Bank Diversification and Lending Resiliency

Michael Gelman Itay Goldstein Andrew MacKinlay*

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Abstract

In this paper, we show how bank asset diversification benefits the economy. Diversification reduces the bank's idiosyncratic risk and stabilizes its stream of earnings. Banks lend more in normal times and maintain credit supply during negative shocks, when credit availability is paramount. Diversification-induced lending, as well as its resiliency, leads to positive spillovers to the economy. We use changes in bank regulation as exogenous shocks to identify the causal effect of asset diversification. Our results speak to the debate about whether bank expansion into new activities benefits or threatens the economy and provide some counterbalance to concerns about systemic risk.

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*Michael Gelman: University of Delaware, Newark, DE 19716. Email: gelmanm@udel.edu. Itay Goldstein: Wharton School, University of Pennsylvania, Philadelphia, PA 19104. Email: itayg@wharton.upenn.edu. Andrew MacKinlay: Pamplin College of Business, Virginia Tech, Blacksburg, VA 24061. Email: acmackin@vt.edu. We are grateful for comments by Linda Allen, Panagiotis Avramidis (discussant), Don Bowen, Yongqiang Chu (discussant), Amina Enkhbold (discussant), John Hackney (discussant), Paul Laux, Evren Örs (discussant), Phil Strahan (discussant), Alexandros Vardoulakis (discussant), Shengxing Zhang (discussant) as well as seminar and conference participants at the 2022 AFA, 2022 SFS Cavalcade North America, FIRS 2022, 2022 MFA, 2022 NFA, 2021 FIFI, Craig Holden Memorial Finance Conference, 2nd Interconnectedness of Financial Systems Conference, 2021 IFABS, Virginia Tech, John Hopkins, Drexel University, Temple University, Lehigh University, and Bank of Italy. This work started when Michael Gelman visited Wharton.

Over the last three decades, banks in the U.S. have become much more diversified. Regulation that was put in place in the Great Depression has been gradually removed in the 1990s, allowing banks to operate across state lines and invest in different business segments. Diversification drew criticism in the wake of the 2008 financial crisis, as it was blamed for increasing fragility and systemic risk (Acharya, 2009; Ibragimov, Jaffee, and Walden, 2011; Wagner, 2010, 2011; Goldstein, Kopytov, Shen, and Xiang, 2022). However, diversification can also play a positive role, as it enables banks to lend more without increasing their risks to excessively high levels. These benefits of diversification have not received much attention in the literature, yet they are of utmost importance, given the central role that banks play in driving economic activity, especially following negative shocks (Bernanke and Gertler, 1995; Peek and Rosengren, 1997, 2000).

In this paper, we provide an empirical exploration into this potential benefit of bank diversification. Our hypothesis is that diversification encourages banks to lend more. The three key premises behind this hypothesis are that diversification allows banks to reduce their idiosyncratic risk and stabilize their stream of earnings, that lending is inherently risky, and that banks have a limited capacity for taking risk. We investigate whether shocks to diversification boost lending, and also whether more diversified banks maintain higher levels of lending following a negative economic shock, when lending is particularly important. We also analyze whether the diversification-induced lending provides positive spillovers to the economy. Overall, our findings confirm the positive role that bank diversification plays in lending and the broader benefits to the economy. Hence, we point to a bright side of diversification, playing against the dark side that is often emphasized when it comes to financial fragility and systemic risk.

Our analysis begins with geographic diversification. Our main measure is based on the number of states where a bank reports small business lending activity. Geographic diversification, according to this measure, has increased significantly in recent years. In 1997, the average bank conducted small business lending across 8 states, whereas in 2017 this number increased to 15 states. This measure captures in a simple and intuitive way the geographic span of a bank's

activity, but our results are robust to alternative measures, such as the number of counties where a bank lends or a measure of lending diversification based on the Herfindahl-Hirschman Index (HHI). In a baseline analysis, we establish that a higher geographic diversification is associated with more lending (as a proportion of total assets). For our main measure, over a sample period of 1997–2017, a one standard deviation increase in geographic diversification is associated with a 1.4% quarterly increase in lending. Consistent with our proposed underlying mechanism, we confirm that asset diversification is associated with a lower idiosyncratic risk and more stable earnings.

Bank lending plays a critical role for recovery from large negative economic shocks. In the 2008 crisis, various government policies attempted to revive bank lending and research tried to identify the best ways of doing so (Bebchuk and Goldstein, 2011). Based on our proposed mechanism, we expect that more diversified banks would be in a better position to absorb the risk from lending and hence that their lending would be more resilient following a negative economic shock. We test this hypothesis utilizing the 2008 financial crisis, which was arguably an unanticipated shock to lending opportunities, by far the largest one in our sample period. Indeed, we find support for our channel. Using a difference-in differences analysis, and exploiting the heterogeneity in diversification prior to the onset of the crisis, we show that the most geographically diversified banks had 6.7% more total lending than the least diversified banks after the crisis.

To investigate the effect of lending resiliency on the economy, we focus on small business lending. This is an economically important segment that is highly bank-dependent.[1] Moreover, the availability of county-level data for this type of lending allows us to sharpen the identification of the effect of bank diversification. Our analysis shows that, in a given county and year, the most geographically diversified banks maintain twofold higher levels of small business lend-

[1] In 2014, small firms accounted for 43.5% of GDP (Kobe and Schwinn, 2018). Over 99% of American firms are small businesses, they employ 48% of the private workforce, and account for over 60% of net job creation (U.S. Census Business Dynamics Statistics). At the same time, smaller firms are exposed to higher financial constraints due to frictions such as agency and moral hazard problems or the inability to provide strong collateral (Holmström, 1979; Holmström and Tirole, 1997).

ing during the financial crisis, compared to the least diversified banks. In the spirit of Khwaja and Mian (2008), these results are found while controlling for local economic conditions using county-year fixed effects. Hence, the results represent a supply effect, whereby more diversified banks choose to provide more credit, rather than a demand effect. Finally, to gauge the overall economic impact, we aggregate banks within each county. We find that counties with a one standard deviation higher share of diversified banks experience 4.2% higher aggregate small business lending in the crisis. This leads to meaningful real effects, as the higher county-level diversification is associated with 0.8% higher small business related employment. The lending resiliency of more diversified banks does not come at the expense of other banks. Instead, geographically diversified banks help promote overall economic activity.

Importantly, geographic diversification is distinct from bank size, which is a bank characteristic that gets a lot of attention in policy and research. The cross-sectional correlation between a bank's total assets and the number of states in which it conducts small business lending was 0.29 in 2017. Thus, in our analysis, we can separate the effect of a bank's diversification from that of its size and find the positive effects of bank diversification on lending. The fact that diversification and size appear to be such different aspects is important for understanding how our results can be reconciled with those in other papers. For example, Chen, Hanson, and Stein (2017) and Gopal and Schnabl (2022) show that the largest banks reduced small business lending following the 2008 crisis. We verify these results, and yet show that diversification was an important characteristic encouraging banks to lend more in that period. Another important aspect to consider is funding diversification, which may be related to geographic asset diversification (Levine, Lin, and Xie, 2020; Doerr and Schaz, 2021), and reduce bank risk independently (Goetz, Laeven, and Levine, 2016). We thus include the geographic breadth of funding as an additional control and show that our results are not about funding diversification. In general, in all our specifications we control for other relevant bank characteristics, and so the results can be interpreted as measuring the effect of diversification controlling for these related factors.

To deal more directly with alternative explanations for the results, we consider changes in

the bank's credit supply following exogenous shocks to bank geographic diversification. For our shocks, we rely on the staggered relaxation of state-level banking restrictions driven by the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994. The act allowed banks to expand lending in other states by removing obstacles to opening new branches or acquiring in-state banks in those states (Becker, 2007; Demyanyk, Ostergaard, and Sørensen, 2007; Rice and Strahan, 2010; Krishnan, Nandy, and Puri, 2014). As the dates vary for each state's exact implementation of the act, we identify 19 distinct regulatory shocks over our sample period. In a difference-in-differences analysis, we organize banks into cohorts for each distinct regulatory shock. For each cohort, we classify the out-of-state banks that lend in the deregulated state prior to the shock as the treated group and those banks that never lend in the deregulated state as the control group. Focusing on small business lending where we can identify the locations of the borrowers, we then consider the effect of the shock on the banks' lending in the states that *do not* experience the regulatory change.

The crux of the identifying assumption is that the principal reason a regulatory change in one state would affect small business lending in another state is through the diversifying effect of additional lending in the deregulated state. By defining the banks, which were already lending in the deregulated state, as the treated group, we focus on those banks who can benefit the most from the regulatory shock as they are in the best position to expand their lending in this state following the removal of additional restrictions. Indeed, we verify that the treated banks are those who utilize the opportunity to expand lending in the deregulated state the most. However, to the extent that one might be concerned that these treated banks would be less affected because they were already benefiting from lending in the deregulated state, we also run our analysis under the assumption that the treated banks are those that enter the state following the regulatory change, and have not been active there before. Our results hold in that specification as well.

Overall, our main analysis shows that treated banks increase small business lending in otherwise unaffected states by about 16.9% relative to the untreated banks. This result is obtained after including rigorous fixed effects—bank-county by cohort and county-year by cohort—for

each cohort, to avoid any influence of potentially overlapping shocks or variation in local loan demand on the estimate of the treatment effect. We also show that our finding is robust to using the alternative difference-in-differences estimator proposed by Callaway and Sant'Anna (2021). In robustness tests, we verify that the results hold in a subsample of out-of-state banks that expand lending but do not report deposits in the deregulated state, and so the effect cannot be attributed to funding diversification. Also, we find that our results remain robust when excluding states that neighbor the deregulated state, which is important for our story given that diversification to more distant geographic areas is expected to be more effective compared to closer ones. Finally, gauging the aggregate implications of the deregulation shocks, we show that lending is 7.6% higher for a one standard deviation increase in the number of treated banks in a county, leading to an increase of 4.7% in small business related employment.

In the rest of the paper, we explore another dimension of asset diversification—the extent to which banks engage in non-lending business activities. The imperfect correlation between these activities and lending may imply similar benefits of diversification as with the geographic measure. However, a lot has been written about the way that certain non-lending activities distract banks from their core business of lending and the resulting negative impact on the banking system (e.g., Brunnermeier, Dong, and Palia, 2020). Hence, we start with exploring how different non-lending activities interact with bank lending. We classify the banks' non-lending activities into five business segments: insurance activities; securities broker-dealer and investment banking; securitization; non-deposit trust subsidiaries, such as fiduciaries; and trading activity. We look at how these activities relate to lending over the full sample and during the financial crisis. Interestingly, we find that only insurance activity is positively associated with lending either in the full sample or during the financial crisis. Given these results, we concentrate the remaining analysis on insurance activities. They represent a relatively new business line for banks, but are very common by now: almost half of the banks own at least one domestic insurance subsidiary by 2017. The literature has pointed out the expected effect that holding insurance companies will have in reducing bank earnings volatility (Boyd, Graham, and Hewitt, 1993; Lown, Osler,

Sufi, and Strahan, 2000), but these activities have not been studied much compared to other non-lending activities.

Our analysis shows that banks' insurance activities improve their lending resiliency during the financial crisis. Banks with an established insurance subsidiary before the crisis lend about 3% more during the crisis compared to other banks. For small business lending, we find that banks with an established insurance subsidiary maintain 38% higher levels of lending than otherwise similar banks in a given county and year. Our analysis includes the other bank controls to account for relevant alternative explanations as discussed for the geographic diversification case. Considering the aggregate county-level effects, we find similar positive spillovers in terms of economic magnitude for insurance as with geographic diversification. Overall, it seems that diversifying into insurance enables banks to lower idiosyncratic risk and stabilize earnings, which lead to more resilient lending during the crisis.

As a final test, we use an exogenous shock to insurance activity by banks and examine the effect on bank lending. This is the passage of the Gramm-Leach-Bliley Act in 1999. It repealed part of the Glass-Steagall Act of 1933 and allowed financial institutions to combine commercial lending, investment banking, and insurance activities. We compare the small business lending activities of banks that acquire or establish an insurance subsidiary immediately following the act to those that do so at a later time. We find that the banks that got into insurance activities increased small business lending by around 35% relative to their peer banks. On the aggregate level, one standard deviation more treated banks in a county is associated with 3.2% higher county-level lending and 0.6% higher small business related employment. Although they represent different dimensions of diversification, we show that both geographic expansion and acquisition of insurance activities improve lending resiliency and provide positive spillovers to the communities in which these banks lend.

To summarize the contribution of the paper, we believe that we are the first to establish that asset diversification by banks leads to a higher and more stable credit supply, and that this provides positive spillovers to the economy. We differ from past work on bank diversification that

focused on the sources of funding (Levine, Lin, and Xie, 2020), the risk implications (Demsetz and Strahan, 1997; Goetz, Laeven, and Levine, 2016; Berger, El Ghoul, Guedhami, and Roman, 2017), or the effects on bank profitability and shareholder value (DeLong, 2001; Stiroh and Rumble, 2006; Laeven and Levine, 2007; Schmid and Walter, 2009; Goetz, Laeven, and Levine, 2013). While this literature has come to mixed conclusions on whether diversification is beneficial at a bank level, we find that asset diversification leads to positive spillovers to the economy from increased lending activity.

The results contribute to the long-standing debate in the literature and among policy makers about whether the expansion of banks into new activities benefits or threatens the economy, and how far banks should be permitted to expand (Yellen, 2013). In the United States, there have been many significant regulatory reforms regarding the nature of banks and their activities. Much attention was given to the fact that higher interdependence among banks, caused by asset diversification, may lead to risk contagion and a rise in systemic risk (Ibragimov, Jaffee, and Walden, 2011; Wagner, 2011; Allen, Babus, and Carletti, 2012; Berger, El Ghoul, Guedhami, and Roman, 2017; Chu, Deng, and Xia, 2019; Goldstein, Kopytov, Shen, and Xiang, 2022). Our results may help offset these concerns as we show that when a crisis occurs, the maintained loan supply of more diversified banks contributes to recovery.

We also relate to the broader literature on lending to bank-dependent firms. Other papers have considered the dynamics of small business lending by focusing, for example, on the relationships between banks and firms (Santikian, 2014; Beck, Degryse, De Haas, and van Horen, 2018), the spillover effects from tax policy (Smolyansky, 2019), or lending changes around the financial crisis (Berger, Cerqueiro, and Penas, 2014; Chen, Hanson, and Stein, 2017; Cortés, Demyanyk, Li, Loutskina, and Strahan, 2020; Bord, Ivashina, and Taliaferro, 2021; Gopal and Schnabl, 2022). Our contribution is to establish the effect of the important variable of bank asset diversification on this category of small business lending and its implications for employment.

Finally, our paper speaks to the broader question about the optimal boundaries of the firm. There is a large literature that considers the benefits and costs of firms diversifying across busi-

ness activities. On the positive side, diversification may increase firm access to better productive opportunities (Gomes and Livdan, 2004) or bring more effective monitoring by the capital provider and better asset deployment (Gertner, Scharfstein, and Stein, 1994; Stein, 1997). On the negative side, it may reduce entrepreneurial incentives and firm frictions may lead to cross-subsidization, divisional rent-seeking, or other agency conflicts that result in inefficient resource allocation (Jensen, 1986; Lamont, 1997; Shin and Stulz, 1998; Scharfstein and Stein, 2000). In our case, we show diversification can benefit the core business of banks rather than distract from it. These benefits spill over to the broader economy through the positive real effects from increased lending.

The remainder of the paper is organized as follows. In Section I, we discuss the sources of data, our measures of diversification, and other variables used in the analysis. Section II investigates the relation between geographic diversification and lending. In Section III, we analyze the role of geographic diversification on lending during the financial crisis. Section IV uses exogenous shocks to geographic diversification to demonstrate the impact of asset diversification on bank lending. Section V discusses the effects of business line diversification in general and during the financial crisis. Section VI considers an exogenous shock to insurance diversification. Section VII concludes.

I. Data

For our analysis, we bring together a few sources of data. The majority of our bank-level variables are from the Federal Reserve's quarterly Y-9C (consolidated bank holding company data) reports.[2] For our small business lending data, we use the Federal Financial Institutions Examination Council's (FFIEC) Community Reinvestment Act (CRA) small business lending

[2]Throughout our paper, we consider banks at a bank holding company (BHC) level. We often refer to BHCs as banks for simplicity. This includes financial holding companies (FHCs), which are a classification of BHCs that engage in a broad range of financial activities. Most large BHCs are registered as FHCs (Avraham, Selvaggi, and Vickery, 2012).

data. All banks over a certain threshold of total assets are required to report this data.[3] We match and aggregate the small business lending data to the BHC parent level. We also collect the quarterly organizational structure of all the BHCs in our sample. Available from the FFIEC's National Information Center (NIC), the data provides the complete subsidiary structure of each bank, including the institution names, Federal Reserve identifiers (RSSD IDs), location, and a categorization of each institution type.[4] For bank deposit data, we use the FDIC's Summary of Deposits data, aggregated to the BHC level. For additional county-level economic data, such as employment, we use the data provided by the U.S. Bureau of Economic Analysis.

Our data sample runs from 1997 until 2017.[5] We conduct our aggregate BHC-level lending analysis on a quarterly level. As the small business lending data is annual, the small business lending analysis is at an annual level.

I.A. Measures of diversification

We measure diversification along two dimensions in this paper. For geographic diversification, our main measure is the number of states where the bank operates. Using the CRA data, we define *No. of States, Loans* as the number of states that a bank reports some small business lending activity in a given year.[6] Separately, we also count the number of states where banks report deposit activity (*No. of States, Deposits*). Interestingly, we find the majority of banks have larger lending than deposit footprints. The median bank in our sample lends in three times as many states as it reports deposits. This difference suggests that banks can have quite different geographic diversification when it comes to their assets and liabilities, and controlling for both

[3]For 2006 and earlier, the threshold is $250 million. Starting in 2007, the FFIEC began annual updates of the asset threshold level required for reporting. For 2007, the asset threshold was increased to $1.033 billion. By 2017, the threshold reached $1.226 billion. See `https://www.ffiec.gov/cra/reporter.htm` for the yearly thresholds.

[4]The NIC data is generated from FR Y-6 *Annual Report of Bank Holding Companies* and FR Y-10 *Report of Changes in Organizational Structure*. See Avraham, Selvaggi, and Vickery (2012) for an overview of BHC organizational structures and other regulatory details.

[5]Small business lending data is available starting in 1996 and as we rely on lagged lending activity for some of our measures, we begin analysis in 1997.

[6]The measure counts each distinct state FIPS code, which includes Washington D.C. and U.S. territories such as Puerto Rico. Limiting our analysis to the fifty states does not change our results.

types of diversification separately may be important. As robustness checks for our geographic diversification measure, we use two alternative measures, *Log No. Counties, Loans* and *Geographic Share, Loans*. *Log No. Counties, Loans* is the log of the number of counties where a bank reports small business lending. *Geographic Share, Loans* is evaluated as one minus the HHI of a bank's lending across states. This measure captures the relative concentration of a bank's lending.

The top panel of Figure 1 presents the change in geographic diversification over time for a balanced panel of banks.[7] From around 2000 until 2007, the average bank increased its lending footprint steadily. Following the 2008 crisis, there was a moderate decrease in the expansion to new states, but it returned to the pre-crisis trend starting in 2011. By 2017, these banks conducted small business lending in around 15 states.

For business line diversification, we consider both the amount of non-interest income as a general measure of non-lending diversification (Brunnermeier, Dong, and Palia, 2020) and separate measures of activities. We consider five distinct lines of activity: insurance, securities broker-dealer and investment banking, trust and fiduciary services, securitization, and trading. For most of these lines, we identify the presence of these activities by identifying pertinent domestic subsidiaries from the NIC BHC organizational data. Appendix A details the exact procedure for classifying business-line-related subsidiaries. For trading activity, we use the fraction of trading income to assets as we are not able to cleanly identify subsidiaries associated with trading.

The bottom panel of Figure 1 presents the change in business segment diversification over time for a balanced panel of banks as measured by the presence of subsidiaries. Insurance activity is the most common of the activities. In 2017, 54% of these banks have at least one domestic insurance subsidiary (49% of all banks in the full, non-balanced sample). It has also grown the most over our sample. The other business lines have remained relatively similar over the

[7] As the threshold for reporting CRA data changes over the sample period, here we present the figure for a balanced panel to focus on changes in diversification separate from changes in the underlying sample composition. Nevertheless, the figure for all banks is largely similar.

time period. In 2017, about 22% of these banks have a securities broker-dealer subsidiary, 12% have non-deposit trust subsidiaries that engage in fiduciary activities, and 4% have subsidiaries linked to securitization. Over the full sample, 13% of all banks report some trading activity, as measured by non-zero trading income.

I.B. Other bank variables

We consider three categories of lending at the BHC level: total loans, real estate loans, and C&I loans. We use the reported values of the loan types from the quarterly BHC balance sheet data. For small business loans (SBL), this is the total volume originated by a bank in a year. Small-business loans are those loans whose original amounts are $1 million or less and fall into either the "Loans secured by nonfarm or nonresidential real estate" or "Commercial and industrial loans" categories on a bank's balance sheet. Importantly for our purposes, this small business lending data is reported at a county-level, which allows us to more robustly control for economic conditions in the specific area.

Apart from lending data, we include other common bank-level variables such as the natural logarithm of total assets (*Log Assets*), *Equity to Assets*, and *Deposits to Assets*. As a measure of bank profitability, we calculate the bank's average quarterly ROA over the past three years (*Average ROA*) and the bank's *Z-Score* as a measure of the solvency risk of the bank. For some analysis, we include the bank's average annual loan growth over the past three years (*Average Loan Growth*) and its fraction of originated SBL (at a BHC level) to its total balance sheet loans at the end of the year (*SBL to Loans*). The summary statistics for these variables are reported in Table I. The data sources used and the exact variable definitions are provided in Appendix Table A.1.

I.C. County variables

Apart from bank-level variables, we include a few county-level variables as well. Specifically, we aggregate all the SBL in a given county and year to measure the aggregate amount of small

business lending. To investigate the impact of small business lending on the county economy, we use a measure of small business employment. Specifically, we use the total full-time and part-time employment for nonfarm proprietors. The BEA estimates this employment data using IRS data from tax return forms primarily submitted by small businesses.

When we consider the effects of diversification at a county-level, we need aggregate versions of our diversification measures and other control variables. To accomplish this, we create county-level weighted averages of our main variables. For weights, we use each bank's reported SBL amount in a county from a prior period, depending on the particular analysis. For the financial crisis, we use the SBL amounts from 2007. For the analysis of the shocks to geographic or business-line diversification, we use the SBL amount in the year prior to the shock.[8] We use past SBL amounts for aggregate weights, as opposed to deposits, because of the evidence that many banks report small business loans in states where they do not report collecting deposits.

II. Asset diversification and bank lending

II.A. The effect of diversification on lending levels

Our analysis begins with the effect of a bank's asset diversification on its lending over time. We use the following specification:

$$\text{Loans to Assets}_{it} = \beta_1 \text{Log No. States, Loans}_{it-1} + \beta_2 \text{Bank Controls}_{it-1} + \alpha_i + \gamma_t + \varepsilon_{it}, \quad (1)$$

where *Loans to Assets* is calculated as bank i's total loans scaled by its total assets in quarter t. Our measure for a bank's geographic diversification is *Log No. States, Loans*, estimated as the log of the number of states with reported small business lending activity. As asset diversification is related to other bank characteristics, we include some additional control variables. Prior literature finds that bank diversification has implications for the funding of banks (Levine, Lin, and Xie, 2020; Doerr and Schaz, 2021), so we separately control for the geographic breadth

[8] See Sections IV and VI for more details on the specific shocks used in the analysis.

of funding sources (*Log No. States, Deposits*), calculated as the log of the number of states with reported bank deposits. We also include the log of the bank's total assets (*Log Assets*), the bank's *Z-Score* (the bank's ROA plus its equity ratio divided by its standard deviation of ROA), the bank's average quarterly ROA over the past three years (*Average ROA*), the bank's equity to assets ratio (*Equity to Assets*), and the bank's deposits to assets ratio (*Deposits to Assets*). We include bank fixed effects to account for any time-invariant bank characteristics and year-quarter fixed effects to control for macroeconomic factors that influence all banks in a given quarter. Standard errors are clustered by bank and the sample period is between 1997-2017.

Columns 1 and 2 in Table II present the results. Across both specifications, diversification is associated with higher bank lending activity. The coefficient estimate of *Log No. States, Loans* is significantly positive, indicating that for a given bank, geographic diversification enhances credit supply. The magnitude of this result is meaningful. A one standard deviation increase in the log number of states (0.84) increases the bank's quarterly loans to assets by 1.4% (using Column 2). This result is found while controlling separately for the bank's size, deposit diversification, and other pertinent bank characteristics.

A potential concern is that a measure based on the number of states is too coarse to capture geographic diversification. As a robustness exercise, we rerun the analysis with two alternative measures, *Log No. Counties, Loans* and *Geographic Share, Loans*. *Log No. Counties, Loans* is the log of the number of counties where a bank reports small business lending. *Geographic Share, Loans* is evaluated as one minus the HHI of a bank's lending across states. This measure captures the relative concentration of a bank's lending. Columns 3 and 4 in Table II present the results using these alternative measures.[9] Increases in *Log No. Counties, Loans* and *Geographic Share, Loans* are both associated with higher loans to assets. The coefficients for these variables are statistically significant at a 5% or higher level. It does not appear that the results are specific to our particular choice of geographic diversification measure.

[9]In place of the control variable *Log No. States, Deposits*, we use analogous versions of this variable that mimic the construction of *Log No. Counties, Loans* and *Geographic Share, Loans*, depending on the specification.

A separate concern is a potential mechanical effect between the measure of the bank's geographic diversification and lending activity, as changes in the number of states where a bank reports small business lending activity may drive the observed effect in total lending unrelated to diversification. To this end, we use total lending scaled by total assets as the dependent variable. Changes in this ratio are not generated solely by lending in more states. Additionally, the use of *Geographic Share, Loans* as an alternative measure of diversification helps to address this concern, as it is not simply based on the number of states in which the bank lends. Finally, to deal more directly with this link between the main independent variable and the outcome variable, in Column 5 of Table II we perform the specification from Column 2 but remove the bank's reported small business loans from the calculation of its loans to assets.[10] In this specification, only the diversification variable is based on the bank's small business lending. We find similar results to our main specification.

As banks expand into new activities and markets, the correlation between their various earnings streams decreases. Asset diversification leads to increased lending and this effect on the bank's credit supply is separate from other bank characteristics.

II.B. The effect of diversification on idiosyncratic risk

In this section, we show that asset diversification reduces a bank's idiosyncratic risk and provides a more stable stream of earnings, which enables it to engage more with the risky activity of lending. To this end, we perform the following specification:

$$\mathrm{Y}_{it} = \beta_1 \text{Log No. States, Loans}_{it-1} + \beta_2 \text{Bank Controls}_{it-1} + \alpha_i + \gamma_t + \varepsilon_{it}, \tag{2}$$

where Y includes measures of idiosyncratic risk and the volatility of ROE and ROA. *Bank Controls* include the bank's log assets, log number of states with deposits, equity to assets,

[10] Banks are only required to report the total amount of small business loans in each June Call Report. We aggregate the total small business loans reported to the BHC level and only focus on the June reports for this specification.

deposits to assets, average ROA, and Z-score.

For idiosyncratic risk, we need estimates of the bank's idiosyncratic return components. Because many of the banks in our sample are not publicly traded, we take the following approach. Using the bank's quarterly return on equity (ROE) and an estimate of the banking sector's overall quarterly ROE (weighted by bank assets), we utilize the following specification:

$$\text{ROE}_{it} = \beta_{it} \text{Bank Sector ROE}_t + \alpha_i + \varepsilon_{it}. \tag{3}$$

We run the specification on a rolling basis with windows of 40 quarters (10 years). We then use the estimated residuals, $\widehat{\varepsilon}_{it}$, to calculate the bank's idiosyncratic volatility. To mitigate potential noise from the estimation of idiosyncratic risk, we calculate the idiosyncratic risk measure over a four-quarter window from time t to time $t+3$.[11] We perform a similar specification to extract the idiosyncratic return component based on return on assets (ROA). For the ROE and ROA volatility measures, we calculate them directly from the bank's reported data using the four quarters from time t to $t+3$. We present the volatilities as annualized percents.

Column 1 of Table III presents the relation between diversification and idiosyncratic risk as measured using ROE. For a one standard deviation increase in the log number of states (0.84), the bank's idiosyncratic risk decreases by about 0.14%, or about 7% of the sample standard deviation. Column 2 uses the alternative idiosyncratic risk measure based on the bank's ROA. We find an economically similar effect as Column 1. Here the one standard deviation change in geographic diversification decreases the idiosyncratic risk by 8% of a standard deviation. Finally, Columns 3-4 present the effect of asset diversification on the volatility of ROE and ROA, respectively. Consistent with the idiosyncratic risk findings above, we find that more diversified banks exhibit more stable earnings.

The more diversified pool of loans reduces the idiosyncratic risk of banks and stabilizes their earnings. This explains why diversified banks maintain higher lending levels over time without

[11] We winsorize the estimates of idiosyncratic risk at the 5% level. We find similar results if we weight the bank sector's ROE by equity instead of assets.

increasing their risk to excessively high levels.

III. Diversification and lending during the financial crisis

III.A. Bank-level lending behavior

The prior section presents general evidence that as banks increase asset diversification, they exhibit less idiosyncratic risk and lend more. In this section, we analyze how diversification affected banks' lending behavior during the 2008 financial crisis. Our reason for considering this period is twofold. First, it serves as an unanticipated shock to the banking system, which led to a large disruption in lending. This shock enables us to better understand how differences in diversification leading up to the crisis affected banks' lending resiliency during the crisis. We expect that more diversified banks would be in a better position to absorb the risk from lending, thus their credit supply would be more resilient following a negative economic shock. Second, lending during a crisis period is inherently important, as it is a key factor for economic recovery (e.g., Kang and Stulz, 2000; Paravisini, 2008).

To analyze the impact of diversification in a time of crisis, we estimate different versions of the following specification:

$$\begin{aligned} Y_{it} =& \beta_1 \text{High Geographic Diversification}_{i,\text{Pre-Crisis}} \times \text{Post-Crisis}_t \\ &+ \beta_2 \text{Bank Controls}_{i,\text{Pre-Crisis}} \times \text{Post-Crisis}_t + \alpha_i + \gamma_t + \varepsilon_{it}. \end{aligned} \tag{4}$$

Here Y represents different lending variables for bank i in quarter t scaled by the pre-crisis level of the bank's assets: total lending, real estate loans, and C&I loans. *Post-Crisis* is an indicator variable for the crisis period, which begins in 2008Q1.[12] For *High Geographic Diversification*, we divide the sample into quartiles based on the number of states in which each bank operated in 2007Q4. *High Geographic Diversification* equals one for the banks in the top quartile (thirteen

[12]The results do not depend on the choice of 2008Q1. If we start the crisis period indicator in 2007Q3 and fix the control variables as of 2007Q2, we get similar results.

or more states) and zero for banks in the bottom quartile (three or fewer states). To clearly identify the effect of diversification, we exclude the middle two quartiles from the analysis. In unreported results, we find similar effects if we use *Log No. States, Lending* as a continuous measure of geographic diversification and include all the banks in the sample. In addition to our main diversification measure, *Bank Controls* include other bank characteristics that likely relate to lending activity, such as *Log No. States, Deposits*, *Log Assets*, *Z-Score*, *Average ROA*, *Equity to Assets*, and *Deposits to Assets*.

Here, we fix our control variables at their 2007Q4 values and interact each control variable with the *Post-Crisis* indicator for two reasons. First, as the crisis also affects many of the other bank controls, we seek to avoid changes in those variables affecting our outcomes of interest (i.e., the "bad controls" problem as discussed in Angrist and Pischke, 2009). Second, by interacting these variables with the crisis indicator, we control for a host of alternative channels that are correlated with but not the exact diversification mechanism in which we are interested. For example, more diversified banks tend to be larger and more profitable.[13] It could be that a bank's pre-crisis size or profitability has an effect on its crisis lending separate from its diversification. In all specifications, we include bank fixed effects (α_i), time fixed effects (γ_t), and cluster standard errors by bank. We focus on a time window around the crisis, from 2005Q1 through 2010Q4.

Table IV presents the results. In Columns 1-2 we consider banks' total loans, in Columns 3-4 real estate loans, and Columns 5-6 C&I loans. In all columns, the outcome variables are scaled by the pre-crisis level of the bank's assets. For similar reasons as for our other control variables, we use the bank's total assets as of 2007Q4 as our scaling factor.

In general, we find positive coefficients for the interaction term *High Geographic Diversification* $\times$ *Post-Crisis*, meaning that more diversified banks maintain their lending during the crisis relative to less diversified banks. For total lending, the most geographically diversified

[13] As mentioned earlier, the correlation between size and geographic diversification is positive but not extreme. In Table A.2, we present the total assets and different diversification measures for the forty largest banks in 2007.

banks have 5.9% higher lending in the crisis and post-crisis period than the least geographically diversified banks (Column 1).[14] In Column 2, we include other pre-crisis variables interacted with the *Post-Crisis* indicator. We find a similar effect for diversification with a slightly higher magnitude. The diversification measure is not simply picking up differences in size, solvency risk, funding diversification, or other characteristics that correlate with diversification but could presumably have unique impacts on lending during the crisis.[15]

We find meaningful economic effects if we focus on real estate loans (Columns 3 and 4) or C&I loans (Columns 5 and 6), with similar economic magnitudes for both types of loans. Overall, diversification is associated with more robust lending during and immediately following the crisis, as diversified banks are in a better position to absorb the risk from lending. These results appear related to a bank having a more diversified portfolio and are not explained by differences in other bank characteristics.

III.B. Diversification, the financial crisis, and small business lending

As more diversified banks can better maintain lending during the crisis, we analyze the spillover effects on the broader economy by focusing on small business lending (Neumark, Wall, and Zhang, 2011; Haltiwanger, Jarmin, and Miranda, 2013). Small businesses are particularly reliant on bank credit and this lending has the benefit that it is available at a very granular county level, which allows for more robust control of loan demand. Specifically, we use the following specification:

$$\begin{aligned}\text{Log SBL}_{ict} =& \beta_1 \text{High Geographic Diversification}_{i,\text{Pre-Crisis}} \times \text{Post-Crisis}_t \\ &+ \beta_2 \text{Bank Controls}_{i,\text{Pre-Crisis}} \times \text{Post-Crisis}_t + \alpha_{ic} + \gamma_{ct} + \varepsilon_{ict}, \end{aligned} \tag{5}$$

[14] Since the specification includes bank and time fixed effects, the standalone coefficients for *Post-Crisis*, *High Geographic Diversification*, and the other fixed bank control variables are absorbed.

[15] In unreported results, we also do not find funding diversification to have a significant effect if we exclude our *High Geographic Diversification* measure.

where *Log SBL* represents the logarithm of small business loans originated by bank i in county c in year t. As the small business lending data is on an annual basis, we necessarily perform our analysis at that level. As before, the *Post-Crisis* indicator begins in 2008. As in Section III.A, *High Geographic Diversification* is an indicator variable that equals one for the banks in the top quartile according to the number of states in which they operated in 2007 and zero for banks in the bottom quartile. All the explanatory variables are as of the end of 2007. In addition to our prior control variables, we include the ratio of small business lending to total lending at the bank level (*SBL to Loans*) to account for differences in specialization in small business lending. We also include the average annual loan growth over the past three years at the bank level to account for differences in growth strategies (*Average Loan Growth*). We interact each of the control variables with our *Post-Crisis* indicator to allow these variables to have a distinct effect on small business lending.

Given the county-level data, we include bank-county fixed effects (α_{ic}) in all specifications. These fixed effects account for the time-invariant locality-specific characteristics of each bank. We also include either year fixed effects or county-year fixed effects (γ_{ct}). The county-year fixed effects control for time-varying county factors, such as local loan demand. In this case, the estimates can be interpreted as estimates for the supply of lending capital, separate from the demand for capital (Khwaja and Mian, 2008). Our time window runs from 2005 through 2010.

Columns 1-2 of Table V present the results. Similar to the bank-level loan results in Table IV, we find positive coefficients for the interaction of diversification and the *Post-Crisis* indicator. During the crisis, the more diversified banks maintain more small business lending than the less diversified banks. Further, we can rule out any arguments about differential demand shocks for loans or any differences in banks' specific locations thanks to the county-year fixed effects (Column 2). Indeed, the difference in magnitude is sizeable: the most diversified banks originate more than twice as many loans following the crisis as the least diversified banks in a given county and year.

In Appendix Table A.3, we repeat the analysis in Table V but include some additional vari-

ables. In Columns 1 and 2, we include the 2007 county-level SBL market HHI and an indicator for whether the bank engaged in a merger in 2007. While both variables affect small business lending, the economic importance of geographic diversification remains largely unchanged. In Columns 3 and 4, we include the estimate of each bank's ROE beta from Equation (3) as of 2007 to capture differences in systematic risk exposure across banks. While increased systematic risk exposure before the crisis leads to less lending during the crisis, the geographic diversification result remains. In Columns 5 and 6, we introduce a separate indicator for the "Big 4" banks (Bank of America, Citigroup, J.P. Morgan Chase, and Wells Fargo). Chen, Hanson, and Stein (2017) and Gopal and Schnabl (2022) document that the largest banks reduced small business lending following the 2008 crisis. Consistent with their results, we find that lending from these largest banks is significantly lower after the crisis. However, the diversification effect persists and is not driven by these largest banks.

III.C. Aggregate small business lending during the crisis

While more diversified banks maintain more of their small business lending during the crisis, it need not necessarily translate to an aggregate increase in lending. If this increase is coming entirely at the expense of the lending of the least diversified banks, total lending may not be meaningfully affected. To understand to what extent diversification affects total lending, we aggregate banks to a county level and compare lending dynamics across counties.

To analyze the effect of diversification among the banks that operate in a county on aggregate small business lending, we perform the following specification:

$$\begin{aligned}\text{Log SBL}_{ct} =& \beta_1 \text{County Geographic Diversification}_{c,\text{Pre-Crisis}} \times \text{Post-Crisis}_t \\ &+ \beta_2 \text{Bank Controls}_{c,\text{Pre-Crisis}} \times \text{Post-Crisis}_t \\ &+ \beta_3 \text{County Geographic Diversification}_{c,\text{Pre-Crisis}} \\ &+ \beta_4 \text{Bank Controls}_{c,\text{Pre-Crisis}} + \alpha_{LMA} + \gamma_{st} + \varepsilon_{ct}, \end{aligned} \tag{6}$$

where *Log SBL* represents the logarithm of the small business loans originated in county c in year t for the banks in our sample. As we are interested in understanding the overall effect, we include all banks in this aggregation and not just the most and least diversified groups. All the explanatory variables are calculated by weighting each bank by its small business loans in that county in 2007, the year prior to the onset of the crisis. *County Geographic Diversification* is the weighted average of the log number of states in which banks operate that report lending in county c. To provide a marginal effect interpretation, we scale *County Geographic Diversification* by its sample standard deviation. *Post-Crisis* is defined as in Equation (5). *Bank Controls* are fixed at their 2007 values, aggregated to the county level, and interacted with the *Post-Crisis* indicator. We include labor market area (LMA) fixed effects (α_{LMA}) and year or state-year fixed effects (γ_{st}). A LMA—defined by the BLS—is an economically-integrated area within which individuals can reside and find employment within a reasonable distance or can readily change jobs without changing their place of residence. We use LMA fixed effects to control for persistent differences in labor market areas that might affect county-level lending.[16] Standard errors are clustered by county.

Columns 3-4 of Table V present the results. We find a significant positive coefficient for *County Geographic Diversification* $\times$ *Post-Crisis*. For a one standard deviation increase in county diversification, aggregate lending increases by about 4.2% (Column 4).[17] Similar to the bank-level regressions, we control for differences in bank size, profitability, and solvency risk. Higher county diversification before the crisis is associated with higher aggregate lending during the crisis.

[16] In unreported results, we instead use county-level fixed effects and find similar estimates to the ones presented here. However, as we are only considering six years of data for each county, using such a fixed effect removes the majority of the variation in county-level small business lending. We believe that LMA-level fixed effects remove the primary concern of variation in local economic conditions without an overly aggressive transformation of the data.

[17] Here the calculation is $e^{.0409} - 1 = 0.0417 \approx 4.2\%$. Throughout this paper, we make similar calculations when the dependent variable is in logs.

III.D. Employment during the crisis

Having established that counties with more diversified banks exhibit higher lending during the crisis, we now turn to spillovers to the economy. Continued lending during turbulent periods is more necessary than in normal times, and especially for the small business sector.

We use the county-level specification from the previous section but focus on county-level small business related employment as our outcome variable. We continue to scale the diversification variable by its sample standard deviation. Columns 5-6 of Table V present the results.

We observe that the more diversified banks in a county prior to the crisis, the higher the positive impact on local employment levels. The result remains consistent across our different sets of fixed effects. For a one standard deviation higher county-level diversification, there is 0.8% higher small business employment (Column 6). Comparing the estimates from Columns 4 and 6, this suggests that each percent increase in lending is associated with 0.2% higher employment. As banks with a more diversified stream of earnings maintain lending during turmoil periods, we document corresponding positive real effects that are meaningful.

IV. Geographic diversification shock

In the previous sections, we showed a positive effect of asset diversification on lending in general, as well as during the financial crisis. However, such diversification may have been the outcome of other bank decisions, such as seeking to increase assets. Therefore, to better isolate the effects of the diversification decision from other bank choices, in this section we use a change in bank regulation as an exogenous shock to diversification. To this end, we rely on the staggered relaxation of state-level banking restrictions driven by the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994. We focus on this shock's impact on small business lending, as we are best able to control for potential confounding demand factors in this setting.

IV.A. Institutional setting

The regulatory changes we utilize are driven by the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 (IBBEA). The IBBEA removed any remaining federal interstate banking and branching barriers, but allowed individual states to decide on many of the specific rules for interstate branching. For branching, it provided five regulatory dimensions for states to control: (1) the minimum age of an in-state bank that can be acquired and merged into an out-of-state bank, (2) whether out-of-state banks are permitted to establish de novo branches, (3) whether out-of-state banks can acquire individual bank branches, (4) whether banks are subject to a statewide deposit cap, and (5) whether reciprocity conditions for (1)–(3) are required with the out-of-state bank's home state. The initial branching regulations each state chose went into effect by 1997. After the initial implementation of the IBBEA, states are free to change the five regulatory dimensions through legislative action. As small business lending data is only available from 1996 onward, we focus on 19 distinct state-level regulatory changes after the initial implementation—from 1998 through 2008—that loosen restrictions on interstate branching.[18] Table A.4 lists the specific changes.

While the IBBEA is not the only source of bank regulatory change, it is a significant and well-studied one.[19] Related to small business lending, papers have considered the effect of the IBBEA on small business credit (Rice and Strahan, 2010), small firms' total factor productivity (Krishnan, Nandy, and Puri, 2014), firm creation (Becker, 2007), and personal income insurance (Demyanyk, Ostergaard, and Sørensen, 2007). In these papers, the focus is on outcomes in the specific state experiencing the regulatory change.

We use the same regulatory changes but with a different focus. In a difference-in-differences

[18]The majority of these changes are identified in Johnson and Rice (2008). Included among these shocks are the decisions of Texas and Montana to opt into the IBBEA after initially opting out. As the sample used in Johnson and Rice (2008) ends in 2005, we identify two additional shocks: Alabama opted to allow de novo branching and individual branch acquisition (with reciprocity) in 2007 and New York opted to allow de novo branching (with reciprocity) in 2008.

[19]See Appendix B for a more comprehensive discussion of other regulatory changes and how they have been used in the banking literature.

analysis, we organize banks into cohorts for each distinct regulatory shock. For each cohort, we classify the out-of-state banks that lend in the deregulated state prior to the shock as the treated group and those banks that never lend in the deregulated state as the control group. Focusing on small business lending, we then consider the effect of the shock on the banks' lending in the states that *do not* experience the regulatory change.

The key identifying assumption is that the principal reason a regulatory change in one state would affect small business lending in another state is through the diversifying effect of additional lending in the deregulated state. By defining the banks, which were already lending in the deregulated state, as the treated group, we focus on those banks who can benefit the most from the regulatory shock as they are best positioned to expand their lending in this state following the removal of additional restrictions. Indeed, we verify that the treated banks utilize the opportunity to expand lending in the deregulated state. However, if one is concerned that these treated banks would be less affected because they were already lending in the deregulated state, we also run our analysis under the assumption that the treated banks are those that enter the state following the regulatory change, and have not been active there before.

As we use 19 different shocks between 1998 and 2008 across 15 states, we do not believe the identified effect is driven by a particular regional or macroeconomic factor. Further, as we observe the SBL data for each bank at a county level, we can control for local changes in loan demand and other time-varying local effects via county-year fixed effects in the main specifications.

Before introducing additional controls and fixed effects, Figure 2 shows the average small business lending for treated and control banks in counties outside of the deregulated states for the 19 different shocks. Time zero represents the regulatory change year for each shock, the time when obstacles to bank operation in the particular state were removed. The figure shows that for the three years prior to the deregulation, the treated and the control groups had a similar small business lending trend in the unaffected states. At time zero, the lending of the treated banks increases significantly in the unaffected states, which persists over the following two years.

Next, we implement a more formal stacked regression approach with the cohorts (Gormley and Matsa, 2011) and various robustness tests, including the alternative difference-in-differences estimator proposed by Callaway and Sant'Anna (2021).

IV.B. The diversification shock and small business lending

We first perform the following difference-in-differences specification to establish the relationship between diversification and small business lending:

$$\text{Log SBL}_{icth} = \beta_1 \text{Treat}_i \times \text{Post}_{th} + \beta_2 \text{Bank Controls}_i \times \text{Post}_{th} + \alpha_{ich} + \gamma_{cth} + \varepsilon_{icth}, \quad (7)$$

where *Log SBL* represents the logarithm of small business lending for bank i in year t in county c in cohort h. Each cohort relates to one of the 19 shocks. Therefore, each cohort-sample only includes counties outside of the cohort-specific deregulated state. The cohort approach for difference-in-differences allows us to identify a common treatment effect over multiple treatment events while controlling for many potentially confounding factors, avoiding the influence of potentially overlapping shocks. To address concerns of persistent heterogeneity in bank-county lending patterns, we include cohort by bank-county fixed effects (α_{ich}). We also use cohort by year or cohort by county-year fixed effects (γ_{cht}). The latter fixed effects most robustly control for variation in local loan demand and other local economic factors that might affect small business lending. *Treat* is a dummy variable equal to one for out-of-state banks that operated in the deregulated state. *Treat* equals zero if the bank had no presence in that state during the sample period. *Post* is an indicator variable that equals one in the shock year or the following two years, and zero for the three years before the shock. The control variables are the same as in the specification in Equation (5), fixed at the year before the shock and interacted with *Post*.[20] Standard errors are clustered by bank.

Table VI presents the results. In Column 1, we find a significant positive coefficient for

[20]Due to the fixed effects used in all specifications, the standalone *Post*, *Treat*, and *Bank Controls* variables are absorbed.

Treat×*Post*. The magnitude of the effect remains statistically significant and economically meaningful even when allowing the shock to influence small business lending through other channels, such as bank size or bank specialization in small business lending (Column 2). In Columns 3 and 4, we replace the cohort by year fixed effects with cohort by county-year fixed effects to better control for changes in local loan demand. Banks that were exposed to the deregulatory shock increased their small business lending by 16.9% relative to control banks (Column 4). Across all specifications, the results remain consistent, confirming that the observed effects are the consequence of banks increasing their lending supply and not differential loan demand.

In Equation (7), we organize banks into cohorts for each distinct regulatory shock. This allows us to focus on specific time windows around each shock. This stacked approach is recognized as an estimation technique that mitigates potential biases from "bad comparisons" problems with multiple treatment events (Baker, Larcker, and Wang, 2022). However, as an another approach to verify that the results are not driven by this issue, in Appendix Table A.5 Panel A, we implement the difference-in-differences estimator proposed by Callaway and Sant'Anna (2021). We find similar results to Table VI.

Separately, there may be a concern that the increased lending in unaffected states is not coming through asset diversification but some other channel. One possibility is that the banks enter or expand in deregulated states, gain deposits, and use those deposits to make loans elsewhere.[21] As an additional robustness check, in Panel B of Appendix Table A.5, we exclude treated banks that report deposits in the deregulated state. The estimates remain similar, suggesting that the effect is not driven by a reallocation of deposits across states.

The above analysis considers a bank's change in lending in all states that do not experience a deregulatory shock. However, one potential concern is the role of neighboring states. As the correlation with the existing pool of loans can be higher in these states relative to more distant ones, banks may not consider the shock as diversifying for their loan portfolios. While

[21] Section 109 of the IBBEA explicitly prohibits this strategy of "deposit production" and requires banks to make loans in any new states such that their in-state loan to deposit ratio is in line with state averages.

the inclusion of county-year fixed effects addresses the potential impact of any local economic conditions, as a further robustness check, we exclude from the analysis any states that border the state that experiences the deregulatory shock. Appendix Table A.5 Panel C shows that the results remain similar to Table VI.

The diversification channel proposed to explain the results makes the assumption that out-of-state banks either begin lending in a new state because of a regulatory change, or if they have some presence already, expand lending in the deregulated state in response to a regulatory change. For those out-of-state banks already present, it is possible that the regulatory change encourages additional out-of-state entrants and these banks cannot increase lending or choose not to do so. Although not the primary focus of our analysis, we confirm that established out-of-state banks increase lending following regulatory changes in the affected state, and utilize the option to diversify. To do this, we rerun Equation (7) except focus on the counties in the cohort-specific deregulated state. In this setting, *Treat* is a dummy variable equal to one for out-of-state banks that operated in the deregulated state before its regulatory change. The control group ($Treat = 0$) are banks headquarted in the deregulated state and therefore not directly affected by the change.

Table VII presents the results. In Column 1, we find a significant positive coefficient for *Treat*×*Post*. The coefficient remains similar in magnitude even when including other bank controls (Column 2). Out-of-state banks that were exposed to the deregulatory shock increased their small business lending by 25% relative to the in-state control banks (Column 2). We find similar estimates when shifting from cohort by year fixed effects to cohort by county-year fixed effects (Columns 3 and 4). Overall, we observe that treated banks increase their lending in both the deregulated and unaffected states, which points to the results coming from a diversification mechanism.

One benefit of considering out-of-state banks that had some presence before the deregulatory shock is they receive the treatment without choosing to do so. Despite having some presence already, Table VII confirms that the treatment enables further expansion. Another group

of banks that benefits from the shock are those banks that enter the state following the deregulation. In Appendix Table A.6, we repeat the analysis of Table VI but instead focus on these entering banks as the treatment group. To be included in the treatment group, the out-of-state bank must first report SBL in the deregulated state in the year of the change or the following two years. The control group remains as the banks that do not report lending in the deregulated state during the sample window. Like in Table VI, the analysis focuses on the states that do not experience the deregulatory shock. Here we again find a positive and statistically significant effect. Banks that diversify by expanding in one state following deregulation also increase their lending in other states.

IV.C. County-level effects of geographic deregulation

We next analyze the effect of diversification on aggregate small business lending in each county. The fact that some banks diversify and increase their supply of lending does not necessarily mean that on aggregate, an increase in small business lending occurs. Rather, it is possible that non-diversified banks lose market share to the diversified ones and at the aggregate county level, total lending remains unchanged.

To this end, we perform a specification similar to Equation (6) in Section III.C, but consider aggregate lending for each cohort-shock. County-level aggregation is achieved by weighting each bank by its small business loans in that county in the year prior to the shock. The sample includes only counties outside of the deregulated state in each cohort, similar to the approach in Section IV.B. *County-Level Treat* and the other bank control variables are the same as in Equation (7) but are aggregated to the county level. To make the *County-Level Treat* variable more interpretable, we scale it by its sample standard deviation.

Table VIII presents the results. In Columns 1 and 2, we find a significant positive coefficient of the interaction *County-Level Treat*$\times$*Post*. Following deregulation, for a one standard deviation increase in county diversification, aggregate lending increases by about 7.6% (using the estimates from Column 2). Since not all banks in a county are treated by the shocks and not

all banks have substantial small business loan volume, this magnitude is meaningful. The rise in lending among the diversified banks is not driven only by a reduction in the loan supply of the less diversified banks.

Having established the positive impact of diversification on small business lending at the county level, we now show that the rise in lending has a positive real effect on the economy. Increased lending should enable small businesses to start and expand their operations and create jobs that support economic activity. To this end, we use the same county-level specification but focus on small business related employment as our outcome variable. Columns 3 and 4 of Table VIII present the results.

We find a positive coefficient for the *County-Level Treat*×*Post* term, indicating that geographic diversification enhances county-level employment. The result remains consistent for both cohort by year and cohort by state-year fixed effects. For a one standard deviation increase in county-level diversification, there is a 4.7% increase in employment (Column 4). The more banks in a county that are exposed to the deregulatory shock, the higher the positive impact on local employment levels. As banks with a more diversified stream of earnings can lend more freely, we document positive real effects from this increase in lending.

V. Additional dimensions of diversification

In the previous sections, we establish a positive impact of a bank's geographic asset diversification on bank lending and its lending resilience, both in general and during the financial crisis. However, asset diversification can be achieved by operating across a variety of business segments, beyond lending. The imperfect correlation between these activities and lending may imply similar benefits of diversification as with the geographic measure.

For our research question, it is therefore interesting to analyze the influence of non-lending activities, as it shows the degree to which a bank's focus shifts away from its core business of lending. Different types of business lines may affect banks in different ways, and potentially

have a negative impact on the banking system (e.g., Brunnermeier, Dong, and Palia, 2020). Thus, we do not expect ex-ante to find similar results.

To estimate the bank's presence in non-lending activities, we use the establishment or acquisition of relevant subsidiaries. This methodology is preferable over observing the share of income of different activities. It enables us to better observe the full impact of diversification, as an increase of 1% in the share of non-interest income is not necessarily associated with a rise in diversification. Hence, consistent with the logic behind our geographic diversification measure—which is based on a lending presence in different states—we use the bank's organizational investments in different activities as a measure of business line diversification.

Analyzing the banks' non-lending subsidiaries based on their holding structures, we group them into four main business segments: insurance activities; securities broker-dealer and investment banking; securitization; and non-deposit trust subsidiaries, such as fiduciaries. However, after studying the full extent of banks' non-interest activity from the income statements in the Y-9C reports, we identify a fifth category—trading activity—which is not conducted under distinct subsidiaries that can be distinguished separately. Thus, for this group we rely on income data.

In addition to the five groups, we also include a simple measure of the total non-interest income from the last four quarters divided by total assets. This measure has been used in past literature to identify business line diversification. It provides an alternative perspective on non-lending activity.

V.A. Business line diversification and lending over time

Similar to Section II.A, we first look at the relationship between business line diversification and lending over time. We perform the specification in Equation (1), using the different measures of business line diversification. The specifications include bank and time fixed effects, and *Log Assets*, *Z-Score*, *Avg. ROA*, *Equity to Assets*, and *Deposits to Assets* as additional controls.

Table IX considers how diversification affects the amount of lending undertaken by banks.

While non-interest income and the log number of insurance subsidiaries, security broker-dealer subsidiaries, and non-depository trust subsidiaries are all positively related to a bank's loan to assets, only insurance has a statistically significant effect. A one standard deviation increase in the log number of insurance subsidiaries (0.59) is associated with 0.5% more lending for the bank (Column 2). The log number of securitization-related subsidiaries and the measure of trading activity are both negative but not significant.

In line with the benefits of diversification and the lower correlation between insurance and lending, we find that expanding into insurance positively affects credit supply levels. To further explore this lending resiliency, in the next section we consider the financial crisis.

V.B. Financial crisis analysis

Next, we analyze the effect of business line diversification during the 2008 financial crisis. Performing a similar specification to Equation (4), we use the business line diversification variables but fix them before the onset of the financial crisis. We simplify the analysis of the subsidiary variables by using indicator variables for whether banks had at least one subsidiary in either insurance, security broker-dealer, non-depository trust, or securitization activities as of the fourth quarter of 2007. For trading, we use an indicator that non-zero trading income was reported in 2007. Panel A of Table X presents the results.

Observing the interaction terms of each estimate with the *Post-Crisis* variable, we find mixed results. The aggregate non-interest income measure has a negative but statistically insignificant effect on lending. Decomposing the effect into the five groups, we find a positive and statistically significant effect for insurance, and statistically insignificant effects for the rest of the group activities.

Having an established insurance subsidiary before the crisis is associated with about 3% more lending during the crisis, compared to other banks. The specification allows for other prominent bank characteristics to potentially explain the change in lending behavior during the crisis period. Panel B of Table X focuses on insurance diversification exclusively and shows

similar effects for real estate and C&I lending. Although geographic diversification and insurance underwriting are different in nature, both types of diversification reduce the correlation of banks' cash flows and enable banks to maintain lending both over time and during the crisis.

The above results provide the first evidence that insurance activities provide similar asset diversification benefits for banks as geographic diversification. This is consistent with previous literature that argues theoretically that insurance activities reduce the earnings volatility of banks (Boyd, Graham, and Hewitt, 1993; Lown, Osler, Sufi, and Strahan, 2000). However, the full effect of insurance activity in the banking system is relatively underexplored. Hence, in the next sections, we perform a similar analysis for insurance as the one conducted for the geographical diversification. First, we further explore the impact of insurance activity on small business lending during the crisis, and show a positive spillover on employment. Then, to establish a causal effect of insurance diversification on lending, we exploit the Gramm–Leach–Bliley Act of 1999 as an exogenous shock to the business line diversification of banks.

V.C. Insurance and small business lending during the crisis

Given the evidence that insurance diversification led to higher credit supply during the financial crisis, we now turn to explore small business lending and its positive spillovers to the economy. We utilize the granularity of the SBL data to show the additional lending by banks that diversified into insurance benefit the local economy. Running specifications similar to Equations (5) and (6), Table XI present the results.

First, we consider the effect of having an insurance subsidiary at the bank-county level. In this framework, our diversification variable, *Insurance Subsidiary*, takes a value of one if a bank has at least one domestic insurance subsidiary as of 2007. The remaining banks have a value of zero. Similar to our geographic diversification analysis in Section III.B, we fix the explanatory variables as of the end of 2007 and interact them with a post-crisis indicator that includes 2008-2010. The bank-county level analysis includes bank-county fixed effects and either year or county-year fixed effects.

In Column 1 of Table XI, we find that banks with at least one insurance subsidiary maintain about 38% higher small business lending than banks without a subsidiary in the financial crisis period. This effect is while controlling for the bank's size, risk, profitability, small business lending specialization, equity ratio, and deposit ratio. One can therefore interpret the results as allowing for the size and other salient characteristics of the bank to have independent effects on small business lending, as they are each interacted with the post-crisis indicator. Column 2 runs a similar specification but instead uses county-year fixed effects. The result is similar. It appears that in the case of the financial crisis, having diversified into insurance allowed banks to maintain higher lending levels.

Next, we establish that the results aggregate to the overall economy. Using the amounts of small business lending in the year before the crisis as weights, we aggregate the *Insurance Subsidiary* variable to a county-level equivalent, *County Insurance Diversification*. This variable is scaled by its sample standard deviation to provide a marginal effect interpretation. Here we also aggregate the other controls to a county level and included LMA fixed effects and either year or state-year fixed effects. In Column 3, we find a one standard deviation increase in county insurance diversification is associated with 3% more small business lending at a county level. We find similar results if we use state-year rather than year fixed effects (Column 4). In both cases, the estimates are statistically significant at the 5% or higher level. It appears that more insurance diversification leads to a larger credit supply to small businesses during the crisis.

Finally, in Columns 5-6 of Table XI, we show that the increased lending affects employment related to small businesses during the crisis. We find that a one standard deviation increase in county-level insurance diversification leads to a statistically significant increase in the employment level of around 0.4%. This implies an elasticity of about 0.19% higher employment for a 1% increase in aggregate small business lending (using Columns 4 and 6).

VI. Shock to business line diversification

To better isolate the effects of the business line diversification decision from other bank choices, in this section we use an additional change in bank regulation as an exogenous shock to the establishment or acquisition of an insurance subsidiary. As with geographical diversification, we focus on this shock's impact on small business lending, as we are best able to control for potential confounding demand factors in this setting.

We exploit the Gramm–Leach–Bliley Act of 1999 (a.k.a. the Financial Services Modernization Act) as an exogenous shock to the business segment diversification of banks, as it eliminated restrictions on commercial banks entering into new business activities. Our focus is on banks undertaking insurance underwriting.

VI.A. Institutional setting

The Gramm-Leach-Bliley Act (GLBA), passed in November 1999, allowed financial institutions to integrate their operations, invest in each other's businesses, and eliminated restrictions on entering into new business types. These changes applied to commercial banks, insurance companies, and securities firms.

Prior literature that studies GLBA (e.g., Allen, Jagtiani, and Moser, 2001; Geyfman and Yeager, 2009; Filson and Olfati, 2014) or earlier regulatory changes related to Section 20 subsidiaries (e.g., Bhargava and Fraser, 1998; Cornett, Ors, and Tehranian, 2002; Neuhann and Saidi, 2018), typically focus on the effects of diversification on bank performance or risk.[22] However, our focus is on banks' entrance into insurance underwriting.[23] This aspect of GLBA

[22] An exception is Neuhann and Saidi (2018), who find that the relaxation of revenue limitations on Section 20 subsidiaries, which perform investment banking activities, lead to increased lending and higher productivity for risky firms. They argue the channel is information related as the commercial and investment banking operations could increasingly share firm-relevant information.

[23] Throughout the 1990s, banks were increasingly able to engage in some insurance activities in the role of an agent. However, insurance underwriting was generally disallowed until the passage of GLBA. For example, a precondition of the Federal Reserve's approval of the Citicorp and Travelers Group merger in 1998 was that Traveler's insurance underwriting business be divested, although with a two-year divestiture period that was mooted by GLBA. See Broome and Markham (2000) and Sinder (2001) for more information on the regulatory and legal

is less explored in the literature, but it is useful in the context of business segment diversification. Insurance activity creates earnings diversification for the bank, as different factors drive the stream of earnings in insurance services versus commercial lending. This combination is anticipated to reduce the earnings volatility of the bank (Boyd, Graham, and Hewitt, 1993; Lown, Osler, Sufi, and Strahan, 2000). Further, the risk associated with a traditional insurance portfolio is typically low. The expansion into insurance activities by banks is also quite common: in our sample, 49% of banks have domestic insurance subsidiaries by 2017. This statistic implies that insurance subsidiaries are present in many small and medium-sized BHCs in addition to the largest ones.

VI.B. Bank diversification and small business lending

We perform a difference-in-differences specification in which we observe the response of banks' small business lending. The treated banks increased their business line diversification by acquiring or establishing a new domestic insurance subsidiary from 2000 to 2002.[24] From 2000 through 2002, 135 banks acquire an insurance subsidiary. For the analysis, we treat each acquisition year as a separate cohort (so there are three cohorts). This approach allows us to generate an appropriate control group for each cohort of treated banks. Control banks are those banks that do not acquire or establish their first domestic insurance subsidiary until after the end of the cohort's sample period. Our identifying assumption is that the only reason these banks would change small business lending is through the diversifying effect of adding insurance activities into the bank's organizational structure. As the decision to acquire an insurer is endogenous and may correlate with other bank characteristics, we note that the control group banks also acquire insurance subsidiaries. However, these banks have not yet acquired an insurance subsidiary during the period we investigate. In the main analysis, we include bank-county fixed effects and control for the bank's recent loan growth, size, share of small business lending, and

background of insurance and banking before and after the passage of GLBA.

[24] We group any banks that acquire a subsidiary in the final quarter of 1999, after the passage of GLBA, in the 2000 cohort.

other bank characteristics.[25] The sample period includes the three years before each cohort's acquisition year, the acquisition year, and the two years after.

Figure 3 shows the average small business lending for treatment and control banks for the acquisition year and the two years following compared to the three years prior. While before the insurance subsidiary acquisition, the treated and the control groups have similar small business lending trends, a significant increase in lending for treated banks occurs in the acquisition year and two years after.

For the main analysis, we perform a specification similar to Equation (7). Here we include small business lending in all counties. *Treat* equals one for banks that acquired an insurance subsidiary in each cohort-year and zero if they do not acquire an insurance subsidiary during the sample window. The rest of the bank control variables are the same as in previous analysis and are fixed as of the year before the cohort's acquisition year. The specifications include cohort by year or cohort by county-year fixed effects to control for any factors that might influence local loan demand. Table XII presents the results.

In Column 1, we find a significant positive coefficient for $Treat \times Post$. The magnitude of the effect remains statistically significant and economically similar even when allowing the shock to influence small business lending through other channels, such as the size or profitability of the bank (Column 2). Banks that acquired an insurance subsidiary following the deregulatory shock increased their small business lending by 35% relative to control banks (using estimates from Column 2). Our results remain consistent after including cohort by county-year fixed effects (Columns 3 and 4), confirming that the observed effects are the consequence of banks increasing their lending supply and not differential loan demand.

[25] In unreported analysis, we find further refining the control group by nearest-neighbor matching on these other bank control variables yields quantitatively and statistically similar results.

VI.C. The effects of bank diversification on the real economy

To further investigate the real effects of business line diversification, we next analyze the effect of the deregulatory shock on aggregate small business lending in each county. We verify that in this case the increase in the diversified banks' lending is not just at the expense of the non-diversified banks. To this end, we perform a similar specification as in Equation (6). Here we use all counties and construct the county-level variables using the bank controls from the year prior to the acquisition year. We weight these county-level variables using the share of small business lending by treatment and control banks in that year. Table XIII presents the results.

We find a significant positive coefficient for the interaction *County-Level Treat*×*Post*. Following the deregulation, for a one standard deviation increase in county diversification, aggregate lending increases by about 3.2% (using the estimates from Column 1). Increased lending among the more diversified banks does not come only at the expense of the less diversified banks.

Now we turn to the real effects of banks diversifying into insurance underwriting. We use the county-level specification but focus on county-level small business related employment as the outcome variable. Columns 3 and 4 of Table XIII present the results.

The coefficient for *County-Level Treat*×*Post* is positive, indicating that diversification enhances county-level employment. In Column 3, we find a 0.6% increase in local small business related employment for a one standard deviation increase in county-level diversification. Column 4 has a similar magnitude estimate, although not statistically significant. Consistent with the geographic deregulation shocks, our results show that the more banks in a county that are exposed to the deregulatory shock to business lines, the higher the positive impact on local employment levels. As banks with a more diversified stream of earnings can lend more freely, we document positive real effects from this increase in lending.

VII. Conclusions

In this paper, we highlight a few of the key benefits of bank diversification. Analyzing two major types of asset diversification—geographic expansion of lending activity and the expansion of banks into non-lending activities—we show that banks with more diversified assets lend more during crisis periods, when it is critical that banks maintain lending to support economic activity. Using exogenous shocks to the ability to diversify, we isolate the effect of diversification on bank lending separate from other factors. We find these banks increase small business lending, which leads to positive real effects for the broader economy. These benefits of bank diversification, that have not yet been fully explored, are separate from the scale of banks and their potential sources of funding. We believe that the positive benefits that come from asset diversification provide some counterbalance to concerns about the systemic risk implications of bigger banks.

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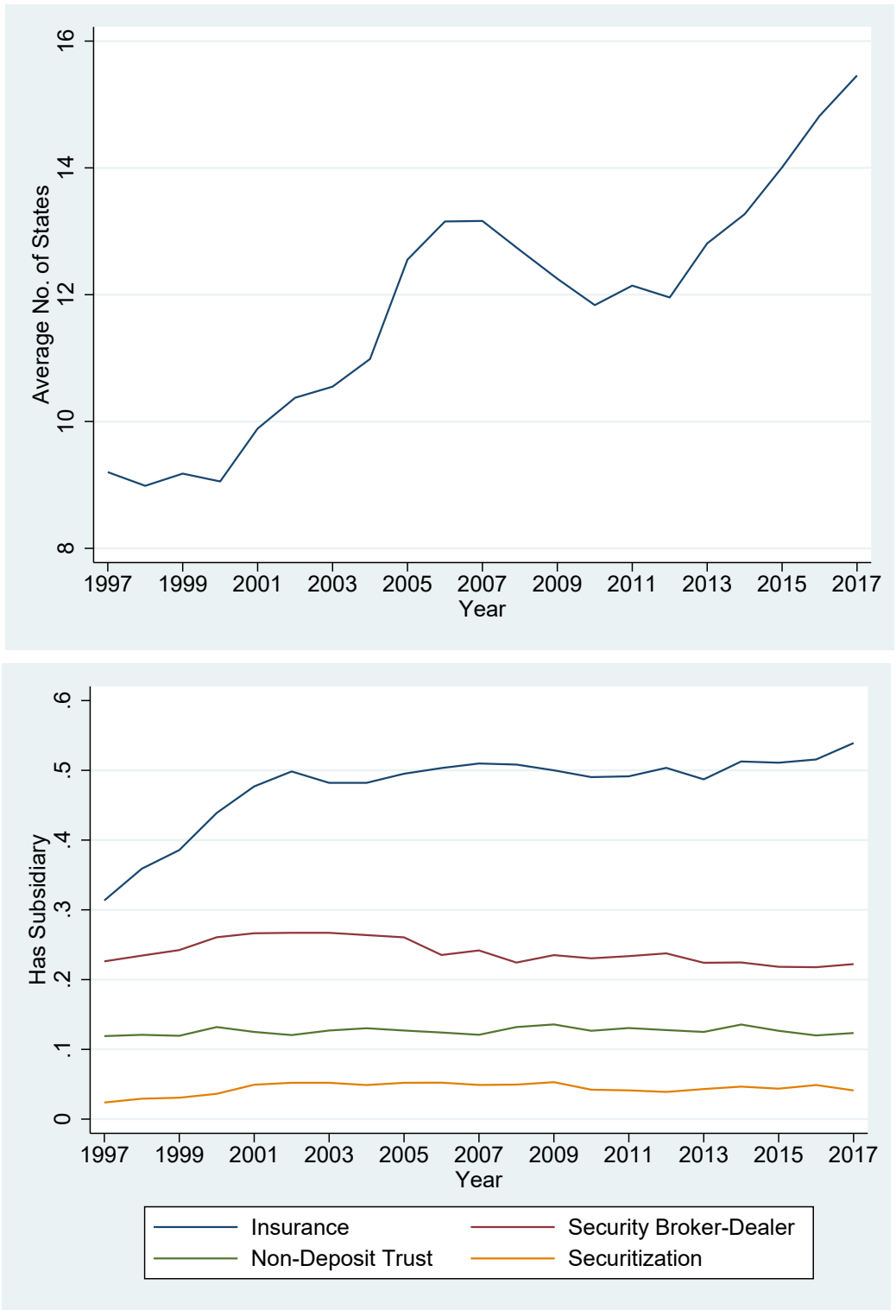

Figure 1: Measures of diversification over time. The figure plots the average number of states that banks lend in (top panel) and the percent of banks with at least one subsidiary for insurance, security broker-dealer, non-deposit trust, or securitization (bottom panel).

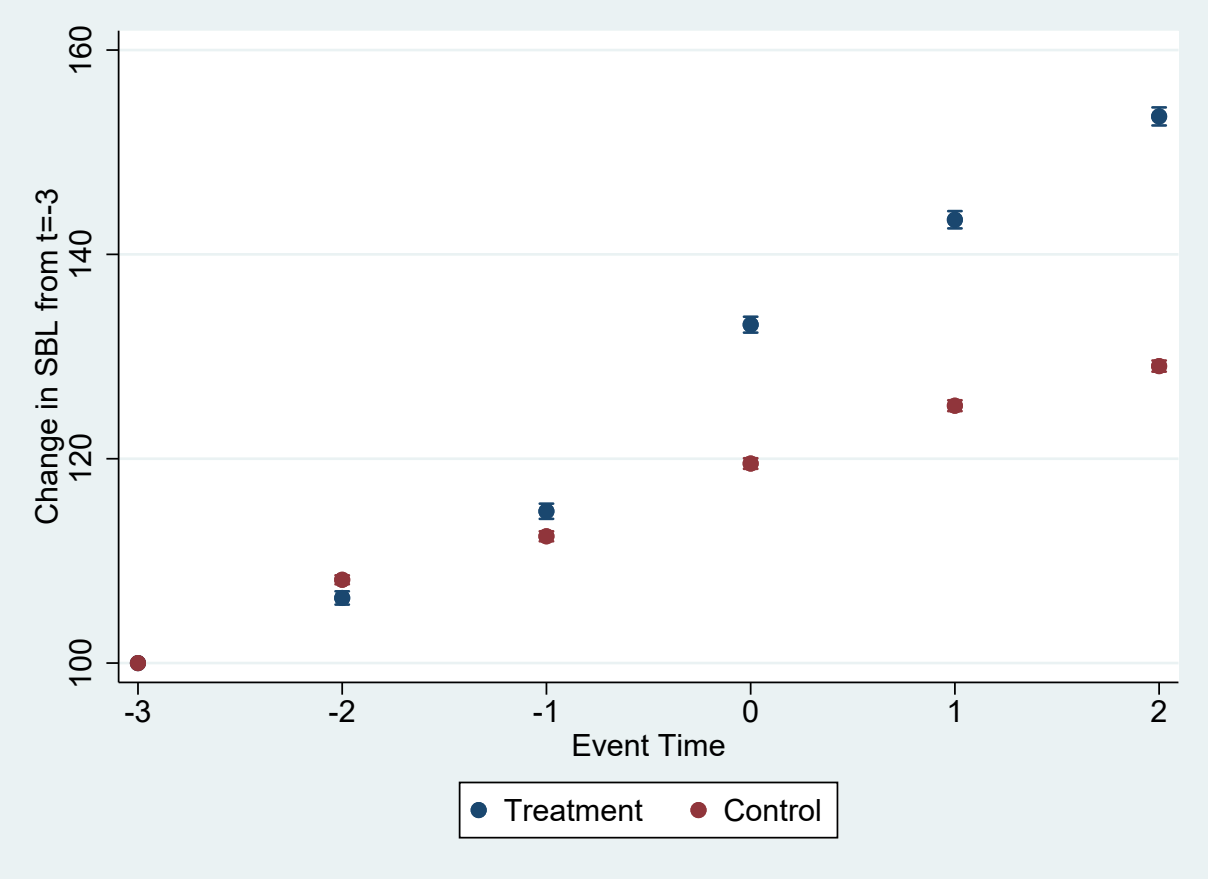

Figure 2: Effect of geographic deregulation on small business lending. The figure plots the average change in small business lending for treatment and control banks in counties outside of states that have changed banking regulations. The change is measured from the level three years before the change in regulation. The treatment group are out-of-state banks are actively lending in these affected states before the change while control banks do not lend in the affected states. 19 different regulatory changes (cohorts) are used. See Table A.4 for the list of the specific shocks. 95% confidence intervals are provided around each average change.

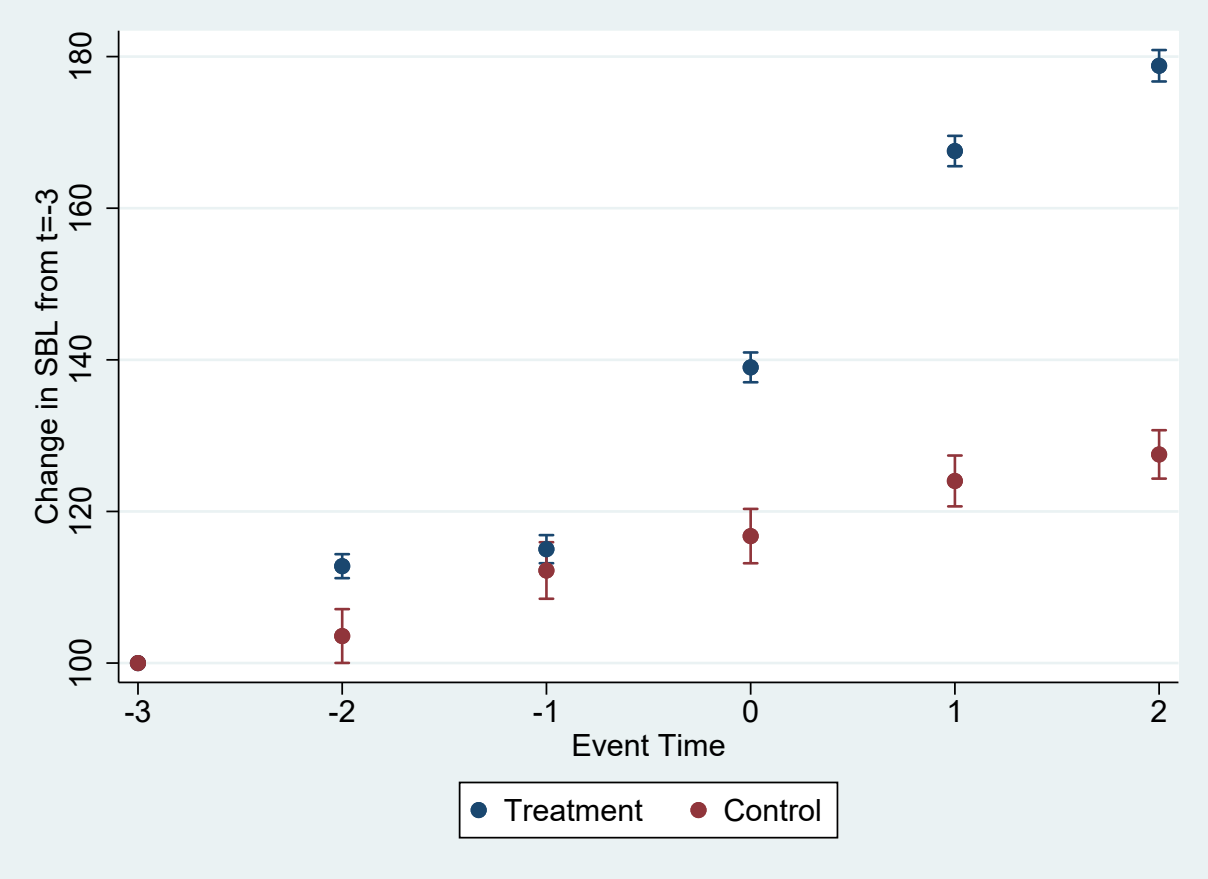

Figure 3: Effect of insurance subsidiary acquisition on small business lending. The figure plots the average change in small business lending for treatment and control banks. The change is measured from the level three years before the year the treatment bank acquired or established a new domestic insurance subsidiary. The treatment banks are in three cohorts: banks with the new domestic insurance subsidiary in 2000, 2001, or 2002. The control banks are those banks that acquire their first insurance subsidiary after the event period. 95% confidence intervals are provided around each average change.

Table I: Summary Statistics

This table presents the summary statistics for our main variables. Our sample is from 1997-2017. *Bank Variables* are constructed at a BHC-level. *Bank-County Variable* is reported at a county-level for each BHC, *County Variables* are at an aggregate county level, and *Macroeconomic Variables* are reported at a national level.

	Mean	Std Dev	25th Pctile	Median	75th Pctile	# Obs.
Bank Variables						
Loans to Assets	0.65	0.13	0.58	0.67	0.74	80,758
Real Estate Loans to Assets	0.46	0.15	0.36	0.47	0.57	80,758
C&I Loans to Assets	0.11	0.068	0.057	0.091	0.14	80,755
Log Assets	13.8	1.49	12.8	13.5	14.4	80,758
Z-Score ($\div$100)	1.85	1.53	0.74	1.46	2.55	80,758
Average ROA (%)	0.23	0.18	0.17	0.25	0.33	80,758
Equity to Assets	0.094	0.041	0.075	0.090	0.11	80,758
Deposits to Assets	0.79	0.11	0.75	0.81	0.86	80,758
Average Loan Growth	0.27	0.30	0.10	0.26	0.42	79,395
SBL to Loans	0.11	0.072	0.054	0.092	0.14	43,089
ROE (%)	2.42	3.46	1.79	2.75	3.70	80,758
ROA (%)	0.23	0.25	0.16	0.25	0.33	80,758
ROE Beta	0.26	0.60	-0.065	0.17	0.51	75,633
ROA Beta	0.34	0.67	-0.038	0.25	0.65	75,633
Idiosyncratic Risk, ROE (%)	1.81	2.09	0.54	0.99	2.01	69,435
Idiosyncratic Risk, ROA (%)	0.15	0.15	0.049	0.087	0.17	69,435
ROE Volatility (%)	3.05	8.45	0.49	0.94	2.02	74,075
ROA Volatility (%)	0.21	0.39	0.046	0.085	0.18	74,075
Bank Merger	0.017	0.13	0	0	0	80,758
No. of States, Lending	9.29	10.9	3	5	11	43,089
No. of States, Deposits	1.81	2.62	1	1	2	74,270
Geographic Share, Loans	0.20	0.24	0.019	0.082	0.33	43,089
Non-Interest Income to Assets	0.0079	0.0075	0.0039	0.0062	0.0095	80,755
No. Insurance Subsidiaries	0.94	3.76	0	0	1	78,475
Has Insurance Subsidiary	0.35	0.48	0	0	1	78,475
No. Security Broker-Dealer Subsidiaries	0.27	1.04	0	0	0	78,475
Has Security Broker-Dealer Subsidiary	0.14	0.35	0	0	0	78,475
No. Non-Deposit Trust Subsidiaries	0.12	0.54	0	0	0	78,475
Has Non-Deposit Trust Subsidiary	0.073	0.26	0	0	0	78,475
No. Securitization Subsidiaries	0.14	1.57	0	0	0	78,475
Has Securitization Subsidiary	0.031	0.17	0	0	0	78,475
Trading Income to Assets ($\times$100)	0.0094	0.048	0	0	0	80,145
Has Trading Activity	0.13	0.34	0	0	0	80,728

Table I: Summary Statistics—*Continued*

	Mean	Std Dev	25th Pctile	Median	75th Pctile	# Obs.
Bank-County Variable						
Log SBL	5.69	2.26	4.06	5.65	7.15	967,373
County Variables						
Log SBL	9.17	2.00	7.87	9.16	10.5	64,123
Log Small Business Employment	7.95	1.44	6.99	7.80	8.75	64,123
County HHI	0.27	0.16	0.16	0.23	0.34	64,123
Macroeconomic Variables						
Banking Sector ROE (%)	2.46	1.62	1.78	2.43	3.77	84
Banking Sector ROA (%)	0.23	0.11	0.19	0.25	0.31	84

Table II: BHC Loans and Diversification

This table measures the sensitivity of quarterly bank lending to the bank's degree of diversification from 1997–2017 at the BHC level. *Loans to Assets* is the bank's total loans divided by its total assets. *Loans to Assets, Excl. SBL* excludes the total amount of small business lending from the calculation. *Log No. States, Loans* is the log of the number of states with reported bank lending activity. *Log No. Counties, Loans* is the log of the number of counties with reported bank lending activity. *Geographic Share, Loans* is one minus the HHI of a bank's lending across states. *Log No. States, Deposits* is the log of the number of states with reported bank deposits. *Log No. Counties, Deposits* is the log of the number of counties with reported bank deposits. *Geographic Share, Deposits* is one minus the HHI of a bank's deposits across states. Standard errors are clustered by bank.

	Loans to Assets				
	All Loans				Excl. SBL
	(1)	(2)	(3)	(4)	(5)
Log No. States, Loans	0.0176***	0.0162***			0.0147***
	(0.00307)	(0.00303)			(0.00340)
Log No. Counties, Loans			0.0234***		
			(0.00320)		
Geographic Share, Loans				0.0371**	
				(0.0167)	
Log No. States, Deposits		-0.00647			-0.0114
		(0.00960)			(0.0103)
Log No. Counties, Deposits			0.0117		
			(0.00733)		
Geographic Share, Deposits				-0.0187	
				(0.0245)	
Log Assets		0.0107	-0.00617	0.0148*	0.0219**
		(0.00886)	(0.00903)	(0.00887)	(0.00947)
Z-Score		0.00199**	0.00187**	0.00206**	0.00194*
		(0.000922)	(0.000923)	(0.000927)	(0.00103)
Average ROA		0.0239*	0.0270**	0.0257*	0.0207
		(0.0131)	(0.0129)	(0.0132)	(0.0148)
Equity to Assets		0.111	0.0908	0.0982	0.164
		(0.128)	(0.125)	(0.128)	(0.138)
Deposits to Assets		0.257***	0.244***	0.259***	0.281***
		(0.0538)	(0.0520)	(0.0543)	(0.0574)
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	37,468	37,468	37,468	37,468	9,127
Adjusted R^2	0.782	0.789	0.792	0.788	0.757

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table III: Idiosyncratic Risk and Diversification

This table measures the sensitivity of different idiosyncratic risk and volatility measures to the bank's degree of diversification. *Idiosyncratic Risk (ROE)* is the bank's estimated idiosyncratic volatility (as an annualized percent) using Equation (3). *Idiosyncratic Risk (ROA)* is the bank's estimated idiosyncratic volatility (as an annualized percent), but using a ROA measure instead of a ROE measure. *ROE Volatility* and *ROA Volatility* are the bank's quarterly ROE and ROA volatilities (as annualized percents). All independent variables are as of the prior quarter. Standard errors are clustered by bank.

	Idiosyncratic Risk (ROE)	Idiosyncratic Risk (ROA)	ROE Volatility	ROA Volatility
	(1)	(2)	(3)	(4)
Log No. States, Loans	-0.167***	-0.0136***	-0.214***	-0.0175***
	(0.0585)	(0.00422)	(0.0807)	(0.00571)
Log No. States, Deposits	-0.0222	0.00367	-0.0344	-0.00484
	(0.159)	(0.0119)	(0.224)	(0.0159)
Log Assets	0.349***	0.0207**	0.675***	0.0428***
	(0.121)	(0.00907)	(0.168)	(0.0122)
Z-Score	-0.0393**	-0.00293**	-0.0385*	-0.00336*
	(0.0166)	(0.00128)	(0.0231)	(0.00172)
Average ROA	-3.278***	-0.216***	-4.507***	-0.278***
	(0.270)	(0.0192)	(0.421)	(0.0273)
Equity to Assets	-10.49***	-0.0608	-18.61***	-0.0969
	(1.919)	(0.145)	(2.942)	(0.198)
Deposits to Assets	-0.557	-0.0514	-0.370	-0.0546
	(0.649)	(0.0490)	(0.904)	(0.0668)
Control Variables	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Observations	34,889	34,889	34,889	34,889
Adjusted R^2	0.467	0.423	0.467	0.440

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table IV: Bank Diversification and the Financial Crisis

This table presents the results of the specification in Equation (4) for the effect of bank diversification on lending around the crisis. The sample is from 2005 through 2010. The outcome variables (total loans, real estate loans, and C&I loans) are scaled by the bank's total assets as of 2007Q4. *Post-Crisis* is an indicator variable for the crisis period, which begins in 2008Q1. *High Geographic Diversification* is an indicator variable that equals one for banks in the top quartile of the number of states in which they operated in 2007Q4 and zero for banks in the bottom quartile. Standard errors are clustered by bank.

	Loans to Pre-Crisis Assets		Real Est. Loans to Pre-Crisis Assets		C&I Loans to Assets Pre-Crisis Assets	
	(1)	(2)	(3)	(4)	(5)	(6)
High Geo. Div. × Post-Crisis	0.0585***	0.0672***	0.0212	0.0352*	0.0211***	0.0196***
	(0.0179)	(0.0230)	(0.0144)	(0.0189)	(0.00406)	(0.00625)
Log No. States, Deposits × Post-Crisis		-0.0185		-0.00878		0.00120
		(0.0255)		(0.0215)		(0.00518)
Log Assets × Post-Crisis		0.00175		-0.00265		-0.0000596
		(0.0120)		(0.00999)		(0.00262)
Z-Score × Post-Crisis		0.0158***		0.0156***		0.00123
		(0.00569)		(0.00452)		(0.00124)
Average ROA × Post-Crisis		0.133		0.0567		0.0220
		(0.0948)		(0.0767)		(0.0153)
Equity to Assets × Post-Crisis		0.0102		-0.345		0.140
		(0.380)		(0.298)		(0.0862)
Deposits to Assets × Post-Crisis		0.0386		0.0250		0.00880
		(0.102)		(0.0818)		(0.0204)
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,053	5,053	5,053	5,053	5,053	5,053
Adjusted R^2	0.679	0.690	0.818	0.825	0.909	0.910

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table V: Diversification, the Financial Crisis, and Small Business Lending

This table presents the results for the effect of bank diversification on small business lending around the financial crisis. The sample is from 2005 through 2010. Observations in Columns 1–2 are at a bank-county level and observations in Columns 3–6 are at a county level. *Log SBL, Bank-County Level* is the log amount of the small business loans originated annually by a bank in a county. *Log SBL, County Level* is the log amount of the small business loans originated annually by all banks in a county. *Log Small Business Employment* is the log number of jobs related to small businesses in a county. *Post-Crisis* is an indicator variable for the crisis period, which begins in 2008. *High Geographic Diversification* is an indicator variable that equals one for banks in the top quartile of the number of states in which they operated in 2007 and zero for banks in the bottom quartile. *County Geographic Diversification* is the weighted average of the log number of states that banks in the county are active in. The control variables are fixed at their 2007 values and interacted with the *Post-Crisis* indicator. For Columns 3–6, the control variables are county-level weighted averages. *Control Variables* refer to the non-interacted treatment and control variables. *LMA Fixed Effects* refer to labor market areas as defined by the BLS. Standard errors are clustered by bank (Columns 1–2) or by county (Columns 3–6).

	Log SBL, Bank-County Level		Log SBL, County Level		Log Small Business Employment	
	(1)	(2)	(3)	(4)	(5)	(6)
High Geo. Div. × Post-Crisis	1.114***	1.227***				
	(0.335)	(0.322)				
Geo. Div. × Post-Crisis			0.0265**	0.0409**	0.0101***	0.00766***
			(0.0124)	(0.0172)	(0.00217)	(0.00247)
Log No. States, Deposits × Post-Crisis	0.302***	0.303***	0.0453*	0.0391	-0.0109**	-0.00597
	(0.106)	(0.106)	(0.0256)	(0.0318)	(0.00437)	(0.00530)
Log Assets × Post-Crisis	-0.305***	-0.302***	-0.0390***	-0.0363***	-0.00345**	-0.00422***
	(0.0659)	(0.0654)	(0.0148)	(0.0127)	(0.00136)	(0.00149)
SBL to Loans × Post-Crisis	-0.483	0.0479	1.079***	1.591***	0.259***	0.000297
	(0.572)	(0.498)	(0.353)	(0.407)	(0.0721)	(0.0667)
Avg. Loan Growth × Post-Crisis	-0.603	-0.350	-0.319	0.323	0.310***	-0.0203
	(0.481)	(0.501)	(0.287)	(0.324)	(0.0580)	(0.0616)
Z-Score × Post-Crisis	0.0239	0.0256	0.000836	0.0138	-0.00608***	-0.00604***
	(0.0229)	(0.0231)	(0.0124)	(0.0144)	(0.00227)	(0.00229)
Avg. ROA × Post-Crisis	1.476***	1.678***	0.743***	0.741***	0.110***	0.0939***
	(0.351)	(0.388)	(0.155)	(0.172)	(0.0281)	(0.0311)
Equity to Assets × Post-Crisis	5.085***	5.022***	-1.368*	-0.334	0.148	0.418***
	(1.519)	(1.574)	(0.825)	(1.000)	(0.153)	(0.154)
Deposits to Assets × Post-Crisis	1.066**	1.037**	0.878***	0.706**	-0.0589**	-0.00391
	(0.528)	(0.488)	(0.278)	(0.330)	(0.0295)	(0.0310)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Bank-County Fixed Effects	Yes	Yes	No	No	No	No
Year Fixed Effects	Yes	No	Yes	No	Yes	No
County-Year Fixed Effects	No	Yes	No	No	No	No
LMA Fixed Effects	No	No	Yes	Yes	Yes	Yes
State-Year Fixed Effects	No	No	No	Yes	No	Yes
Observations	123,081	122,927	18,701	18,695	18,202	18,196
Adjusted R^2	0.856	0.851	0.662	0.667	0.620	0.627

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table VI: Geographic Deregulation and Small Business Lending

This table presents the results of the specification in Equation (7) for the effect of diversification on small business lending following deregulation. *Log SBL, Bank-County Level* is the log amount of the small business loans originated annually by a bank in a county. *Treat* is a dummy variable that equals one for out-of-state banks that operated in a state with a change in deregulation and zero otherwise. The sample uses six-year windows around 19 different deregulatory shocks. *Cohort* refers to the treatment and control banks associated with each shock. For each cohort, the sample is only counties outside of the state experiencing the shock. See Table A.4 for the list of the specific shocks. *Post* is an indicator variable that equals one for the shock year and the following years and zero for the pre-shock period. All control variables are as of year before the shock and interacted with *Post*. Standard errors are clustered by bank.

	Log SBL, Bank-County Level			
	(1)	(2)	(3)	(4)
Treat × Post	0.194**	0.137***	0.203**	0.156***
	(0.0891)	(0.0432)	(0.0902)	(0.0450)
Log No. States, Deposits × Post		-0.242***		-0.262***
		(0.0755)		(0.0870)
Log Assets × Post		0.0725***		0.0645**
		(0.0267)		(0.0279)
SBL to Loans × Post		-1.058***		-1.036***
		(0.243)		(0.293)
Avg. Loan Growth × Post		-0.219		-0.246
		(0.417)		(0.420)
Z-Score × Post		0.0112		0.00641
		(0.0146)		(0.0146)
Avg. ROA × Post		0.0612		0.0112
		(0.231)		(0.239)
Equity to Assets × Post		-0.790		-0.839
		(1.003)		(1.004)
Deposits to Assets × Post		-0.150		-0.398
		(0.331)		(0.388)
Cohort by Bank-County Fixed Effects	Yes	Yes	Yes	Yes
Cohort by Year Fixed Effects	Yes	Yes	No	No
Cohort by County-Year Fixed Effects	No	No	Yes	Yes
Observations	1,322,150	1,151,865	1,251,036	1,074,443
Adjusted R^2	0.792	0.795	0.786	0.787

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table VII: Geographic Deregulation and Small Business Lending, Effect in Deregulated State

The table presents the results of the specification in Equation (7) for the effect of diversification on small business lending following deregulation. *Log(SBL), Bank-County Level* is the log amount of the small business loans originated annually. *Treat* is a dummy variable that equals one for banks that operated in a state with a change in deregulation but are out-of-state banks. *Treat* equals zero for banks that are based in the state with a change in deregulation. The sample uses six-year windows around 19 different deregulatory shocks. *Cohort* refers to the treatment and control banks associated with each shock. For each cohort, the sample is only counties in the state experiencing the shock. See Table A.4 for the list of the specific shocks. *Post* is an indicator variable that equals one for the shock year and the following years and zero for the pre-shock period. All control variables are as of year before the shock and interacted with *Post*. Standard errors are clustered by bank.

	Log SBL, Bank-County Level			
	(1)	(2)	(3)	(4)
Treat × Post	0.264***	0.223**	0.257**	0.198*
	(0.102)	(0.106)	(0.108)	(0.116)
Log No. States, Deposits × Post		-0.137		-0.126
		(0.119)		(0.125)
Log Assets × Post		-0.0421		-0.0439
		(0.0508)		(0.0523)
SBL to Loans × Post		-1.999***		-1.993**
		(0.748)		(0.792)
Avg. Loan Growth × Post		0.483		0.419
		(0.578)		(0.582)
Z-Score × Post		0.00702		0.00589
		(0.0158)		(0.0166)
Avg. ROA × Post		1.657		1.690
		(1.080)		(1.154)
Equity to Assets × Post		-1.960		-1.463
		(2.687)		(2.940)
Deposits to Assets × Post		-0.709		-0.786
		(1.106)		(1.163)
Cohort by Bank-County Fixed Effects	Yes	Yes	Yes	Yes
Cohort by Year Fixed Effects	Yes	Yes	No	No
Cohort by County-Year Fixed Effects	No	No	Yes	Yes
Observations	72,969	72,969	72,569	72,569
Adjusted R^2	0.796	0.798	0.790	0.792

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table VIII: County-Level Effects of Geographic Deregulation

This table presents the effect of diversification on county-level aggregate small business lending and small business employment following deregulation. *Log SBL, County Level* is the log amount of the small business loans originated annually at the county level. *Log Small Business Employment* is the log number of jobs related to small businesses in a county. *County-Level Treat* is the county-level average of banks that operated in a state with a change in deregulation, scaled by the measure's sample standard deviation. The sample uses six-year windows around 19 different deregulatory shocks. *Cohort* refers to each shock (see Table A.4). For each cohort, the sample is only counties outside of the state experiencing the shock. *County-Level Treat* and all other control variables are aggregated at the county level as of the year before the shock. Each bank is weighted by its county-level loans from the year before the shock. *Post* is an indicator variable that equals one for the shock year and the two years after and zero for the pre-shock period. *Control Variables* refer to the non-interacted treatment and control variables. *LMA Fixed Effects* refer to labor market areas as defined by the BLS. Standard errors are clustered by county.

	Log SBL, County Level		Log Small Business Employment	
	(1)	(2)	(3)	(4)
County-Level Treat × Post	0.0597***	0.0732***	0.0327***	0.0457***
	(0.00788)	(0.00921)	(0.00548)	(0.00637)
Log No. States, Deposits × Post	-0.0562	-0.120**	-0.0620**	-0.0681**
	(0.0417)	(0.0493)	(0.0290)	(0.0345)
Log Assets × Post	0.0276**	0.0348**	0.0432***	0.0365***
	(0.0118)	(0.0136)	(0.00847)	(0.00967)
SBL to Loans × Post	-0.0678	0.229	0.429	0.792**
	(0.424)	(0.507)	(0.297)	(0.353)
Avg. Loan Growth × Post	-1.464***	-1.511***	-1.289***	-1.318***
	(0.335)	(0.379)	(0.230)	(0.264)
Z-Score × Post	0.00889	0.0170	-0.00828	-0.00550
	(0.0172)	(0.0194)	(0.0126)	(0.0141)
Average ROA × Post	0.321	0.110	0.369**	0.223
	(0.261)	(0.289)	(0.187)	(0.206)
Equity to Assets × Post	-4.762***	-3.233**	-4.380***	-3.403***
	(1.386)	(1.493)	(1.009)	(1.079)
Deposits to Assets × Post	-0.295*	-0.606***	-0.470***	-0.521***
	(0.165)	(0.195)	(0.116)	(0.134)
Control Variables	Yes	Yes	Yes	Yes
Cohort by LMA Fixed Effects	Yes	Yes	Yes	Yes
Cohort by Year Fixed Effects	Yes	No	Yes	No
Cohort by State-Year Fixed Effects	No	Yes	No	Yes
Observations	274,810	274,678	274,810	274,678
Adjusted R^2	0.490	0.496	0.563	0.568

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table IX: BHC Loans and Business Line Diversification

This table measures the sensitivity of quarterly bank lending on the bank's degree of diversification from 1997–2017 at the BHC level. *Loans to Assets* is the bank's total loans divided by its total assets. All independent variables are as of the prior quarter. *Non-Interest Income to Assets* is the ratio of the bank's non-interest income over the last 4 quarters divided by total assets. *Log No. Insurance Subsidiaries* is the log of one plus the number of domestic insurance subsidiaries in the bank's organizational structure. *Log No. Security Broker-Dealer Subsidiaries* is the log of one plus the number of domestic security broker-dealer subsidiaries in the bank's organizational structure. *Log No. Non-Deposit Trust Subsidiaries* is the log of one plus the number of domestic non-deposit trust subsidiaries in the bank's organizational structure. *Log No. Securitization Subsidiaries* is the log of one plus the number of securitization-related subsidiaries in the bank's organizational structure. *Trading Income* is the ratio of the bank's trading income over the last 4 quarters divided by total assets. *Additional Controls* include *Log Assets*, *Z-Score*, *Avg. ROA*, *Equity to Assets*, and *Deposits to Assets*. Standard errors are clustered by bank.

	Loans to Assets					
	(1)	(2)	(3)	(4)	(5)	(6)
Non-Interest Income to Assets	0.350					
	(0.246)					
Log No. Insurance Subsids.		0.00845**				
		(0.00429)				
Log No. Sec. B-D Subsids.			0.00230			
			(0.00719)			
Log No. Non-Dep. Trust Subsids.				0.00883		
				(0.00856)		
Log No. Securit. Subsids.					-0.00752	
					(0.00555)	
Trading Income						-0.295
						(4.068)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	74,893	74,893	74,893	74,893	74,893	74,893
Adjusted R^2	0.814	0.814	0.814	0.814	0.814	0.814

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table X: Business Line Diversification and the Financial Crisis

This table presents the results for the effect of business line diversification on lending around the crisis. The sample is from 2005 through 2010. Panel A presents the effects of different business lines on total lending. Panel B presents the effects of insurance diversification on different lending segments. *Loans to Pre-Crisis Assets* is total loans scaled by the bank's total assets as of 2007Q4. *Post-Crisis* is an indicator variable for the crisis period, which begins in 2008Q1. *Non-Interest Income* is non-interest income for the last four quarters scaled by assets before 2008. *Insurance Subsidiary* indicates a bank started or acquired its first insurance subsidiary before 2008. *Security Broker-Dealer Subsidiary* indicates a bank started or acquired its first security broker-dealer subsidiary before 2008. *Non-Deposit Trust Subsidiary* indicates a bank started or acquired its non-deposit trust subsidiary before 2008. *Securitization Subsidiary* indicates a bank started or acquired its first securitization-related subsidiary before 2008. *Trading Activity* indicates a bank reported non-zero trading income before 2008. *Controls* × *Post-Crisis* includes *Log Assets*, *Loan Growth*, *Avg. ROA*, *Z-Score*, *Equity to Assets*, and *Deposits to Assets*. The control variables are fixed at their 2007Q4 values and interacted with *Post-Crisis*. Standard errors are clustered by bank.

Panel A: Lending and Business Line Diversification						
	Loans to Pre-Crisis Assets					
	(1)	(2)	(3)	(4)	(5)	(6)
Non-Interest Income × Post-Crisis	-0.00925					
	(0.804)					
Ins. Subsid. × Post-Crisis		0.0295**				
		(0.0132)				
Sec. B-D Subsid. × Post-Crisis			0.00102			
			(0.0245)			
Non-Dep. Trust × Post-Crisis				-0.00789		
				(0.0188)		
Securitization Subsid. × Post-Crisis					0.00667	
					(0.0379)	
Trading Activity × Post-Crisis						-0.0286
						(0.0194)
Controls × Post-Crisis	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,670	19,670	19,670	19,670	19,670	19,670
Adjusted R^2	0.650	0.689	0.687	0.687	0.687	0.688

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table X: Business Line Diversification and the Financial Crisis—*Continued*

Panel B: Lending Segments and Insurance Diversification				
	Real Est. Loans to Pre-Crisis Assets		C&I Loans to Assets Pre-Crisis Assets	
	(1)	(2)	(3)	(4)
Ins. Subsid. × Post-Crisis	0.0156*	0.0220**	0.00753**	0.00498
	(0.00924)	(0.0103)	(0.00302)	(0.00322)
Log Assets × Post-Crisis		-0.00556		0.00311**
		(0.00440)		(0.00143)
Z-Score × Post-Crisis		0.0109***		0.00140
		(0.00333)		(0.000994)
Avg. ROA × Post-Crisis		-0.0511		-0.00101
		(0.0400)		(0.0105)
Equity to Assets × Post-Crisis		-0.000825		-0.00709
		(0.0922)		(0.0271)
Deposits to Assets × Post-Crisis		0.0769*		0.0190
		(0.0407)		(0.0133)
Bank Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Observations	19,670	19,670	19,670	19,670
Adjusted R^2	0.785	0.788	0.859	0.860

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table XI: Insurance Diversification, the Financial Crisis, and Small Business Lending

This table presents the results for the effect of insurance diversification on small business lending during and after the crisis. The sample uses a window from 2005 through 2010. Observations in Columns 1–2 are at a bank-county level and observations in Columns 3–6 are at a county level. *Log SBL, Bank-County Level* is the log amount of the small business loans originated annually by a bank in a county. *Log SBL, County Level* is the log amount of the small business loans originated annually by all banks in a county. *Log Small Business Employment* is the log number of jobs related to small businesses in a county. *Post-Crisis* is an indicator variable for the crisis period, which begins in 2008. *Insurance Subsidiary* indicates a bank started or acquired its first insurance subsidiary before 2008. *County Insurance Diversification* is the weighted average of the number of banks in a county with an insurance subsidiary before 2008. The control variables are fixed at their 2007 values and interacted with the *Post-Crisis* indicator. For Columns 3–6, the control variables are county-level weighted averages. *Control Variables* refer to the non-interacted treatment and control variables. *LMA Fixed Effects* refer to labor market areas as defined by the BLS. Standard errors are clustered by bank (Columns 1–2) or by county (Columns 3–6).

	Log SBL, Bank-County Level		Log SBL, County Level		Log Small Business Employment	
	(1)	(2)	(3)	(4)	(5)	(6)
Insur. Subsid. × Post-Crisis	0.320***	0.303**				
	(0.119)	(0.122)				
County Insur. Div. × Post-Crisis			0.0296***	0.0190**	0.00444***	0.00372***
			(0.00714)	(0.00803)	(0.00134)	(0.00141)
Log Assets × Post-Crisis	-0.00905	0.00816	0.0316	0.0483**	-0.000687	-0.00550***
	(0.0333)	(0.0318)	(0.0199)	(0.0195)	(0.00247)	(0.00135)
SBL to Loans × Post-Crisis	0.770	1.156	1.430***	2.033***	0.303***	0.00975
	(0.854)	(0.847)	(0.364)	(0.419)	(0.0716)	(0.0683)
Avg. Loan Growth × Post-Crisis	0.0267	0.204	-0.0512	0.527	0.329***	-0.0116
	(0.678)	(0.702)	(0.292)	(0.329)	(0.0585)	(0.0619)
Z-Score × Post-Crisis	0.0249	0.0371	0.0128	0.0232	-0.00515**	-0.00704***
	(0.0482)	(0.0498)	(0.0127)	(0.0145)	(0.00234)	(0.00225)
Avg. ROA × Post-Crisis	1.651*	1.723*	0.735***	0.723***	0.106***	0.0933***
	(0.917)	(0.961)	(0.156)	(0.177)	(0.0275)	(0.0301)
Equity to Assets × Post-Crisis	4.132*	3.621	-1.588*	-0.464	0.106	0.422***
	(2.439)	(2.533)	(0.839)	(0.984)	(0.153)	(0.154)
Deposits to Assets × Post-Crisis	1.676**	1.715**	1.781***	1.721***	-0.0239	-0.0400
	(0.719)	(0.738)	(0.385)	(0.372)	(0.0490)	(0.0296)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Bank-County Fixed Effects	Yes	Yes	No	No	No	No
Year Fixed Effects	Yes	No	Yes	No	Yes	No
County-Year Fixed Effects	No	Yes	No	No	No	No
LMA Fixed Effects	No	No	Yes	Yes	Yes	Yes
State-Year Fixed Effects	No	No	No	Yes	No	Yes
Observations	240,019	239,955	18,701	18,695	18,202	18,196
Adjusted R^2	0.839	0.837	0.655	0.660	0.615	0.621

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table XII: Insurance Acquisition and Small Business Lending

This table presents the results for the effect of insurance diversification on small business lending following deregulation. The sample uses three cohorts of data, classifying treatment banks as those that acquire or establish an insurance subsidiary in 2000, 2001, and 2002. The sample period spans three years before the cohort year, the cohort year, and two years after (six years total). Control banks are those banks that do not acquire an insurance subsidiary during the sample period. *Log SBL, Bank-County Level* is the log amount of the small business loans originated annually by a bank in a county. *Treat* indicates that the bank acquired or established an insurance subsidiary in its cohort year. *Post* is an indicator variable that equals one for the cohort year and the two years after and zero for the pre-period. All control variables are from the year prior to the insurance acquisition cohort year. Standard errors are clustered by bank.

	Log SBL, Bank-County Level			
	(1)	(2)	(3)	(4)
Treat × Post	0.266**	0.297**	0.334**	0.324**
	(0.124)	(0.137)	(0.156)	(0.145)
Log Assets × Post		0.0472		0.0798
		(0.0395)		(0.0539)
SBL to Loans × Post		-0.141		-0.0122
		(0.887)		(1.128)
Avg. Loan Growth × Post		-1.156*		-1.299*
		(0.639)		(0.667)
Z-Score × Post		0.0336		0.0498
		(0.0338)		(0.0381)
Avg. ROA × Post		1.650**		2.182**
		(0.832)		(0.872)
Equity to Assets × Post		0.698		-0.934
		(3.066)		(3.079)
Deposits to Assets × Post		2.363**		3.334**
		(1.144)		(1.477)
Cohort by Bank-County Fixed Effects	Yes	Yes	Yes	Yes
Cohort by Year Fixed Effects	Yes	Yes	No	No
Cohort by County-Year Fixed Effects	No	No	Yes	Yes
Observations	157,130	142,639	141,129	125,945
Adjusted R^2	0.764	0.774	0.750	0.763

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table XIII: County-Level Effects of Business Line Deregulation

This table presents the effect of insurance diversification on county-level aggregate small business lending and small business employment following deregulation. The sample uses 3 cohorts of data, classifying treatment banks as those that acquire or establish an insurance subsidiary in 2000, 2001, and 2002. The sample period spans three years before the cohort year, the cohort year, and two years after (six years total). Control banks are those banks that do not acquire an insurance subsidiary during the sample period. *Log SBL, County Level* is the log amount of the small business loans originated annually by treatment and control banks. *Log Small Business Employment* is the log number of jobs related to small businesses in a county. *County-Level Treat* indicates the share of banks that acquired or established an insurance subsidiary in its cohort year and is scaled by the measure's sample standard deviation. *Post* is an indicator variable that equals one for the cohort year and the two years after and zero for the pre-period. All control variables are from the year prior to the cohort year and are aggregated to a county level by using each bank's county-level loan share from the year prior to the cohort year. *Control Variables* refer to the non-interacted treatment and control variables. *LMA Fixed Effects* refer to labor market areas as defined by the BLS. Standard errors are clustered by county.

	Log SBL, County Level		Log Small Business Employment	
	(1)	(2)	(3)	(4)
Treat × Post	0.0314*	0.0542**	0.00599*	0.00503
	(0.0181)	(0.0230)	(0.00317)	(0.00408)
Log Assets × Post	-0.0450***	-0.0317**	0.00379**	0.00611***
	(0.0112)	(0.0130)	(0.00159)	(0.00185)
SBL to Loans × Post	-0.906**	-2.297***	0.0631	0.106
	(0.419)	(0.598)	(0.0745)	(0.0970)
Avg. Loan Growth × Post	-0.0701	-0.590*	-0.0534*	-0.100**
	(0.234)	(0.305)	(0.0297)	(0.0413)
Z-Score × Post	-0.0230**	0.0715***	0.00657***	0.00371
	(0.0112)	(0.0169)	(0.00229)	(0.00302)
Avg. ROA × Post	-0.748**	0.228	-0.165***	-0.171**
	(0.311)	(0.401)	(0.0536)	(0.0721)
Equity to Assets × Post	10.83***	6.062***	-0.102	-0.228
	(1.394)	(1.834)	(0.231)	(0.312)
Deposits to Assets × Post	-0.880***	-0.977***	0.00848	0.00338
	(0.161)	(0.188)	(0.0276)	(0.0332)
Control Variables	Yes	Yes	Yes	Yes
Cohort by LMA Fixed Effects	Yes	Yes	Yes	Yes
Cohort by Year Fixed Effects	Yes	No	Yes	No
Cohort by State-Year Fixed Effects	No	Yes	No	Yes
Observations	34,630	34,588	34,630	34,588
Adjusted R^2	0.501	0.531	0.615	0.618

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Appendix

A. Classification of business lines

For our analysis, we classify different subsidiaries from the NIC's bank organizational structure data by the type of business line. As our focus is on domestic lending activity, we focus only on those subsidiaries that are reported as domiciled in the United States. We categorize domestic insurance subsidiaries as those with a charter code of 550, which covers insurance brokers, agents, underwriters, or insurance companies. For securities broker-dealers, we categorize domestic subsidiaries as those domiciled in the United States with a reported entity type code of "SBD," the vast majority of which also report a charter code of 700 (for securities broker and/or dealer, including securities underwriting). For non-deposit trust subsidiaries, we require the subsidiary to report a charter code of 250, "Non-deposit Trust Company."

Unlike the other subsidiary types, securitization-related subsidiaries cannot be identified only from a charter code or entity code. Instead we use a two-stage approach. First, we identify all remaining non-deposit subsidiaries with a charter code of 720 (Other Non-Depository Institution) that are reported as a controlled entity, do not have a bank analysis code (0 for non-applicable), and have an entity type code of "DEO" for domestic entity other. Within this group, we search for the following keywords in the entity name: SPV, Securitized, and some type of Receivables/Loan/Issuance/Funding/Asset/Mortgage or other similar "Trust." We go back and manually remove any false positives (such as a bank that uses "Trust" in its name generally). These subsidiaries are the specific entities in which the securitized assets are placed and we use their existence as evidence that the bank has outstanding securitization activity.

For trading activity, we are not aware of a common subsidiary structure that is identifiable from the NIC data. We therefore rely on the BHC level reporting of trading income to determine whether a bank has trading activity.

B. Geographic banking deregulation: historical background and related literature

B.1. Historical background

The regulatory landscape for banking in the United States has gone through various phases. The ability of banks to operate across state lines has shifted several times, such as around the Civil War and in the early 1900s (Johnson and Rice, 2008). Beginning in the 1970s, the United States banking system began its most recent regulatory transformation. As discussed in Amel (1993), Jayaratne and Strahan (1996, 1998), and Johnson and Rice (2008), there were historically restrictions on bank expansion within states (intrastate banking and branching) and bank expansion between states (interstate banking and branching). Here the distinction between "banking" and "branching" is whether the expansion is through a banking company acquiring or establishing a separate bank charter (banking) or through acquiring or establishing a branch office that is not separately chartered and capitalized (branching).

Since these regulations are under the control of individual states, different elements of these regulations changed at different times. However, most states first relaxed restrictions on intrastate bank expansion, both via acquiring banks and forming multibank holding companies (MBHCs) and by allowing new branches. Second, many states allowed interstate expansion through MBHCs, often with a requirement of reciprocity. By 1992, all states except Hawaii had some interstate banking agreements in place (Jayaratne and Strahan, 1998), but only eight states permitted interstate branch expansion (Amel, 1993).[26]

Against this backdrop, the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 (IBBEA) was passed at a federal level. It removed any remaining federal interstate banking and branching barriers, but allowed individual states to decide on many of the specific rules to allow interstate branching. For branching, it provided five regulatory dimensions for states to control: (1) the minimum age of an in-state bank that can be acquired and merged

[26]The specific states are Alaska, Massachusetts, New York, Oregon, Rhode Island, Nevada, North Carolina, and Utah. Only Nevada and Utah allowed nonreciprocal branching in some form.

into an out-of-state bank, (2) whether out-of-state banks are permitted to establish de novo branches, (3) whether out-of-state banks can acquire individual bank branches, (4) whether banks are subject to a statewide deposit cap, and (5) whether reciprocity conditions for (1)–(3) are required with the bank's home state.[27] The branching regulations went into effect in 1997 unless the state chose to establish them earlier or decided to opt out of the act.[28]

Since the passage of the IBBEA in 1994 and its first state-level implementations through 1997, there has been a flurry of expansion. Although banks could cross state lines before the IBBEA, the ability of banks to establish multi-state branch networks under one charter and governance and capitalization structure is highly valued. Indeed, many banks with a MBHC structure converted the subsidiary banks into branches of the BHC's principal bank (Jayaratne and Strahan, 1998). The number of out-of-state branches had grown from 62 in 1994 to 24,728 or 37.28% of all domestic branches by 2005 (Johnson and Rice, 2008). Along with this expansionist trend, many states have progressively loosened the IBBEA-related rules over time through legislation. In our setting, we utilize 19 distinct state-level regulatory changes as our source of variation. The changes are listed in Table A.4.

B.2. Related literature

Different elements of this intrastate and interstate banking and branching regulatory has been investigated by prior literature. For the first intrastate banking and branching reforms, Jayaratne and Strahan (1996) find evidence of increased state-level growth following deregulation. Kroszner and Strahan (1999) focus on the political strength of relevant constituencies (i.e., large banks versus small banks) and what role they played in the timing of these state-level reforms. Morgan, Rime, and Strahan (2004) find that across-state integration of banks before the IBBEA

[27] The IBBEA did establish some guidelines for these restrictions. The age requirement for target banks cannot be more than five years. The statewide deposit cap is initially set at 30%, although states are allowed to set an alternative cap. For the de novo branching and individual bank branch regulations, states needed to explicitly opt-in to allow these actions. The majority of states did not opt-in to one or both of these clauses or only did so with reciprocity conditions.

[28] Initially, Texas and Montana chose to opt-out of the IBBEA, but they opted-in in 1999 and 2001, respectively.

lead to more similar state-level macroeconomic fluctuations. Jayaratne and Strahan (1998) and Stiroh and Strahan (2003) document increase profitability and healthier competitive landscapes following intrastate and interstate deregulation. Bisetti, Karolyi, and Lewellen (2020) focus on the interbank banking regulatory changes mainly before the IBBEA passage. They focus on the reciprocal nature of the early interstate banking laws and how banks reacted to the increased competition from the entrance of out-of-state banks and the increased opportunities from being able to expand into new states.

Table A.1: Variable Definitions

This table presents the data sources and the method of construction of the variables used in our analysis.

Variable Definitions		
	Definition	Data Sources
Bank Variables		
Loans to Assets	Total loans and leases (BHCK2122) divided by total assets (BHCK2170).	FR Y-9C
Real Estate Loans to Assets	Loans secured by real estate (BHCK1410) divided by total assets (BHCK2170).	FR Y-9C
C&I Loans to Assets	Commercial and industrial loans (BHCK1763+BHCK1764) divided by total assets (BHCK2170).	FR Y-9C
Log Assets	Log of total assets (BHCK2170).	FR Y-9C
Z-Score	Quarterly ROA plus equity to assets, divided by three-year standard deviation of ROA. Divided by 100.	FR Y-9C
Average ROA	Quarterly net income (BHCK4340) divided by total assets (BHCK2170), average over past 3 years. Scaled by 100.	FR Y-9C
Equity to Assets	Total holding company equity capital (BHCK3210) divided by total assets (BHCK2170).	FR Y-9C
Deposits to Assets	Deposits (BHDM6631+BHDM6636+BHFN6631+BHFN6636)) divided by total assets (BHCK2170).	FR Y-9C
Average Loan Growth	Log difference between current and three years prior total loans and leases (BHCK2122), annualized.	FR Y-9C
SBL to Loans	Total small business loans originated in a year divided by total loans and leases (BHCK2122) at end of same year.	CRA, FR Y-9C
ROE	Quarterly net income (BHCK4340) divided by total equity capital (BHCK3210). Scaled by 100.	FR Y-9C
ROA	Quarterly net income (BHCK4340) divided by total assets (BHCK2170). Scaled by 100.	FR Y-9C
ROE Beta	Estimated beta from Equation (3). Done on a rolling basis with windows of 40 quarters.	FR Y-9C
ROA Beta	Estimated beta from Equation (3). Done on a rolling basis with windows of 40 quarters.	FR Y-9C
Idiosyncratic Risk, ROE	Bank's estimated idiosyncratic volatility using ROE measures in Equation (3). Scaled as an annualized percent.	FR Y-9C
Idiosyncratic Risk, ROA	Bank's estimated idiosyncratic volatility using ROA measures in Equation (3). Scaled as an annualized percent.	FR Y-9C
ROE Volatility	One year forward-looking volatility of the bank's quarterly ROE. Scaled as an annualized percent.	FR Y-9C
ROA Volatility	One year forward-looking volatility of the bank's quarterly ROA. Scaled as an annualized percent.	FR Y-9C
Bank Merger	Indicator that the bank holding company undertook a bank merger in the past year.	Chicago Fed BHC Merger File
No. of States, Lending	Number of states in which a bank reports small business loans originated in a year.	CRA
No. of States, Deposits	Number of states in which a bank reports deposits in a year.	FDIC SOD Data

Table A.1: Variable Definitions—*Continued*

Variable Definitions		
	Definition	Data Sources
Bank Variables (Cont.)		
No. of Counties, Lending	Number of counties in which a bank reports small business loans originated in a year.	CRA
Geographic Share, Loans	One minus the HHI (scaled to one) of a bank's small business lending across states.	CRA
Non-Interest Income to Assets	Total noninterest income (BHCK4079) minus other noninterest income (BHCKB497), divided by total assets (BHCK2170). Income is summed over past four quarters.	FR Y-9C
No. Insurance Subsidiaries	Number of domestic insurance subsidiaries in bank's organizational structure.	FFIEC NIC
Has Insurance Subsidiary	Indicator that bank has at least one domestic insurance subsidiary in its organizational structure.	FFIEC NIC
No. Security Broker-Dealer Subsidiaries	Number of domestic security broker-dealer subsidiaries in bank's organizational structure.	FFIEC NIC
Has Security Broker-Dealer Subsidiary	Indicator that bank has at least one domestic security broker-dealer subsidiary in its organizational structure.	FFIEC NIC
No. Non-Deposit Trust Subsidiaries	Number of domestic non-depository trust subsidiaries in bank's organizational structure.	FFIEC NIC
Has Non-Deposit Trust Subsidiary	Indicator that bank has at least one domestic non-depository trust subsidiary in its organizational structure.	FFIEC NIC
No. Securitization Subsidiaries	Number of domestic securitization subsidiaries in bank's organizational structure.	FFIEC NIC
Has Securitization Subsidiary	Indicator that bank has at least one securitization subsidiary in its organizational structure.	FFIEC NIC
Trading Income to Assets	Total trading revenue (BHCKA220) divided by total assets (BHCK2170). Income is summed over past four quarters.	FR Y-9C
Has Trading Activity	Indicator that bank reports non-zero trading income over the past four quarters.	FR Y-9C
Bank-County Variable		
Log SBL	Log of total dollar amount of small business loans originated by a bank in a county and year.	CRA
County Variables		
Log SBL	Log of total dollar amount of small business loans originated by all banks in a county and year.	FR Y-9C
Log Small Business Employment	Log of total number of employees in a county related to small businesses.	BEA
County HHI	HHI of small business lending in a county.	CRA
Macroeconomic Variables		
Banking Sector ROE	Average ROE of banking sector, weighted by total assets.	FR Y-9C
Banking Sector ROA	Average ROA of banking sector, weighted by total assets.	FR Y-9C

Table A.2: Different Aspects of Diversification

List of 40 largest BHCs in 2007, sorted by total assets.

Rank	Bank Name	Total Assets ($ Bil.)	No. States, Lending	No. States, Deposits	No. Domestic Insurance Subsid.
1	CITIGROUP	2188	54	18	60
2	BANK OF AMERICA	1721	54	31	31
3	JPMORGAN CHASE & CO.	1562	51	24	8
4	WACHOVIA	782.9	51	22	23
5	WELLS FARGO & COMPANY	575.4	52	23	64
6	U.S. BANCORP	237.6	52	26	9
7	BANK OF NEW YORK MELLON	197.8	29	1	6
8	SUNTRUST BANKS	179.6	51	12	6
9	CAPITAL ONE FINANCIAL	150.6	22	6	5
10	NATIONAL CITY	150.4	46	8	16
11	REGIONS FINANCIAL	141.0	48	16	23
12	PNC FINANCIAL SERVICES GROUP	139.0	44	10	3
13	BB&T CORPORATION	132.6	42	12	26
14	FIFTH THIRD BANCORP	111.0	35	10	3
15	KEYCORP	99.57	44	14	8
16	NORTHERN TRUST	67.61	20	17	1
17	M&T BANK	64.88	26	8	4
18	COMERICA INCORPORATED	62.76	45	5	3
19	MARSHALL & ILSLEY	59.86	46	9	3
20	HUNTINGTON BANCSHARES	54.63	35	6	8
21	ZIONS BANCORPORATION	52.95	45	10	3
22	COMMERCE BANCORP	49.37	25	9	1
23	POPULAR	44.41	44	8	4
24	FIRST HORIZON NATIONAL	37.02	43	17	10
25	SYNOVUS FINANCIAL	33.02	37	5	5
26	NEW YORK COMMUNITY BANCORP	30.60	49	2	4
27	COLONIAL BANCGROUP	25.97	27	5	4
28	ASSOCIATED BANC-CORP	21.59	28	3	4
29	BOK FINANCIAL	20.90	33	8	3
30	W HOLDING COMPANY	17.93	1	1	1
31	WEBSTER FINANCIAL	17.21	9	4	3
32	FIRST BANCORP	17.19	2	3	2
33	FIRST CITIZENS BANCSHARES	16.23	22	14	1
34	COMMERCE BANCSHARES	16.21	50	5	2
35	TCF FINANCIAL	16.07	13	7	3
36	FIRST NATIONAL OF NEBRASKA	16.02	52	8	4
37	FULTON FINANCIAL	15.92	14	5	2
38	CITY NATIONAL	15.89	25	3	1
39	FBOP CORPORATION	14.97	29	4	1
40	NEW YORK PRIVATE BANK & TRUST	14.36	11	2	2

Table A.3: The Financial Crisis and Small Business Lending, Alternative Explanations

This table presents the results for the effect of bank diversification on small business lending around the financial crisis. The sample is from 2005 through 2010. Observations are at a bank-county level. *Log SBL, Bank-County Level* is the log amount of the small business loans originated annually by a bank in a county. *Post-Crisis* is an indicator variable for the crisis period, which begins in 2008. *High Geographic Diversification* is an indicator variable that equals one for banks in the top quartile of the number of states in which they operated in 2007 and zero for banks in the bottom quartile. *Bank Merger* is an indicator that a bank reported a merger in 2007. *County HHI* is the Herfindahl-Hirschman index for the county-level SBL in 2007. *ROE Beta* is the estimate of the bank's beta using Equation (3) through 2007. *Big 4* is an indicator that the bank is one of the four largest banks (Bank of America, Citigroup, J.P. Morgan Chase, Wells Fargo). All the other control variables are included as in Table V. The control variables are fixed at their 2007 values and interacted with the *Post-Crisis* indicator. Standard errors are clustered by bank.

	Log SBL, Bank-County Level					
	(1)	(2)	(3)	(4)	(5)	(6)
High Geo. Div. × Post-Crisis	1.103***	1.172***	1.118***	1.240***	0.964***	1.052***
	(0.266)	(0.244)	(0.351)	(0.341)	(0.259)	(0.265)
Bank Merger × Post-Crisis	0.177**	0.193***				
	(0.0706)	(0.0688)				
County HHI × Post-Crisis	-0.629***	-0.442**				
	(0.165)	(0.181)				
ROE Beta × Post-Crisis			-0.245***	-0.196**		
			(0.0828)	(0.0974)		
Big 4 × Post-Crisis					-0.700***	-0.652***
					(0.151)	(0.136)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Bank-County Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	No	Yes	No	Yes	No
County-Year Fixed Effects	No	Yes	No	Yes	No	Yes
Observations	123,081	122,927	122,221	122,067	123,081	122,927
Adjusted R^2	0.857	0.852	0.857	0.852	0.857	0.853

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table A.4: Geographic Diversification Shocks

This table presents the 19 different geographic shocks used in Section IV. *Age Restriction Change* indicates that a state lowered the age restriction for banks that can be acquired. *Individual Branch Change* indicates that a state loosened restrictions on acquiring individual bank branches. *De Novo Branching Change* indicates that a state loosened restrictions on the opening of new branches. See Johnson and Rice (2008) for a more detailed discussion of the specific regulations.

State	Year	Age Restriction Change	Individual Branch Acquisition Change	De Novo Branching Change
Alabama	2007	No	Yes	No
Arizona	2001	No	Yes	No
Georgia	2002	Yes	No	No
Hawaii	2001	Yes	Yes	Yes
Illinois	2004	Yes	Yes	Yes
Kentucky	2000	Yes	No	No
Montana	2001	Yes	Yes	Yes
New Hampshire	2000	No	Yes	Yes
New Hampshire	2002	Yes	No	No
New York	2008	No	No	Yes
North Dakota	2003	Yes	Yes	Yes
Oklahoma	2000	Yes	Yes	Yes
Tennessee	1998	No	Yes	No
Tennessee	2001	No	No	Yes
Tennessee	2003	Yes	No	No
Texas	1999	Yes	Yes	Yes
Utah	2001	No	No	Yes
Vermont	2001	Yes	No	Yes
Washington	2005	No	Yes	Yes

Table A.5: Geographic Deregulation and Small Business Lending, Robustness Checks

The table presents some alternative specifications related to Equation (7) for the effect of diversification on small business lending following deregulation. Panel A uses the alternative difference-in-differences estimator proposed by Callaway and Sant'Anna (2021). Panel B excludes banks that report deposits in the deregulated state from the treatment group. Panel C excludes states that geographically border the shocked state from the analysis. *Log(SBL), Bank-County Level* is the log amount of the small business loans originated annually. *Treat* is a dummy variable that equals one for out-of-state banks that operated in a state with a change in deregulation and zero otherwise. For Panel A, *Treat* is based on the first shock experienced by a bank in the sample. For Panels B and C, the sample uses six-year windows around 19 different deregulatory shocks and is only counties outside of the state experiencing the shock. See Table A.4 for the list of the specific shocks. *Post* is an indicator variable that equals one for the shock year and the following years and zero for the pre-shock period. All control variables are as of year before the shock and interacted with *Post*. Standard errors are clustered by bank.

Panel A: Alternative DiD Estimator		
	Log SBL, Bank-County Level	
	(1)	(2)
ATT	0.241**	0.237**
	(0.0954)	(0.0959)
Additional Controls	No	Yes
Observations	184,442	178,498

Panel B: Exclude Banks with Deposits in Deregulated States				
	Log SBL, Bank-County Level			
	(1)	(2)	(3)	(4)
Treat × Post	0.213**	0.127***	0.226**	0.146***
	(0.0869)	(0.0418)	(0.0884)	(0.0436)
Additional Controls	No	Yes	No	Yes
Cohort by Bank-County Fixed Effects	Yes	Yes	Yes	Yes
Cohort by Year Fixed Effects	Yes	Yes	No	No
Cohort by County-Year Fixed Effects	No	No	Yes	Yes
Observations	1,278,554	1,108,548	1,205,769	1,029,665
Adjusted R^2	0.793	0.795	0.786	0.788

Panel C: Excluding Bordering States				
	Log SBL, Bank-County Level			
	(1)	(2)	(3)	(4)
Treat × Post	0.193*	0.147***	0.200**	0.158***
	(0.0991)	(0.0509)	(0.0978)	(0.0519)
Additional Controls	No	Yes	No	Yes
Cohort by Bank-County Fixed Effects	Yes	Yes	Yes	Yes
Cohort by Year Fixed Effects	Yes	Yes	No	No
Cohort by County-Year Fixed Effects	No	No	Yes	Yes
Observations	1,131,389	986,137	1,081,672	931,293
Adjusted R^2	0.794	0.797	0.787	0.790

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01

Table A.6: Geographic Deregulation and Small Business Lending, New Entrants

This table presents the results of the specification in Equation (7) for the effect of diversification on small business lending following deregulation. *Log SBL, Bank-County Level* is the log amount of the small business loans originated annually by a bank in a county. *Treat* is a dummy variable that equals one for banks that enter a state with a change in deregulation and zero otherwise. The sample uses six-year windows around 19 different deregulatory shocks. *Cohort* refers to the treatment and control banks associated with each shock. For each cohort, the sample is only counties outside of the state experiencing the shock. See Table A.4 for the list of the specific shocks. *Post* is an indicator variable that equals one for the shock year and the following years and zero for the pre-shock period. All control variables are as of year before the shock and interacted with *Post*. Standard errors are clustered by bank.

	Log SBL, Bank-County Level			
	(1)	(2)	(3)	(4)
Treat × Post	0.111***	0.124***	0.121***	0.131***
	(0.0294)	(0.0294)	(0.0308)	(0.0309)
Log No. States, Deposits × Post		-0.110**		-0.0693
		(0.0459)		(0.0509)
Log Assets × Post		-0.00537		-0.0157
		(0.0186)		(0.0202)
SBL to Loans × Post		-1.065***		-0.918***
		(0.201)		(0.208)
Avg. Loan Growth × Post		0.892***		0.926***
		(0.155)		(0.154)
Z-Score × Post		0.0336***		0.0290***
		(0.00772)		(0.00860)
Avg. ROA × Post		0.0817		0.0803
		(0.163)		(0.187)
Equity to Assets × Post		0.489		0.532
		(0.627)		(0.673)
Deposits to Assets × Post		0.479**		0.317
		(0.187)		(0.206)
Cohort by Bank-County Fixed Effects	Yes	Yes	Yes	Yes
Cohort by Year Fixed Effects	Yes	Yes	No	No
Cohort by County-Year Fixed Effects	No	No	Yes	Yes
Observations	876,772	730,632	791,375	640,342
Adjusted R^2	0.790	0.792	0.780	0.780

Standard errors in parentheses. * p<.10, ** p<.05, *** p<.01