPO process.

Differing incentives of private and publicly-listed banks suggest the following hypothesis.

H1b: Publicly listed banks will increase provisions to a lesser extent, compared to private banks, in the face of an increased threat of competition.

4. Data and Empirical Analysis

4.1. Bank and Branch Data

This study uses branch-level data from the FDIC's Summary of Deposits database, and bank-level data from the Reports of Condition and Income (Call data) from the Federal Reserve Bank of Chicago. FDIC's Community Banking Reference data set is used to restrict the sample to community banks, and the SNL Financial database is used to identify banks that are publicly listed. Table 1 describes the sampling procedure for both branch and bank-level data.

Table 1a describes branch-level data. The years 1994 - 2005 have a total of 1,104,016 bank branches. To restrict variation in the cost of expansion, I exclude Alaska and Hawaii from the sample. A few observations have zero or negative asset values, which is most likely due to faulty data. I exclude these observations. The final sample consists of 1,008,339 branch years.

Table 1b describes the sample-selection criteria for bank-level data. I merge the FDIC's community banking reference data set with bank Call data. Banks that were acquired or that failed may have incentives that differ from banks that intend to stay in business. Therefore, I remove observations that fall in a year of acquisition or failure. I further remove observations with missing, zero, or negative loans and restrict the sample to banks in contiguous United States. I only include states that decreased restrictions to interstate branching. I further restrict the sample to states that have a significant community banking presence. The final sample consists of 130,939 bank-year observations from the years 1992 - 2008. Of these, 4,547 observations are publicly listed banks. Figure 1 presents the distribution of banks by state, and demonstrates that Texas and Illinois have

a large community banking presence. Table 2 presents descriptive statistics for private and public banks. On average, public banks make up 3.6% of the sample. Significant differences exist between the two groups. Public banks in the sample tend to be larger, less profitable, and have a lower tier-1 leverage ratio. The loan-portfolio composition of these groups also differs significantly. Public banks tend to have a higher share of real-estate and commercial and industrial loans in their loan portfolio, whereas private banks have a greater share of agricultural and consumer loans.

The list of public banks is sourced from the SNL Financial database. This database includes small public banks that are generally not available in CRSP. However, if a bank switches from public to private or vice versa, the database overwrites the historic ownership status of the company to reflect only its most recent status. I address this issue by comparing the most recent SNL list of public banks with published hard copies of the SNL Executive Compensation Review, which are available from the Library of Congress in Washington D.C.

4.2. Measuring Changes in Regulation

As discussed in Section 2, I rely on an index created by Rice and Strahan (2010) to measure changes in state-level restrictions to interstate bank branching. Table 3a presents the number and percent of states that changed restrictions to interstate branching in a given year. Sixty-two percent of all changes occurred in the years 1996 and 1997.

Table 3b presents the average number of branches and average deposits by state-year, by level of restrictiveness index. States that have greater barriers to interstate branching (index value of 4) also tend to have a lower number of branches and lower deposits, compared to those states that are open to interstate branching. Table 3c presents the change in the average number of branches and deposits by state-year, by year relative to the change in the restrictiveness index. States that ease restrictions to interstate branching tend to show growth in branches and deposits.

4.3. Research Design and Results

I conduct two main analyses to study the effect of a change in the threat of competition on the provisioning behavior of banks. In the first, I use a sample of banks from states that reduced restrictions to interstate branch banking. I track loan loss provisions around the period of deregulation, and study provisions for public banks and banks in concentrated markets. In the second, I

focus on banks from the state of Texas. Findings from the analyses indicate that incumbent banks increased loan loss provisions one to two years before the deregulation event, and that the increase was larger for banks in concentrated markets.

4.3.1. Multi-state Analysis

To study the loan loss provisions of banks around the deregulation event, I use a sample of banks from all states that reduced restrictions to interstate branching, and estimate the model,

$$Y_{ist} = \alpha + \sum_{\tau=-3}^{+3} \beta_k D_{s\tau t} + \omega X_{ist} + T_t + S_s + \epsilon_{ist} \ , \tag{1}$$

where Y is provisions for loan losses scaled by lagged total loans and leases, net of unearned income and allowance for losses (LLP).[16] i, s, and t are firm, state, and year indicators. k is a time-period indicator and goes from 1 to 6. $D_{s\tau}$ is an indicator variable that equals 1 for the τ^{th} year from deregulation and zero otherwise. The deregulation event is defined as the easing of restrictions to interstate branch banking. D_{s0} equals 1 for the year of the event and zero otherwise.

D_{s-3} is set equal to zero such that all coefficients are measured incremental to the third year before the event. The assumption is that $\tau - 3$ is a neutral period and is not influenced by the event being studied. Even though the effect is studied relative to one period, this period reflecting the idiosyncrasies of any one year is less of a concern because the year of the event, D_{s0}, varies by state, making D_{s-3} an average of several years. I expect the coefficients associated with the periods $\tau = -2$ and $\tau = -1$ to be positive and significant, suggesting banks increased their provisions in anticipation of increased competition.

X is a vector of controls and includes variables selected based on prior literature (Beatty and Liao, 2014) and interviews with community bankers. The control variables include the log of lagged assets ($SIZE$), the three-year rolling average of past charge-offs (CO), the lagged, current, and leading changes in non-performing assets ($\Delta NPA_{-1}, \Delta NPA, \Delta NPA_{+1}$), growth in loans ($\Delta LOAN$), the state-level change in per-capita GDP (ΔGDP), as well as measures of loan-portfolio diversity and change ($ShrRE$, $ShrCI$, $ShrCONS$, $\Delta ShrRE$, $\Delta ShrCI$, $\Delta ShrCONS$). Alternate specifications include return on assets (ROA), where income is measured before provisions, and tier-1

[16] In all specifications of the model, I multiply LLP by 10,000.

capital ratio ($TIER1$). The majority of community banks rely on fairly simple provisioning models, making Equation (1) a reasonable approximation for the provisioning behavior of banks in the sample. Appendix C presents definitions of variables. T and S represent year and state fixed effects, and ϵ denotes the error term. For each bank in the sample, the data are limited to seven years around the change in regulation. I require banks to have existed for all seven years to mitigate concerns that variation in sample size might be driving the results.

To test hypotheses related to the effect for public banks and for banks in concentrated markets, I modify Equation (1) as follows:

$$Y_{ist} = \alpha + \sum_{\tau=-3}^{+3} \beta_k D_{s\tau t} + \sum_{\tau=-3}^{+3} \beta_m D_{s\tau t} * PH + \theta PH + \omega X_{ist} + T_t + S_s + \epsilon_{ist} \ , \tag{2}$$

where PH can take the value of $PUBLIC$, $HERF$, or $HERF\_HIGH$. $PUBLIC$ is an indicator variable that takes a value of 1 if the firm is publicly listed and 0 otherwise. $HERF$, a continuous variable, is the Herfindahl index, measured at the county-year level and is a proxy for market concentration. $HERF\_HIGH$ is a discrete variable that takes on a value of 1 for the highest quintile of $HERF$ and 0 otherwise.

Tables 4 and 5 present the results of the multi-state analysis. Table 4 presents OLS estimates of Equation (1). Model 1 presents the main provisioning model, whereas Model 2 includes return on assets as an explanatory variable. In both cases, as predicted, the coefficients for D_{s-1} and D_{s-2} are positive and significant, with t-statistics ranging from 1.46 to 2.54. Consistent with prior literature (Kim and Kross, 1998; Kanagaretnam et al., 2010; Bushman and Williams, 2012; Beck and Narayanamoorthy, 2013), $SIZE$, ΔNPA_{-1}, ΔNPA, and ΔNPA_{+1} are positively associated with loan loss provisions. Prior literature tends to include current period charge-offs in models of loan loss provisioning. For instance, Kim and Kross (1998) and Beaver and Engel (1996) find current-period charge-offs to be significant in predicting loss provisions. Instead of current period charge-offs, I use a three-year rolling average. Interviews with community banks' CFOs reveal that given the volatile nature of this variable; most banks tend to use charge-offs averaged over 12 quarters in estimating provisions. I find this variable to strongly predict loss provisions. Bushman and Williams (2012) also include twice-lagged changes in non-performing assets in their model of loan loss provisions. I include this variable and do not find it to be significant. However, this

variable does load significantly when I exclude the three-year rolling average of charge-offs.

As expected, loan growth is positively associated, and change in state-level per-capita GDP is negatively associated with loan loss provisions. Consistent with prior literature (Wahlen, 1994; Kanagaretnam et al., 2010), measures of portfolio diversity have explanatory power in predicting LLP.

Table 5 presents the results for publicly listed firms, and firms in concentrated markets. Model 1 includes a public-firm indicator. Consistent with prior research, public firms tend to under-provision in the neutral period, D_{s-3} (Beatty et al., 2002). However, the level of provisioning increases in the face of an increased threat of competition. Although surprising, this result could be indicative of the fact that public community banks are small and tend to be illiquid as compared to the general population of public firms, or publicly listed large banks. Therefore, capital market-related incentives may not be very strong for these banks. Furthermore, as documented in Table 2b, public community banks tend to be larger than private community banks and may have larger rents to protect; therefore, the entry-deterrence objective could be stronger for these banks.

In Models 2 and 3 of Table 5, I interact the treatment period indicators with measures of market concentration. I construct two measures of market concentration: $HERF$ and $HERF\_HIGH$. $HERF$ is a continuous variable and represents the county-level Herfindahl index. $HERF\_HIGH$ is an indicator that takes on a value of 1 for the top quintile of $HERF$ and 0 otherwise. Positive and significant coefficients on $HERF$ in Model 2 implies that the effect is stronger in more concentrated markets and weaker in less concentrated markets. The fact that the coefficients on the period indicators become insignificant on including interactions of the period indicators with $HERF$ suggests the strong role of market concentration in explaining the observed increase in provisions. This result is consistent with the argument that banks in more concentrated markets, because they have higher rents to protect, are more likely to engage in entry-deterrence strategies. I find similar results in Model 3 on including $HERF\_HIGH$ as the measure of market concentration.

4.3.2. Single-State Analysis

Because banks and events are spread out spatially and temporally, the possibility of time- or region-specific factors driving the effect demonstrated in the multi-state analysis is less of a concern. However, the concern still exists, because 62% of changes to the restrictiveness index occurred in

only years (1996 and 1997).[17]

To address this concern, I focus on Texas, for which the restrictiveness index changed from a value of 4 in 1999 to 1 in the year 2000. Texas has a large community banking presence and was one of only two states that initially opted out of the provisions of the IBBEA.[18] Opting out was seen as a huge political victory for independent banks.[19] Texas later decided to allow interstate branching, effective September 1, 1999, in response to a court ruling that permitted out-of-state banks to circumvent Texas's ban on interstate branching using the 30-mile rule. The first press mention of this event was on May 15, 1998.[20] However, other events before this announcement suggested Texas would eventually allow interstate branching. Appendix D describes the series of events leading up to the announcement of the decision to permit interstate branching. In October 1997, the U.S. Court of Appeals for the Fifth Circuit ruled that banks may use the 30-mile rule to branch into Texas. In March 1998, the Supreme Court allowed an earlier decision by the federal appeals court in New Orleans permitting banks to branch into Texas. Prior to these events, the Texas Banking Department looked as though it was going to win the battle to keep national banks from branching into the state. For instance, in May 1996, the U.S. District Court overturned a decision by the Office of the Comptroller of the Currency that allowed an out-of-state bank to branch into Texas. Based on the series of events, anticipation effects should be strongest in 1997 to 1999, which I designate as the treatment period.

The econometric specification for this analysis is given by

$$Y_{it} = \alpha + \beta_1 D_{it} + \beta_2 POST_{it} + \omega X_{it} + \epsilon_{it} \ , \tag{3}$$

where D_t is an indicator variable that takes a value of 1 in the treatment period (1997 to 1999) and 0 otherwise. The treatment period is defined as the three years from the first court decision that permitted banks to branch into Texas to the year the regulation took effect. $POST_t$ is an indicator variable that takes a value of 1 for two years after the treatment period (2000 and 2001) and 0 otherwise. The control period is three years before the treatment period. The control period

[17] See Table 3a for a distribution of events by year.
[18] Montana was the other state that opted out of the provisions of the IBBEA.
[19] See "Governor's Signature Makes Texas Lone State To Opt Out of Branching," *American Banker*, 12 May 1995.
[20] See "Texas to Let State Banks Branch Interstate", *American Banker*, 15 May 1998.

is extended to three years to address concerns that idiosyncratic effects of any one year may be driving the results. The sample extends from 1994 to 2001. As before, I require the banks to have existed for all eight years.

To include a control sample, Equation (3) is modified as follows:

$$Y_{ist} = \alpha + \beta_1 D_t + \beta_2 TR_{is} + \beta_3 D_t * TR_{is} + \beta_4 POST_t + \beta_5 POST_t * TR_{is} + \omega X_{ist} + \epsilon_{ist} \ , \qquad (4)$$

where TR is an indicator variable that takes a value of 1 for the treated banks and 0 otherwise. Treated banks are headquartered in Texas. The control sample is selected from states that did not witness a change in restrictions during the period of the study. I also require that states in the control sample resemble the treated state in terms of their openness to interstate branching laws. Banks from the following seven states are selected into the control sample: Colorado, Iowa, Missouri, New Mexico, Nebraska, Kansas, and Arkansas. Several of these states are geographically close to Texas. These states also had a restrictiveness index of 4 for the entire period of study, which is the same as Texas in the pre-treatment period. As did Texas, these states debated whether to opt-out of the federal law.

The results of the single-state analyses are presented in Tables 6, 7, and 8.

Table 6 presents the analysis for all banks headquartered in Texas. As hypothesized, the coefficient on the treatment indicator D is positive and significant, with coefficient values ranging from 11.50 to 11.64.

Table 7 presents pre-treatment descriptive statistics for the treatment and control samples, both before and after matching. As can be seen from the t-statistics for the difference in means and normalized differences, the matching procedure allows for greater covariate balance between treated and control samples. I use a greedy algorithm to match on several bank-level characteristics to get a balanced sample in the pre-treatment period.[21] Variables used in the matching procedure include size ($SIZE$), return on assets (ROA), the three-year rolling average of scaled charge-offs (CO), tier-1 leverage ratio ($TIER1$), and lending-portfolio composition ($ShrRE$, $ShrAGRI$, $ShrCI$,

[21] A greedy algorithm makes the locally optimal choice at each stage, in the hope of finding a global optimum. The algorithm finds the first optimal match for each bank within a specified range of values for the variables. This procedure has the benefit of being computationally efficient. However, better matches may have been possible that were not selected.

ShrCONS). I used the absolute differences in the treated and control values of these variables in the matching procedure, and all variables were equally weighted. The treatment and control groups contain 318 banks after matching.

Table 8 presents results of the analysis using the matched sample of banks. The coefficient on the treatment indicator D remains positive and significant. Results from this analysis alleviate concerns that time-specific factors may be driving the results.

5. Alternative Explanations

5.1. Effect of firm economics and local market conditions

Geographic location is a critical characteristic of community banks, given the localized nature of their business operations. Therefore, financial reporting of banks that operate in the same geographic market is likely to be spatially correlated.[22] Ignoring these spatial correlations could lead to model mis-specification, and, consequently, biased parameter estimates.

I test spatial correlations of loan loss provisions to rule out the explanation that changes in local market conditions or firm actions unrelated to local economic conditions could have driven the observed effect. To elaborate, consider a simple example of a market with three banks, A, B, and C. Banks A and B are located closer together, whereas bank C is farther away. Local economic conditions around A and B are likely to be similar. Because local market conditions drive provisioning behavior, loan loss provisions of A and B are likely to have a stronger correlation than A and C. In the anticipation period, if changes in local market conditions were driving the observed increase in provisions or if banks were taking actions that were tied to local conditions, the correlation between nearby banks should become incrementally stronger. That is, the correlation between A and B should become stronger.

If, however, managers were setting provisions in a manner that was unrelated to local economic conditions, or if regulators were driving the increase in provisions, one would not observe a stronger correlation between A and B in the anticipation period. However, the correlation between A and C could have increased in the anticipation period if bank A was strategically setting provisions

[22] Even though the change in regulation affects all community banks in a state, the strength of correlation between provisions would depend on the relative location of the banks. Banks are not located equidistant from each other, but at varying distances.

relative to bank C. Further, regulators could have required that all banks increase provisions in the anticipation period. This requirement could also lead to an increase in the strength of correlation between A and C in the treatment period.

Including spatial effects in the model involves two main challenges: first, defining the local market or geographic area within and between which observations are likely to be correlated; and second, describing the nature of spatial dependence.

I define local markets as counties within a state. Counties, being local-level administrative units, are likely to have shared characteristics. County-level economic information is reported by the U.S. Census Bureau, making the county a practical choice for defining the local market, both for the purpose of this study, as well as for banks that make expansion decisions.[23]

Prior literature has suggested several methods to define the nature of spatial dependence between observations (LeSage and Pace, 2009). However, as recommended by Anselin (2013), the nature of spatial correlation should be defined in the light of the problem being studied.

Equation (3) is modified as follows to include spatial effects:

$$Y_{it} = \alpha + \beta D_t + \rho W_{ij} Y_{jt} + \omega X_{it} + \epsilon_{it} \ , \tag{5}$$

where W is the spatial weight matrix and captures the spatial autoregressive process in the dependent variable. W is assumed to be constant over time. The element W_{ij} of W specifies the correlation between observations i and j. The diagonal elements of W are set equal to zero, signifying that an observation is not correlated with itself. Further, the rows of matrix W are made to sum to unity by dividing each element in the row by the sum of the elements in the row. This standardization procedure reduces the possibility that results are dependent on the specification of W. Please see Appendix B for further details related to the estimation of Equation 5.

In the presence of spatial correlations, ρ is expected to be positive and significant, suggesting the loss provisioning of a given bank is related to the loss provisioning of banks in its geographic vicinity.

[23] Interviews with community bankers suggest a county is a reasonable way to define a local market.

I construct three different specifications for the spatial weight matrix, which are listed below:

$$W_{ij}^1 = \begin{cases} \frac{1}{d_{ij}} \ , \text{ if bank } j \text{ is located in the same county as bank } i \ , \\ 0 \ , \text{ otherwise}, \textit{and} \end{cases}$$

$$W_{ij}^2 = \begin{cases} \frac{1}{d_{ij}^2} \ , \text{ if bank } j \text{ is located in the same county as bank } i \ , \\ 0 \ , \text{ otherwise}, \end{cases}$$

where d_{ij} is the great-circle distance between the geographic location of bank i and j, and,

$$W_{ij}^3 = \begin{cases} 1 \ , \text{ if bank } j \text{ is located in the county adjacent to bank } i \ , \\ 0 \ , \text{ otherwise.} \end{cases}$$

The first two specifications use inverse distance and inverse distance-squared measures, and are based on the assumption that banks that are located geographically closer together are more strongly correlated than banks that are located farther apart. The third specification for W relates a county to its neighboring counties. In relation to the example above, W^1 and W^2 capture the spatial correlation between banks A and B, whereas W^3 captures the correlation between banks A and C.

Table 9 presents results of the estimation including spatial effects. Models 1, 2, 4, and 5 use distance-based specifications of the weight matrix, given by W^1 and W^2. These specifications of W measure within-county correlations. Models 3 and 6 use the specification based on adjacent counties, as given by W^3. This specification measures between-county correlation.

In all cases, the coefficient on WY is positive and significant, suggesting loan loss provisions of localized banks are spatially correlated. However, the coefficient on $D * WY$ is positive and significant only in Model 6. This finding indicates that whereas between-county correlations become stronger in the treatment period, within-county correlations do not. The coefficients of $D * W^1Y$ and $D * W^2Y$ are negative and not very significant.

The results suggest that factors related to local market conditions could not have driven the increase in provisions in the anticipation period. These factors include changes in local market

conditions, as well as actions taken by managers in the anticipation period that are directly related to the local economy, for instance, expanding loans to less credit-worthy borrowers. An increase in the strength of between-county correlation suggests strategic behavior by managers. Given an entry-deterrence objective, banks in a county would increase provisions relative to banks in a neighboring county, thereby increasing the strength of between-county spatial correlations. This finding is consistent with the objective of appearing worse than the neighboring county so that a prospective entrant would choose to locate in the neighboring county.

5.2. Effect of Regulator

In the survey, community bankers were asked what motivated them to over-reserve for loan losses.[24] Eighty-eight percent of survey respondents cited the regulator's expectations as a reason to over-reserve. This finding makes an exploration whether the regulator could be driving the observed increase in provisions worthwhile.

The effect of bank competition on financial system stability is the subject of an ongoing debate (Keeley, 1990; Hellman et al., 2000; Boyd and De Nicolo, 2005; Carletti and Vives, 2007). The argument is that, as the franchise value of banks erodes due to greater competition, or because of withdrawal of market subsidies,[25] banks have less to lose in case of default and hence a greater incentive to take on more risk. Further, given a risk level, banks may charge lending rates that are too low and deposit rates that are too high, simply to win more business. Such actions could also be taken in anticipation of increased competition, contributing to the instability of the banking system and erosion of deposit-insurance. In response to increased competition, and a possible decline in the credit quality of loans, bank examiners may require that the bank increase provisions.

Recent empirical literature has examined the use of discretion by regulators. Agarwal et al. (2014) find state banking regulators tend to be more lenient than federal regulators in applying identical rules to the same regulated entity. They also find that some state regulators tend to be more lenient than others. Costello et al. (2016) use this setting of differential leniency of state and federal regulators, and explore the impact of regulatory discretion on financial transparency. They find stricter regulators are more likely to enforce income-reducing accounting choices.

[24] Please see Appendix A, survey question 19.

[25] Any regulation that prevents free entry into a market is akin to giving the incumbents a subsidy.

Prior literature also indicates regulatory leniency may vary based on the geographical location of the regulator with respect to the regulated entity. For instance, Kedia and Rajgopal (2011) study SEC enforcements and find that, consistent with the theory of a resource-constrained regulator, the SEC is more likely to investigate firms that are located geographically close to its offices. Gopalan et al. (2016) use variation in closures of bank regulators' field offices, and find that on increasing the distance between supervisors and banks, bank risk increases. Further, given that the onsite portion of a bank examination can extend to several weeks, distance to the regulator's offices is a plausible measure of regulatory attention. For instance, an audit of the FDIC's examination process from 2007 to 2011 for small community banks showed the average length of time for onsite examinations ranged from 20 to 33 days for a bank rated 1 or 2 on the CAMELS score, and 42 to 66 days for a bank with a riskier rating of 3,4, or 5.[26]

If the regulator was driving over-provisioning due to fears regarding the stability of the banking system, a measure of regulatory effectiveness should be positively associated with loss provisions in the treatment period. However, if the regulator was detecting and correcting over-provisioning behavior of management, the measure should be negatively associated with loss provisions in the treatment period. If the observed effect was purely attributable to management, we should see no relation between the measure of regulatory effectiveness and loss provisioning in the treatment period relative to the control period.[27]

Based on prior literature, I construct two measures of regulatory attention. The first is constructed using data from Agarwal et al. (2014), who create an index of regulatory leniency based on the average difference in the CAMELS rating between state and federal regulators. Stricter regulators have lower values of the index. The index uses data from 1996 to 2011, and is aggregated at the state level. I create an indicator variable $STRICT$ that takes a value of 1 if the leniency index is < 0.05, and 0 if the index is > 0.15.[28] The sample is restricted to states where the state regulator has a leniency index of < 0.05 or > 0.15. Because the index measures the

[26] See report titled "The FDIC's Examination Process for Small Community Banks" at https://www.fdicig.gov/reports12/12-011AUD.pdf.

[27] I do not discuss a case in which the regulator detects and corrects over-provisioning by the manager. Given the mandate to ensure safety and soundness of the banking system, regulators are more likely to be concerned about under-provisioning. In un-tabulated analysis, I search the text of FDIC enforcement actions and find that in every case in which loan loss provisions are mentioned, it is with respect to inadequate provisioning.

[28] These cut-offs roughly represent the 25th and 75th percentiles.

relative strictness of state regulators with respect to the federal regulator, the sample is restricted to include only state-chartered banks. Table 10a presents the results of this analysis. $STRICT$ is positively associated with loan loss provisions in the neutral period. This finding is consistent with prior literature (Costello et al., 2016) showing stricter regulators tend to induce income-reducing accounting choices. However, the results are not significantly different in the treatment period (D_{s-2} and D_{s-1}). Based on this measure of regulatory strictness, I do not find evidence in support of the argument that regulators could be driving the observed increase in provisions.

The second measure of regulatory attention is based on distance from the regulators' offices (Kedia and Rajgopal, 2011; Gopalan et al., 2016). I calculate the distance between each of the regional offices of the Banking Department of Texas and the headquarters of state-chartered banks in Texas. Because multiple regional offices exist, I use distance from the nearest office as the measure of regulatory attention. Table 10b presents the results for this analysis. Columns 1 and 2 of Table 10b show the average distance (in kilometers) from the regulator's office by quintile. I estimate Equation 3 within each quintile. The regression of LLP on the treatment indicator D and control variables yields positive and significant coefficients only for the first three quintiles of distance from the regulator's office. This finding suggests the relation between the distance-based measure and LLP is non-linear in the treatment period. Based on the distance measure, I find limited evidence that regulators could be driving the observed increase in provisions. In the next section, I develop a test to differentiate between the effect of the regulator and the manager.

5.2.1. Differentiating between Manager and Regulator Effects

In this section, I describe a test to differentiate between the effect of the manager and the regulator. The test directly assesses the effect of the manager while controlling for the effect of the regulator.

In this test, I exploit variation between counties in Texas to identify banks that have a greater incentive to increase provisions to deter entry. Survey-based evidence indicates financial statements of competitors provide incremental information over economic indicators such as population and income growth in aiding market-expansion decisions.[29] Conditional on an entrant deciding to locate

[29] Please see Appendix Appendix A, survey question 9.

in a particular region within a state, the entrant would have to choose a local market within the region in which to locate. This suggests banks located in counties that are similar to neighboring counties based on economic indicators are more likely to increase their loss provisioning to deter entry. To elaborate, consider two counties in Texas, county A and county B. County A is a high-growth county, surrounded by counties that also have high growth. County B is a similar high-growth county, but is surrounded by counties with lower growth. An entrant seeking to locate in the region of county A is more likely to rely on the incremental information provided in the financial statements of incumbents to inform its location choice. I use this insight to identify banks that have a larger incentive to look less profitable.

I construct two measures of between-county variability using growth in household income. The first measure is defined as

$$HHInc\_Var1_i = \sqrt{\sum_{j=1}^{n} (g_i - g_j)^2} \ , \tag{6}$$

where i is the given county, j is the neighboring county, and n is the number of neighboring counties. $g_{i,j}$ represents two-year growth in household income from 1995 to 1997.

Measure 2 is defined as,

$$HHInc\_Var2_i = Max_{i,j} \left| g_i - g_j \right| \ , \tag{7}$$

where i, j, and $g_{i,j}$ are defined as before.[30]

Results of this analysis are presented in Table 10c. Models 1 and 2 include the interaction of the treatment indicator D with the two measures of household income variability. Models 3 and 4, in addition, control for the distance of from the regulator ($DIST\_REG$) and are estimated in a subsample of state-chartered banks. The coefficient on the interaction term is negative and significant, suggesting banks located in counties that score high on the variability measures are less likely to increase their provisions in response to an increase in the threat of competition. The results hold when controlling for the effect of the regulator in models 3 and 4. The findings are

[30] In untabulated analysis, I use a measure of variability based on population growth and do not find evidence to support the hypothesis related to managers' use of discretion. Lack of significant results when using the measure based on population growth may be driven by the fact that immigration explains much of the population growth in Texas (Gibson and Jung, 2006), and banks may be less inclined to court this population.

consistent with the manager's use of discretion to discourage entry into its local market.

6. Additional Analyses and Robustness

6.1. Falsification Test

I randomly assign a pseudo year of treatment to the states in the sample, and estimate the regression specified in Table 4, Model 2. I repeat the random assignment 1,000 times. The mean t-statistic for the coefficients on variables D_{-1} and D_{-2} is negative and insignificant. Figure 5 shows the distribution of the t-statistic. This analysis reduces concerns that an underlying omitted variable may be driving the results.

6.2. Do Future Losses Justify Increased Provisions?

In this section, I present an analysis to understand whether the increase in provisions was in response to future expected losses.

I create a synthetic control (Abadie and Gardeazabal, 2003; Abadie et al., 2010) for the state of Texas in order to understand whether non-performing assets increased in Texas relative to the synthetic control. This method constructs a synthetic control based on a convex combination of control units that approximates the pre-treatment characteristics of the unit that was exposed to the treatment. As opposed to using the controls for a single year in the pre-treatment period, this method allows one to control for time-varying covariates.

The control states included in the sample are Arkansas, Colorado, Iowa, Kansas, Missouri, Nebraska, and New Mexico. Figure 3a presents change in the non-performing assets for the median firm in Texas and the control states. As the figure shows, the two groups are very different on pre-treatment values of the variable. Figure 3b plots the same variable after applying the synthetic control method. Table 11a reports the pre-treatment means of predictor variables for Texas, synthetic Texas, and all seven control states. Table 11b reports the weights that were assigned to the various states in creating the synthetic control state.

To assess whether non-performing assets increased for the median bank in Texas relative to the synthetic control, I calculate the mean-squared prediction error (MSPE) and construct synthetic states for all control states in the sample. MSPE is the average of the square of the difference between the treated state and its synthetic control. A low value of pre-treatment MSPE indicates

the synthetic control closely matches the treated state on selected predictors, in the pre-treatment period. Synthetic states are constructed for each of the control states by using the remaining control states. For example, the synthetic control for Arkansas is constructed by using the remaining six control states of Colorado, Iowa, Kansas, Missouri, Nebraska, and New Mexico.

Column 2 of Table 11c reports pre-treatment MSPE for all states. As can be seen, Arkansas, Colorado, and New Mexico have high values of MSPE, indicating no combination of states exists that will create a valid synthetic control for these states. Figures 4a and 4b present plots for the gaps between the treated and synthetic control for all states. Figure 4b presents the plot after removing states that had high values of pre-treatment MSPE. As the figure shows, non-performing assets for Texas increased around 2002. This finding is confirmed by the ratio of post-treatment MSPE to pre-treatment MSPE presented in Table 11c.

To understand whether this increase in non-performing assets justified the increase in provisioning in the years 1998 and 1999, I regress loss provisions on future non-performing assets for up to five years. Table 12 presents the results of this analysis. As can be seen, the non-performing assets do not explain all the increase in provisions prior to the easing of restrictions to interstate branching.

6.3. Was the strategy successful?

In this section, I present descriptives statistics that correlate the increase in provisioning behavior with future entry in the market. To identify banks that increased their provisioning behavior, I estimate adjusted means (least-squares means) for interactions of firm fixed effects with the treatment indicator D within the basic framework of Equation (3). Table 13a presents correlations between branch growth, adjusted means of loan loss provisions ($AdjLLP$), and other variables that represent the attractiveness of a county for entry. A correlation of -.263 and -.282 exists between $AdjLLP$ and ex-post branch growth one year after treatment ($BranchGr0$) and two years after treatment ($BranchGr1$). Panel (b) presents a multivariate analysis predicting ex-post growth in branches after controlling for the attractiveness of a county. I find the increase in loan loss provisions is negatively correlated with a future increase in the number of branches in a county. The coefficient value is -0.035 with a t-statistic of -1.75.

Theory would suggest that rational entrants should expect manipulation of loan loss provisions

and correctly conjecture the level of provisions. Incumbents, expecting entrants to account for manipulation would rationally increase provisions. The strategy, therefore, should have no impact on entry.

The evidence presented in this section should be interpreted with caution. The results are weak, but more importantly, there is no valid counterfactual, that is, we cannot see what entry would have been had there been no increase in loss provisioning.

An alternative explanation for this finding is that some banks in the sample increased lending to less credit-worthy customers in the ex-ante period. Based on Dell'Ariccia and Marquez (2004), when faced with competition, banks may allocate capital to borrowers with high information asymmetry which may lead to an increase in ex-ante loan loss provisions. This explanation would lead to me to find only weak evidence of a relation between ex-ante increase in LLP and ex-post entry, as is the case in the data. As I show in the spatial correlation analysis, there was an incremental increase in between-county correlation in the treatment period and not in within-county correlation; therefore, the adoption of this alternative strategy could not have been pervasive.

Another possibility is that entrants have limited processing power: bounded rationality constraints may have caused entrants to systematically overestimate the adequate level of loan loss provisions in a county. To correctly conjecture the level of provisions, entrants would need access to future information: especially future levels of non-performing assets. At the time, potential entrants did not have access to this information; but I, as a researcher do.

7. Conclusion

In this study, I explore managers' use of discretion in financial reporting when firms are faced with a threat of increased competition, and contribute to limited work on the use of discretion in financial reporting as an entry-deterrence strategy. I find that community banks increase their loan loss provisions and appear less profitable when faced with an increase in the threat of competition. I also test and find the results are consistent with managers' and regulators' use of discretion in financial reporting. Results from additional tests indicate the increase in provisions is driven by managers' entry-deterrence objective. Additional tests rule out alternative explanations that the increase in provision could be driven by bank actions tied to local market conditions, changes in

local market conditions, or the actions of regulators. Further, analysis of the loss profile of banks in states that deregulated suggests future losses do not explain the results.

A limitation of the study is that it does not adequately account for systematic biases in beliefs regarding future losses under increased competition. Findings from the main analyses are consistent with a scenario in which managers are overly pessimistic about true future losses and their ex-ante beliefs are not consistent with ex-post realizations. I attempt to address this limitation by conducting several cross-sectional tests. I find the results are stronger in more concentrated markets where managers have greater excess rents to protect. I also find the strength of spatial correlations between the loss provisions of banks in neighboring counties increases in the period of an increased threat of competition. Although these results suggest strategic firm behavior, they are not wholly inconsistent with behavioral biases.

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Appendix A. Competition in Community Banking Survey

I conducted a survey of corporate-level executives at community banks in order to understand bank response to current and expected competition. Specifically, the survey addressed five main questions:

1. Who are the main competitors of community banks?
2. What factors do these banks consider to be important in making expansion decisions?
3. What sources of information do these banks use in assessing current and expected competition in their market?
4. What actions do these banks take in response to current and expected competition?
5. What factors influence the estimation of loan loss provisions?

Several facets of the community banking industry make it an ideal laboratory in which to study firms' use of competitor information. The industry has faced and continues to face significant competitive pressure from several sources, including large national and regional banks, other community banks, credit unions,[31] online banks, and shadow banking organizations. This situation makes dealing with competitive threat paramount in the minds of senior executives at these banks. Further, the industry is largely homogenous and well-organized, making it a favorable environment in which to share information between firms.

Findings from the survey are likely to be informative to academics and practitioners. For academics, it provides systematic evidence that firms access and use competitors' disclosures, as well as insights into sources of information, types of information items used, and actions taken in response to an actual or perceived increase in competition. Although a substantial literature in accounting is built on the premise that firms analyze competitors' financial statements in order to assess the competitive environment,[32] little systematic evidence underlies this assumption.

The survey would also aid practitioners in decisions related to market expansion and competitor analysis.

[31] Credit unions are very similar to community banks in the services they provide. However, unlike community banks, credit unions have the advantage of being tax-exempt entities.

[32] See, for instance, Dye (1985), Darrough and Stoughton (1990), Wagenhofer (1990), Newman and Sansing (1993), Darrough (1993), and Gigler (1994).

Survey Design and Implementation

The survey questionnaire was created using the software Qualtrics and consisted of five main parts, corresponding to the survey objectives stated above. I received feedback from several academic researchers on survey content and design. This feedback included researchers with significant experience in conducting survey-based research.[33] I also pretested the survey questionnaire on three community bankers at the CEO/CFO level. Pretesting the survey allowed me to fine tune the questions so that they would be easily understood by survey participants who were in similar roles, as well as expand on options provided in some of the questions. The final survey instrument consisted of 23 questions, of which 3 were open-ended.

The survey was administered with the help of staff at the American American Bankers Association (ABA)[34] who sent the survey questionnaire to their networks of corporate-level executives at community banks. The networks included a group of 100 CFOs who were participants at a conference held in Nashville, Tennessee, in June 2015.[35] The survey was also sent to 99 CEOs, the ABA Marketing Network of about 650 members, and was included in a periodic newsletter (ABA CFO Bullets) emailed to approximately 1,000 CFOs. To encourage response, a $10 donation was offered to an ABA charity (ABA Community Engagement Foundation) for every completed survey.

Of the 65 people who clicked on the survey link, 6 did not answer any question. I delete these 6 observations from the sample, and am left with a total of 59 usable responses. The remaining respondents substantially answered all questions. The 59 usable responses corresponds to an average response rate of 3.2%. Even though the response rate is low, there are several factors to be kept in mind in assessing the response rate. First, survey response rates vary based on the subsample considered. For instance, in the sample of CFOs who were conference participants and with whom I had more direct contact, the response rate was 12%. The response rate was also higher (at 7%) within the sample of CEOs and bank presidents. It is possible that this group of executives is more likely to make decisions related to market expansion and therefore more interested in the survey. Further, not all intended recipients of an email newsletter open the email or even receive

[33] I am especially grateful to Neil Malhotra and Nicholas Hall of Stanford University for help with the survey questionnaire.

[34] http://www.aba.com/Pages/default.aspx

[35] I attended this conference and was able to conduct interviews as well as advertise the survey, which may have increased response rates for this subsample.

it. A survey by Abrahams et al. (2010) finds that a third of marketing emails get marked as spam by email hosting servers. Finally, the survey is targeted at a very specific group of experts. The respondents were all community bankers and thus able to provide an informed opinion on issues related to the community banking industry.

There are several potential concerns associated with the survey methodology in this case. First, are the targeted firms representative of the community banking industry? Second, is there an issue with non-truthful responses? Finally, are the responses likely to be static across time? That is, are the responses made by community bankers in 2015 the same as that which would have been made by community bankers in the 1990s?

The targeted community bankers belonged to ABA's network. The ABA is active on a national level and a prominent organizer of this industry, for instance, leading lobbying and educational efforts. Therefore, there are reasons to believe that the ABA network is fairly extensive. Further, Figure A.1 shows that the respondents are geographically spread out and not concentrated in any particular region.

Survey responses were anonymous to protect the identity of respondents and encourage truthful responses. No identifying information was collected as part of the survey. To further encourage truthful responses, questions about the industry were asked in an indirect manner. For instance, instead of asking the question "Do you knowingly over-reserve for loan losses?", I ask, "Based on your judgment, what percent of competing banks knowingly over-reserve for loan losses?".

It is difficult to assess whether responses in 2015 were representative of responses in the 1990s as it was hard to find people who were CEOs or CFOs at that time. However, as discussed in the previous section, the industry faces increasing competition from new sources, and dealing with competitive threat is paramount for community banks today.

Non-Response Bias

Non-response bias in this setting can be item level, that is, some respondents did not answer all the questions in the survey, or unit level, they did not respond to the entire survey. The issue is to assess whether the sample of responses is representative of the population. Assessing non-response bias generally requires one to know the identities of respondents, and those to whom the survey was sent. Item level bias was not an issue in this survey as all respondents substantially answered all

questions. The only exception was with respect to the open-ended questions which were answered by only a few respondents.[36]

It is challenging to assess unit level non-response bias in this survey. This is because survey responses were anonymous to protect the identity of respondents and encourage truthful responses. To prevent inadvertent identification of a respondent, I collected only limited demographic information related to the banks. Furthermore, I do not have access to the ABA membership list. Given these limitations, I assess non-response bias in two different ways, described below.

Respondents were asked for the range of asset size to which their bank belonged, and not a single asset size number which could potentially be used to identify a bank. Table A.1 compares the size distribution of banks in the survey to banks in the study sample. As the table shows, respondents of the survey were larger than banks in the study sample. However, community banks have been getting larger over time. In 1992, 94% of all community banks had total assets of less than $250 million, compared to 75% in 2008. That survey respondents, on average, are larger than banks in the study sample is further borne out by the fact that 24% of survey respondents were publicly listed banks. Only 3.6% of banks in the study sample are public. Descriptive statistics in Table 2b show that publicly listed community banks tend to be larger than private banks. Also, the median bank in the survey operated 6 branches whereas the median bank in the study sample operated only one bank. Because survey respondents are larger than banks in the study sample, I assess non-response bias with respect to the range of asset sizes. That is, I assess whether responses on certain key questions were systematically different for smaller community banks. Table A.2 presents the results of this analysis. As can be seen from the table, there are no significant differences in the responses of large and small banks.

Prior literature has used extrapolation-based methods to assess non-response bias (Armstrong and Overton, 1977). The underlying assumption for extrapolation-based methods is that participants who answer less readily are similar to non-respondents. I define "less readily" as participants who take a longer time to respond. However, it is possible that participants who respond in less time may be less attentive. To address this concern, I split the sample into two groups by median

[36]Three open-ended questions were asked. These are: (1) Please elaborate on how competition can influence loan loss provisions, (2) Please provide any feedback related to this survey, and (3) Are you willing to participate in a follow-up interview? If yes, please provide your contact details.

response time (8 minutes), and compare responses across these two groups. I find no significant differences in responses across the two groups.

Discussion of Survey Findings

Survey responses indicate that community banks deal with a variety of competitors. These include large national banks, regional banks, other community banks, and credit unions. To a lesser extent, community banks also compete with on-line banks, shadow banking institutions, as well as mortgage brokers, lease finance companies, and insurance companies.

Respondents were asked which the factors they thought competitors took into consideration while making expansion decisions, as well as which factors they themselves considered. Respondents considered economic indicators such as population and household income growth to be critical factors in making expansion decisions. Incremental to these, financial statement information also played a role, with 75% of all respondents indicating that financial statement information (profitability and credit quality) would be assessed by competitors in making expansion decisions.

Survey respondents were asked for the sources of information that they used in assessing current and future competition. 94% of all respondents stated that they used financial statements of competitors. Other sources of information included market surveys and professional networks. Banks assessed several financial statement items of competitors, including net interest margin, loan portfolio composition, profitability, charge-offs, and loan loss provisions.

I asked respondents about the actions that they would take in response to current and expected competition. The most frequently used strategies were to increase loan and deposit growth. Other strategies included expanding the product offering, and increasing lobbying activity. In all cases, except for increasing lobbying, banks were more likely to react to current competition than to anticipated competition.

The final set of questions related to loan loss provisions. I did not ask bankers directly whether they would manipulate financial statements in response to an increase in the threat of competition, as I did not expect to get a truthful response. However, I ask how likely competing community banks were to misstate provisions. Only 5% of all respondents answered that banks do not misstate loan loss provisions. Banks stated that there were several reasons to overstate loan loss provisions. Prominent among these were regulators' expectations. Banks also misstated provisions under in-

creased threat of competition, and an actual increase in competition. Other motivating factors to over-reserve included potential weaknesses identified with specific borrowers, a decline in the quality of the loan portfolio, anticipated growth in portfolio, anticipated economic downturn, anticipated loss expectations relating to specific credits, being overly conservative, or an inability to re-capture excess provisions due to regulator objections. Other reasons to under-provision include earnings pressure, and the desire to inflate earnings.

cape, and that financial statements of competitors provide incremental information in aiding decisions related to geographical expansion.

Aggregated survey results are presented below, and titled "Summary of Survey Responses".

Figure A.1: Location of Survey Respondents

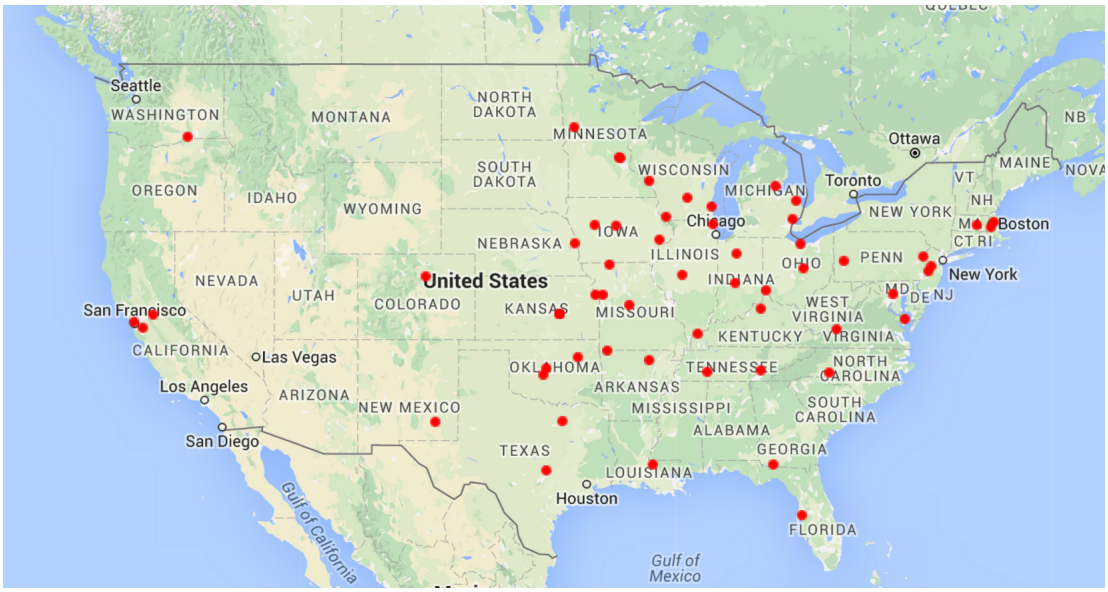


Table A.1: Percent Distribution of Asset Size

	Survey Sample	**Sample of Community Banks**		
		1992 - 2008	**1992**	**2008**
>250 mn	33%	87%	94%	75%
250 to 500	31%	8%	4%	15%
500 to 1bn	21%	3%	1%	7%
>1bn	16%	1%	0%	3%

Table A.2: Assessing Non-Response Bias

	Responses by asset size			Responses by time taken to complete survey		
	<500 mn	**=>500 mn**	**pvalue**	**<= 8 minutes**	**>8 minutes**	**pvalue**
What factors do you think competitor banks assess before entering into your local market?						
Economic growth	100%	100%	1.000	100%	100%	1.000
Identified opportunity in new market	100%	95%	0.375	97%	100%	1.000
Population growth	91%	90%	1.000	97%	85%	0.186
Household income	89%	76%	0.272	93%	74%	0.073
Profitability of incumbent banks	81%	71%	0.533	79%	70%	0.542
Credit quality of incumbent banks' loan portfolio	71%	76%	0.764	76%	70%	0.766
Existing branch density in new market	71%	76%	0.764	76%	70%	0.766
Proximity	63%	76%	0.382	62%	74%	0.399
Talent	46%	57%	0.582	48%	52%	1.000
How would you rate the following markets in terms of attractiveness of de novo entry?						
Markets where incumbent banks have high profitability	85%	83%	1.000	85%	85%	1.000
Markets where incumbent banks have high credit losses	0%	6%	0.346	0%	4%	1.000
How would you rate the following markets in terms of attractiveness of entry through mergers and acquisitions?						
Markets where incumbent banks have high profitability	91%	83%	0.406	92%	85%	0.668
Markets where incumbent banks have high credit losses	6%	6%	1.000	4%	8%	1.000
What information do you use to analyze current and expected competition in your market?						
Financial statements of competitors	94%	94%	1.000	92%	96%	1.000
Market surveys	70%	83%	0.336	81%	68%	0.349
Other	27%	28%	1.000	23%	32%	0.541
N	38	21		32	27	

Summary of Survey Responses

1. What is your role within the bank?

	No. of Responses	Percent Responses	Response Rate
CEO/President	7	12%	7%
CFO	32	54%	3%
CMO/Others	20	34%	3%
Total	**59**	**100%**	**3%**

2. What is your bank's approximate asset size?

	Percent answered
<$250 million	33%
$250 to $500 million	31%
$500 million to $1 billion	21%
>$1 billion	16%

3 & 4. How many branches and loan production offices does your bank currently operate?

5. How many separate markets does your bank operate in?

	Qs 3. Branches	Qs 4. LPOs	Qs 5. Markets
Mean	15.5	0.6	6.9
Median	6.0	0.0	3.0
Std	39.0	1.0	17.0
Min	1	0	1
Max	276	5	120

6. Which of the following describes your bank? Please select all options that apply.

	Percent answered
Private company	44%
C Corp	26%
Public company	25%
Mutual	19%
S Corp	18%
Exchange traded	4%

7. Which of the following best describes the geographic area that your bank serves?

	Percent answered
Rural (population < 50,000)	34%
Small Metropolitan Area (population between 50,000 and 500,000)	47%
Large Metropolitan Area (population > 500,000)	19%

8. Which of the following types of organizations does your bank directly compete with?

	Number answered	
	Loan Products and Services	Deposits
Large National Banks	51	55
Interstate Regional Banks	46	48
Intrastate Regional Banks	43	43
Other Community Banks	53	55
Credit Unions	50	51
On-line Banks	26	32
Shadow Banking Institutions	11	8
Others	6	3

9. What factors do you think competitor banks assess before entering into your local market?

10. What factors do you assess before expanding into a new geographic market?

	Percent "Very Relevant" and "Relevant"	
	Qs 9. Factors assessed by competitors	Qs 10. Factors assessed by given bank
Economic growth	100%	94%
Identified opportunity in new market	98%	96%
Population growth	91%	83%
Household income	84%	79%
Profitability of incumbent banks	75%	56%
Credit quality of incumbent banks' loan portfolio	75%	52%
Existing branch density in new market	73%	87%
Proximity	69%	79%
Talent	50%	55%

11. How would you rate the following markets in terms of attractiveness of de novo entry?

12. How would you rate the following markets in terms of attractiveness of entry through mergers and acquisitions?

	Percent "Very Attractive" and "Attractive"	
	Qs 11. De Novo	Qs 12. M&A
Markets where incumbent banks have high profitability	85%	88%
Markets where incumbent banks have high credit losses	2%	6%

13. What information do you use to analyze current and expected competition in your market?

	Percent answered
Financial statements of competitors	94%
Market surveys	75%
Other [37]	27%

14. What types of information do you assess from competitors' financial statements?

	Percent answered
Net Interest Margin	90%
Loan Portfolio Composition and Growth	88%
Profitability	86%
Capital Ratios	84%
Cost of Deposits	82%
Charge-offs	76%
Loan Loss Provisions	53%
Others	16%

15. To what extent are the following actions taken in response to increased competition from larger banks?

16. To what extent are the following actions taken in response to an anticipated increase in competition from larger banks?

	Percent "Always" and "Usually"	
	Qs 15. Actual competition	Qs 16. Anticipated competition
Increase loan growth	48%	40%
Increase deposit growth	48%	37%
Expand products offered	29%	20%
Increase lobbying activity	16%	22%
Re-balance loan portfolio composition	16%	5%
Expand loans to borrowers with lower credit quality	9%	2%
Reduce products offered	0%	0%

[37] Other sources cited were variants of financial statements such as call reports, Uniform Bank Performance Reports, FDIC and Federal Reserve reports, SNL Financial, State Banking associations, and County Recorders Office Mortgage filings. Survey respondents also suggested word-of-mouth and professional networks as sources of competitor information.

17. What are some reasons to change the methodology used to estimate loan loss reserves?

	Percent answered
At the bank examiner's or auditor's request	91%
Change in composition of loan portfolio	84%
Change in lending policy	78%
Change in current macroeconomic conditions	69%
Expected change in macroeconomic conditions	47%
Loss of high quality clients due to increased competition	22%
Expected loss of high quality clients due to increased competition	20%
Current or expected loss of talent due to increased competition	18%
Others	7%

18. Based on your judgment, what percent of competing community banks knowingly over-reserve or under-reserve for loan losses?

	Percent answered
0%	5%
1 - 10%	30%
11 - 30%	34%
31 - 50%	16%
Greater than 50%	16%

19 & 20. What are some factors that motivate community banks to over-reserve/ under-reserve for loan losses?

	Percent answered [38]	
	Qs 19. Reasons to over-reserve	**Qs 20. Reasons to under-reserve**
Regulator's expectation	88%	24%
Threat of increased competition	12%	21%
Actual increase in competition	15%	21%
Others	27%	55%

[38] Responses to Qs. 19 and 20 for the option "Regulator's expectation" are significantly different ($pvalue < 0.0001$). Responses to Qs. 19 and 20 for the options "Threat of increased competition" and "Actual increase in competition" are not significantly different ($pvalues = 0.3144$ & 0.4741).

Appendix B. Spatial Analysis

In the presence of spatial correlations, Equation (5) cannot be estimated using ordinary least squares, because the correlation between errors and regressors results in biased and inconsistent OLS estimates. Writing Equation (5) in matrix/vector notation and subsuming D in $\mathbf{x}$,

$$\mathbf{y} = \rho \mathbf{W}\mathbf{y} + \beta \mathbf{x} + \epsilon \ , \tag{B.1}$$

which can be written as

$$\begin{aligned} (I - \rho W)\mathbf{y} &= \beta \mathbf{x} + \epsilon \\ \implies \mathbf{y} &= (I - \rho W)^{-1}\beta \mathbf{x} + (I - \rho W)^{-1}\epsilon \ . \end{aligned}$$

The error term $\epsilon^* = (I - \rho W)^{-1}\epsilon$ is not homoskedastic. Also, $\rho \neq 0$ implies the model is no longer linear in parameters.[39]

Consistent with prior literature (Elhorst, 2014; Anselin, 2013; LeSage and Pace, 2009), I use the maximum likelihood principle to estimate spatial interaction effects.

[39] For instance, consider a simple case in which

$$W = \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix} \ .$$

The row normalized matrix is given by,

$$W = \begin{bmatrix} 0 & \frac{1}{3} & \frac{1}{3} & \frac{1}{3} \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ \frac{1}{3} & \frac{1}{3} & 0 & \frac{1}{3} \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 \end{bmatrix} \text{ and,}$$

$$(I - \rho W)^{-1} = \frac{1}{1 - \frac{7\rho^2}{9} - \frac{2\rho^3}{9}} \begin{bmatrix} (1 - \frac{\rho^2}{3}) & (\frac{\rho}{3} + \frac{\rho^2}{9}) & (\frac{\rho}{3} + \frac{\rho^2}{3}) & (\frac{\rho}{3} + \frac{\rho^2}{9}) \\ (\frac{\rho}{2} + \frac{\rho^2}{6}) & (1 - \frac{4\rho^2}{9} - \frac{\rho^3}{9}) & (\frac{\rho}{2} + \frac{\rho^2}{6}) & (\frac{\rho}{3} + \frac{\rho^2}{9}) \\ (\frac{\rho}{3} + \frac{\rho^2}{3}) & (\frac{\rho}{3} + \frac{\rho^2}{9}) & (1 - \frac{\rho^2}{3}) & (\frac{\rho}{3} + \frac{\rho^2}{9}) \\ (\frac{\rho}{2} + \frac{\rho^2}{6}) & (\frac{\rho^2}{3} + \frac{\rho^3}{9}) & (\frac{\rho}{2} + \frac{\rho^2}{6}) & (1 - \frac{4\rho^2}{9} - \frac{\rho^3}{9}) \end{bmatrix} \ .$$

Appendix C. Variable Definitions

Variable	Definition	Data Source
LLP	Provision for loan losses scaled by lagged total loans and leases, net of unearned income and allowance for losses (multiplied by 10,000 when used as a dependent variable in regressions)	Call data items 4230, 1400, 3123, 2123
$SIZE$	Natural log of lagged Assets	Call data item 2170
ΔNPA	Change in Non-performing assets scaled by lagged total loans and leases, net of unearned income and allowance for losses	Call data items 1403, 1407, 1400, 3123, 2123
CO	Three year rolling average of net charge-offs (charge-offs less recoveries) scaled by lagged total loans and leases, net of unearned income and allowance for losses	Call data items 4635, 4605, 3123, 1400, 2123
$\Delta LOAN$	Change in Gross Total Loans scaled by lagged Gross Total Loans	Call data item 1400
ΔGDP	Change in per capita GDP for State	Bureau of Economic Analysis
$ShrRE$	Loans secured by real estate scaled by Gross Total Loans	Call data items 1410, 1400
$ShrAGRI$	Agricultural loans scaled by Gross Total Loans	Call data items 1590, 1400
$ShrCI$	Commercial and Industrial loans scaled by Gross Total Loans	Call data items 1766, 1400
$ShrCONS$	Consumer loans scaled by Gross Total Loans	Call data items 1975, 1400
$\Delta ShrRE$	Change in $ShrRE$	Call data items 1410, 1400
$\Delta ShrAGRI$	Change in $ShrAGRI$	Call data items 1590, 1400
$\Delta ShrCI$	Change in $ShrCI$	Call data items 1766, 1400
$\Delta ShrCONS$	Change in $ShrCONS$	Call data items 1975, 1400
ROA	Return on Assets: Net Income,measured before loan loss provisions, scaled by Average Total Assets	Call data items 4340, 2170
$TIER1$	Tier 1 leverage ratio, calculated as Tier 1 Capital scaled by Average Assets	Call data items 8274, 2170

Appendix D. Events related to interstate branching in Texas

Date	Event	Source
May 1996	Texas banking Department wins case overturning OCC decision to allow Commercial Bank of Texarkana to branch into Texas	Domis, O. (1996, May 24). Texas Wins Big in Fight to Ban Out-of-State Bank Branches. *American Banker*. Retrieved from http://www.americanbanker.com/
October 1996	Texas banking Department wins a second case against the OCC and NationsBank Corp, preventing the national bank from branching into Texas	Domis, O. (1996, October 30). Texas Scores in Fight to Block Interstate Branching Under 30-Mile Rule. *American Banker*. Retrieved from http://www.americanbanker.com/
October 1997	U.S. Court of Appeals for the Fifth Circuit rules that banks may use the 30-mile rule to branch into Texas, allowing Commercial Bank of Texarkana to relocate headquarters from Arkansas to Texas	Seiberg, J. (1997, October 31). 30-Mile Rule Lets Bank Branch into Texas. *American Banker*. Retrieved from http://www.americanbanker.com/
March 1998	Supreme court allows earlier decision by federal appeals court of New orleans to stand, allowing NationsBank Corp to branch into Texas	Seiberg, J. (1998, March 31). Justices Reject Texas Bid to Block NationsBank on Branching Move. *American Banker*. Retrieved from http://www.americanbanker.com/
May 1998	Texas Banking Commissioner announces decision to allow interstate branching citing the recent Supreme Court decision	Rehm, B. (1998, May 15). Texas to Let State Banks Branch Interstate. *American Banker*. Retrieved from http://www.americanbanker.com/

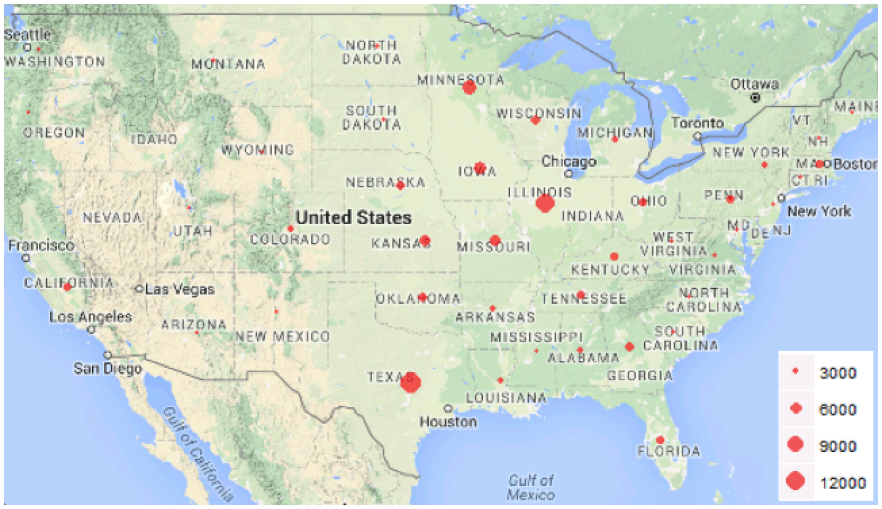


Figure 1: Distribution of sample community banks

This figure shows the spatial distribution of community banks-years in the sample, for the years from 1992 to 2008. The size of the bubble represents number of bank-years in a given state.

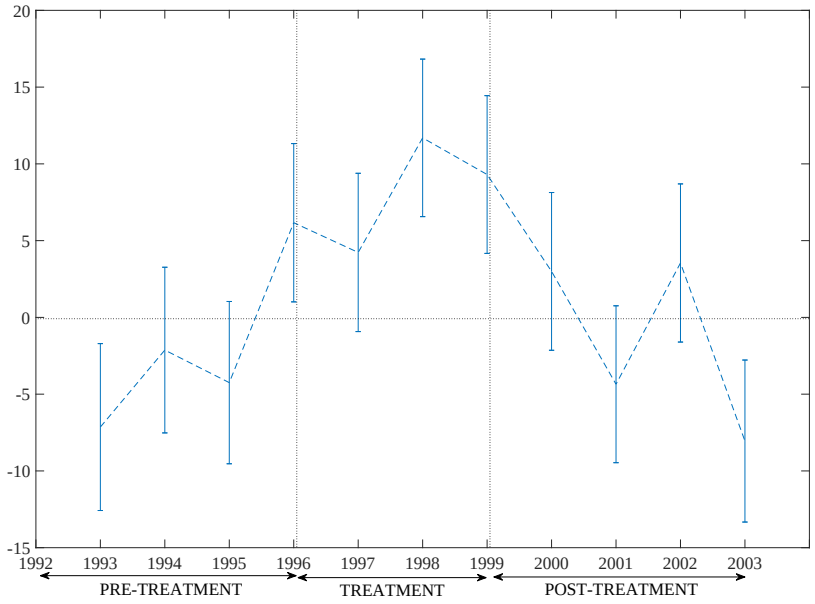
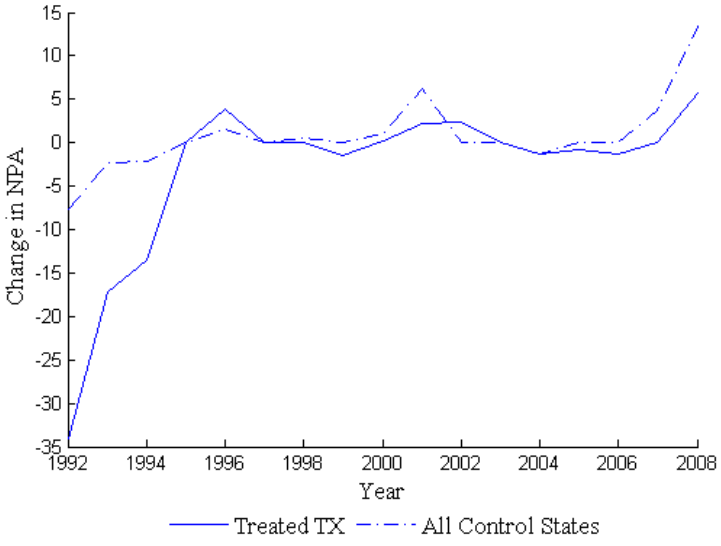
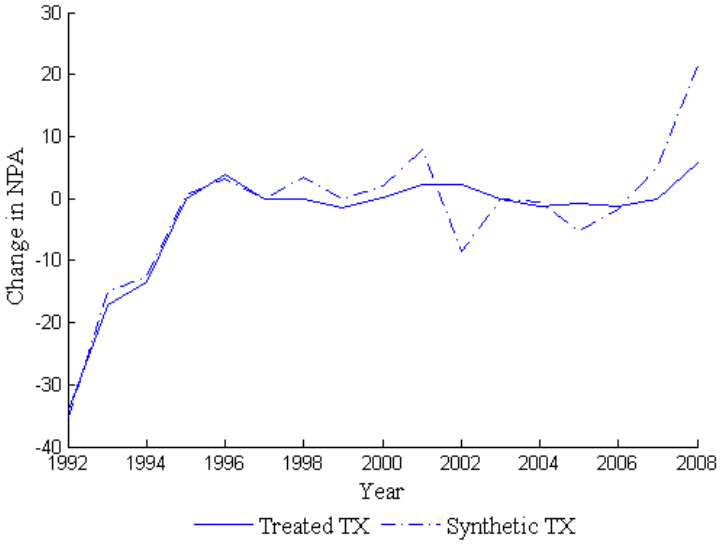


Figure 2: Estimated Coefficients from Regression to Assess Pre-trends

This figure plots the regression coefficients from a regression of LLP on the treatment indicator interacted with each year, for the Texas sample. The coefficient values represent the difference between the treated and control groups for four years before and after the treatment period. The treatment period extends from 1997 to 1999.



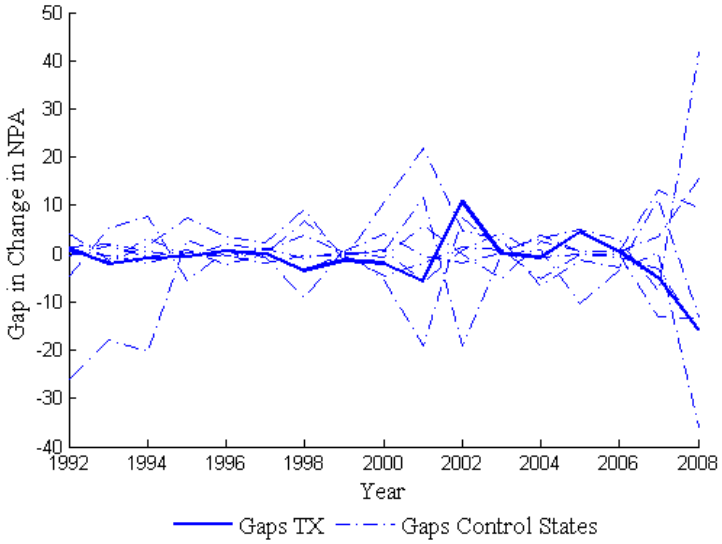
(a) Texas vs all control States



(b) Texas vs Synthetic Texas

Figure 3: Change in non-performing assets for the median firm

Figure (a) presents the change in non-performing assets for Texas and all control States. Figure (b) shows the change in non-performing assets for Texas vs Synthetic Texas. Synthetic Texas is constructed using the procedure described in Abadie and Gardeazabal (2003), and is a convex combination of control states that approximates the pre-treatment characteristics of Texas. The control states used in this analysis include Arkansas, Colorado, Iowa, Kansas, Missouri, Nebraska, and New Mexico.

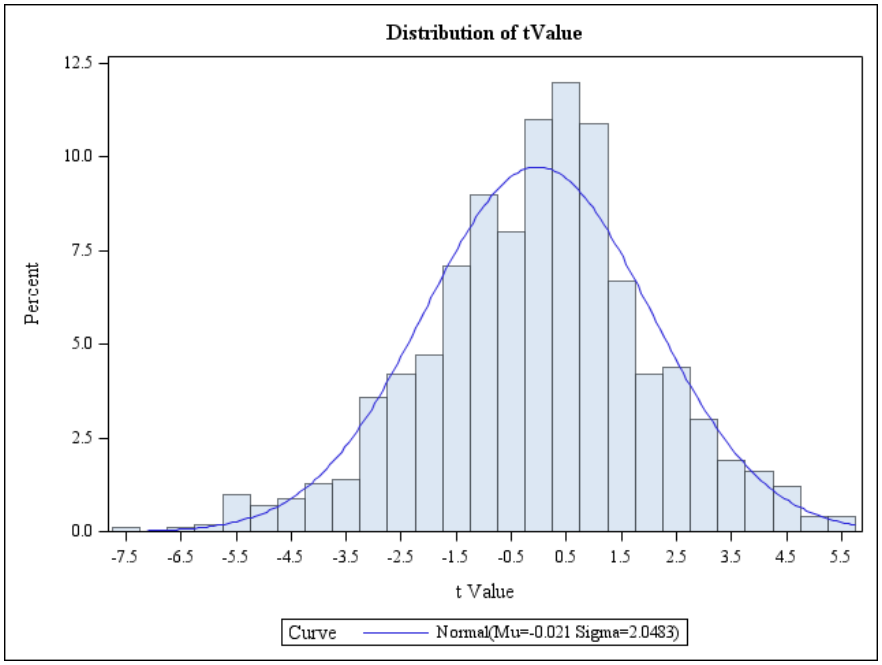


(a) Gaps in change in non-performing assets between states and their synthetic control

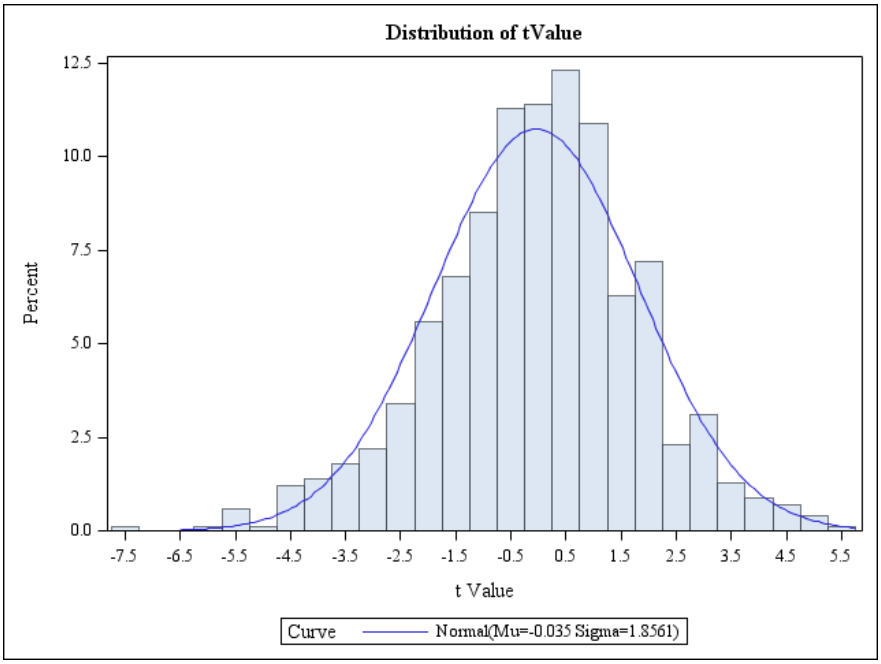
(b) Gaps in change in non-performing assets between states and their synthetic control, excluding states with high pre-treatment MSPE

Figure 4: Gaps between states and their synthetic control

Synthetic controls were constructed for Texas as well as the control states of Arkansas, Colorado, Iowa, Kansas, Missouri, Nebraska, and New Mexico, using the synthetic control method described in Abadie and Gardeazabal (2003). The synthetic controls for the control states were created using the other control states and excluding Texas. Figures (a) and (b) plot the gap in the change in non-performing assets for state and its synthetic control.



(a) Distribution of t-statistics for coefficient on D_{-1}



(b) Distribution of t-statistics for coefficient on D_{-2}

Figure 5: Distribution of t-statistics for pseudo treatment years

Figures (a) and (b) present the distribution of t-statistics for the coefficients on D_{-1} and D_{-2} from the estimation of Equation (1), after randomizing treatment years across states. The randomization was repeated 1,000 times.

Table 1: Sample Selection

(a) Sampling criteria for branch-year observations

	Branch-years	**Obs. lost**
Total branch dataset	1,014,016	
Restrict to contiguous United States	1,008,403	5,613
Exclude observations with assets <= 0	1,008,339	64

(b) Sampling criteria for bank-year observations

Sampling Criteria	**Bank-years**	**Obs. lost**
FDIC community banking reference dataset merged with bank Call data (1992 - 2008)	138,198	
Remove year of acquisition or failure	134,888	3,310
Remove observations with missing, zero or negative loans	134,868	20
Restrict to contiguous United States, and to states that decreased restrictions to interstate branching	132,267	2,601
Remove states that have an average of less than 20 community banks a year	130,939	1,328
Number of publicly listed banks (sourced from SNL Financial database)	4,547	-

Panel (a) reports the sample selection procedure for bank branches. The data are for the years from 1994 to 2005, and are sourced from the FDIC's Summary of Deposits database. It includes all branches of all banks located in the United States. Panel (b) presents the sample selection criteria for banks. The data is sourced from the Federal Reserve Bank's Reports of Condition and Income for commercial banks. Public banks were identified using the SNL Financial database.

Table 2: Sample description

(a) Number of banks and percent of public banks, by year

Year	No. of Banks	% Public
1992	9699	2.23
1993	9418	2.37
1994	8929	2.41
1995	8577	3.46
1996	8375	3.40
1997	8107	3.60
1998	7738	4.23
1999	7613	4.91
2000	7463	4.88
2001	7320	4.99
2002	7184	4.57
2003	7096	3.91
2004	6930	3.59
2005	6839	4.17
2006	6686	3.48
2007	6577	3.02
2008	6388	2.98
TOTAL	**130939**	**3.60**

(b) Descriptive statistics for private and public bank years

	Private (N = 126,392)		Public (N =4,547)		Difference in Means		
Variables	**Mean**	**s.d.**	**Mean**	**s.d.**	**t-stat**	**pvalue**	**Nor-diff**
$SIZE$	11.190	1.057	12.049	0.761	73.621	0.000	0.933
ROA	0.010	0.010	0.008	0.009	-11.994	0.000	-0.179
$\Delta LOAN$	0.437	29.192	0.558	19.534	0.390	0.696	0.005
$TIER1$	0.107	0.041	0.100	0.033	-13.463	0.000	-0.207
LLP	0.008	0.372	0.007	0.094	-0.473	0.636	-0.003
CO	0.003	0.008	0.003	0.005	-1.254	0.210	-0.014
ΔNPA	0.001	0.027	0.005	0.277	1.044	0.296	0.022
$ShrRE$	0.601	0.206	0.715	0.153	48.889	0.000	0.631
$ShrAGRI$	0.103	0.155	0.011	0.032	-143.921	0.000	-0.823
$ShrCI$	0.155	0.111	0.169	0.122	7.413	0.000	0.117
$ShrCONS$	0.125	0.108	0.091	0.093	-24.363	0.000	-0.341

Panel (a) presents the number of banks and percent of public banks in the sample, by year. The data is sourced from the Federal Reserve Bank's Report of Condition and Income data for commercial banks. Public banks were identified using the SNL Financial database. Panel (b) presents descriptive statistics for private and public banks, pooled across years. The data are for the years from 1992 to 2008. The variables listed are natural log of total assets ($SIZE$), return on assets (ROA), growth in total loans ($\Delta LOAN$), Tier-1 Capital Ratio ($TIER1$), scaled loan loss provisions (LLP), three year rolling average of scaled net charge-offs (CO), growth in non-performing assets (ΔNPA), and share of real estate ($ShrRE$), agricultural ($ShrAGRI$), commercial and industrial ($ShrCI$) , and consumer loans ($ShrCONS$) in the lending portfolio. The table also reports normalized differences (Nor-diff) which is measured as the difference in means scaled by average within group standard deviations.

Table 3: Descriptive tables related to Restrictiveness Index

(a) Number and percent of changes to restrictiveness index

YEAR	**1995**	**1996**	**1997**	**1998**	**2000**	**2001**	**2002**	**2004**	**2005**
No. of Events	2	11	15	3	3	2	3	1	2
Percent of Events	5%	26%	36%	7%	7%	5%	7%	2%	5%

(b) Average branches and deposits by level of restrictiveness index

Level of Restrictiveness Index	**No. of branches**	**Deposits ($ mn)**
0	1,831	82.3
1	2,020	107.6
2	2,080	187.7
3	1,740	94.9
4	1,470	55.8

(c) Average change in branches and deposits by year relative to event

Year relative to Event	**Change in No. of branches**	**Change in deposits ($ mn)**
-2	6.76	2.19
-1	(5.25)	2.25
0	13.08	3.50
1	13.31	3.93
2	14.21	3.44

Panel (a) presents the number and percent of events by year. An event is defined as a change in restrictions to interstate branching, measured using the restrictiveness index of Rice and Strahan (2010). The index, measured at the state level, counts the number of restrictions to interstate branching. The index varies from zero for the least restrictive states, to four for states with the greatest number of restrictions. Please see Section 4.2 for a description of the index. Panel (b) presents the average number of branches and average deposits by state-year, by restrictiveness index. Panel (c) presents the average change in the number of branches and deposits by state-year, by year relative to the event, where 0 is the period of the event. Data on number of branches and volumes of deposits are sourced from the FDIC's Summary of Deposits database.

Table 4: Estimated parameters for regression of scaled loan loss provisions on explanatory variables and time period indicators (Test of H1)

		Model 1			Model 2		
Variables	**Prediction**	**Estimate**	**t-stat**	**pvalue**	**Estimate**	**t-stat**	**pvalue**
D_{s-2}	+	1.667	1.460	0.153	1.691	1.550	0.131
D_{s-1}	+	2.430	2.190	0.036	2.695	2.540	0.016
D_0	?	0.801	0.690	0.497	0.770	0.740	0.463
D_{s1}	?	0.118	0.080	0.936	-0.191	-0.160	0.877
D_{s2}	?	-0.929	-0.540	0.590	-1.279	-0.850	0.400
D_3	?	-1.170	-0.630	0.534	-1.762	-1.060	0.295
$SIZE$	?	2.561	7.270	<.0001	5.318	12.860	<.0001
ΔNPA_{-1}	+	515.264	7.880	<.0001	461.902	8.520	<.0001
ΔNPA	+	593.394	6.630	<.0001	554.122	7.290	<.0001
ΔNPA_{+1}	+	227.372	3.870	0.001	258.387	4.080	0.000
CO	+	5916.594	19.990	<.0001	5063.398	14.630	<.0001
$\Delta LOAN$	+	45.415	12.220	<.0001	42.774	11.450	<.0001
ΔGDP	-	-64.746	-2.730	0.010	-46.769	-2.530	0.016
$ShrRE$	?	-10.029	-1.950	0.059	-16.602	-3.680	0.001
$ShrCI$	?	27.818	4.810	<.0001	22.803	4.270	0.000
$ShrCONS$	?	31.736	5.120	<.0001	34.045	4.900	<.0001
$\Delta ShrRE$	?	15.227	1.230	0.227	7.603	0.620	0.537
$\Delta ShrCI$	?	-30.230	-2.220	0.033	-36.851	-3.020	0.005
$\Delta ShrCONS$	?	-16.045	-1.070	0.291	-22.219	-1.500	0.142
ROA	-				-1757.141	-15.400	<.0001
N		36,897			36,897		
Adj-R^2		38.72			43.21		

This table presents results of a regression based on 7 years of data for each bank in the sample. The dependent variable is provisions for loan losses scaled by lagged total loans and leases, net of unearned income and allowance for losses. $D_{s\tau}$ are time period indicators where $\tau = 0$ is the year in which restrictions to interstate branching were eased for state s. Explanatory variables include the natural log of lagged total assets ($SIZE$), lagged, current and leading change in non-performing assets ($\Delta NPA_{-1}, \Delta NPA, \Delta NPA_{+1}$), three year rolling average of scaled net charge-offs (CO), growth in total loans ($\Delta LOAN$), change in state per capita GDP (ΔGDP), share of real estate ($ShrRE$), commercial and industrial ($ShrCI$), and consumer ($ShrCONS$) loans in the lending portfolio, change in the share of real estate ($\Delta ShrRE$), commercial and industrial ($\Delta ShrCI$), and consumer ($\Delta ShrCONS$) loans, and return on assets (ROA). The model includes year and state fixed effects. Standard errors are clustered by state.

Table 5: Estimated parameters for regression of scaled loan loss provisions on explanatory variables and time period indicators, by sample subset and including treatment indicators (Test of H2 and H3)

	Model 1			**Model 2**			**Model 3**		
	TREAT = PUBLIC			**TREAT = HERF**			**TREAT = HERF_HIGH**		
	Estimate	**t-stat**	**pvalue**	**Estimate**	**t-stat**	**pvalue**	**Estimate**	**t-stat**	**pvalue**
D_{s-2}	1.743	1.96	0.050	-1.77	-1.17	0.242	0.849	0.92	0.359
D_{s-1}	2.882	2.50	0.013	0.27	0.15	0.882	2.250	1.91	0.056
D_0	0.781	0.61	0.540	-2.33	-1.23	0.217	0.118	0.09	0.926
D_1	-0.082	-0.06	0.949	-2.35	-1.23	0.217	-0.677	-0.53	0.598
D_2	-0.923	-0.67	0.503	-6.85	-3.39	0.001	-2.823	-2.05	0.040
D_3	-1.206	-0.78	0.436	-3.54	-1.61	0.108	-1.705	-1.08	0.281
$TREAT$	-10.049	-1.58	0.114	-6.79	-2.33	0.020	-2.408	-1.37	0.171
$TREAT * D_{s-2}$	9.692	1.41	0.158	8.65	2.73	0.006	4.220	2.10	0.036
$TREAT * D_{s-1}$	10.602	1.45	0.147	5.25	1.41	0.159	0.420	0.19	0.849
$TREAT * D_0$	9.463	1.34	0.180	6.65	1.81	0.070	1.311	0.60	0.550
$TREAT * D_1$	9.570	1.44	0.151	5.00	1.39	0.163	1.796	0.83	0.408
$TREAT * D_2$	11.961	1.81	0.070	13.25	3.43	0.001	6.675	2.86	0.004
$TREAT * D_3$	12.724	1.85	0.064	4.83	1.32	0.187	0.801	0.35	0.729
N	35,385			36,897			36,897		
Adj-R^2	43.61			43.48			43.48		

This table presents results of a regression based on 7 years of data for each bank in the sample. T-statistics are reported in parentheses. The dependent variable is provisions for loan losses scaled by lagged total loans and leases, net of unearned income and allowance for losses. $D_{s\tau}$ are time period indicators where $\tau = 0$ is the year in which restrictions to interstate branching were eased for state s. Explanatory variables (unreported) include the natural log of lagged total assets, lagged, current and leading change in non-performing assets, three year rolling average of scaled net charge-offs, growth in total loans, change in state per capita GDP, share of real estate, commercial and industrial, and consumer loans in the lending portfolio, and change in the share of real estate, commercial and industrial, and consumer loans. $PUBLIC$ is an indicator variable that takes on a value of 1 for public banks, and a value of 0 otherwise. $HERF$ is the Herfindahl index measured at the county level. $HERF\_HIGH$ is an indicator than takes on a value of 1 for the top quintile of $HERF$ and zero otherwise. The regressions include state and year fixed effects.

Table 6: Estimated parameters for regression of scaled loan loss provisions on explanatory variables and time period indicators, for the state of Texas (Test of H1)

		Model 1			Model 2			Model 3		
Variables	**Prediction**	**Estimate**	**t-stat**	**pvalue**	**Estimate**	**t-stat**	**pvalue**	**Estimate**	**t-stat**	**pvalue**
Intercept	?	-27.552	-1.680	0.093	-16.765	-1.030	0.303	-16.800	-1.030	0.305
D	+	11.579	4.980	<.0001	11.499	5.120	<.0001	11.644	5.010	<.0001
$POST$	?	16.354	4.930	<.0001	14.786	4.580	<.0001	16.480	4.970	<.0001
$SIZE$	?	1.723	1.230	0.220	-1.592	-1.110	0.268	1.830	1.290	0.197
ΔNPA_{-1}	+	557.972	4.470	<.0001	549.332	4.440	<.0001	554.210	4.460	<.0001
ΔNPA	+	848.960	6.550	<.0001	810.527	6.510	<.0001	844.130	6.530	<.0001
ΔNPA_{+1}	+	277.974	2.640	0.009	247.919	2.500	0.013	276.098	2.630	0.009
CO	+	7021.116	17.820	<.0001	6877.306	19.520	<.0001	6973.622	17.600	<.0001
$\Delta LOAN$	+	51.120	5.150	<.0001	49.050	5.040	<.0001	49.503	4.880	<.0001
ΔGDP	-	130.838	1.410	0.159	91.476	1.020	0.307	130.495	1.410	0.158
$ShrRE$	?	-13.887	-1.750	0.081	-12.181	-1.540	0.123	-17.693	-2.200	0.028
$ShrCI$	?	47.038	3.620	0.000	50.168	3.840	0.000	42.499	3.200	0.002
$ShrCONS$	?	26.914	2.200	0.028	23.530	1.990	0.047	26.122	2.150	0.032
$\Delta ShrRE$	?	91.480	2.510	0.012	117.749	3.380	0.001	94.132	2.570	0.010
$\Delta ShrCI$	?	-11.674	-0.290	0.769	17.216	0.450	0.651	-8.396	-0.210	0.833
$\Delta ShrCONS$	?	92.555	2.230	0.026	108.824	2.770	0.006	92.753	2.240	0.026
ROA	?				1904.085	7.940	<.0001			
$TIER1$	?							-87.408	-2.070	0.039
Adj-R^2		43.66			46.26			43.76		

This table presents results of a regression based on 8 years of data, from 1994 to 2001, for each bank in the sample. There are 4,280 firm-year observations. The sample is restricted to community banks headquartered in the state of Texas. The dependent variable is provisions for loan losses scaled by lagged total loans and leases, net of unearned income and allowance for losses. D is an indicator variable that takes on a value of 1 in the treatment period, and 0 otherwise. $POST$ is an indicator variable that takes on a value of 1 in the post-treatment period and 0 otherwise. Explanatory variables include the natural log of lagged total assets ($SIZE$), lagged, current and leading change in non-performing assets ($\Delta NPA_{-1}, \Delta NPA, \Delta NPA_{+1}$), three year rolling average of scaled net charge-offs (CO), growth in total loans ($\Delta LOAN$), change in state per capita GDP (ΔGDP), share of real estate ($ShrRE$), commercial and industrial ($ShrCI$), and consumer ($ShrCONS$) loans in the lending portfolio, change in the share of real estate ($\Delta ShrRE$), commercial and industrial ($\Delta ShrCI$), and consumer ($\Delta ShrCONS$) loans, return on assets (ROA) where returns are measured before provisions, and tier-1 capital ratio ($TIER1$). Standard errors are clustered by firm.

Table 7: Pre-treatment descriptive statistics for treated and control groups

(a) Before matching

	Control (N = 1880)		**Treated (N = 535)**		**Difference in Means**		
Variables	**Mean**	**s.d.**	**Mean**	**s.d.**	**t-stat**	**pvalue**	**Nor-diff**
$SIZE$	10.523	0.826	10.666	0.787	3.667	0.000	0.177
ROA	0.012	0.005	0.012	0.005	2.359	0.018	0.116
$\Delta LOAN$	0.105	0.140	0.115	0.188	1.185	0.236	0.062
$TIER1$	0.107	0.034	0.103	0.030	-3.032	0.002	-0.142
LLP	0.003	0.006	0.003	0.007	1.481	0.139	0.077
CO	0.002	0.005	0.003	0.007	3.877	0.000	0.204
$ShrRE$	0.457	0.177	0.424	0.173	-3.845	0.000	-0.187
$ShrAGRI$	0.214	0.196	0.139	0.163	-8.972	0.000	-0.417
$ShrCI$	0.151	0.088	0.176	0.097	5.303	0.000	0.267
$ShrCONS$	0.164	0.113	0.248	0.135	13.008	0.000	0.668

(b) After matching

	Control (N = 318)		**Treated (N = 318)**		**Difference in Means**		
Variables	**Mean**	**s.d.**	**Mean**	**s.d.**	**t-stat**	**pvalue**	**Nor-diff**
$SIZE$	10.749	0.742	10.770	0.780	0.359	0.720	0.028
ROA	0.012	0.004	0.012	0.004	1.153	0.249	0.091
$\Delta LOAN$	0.099	0.079	0.108	0.106	1.190	0.235	0.094
$TIER1$	0.105	0.028	0.103	0.029	-1.016	0.310	-0.081
LLP	0.002	0.003	0.002	0.003	-1.337	0.182	-0.106
CO	0.002	0.002	0.002	0.002	1.004	0.316	0.080
$ShrRE$	0.483	0.149	0.465	0.179	-1.304	0.193	-0.103
$ShrAGRI$	0.154	0.152	0.158	0.175	0.337	0.736	0.027
$ShrCI$	0.164	0.080	0.167	0.082	0.489	0.625	0.039
$ShrCONS$	0.187	0.098	0.196	0.095	1.185	0.236	0.094

This table reports descriptive statistics for banks in the treated and control samples for the pre-treatment period, before and after the matching procedure. Treated banks include community banks from the state of Texas. Banks in the control sample include community banks from states of Colorado, Iowa, Missouri, New Mexico, Nebraska, Kansas, and Arkansas. Covariate balance was obtained by matching on firm characteristics by using a greedy algorithm. The variables used in the matching procedure include natural log of total assets ($SIZE$), return on assets (ROA), Tier-1 leverage ratio ($TIER1$), three year rolling average of scaled net charge-offs (CO), share of real estate ($ShrRE$), agricultural ($ShrAGRI$), commercial and industrial ($ShrCI$) , and consumer loans ($ShrCONS$) in the lending portfolio. Variables reported in this table also include growth in total loans ($\Delta LOAN$), and scaled loan loss provisions (LLP). The table also reports normalized differences (Nor-diff) which is measured as the difference in means scaled by average within group standard deviations.

Table 8: Estimated parameters for regression of scaled loan loss provisions on explanatory variables and time period indicators, using a matched sample of firms (Test of H1)

		Model 1			Model 2		
Variables	**Prediction**	**Estimate**	**t-stat**	**pvalue**	**Estimate**	**t-stat**	**pvalue**
$TREAT * D$	+	3.813	1.690	0.092	4.159	1.830	0.068
$TREAT * POST$	?	4.291	1.580	0.115	3.094	1.060	0.291
$SIZE$	?	0.108	0.150	0.884	21.469	4.560	<.0001
ΔNPA_{-1}	+	395.352	7.100	<.0001	343.826	6.520	<.0001
ΔNPA	+	486.605	5.950	<.0001	424.999	4.990	<.0001
ΔNPA_{+1}	+	87.890	1.420	0.157	27.454	0.410	0.685
CO	+	7592.464	21.900	<.0001	5494.293	13.030	<.0001
$\Delta LOAN$	+	37.333	7.500	<.0001	24.152	5.300	<.0001
ΔGDP	-	67.651	2.000	0.046	58.146	1.750	0.081
$ShrRE$	?	-2.469	-0.710	0.476	-10.781	-0.560	0.576
$ShrCI$	?	30.537	4.140	<.0001	35.080	1.410	0.158
$ShrCONS$	?	8.732	1.550	0.121	24.613	1.080	0.279
$\Delta ShrRE$	?	33.962	1.870	0.062	28.252	1.210	0.227
$\Delta ShrCI$	?	12.215	0.670	0.502	3.241	0.140	0.888
$\Delta ShrCONS$	?	-21.599	-0.980	0.326	-35.109	-1.310	0.192
Fixed Effects		Year, State			Year, Firm		
Adj-R^2		41.95			44.82		

This table presents results of a regression based on 8 years of data, from 1994 to 2001, for each bank in the sample. There are 5,088 firm-year observations. The dependent variable is provisions for loan losses scaled by lagged total loans and leases, net of unearned income and allowance for losses. D is an indicator variable that takes on a value of 1 in the treatment period, and 0 otherwise. $POST$ is an indicator variable that takes on a value of 1 in the post-treatment period and 0 otherwise. $TREAT$ is an indicator variable for treated units, which are community banks headquartered in the state of Texas. A matched control sample of banks is drawn from the following states: Colorado, Iowa, Missouri, New Mexico, Nebraska, Kansas, and Arkansas. Explanatory variables include the natural log of lagged total assets ($SIZE$), lagged, current and leading change in non-performing assets ($\Delta NPA_{-1}, \Delta NPA, \Delta NPA_{+1}$), three year rolling average of scaled net charge-offs (CO), growth in total loans ($\Delta LOAN$), change in state GDP (ΔGDP), share of real estate ($ShrRE$), commercial and industrial ($ShrCI$), and consumer ($ShrCONS$) loans in the lending portfolio, and change in the share of real estate ($\Delta ShrRE$), commercial and industrial ($\Delta ShrCI$), and consumer ($\Delta ShrCONS$) loans. Standard errors are clustered by firm.

Table 9: Estimated parameters for regression of scaled loan loss provisions on explanatory variables, including spatial effects

	Prediction	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
		(Within-County)	*(Within-County)*	*(Between-County)*	*(Within-County)*	*(Within-County)*	*(Between-County)*
D	+	10.003	10.019	8.715	10.863	11.081	5.309
		(3.670)	(3.677)	(3.134)	(3.795)	(3.890)	(1.457)
WY	+	0.022	0.021	0.078	0.034	0.036	0.049
		(1.616)	(1.627)	(2.711)	(2.408)	(2.692)	(1.617)
$D * WY$	?				-0.026	-0.033	0.076
					(-1.103)	(-1.436)	(1.575)
R^2		45.16	45.16	45.25	45.19	45.20	45.26

This table presents maximum likelihood estimates for a regression of scaled loan loss provisions on spatial effects (characterized by spatial weight matrix W) and explanatory variables. The regression is based on 8 years of data, from 1994 to 2001, for each bank in the sample. The sample is restricted to community banks headquartered in the state of Texas. D is an indicator variable that takes on a value of 1 in the treatment period, and 0 otherwise. T-statistics are shown in parentheses below the parameter estimates. Models 1 and 4 use an inverse distance measure to define W, Models 2 and 5 use the inverse distance squared, whereas Models 3 and 6 use adjacent counties. Section 6.1 describes the weight matrices. Explanatory variables (unreported) include the natural log of lagged total assets, lagged, current and leading change in non-performing assets, three year rolling average of scaled net charge-offs, growth in total loans, change in state GDP, share of real estate, commercial and industrial, and consumer loans in the lending portfolio, and change in the share of real estate, commercial and industrial, and consumer loans.

Table 10: Tables related to testing for effect of regulator (Test of H4)

(a) Estimation including indicator for strict regulators

Variables	**Prediction**	**Estimate**	**t-stat**	**pvalue**
$STRICT$	+	23.124	3.000	0.003
$STRICT * D_{s-2}$	?	-8.810	-1.160	0.247
$STRICT * D_{s-1}$	?	-10.614	-1.320	0.186
$STRICT * D_{s0}$	?	-17.498	-2.420	0.016
$STRICT * D_{s1}$	?	-10.788	-1.360	0.173
$STRICT * D_{s2}$	?	-9.127	-1.310	0.192
$STRICT * D_{s3}$	?	-12.194	-1.840	0.066
N		5,698		
Adj-R^2		37.22		

(b) Estimation by quintile of distance to regulator's office

Distance to Regulator		**Treatment effect (D)**				
Quintile	**Mean**	**Coeff**	**t-stat**	**pvalue**	**Adj-R^2**	**N**
1	25.7	15.789	4.630	<.0001	67.76	448
2	68.1	9.021	1.870	0.068	66.38	440
3	113.7	5.827	1.890	0.064	47.90	440
4	168.1	-4.095	-1.040	0.303	56.76	440
5	273.1	5.563	1.330	0.190	54.21	440

(c) Estimation including household income variability and distance to regulator's office

Variables	**Prediction**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
D	+	12.010	11.560	11.012	11.827
		(6.12)	(5.46)	(4.59)	(4.41)
$HHInc\_Var1$	?	23.518		29.417	
		(1.61)		(1.66)	
$HHInc\_Var2$	?		27.775		42.928
			(1.25)		(1.43)
$D * HHInc\_Var1$	−	-31.563		-52.279	
		(-2.11)		(-3.08)	
$D * HHInc\_Var2$	−		-42.405		-82.359
			(-1.77)		(-2.71)
$DIST\_REG$	+			0.016	0.016
				(1.83)	(1.85)
Adj-R^2		64.9	64.8	56.2	56.2
N		4280	4280	2252	2252

Panel (a) presents results of a regression based on 7 years of data for each bank in the sample. The dependent variable is provisions for loan losses scaled by lagged total loans and leases, net of unearned income and allowance for losses. $D_{s\tau}$ are time period indicators where $\tau = 0$ is the year in which restrictions to interstate branching were eased for state s. $STRICT$ is an indicator variable that takes on a value of 1 for states where regulators have a leniency index of < 0.05 and 0 if the leniency index is > 0.15. The sample only includes states where the state regulator has a leniency index of < 0.05 or > 0.15. Panels (b) and (c) present results of regressions based on 8 years of data for each bank in the sample, for the state of Texas. Panel (b) shows results of the estimation by quintile of distance to the regulator's office. Panel (c) includes measures of household income variability ($HHInc\_Var1$, $HHinc\_Var2$) and distance to the regulator's office ($DIST\_REG$). The sample is restricted to state-chartered banks for the analyses in Panel (b) and Models 3 and 4 of Panel (c). The dependent variable is provisions for loan losses scaled by lagged total loans and leases, net of unearned income and allowance for losses. D is an indicator variable that takes on a value of 1 in the treatment period, and 0 otherwise. Explanatory variables (unreported) in both panels include the natural log of lagged total assets, lagged, current and leading change in non-performing assets, three year rolling average of scaled net charge-offs, growth in total loans, change in state GDP, share of real estate, commercial and industrial, and consumer loans in the lending portfolio, and change in the share of real estate, commercial and industrial, and consumer loans.

Table 11: Tables related to synthetic control analysis

(a) Pre-treatment means for predictor variables

Variables	Texas		Average of 7 control states
	Real	Synthetic	
$log(GDP)$	10.234	10.147	10.163
$\Delta UNEMP$	-0.272	-0.111	-0.163
ΔNPA (1992)	-34.374	-35.507	-19.927
ΔNPA (1993)	-17.203	-15.080	-6.538
ΔNPA (1994)	-13.508	-12.541	-4.629
ΔNPA (1995)	0.000	0.680	0.722
ΔNPA (1996)	3.810	3.179	3.060
ΔNPA (1997)	0.000	-0.014	0.224

(b) State weights in synthetic Texas

State	Weight
Arkansas	0.0000
Colorado	0.0003
Iowa	0.0002
Kansas	0.0001
Missouri	0.3553
Nebraska	0.1368
New Mexico	0.5073

(c) Pre and post treatment mean squared prediction error (MSPE) for Texas and control states

State	Pre-treatment MSPE	Post-treatment MSPE			Ratio of Post-MSPE to Pre-MSPE		
		98-03	98-05	98-08	POST 98-03 /PRE	POST 98-05 /PRE	POST 98-08 /PRE
Texas	1.26	27.95	23.59	42.01	22.11	18.66	33.24
Arkansas	13.15	116.48	93.43	96.17	8.86	7.11	7.32
Colorado	23.62	89.43	71.49	216.57	3.79	3.03	9.17
Iowa	1.86	13.19	10.85	30.91	7.11	5.84	16.64
Kansas	1.50	11.19	8.47	30.80	7.48	5.66	20.58
Missouri	1.03	3.55	4.50	27.23	3.46	4.38	26.49
Nebraska	5.65	4.54	6.89	36.16	0.80	1.22	6.40
New Mexico	236.08	90.75	81.63	178.21	0.38	0.35	0.75

This table presents descriptive statistics and results for the synthetic control analysis. Panel (a) reports pre-treatment means of predictor variables for Texas, synthetic Texas, and all control states. Panel (b) presents the output of an optimization procedure to create a convex combination of states that closely resembles Texas on pre-treatment predictor variables reported in Panel (a). Panel (c) presents the mean squared prediction error (MSPE) for Texas and all control states. MSPE is the average squared difference between a state and its synthetic control. Synthetic controls were created for all 7 control states by using the remaining 6 control states (excluding Texas).

Table 12: Estimated parameters for regression of scaled loan loss provisions on explanatory variables and time period indicators, including additional variables

		Model 1			Model 2		
Variables	**Prediction**	**Estimate**	**t-stat**	**pvalue**	**Estimate**	**t-stat**	**pvalue**
Intercept	?	-28.120	-1.710	0.087	-28.886	-2.460	0.014
D	+	11.648	5.020	<.0001	9.350	4.640	<.0001
$POST$	?	16.461	4.920	<.0001	15.117	4.690	<.0001
$SIZE$	?	1.721	1.220	0.222	1.503	1.530	0.127
ΔNPA_{-1}	+	545.539	4.390	<.0001	426.139	3.770	0.000
ΔNPA	+	828.562	6.280	<.0001	597.107	5.100	<.0001
ΔNPA_{+1}	+	238.210	2.020	0.044	143.629	1.300	0.194
CO	+	6997.919	17.630	<.0001	5993.366	18.090	<.0001
$\Delta LOAN$	+	51.077	5.100	<.0001	29.031	3.260	0.001
ΔGDP	-	125.038	1.350	0.179	152.904	1.750	0.080
$ShrRE$	?	-13.239	-1.670	0.095	-6.348	-1.060	0.290
$ShrCI$	?	48.213	3.720	0.000	37.799	4.040	<.0001
$ShrCONS$	?	27.987	2.300	0.022	7.675	0.870	0.382
$\Delta ShrRE$	?	90.997	2.480	0.013	66.801	2.080	0.038
$\Delta ShrCI$	?	-11.858	-0.300	0.766	-31.306	-0.930	0.351
$\Delta ShrCONS$	?	90.745	2.190	0.029	64.530	1.770	0.078
ΔNPA_{+2}	?	-93.719	-1.090	0.277	-55.049	-0.550	0.581
ΔNPA_{+3}	?				29.070	0.330	0.745
ΔNPA_{+4}	?				60.548	0.800	0.423
ΔNPA_{+5}	?				101.557	1.420	0.156
LLP_{+1}	?				0.174	9.340	<.0001
LLP_{+2}	?				0.022	1.360	0.175
LLP_{+3}	?				0.056	3.700	0.000
Adj-R^2		43.63			49.24		

This table presents results of a regression based on 8 years of data, from 1994 to 2001, for each bank in the sample. The sample is restricted to community banks headquartered in the state of Texas. The dependent variable is provisions for loan losses scaled by lagged total loans and leases, net of unearned income and allowance for losses. D is an indicator variable that takes on a value of 1 in the treatment period, and 0 otherwise. Explanatory variables include the natural log of lagged total assets ($SIZE$), lagged, current and leading change in non-performing assets ($\Delta NPA_{-1}, \Delta NPA, \Delta NPA_{+1}$), three year rolling average of scaled net charge-offs (CO), growth in total loans ($\Delta LOAN$), change in state per capita GDP (ΔGDP), share of real estate ($ShrRE$), commercial and industrial ($ShrCI$), and consumer ($ShrCONS$) loans in the lending portfolio, and change in the share of real estate ($\Delta ShrRE$), commercial and industrial ($\Delta ShrCI$), and consumer ($\Delta ShrCONS$) loans. Additional variables in this table include two to five year ahead change in non-performing assets (NPA_{+2}, NPA_{+3}, NPA_{+4}, NPA_{+5}), and one to three year ahead scaled loan loss provisions (LLP_{+1}, LLP_{+2}, LLP_{+3}).

Table 13: Tables related to testing for ex post entry

(a) Correlation Matrix

	BranchGr0	*BranchGr1*	*AdjLLP*	*HHInc*	*PopGr*	*CntyROA*	*Density*
BranchGr0		0.886	-0.259	0.244	0.246	0.051	-0.362
		<.0001	0.000	0.000	0.000	0.459	<.0001
BranchGr1	0.888		-0.251	0.284	0.258	0.054	-0.340
	<.0001		0.000	<.0001	0.000	0.429	<.0001
AdjLLP	-0.263	-0.282		-0.155	-0.232	0.089	0.378
	<.0001	<.0001		0.023	0.001	0.194	<.0001
HHInc	0.317	0.281	-0.256		0.288	0.155	-0.249
	<.0001	<.0001	0.000		<.0001	0.022	0.000
PopGr	0.256	0.260	-0.211	0.231		0.097	-0.361
	0.000	0.000	0.002	0.001		0.154	<.0001
CntyROA	0.150	0.154	-0.051	0.150	0.178		-0.039
	0.027	0.023	0.458	0.028	0.009		0.573
Density	-0.453	-0.419	0.342	-0.292	-0.372	-0.185	
	<.0001	<.0001	<.0001	<.0001	<.0001	0.006	

(b) Estimated parameters for regression of county level branch growth on adjusted loan loss provisions and control variables

		Model 1			**Model 2**		
Variables	**Prediction**	**Estimate**	**t-stat**	**pvalue**	**Estimate**	**t-stat**	**pvalue**
Intercept	?	-96.627	-1.240	0.215	-139.439	-2.260	0.025
AdjLLP	-	-0.035	-1.520	0.131	-0.035	-1.750	0.082
HHInc	+	11.106	1.490	0.137	15.325	2.590	0.010
PopGr	+	16.133	1.450	0.148	19.257	1.610	0.110
CntyROA	+	80.005	0.500	0.615	67.387	0.380	0.708
Density	-	-19.014	-3.550	0.001	-16.668	-2.650	0.009
N		216			216		
Adj-R^2		15.81			16.08		

This table presents analysis related to testing for ex post entry. Panel (a) presents a correlation matrix of branch growth ($BranchGr0, BranchGr1$), ex-ante loan loss provisions adjusted for predictors of loan loss provisions ($AdjLLP$), and county characteristics measuring attractiveness for entry. These include household income ($HHInc$), population growth ($PopGr$), profitability of banks in a county ($CntyROA$), and pre-existing branch density ($Density$). Panel (b) presents results of cross-sectional regressions at the county-level, where the dependent variable is growth in branches. Model 1 uses growth in branches one year after treatment, over the year before treatment ($BranchGr0$). Model 2 uses growth in branches two years after treatment over the same base year ($BranchGr1$).