

How Did Bank Lending to Small Business in the United States Fare After the Financial Crisis?

By

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Abstract:

Aggregate bank-loan data reported by the FDIC show that bank lending to small businesses plummeted during 2009 – 2011 following the collapse of Lehman Brothers in Sep. 2008 and the onset of the financial crisis, and continued to decline during the post-crisis years 2012 – 2015. However, the number of banks also declined during both periods, making it difficult to determine if banks have continued, or loosened, the tight-credit policies of 2009 – 2011. The current study analyzes bank-level data on both the stock and flow of small-business lending collected by U.S. banking regulators to provide new univariate and multivariate evidence on whether bank lending to businesses--small and large--recovered after the financial crisis. The analysis reveals that bank lending to small businesses remained at depressed levels throughout the post-crisis years, while total-business lending saw somewhat of a recovery. Finally, the analysis documents that the declines in small-business lending were significantly greater at large banks than at small banks, and at banks in worse financial condition than at banks in better financial condition.

Key words: availability of credit, bank credit, bank lending, business lending, business subsidies, credit crunch, entrepreneurship, financial crisis, small business, small business lending, troubled bank

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Executive Summary

Aggregate bank-loan data reported by the FDIC show that bank lending to small businesses plummeted during 2009 – 2011 following the onset of the financial crisis after the collapse of Lehman Brothers in Sep. 2008, and continued to decline during the post-crisis years 2012 – 2013. However, the number of banks also declined during both periods, making it difficult to determine if banks have continued, or loosened, the tight-credit policies of 2009 – 2011.

The current study analyzes bank-level data on both the stock and flow of small-business lending collected by U.S. banking regulators to provide new univariate and multivariate evidence on whether bank lending to businesses--small and large--recovered after the financial crisis. The study also tests whether there were significant differences in the lending behavior of large banks vs. small banks and of troubled banks vs. healthy banks.

Key Findings

The analysis reveals that the outstanding amounts of both small-business loans and total-business loans grew at double-digit rates prior to the financial crisis, but small-business loans grew only about half as fast at large banks than at small banks. Growth rates for both types of business loans declined precipitously during the crisis years 2009 – 2011, but by much more at large banks than at small banks. Growth rates for both types of loans rebounded somewhat during the post-crisis years 2012 – 2015. Post-crisis, small-business lending grew somewhat faster at small banks than at large banks while total-business lending grew much faster at large banks than at small banks.

During the pre-crisis years, growth in outstanding amounts of business lending by problem banks averaged only three percent per year as compared to 15 percent per year at healthy banks. During the crisis years, both total and small-business lending contracted at problem banks by more than five percent per year but continued to expand at healthy bank by more than five percent per year. Post crisis, small-business lending

remained weak, growing by only 3.5 percent per year at healthy banks and contracting by 3.9 percent per year at troubled banks. Post-crisis, total business lending grew at 5.8 percent per year at healthy banks but contracted by 4.4 percent

Pre-crisis growth in the outstanding number of small-business loans averaged more than ten percent per year at both large and small banks. During the crisis years, the number of small-business loans grew much more slowly at large banks than at small banks, but this trend reversed during the post-crisis years, when the number of small-business loans grew faster at large banks than at small banks. At troubled banks, the number of small business loans averaged -0.5 percent per year pre-crisis, -6.8 percent per year during the crisis, and -2.2 percent per year during the post-crisis years. At healthy banks, the number of small business loans averaged 12.1 percent per year pre-crisis, 7.6 percent per year during the crisis, and 7.3 percent per year during the post-crisis years.

Multivariate analysis of the amounts of small-business loans outstanding and total business loans outstanding, as well as of the number of small business loans outstanding largely confirms the univariate results. These multivariate analyses include an extensive set of control variables designed to rule out alternative explanations for the decline in small-business lending documented in the univariate analysis. The growth rates for each of these measures remain depressed from pre-crisis levels, but much more so for small-business loans than for total business loans. Hence, it appears that there has been little in the way of a recovery in the small-business loan market, but a somewhat more robust recovery in the market for total-business loans.

Multivariate analysis of the amount and number of small-business loan originations reveal that univariate differences in loan originations by large vs. small banks are driven by differences in capital adequacy and asset quality rather than by size.

Policy Implications

From a policy perspective, the results of this study lead to several recommendations. First, regarding troubled banks, the results indicate that troubled banks severely curtail their business lending, especially their lending to small businesses, which adversely affects the economy. Therefore, an important policy implication is

that troubled banks should be resolved more quickly than in the past so that their assets are passed on to healthy banks that can resume lending to small businesses.

Second, regarding large banks, the results in the current study indicate that large banks lent a smaller portion of their assets to small businesses than did small banks, and that large banks also severely curtailed their small-business lending following onset of the financial crisis. Moreover, the post-crisis lending of large banks has disproportionately gone to large businesses. Regulators could use existing laws, such as the Community Reinvestment Act, to encourage more small-business lending by these very large banks. Another option is for legislators and regulators pass legislation and take other steps to limit the ongoing concentration of banking sector assets in the hands of just a few large players. Re-enactment of the Glass-Steagall separation of commercial banking and investment banking would force the very largest banks to shrink by divesting their investment-banking subsidiaries. Amending and lowering the 10 percent deposit market share cap of the Riegle-Neal Act of 1994 (codified in 12 U.S.C. 1842(d)), to apply not only to bank acquisitions but also to non-bank acquisitions and to organic growth would provide another means of reducing the size of the largest banks.

However, differences in small-business-loan originations by large vs. small banks appear to be driven by differences in capital adequacy and asset quality. Other researchers have documented that capital ratios at large banks are significantly lower than at small banks--a result also reported here. This suggests that another policy implication is for legislators and regulators to act to raise minimum capital ratios to levels where they are binding constraints for large banks. Such policies already have been contemplated by U.S. banking regulators; the evidence provided here supports those proposals.

Another policy implication is that regulators should take steps to encourage the formation of more de novo community banks, which are specialists in small-business lending. New legislation and policies to encourage the formation of de novo banks, as well as legislation and policies that would reduce regulatory burden by exempting small banks from regulations aimed at curbing the excesses of large banks would be very helpful.

Finally, legislators and regulators can take actions to encourage the growth of small-business lending by non-bank lenders to fill the void left by the declines in bank lending. Recent changes to small-business loan limits on the almost 6,000 U.S. credit unions are one such action. Credit union lending to small businesses has more than doubled from 2008 to 2016, from \$30 billion to \$60 billion, while bank lending to small businesses over the same period has declined by almost \$100 billion.

1. Introduction

After the collapse of Lehman Brothers in Sep. 2008 and the ensuing onset of the financial crisis, credit markets in the U.S. (and around the world) virtually froze up.¹ Lax underwriting standards led to unprecedented levels of nonperforming loans that led U.S. bank regulators to close almost 500 banks during 2008 - 2012. The financial crisis was predominantly driven by losses in the banking sector of the economy. Research by Reinhart and Rogoff (2014) suggests that bank-driven recessions are much more severe and last longer than typical recessions driven by events in the economic sectors, taking an average of eight years for real per capita income to return to pre-crisis levels. However, Barro and Jin (2016) dispute this notion, pointing to weak post-crisis productivity growth rather than to losses in the financial sector.

Cole (2012) documents how these developments affected bank lending to small businesses, which plummeted by almost 20 percent during 2009 – 2011, from a 2008 high of \$659 billion to a low of \$543 billion.² Moreover, he also provides evidence that the decline in lending was much greater at large than at small banks, even though the more than 400 bank failures associated with the financial crisis were heavily concentrated among small, rather than large, banks.³

Aggregate data collected by the U.S. Federal Financial Institutions Examination Council (FFIEC) on behalf of the three primary U.S. bank regulators show that bank lending to small businesses continued to decline during

¹ The National Bureau of Economic Research--the official arbiter of U.S. recessions--set the dates of the Great Recession *ex post* as beginning in Dec. 2007 and ending in Jun. 2009. For purposes of the current study, the financial crisis is defined as beginning with the collapse of Lehman Brothers in Sep. 2008 and extending through June 2011, which was approximately the bottom of the decline in U.S. housing prices. In addition, the dollar amount of small-business loans outstanding as reported by U.S. commercial banks to their regulators peaked in the June 2008 reporting period and then declined precipitously during the subsequent three years (see Cole, 2012).

² Cole (2012) analyzes commercial banks, but not savings banks or savings associations. The FDIC includes loans by these types of financial institutions in the aggregate small-business lending data it publishes on its website so the corresponding volume of loans is somewhat larger but show a similar percentage decline from 2009 to 2011.

³ The number of bank failures peaked at 132 in 2010 and declined during subsequent years. See Cole and White (2012, 2016) and Chernykh and Cole (2015) for analyses and discussions of U.S. bank failures during and after the financial crisis years.

the post-crisis years of 2012 - 2015, but so did the number of banks; this makes it difficult to determine if individual banks have continued, or loosened, tight credit policies.

In the current study, data on both the amount and number of both the stock and flow of bank-level small-business lending collected by U.S. banking regulators are analyzed to provide new evidence on how bank lending to businesses, and especially to small businesses, changed after the financial crisis years of 2009 - 2011. The study also provides results from tests for differences in the lending behavior of large banks vs. small banks and of troubled banks vs. healthy banks.⁴

Both theory dating back to Schumpeter (1934)⁵ and more recent empirical research (e.g., King and Levine, 1993a, 1993b; Rajan and Zingales, 1998) indicate that capital-constrained firms grow more slowly, hire fewer workers and make fewer productive investments than firms utilizing debt in their capital structure. A better understanding of how bank lending to small businesses fared during the post-crisis years of 2012 - 2015 should provide policymakers with guidance regarding how to tailor legislation and regulations to boost bank lending to small firms, thereby increasing both employment and economic output.

Why is this analysis of importance? According to the U.S. Department of Treasury and Internal Revenue Service, there were almost 33 million businesses that filed taxes for 2012, of which 23 million were nonfarm sole proprietorships, four million were S-corporations, three million were partnerships and two million were C-corporations; all but about 10,000 C-corporations are privately held and the vast majority have annual revenues less than \$1 million.⁶ Small firms are vital to the U.S. economy. According to the U.S. Small Business Administration, small businesses account for 99.9 percent of all businesses; 48 percent of private-sector employment; half of all U.S. private-sector employment and produced 63 percent of net job growth in the U.S.

⁴ These groupings of banks are defined below in section 4 of the manuscript.

⁵ Aghion and Howitt (1988) provide a comprehensive exposition of Schumpeter's theory of economic growth.

⁶ See the U.S. Internal Revenue Service statistics for integrated business data at: <https://www.irs.gov/uac/soi-tax-stats-integrated-business-data>. The year 2012 is used for reference because it was the latest year for which statistics were available at the time this report was written.

between 1992 and 2013.⁷ Therefore, a better understanding of how bank credit to small businesses was affected by the financial crisis can help legislators, regulators, and other policymakers to take actions that will lead to more credit, which will translate into more jobs and faster economic growth. The current study contributes to the literature on the availability of credit to small businesses by providing the first rigorous analysis of how bank lending to small businesses fared during the post-crisis recovery years of 2012 - 2015. Specific policy recommendations are detailed in the executive summary and in the final section of the manuscript.

2. Review of the Literature

2.1. Availability of Credit to Small Businesses

The issue of availability of credit to small businesses has been studied by financial economists for at least sixty years, dating back at least to Wendt (1947), who examines availability of loans to small businesses in California. Since then, scores of articles have addressed this issue.

This review of the literature on small-business lending is limited to the most prominent studies of bank small-business lending using bank-level loan data that have appeared in the financial economics literature during the past few years, especially those that use data from the bank Consolidated Reports of Condition and Income and Community Reinvestment Act (CRA) data on small-business loans.⁸

⁷ See, "Frequently Asked Questions," Office of Advocacy, U.S. Small Business Administration (2016) at: https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf. The SBA defines a small business as "an independent firm with fewer than 500 employees." We follow that definition in this research.

⁸ There also is a related body of work on the availability of credit that relies upon information on the Surveys of Small Business Finances (SSBFs). See, for example, Petersen and Rajan (1994, 1995, 1997, 2002); Berger and Udell (1995); Cole (1998, 2008, 2009, 2010, 2012, 2016); Cole, Goldberg and White (2004); Craig and Hardee (2007); Hardee (2007); and Rice and Strahan (2010).

From a methodological viewpoint, the study most closely related to this one is Peek and Rosengren (1998b), which examines the impact of banking consolidation on small-business lending.⁹ They examine the change in small-business lending (as measured by the ratio of small-business loans to total assets) by groups of banks subject to different “treatment.”¹⁰ In their study, the treatment is whether or not the bank was involved in a merger, whereas, in the current study, the treatment is whether or not the financial crisis has ended, as well as whether or not the bank is a large bank versus a small bank or whether the bank is a troubled bank versus a healthy bank.¹¹ Peek and Rosengren find that post-merger ratio of small-business loans to total assets of the consolidated bank converges towards that of the pre-merger acquirer rather than that of the pre-merger target. Their study also makes clear the importance of adjusting for bank mergers over time when analyzing changes in bank lending.

Another closely related study is Berger and Udell (2004), which examines changes in bank lending to test what the authors call the “institutional memory” hypothesis. This hypothesis states that the skills of loan officers deteriorate over the business cycle, so that the quality of a bank’s loan portfolio deteriorates as loan officers become less effective in differentiating high-quality and low-quality credits. Berger and Udell construct a bank-level dataset that spans twenty years—from 1980 through 2000—and calculate the annual proportional change in the outstanding amounts of commercial loans, which they use as their primary dependent variable. They regress

⁹ There also are a number of other studies that examine how mergers affect small-business lending, including Berger *et al.* (1998) and Cole and Walraven (1998), but the methodologies in those studies differ from the methodology used here. In addition, many of those studies examine data from the Survey of Terms of Bank Lending rather than from the June Call Reports.

¹⁰ Strictly speaking, these are not “treatments” because banks are not randomly assigned to groups by researchers or by exogenous events. However, this is the standard description of “groups” in these types of difference-in-difference studies.

¹¹ The current study follows Cole, Goldberg and White (2004) and many other researchers in defining a “large bank” as a bank with more than \$1 billion in (2000 constant-dollar) assets. Only about 500 of the 6,000 commercial banks operating in 2014 exceed this size threshold, so using a larger threshold like \$10 billion would reduce the sample size of “large banks” to the point where it would be difficult to obtain meaningful results. Assets are adjusted for inflation using the Consumer Price Index for All Urban Consumers (CPI-U) compiled and reported by the U.S. Bureau of Labor Statistics (BLS) and available at <http://www.bls.gov/cpi/>.

this dependent variable against a set of explanatory variables designed to measure “institutional memory” (their primary variable of interest), as well as variables designed to measure the health of the bank and overall loan demand, and find evidence supportive of the “institutional memory” hypothesis. The current study does not examine small-business loans or the impact of the recent financial crisis on bank lending.

Ou and Williams (2009) use data from a variety of sources, including the FFIEC Call Reports, to provide an overview of small-business lending by U.S. financial institutions during the past decade. Using the FFIEC data, they present aggregate statistics from 1995 – 2007 on small-business lending by depository institutions, including a breakdown by institution size and a discussion of the growing importance of business credit-card loans.

A recent study that examines the impact of the recent financial crisis on bank lending is Ivashina and Scharfstein (2010), which uses loan-level data from DealScan to analyze changes in the market for large, syndicated bank loans. The focus of this study is whether banks that were deemed more vulnerable to contagion following the failure of Lehman Brothers reduced their lending by more than other banks. As these authors note, DealScan and the regulatory database on bank loans that we use each captures only a portion of total bank lending to businesses. In that respect, the current study is a complement to theirs; their study covers large, syndicated loans that often are securitized and do not appear on bank balance sheets; whereas the current study covers the smaller, non-syndicated loans that are not securitized, but remain on the balance sheets of the bank lenders.

Cornett *et al.* (2011) analyze how the financial crisis affected bank lending, but focuses on the role of liquidity-risk management. They find that banks holding more illiquid assets funded by sources other than core deposits and equity reduced lending more than other banks in order to increase their liquid assets. They also find that banks with greater unused loan commitments increased lending by more than other banks, as borrowers drew down pre-existing lines when other sources of funding had dried up. Cornett *et al.* looks only at total lending, whereas the current study focuses on business lending and, in particular, small-business lending. Also, Cornett *et al.* do not adjust their data for mergers; instead, they simply delete from analysis all banks whose

assets grew by more than ten percent in a quarter. The author of the current study calculates that this decision would exclude a significant number of observations during the sample period.

Cole (2012) uses FFIEC data on the stock of small-business loans to examine how small-business lending by banks changed during the financial crisis years. He finds that, from June 2008 to June 2011, small-business lending declined by \$116 billion, or almost 18 percent, from \$659 billion to only \$543 billion; and that small commercial & industrial lending declined by even more, falling by more than 20 percent over the same period. Cole also examines lending by banks that did and did not participate in the CPP; and finds that banks participating in the Capital Purchase Program cut lending by even more than non-participating banks. Finally, Cole documents a strong negative relation between bank size and business lending, and a strong positive relation between bank capital adequacy and business lending.

Jagtiani and Lemieux (2016) use FFIEC Call Report data on the amount of small-business loans outstanding at depository institutions to document how, since the 1990s, the market share of small-business loans has risen at large banks at the expense of community banks and that this trend accelerated following onset of the financial crisis in 2008. They also find that, during the run-up to the financial crisis when housing prices were rising rapidly, small businesses increased the use of home equity lines of credit to fund their operations.

Three recent unpublished working papers (Bord *et al.* 2015; Flannery and Lin, 2016; and Jang, 2015) have used county-level FFIEC data on small-business loan originations to analyze the impact of housing prices on small-business lending during the recent financial crisis.

Bord *et al.* (2015) use CRA loan-origination data from 2005-2013 to analyze the role of large banks in propagating financial shocks across the U.S. economy. They find that banks operating in the counties most severely affected by the decline in housing prices reduced small-business loan originations even in counties where housing prices were not severely affected by the crisis. In many cases, these banks ceased to lend in unaffected counties. In contrast, banks not exposed to loans in severely affected counties expanded their operations. Finally, they report that their findings persist for years after the initial shock.

Flannery and Lin (2016) use CRA loan-origination data from the pre-crisis period 1996-2006 to analyze how increases in house prices affected small-business lending. They find that the real estate bubble caused growth not only in real-estate loans but also in small-business commercial & industrial loans, even after controlling for local economic conditions.

Jang (2015) uses CRA loan-origination data from 2005-2010 to analyze the effect of the Troubled Asset Relief Program on the propagation of real estate shocks via geographically diversified U.S. banks. Employing a difference-in-differences identification strategy, she finds that the amount of TARP money provided to banks in distressed areas is positively associated with small-business loan originations in non-distressed areas. She also finds that TARP funds helped recipient banks return faster to their pre-crisis franchise values.

2.2 Non-Traditional Lending to Small Businesses

While commercial banks remain the primary source of credit for small businesses, several recent studies have examined small-business lending by nonbanks. Data from the 2003 Survey of Small Business Finance (SSBF) show that banks provided about 60 percent of small-business credit, with the remaining 40 percent coming from nonbank lenders--led by finance companies at 15 percent. The U.S. Small Business Administration estimates from Federal Reserve Board data that finance companies provided \$422 billion in credit to small firms in 2013.

Wilcox (2011) asks whether U.S. credit unions stepped in to pick up market share in small-business loans as bank small-business lending declined. He finds that credit unions quadrupled the portion of small-business loans in their asset portfolios from 2000 – 2010, rising from less than \$10 billion to \$37 billion. Data from the NCUA's Credit Union Summary Report for December 2015 shows that business loans have since grown to \$57 billion and are growing at 10 percent per year.

Smith (2012) compares bank and credit union lending to small businesses and finds that delinquency rates and credit losses were much more severe at banks. He also reports that most credit union loans to small businesses are very small—averaging less than \$50,000 per loan.

Mills and McCarthy (2014) provide an assessment of access to credit by small businesses during the post-crisis recovery years and how technology may play an important future role. They argue that structural barriers are at play, such as ongoing consolidation in the banking industry and high transaction costs of small-dollar-value loans, which have negatively impacted bank lending to small businesses. They posit that emerging online lenders are using technology to mitigate these structural barriers by providing an alternative supply of small business credit. They estimate that online lenders made about \$5 billion in small-business loans during 2014 and were growing at 175 percent per year.

Mach, Carter and Slattery (2014) examine online peer-to-peer lending (also known as crowd-funding) to small U.S. businesses using loan-level data from the Lending Club. They find that crowd-funded small-business loans were more likely to be funded, were charged higher rates, and performed much more poorly than small-business loans made by banks.

3. Data

3.1. Call Report Data

The current study uses data from a number of different sources. The first primary source of data is the FFIEC's quarterly Consolidated Reports of Condition and Income that are filed by each commercial bank in the U.S., which are known informally among bank researchers as the Call Reports.¹² As part of the FDIC Improvement Act of 1991, which was passed to address regulatory shortcomings identified during the last major banking crisis, banking regulators were directed (in section 122) to begin collecting annual data on lending to small businesses

¹² The U.S. Federal Financial Institutions Examination Council, or FFIEC, is an interagency body that, among other duties, collects periodic financial information filed by depository institutions (known informally as the "Call Reports") on behalf of the Federal Reserve System (FRS), the Federal Deposit Insurance Corporation (FDIC) and the Office of the Comptroller of the Currency (OCC). The Call Report data from 1980 through 2010 are freely available to the public for download from the website of the Federal Reserve Bank of Chicago:

http://www.chicagofed.org/webpages/banking/financial_institution_reports/commercial_bank_data.cfm.

and small farms.¹³ To comply with this requirement, beginning in 1994, regulators included in the June Call Report a section that gathers information on small-business lending—*Schedule RC-C Part II: Loans to Small Businesses and Small Farms*. The schedule collects information on the number and amount outstanding of commercial real estate and commercial & industrial loans with original loan amounts in three size categories: \$100,000 or less; more than \$100,000 through \$250,000; and more than \$250,000 through \$1 million. These are the two primary types of commercial loans made by commercial banks and correspond to items collected on Part I of Schedule RC-C, which provide the amounts of all loans secured by nonfarm nonresidential properties and of commercial & industrial loans.¹⁴ In 2009, the decision was made to change the reporting frequency from annual to quarterly.¹⁵ Quarterly reporting of Section RC-C Part II began with the March 2010 Call Report. The Call Report data cover 1995 Q2 - 2015 Q2. The primary shortcomings of these data are: (1) they provide information on small loans, which is not the same as information on loans to small businesses because small loans can be, and are, made to large businesses; (2) they only cover lending by commercial banks; (3) they do not distinguish between new loans and existing loans.; the only locational information about these data is the headquarters of the bank, not the location of the branch/subsidiary making the loan.¹⁶

¹³ See the text of Section 122 at: <http://www.fdic.gov/regulations/laws/rules/8000-2400.html>.

¹⁴ The schedule also identifies banks that make substantially all of their business loans in original amounts less than \$100,000. There are about 1,000 such banks. For these banks, the values of business loans from Part I of Schedule RC-C are used as the values of small-business loans. These banks still have to report the number of such loans.

¹⁵ See Notices in the *Federal Register* Vol. 72, No. 245 (Wednesday, December 23, 2009) at: http://www.ffiec.gov/PDF/FFIEC_forms/FFIEC031_FFIEC041_20091223_ffr.pdf

¹⁶ For example, Bank of America makes loans throughout the U.S., but is not required to identify the branch/subsidiary that makes these loans. The bank only reports that its headquarters is located in Charlotte, NC.

3.2. CRA Data

The second primary source of data for the current study is the FFIEC's Community Reinvestment Act (CRA) database.¹⁷ The CRA was passed into law in 1977 by Congress (12 U.S.C. 2901) and has been implemented by bank regulators (see 12 CFR parts 25, 228, 345, and 195). Congress intended that CRA would encourage each financial institution to take steps to meet the credit needs of borrowers in the localities in which the institution does business. In part, the CRA regulations require that financial institutions report annual information on their lending to small businesses. In particular, they are required to report the numbers and amounts of business loans originated in amounts less than \$100,000, more than \$100,000 through \$250,000 and more than \$250,000 through \$1 million. In addition, they must report the number and amount of loans originated to firms with less than \$1 million in revenues.¹⁸ Because these are originations rather than outstanding portfolio amounts, they represent the flow of new loans to small businesses, whereas the Call Report data represent the stock of loans to small business. The current study analyzes annual CRA data on the amount and number of small-business loan originations during 1996 - 2014.

While CRA data provide information on loan originations and loans to small businesses as opposed to small loan amounts, they still have a number of shortcomings. The most significant shortcoming is that the data are not reported by small community banks; the regulations exempt them because they are assumed to serve only small businesses. While the threshold for this reporting has changed each year, in general since 2006, banks with assets less than \$1 billion have been exempt from the CRA reporting requirement. This exemption covers almost 90 percent of banks by number, but only about 25 percent by aggregate banking system assets.

¹⁷ The CRA data on small-business loan originations are available for public download from the FFIEC's website at: <http://www.ffiec.gov/cra/default.htm>.

¹⁸ Banks must report these data at the granularity of the census tract, but the FFIEC does not make these data available to the public at the bank level. Instead, the FFIEC make data available at the census tract level only after aggregating across all banks that lend in a particular area.

3.3. Bank Merger Data

As Peek and Rosengren (1998b) demonstrate, it is important to account for the effect of mergers in calculating changes in bank balance-sheet data over time. During 1994 – 2014, more than 10,000 banks disappeared via mergers. This means that about six percent of bank-year observations for these years are affected by these mergers. To account for the impact of mergers on the balance sheets of acquiring banks, the current study employs the following procedure. The acquirer and target are identified, as well as the date of each acquisition, using information from the FDIC’s Institution Directory—the third primary source of data for the current study.¹⁹ This information is used to combine the values of each dollar-denominated item reported in the period prior to the merger. For example, if Bank A acquires Bank B during year ($t - 0$), the values of dollar-denominated items for Bank A and Bank B are summed during year ($t - 1$). The change in dollar-denominated items for Bank A is then calculated as the reported values for year-end ($t - 0$) and the sum of values for Bank A and Bank B for year-end ($t - 1$). This ensures that the changes in the loan variables that are measured are the result of changes in lending, and not the result of mergers.

4. Methodology

4.1 Univariate Tests

In order to provide new evidence on how the financial crisis affected bank lending to small businesses, the current study employs both univariate and multivariate tests. First, charts and univariate tests are used to analyze both the level and changes in small-business lending and total-business lending, for all banks and for different groups of banks.

¹⁹ The FDIC’s Institution Directory is available for download from its webpages. See the “Download” link at the bottom of the webpage found at <http://www2.fdic.gov/idasp/main.asp>. This directory includes the FDIC Certificate Number of each inactive bank along with the certificate number of its acquirer.

A vector *Treatment*_{*i,t-1*} is defined that includes a set of so-called “treatment” variables defining groups of banks with different characteristics expected to impact lending. These treatment variables enable one to test whether the impact of the financial crisis differed across the groups of banks. The primary treatment variables, which are measured as of period *t-1*, are *Large Bank* and *Troubled Bank*.

- *Large Bank* is defined as equal to one if a bank's merger-adjusted assets are greater than \$1 billion (also adjusted for inflation in 2000 dollars) as of period *t-1* and equal to zero otherwise.
- *Troubled Bank* is defined as equal to one if the bank's nonperforming asset coverage ratio (NACR) is less than 4.0 percent as of period *t-1*.²⁰ The NACR is a capital ratio that adjusts for differences in how banks provision for and write off nonperforming loans.

The univariate analysis enables one to test whether the average change in lending by the treatment group (large or troubled) is significantly different from the average change in lending by the control group (small or healthy).

4.2 Multivariate Tests

In addition to univariate tests described above, the current study provides results from multivariate tests on the data. More specifically, a variation of the "difference-in-difference" methodology," which dates back to the seminal study by Ashenfelter and Card (1985), is used to analyze differences in lending by large vs. small banks and by healthy vs. troubled banks. Imbens and Wooldridge (2007, p. 1) explain the methodology as follows:

"The simplest set-up is one where outcomes are observed for two groups for two time periods.

One of the groups is exposed to a treatment in the second period but not in the first period. The second group is not exposed to the treatment during either period. In the case where the same units within a group are observed in each time period, the average gain in the second (control) group is subtracted from the average gain in the first (treatment) group. This removes biases in

²⁰ NACR is defined as $(\text{Total Equity} + \text{Loan-Loss Reserves} - 0.5 \times \text{Nonperforming Assets}) / \text{Total Assets}$, and is interpreted as the bank's leverage ratio after forcing the bank to write off all of its nonperforming assets against its loan-loss reserves. A level of 4.0% corresponds to the regulatory minimum for a bank's leverage ratio. See Cole and White (2012, 2016) and Chernykh and Cole (2015) for more information about the NACR.

second-period comparisons between the treatment and control group that could be the result from permanent differences between those groups, as well as biases from comparisons over time in the treatment group that could be the result of trends."

In the current study, asset size and capital adequacy are used to classify banks into "treatment" and "control" groups: large vs. small and troubled vs. healthy, where "large" and "troubled" are the "treatment" groups; and "small" and "healthy" are the "control" groups. Both pairs of groups are exposed to an exogenous shock--onset of the financial crisis. The difference in the change in the stock and flow of business lending for each pair is then estimated using a fixed-effects panel-data regression model. The current study provides results from the analysis of one measure of the **stock** and one measure of the **flow** of the amount small-business lending:

- the year-over-year percentage change in the dollar value of small-business loans *outstanding*;
- the year-over-year percentage change in the dollar value of small-business loan *originations*.

Similarly, a fixed-effects panel-data regression model is utilized to explain different measures of the **stock** and **flow** of the number of small-business loans. The study provides results from the analysis of one measure of the **stock** and one measure of the **flow** of the number of small-business loans:

- the year-over-year percentage change in the number of small-business loans *outstanding*.
- the year-over-year percentage change in the number of small-business loan *originations*.

In general, the "difference-in-differences" models analyzed in the current study take the form:

$$\begin{aligned}
 \text{Chg. SBL}_{i,t} = & \beta_0 + \beta_1 \times \text{Treatment}_{i,t-1} + \beta_2 \times \text{Fin'l Crisis} + \beta_3 \times \text{Fin'l Crisis} \times \text{Treatment}_{i,t-1} \\
 & + \beta_4 \times \text{Post Crisis} + \beta_5 \times \text{Post Crisis} \times \text{Treatment}_{i,t-1} \\
 & + \beta_k \times \text{Controls}_{i,t-1} + \epsilon_{i,t}
 \end{aligned} \tag{1}$$

where:

Chg. SBL_{i,t} is one of four alternative measures of small-business lending:

(1) $\Delta ASBLS_{i,t}$ is the percentage change in the dollar value amount, of small-business loans *outstanding* at bank *i* during year *t-0* and the dollar value of small-business loans outstanding at bank *i* during year *t-1*;

(2) $\Delta ASBLF_{i,t}$ is the percentage change in the dollar value amount of small-business loans *originated* at bank i during year $t-0$ and the dollar value of small-business loans outstanding at bank i during year $t-1$;

(3) $\Delta NSBLS_{i,t}$ is the percentage change in the *number* of small-business loans *outstanding* at bank i during year $t-0$ and the number of small-business loans outstanding at bank i during year $t-1$;

(4) $\Delta NSBLF_{i,t}$ is the percentage change in the *number* of small-business loans *originated* at bank i during year t and the number of small-business loans originated at bank i during year $t-1$;

In the fixed-effects regression model, the vector β_0 includes a set of dummy variables for each bank and for each year. The bank dummies control for the effects on lending of each individual bank's average characteristics, while the year dummies measure the average amount of lending that cannot be accounted for by bank dummies and other control variables in each pre-crisis year. Therefore, the coefficients of the year dummies measure the unexplained changes in lending for each year.

In addition, the current study provides results from analysis of business lending to firms of all sizes—total-business lending, which is defined in the current study as total commercial real estate lending plus total C&I lending (so as to match the FDIC's definition of small-business loans). The model analyzed takes same the form as in equation (1), except that *Chg. SBL* is replaced by *Chg. TBL*, which is defined as:

(5) $\Delta ATBLS_{i,t}$ is the percentage change in the dollar value of all business loans *outstanding* at bank i during period $t-0$ and the dollar value of all business loans outstanding at bank i during period $t-1$;

For total-business lending, the current study is limited to this single measure because bank regulators do not collect data on the total number of business loans outstanding or originated, nor do they collect information on the total amount of business loans originated.

By comparing the results for small-business lending with the corresponding results for all business lending, the current study is able to provide evidence regarding whether declines in small-business lending were more, or less, severe than declines in total-business lending.

In order to determine if changes in lending following the onset of the financial crisis in 2008, the current study defines two indicator variables and includes them in the regression model. *Fin'l Crisis* is equal to one for the financial crisis years 2009 – 2011 and zero for all other years. *Post Crisis* is equal to one for the post-crisis years of 2012 – 2015 and zero for all other years. Hence, these two dummy variables measure *changes in lending attributable to the crisis and to its aftermath*.^{21, 22}

Next, to determine in changes if lending following onset of the financial crisis were attributable to particular bank characteristics, the current study also interacts these two indicator variables (*Fin'l Crisis* and *Post Crisis*) with treatment variables, which are defined above. The coefficients on these interaction variables (β_3 and β_5 , respectively) measure the change in lending for each of the two periods after onset of the crisis associated with each treatment. If the financial crisis led banks with a particular characteristic to reduce lending more than other banks, as hypothesized, then these beta coefficients should be negative and statistically significant. By comparing the magnitude of these coefficients, one can determine the relative impact of the financial crisis as it progressed during 2009 - 2015.

The current study also defines a vector *Controls*_{*i,t-1*} that includes bank-level control variables measured as of period *t-1*. The control variables are chosen based upon previous research on bank lending. First, the current study follows Peek and Rosengren (1998) and Berger and Udell (2004) by including various measures of financial health as measured by proxies for the CAEL components of the CAMELS supervisory ratings system: **C**apital, **A**sset quality, **M**anagement quality, **E**arnings, **L**iquidity, and **S**ensitivity to market risk. More specifically, the current study includes *Total Equity*, defined as total equity capital divided by total assets; nonperforming loans (*NPLs*), defined as the sum of loans past due 30 - 89 days and still accruing interest, loans past due 90 days or more and

²¹ It is important to note that these indicator variables measure changes in lending due to both changes in demand conditions as well as to changes in supply conditions.

²² The results are qualitatively unchanged when *Fin'l Crisis* is defined as equal to one for the years 2008 - 2011 instead of only for the years 2009 - 2011.

still accruing interest, nonaccrual loans, and OREO (other real estate owned) all divided by total assets;²³ ROA, defined as net income divided by total assets; and *Liquid Assets*, defined as cash and due from plus Fed Funds purchased and securities purchased under reverse repurchase agreements plus securities held to maturity plus securities available for sale. Each is measured as of the previous year and expressed as a percentage of total assets. One should expect a positive relation between bank health and changes in business lending, so the expected coefficients on *Total Equity*, *Loss Reserves*, *Net Income* and *Liquid Assets* are positive while the expected coefficient on *NPLs* is negative.

Next, the current study follows Cornett *et al.* (2011) by including *Core Deposits*, defined as the ratio of core deposits to total assets as of the previous year; and *Commitments*, defined as the ratio of business loan commitments to total credit commitments, where total credit commitments is defined as the sum of total assets and total loan commitments. Cornett *et al.* argue that banks responded to the liquidity shock that accompanied the financial crisis by reducing new loan originations, and that banks exposed to more liquidity risk reduced lending by more than other banks. They proxy liquidity exposure on the asset side of the balance sheet by the ratios of illiquid assets to total assets and loan commitments to total credit; on the liability side of the balance sheet by the ratios of total equity to assets and core deposits to assets.

On the asset side, banks with more illiquid assets and more loan commitments would want to reduce new loan commitments in order to reduce their liquidity risk from having to fund new loans drawn on existing commitments. On the liability side, banks with less equity and fewer core deposits would want to reduce new loan commitments in order to reduce their liquidity risk from having to fund new loans drawn on existing commitments at a time when other sources of funds, such as wholesale deposits and short-term borrowing, had dried up. Consequently, the expected coefficient on each of these variables is positive.

²³ As an alternative measure of asset quality, the current study follows Berger and Udell (2004) in using the allowance for loan and lease loss (*Loss Reserves*). Results are robust to this alternative specification.

Cornett *et al.* also argue that it is important to control for *Bank Size* because depositors and investors may prefer the safety of too-big-to-fail institutions. This would give larger banks a funding advantage during times of crisis, lessening their need to reduce new loan commitments. The current study includes the natural logarithm of total assets as of the prior year as our measure of bank size. During normal times, small-business lending is less important to larger banks so the expected relation between bank size and changes in small-business lending is negative. The expected relation between bank size and total-business lending is ambiguous.

The study also include *De Novo*, an indicator for *de novo* banks, which, following the banking literature, is defined as banks in operation for less than five years. Newly chartered banks start with virtually 100 percent cash on the asset side of the balance sheet and then quickly replace cash with new loans as they develop lending relationships. Consequently, loan growth is expected to be much more rapid at such banks.²⁴

The study also controls for the amount of outstanding loans corresponding to each of the dependent variables, expressed as a percentage of assets. Banks with extremely high exposure to a particular loan category are less likely to increase lending in that loan category and are constrained at the high end by 100 percent and at the low end by 0 percent. The expected coefficient on each of these variables is negative.

5. Hypotheses

The primary hypotheses in the current study revolve around factors expected to explain changes in small-business lending (see eq. 1) following the onset of the crisis during 2008.

H1: Small-business lending declined during the financial crisis years of 2009 - 2011, but then recovered during the post-crisis years 2012 - 2015.

²⁴ In addition, Goldberg and White (1998) and Goldberg and DeYoung (1999) find that *de novo* banks allocate a higher portion of their assets to small-business loans than do similar mature banks and that there is a negative relation between bank age and small-business lending.

Small-business lending, in general, is expected to have declined following onset of the financial crisis as banks sought to boost their capital ratios by reducing bank loans in general and small-business loans in particular, but small-business lending is expected to have recovered during the post-crisis years once capital ratios had returned to normal levels. This implies that the expected β_1 coefficient for *Fin'l Crisis* in equation (1) is negative and significant, while the expected β_3 coefficient for *Post Crisis* in equation (1) is positive and significant when one of the four measures of *Chg. SBL* is the dependent variable.

H2: Total-business lending declined during the financial crisis years of 2009 – 2011, but then recovered during the post-crisis years 2012 – 2015.

It is expected that business lending, in general, declined following onset of the financial crisis as banks sought to boost their capital ratios by reducing bank loans, but then recovered during the post crisis years after capital ratios had returned to normal levels. This implies that the expected β_1 coefficient for *Fin'l Crisis* in equation (1) is negative and significant, while the expected β_3 coefficient for *Post Crisis* in equation (1) is positive and significant when *Chg. TBL* is the dependent variable.

H3: Small-business lending declined by a greater percentage than total-business lending during the financial crisis years of 2009 - 2011, and failed to share in the recovery during the post-crisis years of 2012 - 2015.

Following onset of the financial crisis in late 2008, small-business lending is expected to have declined by a greater percentage than total-business lending as banks sought to boost their capital ratios by reducing bank loans in general and small-business loans in particular. Banks are expected to be more loyal to their large customers than to their small customers, and this effect is expected to be more pronounced at large banks than at small banks. This implies that the β_1 coefficient for *Fin'l Crisis* and β_3 coefficient for *Post Crisis* in equation (1) are expected to be more negative when the dependent variable is *Chg. SBL* than when the dependent variable is *Chg. TBL*, i.e., the differences in the change in small-business lending and the change in total-business lending are negative and significant during the crisis and post-crisis years.

H4: The declines in small-business lending during the crisis years of 2009 - 2011 and post-crisis years of 2012 - 2015 were greater for large banks than for small banks.

It is expected that, in bad economic times, large banks would jettison their small-business borrowers more quickly than their large commercial borrowers. This implies that the β_3 coefficient on the interaction indicator for *Large Bank* \times *Fin'l Crisis* and the β_5 coefficient on the interaction indicator for *Large Bank* \times *Post Crisis* are negative and significant.²⁵

H5: The declines in small-business lending and total-business lending during the crisis year of 2009 - 2011 and post crisis years of 2012 - 2015 were greater for troubled banks than for healthy banks.

It is expected that the decline in small-business lending and total business lending was greater for banks in poorer financial condition. Troubled banks face restrictions on lending from their regulators, and they have incentive to reduce their business loan portfolios in order to boost their risk-adjusted capital ratios. Hence, the expected that the β_3 coefficient on the interaction of *Troubled-Bank* \times *Fin'l-Crisis* and the β_5 coefficient on the interaction of *Troubled-Bank* \times *Post Crisis* are negative and significant.

6. Results

6.1. Descriptive Statistics

Tables 1 and 2 present descriptive statistics both for the dependent variables and for the explanatory variables. Table 1 also presents descriptive statistics separately for *Small Banks* and *Large Banks*, while Table 2 presents descriptive statistics separately for *Healthy Banks* and *Troubled Banks*. These bank classifications are defined above in section 4.1.

²⁵ There are a number of previous studies that analyze the June Call Report data on small-business lending and find that large banks allocate smaller portions of their assets to small-business loans than do small banks. See, e.g., Berger and Udell (1996), Peek and Rosengren (1998) and Strahan and Weston (1998).

For the full sample, the average percentage growth in small-business lending over the 20-year sample period was 11.6 percent while the average growth in total business lending was 13.6 percent. The average growth rate in the number of small-business loans was 10.8 percent.

The average bank held \$64.9 million in small-business loans and \$210.4 million in total business loans. Among the control variables, the average ratio of equity to assets was 11.5 percent, average ROA was 96 basis points, the average ratio of NPLs to assets was 1.6 percent, the average ratio of liquid assets to total assets was 35.0 percent, the average ratio of core deposits to total assets was 48.2 percent and the average ratio of business loan commitment to total assets and commitments was 6.7 percent. On average, 6.0 percent of banks were classified as de novos.

When Table 1 is used to compare small banks and large banks, one finds statistically significant differences in means for every single variable, but that is not surprising given the large number of observations. The growth rate of small-business lending was 12.0 percent for small banks as compared with only 5.6 percent for large banks. The growth in the ratio of small-business loans to total assets was 3.9 percent for small banks but -1.4 percent for large banks. The growth rate in the number of small-business loans was 10.7 percent for small banks but 12.4 percent for large banks. The growth rate for total business loans was 13.8 percent for small banks but only 10.7 percent for large banks. The growth in the ratio of total business loans to total assets was 5.5 percent for small banks but only 3.0 percent for large banks. Among the control variables, the ratio of equity to assets was larger at small banks (11.6 percent) than at large banks (10.4 percent); the ratio of NPLs to assets was slightly smaller at small banks (1.6 percent) than at large banks (1.7 percent); and ROA was slightly lower at small banks (95 basis points) than at large banks (108 basis points). There are large differences in the ratio of core deposits to assets (49.4 percent at small banks vs. 27.8 percent at large banks); the ratio of liquid assets to total assets (35.3 percent at small banks vs. 29.5 percent at large banks); and the ratio of business loan commitments to assets and commitments (6.5 percent at small banks vs. 10.9 percent at large banks). De novos account for 6.2 percent of small banks, but only 2.7 percent of large banks.

When Table 2 is used to compare healthy banks and troubled banks, one again find statistically significant differences in means for every single variable. The growth rate of small-business lending was 12.2 percent for healthy banks as compared with -3.8 percent for troubled banks. The growth in the ratio of small-business loans to total assets was 3.8 percent for healthy banks but zero percent for troubled banks. The growth rate in the number of small-business loans was 11.3 percent for healthy banks but -3.5 percent for troubled banks. The growth rate for all business loans was 14.2 percent for healthy banks but -3.3 percent for troubled banks. The growth in the ratio of all business loans to total assets was 5.5 percent for healthy banks but only 0.5 percent for troubled banks. Among the control variables, the ratio of equity to assets was much larger at healthy banks (11.6 percent) than at troubled banks (7.8 percent); the ratio of NPLs to assets was much smaller at healthy banks (1.4 percent) than at troubled banks (9.5 percent); ROA was much higher at healthy banks (101 basis points) than at troubled banks (-47 basis points); and the ratio of liquid assets to total assets was much higher at healthy banks (35.3 percent) than at troubled banks (25.2 percent). There are only small differences in the ratio of core deposits to assets (48.3 percent at healthy banks vs. 45.6 percent at troubled banks) and the ratio of business loan commitments to assets and commitments (6.8 percent at healthy banks vs. 5.0 percent at troubled banks). De novos account for 6.1 percent of healthy banks but only 3.6 percent of troubled banks.

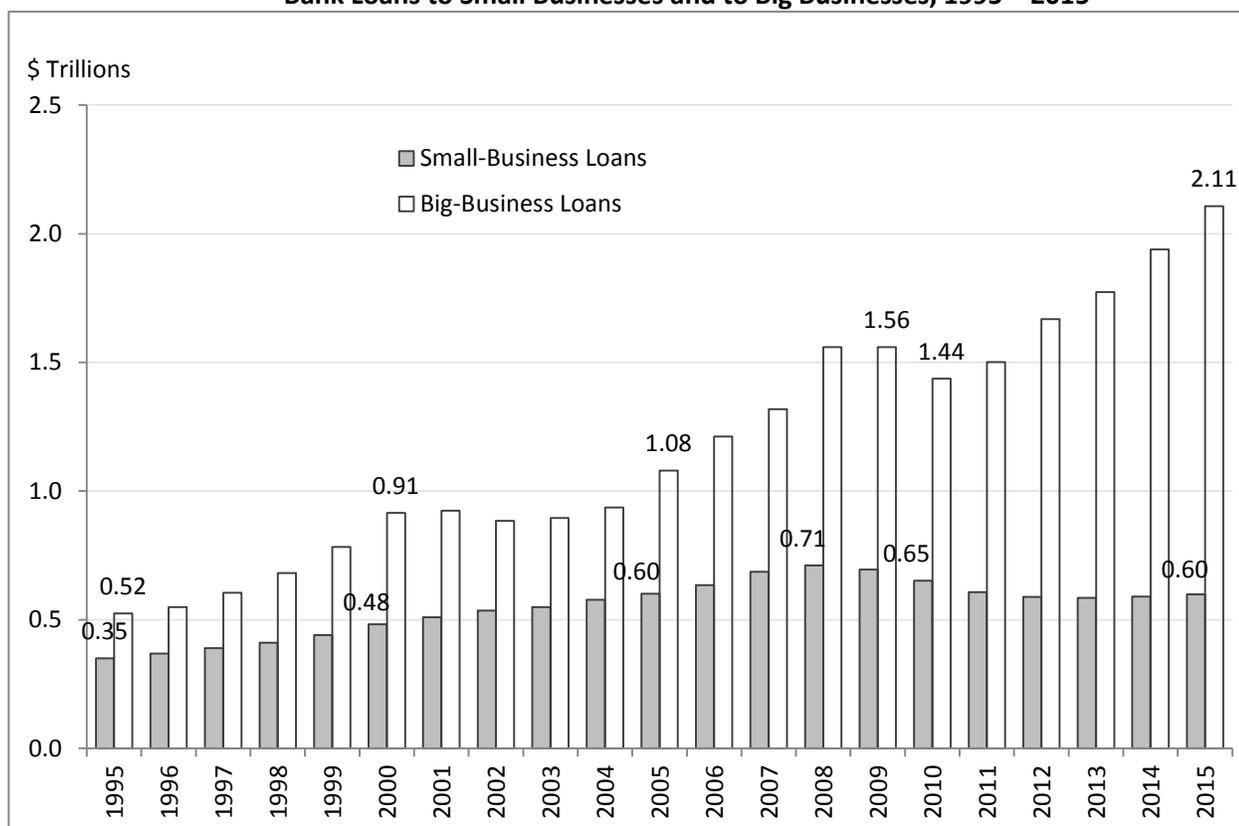
6.2. Univariate Results

6.2.1. Univariate Results for Amounts of Small-Business Loans Outstanding

A series of charts are presented to provide univariate evidence on how small-business lending and total-business lending changed during, and after, the financial crisis relative to the pre-crisis years. Figure 1 shows total-business lending split into outstanding loans originated in amounts greater than \$1 million (big-business loans) and in amounts of \$1 million or less (small-business loans). Not surprisingly, both types of business loans show declines in amounts outstanding following onset of the financial crisis in 2008. Big-business loans declined from \$1.56 trillion in 2008 to \$1.44 trillion in 2010, but then increased in each subsequent year to a new high of \$2.11

trillion in 2015. In sharp contrast, small-business loans declined from \$710 billion in 2008 to a low of \$580 billion in 2013 before rising slightly to \$599 billion in 2015. Hence, the amount of small-business loans outstanding in 2015 remained more than 17 percent below the pre-crisis high, while the amount of big-business loans outstanding in 2015 surpassed the pre-crisis high by more than 35 percent. Had the small-business loan market seen a similar recovery, there would have been \$960 billion in outstanding small-business loans in 2015--a difference from actual of more than \$360 billion. Appendix Table A-1 presents this information in a tabular format.

**Figure 1:
Bank Loans to Small Businesses and to Big Businesses, 1995 – 2015**

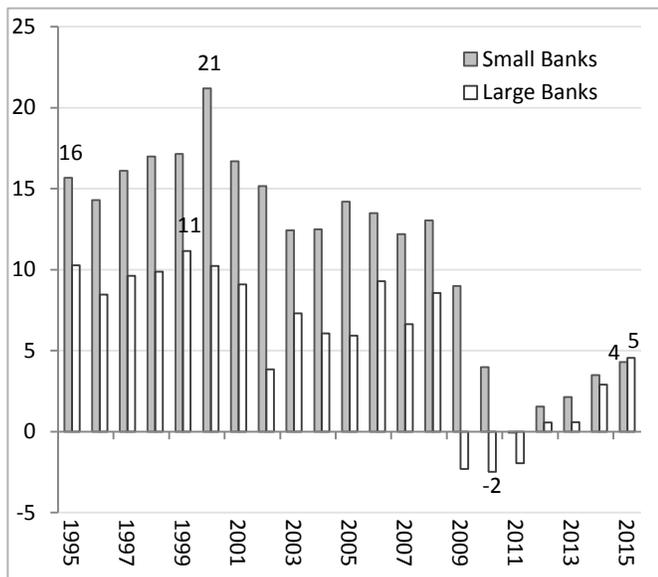


Source: FDIC Quarterly Banking Profiles Time Series Spreadsheet 2015-Q2

Next, banks are classified into two asset-size groups (large and small) using a threshold of \$1 billion (in 2000 inflation-adjusted dollars), and the changes in business lending at large and small banks are analyzed. Since the onset of the financial crisis, the largest banks have gotten even larger through consolidation. Cole (2012) finds

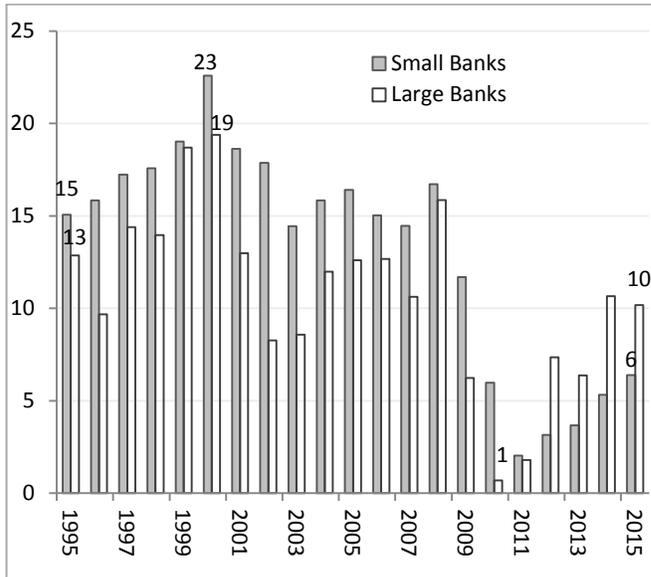
a strong inverse relation between bank size and small-business lending, so the current analysis sheds additional new light on how ongoing consolidation in the banking industry is affecting small-business lending, and provides guidance to regulators that they need to change policies and regulations to ensure the flow of credit to small businesses.

Figure 2:
Average Percentage Change in Dollar Amount of Small-Business Loans
Large Banks vs. Small Banks



Source: Author's Analysis of FFIEC Call Report Data

Figure 3:
Average Percentage Change in Dollar Amount of Total-Business Loans
Large Banks vs. Small Banks



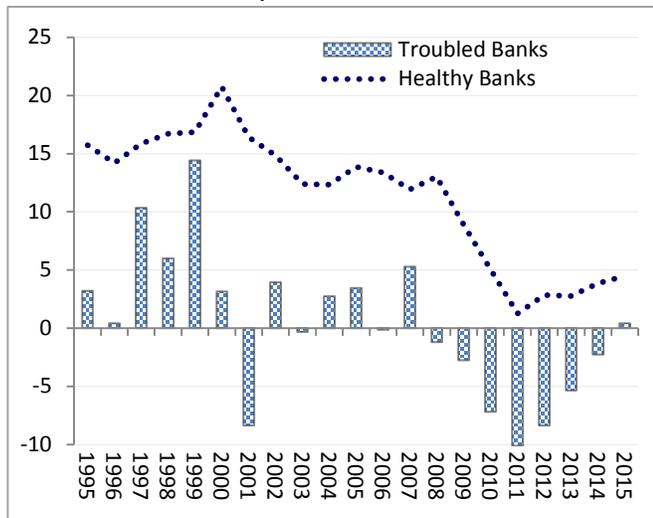
Source: Author's Analysis of FFIEC Call Report Data

Figures 2 and 3 show the average percentage changes in the dollar amounts of small-business loans and total-business loans, respectively, over the 1995 - 2015 period by bank size. As shown in Figure 2, the annual growth in loans to small businesses at small banks during 1995 - 2008 averages about 15 percent per year, which is about double the eight-percent growth rate at large banks. During the crisis years of 2009 - 2011, loan growth at large banks is negative in each year, averaging about negative two percent per year; while loan growth at small banks averages about four percent per year (but drops below zero in 2011). During the post-crisis years of 2012 - 2015, loan growth at small banks averages about 2.5 percent per year while loan growth at large banks averages just over one percent per year. Hence, it appears that small-business loan growth has recovered somewhat post-

crisis, but to nowhere near pre-crisis rates, and by less at large banks than at small banks. Appendix Table A-2 presents this information in a tabular format.

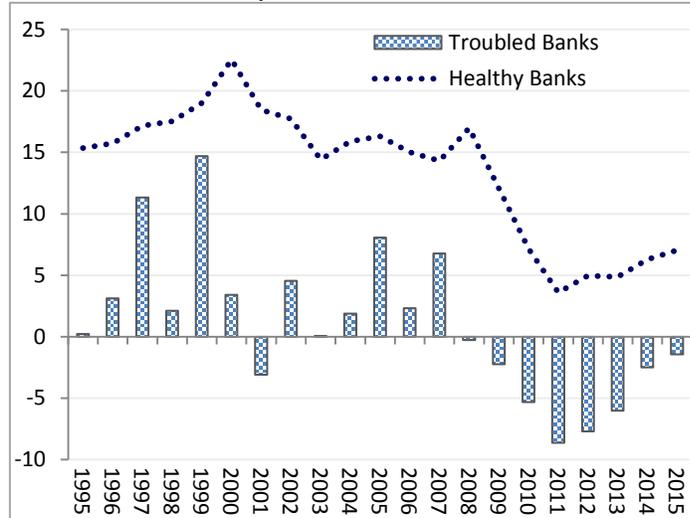
Figure 3 shows a far different picture for average annual percentage growth in total-business lending. From 1995 - 2008, growth in total-business loans at small banks averaged 17 percent per year and, at large banks, is only somewhat smaller at 13 percent per year. During the crisis years of 2009 - 2011, total-business loan growth drops precipitously, to an annual average of three percent per year at large banks and seven percent per year at small banks. During the post-crisis years of 2012 - 2015, total business loan growth at large banks jumps to an average of nine percent per year, while loan growth at small banks rebounds to only an average of five percent per year. Hence, it appears that total-business lending recovered much more strongly post-crisis, and that this recovery was led by loans from large banks rather than from small banks. Appendix Table A-3 presents this information in a tabular format.

Figure 4:
Average Percentage Change in Dollar Amount of Small-Business Loans
Healthy Banks vs. Troubled Banks



Source: Author's Analysis of FFIEC Call Report Data

Figure 5:
Average Percentage Change in Dollar Amount of Total-Business Loans
Healthy Banks vs. Troubled Banks



Source: Author's Analysis of FFIEC Call Report Data

Beyond size, changes in small-business lending are examined by the financial soundness of the bank. As described above, each bank is classified as a troubled bank or a healthy bank based upon its nonperforming asset coverage ratio (greater than or less than four percent). This enables one to determine if declines in small-business

lending are concentrated in troubled or healthy banks. Figures 4 and 5 show the average percentage changes in the dollar amounts of small-business loans and total-business loans, respectively, over the 1995 - 2015 period, by bank financial condition.

As shown in Figure 4, the average percentage growth in small-businesses loans at healthy banks averages about 15 percent during 1995 - 2008, while loan growth at troubled banks averages only about three percent. During the crisis years of 2009 - 2011, loan growth at healthy banks drops to an average of five percent per year, while loan growth at troubled banks averages about negative seven percent per year. During the post-crisis years of 2012 - 2015, growth at healthy banks averages positive 3.5 percent per year, while loan growth at troubled banks remains negative, averaging about negative four percent per year. Appendix Table A-4 presents this information in a tabular format.

Total business lending in Figure 5 shows a very similar picture for average growth in small-business lending by troubled and healthy banks. Perhaps the biggest differences are the higher growth rates for total-business loan growth at healthy banks both during and after the crisis--about double the growth rate for small-business loans. Appendix Table A-5 presents this information in a tabular format.

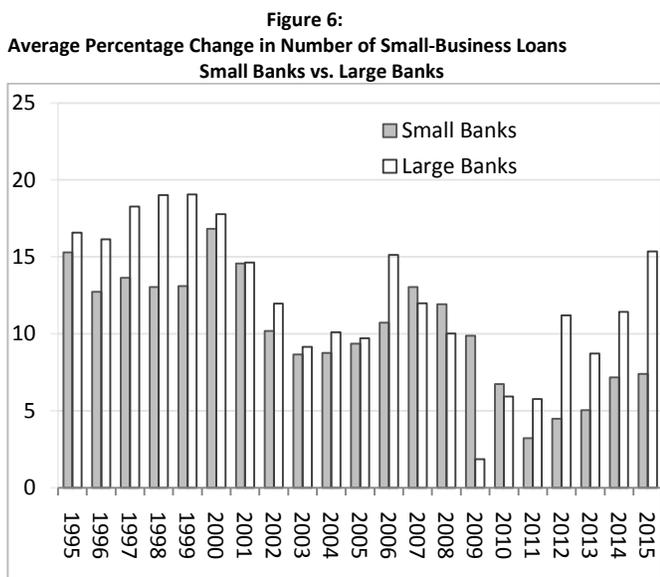
Hence, it appears that the overhang of troubled banks following onset of the financial crisis has adversely affected both small-business lending and total-business lending during the post-crisis period. From a policy perspective, this argues for swifter resolution of problem banks. Cole and White (2016) provide evidence on how forbearance by regulators cost taxpayers billions of dollars directly through increased failure costs. The evidence presented here suggests that sluggish lending to businesses small and large also imposes indirect costs onto the economy.

6.2.2. Univariate Results for Numbers of Small-Business Loans Outstanding

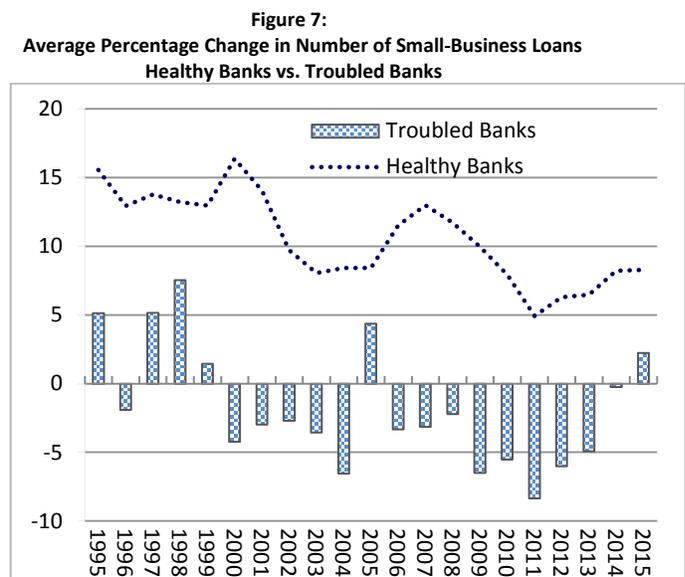
In addition to analyzing the amounts of small-business loans outstanding, the current study also analyzes the numbers of small-business loans outstanding. Figures 6 and 7 show the average annual percentage changes in

the numbers of small-business loans outstanding at small banks vs. large banks and at healthy banks vs. troubled banks, respectively.

As shown in Figure 6, the average annual percentage change in the number of small-business loans is significantly larger at large banks than at small banks during each year except for 2001, 2009 and 2010, during which the U.S. economy was in recession. The chart clearly shows that large banks cut back on small-business lending much more sharply than did small banks during bad economic times. During 1995 – 2008, growth in the number of loans averaged 14.3 percent for large banks and 12.3 percent for small banks. During the crisis years 2009 – 2011, this growth rate dropped to 4.5 percent for large banks but only to 6.6 percent for small banks. During the post-crisis years, the growth rate rebounded at large banks to 11.7% but fell to only six percent for small banks. This decline in the growth rate for the number of loans during the crisis years undoubtedly exacerbated the bad economic conditions, and suggests that regulators should consider countercyclical regulations and policies to provide incentives for banks to avoid cutbacks in small-business lending during recessionary times. Appendix Table A-6 presents this information in a tabular format.



Source: Author's Analysis of FFIEC Call Report Data



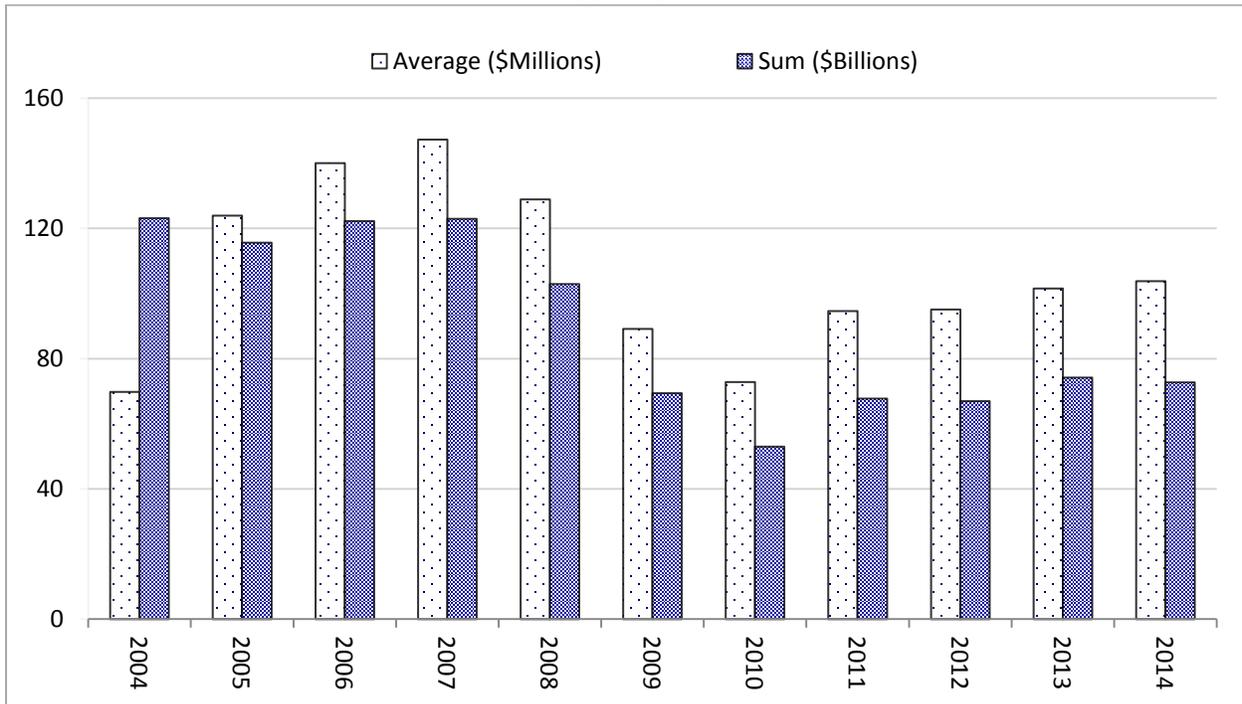
Source: Author's Analysis of FFIEC Call Report Data

As shown in Figure 7, the average annual percentage change in the number of small-business loans is not only significantly lower at troubled banks than at healthy banks, but actually is negative for the majority of the two decades analyzed. Since 1999, the average troubled bank increased the number of small-business loans only during 2005. During 1995 – 2008, growth in the number of loans averaged 12.1 percent at healthy banks but was -0.5 percent at troubled banks. During the crisis years 2009 – 2011, this growth rate dropped to 7.6 percent for healthy banks and to -6.8 percent for troubled banks. During the post-crisis years, the growth rates remained depressed at positive 7.3 percent for healthy banks and at negative 2.2 percent for troubled banks. The lending behavior of troubled banks undoubtedly exacerbated bad economic conditions, and suggests that regulators should move more swiftly to resolve troubled financial institutions instead of allowing them to linger, as they did during the crisis and post-crisis years. Appendix Table A-7 presents this information in a tabular format.

6.2.3. Univariate Results for Amounts of Small-Business Loan Originations

The current study also analyzes CRA data on the flow of new credit to small businesses. Figure 8 shows the total and average amounts of small-business loan originations to firms with annual revenues of \$1 million or less by year for the years 2004 - 2014. The two series closely track one another except for 2004, when there were twice as many reporting banks, as the minimum reporting size increased from \$250 million to \$1 billion in 2005. Both series show increasing originations for 2005 - 2007, and then sharp declines for 2008 - 2010, with a modest recovery in 2011. Originations remain flat from 2011 - 2014. The total amount of originations averaged \$117 billion per year during 2004 – 2008, then plummeted to an average of only \$63 billion during the crisis years of 2009 – 2011 and remained depressed at an average of only \$71 billion during the post-crisis years of 2012 – 2014.

Figure 8:
Total and Average Amounts of Small-Business Loan Originations to Firms with Revenues of \$1 Million or Less
2004 – 2014

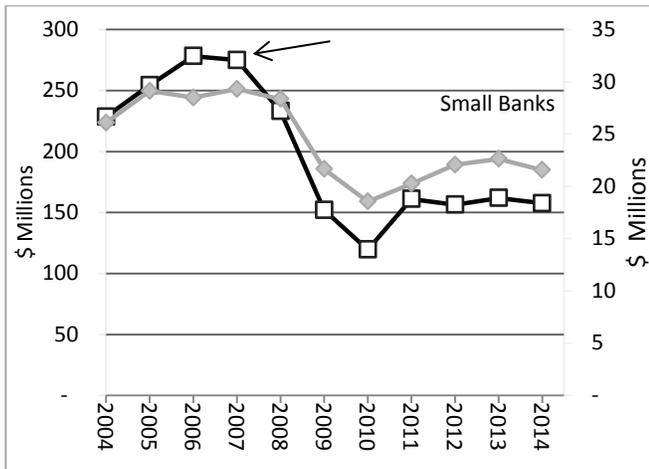


Source: Author's Analysis of CRA Data

The total amount of originations peaks at \$123 billion in 2007, drops by 57 percent over the following three years to only \$53 billion, and then rises to and remains at about \$70 billion, or about 40 percent below the 2007 peak. The average amounts of originations tell a very similar story of a decline in small-business loan originations. Appendix Table A-8 presents this information in a tabular format. These statistics provide evidence that strongly supports the first part of *Hypothesis 1*--that small-business lending declined during the financial crisis--but that fails to support the second part of *Hypothesis 1*--that small-business lending recovered after the financial crisis.

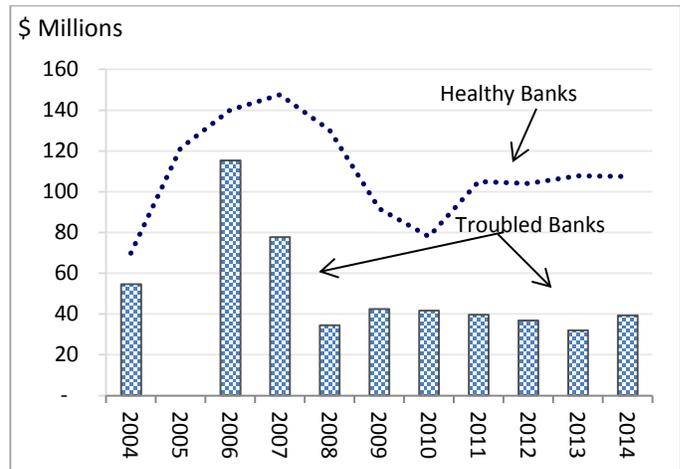
Figures 9 and 10 show the average amounts of small-business loan originations during 2004 - 2014 to firms with revenues of \$1 Million or less, for small banks (right axis) vs. large banks (left axis) and for healthy banks vs. troubled banks, respectively. Figure 9 shows that the average amount of originations by large banks peaked at \$278 million during 2006, declined ever so slightly to \$275 million during 2007 and then plummeted by 57 percent to only \$120 million during 2010, before recovering slightly to \$161 million during 2011, after which

Figure 9:
Amount of Small-Business Loan Originations
Small Banks vs. Large Banks



Source: Author's Analysis of CRA Data

Figure 10:
Amount of Small-Business Loan Originations
Healthy Banks vs. Troubled Banks

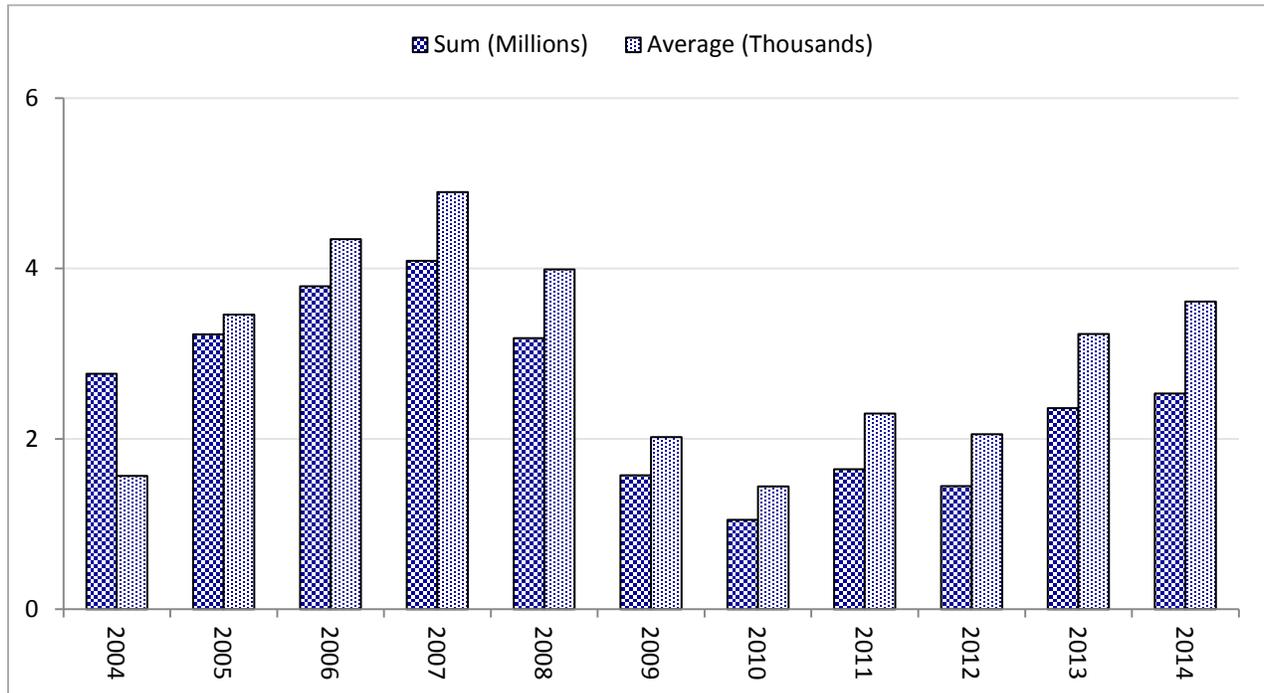


Source: Author's Analysis of CRA Data

originations remained flat through 2014. The average amount of originations by small banks peaked during 2007 at \$29 million, and then fell by 37 percent to \$19 million during 2010 before recovering to \$20 million during 2011 and \$23 million in 2013. Clearly, the decline in lending during the financial crisis years was much more pronounced at large banks than at small banks, supportive of *Hypothesis 4*--that the decline in small-business lending was greater for large banks than for small banks. Appendix Table A-9 presents this information in a tabular format.

Figure 10 shows that the average amount of originations by healthy banks closely parallels that of all banks shown in Figure 8, which is not surprising because the number of troubled banks that are large enough to be required to report CRA data is relatively small, especially during 2004 - 2008, when there are less than 12 in each year. The number of troubled banks rises to 114 in 2011 before declining to only 38 in 2014. On average, about 800 banks are required to report CRA data during 2005 - 2014. Because of the fluctuations in the number of troubled banks, there is little that one can say about originations by year in a univariate context. Appendix Table A-10 presents this information in a tabular format.

**Figure 11:
Numbers of Small-Business Loan Originations to Firms with Revenues of \$1 Million or Less
2004 – 2014**



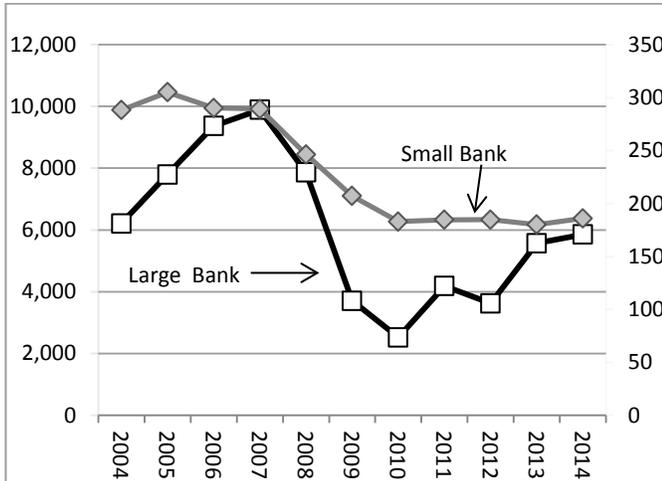
Source: Author's Analysis of CRA Data

6.2.4. Univariate Results for Numbers of Small-Business Loan Originations

Figure 11 shows the total numbers (in millions, shown in grey) and average numbers (in thousands, shown in white) of small-business loan originations to firms with annual revenues of \$1 million or less by year for the years 2004 - 2014. As with amounts, both number series closely parallel one another with the exception of 2004, when about twice as many banks were required to report CRA data. The total number of originations peaked in 2007 at 4.1 million, declined to 3.2 million in 2008, and then plummeted to only 1.6 million in 2009. The total number of originations hit a low of 1.05 million in 2010--down 74 percent from the 2007 peak--and then slowly recovered to 2.5 million per year in 2014. Even at this level, originations remain 38 percent below the 2007 peak. In summary, the annual total number of originations fell by almost three quarters during the financial crisis, has recovered during the post-crisis years, but remains substantially below pre-crisis levels. The average annual number of originations shows a very similar pattern. Appendix Table A-11 presents this information in a tabular

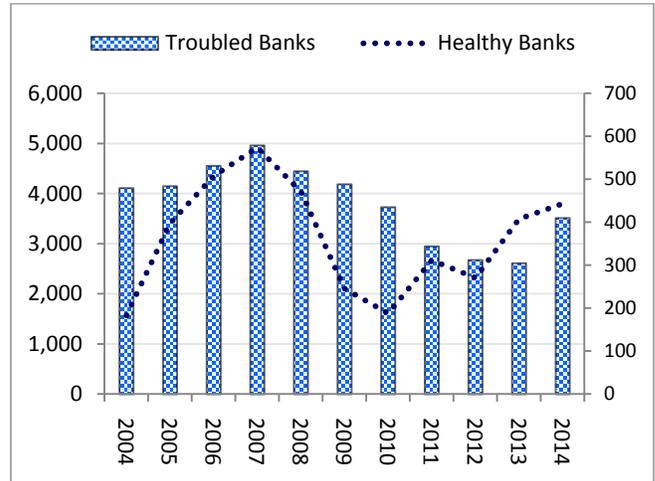
format. This chart and table provide evidence that strongly supports the first part of *Hypothesis 1*--that small-business lending declined during the financial crisis--and weak support for the second part of *Hypothesis 1*--that small-business lending recovered after the financial crisis.

Figure 12:
Average Numbers of Small-Business Loan Originations
Small Banks vs. Large Banks



Source: Author's Analysis of CRA Data

Figure 13:
Average Numbers of Small-Business Loan Originations
Healthy Banks vs. Troubled Banks



Source: Author's Analysis of CRA Data

Figures 12 and 13 show the average numbers of small-business loan originations during 2004 – 2014 to firms with revenues of \$1 million or less for small banks vs. large banks and for healthy banks vs. troubled banks, respectively. In Figure 12, the left vertical axis is for large banks while the right vertical axis is for small banks. Different axes are necessary because of the differences in scale of small vs. large banks. Figure 12 shows that the average number of originations by large banks peaked at just under 10,000 loans during 2007, declined to about 8,000 loans during 2008 and then plummeted by 74 percent to only about 2,500 during 2010, before recovering to about 4,000 during 2011 and 6,000 during 2014. The average number of originations by small banks peaked in 2005 at about 300 loans, and then fell by 40 percent to less than 200 during 2010, about where it has remained during 2011 - 2014. Clearly, the decline in the number of originations during the financial crisis years was much more pronounced at large banks than at small banks but so has been the recovery. However, even with the recovery in lending at large banks, the number of originations remains 40 percent below its pre-crisis peak. Hence,

the analysis provides some support for *Hypothesis 4*--that the decline in small-business lending (during the crisis, but not post-crisis) was greater for large banks than for small banks--but also some support for *Hypothesis 1*--that small-business lending recovered during the post-crisis years 2012 - 2014. Appendix Table 9 presents this information in a tabular format.

In Figure 13, the left vertical axis is for healthy banks while the right vertical axis is for troubled banks. Figure 13 shows that the average number of originations by healthy banks closely parallels that of all banks shown in Figure 11, which is not surprising because, as noted above, the number of troubled banks that are large enough to be required to report CRA data is relatively small. For troubled banks, Figure 13 shows that the decline in originations began earlier, was much more pronounced than the decline at healthy banks during the crisis years, and recovered much more slowly than the recovery at healthy banks during the post-crisis years. Appendix Tables A-12 and A-13 present this information in a tabular format.

6.3. Multivariate Results

This section presents results from the multivariate regression analysis of bank lending. A series of ordinary-least-squares regressions with bank- and year-fixed effects are estimated that enable one to test for significant differences in the lending behavior of small banks vs. large banks and in the lending behavior of healthy banks vs. troubled banks, both during and after the financial crisis. The analysis includes a set of control variables for the level of lending, capital adequacy, asset quality, earnings, liquidity, and loan commitments.

6.3.1. Multivariate Results for Amounts of Small-business Loans Outstanding

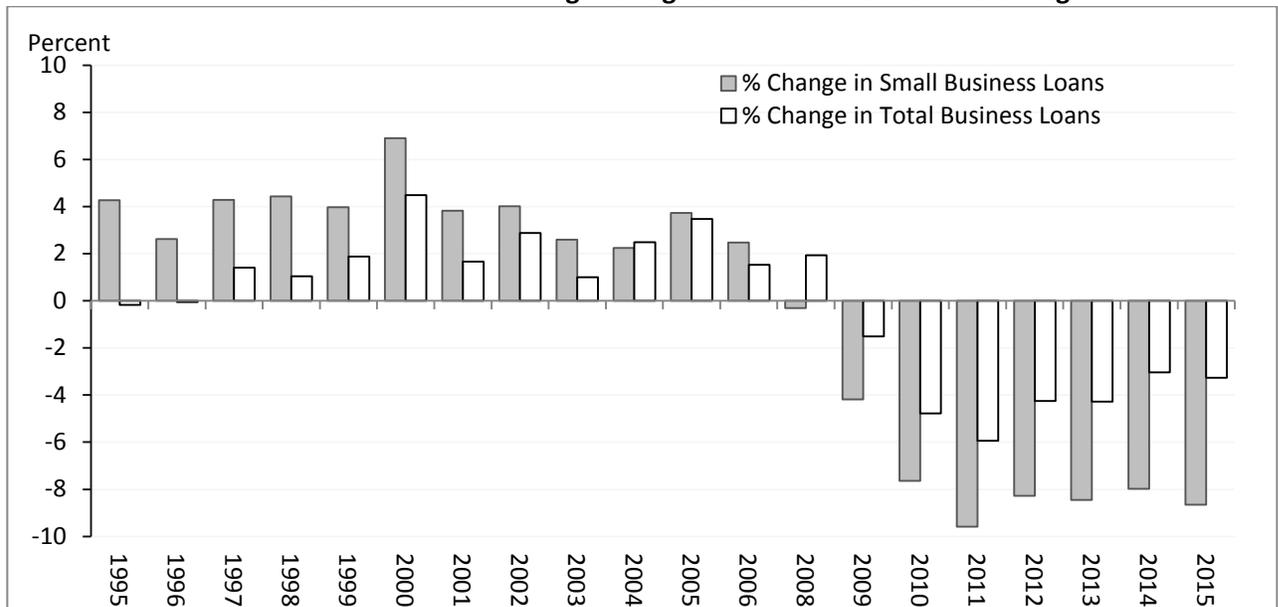
Tables 3, 4 and 5 present panel regression results for the annual percentage change in business lending, showing results from two regressions where the dependent variables are (1) small-business loans outstanding (shown in Panel A) and (2) total-business loans outstanding (shown in Panel B). Table 3 presents the results for all banks; Table 4 presents results for large banks vs. small banks; and Table 5 presents results for troubled banks vs.

healthy banks. Each model includes a set of control variables measured as of the previous year, a set of year fixed effects (with 2007 being the omitted year) and a set of bank fixed effects (not shown because there are thousands of banks). The primary variables of interest are the indicators for financial crisis years (*Fin'l Crisis*) and post-crisis years (*Post Crisis*), the treatment variables (either *Large Bank* or *Troubled Bank*) and the interaction of these treatment variables with indicator variables—*Large/Troubled Bank x Fin'l Crisis* for the financial crisis years of 2009 – 2011 and *Large/Troubled Bank x Post Crisis* for the post-crisis years of 2012 – 2015. These interaction terms enable one to test whether lending by treated banks increased (or decreased) their lending by more than banks not receiving the treatment. For each model in each table, the adjusted R-square is greater than 0.24, indicating relatively good fits; by contrast, Berger and Udell (2004), who use a much less comprehensive set of control variables, report adjusted R-squares of less than 0.06.

The key variables of interest are the year indicators (fixed effects) Y2009 – Y2015 in Table 3 and, in Tables 4 and 5, the treatment-interaction terms for the financial crisis and post-crisis periods. The year indicator variable for 2007 is omitted so the interpretation of the year indicator coefficients is the percentage change in lending relative to 2007. For the year indicator variables in Table 3, which are shown graphically in Figure 14, each of the coefficients for 2009 - 2015 is negative and the associated t-statistics indicates that each is statistically significant at the 1 percent level or better in each of the two models. Most are significant at better than the 0.1 percent level.

For small-business loans, the year coefficients shown in Panel A of Table 3 indicate that the annual percentage declines in lending (relative to the baseline year of 2007) were 4.2 percent in 2009, 7.6 percent in 2010, 9.6 percent in 2011, 8.3 percent in 2012, 8.5 percent in 2013, 8.0 percent in 2014, and 8.7 percent in 2015. These results are broadly supportive of the first part of Hypothesis 1—that small-business lending declined during the financial crisis years of 2009 – 2011; but providing no support for the second part of *Hypothesis 1*—that small-business lending recovered during the post-crisis years 2012 – 2015. In contrast, each of the coefficients for the years 1995 – 2006 is positive and significant at the 1 percent level or better.

**Figure 14:
Year Coefficients for Percentage Change in Amount of Business Lending**

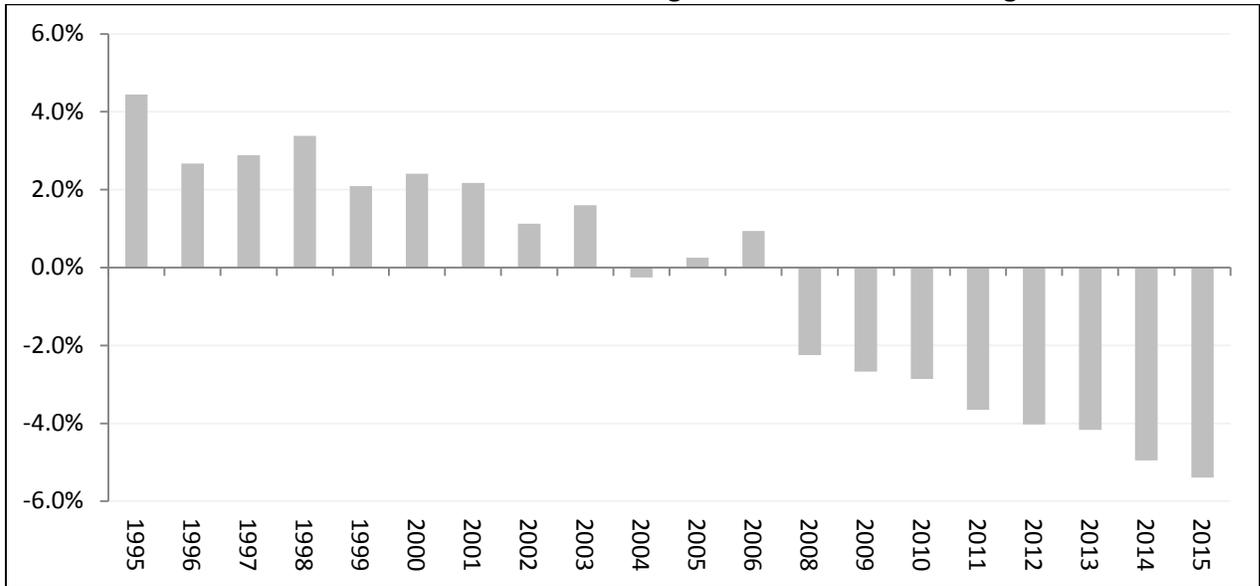


Source: Author's Analysis of FFIEC Data on Small Business Loans Outstanding

For total-business loans, the year coefficients shown in Panel B of Table 3 and Figure 14 indicate that the percentage declines in lending (relative to the baseline year of 2007) were 1.5 percent in 2009, 4.8 percent in 2010, 5.9 percent in 2011, 4.3 percent in 2012, 4.3 percent in 2013, 3.0 percent in 2014, and 3.3 percent in 2015. These results provide strong support for the first part of hypothesis 2-- that total-business lending declined during the financial crisis years of 2009 – 2011; but more limited support for the second part of hypothesis 2--that total-business lending recovered during the post-crisis years 2012 – 2015.²⁶ In contrast, the coefficients for the years 1997 – 2006 are positive and significant at the 1 percent level or better. Hence, the multivariate results provide much weaker support for Hypothesis 2 than do the univariate results shown in Figures 1 and 3.

²⁶ The result of an F-test for the equality of the coefficients for 2009 - 2011 and the coefficients for 2012 - 2015 shown in Panel B of Table 3 indicates that the coefficients in the latter period are significantly larger (less negative)—providing evidence of at least a weak post-crisis recovery in total-business lending. A similar test for the coefficients shown in Panel A of Table 3 shows no significant difference in the former and latter period—failing to provide any evidence of a recovery in small-business lending.

**Figure 15:
Differences in Year Coefficients for Percentage Change in
Amounts of Small-Business Lending and Total-Business Lending**



Source: Author's Analysis of FFIEC Data on Small Business Loans Outstanding

Figure 15 plots the *difference* in the year coefficients for the change in small-business lending and the change in total-business lending shown in Table 3. The chart clearly shows that loan growth was greater for small-business loans prior to the crisis and that the decline in lending was greater for small-business loans during and after the crisis. This provides strong support for *Hypothesis 3*—that the declines in small-business lending during the financial-crisis and post-crisis years exceeded the declines in total-business lending. What is surprising is that the difference continued to grow during the post-crisis period, which provides additional support for *Hypothesis 2*—that total-business lending recovered during the post-crisis years, at least relative to small-business lending.

Table 4 presents multivariate results for large banks vs. small banks. The year indicator coefficients are consistent with those reported in Table 3. With respect to the treatment and interaction variables, the -0.078 coefficient on *Large Bank* in Panel A of Table 4 indicates that the average growth in small-business lending over the entire period was 7.8 percentage points lower at large banks than at small banks. During the financial crisis years, the -0.062 coefficient on the interaction of *Large Bank x Fin'l Crisis* indicates that loan growth at large banks was an additional 6.2 percentage points lower than at small banks. This result supports *Hypothesis 4*—that the

decline in small-business lending during the crisis was greater for large banks than for small banks. Finally, the statistically insignificant 0.012 coefficient on the interaction of *Large Bank x Post Crisis* indicates that the growth rate of post-crisis small-business lending by large banks was not significantly different than that of small banks. Hence, Table 4 provides strong evidence that small-business lending by banks both large and small declined significantly during the financial crisis and that the decline was much more severe at large banks than at small banks. Table 4 provides some evidence of a post-crisis recovery in small-business lending by large banks in that the 0.012 coefficient on the interaction of *Large Bank x Post Crisis* is significantly greater than the -0.062 coefficient on the interaction of *Large Bank x Fin'l Crisis*.

With respect to the treatment and interaction variables for total-business lending, the -1.00 *t*-statistic on *Large Bank* shown in Panel B of Table 4 indicates that the average growth in total-business lending was not significantly different for large banks relative to small banks. During the financial crisis years, the -0.037 coefficient on the interaction term *Large Bank x Fin'l Crisis* indicates that loan growth at large banks was 3.7 percentage points lower than at small banks. Finally, the 0.026 coefficient on the interaction term *Large Bank x Post Crisis* indicates that post-crisis loan growth at large banks rebounded by 2.6 percentage points relative to loan growth at small banks. Hence, Table 4 provides strong evidence of a decline in total business lending during the financial crisis that was more severe at large banks; and that this was followed a post-crisis recovery in total-business loan growth that was stronger at large banks than at small banks.

Panel A of Table 5 presents multivariate results for small-business lending growth at troubled banks vs. healthy banks. The year indicator coefficients are consistent with those reported in Tables 3 and 4. With respect to the treatment and interaction variables, the -0.015 coefficient on *Troubled Bank* is negative but not significantly different from zero (*t*-statistic = -1.32). This indicates that average loan growth was no different at troubled banks than at healthy banks. However, the -0.049 interaction term *Troubled Bank x Fin'l Crisis* is negative and significant, evidence that troubled banks reduced small-business lending relative to healthy banks by 4.9 percentage points. This provides support for *Hypothesis 5*—that the decline in small-business lending was greater

for troubled banks than for healthy banks. The 0.026 *Troubled Bank* × *Post Crisis* interaction term is positive and marginally significant (t -statistic = 1.91); and it is significantly larger than the -0.049 interaction term *Troubled Bank* × *Fin'l Crisis*, indicating a recovery in post-crisis lending by troubled banks. This must be interpreted with caution, as the most seriously troubled banks were closed by regulators during the crisis years.

Panel B of Table 5 presents multivariate results for total-business loan growth at troubled banks vs. healthy banks. Again, the year fixed-effects coefficients are consistent with those reported in Tables 3 and 4. With respect to the treatment and interaction variables, the -0.039 coefficient on *Troubled Bank* is negative and highly significant (t -statistic = -3.89). This indicates that average loan growth was 3.9 percentage points lower at troubled banks than at healthy banks. This is not surprising because regulators impose lending restrictions on troubled banks and because troubled banks have incentive to reduce outstanding loan balances as a way of improving their risk-based capital ratios. The -0.004 interaction term *Troubled Bank* × *Fin'l Crisis* is not significantly different from zero (t -statistic = -0.33), indicating that the decline in total business lending during the crisis was no different at troubled banks and healthy banks. The 0.059 coefficient on the *Troubled Bank* × *Post Crisis* interaction term is positive and highly significant (t -statistic = 4.70). This indicates a strong post-crisis recovery in total business lending by troubled banks, but, again, this must be interpreted with caution, as the most troubled banks were closed by regulators during the crisis years.

Among the control variables in Tables 3 - 5, the coefficients on the ratio of loans to assets, where “loans” are small-business loans in Panels A and total business loans in Panels B are negative and highly significant in each of the six regressions. This is consistent with mean reversion to a target loan-to-asset ratio.

Coefficients on the ratio of total equity to total assets are positive and highly significant in each of the six regressions, indicating that better capitalized banks increase their lending by more than less well capitalized banks. This result refutes industry claims that higher capital ratios would adversely impact business lending.

Coefficients on the ratio of NPLs to total assets are negative and significant in each of the regressions, indicating that worse asset quality leads to lower levels of lending. This is consistent with past research showing

that banks with asset quality problems tend to shed assets rather than grow assets, typically by curtailing new lending.

Coefficients on the ROA (the ratio of net income to assets) are negative and highly significant in each of the regressions, indicating that less profitable banks increase lending by more than do more profitable banks. This is consistent with the existence of moral hazard due to deposit insurance; unprofitable banks "double down" by increasing their portfolio risk through increased business lending.

Coefficients on the ratio of liquid assets to total assets are positive and significant, indicating that more liquid banks increase lending by more than do less liquid banks.

Coefficients on the ratio of core deposits to total assets are positive and significant for small-business loans but negative and significant for total-business loans. This indicates that banks that rely more upon core deposits for funding make more small-business loans but fewer total-business loans, relative to other banks.

Coefficients on the ratio of business loan commitments to total credit are positive and highly significant in each of the regressions, indicating that banks with more loan commitments increase subsequent lending by more than banks with fewer loan commitments. This is consistent with the purpose of loan commitments and with the findings of Cornett *et al.* (2011).

The indicator for de-novo banks is positive and highly significant in each of the regressions, consistent with the expectation that de novo banks increase lending by more than mature banks. This argues for legislation and regulatory policies that foster the establishment of new banks, such as lower minimum capital requirements for a new bank charter.

6.3.2. Multivariate Results for Numbers of Small-Business Loans Outstanding

Tables 6, 7 and 8 present the results from regression analysis where the dependent variable is the annual percentage change in the number of small-business loans outstanding. Table 6 presents the results for all banks; Table 7 presents results for large banks vs. small banks; and Table 8 presents results for troubled banks vs. healthy banks. The adjusted R-squares for the models shown in each of these tables are greater than 0.15.

In Table 6, each of the coefficients for 2008 - 2015 are negative and significant at the one percent level or better, and most are significant at better than the 0.1 percent level. They indicate a statistically significant decline in the number of small-business loans in each year during 2009 – 2015 of between four and seven percent per year relative to the start of the crisis in 2007. In contrast, each of the coefficients for 1995 – 2001 is positive and significant at the 1 percent level or better. The coefficients for 2002 – 2005 are not significantly different from zero, indicating that the change in the number of small-business loans was not significantly different from that in the omitted year of 2007. This provides strong evidence in support of the first part of Hypothesis 1—that small-business lending, here measured by the number of loans, declined during the financial crisis but providing no support for the second part of *Hypothesis 1*—that small-business lending recovered during the post-crisis years 2012 – 2015.²⁷

With respect to the control variables shown in Table 6, the results are not qualitatively different from those shown in Panel A of Table 3 and discussed above, with one exception. The coefficient on core deposits is negative and significant, indicating that banks with more core deposits make fewer small-business loans.

Table 7 presents results for large banks vs. small banks. The coefficients on the year indicator variables are consistent with those shown in Table 6 and discussed above. With respect to the treatment and interaction variables, the -0.053 coefficient on *Large Bank* indicates that the average annual change in the number of small-business loans was 5.3 percentage points lower at large banks than at small banks. During the financial crisis years, the -0.038 coefficient on the interaction of *Large Bank x Fin'l Crisis* indicates that the change in the number of loans originated at large banks was 3.6 percentage points lower than at by small banks. Finally, the 0.040 coefficient on the interaction of *Large Bank x Post Crisis* indicates that the change in the number of loans made at large banks rebounded by 4.0 percentage points relative to that at small banks during the post-crisis years. Hence,

²⁷ In addition, the result of an F-test for the equality of the coefficients for 2009 - 2011 and the coefficients for 2012 - 2015 shown in Table 6 indicates no statistically significant difference in the former and latter period—failing to provide any evidence of a recovery in small-business lending.

there is evidence of a post-crisis recovery in small-business lending by large banks but not by small banks, as measured by the annual percentage change in the number of small-business loans. This provides some support for the second part of Hypothesis 1—that small-business lending recovered during the post-crisis years—at least at large banks.

Table 8 presents results for troubled banks vs. healthy banks. The coefficients of both *Troubled Bank* and its interaction with the indicator for crisis years *Troubled Bank x Fin'l Crisis* are negative, but both lack statistical significance at the five percent level. This only weakly supports Hypothesis 5—that small-business lending during the crisis declined by more at troubled banks than at healthy bank. However, the 0.055 coefficient on the interaction term *Troubled Bank x Post Crisis* is positive and significant, evidence that troubled banks increased the number of small-business loans post-crisis by five percentage points more than did healthy banks during the post crisis years. This provides some support for the second part of Hypothesis 1—that small-business lending recovered during the post-crisis years—at least at troubled banks. Again, this must be interpreted with caution because the most troubled banks were closed by regulators during the crisis years.

6.3.3. Multivariate Results for Amounts of Small-Business Loan Originations

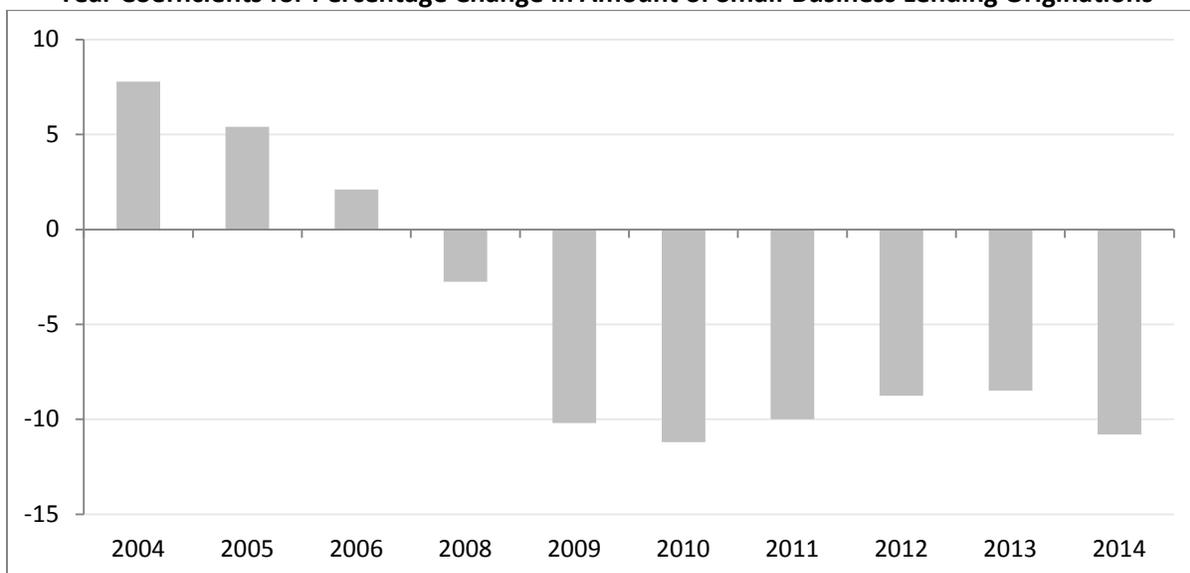
Table 9 presents regression results where the dependent variable is the annual amount of small-business-loan originations divided by the amount of small-business loans outstanding as of the previous year end. The dependent variable in Table 9 is analogous to that in Table 3, where the dependent variable was the percentage change in the amount of small-business loans outstanding. In Table 9, the change in the amount outstanding from year $t-1$ to year $t-0$ is simply replaced with the amount of originations—an alternative measure of change that does not incorporate the amount of payoffs during each year. Table 9 presents three specifications of the model. The first specification includes only one bank-level control variable--the amount of loans as of the previous year-end. The second adds bank-level control variables for return on assets, liquid assets, core deposits, pre-existing loan commitments, and the indicator for de novo bank. The third specification adds bank-level control variables

for NPLs and total equity capital, both divided by total assets. (The analysis is limited to testing for differences in large banks vs. small banks because the vast majority of troubled banks were small and hence were not required to file the CRA reports used in this analysis, leaving too few for meaningful analysis.)

In all specifications, the coefficients on the year indicator variables are negative and highly significant for 2008 – 2014. As shown in Figure 16 and Table 9, the coefficients indicate that originations as a percentage of previous year-end loans declined by 2.8 percent in 2008, 10.2 percent in 2009, 11.2 percent in 2010, 10.0 percent in 2011, 8.8 percent in 2012, 8.5 percent in 2013, and 10.8 percent in 2014 relative to the omitted year of 2007.

In contrast, the coefficients for 2004 – 2006 are positive and statistically significant. These results provide evidence of a sharp decline in small-business-loan originations not only during the financial crisis years of 2009 - 2011, but also during the post-crisis years of 2012 - 2014. This evidence supports the first part of Hypothesis 1--that small-business lending declined during the financial crisis years 2009 - 2011--but fails to support the second part of Hypothesis 1—that small-business lending recovered during the post-crisis years 2012-2014. Instead, the results support the second part of Hypothesis 3—that small-business lending failed to recover during 2012 – 2014.

Figure 16:
Year Coefficients for Percentage Change in Amount of Small-Business Lending Originations



Source: Author's Analysis of FFIEC Data on Small Business Loans

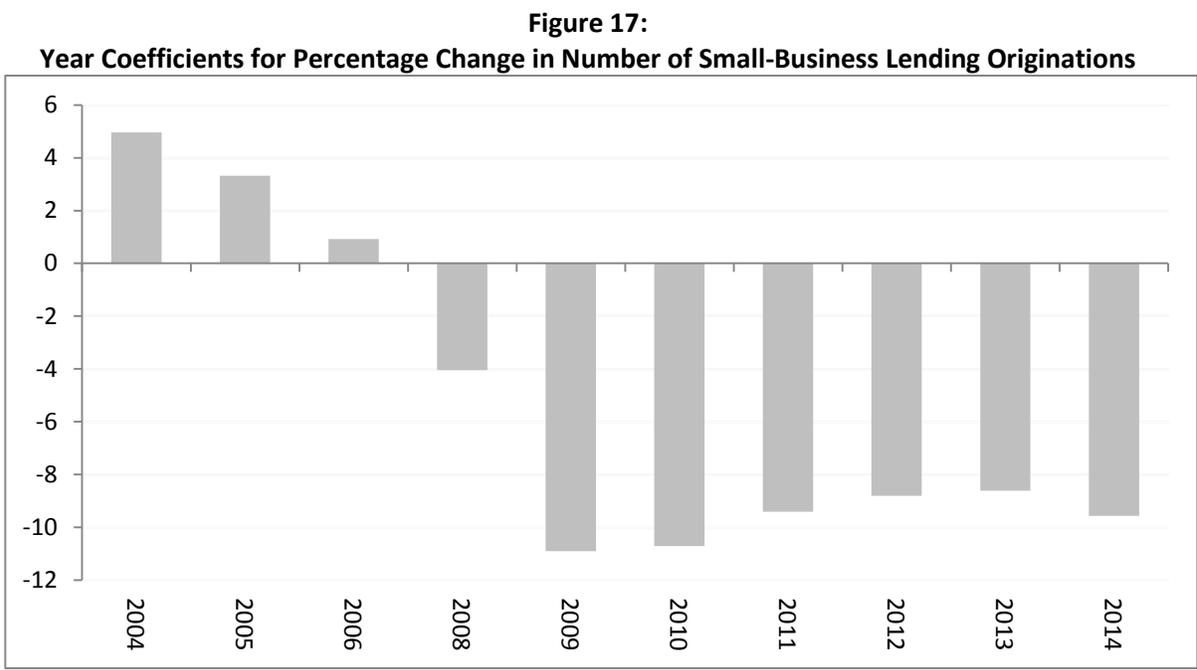
With respect to the *Large-Bank* treatment variables, *Large Bank* is negative, but not significantly different from zero in each of the three specifications. Both interaction terms *Large Bank* × *Fin'l Crisis* and *Large Bank* × *Post Crisis* are negative and significant in the first specification, indicating that large banks reduced small-business -loan originations relative to small banks by 2.5 percent during the crisis and by 2.8 percent post-crisis. This is consistent with the univariate evidence presented above, which showed much larger declines in originations by large banks than by small banks and provides additional support for Hypothesis 4—that the decline in small-business lending was greater for large than for small banks. These results continue to hold in specification 2, where five bank-level control variables are added to the model, although the coefficients and t-statistics are somewhat smaller. However, in the third specification, where bank-level control variables for capital adequacy and asset quality are added to the model, the coefficients on both *Large-Bank* interaction terms flip signs from negative to positive. These results indicate that the results observed for specifications 1 and 2 are largely driven by these two omitted variables. As indicated by the coefficients on *Total Equity* and *NPLs*, banks with more capital and fewer NPLs make significantly more originations than do banks with less capital and more NPLs. As shown in Table 1, large banks have significantly lower capital ratios than small banks and have significantly higher NPL ratios than do small banks. In other words, it is not bank size *per se* that leads to fewer small-business -loan originations, it is capital adequacy and asset quality. Hence, the results in specification 3 contradict the first part of Hypothesis 3—that large banks make fewer small-business loans than small banks during and after the financial crisis.

6.3.4. Multivariate Results for Numbers of Small-Business Loan Originations

Table 9 present the regression results where the dependent variable is the annual number of small-business-loan originations scaled by the number of small-business loans outstanding as of the previous year end. The dependent variable in Table 10 is analogous to that in Table 6, where the dependent variable was the percentage change in the number of small-business loans outstanding. In Table 10, the change in the number outstanding from year t-1 to year t-0 is simply replaced with the number of originations—an alternative measure

of change that does not incorporate the number of loans paid off during each year. As in Table 8, three alternative specifications of the model are presented.

In all specification, the year indicators are negative and highly significant for 2008 – 2014. As shown in Figure 17 and Table 10, the coefficients in the third specification indicate that that the number of originations as a percentage of the number of previous year-end loans declined by 4.0 percent in 2008, 10.9 percent in 2009, 10.7 percent in 2010, 9.4 percent in 2011, 8.8 percent in 2012, 8.6 percent in 2013 and 9.6 percent in 2014 relative to the omitted year of 2007. These results provide evidence of a sharp decline in the number of small-business-loan originations during the financial crisis, with little evidence of a post-crisis recovery. Consistent with the results in Table 8, this evidence in Table 9 supports the first part of Hypothesis 1--that small-business lending declined during the financial crisis years 2009 – 2011--but fails to support the second part of Hypothesis 1—that small-business lending recovered during the post-crisis years 2012 – 2014. Instead, the results support the second part of Hypothesis 3—that small-business lending failed to recover during 2012 – 2014.



Source: Author's Analysis of FFIEC Data on Small Business Loans

With respect to the *Large Bank* treatment variables, *Large Bank* is negative but not significantly different from zero in each specification. In specification 1, both of the interaction terms *Large Bank* × *Fin'l Crisis* and *Large Bank* × *Post Crisis* are negative and the former is statistically significant, indicating that large banks decreased the number of small-business-loan originations relative to small banks by 4.0 percent during the crisis period and by 2.5 percent during the post-crisis period. As with the amount of originations, this is consistent with the univariate evidence presented above, which showed much larger declines in the number of originations by large banks than by small banks and provides additional support for Hypothesis 4—that the decline in small-business lending was greater for large than for small banks. These results continue to hold in specification 2, where five bank-level control variables are added to the model, although the coefficients and t-statistics are somewhat smaller. However, in the third specification, where bank-level control variables for capital adequacy and asset quality are added to the model, the coefficients on both *Large-Bank* interaction terms flip signs from negative to positive—just as they did for the amount of originations. These results indicate that the results observed for specifications 1 and 2 are largely driven by these two omitted variables. As indicated by the coefficients on *Total Equity* and *NPLs*, banks with more capital and fewer NPLs make significantly more originations than do banks with less capital and more NPLs. In other words, it is not bank size *per se* that leads to fewer small-business -loan originations, it is capital adequacy and asset quality. Hence, the results in specification 3 contradict the first part of Hypothesis 3—that large banks make fewer loans than small banks during and after the financial crisis, at least when we control for differences in capital adequacy and asset quality.

7. Summary, Conclusions and Policy Relevance

As the first rigorous analysis of how recovery from the financial crisis affected bank lending to small U.S. businesses, the current study provides both academics and policymakers with new insights into whether or not the small-business credit market has shared in the recovery, and, if not, how to tailor legislation, regulations and taxes to help small businesses obtain needed credit. This is critically important because theory suggests that

credit-constrained firms will be smaller, less likely to hire new employees, and less likely to make new long-term investments that could improve economic growth, so policies that help these firms improve their capitalization should lead to higher growth in both employment and output (GDP).

The analysis reveals that both small-business loans and total-business loans grew at double-digit rates prior to the financial crisis, but small-business loans grew only about half as fast at large banks than at small banks. Growth rates for both types of business loans declined precipitously during the crisis years 2009–2011, but by much more at large banks than at small banks. Growth rates rebounded somewhat post-crisis during 2012–2015. Post-crisis, small-business lending grew much faster at small banks than at large banks while total-business lending grew much faster at large banks than at small banks.

Growth in business lending by problem banks averaged only three percent per year as compared to 15 percent at healthy banks. During the crisis years, both total and small-business lending contracted at problem banks by more than five percent per year but continued to expand at healthy bank by more than five percent per year. Post crisis, small-business lending remained weak averaging growth of only about two percent per year while total-business lending expanded by four percent per year.

Univariate results for the amounts and numbers of small-business loan originations paint a very similar picture. During the financial crisis, the amount of originations plummeted by more than half, and post-crisis has seen only a very limited recovery, leaving origination down 40 percent from pre-crisis levels. As with outstanding balances, the decline in small-business loan originations has been much sharper at large banks rather than at small banks and at troubled banks rather than at healthy banks.

Multivariate analysis of both outstanding loan amounts and loan originations largely confirms the univariate results. Hence, it appears that there has been little in the way of a recovery in the small-business loan market, but a somewhat more robust recovery in the market for total-business loans.

From a policy perspective, the results lead to several recommendations. First, regarding troubled banks, the results indicate that troubled banks severely curtail their business lending, especially their lending to small

businesses, which adversely affects the economy. Other researchers, such as Cole and White (2016) have documented a policy of regulatory forbearance that allowed problem banks to continue operating for years after they should have been closed and that this led directly to billions of additional dollars in resolution costs paid by the FDIC Bank Insurance Fund. The results of the current study indicate that there also are large indirect costs, as these banks reduce their lending to small businesses. Therefore, an important policy implication is that troubled banks should be resolved more quickly than in the past so that their assets are passed on to healthy banks that can resume lending to small businesses.

Second, regarding large banks, the results in the current study indicate that large banks lent a smaller portion of their assets to small businesses than did small banks, and that large banks also severely curtailed their small-business lending following onset of the financial crisis. Moreover, their post-crisis lending has disproportionately gone to large businesses. Regulators could use existing laws, such as the Community Reinvestment Act, to encourage more small-business lending by these very large banks. Another option is for legislators and regulators pass legislation and take other steps to limit the ongoing concentration of banking sector assets in the hands of just a few large players. Re-enactment of the Glass-Steagall separation of commercial banking and investment banking would force the very largest banks to shrink by divesting their investment-banking subsidiaries. Amending and lowering the 10 percent deposit market share cap of the Riegle-Neal Act of 1994 (codified in 12 U.S.C. 1842(d)), to apply not only to bank acquisitions but also to non-bank acquisitions and to organic growth would provide another means of reducing the size of the largest banks.

However, differences in small-business-loan originations by large vs. small banks appear to be driven by differences in capital adequacy and asset quality. Other researchers have documented that capital ratios at large banks are significantly lower than at small banks--a result also reported here. This suggests that another policy implication is for legislators and regulators to act to raise minimum capital ratios to levels where they are binding

constraints for large banks. Such policies already have been contemplated by U.S. banking regulators;²⁸ the evidence provided here supports those proposals.

Another policy implication is that regulators should take steps to encourage the formation of more de novo community banks, which are specialists in small-business lending. New legislation and policies to encourage the formation of de novo banks, as well as legislation and policies that would reduce regulatory burden by exempting small banks from regulations aimed at curbing the excesses of large banks would be very helpful.²⁹ The current FFIEC proposal for a new Consolidated Report of Condition and Income for Eligible Small Institutions (FFIEC 051) would reduce regulatory burden on community banks by reducing by about 40 percent the approximately 2,400 data items found in the existing Report of Condition and Income form FFIEC 041. The ongoing review process for the Economic Growth and Regulatory Paperwork Reduction Act of 1996 (EGRPRA) is another policy for reducing regulatory burden; the EGRPRA requires that regulations prescribed by bank regulators be reviewed by the agencies at least once every ten years.

Finally, legislators and regulators can take actions to encourage the growth of small-business lending by non-bank lenders. Recent changes to small-business loan limits on the almost 6,000 U.S. credit unions are one such action. A credit union had been limited to investing 12.25 percent of its total assets in business loans to members, and many credit unions had reached this limit; the proposed change increases this limit to 27.5 percent of assets. Credit union lending to small businesses has more than doubled from 2008 to 2016, from \$30 billion to \$60 billion, while bank lending to small businesses over the same period has declined by almost \$100 billion.

²⁸ In a June 2, 2016 story, a Wall Street Journal story reported the following: "Fed governors Daniel Tarullo and Jerome Powell, in separate public comments, said the central bank would probably decide to require eight of the largest U.S. banks to maintain more equity to pass the central bank's annual "stress tests," exams designed after the financial crisis to measure the ability of banks to weather a severe downturn."

²⁹ In Sep. 28, 2016 Congressional testimony before the House Financial Services Committee, Federal Reserve Board Chairwoman Janet Yellen encouraged Congress to consider exempting small banks from restrictions on their investments imposed by the Volcker Rule and compensation limits imposed by Dodd-Frank. See: <https://www.federalreserve.gov/newsevents/testimony/yellen20160928a.htm>

REFERENCES

- Ashenfelter, O., Card, D. (1985). Using the longitudinal structure of earnings to estimate the effect of training programs. *Review of Economics and Statistics* 67, 648-660.
- Aghion, P., Howitt, P. 1988. *Endogenous growth theory*. Vol. 1, 1st ed. The MIT Press.
- Barro, R., Jin, T. 2016. Rare events and long-run risks. *National Bureau of Economic Research Working paper* No. 21871.
- Bernanke, B., Lown, C. 1991. The credit crunch. *Brookings Papers on Economic Activity*, 205-247.
- Berger, A., Saunders, A., Scalise, J., Udell, G. 1998. The effects of bank mergers and acquisitions on small-business lending. *Journal of Financial Economics* 50, 187-229.
- Berger, A., Udell, G. 1995. Relationship lending and lines of credit in small firm finance. *Journal of Business* 68, 351-381.
- Berger, A., Udell, G., 1996. Universal banking and the future of small-business lending. In: Saunders, A., Walter, I. (Eds.), *Financial System Design: The Case for Universal Banking*. Irwin, Burr Ridge, IL, pp. 559 – 627.
- Berger, A., Udell, G. 1998. The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle, *Journal of Banking & Finance* 22 (6-8), 613–673.
- Berger, A., Udell, G. 2002. Small business credit availability and relationship lending: The importance of bank organizational structure. *The Economic Journal* 112, F32-F53.
- Berger, A., Udell, G. 2004. The institutional memory hypothesis and the pro-cyclicality of bank lending behavior, *Journal of Financial Intermediation* 13, 458 – 495.
- Bord, V., Ivashina, V., Taliaferro, R. 2015 Large banks and the transmission of financial shock. SSRN working paper. Available at: <http://ssrn.com/abstract=2688738>.
- Chernykh, L., Cole, R. 2015. How should we measure bank capital adequacy? A simple proposal. *Journal of Financial Stability* 20, 131-143.
- Cole, R. 1998. The importance of relationships to the availability of credit. *Journal of Banking and Finance* 22, 959-997.
- Cole, R. 2008. What do we know about the capital structure of privately held firms? Evidence from the Surveys of Small Business Finance. U.S. Small Business Administration Research Study No. 324.

- Cole, R. 2009. Who needs credit and who gets credit? Evidence from the Surveys of Small Business Finances. In *Small Business in Focus: Finance. A Compendium of Research by the Small Business Administration Office of Advocacy*, July, 95-133.
- Cole, R. 2010. Bank credit, trade credit, or no credit: Evidence from the Surveys of Small Business Finances. U.S. Small Business Administration Research Study No. 365.
- Cole, R. 2012. How did the financial crisis affect small-business lending in the U.S.? U.S. Small Business Administration Research Study No. 399.
- Cole, R., Cumming, D., Li, D. 2016. Do banks or VCs spur growth? *Journal of International Financial Markets, Institutions, and Money* 41, 60-72.
- Cole, R., Goldberg, L. and White, L. 2004. Cookie-cutter versus character: The micro structure of small-business lending by large and small banks. *Journal of Financial and Quantitative Analysis* 39, 227-251.
- Cole, R., Sokolyk, T. 2016: Who needs credit and who gets credit: Evidence from the Surveys of Small Business Finances. *Journal of Financial Stability* 24, 40-60.
- Cole, R., Walraven, N. 1998. Banking consolidation and the availability of credit to small businesses. Available at SSRN: <http://ssrn.com/abstract=1007062>.
- Cole, R., White, L. 2012. Déjà Vu all over again: The causes of U.S. commercial bank failures this time around. *Journal of Financial Services Research* 42, 5-29.
- Cole, R., White, L. 2016. When time is not on our side: The costs of regulatory forbearance in the closure of insolvent banks. *Journal of Banking and Finance*, forthcoming..
- Cornett, M., McNutt, J., Strahan, P., Tehranian, H. 2011. Liquidity risk management and credit supply in the financial crisis. *Journal of Financial Economics* 101, 297-312.
- Craig, S., Hardee, P. 2007. The impact of bank consolidation on small business credit availability. *Journal of Banking and Finance* 31, 1237-1263.
- DeYoung, R., Goldberg, L, White, L. 1999. Youth, adolescence and maturity at banks: credit availability in an era of banking consolidation. *Journal of Banking and Finance* 23, 463-492.
- Flannery, M., Lin, L. 2016. House prices, bank balance sheets, and bank credit supply. Paper presented at the 2016 China International Conference in Finance in Xiamen, PRC held July 7-10, 2016.
- Goldberg, L., DeYoung, R. 1999. Youth, adolescence and maturity at banks: Credit availability to small businesses in an era of banking and consolidation. *Journal of Banking and Finance* 23, 463-492.

- Goldberg, L., White, L. 1998. De novo banks and lending to small businesses: an empirical analysis. *Journal of Banking and Finance* 22, 851-867.
- Hardee, P. 2007. A two-step analysis of standardized versus relationship bank lending to small firms. U.S. Small Business Administration Research Study No. 305.
- Hancock, D., Wilcox 1998. The “credit crunch” and the availability of credit to small businesses. *Journal of Banking and Finance* 22, 983-1014.
- Imbens, G., Wooldridge, J. 2007 What's new in econometrics? Differences in differences. NBER Summer Lecture Series. Available at: http://www.nber.org/WNE/lect_10_diffindiffs.pdf.
- Ivashina, V., Scharfstein, D. 2010. Bank lending during the financial crisis of 2008. *Journal of Financial Economics* 97, 319-338.
- Jagtiani, J., Lemieux, C. 2016. Small-business lending: Challenges and opportunities for community banks. Federal Reserve Bank of Philadelphia Working Paper No. 16-08.
- Jang, K. 2015. The effect of TARP on the propagation of real estate shocks: Evidence from geographically diversified banks. Paper presented at the 2015 Annual Meetings of the Southern Finance Association in Captiva, FL held Nov. 19-21, 2015.
- King, R., Levine, R., 1993a. Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics* 108, 717-737.
- King, R., Levine, R., 1993b. Finance, entrepreneurship and growth. *Journal of Monetary Economics* 32, 513-542.
- Mach, T., Carter, C., Slattery, C. 2014. Peer-to-peer lending to small businesses. *FEDS Working Paper* No. 2014-10. Available at SSRN: <http://ssrn.com/abstract=2390886>.
- Mills, K., McCarthy, B. 2014. The state of small-business lending: Credit access during the recovery and how technology may change the game. *Harvard Business School Working Paper* 15-004.
- Ou, C., Williams, V. 2009. Lending to small businesses by financial institutions in the United States. In *Small Business in Focus: Finance. A Compendium of Research by the Small Business Administration Office of Advocacy*, July, 9-38.
- Peek, J., Rosengren, E., 1996. Small business credit availability: how important is size of lender? In: Saunders, A., Walter, I. (Eds.), *Financial System Design: The Case for Universal Banking*. Irwin, Burr Ridge, IL, pp. 628 – 655.
- Peek, J., Rosengren, E. 1998a. The evolution of bank lending to small businesses. *New England Economic Review*, March/April, 27-36.

- Peek, J., Rosengren, E. 1998b. Bank consolidation and small-business lending: It's not just bank size that matters. *Journal of Banking and Finance* 22, 799-819.
- Petersen, M., Rajan, R. 1994. The benefits of lending relationships: Evidence from small business data. *Journal of Finance* 46, 3-37.
- Petersen, M., Rajan, R. 1995. The effect of credit market competition on lending relationships. *Quarterly Journal of Economics* 46, 3-37.
- Petersen, M., Rajan, R. 1997. Trade Credit: Theory and Evidence. *Review of Financial Studies* 10, 661-691.
- Petersen, M., Rajan, R. 2002. Does distance still matter? The information revolution in small business lending. *Journal of Finance* 57, 2533-2570.
- Rajan, R., Zingales, L. 1998. Financial dependence and growth. *American Economic Review* 88, 559-586.
- Reinhart, C., Rogoff, K. 2014. Recovery from financial crises: Evidence from 100 episodes. *American Economic Review* 104, 50-55.
- Rice, T., Strahan, P. 2010. Does credit competition affect small-firm finance? *Journal of Finance* 65, 861-889.
- Schumpeter, J. 1934. *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. (Vol. 55). Transaction Publishers.
- Smith, D. 2012. Commercial lending during the crisis: Credit unions vs. banks. Filene Research Institute, Madison, WI.
- Strahan, P., Weston, J. 1998. Small-business lending and the changing structure of the banking industry. *Journal of Banking and Finance* 22, 821-845.
- Wilcox, J. 2011. The increasing importance of credit unions in small business lending. U.S. Small Business Administration Research Study No. 387.
- Wendt, P. 1947. The availability of capital to small businesses in California. *Journal of Finance* 2, 43-54.

Table 1: Descriptive Statistics for full sample and separately for Small Banks and for Large Banks

CSBLTOT is the annual percentage change in the amount of small-business loans outstanding at time t-0. CSBLTOT_TA is the annual percentage change in the ratio of small-business loans outstanding to total assets at time t-0. SBLTOT is the amount of small-business loans outstanding at time t-0. SBLTOT0 is the annual percentage change in the amount of small-business loans outstanding at time t-1. CNUMSBL is the annual percentage change in the number of small-business loans outstanding at time t-0. CBLTOT is the annual percentage change in the amount of total-business loans outstanding at time t-0. CBLTOT_TA is the annual percentage change in the ratio of total-business loans outstanding to total assets at time t-0. BLTOT is the amount of total-business loans outstanding at time t-0. BLTOT0 is the amount of total-business loans outstanding at time t-1. EQTA0 is the ratio of total equity to total assets at time t-1. NPA0 is the ratio of nonperforming loans to total assets at time t-1. ROA0 is the ratio of net income to total assets at time t-1. LIQTA0 is the ratio of liquid assets to total assets at time t-1. CORETA0 is the ratio of core deposits to total assets at time t-1. BCOMMITTAC0 is the ratio of business loan commitments to total assets and commitments at time t-1. DENOVO is an indicator variable for banks operating less than five years as of time t-1. Small Banks (Large Banks) are defined as banks with less than (greater than) \$1 billion in total assets in inflation-adjusted 2000 dollars. a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Variable	All Banks			Small Banks			Big Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
CSBLTOT	167,506	0.116	0.001	158,070	0.120	0.001	9,436	0.056	0.004	0.063	17.10 a
CSBLTOT_TA	167,506	0.036	0.001	158,070	0.039	0.001	9,436	-0.014	0.003	0.054	15.55 a
SBLTOT	167,506	64.9	1.2	158,070	27.7	0.1	9,436	689.2	20.8	-661.5	-31.85 a
SBLTOT0	167,506	63.4	1.2	158,070	26.2	0.1	9,436	686.5	20.9	-660.4	-31.56 a
CNUMSBL	167,506	0.108	0.001	158,070	0.107	0.001	9,436	0.124	0.006	-0.017	-2.93 a
CBLTOT	167,506	0.136	0.001	158,070	0.138	0.001	9,436	0.107	0.003	0.030	9.63 a
CBLTOT_TA	167,506	0.053	0.001	158,070	0.055	0.001	9,436	0.030	0.003	0.025	9.18 a
BLTOT	167,506	210.4	6.8	158,070	45.2	0.2	9,436	2,977	117.8	(2,932)	-24.89 a
BLTOT0	167,506	198.6	6.6	158,070	41.4	0.2	9,436	2,832	114.5	(2,791)	-24.38 a
EQTA0	167,506	0.115	0.000	158,070	0.116	0.000	9,436	0.104	0.001	0.012	17.91 a
NPA0	167,506	0.016	0.000	158,070	0.016	0.000	9,436	0.017	0.000	-0.001	-3.24 a
ROA0	167,506	0.010	0.000	158,070	0.010	0.000	9,436	0.011	0.000	-0.001	-12.21 a
LIQTA0	167,506	0.350	0.000	158,070	0.353	0.000	9,436	0.295	0.002	0.058	34.21 a
CORETA0	167,506	0.482	0.000	158,070	0.494	0.000	9,436	0.278	0.002	0.217	139.36 a
BCOMMITTAC0	167,506	0.067	0.000	158,070	0.065	0.000	9,436	0.109	0.001	-0.044	-52.19 a
DENOVO	167,506	0.060	0.001	158,070	0.062	0.001	9,436	0.027	0.002	0.036	20.07 a

Table 2: Descriptive Statistics for full sample and separately for Healthy Banks and for Troubled Banks

CSBLTOT is the annual percentage change in the amount of small-business loans outstanding at time t-0. CSBLTOT_TA is the annual percentage change in the ratio of small-business loans outstanding to total assets at time t-0. SBLTOT is the amount of small-business loans outstanding at time t-0. SBLTOT0 is the annual percentage change in the amount of small-business loans outstanding at time t-1. CNUMSBL is the annual percentage change in the number of small-business loans outstanding at time t-0. CBLTOT is the annual percentage change in the amount of total-business loans outstanding at time t-0. CBLTOT_TA is the annual percentage change in the ratio of total-business loans outstanding to total assets at time t-0. BLTOT is the amount of total-business loans outstanding at time t-0. BLTOT0 is the amount of total-business loans outstanding at time t-1. EQTA0 is the ratio of total equity to total assets at time t-1. NPA0 is the ratio of nonperforming loans to total assets at time t-1. ROA0 is the ratio of net income to total assets at time t-1. LIQTA0 is the ratio of liquid assets to total assets at time t-1. CORETA0 is the ratio of core deposits to total assets at time t-1. BCOMMITTAC0 is the ratio of business loan commitments to total assets and commitments at time t-1. DENOVO is an indicator variable for banks operating less than five years as of time t-1. Healthy Banks (Troubled Banks) are defined as banks with adjusted capital ratios greater than (less than) 4.0 percent. a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Variable	All Banks			Healthy Banks			Troubled Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
CSBLTOT	167,506	0.116	0.001	161,739	0.122	0.001	5,767	-0.038	0.004	0.160	41.50 a
CSBLTOT_TA	167,506	0.036	0.001	161,739	0.038	0.001	5,767	0.000	0.004	0.038	10.19 a
SBLTOT	167,506	64.9	1.2	161,739	65.5	1.3	5,767	48.4	1.5	17.2	8.71 a
SBLTOT0	167,506	63.4	1.2	161,739	63.7	1.3	5,767	53.1	1.6	10.6	5.07 a
CNUMSBL	167,506	0.108	0.001	161,739	0.113	0.001	5,767	-0.035	0.004	0.148	32.63 a
CBLTOT	167,506	0.136	0.001	161,739	0.142	0.001	5,767	-0.033	0.003	0.175	53.49 a
CBLTOT_TA	167,506	0.053	0.001	161,739	0.055	0.001	5,767	0.005	0.003	0.050	17.20 a
BLTOT	167,506	210.4	6.8	161,739	213.4	7.1	5,767	124.5	6.0	89.0	9.58 a
BLTOT0	167,506	198.6	6.6	161,739	201.0	6.9	5,767	133.5	6.4	67.5	7.16 a
EQTA0	167,506	0.115	0.000	161,739	0.116	0.000	5,767	0.078	0.000	0.039	103.82 a
NPA0	167,506	0.016	0.000	161,739	0.014	0.000	5,767	0.095	0.001	-0.081	-123.23 a
ROA0	167,506	0.010	0.000	161,739	0.010	0.000	5,767	-0.005	0.000	0.015	73.60 a
LIQTA0	167,506	0.350	0.000	161,739	0.353	0.000	5,767	0.252	0.002	0.101	64.55 a
CORETA0	167,506	0.482	0.000	161,739	0.483	0.000	5,767	0.456	0.002	0.027	14.49 a
BCOMMITTAC0	167,506	0.067	0.000	161,739	0.068	0.000	5,767	0.050	0.001	0.018	33.86 a
DENOVO	167,506	0.060	0.001	161,739	0.061	0.001	5,767	0.036	0.002	0.025	9.95 a

Table 3: Annual Pct. Change in the Amount of Business Loans Outstanding at All Banks

Results are from an OLS fixed-effects model with bank fixed effects where the dependent variable is the annual change in the amount of bank loans, where bank loans is either total small-business loans (Panel A) or total-business loans (Panel B) outstanding at mid-year. Business loans are defined as the sum of commercial & industrial loans and commercial real estate loans in order to be consistent with bank reporting of small-business loans. The analysis is based upon 167,515 bank-year observations on 13,473 banks from 1995 – 2015 gathered from the June FFIEC Call Reports. *Loans* is the ratio of loans in the loan category of the dependent variable to total assets. *Total Equity* is the ratio of total equity to total assets. *NPLs* is the ratio of nonperforming assets to total assets. *ROA* is the ratio of net income to total assets. *Core Deposits* is the ratio of core deposits to total assets. *Commitments* is the ratio of business loan commitments to total credit, which is defined as the sum of total assets and total loan commitments. *Bank Size* as measured by the log of total assets. *De Novo* is an indicator for de novo banks less than five years old. Each bank control variable is measured as of year $t - 1$. Bank fixed effects are included in each model but are not shown. t -statistics are based upon robust standard errors clustered at the bank level. R-squared is the “within” R-squared.

Variable	Panel A % Change in Small Business Loans			Panel B % Change in Total Business Loans				
	Coefficient	S.E.	t-Statistic	Coefficient	S.E.	t-Statistic		
Loans	-1.539	0.030	-51.69	a	-1.194	0.026	-45.44	a
Total Equity	1.413	0.051	27.94	a	1.422	0.050	28.34	a
ROA	-5.661	0.213	-26.56	a	-5.524	0.203	-27.18	a
NPLs	-2.183	0.083	-26.22	a	-2.189	0.072	-30.36	a
Liquid Assets	0.103	0.018	5.78	a	0.070	0.019	3.68	a
Core Deposits	0.098	0.016	6.05	a	-0.048	0.015	-3.16	a
Commitments	0.496	0.052	9.55	a	0.709	0.045	15.72	a
De Novo Indicator	0.236	0.007	32.76	a	0.190	0.006	29.41	a
1995	0.043	0.006	7.55	a	-0.002	0.005	-0.34	
1996	0.026	0.006	4.69	a	0.000	0.005	-0.10	
1997	0.043	0.006	7.59	a	0.014	0.005	2.72	b
1998	0.044	0.006	8.00	a	0.011	0.005	2.10	b
1999	0.040	0.005	7.25	a	0.019	0.005	3.78	a
2000	0.069	0.005	12.98	a	0.045	0.005	9.47	a
2001	0.038	0.005	7.34	a	0.017	0.005	3.58	a
2002	0.040	0.005	7.70	a	0.029	0.005	6.27	a
2003	0.026	0.005	5.20	a	0.010	0.004	2.28	b
2004	0.022	0.005	4.54	a	0.025	0.004	5.74	a
2005	0.037	0.005	7.59	a	0.035	0.004	8.28	a
2006	0.025	0.005	5.11	a	0.015	0.004	3.94	a
2008	-0.003	0.005	-0.61		0.019	0.004	4.83	a
2009	-0.042	0.005	-8.47	a	-0.015	0.004	-3.62	a
2010	-0.076	0.005	-14.82	a	-0.048	0.004	-10.71	a
2011	-0.096	0.005	-19.30	a	-0.059	0.004	-13.71	a
2012	-0.083	0.005	-16.49	a	-0.043	0.004	-9.51	a
2013	-0.085	0.005	-17.35	a	-0.043	0.004	-9.85	a
2014	-0.080	0.005	-16.44	a	-0.030	0.004	-7.12	a
2015	-0.087	0.005	-17.53	a	-0.033	0.004	-7.49	a
Constant	0.163	0.016	10.54	a	0.260	0.017	15.40	a
Observations	167,515				167,515			
R-squared	0.24				0.27			
Number of Banks	13,473				13,473			

Table 4: Annual Pct. Change in the Amount of Business Loans Outstanding at Large vs. Small Banks

Results are from an OLS fixed-effects model with bank fixed effects where the dependent variable is the annual change in the amount of bank loans, where bank loans is either total small-business loans (Panel A) or total-business loans (Panel B) outstanding at mid-year. Business loans are defined as the sum of commercial & industrial loans and commercial real estate loans in order to be consistent with bank reporting of small-business loans. The analysis is based upon 167,515 bank-year observations on 13,473 banks from 1995 – 2015 gathered from the June FFIEC Call Reports. *Large Bank* is an indicator for banks with more than \$1 billion in assets in inflation-adjusted 2000 dollars. *Fin'l Crisis* is an indicator for the financial crisis years 2009 – 2011. *Post Crisis* is an indicator variable for the post-crisis years 2012 – 2015. *Loans* is the ratio of loans in the loan category of the dependent variable to total assets. *Total Equity* is the ratio of total equity to total assets. *NPLs* is the ratio of nonperforming assets to total assets. *ROA* is the ratio of net income to total assets. *Core Deposits* is the ratio of core deposits to total assets. *Commitments* is the ratio of business loan commitments to total credit, which is defined as the sum of total assets and total loan commitments. *Bank Size* as measured by the log of total assets. *De Novo* is an indicator for de novo banks less than five years old. Each bank control variable is measured as of year $t - 1$. Bank fixed effects are included in each model but are not shown. *t*-statistics are based upon robust standard errors clustered at the bank level. R-squared is the “within” R-squared.

Variable	Panel A % Change in Small Business Loans			Panel B % Change in Total Business Loans				
	Coefficient	S.E.	t-Statistic	Coefficient	S.E.	t-Statistic		
Large Bank	-0.078	0.011	-7.06	a	-0.010	0.010	-1.00	
Large Bank x Fin'l Crisis	-0.062	0.009	-7.02	a	-0.037	0.008	-4.83	a
Large Bank x Post Crisis	0.012	0.009	1.27	b	0.026	0.009	2.96	a
Loans	-1.560	0.030	-52.02	a	-1.194	0.026	-45.49	a
Total Equity	1.400	0.051	27.57	a	1.420	0.050	28.26	a
ROA	-5.743	0.215	-26.71	a	-5.564	0.205	-27.16	a
NPLs	-2.092	0.093	-22.58	a	-2.175	0.082	-26.58	a
Liquid Assets	0.097	0.018	5.42	a	0.069	0.019	3.63	a
Core Deposits	0.084	0.016	5.20	c	-0.049	0.015	-3.23	a
Commitments	0.497	0.052	9.61	a	0.709	0.045	15.73	a
De Novo Indicator	0.235	0.007	32.58	a	0.189	0.006	29.34	a
1995	0.041	0.006	7.28	a	-0.002	0.005	-0.37	
1996	0.025	0.006	4.52	a	-0.001	0.005	-0.12	
1997	0.042	0.006	7.47	a	0.014	0.005	2.71	b
1998	0.044	0.006	7.95	a	0.011	0.005	2.10	b
1999	0.040	0.005	7.24	a	0.019	0.005	3.79	a
2000	0.069	0.005	12.97	a	0.045	0.005	9.48	a
2001	0.038	0.005	7.35	a	0.017	0.005	3.58	a
2002	0.039	0.005	7.54	a	0.029	0.005	6.24	a
2003	0.025	0.005	5.08	a	0.010	0.004	2.26	b
2004	0.022	0.005	4.44	a	0.025	0.004	5.72	a
2005	0.037	0.005	7.56	a	0.035	0.004	8.27	a
2006	0.025	0.005	5.09	a	0.015	0.004	3.94	a
2008	-0.003	0.005	-0.67		0.019	0.004	4.82	a
2009	-0.040	0.005	-8.03	a	-0.013	0.004	-3.21	a
2010	-0.071	0.005	-13.83	a	-0.044	0.004	-9.81	a
2011	-0.091	0.005	-18.23	a	-0.055	0.004	-12.69	a
2012	-0.086	0.005	-17.10	a	-0.046	0.004	-10.21	a
2013	-0.087	0.005	-17.88	a	-0.045	0.004	-10.39	a
2014	-0.081	0.005	-16.77	a	-0.032	0.004	-7.49	a
2015	-0.087	0.005	-17.69	a	-0.034	0.004	-7.71	a
Constant	0.181	0.015	11.77	a	0.263	0.017	15.61	a
Observations	167,515			167,515				
R-squared	0.24			0.27				
Number of Banks	13,473			13,473				

Table 5: Annual Pct. Change in the Amount of Business Loans Outstanding at Healthy vs. Troubled Banks

Results are from an OLS fixed-effects model with bank fixed effects where the dependent variable is the annual change in the amount of bank loans, where bank loans is either total small-business loans (Panel A) or total-business loans (Panel B) outstanding at mid-year. Business loans are defined as the sum of commercial & industrial loans and commercial real estate loans in order to be consistent with bank reporting of small-business loans. The analysis is based upon 167,515 bank-year observations on 13,473 banks from 1995 – 2015 gathered from the June FFIEC Call Reports. *Troubled Bank* is an indicator for banks with nonperforming asset coverage ratios of less than 4 percent. *Fin'l Crisis* is an indicator for the financial crisis years 2009 – 2011. *Post Crisis* is an indicator variable for the post-crisis years 2012 – 2015. *Loans* is the ratio of loans in the loan category of the dependent variable to total assets. *Total Equity* is the ratio of total equity to total assets. *NPLs* is the ratio of nonperforming assets to total assets. *ROA* is the ratio of net income to total assets. *Core Deposits* is the ratio of core deposits to total assets. *Commitments* is the ratio of business loan commitments to total credit, which is defined as the sum of total assets and total loan commitments. *Bank Size* as measured by the log of total assets. *De Novo* is an indicator for de novo banks less than five years old. Each bank control variable is measured as of year $t - 1$. Bank fixed effects are included in each model but are not shown. *t*-statistics are based upon robust standard errors clustered at the bank level. R-squared is the “within” R-squared.

Variable	Panel A % Change in Small Business Loans			Panel B % Change in Total Business Loans			
	Coefficient	S.E.	t-Statistic	Coefficient	S.E.	t-Statistic	
Troubled Bank	-0.015	0.012	-1.32	-0.039	0.010	-3.89	a
Troubled Bank x Fin'l Crisis	-0.049	0.013	-3.71	-0.004	0.011	-0.33	
Troubled Bank x Post Crisis	0.026	0.014	1.91	0.059	0.012	4.92	a
Loans	-1.541	0.030	-51.70	-1.195	0.026	-45.50	a
Total Equity	1.408	0.051	27.74	1.418	0.050	28.16	a
ROA	-5.742	0.215	-26.74	-5.588	0.205	-27.25	a
NPLs	-2.065	0.097	-21.35	-2.103	0.084	-25.03	a
Liquid Assets	0.104	0.018	5.80	0.070	0.019	3.67	a
Core Deposits	0.099	0.016	6.10	-0.047	0.015	-3.14	a
Commitments	0.495	0.052	9.54	0.711	0.045	15.76	a
De Novo Indicator	0.236	0.007	32.72	0.190	0.006	29.39	a
1995	0.043	0.006	7.63	-0.001	0.005	-0.23	
1996	0.027	0.006	4.78	0.000	0.005	-0.03	
1997	0.043	0.006	7.67	0.014	0.005	2.75	b
1998	0.045	0.006	8.09	0.011	0.005	2.13	b
1999	0.040	0.005	7.36	0.019	0.005	3.82	a
2000	0.070	0.005	13.09	0.045	0.005	9.51	a
2001	0.039	0.005	7.46	0.017	0.005	3.62	a
2002	0.040	0.005	7.64	0.029	0.005	6.29	a
2003	0.026	0.005	5.13	0.010	0.004	2.27	b
2004	0.022	0.005	4.47	0.025	0.004	5.73	a
2005	0.037	0.005	7.55	0.035	0.004	8.26	a
2006	0.025	0.005	5.10	0.015	0.004	3.92	a
2008	-0.003	0.005	-0.66	0.020	0.004	4.84	a
2009	-0.040	0.005	-8.10	-0.014	0.004	-3.41	a
2010	-0.072	0.005	-13.86	-0.045	0.004	-10.06	a
2011	-0.091	0.005	-18.19	-0.057	0.004	-12.93	a
2012	-0.087	0.005	-17.11	-0.047	0.005	-10.47	a
2013	-0.088	0.005	-17.91	-0.046	0.004	-10.63	a
2014	-0.082	0.005	-16.86	-0.033	0.004	-7.73	a
2015	-0.088	0.005	-17.81	-0.034	0.004	-7.90	a
Constant	0.163	0.015	10.57	0.261	0.017	15.45	a
Observations	167,515			167,515			
R-squared	0.237			0.27			
Number of Banks	13,473			13,473			

Table 6: Annual Pct. Change in Number of Small-Business Loans Outstanding at All Banks

Results are from an OLS fixed-effects model with bank fixed effects where the dependent variable is the annual change in the number of bank loans to small businesses. Business loans are defined as the sum of commercial & industrial loans and commercial real estate loans in order to be consistent with bank reporting of small-business loans. The analysis is based upon 167,515 bank-year observations on 13,473 banks from 1995 – 2015 gathered from the June FFIEC Call Reports. *Large Bank* is an indicator for banks with more than \$1 billion in assets in inflation-adjusted 2000 dollars. *Fin'l Crisis* is an indicator for the financial crisis years 2009 – 2011. *Post Crisis* is an indicator variable for the post-crisis years 2012–2015. *Loans* is the ratio of loans in the loan category of the dependent variable to total assets. *Total Equity* is the ratio of total equity to total assets. *NPLs* is the ratio of nonperforming assets to total assets. *ROA* is the ratio of net income to total assets. *Core Deposits* is the ratio of core deposits to total assets. *Commitments* is the ratio of business loan commitments to total credit, which is defined as the sum of total assets and total loan commitments. *Bank Size* as measured by the log of total assets. *De Novo* is an indicator for de novo banks less than five years old. Each bank control variable is measured as of year $t - 1$. Bank fixed effects are included in each model but are not shown. t -statistics are based upon robust standard errors clustered at the bank level. R-squared is the “within” R-squared.

Variable	% Change in Number of Small Business Loans		
	Coefficient	S.E.	t-Statistic
Loans	-0.806	0.028	-29.11 a
Total Equity	1.651	0.055	29.95 a
ROA	-5.587	0.230	-24.28 a
NPLs	-1.810	0.092	-19.77 a
Liquid Assets	0.091	0.020	4.55 a
Core Deposits	-0.037	0.018	-2.03 b
Commitments	0.260	0.052	4.97 a
De Novo Indicator	0.258	0.007	35.01 a
1995	0.087	0.007	13.28 a
1996	0.058	0.006	9.02 a
1997	0.064	0.006	10.04 a
1998	0.046	0.006	7.35 a
1999	0.034	0.006	5.49 a
2000	0.057	0.006	9.69 a
2001	0.038	0.006	6.50 a
2002	0.008	0.006	1.38
2003	-0.001	0.005	-0.18
2004	0.000	0.005	-0.07
2005	0.007	0.005	1.33
2006	0.014	0.005	2.63 a
2008	-0.024	0.006	-4.23 a
2009	-0.044	0.005	-8.08 a
2010	-0.059	0.006	-10.49 a
2011	-0.073	0.005	-13.45 a
2012	-0.055	0.005	-10.02 a
2013	-0.060	0.005	-11.35 a
2014	-0.043	0.005	-8.30 a
2015	-0.052	0.005	-9.75 a
Constant	0.081	0.017	4.82 a
Observations	167,515		
R-squared	0.17		
Number of Banks	13,473		

Table 7: Annual Pct. Change in Number of Small-Business Loans Outstanding at Large vs. Small Banks

Results are from an OLS fixed-effects model with bank fixed effects where the dependent variable is the annual change in the number of bank loans to small businesses. Business loans are defined as the sum of commercial & industrial loans and commercial real estate loans in order to be consistent with bank reporting of small-business loans. The analysis is based upon 167,515 bank-year observations on 13,473 banks from 1995 – 2015 gathered from the June FFIEC Call Reports. *Large Bank* is an indicator for banks with more than \$1 billion in assets in inflation-adjusted 2000 dollars. *Fin'l Crisis* is an indicator for the financial crisis years 2009 – 2011. *Post Crisis* is an indicator variable for the post-crisis years 2012 – 2015. *Loans* is the ratio of loans in the loan category of the dependent variable to total assets. *Total Equity* is the ratio of total equity to total assets. *NPLs* is the ratio of nonperforming assets to total assets. *ROA* is the ratio of net income to total assets. *Core Deposits* is the ratio of core deposits to total assets. *Commitments* is the ratio of business loan commitments to total credit, which is defined as the sum of total assets and total loan commitments. *Bank Size* as measured by the log of total assets. *De Novo* is an indicator for de novo banks less than five years old. Each bank control variable is measured as of year $t - 1$. Bank fixed effects are included in each model but are not shown. t -statistics are based upon robust standard errors clustered at the bank level. R-squared is the “within” R-squared.

Variable	% Change in Number of Small Business Loans		
	Coefficient	S.E.	t-Statistic
Large Bank	-0.053	0.013	-4.07 a
Large Bank x Fin'l Crisis	-0.038	0.009	-4.25 a
Large Bank x Post Crisis	0.040	0.010	4.11 a
Loans	-0.820	0.028	-29.51 a
Total Equity	1.645	0.055	29.75 a
ROA	-5.628	0.231	-24.35 a
NPLs	-1.829	0.103	-17.74 a
Liquid Assets	0.085	0.020	4.27 a
Core Deposits	-0.046	0.019	-2.51 a
Commitments	0.263	0.052	5.03 a
De Novo Indicator	0.257	0.007	34.96 a
1995	0.086	0.007	13.13 a
1996	0.057	0.006	8.90 a
1997	0.063	0.006	9.94 a
1998	0.045	0.006	7.26 a
1999	0.033	0.006	5.42 a
2000	0.057	0.006	9.62 a
2001	0.037	0.006	6.41 a
2002	0.007	0.006	1.33
2003	-0.001	0.005	-0.20
2004	0.000	0.005	-0.07
2005	0.007	0.005	1.34
2006	0.014	0.005	2.62 a
2008	-0.024	0.006	-4.23 a
2009	-0.042	0.005	-7.70 a
2010	-0.054	0.006	-9.62 a
2011	-0.068	0.005	-12.47 a
2012	-0.059	0.005	-10.77 a
2013	-0.063	0.005	-11.93 a
2014	-0.045	0.005	-8.67 a
2015	-0.053	0.005	-9.96 a
Constant	0.094	0.017	5.59 a
Observations	167,515		
R-squared	0.17		
Number of Banks	13,473		

Table 8: Annual Pct. Change in Number of Small-Business Loans Outstanding at Troubled vs. Healthy Banks

Results are from an OLS fixed-effects model with bank fixed effects where the dependent variable is the annual change in the number of bank loans to small businesses. Business loans are defined as the sum of commercial & industrial loans and commercial real estate loans in order to be consistent with bank reporting of small-business loans. The analysis is based upon 167,515 bank-year observations on 13,473 banks from 1995 – 2015 gathered from the June FFIEC Call Reports. *Troubled Bank* is an indicator for banks with nonperforming asset coverage ratios of less than 4 percent. *Fin'l Crisis* is an indicator for the financial crisis years 2009 – 2011. *Post Crisis* is an indicator variable for the post-crisis years 2012 – 2015. *Loans* is the ratio of loans in the loan category of the dependent variable to total assets. *Total Equity* is the ratio of total equity to total assets. *NPLs* is the ratio of nonperforming assets to total assets. *ROA* is the ratio of net income to total assets. *Core Deposits* is the ratio of core deposits to total assets. *Commitments* is the ratio of business loan commitments to total credit, which is defined as the sum of total assets and total loan commitments. *Bank Size* as measured by the log of total assets. *De Novo* is an indicator for de novo banks less than five years old. Each bank control variable is measured as of year $t - 1$. Bank fixed effects are included in each model but are not shown. t-statistics are based upon robust standard errors clustered at the bank level. R-squared is the “within” R-squared.

Variable	% Change in Number of Small Business Loans		
	Coefficient	S.E.	t-Stat
Troubled Bank	-0.016	0.013	-1.31
Troubled Bank x Fin'l Crisis	-0.024	0.013	-1.76 c
Troubled Bank x Post Crisis	0.055	0.014	3.98 a
Loans	-0.807	0.028	-29.08 a
Total Equity	1.649	0.055	29.82 a
ROA	-5.631	0.231	-24.37 a
NPLs	-1.800	0.109	-16.49 a
Liquid Assets	0.090	0.020	4.49 a
Core Deposits	-0.036	0.018	-2.00 b
Commitments	0.261	0.052	5.00 a
De Novo Indicator	0.258	0.007	35.00 a
1995	0.087	0.007	13.32 a
1996	0.058	0.006	9.03 a
1997	0.063	0.006	10.04 a
1998	0.045	0.006	7.34 a
1999	0.034	0.006	5.49 a
2000	0.057	0.006	9.68 a
2001	0.038	0.006	6.48 a
2002	0.008	0.006	1.40
2003	-0.001	0.005	-0.16
2004	0.000	0.005	-0.05
2005	0.007	0.005	1.34
2006	0.014	0.005	2.63 a
2008	-0.024	0.006	-4.22 a
2009	-0.042	0.005	-7.76 a
2010	-0.055	0.006	-9.68 a
2011	-0.068	0.005	-12.48 a
2012	-0.060	0.006	-10.82 a
2013	-0.064	0.005	-11.96 a
2014	-0.046	0.005	-8.77 a
2015	-0.054	0.005	-10.05 a
Constant	0.081	0.017	4.85 a
Observations	167,515		
R-squared	0.17		
Number of Banks	13,473		

Table 9: Annual Pct. Change in the Amount of Small-Business-Loan Originations at Large vs. Small Banks

Results are from an OLS fixed-effects model with bank fixed effects where the dependent variable is the amount of bank small-business loan originations scaled by the amount of small-business loans outstanding as of the previous year. Business loans are defined as the sum of commercial & industrial loans and commercial real estate loans in order to be consistent with bank reporting of small-business loans. The analysis is based upon 9,404 bank-year observations on 1,993 banks from 2004 – 2014 gathered from the annual FFIEC CRA data on small-business loan originations and annual FFIEC Call Report data. *Large Bank* is an indicator for banks with more than \$1 billion in assets in inflation-adjusted 2000 dollars. *Fin'l Crisis* is an indicator for the financial crisis years 2009-2011. *Post Crisis* is an indicator variable for the post-crisis years 2012-2014. *Loans* is the ratio of loans in the loan category of the dependent variable to total assets or the lagged natural logarithm in the loan category of the dependent variable. *Total Equity* is the ratio of total equity to total assets. *NPLs* is the ratio of nonperforming assets to total assets. *ROA* is the ratio of net income to total assets. *Core Deposits* is the ratio of core deposits to total assets. *Commitments* is the ratio of business loan commitments to total credit, which is defined as the sum of total assets and total loan commitments. *Bank Size* as measured by the log of total assets. *De Novo* is an indicator for de novo banks less than five years old. Each bank control variable is measured as of year $t - 1$. Bank fixed effects are included in each model but are not shown. t-statistics are based upon robust standard errors clustered at the bank level. R-squared is the “within” R-squared.

Variable	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Large Bank	-0.002	-0.20	-0.002	-0.21	-0.002	-0.20
Large Bank x Fin'l Crisis	-0.025	-3.08 a	-0.019	-2.07 b	0.022	2.16 b
Large Bank x Post Crisis	-0.028	-2.07 b	-0.023	-1.62	0.030	2.07 b
Loans	-0.755	-6.83 a	-0.763	-6.47 a	-0.795	-7.99 a
Total Equity					0.734	4.37 a
ROA			0.363	1.17	-0.137	-0.41
NPLs					-0.725	-4.42 a
Liquid Assets			0.007	0.16	-0.003	-0.07
Core Deposits			0.026	0.53	0.069	1.78
Commitments			0.126	1.37	0.095	1.17
De Novo Indicator			0.048	1.71 c	0.029	1.08
y2004	0.073	9.13 a	0.073	9.20 a	0.078	9.97 a
y2005	0.049	7.34 a	0.050	7.45 a	0.054	8.22 a
y2006	0.020	3.63 a	0.020	3.68 a	0.021	3.89 a
y2008	-0.027	-5.03 a	-0.027	-4.92 a	-0.028	-5.25 a
y2009	-0.109	-18.75 a	-0.106	-17.91 a	-0.102	-17.85 a
y2010	-0.128	-19.12 a	-0.121	-16.71 a	-0.112	-15.62 a
y2011	-0.118	-17.17 a	-0.110	-14.91 a	-0.100	-13.00 a
y2012	-0.101	-13.37 a	-0.094	-11.66 a	-0.088	-10.10 a
y2013	-0.096	-12.49 a	-0.089	-11.35 a	-0.085	-10.04 a
y2014	-0.116	-14.52 a	-0.110	-13.75 a	-0.108	-13.10 a
Constant	0.415	17.64 a	0.386	15.08 a	0.323	9.56 a
Observations	9,404		9,404		9,404	
R-squared	0.253		0.255		0.27	
Number of Banks	1,993		1,993		1,993	

Table 10: Annual Pct. Change in the Number of Small-business Loan Originations at Large vs. Small Banks

Results are from an OLS fixed-effects model with bank fixed effects where the dependent variable is the number of bank small-business loan originations scaled by the number of small-business loans outstanding as of the previous year. Business loans are defined as the sum of commercial & industrial loans and commercial real estate loans in order to be consistent with bank reporting of small-business loans. The analysis is based upon 9,404 bank-year observations on 1,993 banks from 2004 – 2014 gathered from the annual FFIEC CRA data on small-business loan originations. *Large Bank* is an indicator for banks with more than \$1 billion in assets. *Fin'l Crisis* is an indicator for the financial crisis years 2009 – 2011. *Post Crisis* is an indicator variable for the post-crisis years 2012 – 2014. *Loans* is the ratio of loans in the loan category of the dependent variable to total assets. *Total Equity* is the ratio of total equity to total assets or the lagged natural logarithm in the loan category of the dependent variable. *NPLs* is the ratio of nonperforming assets to total assets. *ROA* is the ratio of net income to total assets. *Core Deposits* is the ratio of core deposits to total assets. *Commitments* is the ratio of business loan commitments to total credit, which is defined as the sum of total assets and total loan commitments. *Bank Size* as measured by the log of total assets. *De Novo* is an indicator for de novo banks less than five years old. Each bank control variable is measured as of year $t - 1$. Bank fixed effects are included in each model but are not shown. t-statistics are based upon robust standard errors clustered at the bank level. R-squared is the “within” R-squared.

Variable	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Large Bank	-0.002	-0.19	-0.002	-0.14	-0.001	-0.09
Large Bank x Fin'l Crisis	-0.040	-3.43 a	-0.035	-2.78 a	0.013	0.96
Large Bank x Post Crisis	-0.025	-1.19	-0.019	-0.92	0.041	1.89 c
Loans	-0.570	-5.53 a	-0.575	-5.40 a	-0.602	-5.87 a
Total Equity					0.496	3.10 a
ROA			0.153	0.41	-0.520	-1.26
NPLs					-0.984	-4.57 a
Liquid Assets			0.048	0.87	0.023	0.41
Core Deposits			-0.018	-0.40	0.016	0.38
Commitments			0.133	1.19	0.060	0.56
De Novo Indicator			0.130	3.48 a	0.116	3.17 a
y2004	0.045	5.15 a	0.045	4.48 a	0.050	4.96 a
y2005	0.030	3.75 a	0.030	3.49 a	0.033	3.86 a
y2006	0.009	1.34	0.008	1.24	0.009	1.34
y2008	-0.042	-5.77 a	-0.041	-5.58 a	-0.040	-5.65 a
y2009	-0.117	-15.38 a	-0.114	-14.69 a	-0.109	-14.17 a
y2010	-0.125	-14.22 a	-0.119	-12.49 a	-0.107	-11.15 a
y2011	-0.114	-12.06 a	-0.109	-10.73 a	-0.094	-8.89 a
y2012	-0.105	-10.63 a	-0.100	-9.35 a	-0.088	-7.81 a
y2013	-0.100	-10.33 a	-0.096	-9.36 a	-0.086	-8.12 a
y2014	-0.105	-9.92 a	-0.101	-9.33 a	-0.096	-8.75 a
Constant	0.466	26.22 a	0.440	13.82 a	0.415	10.94 a
Observations	9,404		9,404		9,404	
R-squared	0.140		0.145		0.154	
Number of Banks	1,993		1,993		1,993	

Appendix Tables

**Table A-1: Annual Dollar Amounts of Small-Business and Big-Business Loans, 1995-2015
(\$ Trillions)**

Year	Small-Business Loans	Big-Business Loans	All Business Loans
1995	0.350	0.524	0.874
1996	0.368	0.549	0.917
1997	0.389	0.605	0.994
1998	0.411	0.681	1.092
1999	0.440	0.783	1.224
2000	0.482	0.915	1.397
2001	0.509	0.924	1.433
2002	0.535	0.884	1.419
2003	0.549	0.895	1.444
2004	0.577	0.936	1.513
2005	0.601	1.080	1.681
2006	0.634	1.212	1.846
2007	0.687	1.318	2.004
2008	0.711	1.559	2.271
2009	0.695	1.559	2.254
2010	0.652	1.437	2.089
2011	0.608	1.501	2.109
2012	0.588	1.668	2.256
2013	0.585	1.773	2.358
2014	0.590	1.940	2.529
2015	0.599	2.107	2.706

Small-business loans are defined as loans originated in amounts of \$1 million or less, while big-business loans are defined as loans originated in amounts greater than \$1 million.

Source: FDIC Quarterly Profiles for Q2 2015

Table A-2: Average Annual Percentage Change in the Dollar Amount of Small-Business Loans Outstanding, 1995-2015—Small vs. Large Banks

Year	All Banks			Small Banks			Big Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
1995	10,570	0.154	0.003	10,091	0.157	0.003	479	0.103	0.020	0.054	2.71 a
1996	10,055	0.140	0.003	9,582	0.143	0.003	473	0.085	0.017	0.058	3.45 a
1997	9,596	0.158	0.004	9,158	0.161	0.004	438	0.096	0.019	0.065	3.35 a
1998	9,251	0.166	0.004	8,811	0.170	0.004	440	0.099	0.018	0.071	3.79 a
1999	8,889	0.168	0.004	8,443	0.171	0.004	446	0.112	0.018	0.060	3.22 a
2000	8,686	0.206	0.004	8,259	0.212	0.004	427	0.102	0.016	0.110	6.62 a
2001	8,462	0.163	0.004	8,041	0.167	0.004	421	0.091	0.019	0.076	3.95 a
2002	8,271	0.146	0.004	7,852	0.152	0.004	419	0.038	0.018	0.113	6.03 a
2003	8,141	0.121	0.004	7,699	0.124	0.004	442	0.073	0.018	0.051	2.71 a
2004	7,969	0.121	0.004	7,541	0.125	0.004	428	0.061	0.017	0.064	3.64 a
2005	7,773	0.137	0.004	7,331	0.142	0.004	442	0.059	0.017	0.083	4.84 a
2006	7,658	0.132	0.004	7,206	0.135	0.004	452	0.093	0.018	0.042	2.29 b
2007	7,613	0.119	0.004	7,144	0.122	0.005	469	0.066	0.015	0.056	3.47 a
2008	7,490	0.128	0.005	7,042	0.130	0.005	448	0.086	0.018	0.045	2.43 b
2009	7,357	0.083	0.004	6,893	0.090	0.005	464	-0.023	0.014	0.113	7.61 a
2010	7,080	0.036	0.004	6,639	0.040	0.004	441	-0.025	0.018	0.065	3.56 a
2011	6,799	-0.002	0.003	6,369	-0.001	0.003	430	-0.019	0.015	0.019	1.26
2012	6,585	0.015	0.003	6,153	0.016	0.003	432	0.006	0.014	0.010	0.69
2013	6,697	0.020	0.003	6,226	0.021	0.003	471	0.006	0.011	0.016	1.42
2014	6,434	0.035	0.003	5,951	0.035	0.003	483	0.029	0.012	0.006	0.50
2015	6,139	0.043	0.003	5,648	0.043	0.003	491	0.046	0.012	-0.003	-0.20

Small Banks (Large Banks) are defined as banks with less than (greater than) \$1 billion in total assets in inflation-adjusted 2000 dollars.

a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table A-3: Average Annual Percentage Change in the Dollar Amount of All Business Loans Outstanding, 1995-2015—Small vs. Large Banks

Year	All Banks			Small Banks			Big Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
1995	10,570	0.150	0.003	10,091	0.151	0.003	479	0.129	0.013	0.022	1.65
1996	10,055	0.156	0.003	9,582	0.158	0.003	473	0.097	0.013	0.062	4.47 a
1997	9,596	0.171	0.003	9,158	0.172	0.004	438	0.144	0.016	0.028	1.71 c
1998	9,251	0.174	0.004	8,811	0.176	0.004	440	0.140	0.015	0.036	2.35 b
1999	8,889	0.190	0.004	8,443	0.190	0.004	446	0.187	0.017	0.003	0.19
2000	8,686	0.224	0.004	8,259	0.226	0.004	427	0.194	0.015	0.032	2.12 b
2001	8,462	0.183	0.004	8,041	0.186	0.004	421	0.130	0.016	0.057	3.34 a
2002	8,271	0.174	0.004	7,852	0.179	0.004	419	0.083	0.015	0.096	6.01 a
2003	8,141	0.141	0.003	7,699	0.145	0.004	442	0.086	0.013	0.059	4.29 a
2004	7,969	0.156	0.004	7,541	0.158	0.004	428	0.120	0.014	0.039	2.62 a
2005	7,773	0.162	0.004	7,331	0.164	0.004	442	0.126	0.013	0.038	2.72 a
2006	7,658	0.149	0.004	7,206	0.150	0.004	452	0.127	0.015	0.024	1.57
2007	7,613	0.142	0.004	7,144	0.145	0.004	469	0.106	0.014	0.038	2.69 a
2008	7,490	0.167	0.004	7,042	0.167	0.005	448	0.159	0.016	0.009	0.52
2009	7,357	0.114	0.004	6,893	0.117	0.004	464	0.062	0.012	0.055	4.26 a
2010	7,080	0.056	0.003	6,639	0.060	0.003	441	0.007	0.014	0.053	3.56 a
2011	6,799	0.020	0.003	6,369	0.020	0.003	430	0.018	0.012	0.002	0.19
2012	6,585	0.034	0.003	6,153	0.032	0.003	432	0.074	0.015	-0.042	-2.76 a
2013	6,697	0.039	0.003	6,226	0.037	0.003	471	0.064	0.008	-0.027	-3.15 a
2014	6,434	0.057	0.003	5,951	0.053	0.003	483	0.107	0.012	-0.053	-4.45 a
2015	6,139	0.067	0.003	5,648	0.064	0.003	491	0.102	0.009	-0.038	-3.85 a

Small Banks (Large Banks) are defined as banks with less than (greater than) \$1 billion in total assets in inflation-adjusted 2000 dollars.

a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table A-4: Average Annual Percentage Change in the Dollar Amount of Small-Business Loans Outstanding, 1995-2015—Healthy vs. Troubled Banks

Year	All Banks			Healthy Banks			Troubled Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
1995	10,570	0.154	0.003	10,317	0.157	0.003	253	0.032	0.022	0.125	5.55 a
1996	10,055	0.140	0.003	9,911	0.142	0.003	144	0.004	0.034	0.138	4.02 a
1997	9,596	0.158	0.004	9,510	0.159	0.004	86	0.103	0.046	0.055	1.21
1998	9,251	0.166	0.004	9,191	0.167	0.004	60	0.060	0.058	0.107	1.85 c
1999	8,889	0.168	0.004	8,843	0.169	0.004	46	0.144	0.092	0.024	0.27
2000	8,686	0.206	0.004	8,634	0.208	0.004	52	0.032	0.048	0.176	3.65 a
2001	8,462	0.163	0.004	8,427	0.164	0.004	35	-0.084	0.044	0.248	5.56 a
2002	8,271	0.146	0.004	8,061	0.149	0.004	210	0.039	0.025	0.109	4.31 a
2003	8,141	0.121	0.004	7,986	0.124	0.004	155	-0.003	0.026	0.127	4.88 a
2004	7,969	0.121	0.004	7,818	0.123	0.004	151	0.027	0.031	0.096	3.06 a
2005	7,773	0.137	0.004	7,667	0.139	0.004	106	0.034	0.030	0.104	3.43 a
2006	7,658	0.132	0.004	7,587	0.134	0.004	71	-0.001	0.032	0.135	4.22 a
2007	7,613	0.119	0.004	7,526	0.119	0.004	87	0.053	0.048	0.067	1.37
2008	7,490	0.128	0.005	7,354	0.130	0.005	136	-0.012	0.030	0.142	4.69 a
2009	7,357	0.083	0.004	6,977	0.089	0.004	380	-0.028	0.016	0.116	7.12 a
2010	7,080	0.036	0.004	6,229	0.051	0.004	851	-0.072	0.008	0.122	13.53 a
2011	6,799	-0.002	0.003	5,931	0.013	0.003	868	-0.101	0.007	0.114	14.36 a
2012	6,585	0.015	0.003	5,792	0.028	0.003	793	-0.084	0.008	0.112	13.67 a
2013	6,697	0.020	0.003	6,085	0.028	0.003	612	-0.054	0.010	0.081	7.64 a
2014	6,434	0.035	0.003	6,021	0.038	0.003	413	-0.023	0.011	0.061	5.22 a
2015	6,139	0.043	0.003	5,880	0.045	0.003	259	0.004	0.015	0.041	2.76 a

Healthy Banks (Troubled Banks) are defined as banks with adjusted capital ratios greater than (less than) 4.0 percent. a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table A-5: Average Annual Percentage Change in the Dollar Amount of All Business Loans Outstanding, 1995-2015—Healthy vs. Troubled Banks

Year	All Banks			Healthy Banks			Troubled Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
1995	10,570	0.150	0.003	10,317	0.153	0.003	253	0.002	0.015	0.151	9.63 a
1996	10,055	0.156	0.003	9,911	0.157	0.003	144	0.031	0.031	0.126	4.06 a
1997	9,596	0.171	0.003	9,510	0.172	0.003	86	0.113	0.041	0.058	1.42
1998	9,251	0.174	0.004	9,191	0.175	0.004	60	0.021	0.051	0.154	3.00 a
1999	8,889	0.190	0.004	8,843	0.190	0.004	46	0.147	0.090	0.043	0.48
2000	8,686	0.224	0.004	8,634	0.226	0.004	52	0.034	0.045	0.191	4.25 a
2001	8,462	0.183	0.004	8,427	0.184	0.004	35	-0.031	0.042	0.215	5.04 a
2002	8,271	0.174	0.004	8,061	0.177	0.004	210	0.046	0.022	0.132	5.95 a
2003	8,141	0.141	0.003	7,986	0.144	0.004	155	0.001	0.022	0.143	6.44 a
2004	7,969	0.156	0.004	7,818	0.159	0.004	151	0.019	0.023	0.140	6.01 a
2005	7,773	0.162	0.004	7,667	0.163	0.004	106	0.081	0.032	0.082	2.53 b
2006	7,658	0.149	0.004	7,587	0.150	0.004	71	0.023	0.031	0.127	4.10 a
2007	7,613	0.142	0.004	7,526	0.143	0.004	87	0.068	0.042	0.076	1.80 c
2008	7,490	0.167	0.004	7,354	0.170	0.004	136	-0.003	0.026	0.172	6.65 a
2009	7,357	0.114	0.004	6,977	0.121	0.004	380	-0.022	0.012	0.143	11.21 a
2010	7,080	0.056	0.003	6,229	0.071	0.004	851	-0.053	0.007	0.125	15.65 a
2011	6,799	0.020	0.003	5,931	0.036	0.003	868	-0.086	0.006	0.122	18.03 a
2012	6,585	0.034	0.003	5,792	0.050	0.003	793	-0.077	0.006	0.126	18.12 a
2013	6,697	0.039	0.003	6,085	0.049	0.003	612	-0.060	0.007	0.109	14.85 a
2014	6,434	0.057	0.003	6,021	0.063	0.003	413	-0.025	0.010	0.088	8.86 a
2015	6,139	0.067	0.003	5,880	0.070	0.003	259	-0.014	0.013	0.085	6.30 a

Healthy Banks (Troubled Banks) are defined as banks with adjusted capital ratios greater than (less than) 4.0 percent.
a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table A-6: Average Annual Percentage Change in the Number of Small-Business Loans Outstanding, 1995-2015—Small vs. Large Banks

Year	All Banks			Small Banks			Big Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
1995	10,570	0.154	0.004	10,091	0.153	0.004	479	0.166	0.027	-0.013	-0.47
1996	10,055	0.129	0.004	9,582	0.127	0.004	473	0.161	0.025	-0.034	-1.33
1997	9,596	0.139	0.005	9,158	0.136	0.005	438	0.183	0.027	-0.046	-1.71 c
1998	9,251	0.133	0.005	8,811	0.130	0.005	440	0.190	0.028	-0.060	-2.10 b
1999	8,889	0.134	0.005	8,443	0.131	0.005	446	0.191	0.029	-0.059	-2.05 b
2000	8,686	0.169	0.005	8,259	0.168	0.005	427	0.178	0.026	-0.010	-0.36
2001	8,462	0.146	0.005	8,041	0.146	0.005	421	0.146	0.028	-0.001	-0.02
2002	8,270	0.103	0.005	7,851	0.102	0.005	419	0.120	0.029	-0.018	-0.61
2003	8,140	0.087	0.005	7,698	0.087	0.005	442	0.092	0.025	-0.005	-0.20
2004	7,968	0.088	0.005	7,540	0.088	0.005	428	0.101	0.025	-0.013	-0.52
2005	7,772	0.094	0.005	7,330	0.094	0.005	442	0.097	0.024	-0.004	-0.15
2006	7,657	0.110	0.005	7,205	0.107	0.005	452	0.151	0.025	-0.044	-1.72 c
2007	7,612	0.130	0.006	7,143	0.131	0.006	469	0.120	0.024	0.011	0.44
2008	7,489	0.118	0.006	7,041	0.119	0.006	448	0.100	0.023	0.019	0.81
2009	7,356	0.094	0.006	6,892	0.099	0.006	464	0.019	0.021	0.080	3.67 a
2010	7,079	0.067	0.005	6,638	0.067	0.005	441	0.059	0.026	0.008	0.30
2011	6,799	0.034	0.005	6,369	0.032	0.005	430	0.058	0.025	-0.025	-1.00
2012	6,585	0.049	0.005	6,153	0.045	0.005	432	0.112	0.026	-0.067	-2.56 b
2013	6,697	0.053	0.005	6,226	0.050	0.005	471	0.087	0.023	-0.037	-1.58
2014	6,434	0.075	0.005	5,951	0.072	0.005	483	0.114	0.024	-0.042	-1.77 c
2015	6,139	0.080	0.005	5,648	0.074	0.005	491	0.154	0.023	-0.080	-3.38 a

Small Banks (Large Banks) are defined as banks with less than (greater than) \$1 billion in total assets in inflation-adjusted 2000 dollars.

a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table A-7: Average Annual Percentage Change in the Number of Small-Business Loans Outstanding, 1995-2015—Healthy vs. Troubled Banks

Year	All Banks			Healthy Banks			Troubled Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
1995	10,570	0.153	0.004	10,317	0.156	0.005	253	0.051	0.029	0.104	3.55 a
1996	10,055	0.127	0.004	9,911	0.129	0.004	144	-0.019	0.039	0.148	3.81 a
1997	9,596	0.137	0.005	9,510	0.138	0.005	86	0.051	0.048	0.086	1.78 c
1998	9,251	0.132	0.005	9,191	0.132	0.005	60	0.075	0.060	0.057	0.95
1999	8,889	0.129	0.005	8,843	0.130	0.005	46	0.015	0.076	0.115	1.51
2000	8,686	0.163	0.005	8,634	0.164	0.005	52	-0.042	0.053	0.206	3.89 a
2001	8,462	0.140	0.005	8,427	0.140	0.005	35	-0.030	0.077	0.170	2.21 b
2002	8,271	0.094	0.005	8,061	0.097	0.005	210	-0.027	0.028	0.124	4.37 a
2003	8,141	0.078	0.005	7,986	0.080	0.005	155	-0.036	0.031	0.116	3.71 a
2004	7,969	0.081	0.005	7,818	0.084	0.005	151	-0.065	0.030	0.150	4.88 a
2005	7,773	0.084	0.005	7,667	0.084	0.005	106	0.044	0.043	0.041	0.95
2006	7,658	0.114	0.005	7,587	0.115	0.005	71	-0.033	0.031	0.148	4.72 a
2007	7,613	0.128	0.006	7,526	0.130	0.006	87	-0.031	0.049	0.161	3.28 a
2008	7,490	0.115	0.006	7,354	0.117	0.006	136	-0.022	0.045	0.139	3.07 a
2009	7,357	0.091	0.006	6,977	0.100	0.006	380	-0.065	0.017	0.164	8.95 a
2010	7,080	0.063	0.006	6,229	0.079	0.006	851	-0.055	0.013	0.135	9.52 a
2011	6,799	0.032	0.005	5,931	0.049	0.005	868	-0.083	0.011	0.133	10.58 a
2012	6,585	0.048	0.005	5,792	0.063	0.005	793	-0.060	0.012	0.123	9.68 a
2013	6,697	0.054	0.005	6,085	0.065	0.005	612	-0.049	0.012	0.114	8.87 a
2014	6,434	0.077	0.005	6,021	0.082	0.005	413	-0.003	0.016	0.085	5.03 a
2015	6,139	0.080	0.005	5,880	0.083	0.005	259	0.022	0.019	0.061	3.13 a

Healthy Banks (Troubled Banks) are defined as banks with adjusted capital ratios greater than (less than) 4.0 percent. a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table A-8: Average Annual Amounts of Small-Business Loan Originations—2004 - 2014

Year	Obs.	Sum (Millions)	Average (Thousands)
2004	1,766	123.2	69.8
2005	933	115.7	124.0
2006	873	122.3	140.1
2007	835	123.0	147.3
2008	798	102.9	128.9
2009	778	69.4	89.2
2010	728	53.0	72.8
2011	716	67.7	94.6
2012	704	67.0	95.2
2013	731	74.2	101.5
2014	701	72.8	103.8

Table A-9: Average Annual Amounts of Small-Business Loan Originations, 2004 - 2014—Small vs. Large Banks

Year	All Banks			Small Banks			Large Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
2004	1,766	69,761	6,558	1,385	26,092	625	381	228,505	28,948	-202,412	-6.99 a
2005	933	123,991	15,737	540	29,128	1,139	393	254,337	36,364	-225,209	-6.19 a
2006	873	140,089	21,200	483	28,498	1,184	390	278,290	46,555	-249,793	-5.36 a
2007	835	147,335	25,159	434	29,318	1,316	401	275,065	51,681	-245,747	-4.75 a
2008	798	128,939	20,648	406	28,352	1,314	392	233,119	41,411	-204,767	-4.94 a
2009	778	89,168	15,699	375	21,653	1,050	403	151,992	29,989	-130,339	-4.34 a
2010	728	72,843	8,318	337	18,558	1,011	391	119,631	15,083	-101,073	-6.69 a
2011	716	94,592	17,340	338	20,264	1,046	378	161,054	32,492	-140,789	-4.33 a
2012	704	95,167	14,291	321	22,075	1,082	383	156,428	25,871	-134,353	-5.19 a
2013	731	101,531	16,136	317	22,630	1,087	414	161,946	28,149	-139,316	-4.95 a
2014	701	103,816	18,300	277	21,568	1,087	424	157,549	29,988	-135,982	-4.53 a

Small Banks (Large Banks) are defined as banks with less than (greater than) \$1 billion in total assets in inflation-adjusted 2000 dollars.

a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table A-10: Average Annual Amounts of Small-Business Loan Originations, 2004 - 2014—Healthy vs. Troubled Banks

Year	All Banks			Healthy Banks			Troubled Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
2004	1,766	69,761	6,558	1,759	69,822	6,583	7	54,562	37,151	15,259	0.40
2005	933	123,991	15,737	928	121,415	15,562	4	62,947	39,155	58,468	1.49
2006	873	140,089	21,200	871	140,146	21,249	2	115,284	68,720	24,862	0.35
2007	835	147,335	25,159	832	147,587	25,249	3	77,629	50,897	69,958	1.23
2008	798	128,939	20,648	787	130,261	20,933	11	34,380	9,894	95,881	4.14 a
2009	778	89,168	15,699	737	91,768	16,551	41	42,436	14,121	49,332	2.27 b
2010	728	72,843	8,318	624	78,047	9,557	104	41,621	9,678	36,426	2.68 a
2011	716	94,592	17,340	602	104,997	20,540	114	39,646	8,434	65,351	2.94 a
2012	704	95,167	14,291	611	104,063	16,421	93	36,726	5,204	67,337	3.91 a
2013	731	101,531	16,136	671	107,750	17,550	60	31,987	7,029	75,763	4.01 a
2014	701	103,816	18,300	663	107,515	19,332	38	39,272	10,445	68,244	3.11 a

Healthy Banks (Troubled Banks) are defined as banks with adjusted capital ratios greater than (less than) 4.0 percent. a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table A-11: Average and Total Annual Number of Small-Business Loan Originations, 2004 – 2014

Year	Obs.	Average (Thousands)	Sum (Millions)
2004	1,766	1.57	2.77
2005	933	3.46	3.23
2006	873	4.34	3.79
2007	835	4.90	4.09
2008	798	3.99	3.18
2009	778	2.02	1.57
2010	728	1.44	1.05
2011	716	2.30	1.64
2012	704	2.06	1.45
2013	731	3.23	2.36
2014	701	3.61	2.53

Table A-12: Average Annual Number of Small-Business Loan Originations, 2004 - 2014—Small vs. Large Banks

Year	All Banks			Small Banks			Large Banks			Difference	
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Diff	t-Stat
2004	1,766	1,566	386	1,385	288	8	381	6,211	1,774	-5,923	-3.34 a
2005	933	3,461	1,006	540	305	16	393	7,798	2,375	-7,493	-3.16 a
2006	873	4,344	1,512	483	290	18	390	9,365	3,371	-9,074	-2.69 a
2007	835	4,900	1,795	434	289	22	401	9,891	3,727	-9,601	-2.58 b
2008	798	3,989	1,194	406	246	14	392	7,865	2,418	-7,619	-3.15 a
2009	778	2,020	650	375	207	12	403	3,707	1,250	-3,500	-2.80 a
2010	728	1,440	379	337	183	11	391	2,524	702	-2,342	-3.33 a
2011	716	2,297	777	338	185	11	378	4,186	1,466	-4,001	-2.73 a
2012	704	2,055	584	321	185	11	383	3,623	1,068	-3,439	-3.22 a
2013	731	3,232	1,196	317	180	10	414	5,570	2,107	-5,390	-2.56 b
2014	701	3,615	1,341	277	186	12	424	5,855	2,213	-5,669	-2.56 b

Small Banks (Large Banks) are defined as banks with less than (greater than) \$1 billion in total assets in inflation-adjusted 2000 dollars.

a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.

Table A-13: Average Annual Number of Small-Business Loan Originations, 2004 - 2014—Healthy vs. Troubled Banks

Year	All Banks			Healthy Banks			Troubled Banks			Difference
	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	t-Stat
2004	1,766	1,566	386	1,759	1,570	388	7	480	281	2.28 b
2005	933	3,461	1,006	928	3,407	1,009	4	484	291	-0.69
2006	873	4,344	1,512	871	4,351	1,515	2	1,180	208	2.07 b
2007	835	4,900	1,795	832	4,916	1,802	3	579	441	2.34 b
2008	798	3,989	1,194	787	4,042	1,211	11	519	288	3.16 a
2009	778	2,020	650	737	2,105	685	41	489	270	2.20 b
2010	728	1,440	379	624	1,608	441	104	435	154	2.51 b
2011	716	2,297	777	602	2,667	923	114	344	104	2.50 b
2012	704	2,055	584	611	2,321	672	93	312	90	2.96 a
2013	731	3,232	1,196	671	3,494	1,303	60	305	127	2.44 b
2014	701	3,615	1,341	663	3,799	1,418	38	410	193	2.37 b

Healthy Banks (Troubled Banks) are defined as banks with adjusted capital ratios greater than (less than) 4.0 percent. a, b, c indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively.