Squeezing Small Business Lending: Dodd-Frank's Capital Market Incentives*

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Abstract

One element in the continuing debate on the costs and benefits of the Dodd-Frank Act of 2010 focuses on small business loans. Instead of attempting to directly measure the costs and benefits, I propose an alternative approach, measuring how the new regulations altered the capital market incentives for bank lending to small businesses. The events triggering the market's response were (1) the passage of the Dodd-Frank Act of 2010 and (2) the regulatory relief plan announced in 2015. By matching the Federal Reserve's Call Reports, Summary of Deposits, and Y9C Reports with Compustat data, I constructed a dataset of the top-tier publicly traded bank holding companies, spanning the years 2001–2017 to identify the market effects of the Dodd-Frank Act. Overall, the capital market responded by increasing the incentives for community banks to expand their small business loans and for large banks to reduce theirs. After 2010, large banks' lending recovered so sluggish that in spite of increased incentives for community banks to increase lending following the Federal Reserve's 2015 regulatory relief plan, the volume of newly originated small business loans never fully recovered from the recession.

JEL classification: G21, G28, G01, L25, L51

*Keywords:* bank lending, small business, recovery, Dodd-Frank Act

1 Introduction

The U.S. bank credit recovery pace of the recent recession "has been the slowest of any recession since the early 1960s" (Liu and Tai, 2016), as shown in Figure 1. Within the private non-financial sector, small businesses particularly have difficulties getting bank credit due to lack of formal accounting information and potential higher risks. Nevertheless,since small businesses usually do not have access to debt or equity markets, small business loans (SBL) by banks, is one of their primary funding sources. Ten years after the 2008 financial crisis, the bank credit flowing to small businesses has recovered slowly, remaining below pre-crisis levels both in absolute amounts and relative to total assets (Figure 2). Small businesses' lack of credit access has contributed to the slow recovery of employment and wage growth (Chen, Hanson, and Stein, 2017), business formation (Bordo and Duca, 2018), entrepreneurial activities (Bord, Ivashina, and Taliaferro, 2018), and investment and output(Klein, 2014). This raises the question of why SBL recovered so slowly this time.

In addition to the weak credit demand,[1] the credit rationing from large banks has been attributed to the slow recovery of SBL (Chen, Hanson, and Stein, 2017; Bord, Ivashina, and Taliaferro, 2018; Nguyen, 2019). Another widely discussed factor is Dodd-Frank Act of 2010 (Bordo and Duca, 2018; Acharya, Berger, and Roman, 2018), which imposed heightened supervisions and annual Federal Reserve-conducted stress tests for large banks with assets above \$50 billion. Although not directly targeted by the Act, some community banks also have been complaining about the compliance costs imposed by Dodd-Frank regulations (American Bank Association, 2012). At the same time, other surveys and interviews of community bankers showed the opposite views, for example, "(Dodd-Frank Act is) not considered a serious problem because banks already have established regulatory compliance programs." (Conference of State Bank Supervisors, 2017). How to measure the regulatory

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[1] *The Federal Reserve Report to the Congress on the Availability of Credit to Small Business (2017)* stated that credit conditions for SBL were increasingly accommodative during the recovery but small business demand for credit was weak. Their main argument was that, in surveys of National Federation of Independent Business (NFIB), small business investment plans (planned capital outlays and anticipated business expansions) recovered very slowly. However, it is difficult to identify whether the the slow recovery of SBL was due to a lack of credit demand or insufficient credit supply, without comprehensive loan-level data.

Figure 1: Bank Credit to Private Non-Financial Sector during Recoveries
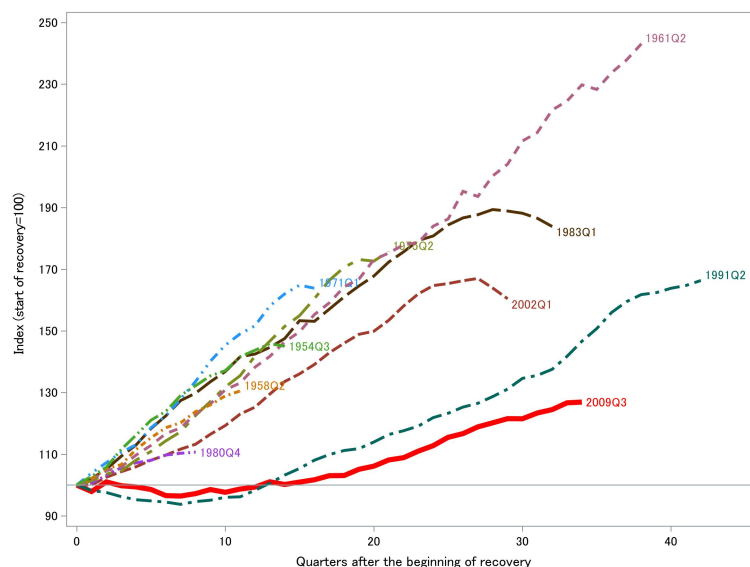
Source: BIS, FRED, and NBER.

Notes: The data is collected and adjusted by BIS and retrieved from FRED. The private non-financial sector includes households, non-financial businesses, and non-profit institutions serving households. The data captures the outstanding amount of credit at the end of each quarter. The original unit of private credit is billions USD, but all series are adjusted by setting the level in the first quarter after the recession as 100.

Figure 2: Annual New Originations of Small Business Loans by U.S. Banks during 2001-2017
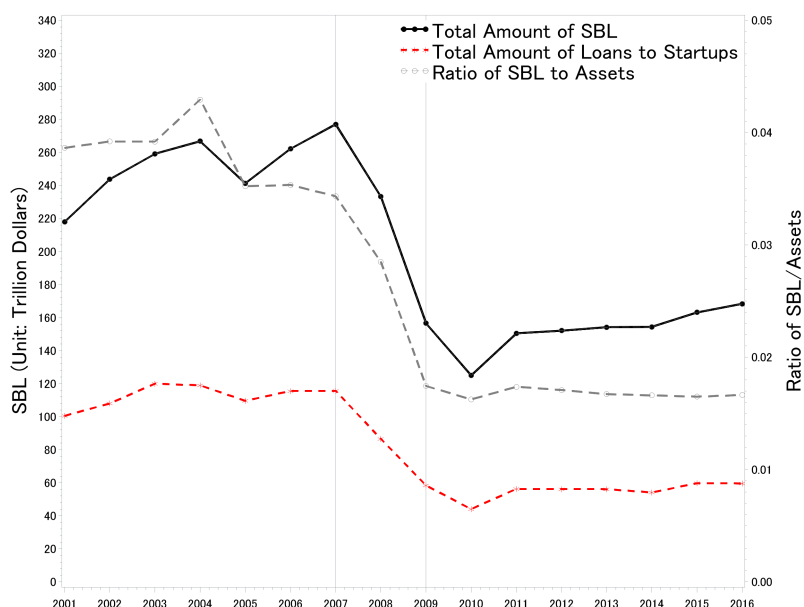
Source: the Community Reinvestment Act and the U.S. Bureau of Labor Statistics.

Notes: SBL is defined as business loans with originated amounts less than $1 million. Startups here are defined as firms with gross annual revenues less than $1 million. Both SBL and loans to startups are adjusted for inflation, using the price level in 2001 as benchmark.The total assets in CRA, which I use to calculate the ratio of SBL to assets, are the values of total assets in Call Reports of the previous year.

burdens and the effects becomes a crucial question, especially with the data limitation.[2]

In this paper, I address the problem of slow recovery of SBL by measuring how the new regulations imposed by Dodd-Frank Act of 2010 altered the capital market incentives for banks to lend to small businesses. The idea is that shareholders or investors should know better about the profitability of certain assets, according to the theory of market discipline, and how shareholders evaluate the impact of changes in regulations would affect bankers' lending strategy, assuming that they would maximize shareholders' value. If the capital market or shareholders consider certain types of loans as becoming more/less profitable due to changes in policies or macroeconomic conditions, banks would have more/less financial incentives to make these loans at the margin.

First, in a year-by-year analysis, community banks (with assets of less than $10 billion) have incentives to increase their SBL both before the recent financial crisis and after 2015 Regulatory Relief Plan for Small Banks. For a 1 p.p. increase in the ratio of SBL/assets, their Tobin's Q ratio is expected to increase at least 0.5 p.p. on average. Similar trends are found when measuring the effects of replacing large business loans or non-business loans with SBL. On the opposite, regional and large banks (with assets of more than $10 billion) were penalized by the capital market for SBL during the crisis and following the Dodd-Frank Act of 2010. Although the trend is clear, some results are not significant because I have to group regional (with assets of between $10 and $50 billion) and large banks (with assets of more than $50 billion) due to the relative small number of them.

The next section focuses on large banks and examines whether policy changes have contributed to the divergence between large banks and smaller banks in terms of capital market incentives to lend to small businesses. Because Dodd-Frank Act of 2010 was designed to target *large* banks and then Federal Reserve announced to ease regulatory burdens for *smaller* banks effective in 2015, the capital market is expected to react differently to banks in different sizes. Using fixed effect model on panel data spanning 2001–2017, I find that,

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[2]Currently, there is no direct measure of regulatory compliance costs, but some studies used crude proxies, such as the number of employees, the salary, and the consulting fees.

while smaller banks (with assets of less than \$50 billion) have been encouraged to lend more to small businesses, large banks were penalized for SBL and the penalty would triple once a large bank is labeled as a systemically important bank (SIB). For a 1 p.p. increase in the ratio of SBL/assets, Tobin's Q of a SIB would decrease about 3 p.p. on average. One possible explanation is that SIBs are under stress tests which usually put SBL under higher risk assessment and thus shareholders would predict that SIBs with increasing share of SBL are more likely to fail the stress test. The failure of stress tests is not desirable for shareholders because the consequence would be a limitation on a SIB's dividend and share buyback plan.

During the post-Act era, the capital market continued to encourage smaller banks to increase SBL, which was mainly driven by the surged incentives following the regulatory relief plan of 2015. Smaller banks which were relieved from some reporting and examination burden would expect a 0.6 to 0.8 p.p. increase in Tobin's Q ratio for a 1 p.p. increase in SBL/assets. The disincentives for large banks to lend to small businesses have increased about 50% since 2015. This might be because the capital market reassessed the competitiveness of large and smaller banks in lending to small businesses as only smaller banks qualified for regulatory relief policies.

My paper contributes to the literature in three aspects. First, my research fills the gap of studies on U.S. SBL recovery after the recent recession. Most of the related research[3] is on Euro Area, which is due to more comprehensive loan-level datasets. Compared with other studies on SBL by U.S. banks, my paper complements the literature by telling the story from the perspective of capital market incentives. Chen, Hanson, and Stein (2017) found that counties with an initial high presence of big banks experienced a large decline in SBL and business establishments, leading to slower employment and wage growth, but they did not explain the reasons. My paper confirms one of their hypotheses that financial

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[3]For example, Artola and Genre (2011) confirmed the financing crunch across firms in the Euro zone and found that small and young firms suffered more when credit standards were tightened. Kremp and Sevestre (2013) claimed that the decline of small businesses' access to bank loans in France is due to a decrease in credit demand, not credit rationing of banks. Despite the tighter bank lending standard, they believe that French small businesses were not strongly affected by credit rationing after 2008. Ozturk and Mrkaic (2014) analyzed the factors affecting the access to finance of SME in Euro area. They found that higher bank funding costs, larger firms' debt/asset ratio, smaller and younger firms, and less subsidized funding would lead to less credit access for small businesses.

regulations played an important role in the large decline in SBL by big banks. While Bordo and Duca (2018) found that Dodd-Frank Act hampers SBL and business formation speed, my paper supports their results by suggesting another transmission mechanism.

Second, my work contributes to the discussion about the role played by banks of different sizes in financing small businesses, given that existing empirical studies have shown conflicting results. Since the recent financial crisis, large banks have been playing increasingly important roles in SBL (DeYoung, Glennon, and Nigro, 2008, Berger, Goulding, and Rice, 2014, and Berger, Cerqueiro, and Penas, 2014). Prager and Wolken (2008) found that 70% of small businesses cited a big bank as their primary financial institution, but only 25% cited a community bank, and 5% cited a nonbank institution. Jagtiani and Lemieux (2016) added that SBL by community banks has been declining for more than ten years, but large banks and nonbank financial institutions have been playing an increasing role in SBL. However, Berger, Bouwman, and Kim (2017) found that small banks still have comparative advantages in alleviating small business financial constraints compared to large banks, especially during the crisis when large banks had liquidity shocks. My paper supports Berger, Bouwman, and Kim (2017) from a capital market perspective that SBL was considered by shareholders as a profitable asset for smaller banks throughout my sample period of 2001–2017, even during the 2008 financial crisis. Contrarily, large banks have been penalized by the capital market for increasing SBL since Dodd-Frank Act, as regulatory constraints have turned SBL into nonprofitable and risky asset for large banks from shareholders' point of view.

Third, my research offers an alternative method to measure the effects of regulatory compliance costs. A common practice is to use non-interest expense items in call reports as proxies for regulatory compliance costs, but the proxies are crude. For example, Hogan and Burns (2017) use employees' salary expenses as a proxy of compliance costs, but it is impossible to separate compliance staff's salary from others.[4] Moreover, some banks do not report detailed non-interest expenses in Call reports, so some items, such as advisory

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[4]Although in Conference of State Bank Supervisors (2017), community banks were asked what portion of expenses are used for compliance, in a interview conducted by FDIC in 2012, community bankers reported that it is too costly to track compliance costs so they can not estimate the exact amount.

and consulting fees, are not available for every bank data. Therefore, direct measures of regulatory compliance costs are not reliable. By interacting time-series policy dummy with SBL and size dummy, my paper teases out the effects of regulatory compliance on financial performance of banks in different sizes.

The remaining parts of this paper are organized as follows. In section 2 and 3, I introduce background of Dodd-Frank Act, data, and identification strategy. Section 4 presents empirical results from year-by-year analysis and panel regressions, and section 5 provides robustness check. Section 6 concludes and places this study in the context of literature.

2 Background

2.1 The Dodd-Frank Act and Regulatory Burden

The Dodd–Frank Wall Street Reform and Consumer Protection Act of 2010 was passed to target the systemically important financial institutions whose excess leverage and growth were believed to be the major cause of the crisis in 2008. To prevent future crises, the Act requires certain large banks with assets more than $50 billion to submit to annual stress tests administered by the Federal Reserve. One of the unintended consequences of the stress tests might provide disincentives for large banks to lend to small businesses.

Although Dodd-Frank regulations target large banks, many researchers and bankers have claimed that Dodd-Frank Act imposes "daunting new compliance, operational, and record-keeping burdens on all banks...make it significantly harder for banks, particularly community banks, to serve their communities and help grow the economy" (American Bank Association, 2012). Specifically, several studies argued that the increased fixed regulatory compliance cost would discourage banks to make SBL.

In another survey conducted by the Mercatus Center of George Mason University on 200 community banks in 2013, 90% of participants reported increased compliance cost and 83%

reported more than 5% increase, and 10% of participants anticipated mortgage products and services to be cut and 5% have done so (Peirce, Robinson, and Stratmann, 2014). But the Government Accountability Office (2015) criticized this survey, because "the survey was based on a convenience sample of small banks and was conducted prior to the effective dates of some of the rules covered in the survey." Nevertheless, the Government Accountability Office (2015) reported that representatives from community banks, credit unions, and industry associations confirmed the overall increased compliance burden, including training staff, allocating time for regulatory compliance issues, and updating compliance systems.

However, other surveys and interviews for community bankers showed opposite opinions towards regulatory burdens. FDIC conducted interviews with 9 community bankers in 2012 to ask about regulatory compliance costs.[5] Most participants reported that no *one* regulation or practice had a significant effect on their overall business model and strategic direction, but the *cumulative* effects of all regulatory requirements built up over time caused them to increase staff over the past 10 years for regulatory compliance and the associated duties. They had not cut any products or services because of regulatory compliance, except for overdraft protection and certain high-risk mortgage products. They did not actively track the regulatory compliance costs, because it is too time-consuming, costly, and difficult to separate from normal operational costs. Despite this, a national survey asked community bankers to estimate the percentage of compliance costs due to specific regulations in 2017. The result showed that the Bank Secrecy Act[6] accounted for more than 20% of total compliance costs and call report requirements accounted for 7.7%, but Dodd-Frank regulations were not even mentioned by bankers. They explained that Dodd-Frank regulations "are not considered a serious problem because banks already have established regulatory compliance programs" (Conference of State Bank Supervisors, 2017).

Which provision in Dodd-Frank Act is *directly* related to SBL? I found only one[7] – Section

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[5] https://www.fdic.gov/regulations/resources/cbi/report/cbsi-b.pdf

[6] require banks to report cash transactions of more than 10k and suspicious activities to control money laundry or fraud

[7] This was also confirmed by some officials from federal agencies, state regulatory associations, and industry associations in (Government Accountability Office (2012))

1071 "Small Business Data Collection" amended the Equal Credit Opportunity Act which additionally requires financial institutions to ask borrowers if their business is minority or women owned or if it is a small business and to compile and maintain a record of the information. This record contains many details[8] In interviews conducted by the Government Accountability Office (2012), 12 of 16 officials from state associations, community banks, and credit unions expected section 1071 to negatively affect SBL. Particularly, they expected increasing compliance and other costs and being forced to develop standardized criteria for SBL to avoid being penalized by regulators.[9] Although some surveys and interviews showed that bankers have been concerned about section 1071, in fact it has never been implemented and has been reclassified "from pre-rule status to longer-term action status" in the fall 2018 rulemaking agenda[10] of Consumer Financial Protection Bureau.

Therefore, many provisions in Dodd-Frank Act might cumulatively affect banks' ability to lend to small businesses. For community banks, one possible channel is through the new regulations related to mortgage lending, because some small business owners often use their homes as a financial source, not only for 1–4 family real estate loans, but also as additional collateral for SBL. Community bankers usually accept this collateral, but "now that this collateral avenue will be HMDA (the Home Mortgage Disclosure Act) -reportable, we (bankers) are going to be less likely to utilize that source of equity, which ultimately reduces the availability of small business credit" (Conference of State Bank Supervisors, 2017). For SIBs, one possible channel is through the stress tests which would put SBL in higher risk assessment. To pass the test, SIBs do not have incentives to hold more SBL in their asset portfolios.

Quantifying regulatory burdens is a challenge not only for banks but also for regulators. To solve the problem that "while they (FDIC officials) have heard concerns about an increase in compliance burden, they have not been able to quantify compliance costs", the Govern-

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[8]Such as the census tracts of principal place of business, the type and purpose of the loan, the number and the received data of the application, the type of action and the date, race, sex, and ethnicity of principal owners, and etc.

[9]However, 11 of the 16 officials stated that it was too soon to tell the overall impact of Dodd-Frank Act on their SBL, and two said that Dodd-Frank Act would have no impact.

[10]https://www.consumerfinance.gov/about-us/blog/fall-2018-rulemaking-agenda/

ment Accountability Office (2015) used data from Call Reports to construct indicators of the cumulative compliance costs associated with the Dodd-Frank Act, including numbers of employees per $1 million assets, non-interest expenses as a percentage of assets, and earnings as a percentage of assets. They found that the cumulative compliance costs have not increased since the financial crisis. McCord and Prescott (2014) also confirmed that "the increase is relatively small and, more importantly, the size of these expenses is just too small to have a big effect on bank profitability." There are also studies showing opposite results.[11]

Nevertheless, these measures are crude and inaccurate, because it is difficult to distinguish the parts related to regulatory compliance and parts for operations.[12] The limitation of data constrains our ability to accurately measure regulatory compliance cost and its effects. Therefore, the changes of capital market incentives could be a better way to measure effects of regulatory burdens imposed by policy changes.

2.2 The Regulatory Relief Plan for Smaller Banks

Around 2015, a series of rules (see Table A.1) were made to provide regulatory relief for smaller banks. Hunter (2015) provided a summary of the relief plan. First, the plan calls for improving the efficiency of supervisory activities by (a) reducing examination intensity and frequency on low-risk community (assets under $10 billion) and regional banks (assets of $10-50 billion), (b) more off-site supervisory activities, (c) developing technological tools for off-site and on-site supervisory activities, and (d) training community bank examiners. Second, the plan calls for expanding the Small Bank Holding Company Policy Statement to

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[11]For an example, Cyree (2016) found lower pretax return on assets, lower loans per employee, lower technology and fixed-asset expenditures, and higher percentage change in employees and salaries-to-assets in panel regressions after the passage of Dodd–Frank Act. For another example, Hogan and Burns (2017) divided noninterest expenses into salary expenses and non-salary expenses. They found that although salary expenses grew faster after Dodd-Frank Act for both large and small banks, small banks have been bearing higher total noninterest expenses and salary related expenses and non-salary related expenses after the Act.

[12]The Conference of State Bank Supervisors (2017) conducted a national survey of more than 600 community banks and estimated compliance costs as a percentage of each expense category. On average, the salary and benefits of compliance staff account for 10–12% of total salary expenses; accounting and auditing for compliance purpose accounts for 38–42% of expenses of accounting and auditing; consulting and advisory expenses related to regulatory compliance accounts for 42–47% of total such expenses. Yet, these survey results have large variance, as the median values are dramatically smaller than the mean values.

cover 89% of all BHCs and 81% of all savings and loan holding companies to a) increase debt limit for transferring ownership, and b) be excluded from consolidated capital requirements. Third, BHCs and savings and loan holding companies (assets under $1 billion) are exempted from quarterly Y-9C reports and instead required to file simpler Y-9SP reports semiannually, and savings and loan holding companies with assets of less than $500 million are exempted from reporting regulatory capital data in Y-9SP reports.

Despite that the Conference of State Bank Supervisors (2017) stated that "signs of actual regulatory relief were not yet apparent in our survey results" and "inferred compliance costs for community banks increased from $4.5 billion in 2014 to $5.0 billion in 2015 and then to $5.4 billion in 2016." Therefore, it is crucial to measure the effects of the relief plan.

At the same time, heightened capital and risk requirements were imposed on larger BHCs with assets of $50 billion or more, which might intensify the divergence between SIBs and non-SIBs. For example, Basel III has implemented regulatory capital rules and minimum liquidity coverage ratio for large BHCs. To implement Dodd-Frank Act, guidelines for heightened standards for SIBs are effective from late 2014. Details are provided in Table A.2.

2.3   Systemically Important Banks

To compare the divergence of lending behaviors between SIBs and non-SIBs, I summarize the list of SIBs in Table B.3 in Appendix, based on the list of large BHCs participated in the Supervisory Capital Assessment Program (SCAP), Comprehensive Capital Analysis and Review (CCAR), and Dodd-Frank Act stress test (DFAST) in 2009–2019 in Federal Reserve reports[13] and the list of large holding companies collected by NIC National Information Center[14]. The SIB list includes 19 "old" SIBs[15] which participated in the 2009 SCAP and

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[13]The list of CCAR reports: https://www.federalreserve.gov/publications/comprehensive-capital-analysis-and-review-publications.htm; the list of DFAST reports: https://www.federalreserve.gov/publications/dodd-frank-act-stress-test-publications.htm

[14]https://www.ffiec.gov/npw/Institution/TopHoldings

[15]They are Ally Financial, American Express, Bank of America, Bank of NY Mellon, BB&T, Capital One, Citigroup, Fifth Third Bank, Goldman Sachs, JPMorgan Chase, Keycorp, MetLife (dropped out after

have remained in the list since then and 20 "new" SIBs[16], including 12 foreign banks[17] operating in the U.S., which joined after 2014.[18] The scattered plots of SBL made by SIBs are in Figure B.1.

At aggregate level, SIBs contributed to the recovery of SBL more than non-SIBs did, especially after 2015, as shown in Figure 3. Although more than half of the total SBL was made by smaller banks, SIBs have been increasing loans to small businesses since 2011. SIBs have contributed to half of the total SBL in the U.S., within which the additional $13 trillion of SBL were made by the 19 "old" SIBs which participated in the 2009 SCAP and $28 trillion of SBL were made by the "new" SIBs which joined in the list after 2014. In 2009–2015, about 10 million outstanding SBLs were originated by SIBs, twice of the number by small BHCs. In 2017, SIBs made about 5 million more SBL, in which 1 million were made by "new" SIBs and 4 million were contributed by "old" SIBs. This implies that "old" SIBs mainly originated SBL of smaller amount than "new" SIBs did.

After scaled by total assets, SBL by SIBs and non-SIBs both remained relatively stable at levels of 1% and 4-5% respectively, as shown in Figure 3. At bank level, the average ratio of SBL/assets for non-SIBs declined from more than 5% in 2009 to below 4% in 2017 and, similarly, "old" SIBs decreased their SBL shares from 1.5% in 2009 and 2010 to slightly above 1% in recent years. "New" SIBs have been maintaining the average ratio of SBL/assets at more than 1.5%, pushing up the average ratio for all SIBs to 1.45% in 2017. But at industry level, SIBs have been holding 1% of their portfolio as SBL since 2009 without much variations, while the SBL shares of smaller BHCs have varied between 4%

2012), Morgan Stanley, PNC Financial, Regions, State Street, SunTrust Banks, US Bancorp, and Wells Fargo.

[16]Eight domestic BHCs added to the list are CIT group, Comerica, Discover, Huntington, M&T Bank, Northern Trust, Citizens, and Zions.

[17]They are BNP Paribas (BancWest), BBVA, BMO, Barclays, Credit Suisse, Deutsche Bank, HSBC, RBC, Santander, TD group, UBS, and MUFG. Due to the changes of institution type and other reasons, these foreign SIBs often use different RSSD ID in Call reports and Y9C reports and some also changed ID. In addition, the ID matching list by NY Fed which I use to link market value with bank information does not include foreign banks. Therefore, I have to manually fix their ID changes and match their market values with their bank information. See my data manual for details.

[18]Note that there is a group of banks which have more than $50 billion in assets but have never submitted to the annual stress test: SVB Financial (1031449), E Trade (3412583), Charles Schwab (1026632), and Synchrony (4504654).

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and 5.5%. These constant ratios of SBL/assets, combined with the consolidation of smaller banks and the increase in assets of SIBs, contributed to the trends shown in Figure 3.

Figure 3: Aggregate and Average SBL: SIBs vs. non-SIBs in 2009-2017

To briefly examine whether the $50 billion asset threshold has changed the lending behavior of large banks, I select 20 regional banks and 20 large banks with assets around the threshold and plot the average ratio of SBL/assets, as shown in Figure 4. Although initially falling behind, 20 largest regional banks more focus on SBL than 20 smallest large banks do. The

Figure 4: SBL by Banks with Assets Around $50 Billion Threshold

difference is statistically significant in the Wilcoxon two sample test and maintains about 1—2% during 2007—2015, as indicated by the pink area.

3 Data and Identification

3.1 Data Description

This paper uses BHC-level data from Federal Reserve Y-9C reports, market value data from Wharton Research Data Service (WRDS) Compustat, SBL data from Consolidated Report of Condition and Income for FDIC-insured institutions (Call Reports), branch-level bank deposit data from Summary of Deposit, and state-level GDP data from Bureau of Economic Analysis.[19] The time period of interest is 2001-2017, covering before, during, and after the financial crisis. Although I have updated the data to 2018, this paper does not include year

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[19]Data manual in Appendix C

2018 due to the possible effects of the deregulation law in 2018. Except for SBL data, other data are collected at the end of each year during 2001-2017.

Federal Reserve Y-9C data are collected quarterly for all domestic holding companies with certain level of consolidated assets.[20] The BHC accounting items collected are liabilities, assets, revenues, different types of loans, capital, interests, cost of funding, and non-performing loans.

The market values for BHCs are collected from WRDS Compustat. The market value of assets is proxied by the sum of the market value of equity and the book value of liabilities, and the market value of equity is calculated as the product of stock prices and outstanding shares by the end of each fourth quarter.

Because regulators do not collect data on SBL, I extract the small commercial and industrial (C&I) loans as a proxy for SBL from the Schedule RC-C Part II in Call Reports. FDIC-supervised banks are required to report the number and amount of *outstanding* of C&I loans with original amounts of $100,000 or less, more than $100,000 through $250,000, and more than $250,000 through $1,000,000 respectively.[21] This paper uses the total amount of outstanding C&I loans under $1 million as the amount of SBL.[22] Due to the data limitation of SBL before 2010, Call Reports in second quarters are used for each year. So SBL data is 6-month leading other variables. A summary of average amount of SBL and the ratio of SBL/assets by banks of different sizes is shown in Table 1.

Summary of Deposits provides bank branch-level data on deposits for FDIC-insured banks. This data is used for three purposes. First, the Herfindahl-Hirschman index (HHI), as a measure of market concentration, is calculated by taking square of market share of each

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[20]Before 2006, banks with more than $150 million in consolidated assets were required to file Y9C. In 2006, the asset-size threshold was raised from $150 million to $500 million; in 2015, it was further raised to $1 billion; in 2018, it was increased to $3 billion. This leads to the decline of the number of observations. Details in Appendix.

[21]In Schedule RC-C Part II, banks are also asked whether all C&I loans have original amounts of $100,000 or less. If the answer is yes, then the total amount of C&I loans is counted as SBL.

[22]Although, according to FDIC Small Business Lending Survey (2018), this proxy of C&I loans under $1 million in the Call Report failed to capture larger C&I loans and loans secured by residential real estate that were also borrowed by small businesses, it is still the best available measure of sbl. Detailed discussion in Appendix.

Table 1: SBL by Banks of Different Sizes
(unit: million dollars)

Year	All Banks	Large	Regional	Large Community	Small Community
2001	32.81	4101.13	846.08	157.18	27.2
2002	34.46	4129.73	897.43	154.14	26.37
2003	34.57	3874.09	815.22	140.71	25.2
2004	36.14	3764.31	716.47	140.02	24.85
2005	37.59	4343.64	699.29	134.19	24.83
2006	38.61	4323.67	686.89	133.81	38.62
2007	43.27	5695.01	691.99	131.22	39.37
2008	51.81	5707.06	674.55	130.3	39.77
2009	50.36	5034.89	623.41	119.04	38.33
2010	49.42	5077.12	584.31	111.66	35.44
2011	42.49	4664.92	560.2	101.99	31.59
2012	42.83	5246.72	541.89	97.32	30.24
2013	45.21	5197.48	533.7	98.51	30.42
2014	48.24	5298.57	556.77	101.4	30.09
2015	52.46	5161.54	631.628	104.93	40.66
2016	57.61	5388.11	571.56	103.95	35.62
2017	62.4	5539.44	637.95	100.59	35.36

Source: Call Reports.
Note: The sample has 19003 observations, larger than that used in regressions.

BHC's deposits in the market and then summing up to the state-level. The county-level HHI can be calculated using zip codes of branches.[23] Second, I calculate each BHC's share of deposits in each operating counties as weights to get weighted HHI. Similarly, using the state-level GDP data from the Bureau of Economic Analysis, I calculate the weighted average GDP growth rate for each holding company to control the economic fundamentals. Third, SOD contains the relationship structure of banks with their BHCs, which can be extracted and used to sum all the bank-level data can be summed up to top-tier holding company level.

Depending on the size of consolidated assets, banks are categorized into regional and large banks[24] (with more than $10 billion assets), and community banks (including large community banks with assets of $1-10 billion and small community banks with less than $1 billion assets)[25]. The cross-sectional regression is conducted for each bank category during 2001–2017, which can demonstrate the divergence between large and smaller banks in capital market incentives.

Table 2 provides a summary of key variables. When combining the data, many observations are dropped, due to different reporting requirements from different data sources and the limited number of publicly-traded BHCs. This is a limitation of the dataset. My sample data is an unbalanced panel. The sample selection cannot be assumed exogenous, because only publicly-traded BHCs which filed Y9-C and Call reports are included. The fact that smaller banks (footnote) which were not required to file regulatory reports or not publicly traded are not in my sample probably underestimated the effects of regulatory burden.

This paper also collects the branch-level SBL data in CRA Disclosure Reports during 2001-2017 for robustness check. This SBL is different in definition and reporting requirements

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[23]According to FDIC Small Business Lending Survey (2018), banks usually view local banks of similar size as major competitors and local banks of other size as frequent competitors. Therefore, county-level HHI is a better proxy for market competition than state-level HHI.

[24]It would be ideal to create a category of large banks, but the number of banks with more than $50 billion assets is too small, which hampers the estimation process.

[25]Due to the dramatic decline of number of small community banks in recent years, it is better to combine small community banks with large community banks for estimation purpose.

Table 2: The Summary Statistics for Key Variables (N=6331)

Variable	Mean	Std. Dev.	Min.	Max.
Tobin's Q	1.057	0.069	0.616	1.534
SBL/Assets	0.05	0.039	0	0.422
Business-Loan/Assets	0.109	0.074	0	0.579
Total-Loan/Assets	0.682	0.133	0.012	0.966
Log(Assets)	14.76	1.675	11.94	21.67
Liquid-Assets/Assets	0.261	0.121	0.016	0.952
Noninterest-Income/Revenue	0.19	0.132	-1.129	0.977
Nonperforming-Loan/Assets	0.02	0.023	0	0.316
Deposits/Funding	0.905	0.095	0.107	1
GDP	0.041	0.014	-0.025	0.119
HHI	0.19	0.084	0.061	0.895

[1] The sample period spans 2001-2017.
[2] All variables are at BHC level.

from Call Reports.[26] The branch-level data is summed up to holding company level according to the link implied by the Summary of Deposit. The data would be used for a robustness check. The plotted SBL data for banks in different sizes are in Figure D.4, Figure D.5, Figure D.6, and Figure D.7 in the Appendix.

3.2 Univariate Analysis

Before running regressions, I check the univariate relation between SBL and financial performance of banks in different sizes. Table 3 provides the average Tobin's Q ratio for banks with different levels of SBL and bank assets. To construct this table, I rank BHC-year data based on the ratio of SBL/assets and the size of assets and then divide by the 25th, 50th, and 75th percentile. I calculate the average value of Tobin's Q ratio for each group of large, regional, and community banks respectively. For community banks, financial performance and lending to small businesses are positively correlated, while for large and regional banks, SBL and financial performance are roughly negatively correlated.

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[26]Note that SBL data from CRA are flow data while SBL from Call Reports are stock data. To some extent, the newly originated SBL amount in CRA can better demonstrate the recovery of small business credit availability.

Table 3: Bank Financial Performance
by Small Business Lending and Bank Size

Quantile of SBL	Average Financial Performance(Tobin's Q)		
	Large	Regional	Community
P0 – P25 (smallest)	1.095	1.100	1.044
P25 – P50	1.057	1.076	1.052
P50 – P75	1.050	1.072	1.059
P75 – P100 (largest)	1.079	1.076	1.060

[1] Banks in different sizes are ranked by their ratio of SBL/assets and grouped
by 25th, 50th, and 75th percentiles. I calculate the average value of Tobin's
Q ratio for each group.

To better illustrate the relationship between financial performance and SBL of large and community banks, I plot the average financial performance of banks dedicated most and least to SBL, as shown in Figure 5. First, I ranked large banks by their ratio of SBL/assets, and then plot the average value of Tobin's Q ratio for the top 10 and bottom 10. The bottom 10 large banks making least SBL as a percentage of total assets[27] have been outperforming the top 10 banks in financial performance since 2007. Before the recent financial crisis, the top 10 large banks maintained about 3%–6% of assets as SBL and enjoyed higher Tobin's Q ratio than those of the bottom 10, but they were also hurt more in the crisis partly because of the risky nature of SBL. I conduct the Wilcoxon two sample tests to examine the difference between the two groups, despite that the results are not statistical significant due to the small sample size, the trend of bottom SBL-making large banks performing better financially is robust to slight changes of the sample size.

Second, based on the ratio of SBL/assets, I rank community banks and plot the average Tobin's Q ratio for the top and bottom 10%. The financial performance of the top community banks, similar to that of top large banks, is more volatile than that of the bottom community banks, which is partly because the financial crisis is associated with higher default rate of SBL. However, top community banks have been outperforming bottom 10% in financial performance during pre-crisis era and later recovery period, with eight years with statistically significant difference as shown in pink shades. Both top and bottom community banks have

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[27]it often includes at least two Big4 banks: Citi Group and JPMorgan Chase.

mostly recovered their Tobin's Q ratio, but large banks have not.

Figure 5: Financial Performance Comparison
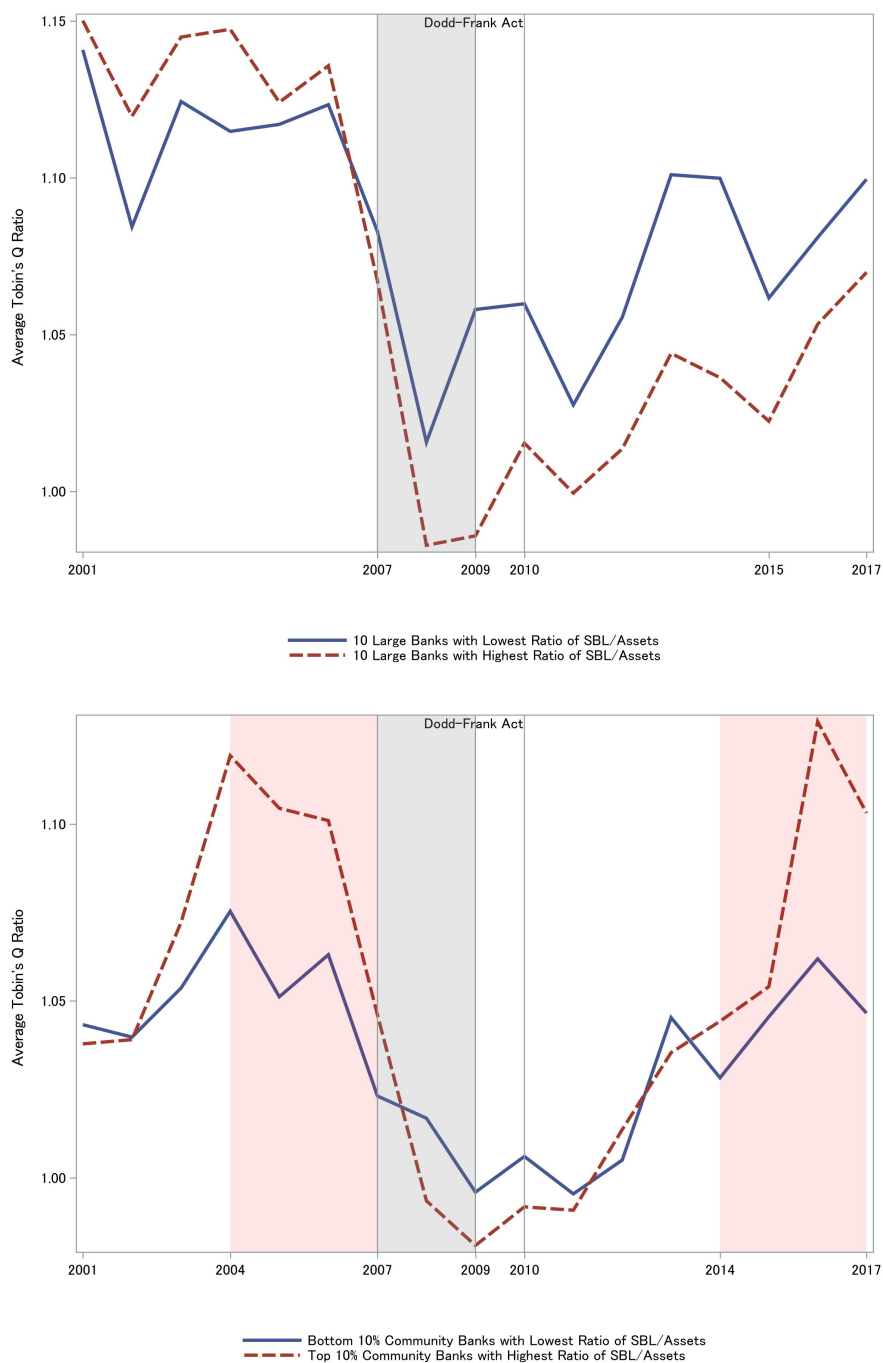
Note: I ranked 40 large banks which once labeled as SIB by their ratio of SBL/assets, and then plot the average value of Tobin's Q ratio for the top 10 and bottom 10 in the upper panel. Similarly, I rank community banks and plot the average Tobin's Q ratio for the top and bottom 10% in the lower panel. I conduct the Wilcoxon two sample test and the area is filled pink if the test result is statistically significant at 90% confidence level.

3.3   Methodology

The relationship of interest is how much financial incentives the capital market provided for banks to make SBL:

$$FinancialPerformance_{i,t} = \alpha + \tau_t + \beta \frac{SBL_{i,t-0.5}}{Assets_{i,t}} + \gamma' X_{i,t} + \epsilon_{i,t} \qquad (1)$$

where $FinancialPerformance_i$ is proxied by the Tobin's Q ratio of BHC i in year t, $SBL_{i,t-0.5}$ is the outstanding amount of small business loan in 6 months before year t, $Assets_{i,t}$ is the amount of total assets, τ_t are year fixed effects, and $X_{i,t}$ is a vector of bank characteristics[28] and deposit-weighted fundamentals which include logarithm of book value of assets, share of liquid assets to total assets, share of non-interest income to total revenue, nonperforming loans-to-assets, ratio of deposits to total funding, ratio of equity to assets, and deposit-weighted HHI and GDP growth rate, as well as large business loan and non-business loan ratios, based on Hughes et al. (2019).

The underlying assumption for an unbiased OLS estimate for β is that $\frac{SBL_{i,t-0.5}}{Assets_{i,t}}$ is orthogonal to $\epsilon_{i,t}$. Generally, this assumption is likely to hold because the ratio of SBL to total assets half a year ahead is unrelated to other factors which might affect the financial performance of one BHC, conditioned on covariates. The concern of reverse causality is not valid, not only because the lending strategy cannot be caused by bank's financial performance 6 months later, but also because the change of lending strategy[29] should be based on the observation of incentives provided by the capital market.

I apply the year fix effects to eliminate the inter-temporal variation and focus on comparing

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[28]For the concern of near-multicollinearity, it would not lead to estimation bias but would make all parameter estimates insignificant while joint significance of all regressors is upheld, which does not happen in my results.

[29]One possible channel could be that the enhanced financial performance due to stock market boom would lure banks to expand sizes. In order to conduct M&A activities, according to Community Reinvestment Act, banks need to meet certain levels of requirements for SBL. While this possible channel implies positive relationship between SBL and financial performance, my results show negative relationship for large banks, which further eliminates the possibility of this channel.

banks within the same period of time. I choose to not include unit fix effects due to two reasons. First, there is not enough within-unit variation in SBL to allow for the unit fixed-effects estimation.[30] Second, when both unit and year fixed effects are used, the variation reduction would be even more severe and the coefficient would be a complicated weighted average of unit and year fixed effects.

To capture the impact of regulatory changes on SBL, I specify the pooled OLS regression and further add policy and size dummy variables interacting with SBL to estimate the capital market incentives for the periods under specific policy and for certain groups of banks. The panel estimation takes the form:

$$
\begin{aligned}
FinancialPerformance_{i,t} = {} & \alpha_0 + \alpha_t + \beta_1 \frac{SBL_{i,t-0.5}}{Assets_{i,t}} + \beta_2 \frac{SBL_{i,t-0.5}}{Assets_{i,t}} * PolicyDummy \\
& + \beta_3 \frac{SBL_{i,t-0.5}}{Assets_{i,t}} * SizeDummy + \beta_4 \frac{SBL_{i,t-0.5}}{Assets_{i,t}} \\
& * PolicyDummy * SizeDummy + \gamma^{'} X_{i,t} + \epsilon_{i,t}
\end{aligned}
\tag{2}
$$

where $PolicyDummy$ is a dummy variable, equals 1 in years under certain regulatory policies and 0 otherwise, and $SizeDummy$ is a dummy variable, equals 1 for large banks or with other conditions, and 0 otherwise. Other variables are the same as those in regression (1). The cluster-robust standard deviations are calculated as clustering by each BHC.

To measure the marginal effect of a 1 p.p. increase in SBL/assets, I sum up coefficients. β_1 shows the effect for smaller banks before the regulation; $\beta_1 + \beta_2$ represents the effect for smaller banks under the regulation; $\beta_1 + \beta_3$ shows the effect for large banks before the regulation; $\beta_1 + \beta_2 + \beta_3 + \beta_4$ represents the effect for large banks under the regulation.

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[30]Within-unit variation is usually smaller than the overall variation in the independent variable.

4 Results

4.1 Year-by-year Estimation

The year-by-year regression to measure the impact of increasing or substituting SBL on banks' financial performance is

$$FinancialPerformance_i = \alpha + \beta_1 \frac{SBL_i}{Assets_i} + \beta_2 \frac{LBL_i}{Assets_i} + \beta_3 \frac{NBL_i}{Assets_i} + \gamma^{'} X_i + \epsilon_i \quad (3)$$

where $FinancialPerformance_i$ is proxied by the Tobin's Q ratio of BHC i in one year between 2001 and 2017, SBL_i is the outstanding amount of small business loans of BHC i, LBL_i represents large business loans which is calculated as total business loans (or commercial & industrial loans) subtracting SBL, and NBL_i represents total non-business loans which is calculated as total loans subtracting total business loans. I control for a set of bank characteristics in X_i, including logarithm of book value of assets, share of liquid assets to total assets, share of non-interest income to total revenue, nonperforming loans-to-assets, ratio of deposits to total funding, and ratio of equity to assets. I also control for GDP and HHI. GDP is the 5-year average growth rate of GDP in states where branches of one BHC operate weighted by its deposits in each state, HHI is county-level and weighted by one BHC's deposits in each county it operates.

The coefficients of interest are β_1 on the ratio of SBL-to-assets for each BHC, β_2 on the ratio of large business loans-to-assets, and β_3 on the ratio of total non-business loans-to-total assets. Specifically, β_1 measures the effect of an 1 p.p. increase in SBL ratio on financial performance. By subtracting β_2 from β_1, I measure the impact of replacing large business loans with SBL on financial performance. By subtracting β_3 from β_1, I measure the impact of replacing non-business loans[31] with SBL.

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[31]Other types of loans include real estate loans, loans to other banks, loans to other financial institutions,

The baseline cross-sectional model was estimated for each year from 2001-2017 for banks with different sizes. Table E.10, E.8, and E.9 in Appendix summarize the results of interest. Although some coefficients are not statistically significantly different from zero, there exist obvious divergences between large banks and smaller banks in capital market incentives, as shown in Figures 6, 7, and 8.

4.1.1 Decreasing SBL?

To measure the impact of a 1 p.p. increase in SBL/assets on banks' financial performance in each year, I plot the estimated coefficients of SBL ratio of community banks and regional & large banks,[32] as shown in Figure 6. Significantly positive coefficient represents that banks have incentives from the capital market to lend more to small businesses, because banks can improve their financial performance by increasing ratio of SBL/assets. Similarly, significantly negative coefficient represents that banks have incentives to reduce SBL.

For community banks, the financial incentives have been mostly positive before the crisis and after 2015, implying that shareholders viewed SBL as a profitable opportunity for community banks during those periods. In 2008 and 2009, the capital market considered SBL as risky and nonprofitable assets for community banks, since small businesses are usually hit most and easier to bankrupt compared to large firms during recessions.

For regional & large banks, the coefficients were fluctuating and insignificant before 2010. After 2010 when Dodd-Frank Act was passed, the coefficients have turned to negative and were significant in 2010, 2011, and 2012. The coefficients were increasing during 2010-2015 but started to decline after 2015.

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agricultural loans, consumer loans, and loans to foreign governments.

[32]Since community banks are the majority of my sample, the results for all banks are driven by community banks' characteristics. I do not report the results for entire sample, as them are very similar to those of community banks.

Figure 6: Financial Incentive (Tobin's Q Ratio) on Increasing SBL/Assets
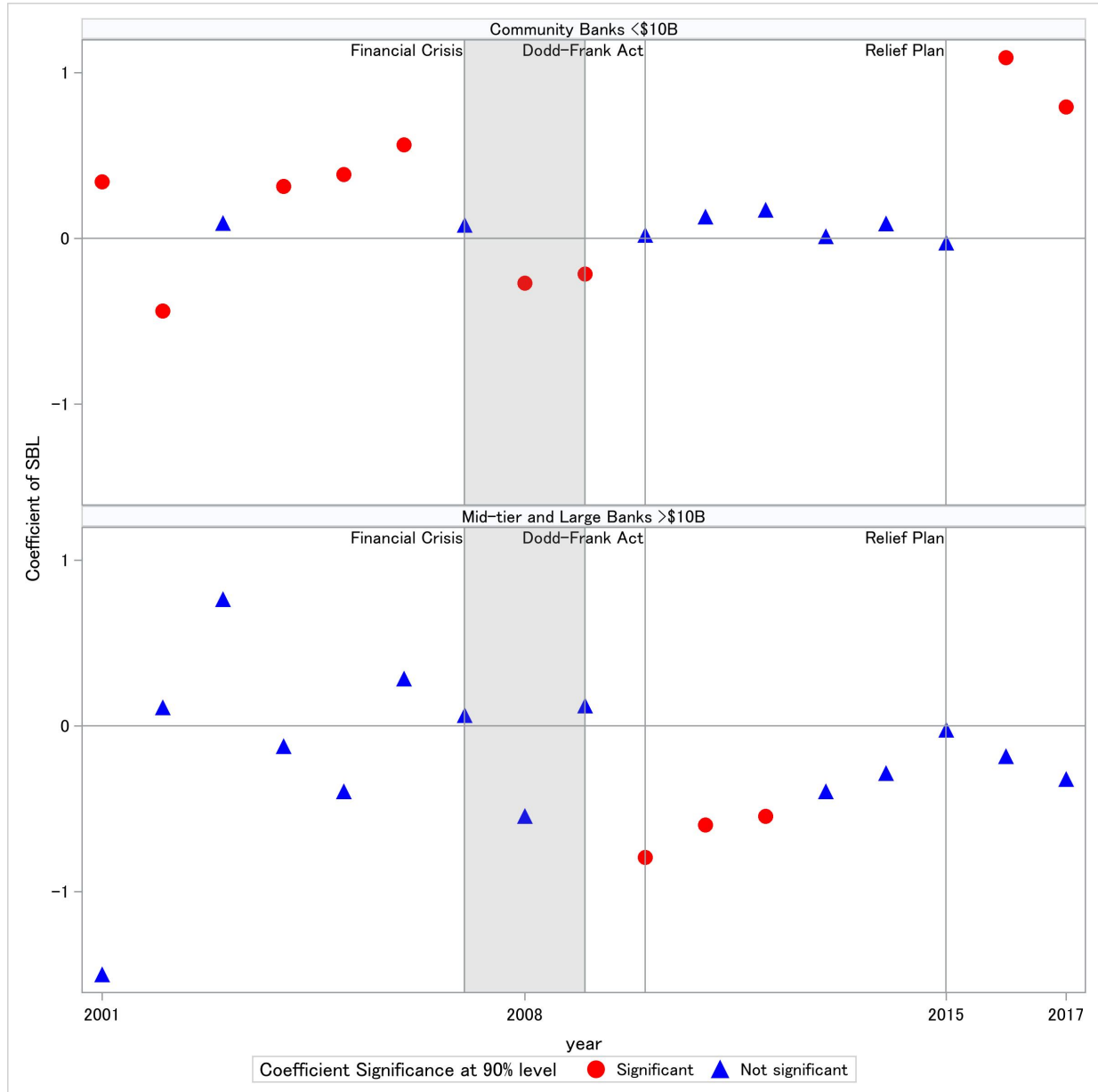
Note: The figure shows the coefficients of SBL ratio in repeated cross-sectional regressions (see Table E.10) for community banks and larger banks, which represent capital market incentives for banks to increase SBL/Assets. Significant positive coefficient represents that banks have incentives from the capital market to lend more to small businesses, and significant negative coefficient represents incentives for banks to make less SBL. Blue triangles refer to no incentives from the capital market for SBL. Community banks are banks with consolidated assets of less than $10 Billion; regional banks refer to banks with consolidated assets of $10-50 Billion; large banks refer to banks with consolidated assets of more than $50 Billion.

4.1.2 Replacing SBL with Large Business Loans?

To measure the impact of replacing large business loans with SBL on banks' financial performance for community banks and regional & large banks in each year, I plot the estimated coefficients of SBL ratio minusing those of large business loans-to-assets ratio, as shown in Figure 7. Significantly positive coefficient represents that banks have incentives from the capital market to replace large business loans with SBL, because banks can enhance their market value by increasing SBL and at the same time decreasing large business loans. Similarly, significantly negative coefficient represents that banks have incentives to replace SBL with large business loans.

Consistently, community banks have financial incentives to replace large business loans with SBL. This implies that the capital market consider cutting the size of business loans would be more profitable for community banks, even in 2008. This could be explained by the comparative advantage of community banks for SBL.

For regional & large banks, the coefficients have been statistically insignificant before 2008 financial crisis and turned negative afterwards, except for year 2008 and 2010. If replacing 1% of SBL ratio with 1% of large business loans-to-assets, Tobin's Q ratio of regional & large banks would increase by more than 0.5 p.p. in 2008 and 2010–2012. This is probably due to the fact that large firms are less likely to default the loans compared to small businesses during recessions, which is easier to understand than the case of community banks.

4.1.3 Replacing SBL with Non-business Loans?

To measure the impact of replacing non-business loans with SBL on banks' financial performance for community banks and regional & large banks in each year, I plot the estimated coefficients of SBL/assets ratio subtracting those of non-business loans/assets ratio, as shown in Figure 8. Significantly positive coefficient represents that banks have incentives from the capital market to replace non-business loans (such as residential or commercial real estate

Figure 7: Financial Incentive (Tobin's Q Ratio) on Replacing Large Business Loans with SBL
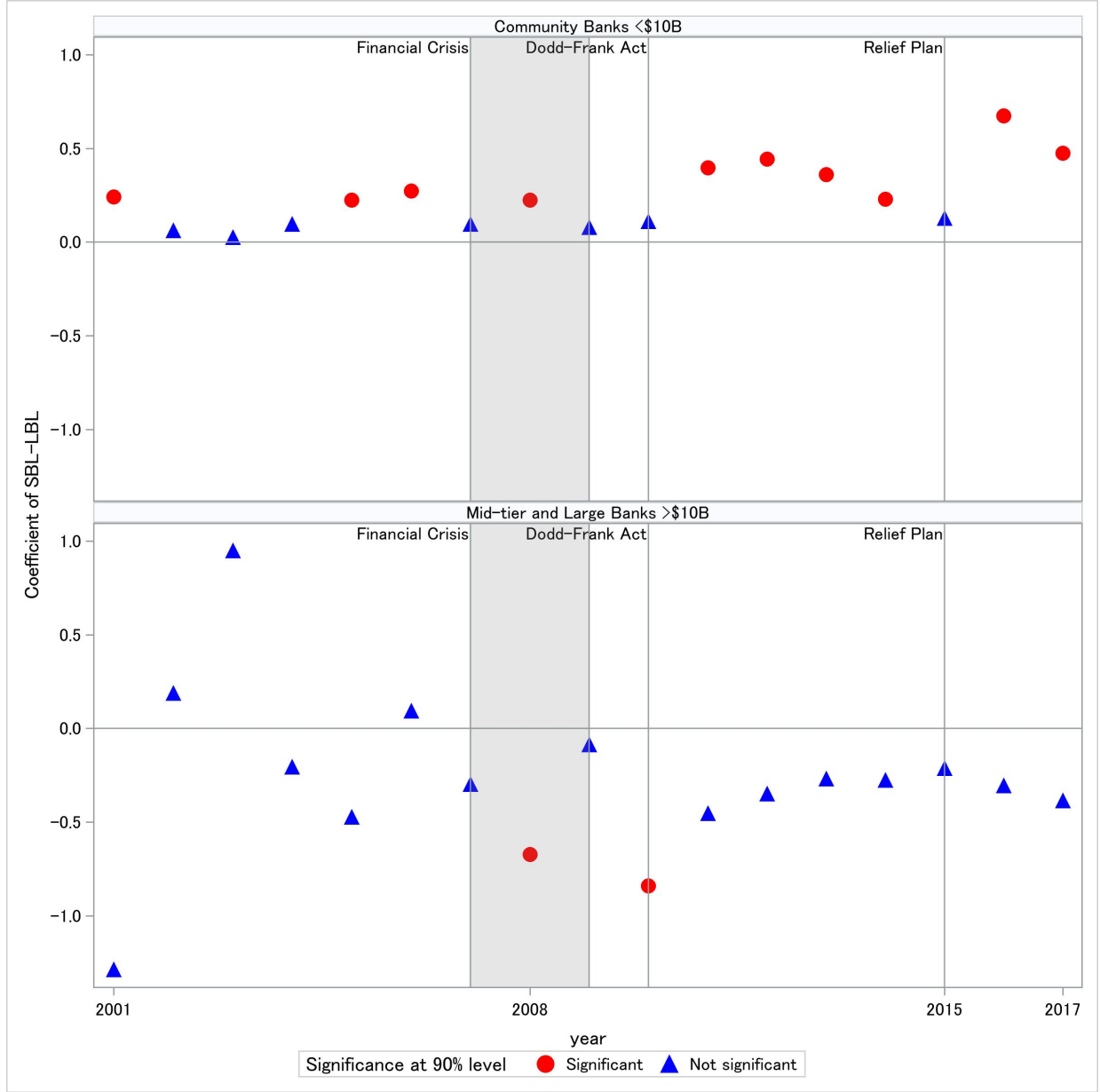
The points show the difference between coefficients of SBL/assets ratio and coefficients of large business loans-to-assets ratio in the cross-sectional regressions (see Table E.8), which represent financial incentives for banks to replace large business loans with SBL. Significantly positive coefficient represents that banks have incentives from the capital market to replace large business loans with SBL. Similarly, significantly negative coefficient represents that banks have incentives to replace SBL with large business loans. Blue triangles refer to no incentives from the capital market for replacement. The significance level is determined by the joint F-test. Community banks are banks with consolidated assets of less than $10 Billion; regional banks refer to banks with consolidated assets of $10-50 Billion; large banks refer to banks with consolidated assets of more than $50 Billion.

loans and consumer loans) with SBL, because banks can enhance their market value by increasing SBL and at the same time decreasing non-business loans. Similarly, significantly negative coefficient represents that banks have incentives to replace SBL with non-business loans.

Similar to the case in Figure 7, community banks have financial incentives to replace non-business loans with SBL before 2008 financial crisis and after 2015, implying that the capital market consider SBL would be more profitable than other types of loans for community banks. For regional & large banks, the coefficients have been mostly negative and statistically insignificant, except for year 2008 and 2010–2012. The trends in Figure 8 is similar to those shown in Figure 7, which is probably because SBL is riskier than not only large business loans but also other types of loans.

In summary, the capital market evaluates lending strategies differently based on the asset size of banks. Overall, the capital market considers SBL as a profitable asset for community banks but an unimportant or nonprofitable asset for regional & large banks. Before the recent recession, community banks had incentives to increase SBL/assets and replace large business loans or other types of loans with SBL, but for regional & large banks, their lending strategy related to SBL did not affect their financial performance, which might be due to the relatively lower share of SBL to assets in regional and large banks, as shown in Figure D.5 and Figure D.7 in the Appendix. During and after the recent crisis, shareholders started to evaluate SBL in regional & large banks as risky and nonprofitable and thus regional & large banks have incentives to decrease SBL or replace it with other loans to improve financial performance. The disincentives during the crisis could be explained by the risky nature of SBL, yet the disincentives in the post-crisis era should be related to Dodd-Frank Act. For community banks, the lack of incentives during 2010–2015 could also be related to the regulatory burden imposed by Dodd-Frank Act and the revival after 2015 should be due to the relief plan for smaller banks. These results motivate the panel estimation for policy effects in the next section.

Figure 8: Financial Incentive (Tobin's Q Ratio)
on Replacing Non-business Loans with SBL
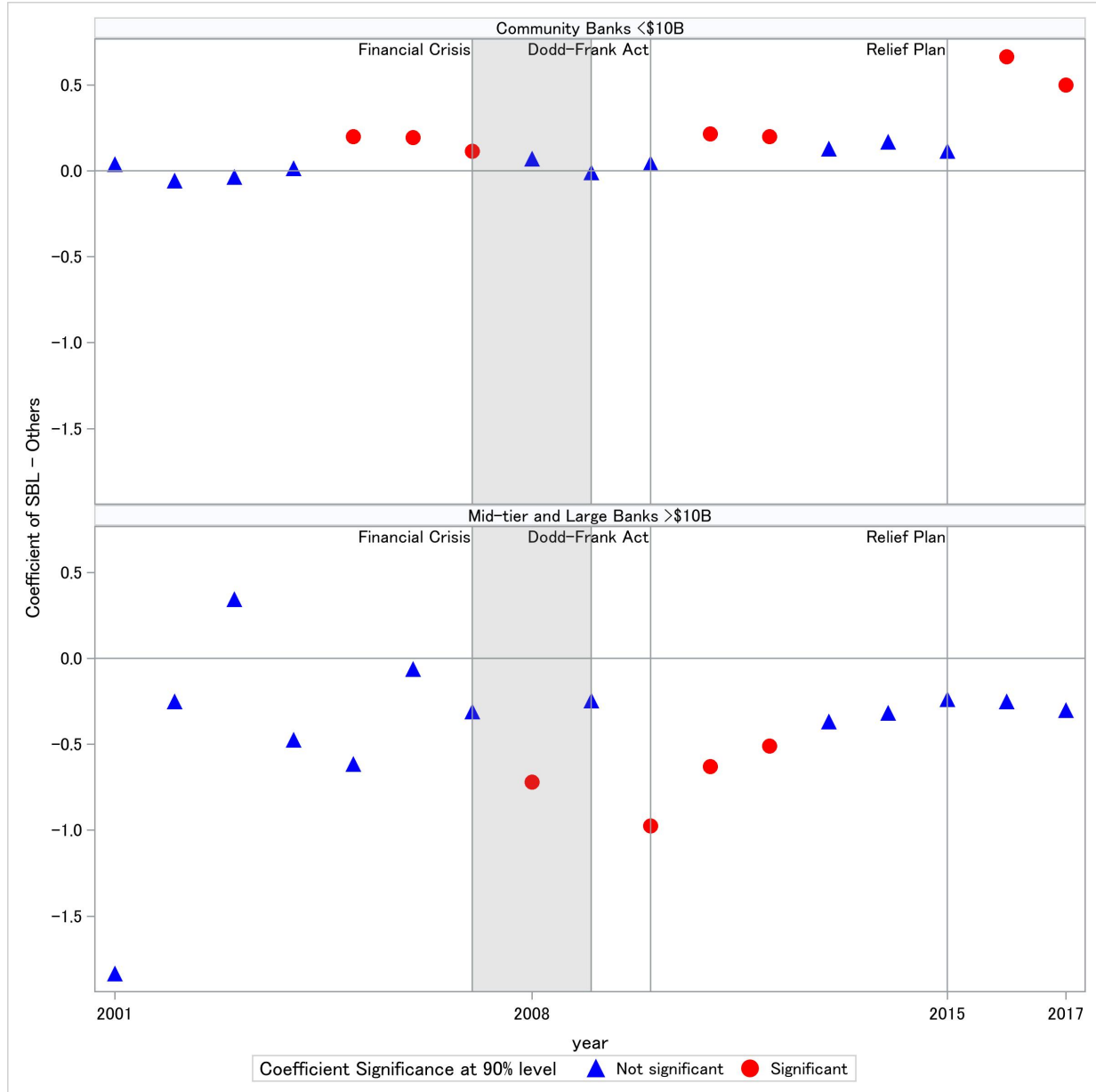
Note: The points show the result of coefficients of SBL ratio minus non-business loan ratio in the cross-sectional regressions (see Table E.9), which represent financial incentives for banks to to replace non-business loans with SBL. Significantly positive coefficient represents that banks have incentives from the capital market to replace non-business loans with SBL. Similarly, significantly negative coefficient represents that banks have incentives to replace SBL with non-business loans. Blue triangles refer to no incentives from the capital market for replacement. The significance is determined by the joint F-test. Community banks are banks with consolidated assets of less than $10 Billion; regional banks refer to banks with consolidated assets of $10-50 Billion; large banks refer to banks with consolidated assets of more than $50 Billion.

4.2 Panel Estimation – Effects of Regulation Changes

In year-by-year regressions, I have to measure the capital market incentives for regional and large banks together due to the small number[33] of large banks. This section focuses more on large banks, especially the ones under stress tests – SIBs. Panel regressions can capture regulatory policy effects.

4.2.1 The Effects of Dodd-Frank Act

To evaluate how Dodd-Frank regulations alter capital market incentives to lend to small businesses, I create a time-series dummy variable *DFA*, which equals 1 from 2010 when the Act was signed. To demonstrate the divergence between large and smaller banks, I include another dummy variable *LARGE*, which equals 1 for BHCs with consolidated assets of more than \$50 billion,[34] and 0 for community and regional banks.[35] I also create a dummy variable SIB which equals to 1 when one BHC is labeled as a SIB and under stress test *currently at year t*.[36] This is to capture the effects that Dodd-Frank Act imposes heightened restrictions on large banks. Table 4 summarizes results from pooled OLS estimation using data spanning 2001-2017. To better compare the different effects of Dodd-Frank Act on capital market incentives for large banks and smaller banks, I summarize the marginal effect of a 1 p.p. increase in SBL at the lower panel.

Model (1) and (2) show that capital market has been encouraging community and regional banks but penalizing large banks for lending to small businesses. A 1 p.p. increase in SBL/Assets ratio is associated with a 1.172 p.p. drop of Tobin's Q ratio for large banks, compared with a 0.174 p.p. increase for smaller banks. What's worse, when a large bank is *actually* labeled as a SIB and submit to stress test and heightened regulations, the penalty

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[33]The sample sizes for each regression are summarized in Table E.8, Table E.9, and Table E.10.

[34]Excluding those with assets more than \$50 billion but have never been labeled as SIBs

[35]Note that even if one BHC was not listed as a SIB in a specific year, as long as it has been labeled as SIB before, then it is assigned 1 for LARGE variable.

[36]Because the list of SIBs is available only after 2009, I use the dummy for SIBs for the convenience of comparison with pre-crisis period.

Table 4: Large vs. Small Banks Before and After Dodd-Frank Act

Note: This table reports results of pooled OLS regression of Tobin's Q on ratio of SBL/assets and its interaction with dummy variables. Coefficients are estimated using annual BHC level data spanning 2001-2017. SBL is defined as business loans with original amount of $1 million or less. DFA is a dummy variable and equals 1 from 2010 onward and 0 before 2010. LARGE is a dummy variable and equals 1 for large banks which were once labeled as systematically important bank and 0 otherwise. SIB is a dummy variable and equals 1 when a large bank is labeled SIB and under stress test. Bank controls include nonperforming loans, consumer loans, residential real estate loans, commercial real estate loans, ratio of liquid assets to total assets, ratio of non-interest income to revenue, and ratio of deposits to all funding. All loan variables are scaled by assets. Fundamental controls are weighted state-level 5-year GDP growth rate and weighted county-level Herfindahl-Hirschman index. All standard errors are clustered at individual BHC level. The joint effect is tested by using heteroscedasticity consistent covariance.

	Tobin's Q				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
SBL/Assets	0.171*	0.174*	0.174*	0.143	0.159
(a)	(0.097)	(0.098)	(0.098)	(0.099)	(0.1)
(SBL/Assets)*SIB			-3.098***		
(b)			(0.522)		
(SBL/Assets)*LARGE		-1.172***			-0.57
(c)		(0.375)			(0.375)
(SBL/Assets)*DFA				0.134*	0.106
(d)				(0.077)	(0.075)
(SBL/Assets)*DFA*LARGE					-2.325***
(e)					(0.522)
Bank Controls?	YES	YES	YES	YES	YES
Year FE?	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES
Obs.	6331	6331	6331	6331	6331
Adj.R^2	0.463	0.470	0.470	0.464	0.477
Marginal Effect of 1 p.p. Increase in SBL/Assets:					
SIBs			-2.919***		
(a+b)			(130.69)		
Large Banks		-0.998***			
(a+c)		(25.78)			
During DFA				0.277***	
(a+d)				(20.87)	
Large Banks before DFA					-0.411*
(a+c)					(3.83)
Non-SIB during DFA					0.265***
(a+d)					(19.35)
SIB during DFA					-2.63***
(a+c+d+e)					(118.4)

[1] Clustered standard errors in parenthesis under estimated coefficients; Chi-Square values for joint effect using heteroscedasticity consistent covariance in parenthesis under marginal effect.

[2] *** stands for p<0.01; ** stands for p<0.05; * stands for p<0.1.

[3] Data are collected from Call Reports, Y-9C Reports, WRDS Compustat, Summary of Deposit, and Bureau of Economic Analysis.

grows almost 3 times larger (from -0.998 to -2.919), as shown in model (2) and (3).

Model (4) and (5) further confirm the hypothesis that Dodd-Frank regulations changed capital market incentives for large banks to lend to small businesses. During the period under Dodd-Frank Act, banks overall enjoyed positive and enhanced capital market incentives: a 0.277 p.p. increase in financial performance for a 1 p.p. increase in SBL ratio in model (4), which is mainly driven by smaller banks. Large banks under Dodd-Frank regulations would expect a 2.63 decline in Tobin's Q ratio for a 1 p.p. increase in SBL ratio, drop from a decrease of 0.411 before the Act.

The worsen financial incentives for large banks can be explained by the heightened supervision standards imposed by Dodd-Frank Act. Since SBL is under higher risk assessment in stress tests, investors or shareholders would expect SIBs holding increasing amount of SBL are more likely to fail the test and thus suffer from the limits on dividend policy. But the improved financial incentives for smaller banks under the Dodd-Frank Act, as shown in model (5) in Table 4, are counter-intuitive, because many community banks complaint about the compliance costs contributed by Dodd-Frank regulations. Whether the relief plan for smaller banks in 2015 improved the capital market incentives and then drove up the incentives for post-Act period? The revival of financial incentives on SBL lending strategy for community banks after 2015 in the previous section also suggests a change in incentives.

4.2.2 The Impact of the Relief Plan of 2015

To further examine the effects of policy change for Dodd-Frank Act, this section focuses on SBL made by the large banks and their financial performance during 2010–2017. I create a time-series dummy variable *DFA2*, which equals 1 starting from 2015 and 0 before 2015, because in late 2014, the Federal Reserve announced to relieve the regulatory burden of Dodd-Frank Act for smaller banks from 2015. The dummy variable *DFA2* divided the sample period into two parts: before and after the relief policies. If this plan did relieve the regulatory burdens for smaller banks, then we would see an increase of financial incentives

on SBL for smaller banks.

Table 5 lists pooled OLS estimation effects of bank financial performance on SBL share and its interaction with dummy variables *LARGE* and *DFA2*. To better compare the divergence between large and smaller banks before and after the policy change, I summarize the marginal effect of 1 p.p. increase in SBL/assets at the lower panel. Model (1)–(5) use all banks in my sample and model (6)–(8) focus on community and large banks only. Results are statistically significant with decent goodness-of-fit, confirming the hypothesis that the regulation relief plan for regional and community banks provided positive incentives for them to lend more to small businesses.

The overall financial incentives since Dodd-Frank Act remain significantly positive and become two times larger after the relief plan in 2015: for a 1 p.p. increase in SBL/assets, Tobin's Q ratio would increase 0.611 p.p. after 2015, up from 0.319 p.p. for entire 2010–2017 period, shown in model (1) and (4). This enhanced incentives are mainly driven by smaller banks, especially community banks as indicated in model (8) which compares community and large banks. For community banks, a 1 p.p. increase in SBL/assets is associated with an increase in Tobin's Q of 0.349 p.p. before 2015 and of 0.809 p.p. after 2015. This implies that the relief plan which targets community banks and some regional banks successfully convinced investors and shareholders that reduced regulatory burden would make SBL more profitable for smaller banks.

For SIBs in post-crisis era, the capital market keeps penalizing them for lending to small businesses both before and after the Relief Plan, but since 2015, SIBs have been imposed about 50% more penalty from the capital market for SBL. Model (5) and (8) show that, for a 1 p.p. increase in SBL/assets, SIBs' Tobin's Q ratio would decrease about 3 p.p. after 2015, down from a decline of about 2 p.p. during 2010–2014. This can be explained by the capital market's reassessment of large banks' competitiveness in lending to small businesses, since community banks would gain exclusive benefits from the regulatory relief plan and become more competitive in lending market. For the entire post-Act period, large banks were severely penalized and SIBs suffered only slightly more, since most large banks were

Table 5: Pooled OLS Results

This table reports results of pooled OLS regression of Tobin's Q on ratio of SBL/assets and its interaction with dummy variables. Coefficients are estimated using annual BHC level data spanning 2010–2017. SBL is defined as business loans with original amount of $1 million or less. DFA2 is a dummy variable for the Relief Plan period and equals 1 from 2015 onward and 0 before 2015. LARGE is a dummy variable and equals 1 for large banks which were once labeled as systematically important bank and 0 otherwise. SIB is a dummy variable and equals 1 when a large bank is labeled SIB and under stress test. Bank controls include nonperforming loans, consumer loans, residential real estate loans, commercial real estate loans, ratio of liquid assets to total assets, ratio of non-interest income to revenue, and ratio of deposits to all funding. All loan variables are scaled by assets. Fundamental controls are weighted state-level 5-year GDP growth rate and weighted county-level Herfindahl-Hirschman index. All standard errors are clustered at individual BHC level. Joint effects are estimated by using heteroscedasticity consistent covariance.

	Tobin's Q Ratio in 2010–17							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SBL/Assets	0.319**	0.324**	0.325**	0.224	0.178	0.447***	0.318**	0.349**
(a)	(0.147)	(0.15)	(0.15)	(0.148)	(0.149)	(0.164)	(0.161)	(0.161)
(SBL/Assets)*SIB		-3.076***						
(b)		(0.592)						
(SBL/Assets)*LARGE			-2.711***		-2.095***	-3.352***		-2.917***
(c)			(0.538)		(0.451)	(0.667)		(0.643)
(SBL/Assets)*DFA2				0.387***	0.399***		0.48***	0.46***
(d)				(0.123)	(0.127)		(0.152)	(0.146)
(SBL/Assets)*LARGE*DFA2					-1.336***			-1.308***
(e)					(0.319)			(0.296)
Bank Controls?	YES	YES	YES	YES	YES	YES	YES	YES
Year FE?	YES	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES	YES
RegionalB Removed?						YES	YES	YES
Obs.	2810	2810	2810	2810	2810	2137	2137	2137
Adj.R^2	0.425	0.454	0.456	0.43	0.464	0.457	0.423	0.468
Marginal Effect of 1 p.p. Increase in SBL/Assets:								
SIBs	-2.516***							
(a+b)	(104.17)							
Large Banks			-2.387***			-2.905***		
(a+c)			(95.49)			(94.49)		
During Relief Plan				0.611***			0.798***	
(a+d)				(23.07)			(20.6)	
SIB before Relief Plan					-1.917***			-2.568***
(a+c)					(64.83)			(62.26)
Non-SIB during Relief Plan					0.577***			0.809***
(a+d)					(21.02)			(24.43)
SIB during Relief Plan					-2.854***			-3.416***
(a+c+d+e)					(65.78)			(68.88)

[1] Clustered standard errors in parenthesis under estimated coefficients; Chi-Square values in parenthesis under marginal effect.

[2] *** stands for p<0.01; ** stands for p<0.05; * stands for p<0.1.

[3] Data are collected from Call Reports, Y-9C Reports, WRDS Compustat, Summary of Deposit, and Bureau of Economic Analysis.

labeled as SIBs and under stress tests.

After removing regional banks from the sample, model (7) and (8) magnify the effects for community and large banks. The coefficient for SBL/assets is not significant in model (4) and (5) but become larger and significant in (7) and (8), implying that capital market was not sensitive to regional banks' lending to small businesses during post-crisis era. This is reasonable because regional banks are neither under stress tests like SIBs nor provided much regulatory relief like community banks.

Therefore, the capital market has completely different evaluation of SBL for large banks and smaller banks, and the incentives changed dramatically responding to the regulatory policy change. On the one hand, large banks, were penalized by the capital market for SBL throughout the sample period 2001–2017. Large banks' financial performance would decrease by more than 2 p.p. for increasing 1 p.p. of SBL/assets after Dodd-Frank Act, and the disincentive worsened after 2015 when Federal Reserve announced a regulatory relief plan for smaller banks. On the other hand, community banks were encouraged for SBL throughout the sample period, with an average of 0.174 p.p. increase of Tobin's Q ratio caused by 1 p.p. increase of SBL/Assets. The Dood-Frank Act did not affect the financial incentives for SBL for smaller banks, but the relief plan convinced the capital market that SBL is a profitable asset for smaller banks, as their Tobin's Q ratio would increase 0.6–0.8 p.p. for a 1 p.p. increase in SBL/assets.

4.2.3 Interpretation

For the convenience of comparing effects of policy changes, I summarize the marginal effects for large and smaller banks during different periods from panel estimation results in Table 4, 5, and F.12[37]. Banks are grouped by their consolidated asset size: community banks refer to banks with assets under $10 billion and large banks refer to banks with assets above $50 billion and *at any time* under heightened supervision standards and annual stress test.

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[37]To complete the story, I conduct similar panel regressions for pre-Act period and results are summarized in Table F.12

Table 6: Marginal Effects of 1 p.p. Increase in SBL/Assets on Bank Financial Performance in Subsample Periods

Size	Sample Period			
	2001–2009		2010–2017	
Community Banks	**0.205***		**0.447***	
	2001–2006	2007–2009	2010–2014	2015–2017
	0.212*	**0.191****	**0.349****	**0.809****
	2001–2009		2010–2017	
Large Banks	**-0.411****		**-2.63****	
	2001–2006	2007–2009	2010–2014	2015–2017
	0.355	**-2.207****	**-1.917****	**-2.854****

[1] The marginal effect coefficients are summarized from Table 4, 5, and F.12.

[2] Large banks are defined as banks with consolidated assets of more than $50 billion and labeled as SIB at any time in the sample; regional and community banks refer to those with assets under $50 billion.

The comparison of marginal effects before and after Dodd-Frank Act gives a rough impression that large banks were penalized for SBL by the capital market while smaller banks were encouraged for it, and Dodd-Frank regulations intensified the divergence. Then I further divide the sample into the pre-Act period of 2001–2009, pre-relief of 2010–2014, and post-relief period of 2015–2017.

For community banks, capital market incentives were slightly positive and steady during 2001–2014, as Tobin's Q ratio would increase around 0.2–0.3 p.p. for a 1 p.p. increase in SBL/assets. How to explain the persistent positive capital market incentives? One might speculate that smaller banks were not suffered from the regulatory burdens imposed by Dodd-Frank which was designed to target systemically important banks. But the revival since the relief plan for smaller banks in 2015 suggests another explanation. After 2015, smaller banks would enjoy a 0.8 p.p. increase in Tobin's Q ratio for a 1 p.p. increasing in their SBL/assets ratio, which is about two times larger than during pre-relief period. Shareholders believed that the relief plan will make SBL a more profitable opportunity for smaller banks, which implies that smaller banks were under constraints before the relief plan.

Next question: knowing that smaller banks were affected by Dodd-Frank regulations and hit by the financial crisis, why the capital market or shareholders still evaluate SBL as profitable assets for smaller banks? There are two main reasons. First, smaller banks, especially community banks, have a comparative advantage in lending to small business. They are usually specialized in relationship lending, which is efficient in gathering and monitoring soft information of local community and its small businesses. They are also more flexible and able to engage with small businesses, with better customer services and faster loan decisions. According to the FDIC Small Business Lending Survey (2018), community banks are ranked by other banks as top competitors for SBL. Second, smaller banks have to be more committed to SBL and keep a larger share of SBL in their portfolio compared to large banks. One explanation is that small banks with less capital are unable to lend large amounts, due to regulations that require banks not to lend to a single borrower more than 25% of bank's capital. Another reason is that small banks need to diversify their portfolios by making more loans of smaller amounts. Therefore, the financial incentives to smaller banks for SBL maintained significantly positive, even during the financial crisis and under Dodd-Frank Act before the relief plan.

For large banks, ever since the recent financial crisis, their Tobin's Q ratio would drop more than 2 p.p. for a 1 p.p. increase in SBL/assets. During the financial crisis, small businesses were more likely to bankrupt and thus SBL was riskier than other types of assets. This also explains why large banks had significant incentives to replace SBL with large business loans or non-business loans in 2008, as shown in results of repeated cross-sectional estimations. The disincentives during the crisis could be also explained by the threat of insolvency faced by large banks, as suggested by Chen, Hanson, and Stein (2017). During post-Act period, large banks continued to be discouraged for SBL, probably because shareholders expect that SBL will be under stricter risk assessment in stress test and thus not a profitable asset for large banks. After the relief plan for smaller banks, large banks still faced bad capital market incentives probably because shareholders re-assessed the comparative advantage of large banks for lending to small businesses, as Chen, Hanson, and Stein (2017) hypothesized, and believed that SBL will be even more profitable for smaller banks and less profitable for

large banks.

5 Robustness Check

5.1 Dynamic Effects

My data is year-end annual data, so shorter-period dynamics should be shown as instantaneous causality. To check the potential dynamic effect, I include a dummy variable *gSBL* which equals to 1 if the growth rate of SBL/assets of one BHC from previous year is positive, 0 otherwise. I interact it with size dummy and policy dummy and estimate in different periods during 2002–2017. Results are in Table F.11 and consistent with previous findings.

Interestingly, the only significant dynamic variable is *gSBL*LARGE*DFA*, and the sum of *gSBL*LARGE*DFA* and *gSBL*LARGE* is also statistically significant. This implies that if a large bank increased its SBL/assets from previous year and it is under Dodd-Frank regulations, then this bank's Tobin's Q ratio is 0.026 p.p. lower than that of the large banks which did not increase SBL ratio from previous year, according to my estimation. But this effect did not exist in pre-crisis era.

To further illustrate it, I plot the annual average Tobin's Q ratio of 20 banks with highest/lowest growth rate of SBL/assets from previous year in Figure 9. Before Dodd-Frank Act, there is no obvious divergence, but since 2010, the bottom 10 banks with lowest growth rate of SBL/assets[38] has been outperforming the top 10 banks which increased SBL ratio most, in terms of financial performance.

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[38]I exclude banks with zero SBL/assets growth. If including those, the divergence is more obvious.

Figure 9: Average Tobin's Q Ratio of Large Banks with Lowest/Highest Growth Rate of SBL/Assets from Previous Year during 2002–2017
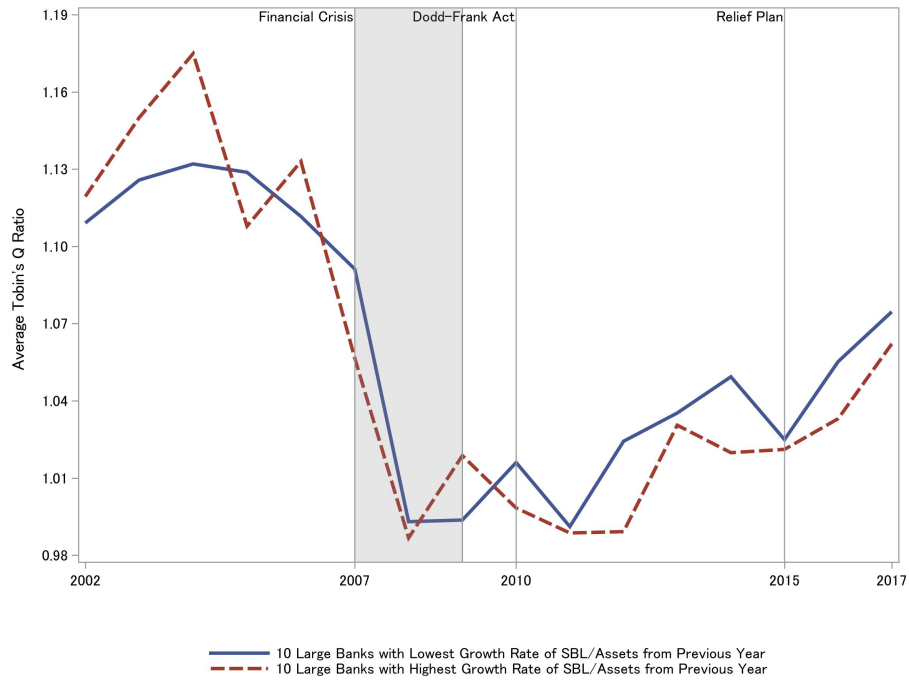
I extract 20 large banks (with assets more than $50 billion) with highest or lowest growth rate of SBL/assets from the previous year, and this figure plots their average Tobin's Q ratio during 2002–2017. After Dodd-Frank Act of 2010, although financial performances of large banks have steadily recovered, large banks which increased SBL/assets most would underperform than those decreased SBL/assets most.

6 Discussion

The slow recovery of SBL following the recent financial crisis concerns many researchers and policymakers. This paper looks at this issue in terms of how Dodd-Frank Act of 2010 and the Regulatory Relief Plan for Smaller Banks in 2015 altered the capital market incentives for large and community banks to lend to small businesses. The idea is that how shareholders evaluate changes in regulations would affect banks' lending strategy.

During 2001–2017, the capital market has been encouraging community banks to lend to small businesses, even during the recent financial crisis, while large banks have been penalized for SBL. Especially, when a large bank is labeled as a SIB and submit to heightened supervisions, the financial disincentive for its SBL triples. A possible explanation is that SBL is under higher risk assessment in stress tests and shareholders would believe that SIBs with increasing share of SBL are more likely to fail the test whose penalty is a limitation on dividend and share buyback plan. Interestingly, although many bankers are complaining about the regulatory burden, my results imply that, during Dodd-Frank era, banks *overall* are encouraged by the capital market to lend to small businesses, which is mainly driven by smaller banks which are benefited by the regulatory relief plan in 2015. Ever since 2015, smaller banks' financial incentives have doubled, but SIBs have suffered from worsen disincentives for SBL, which might be because the relief plan persuaded the capital market to reassess large banks' competitiveness in lending to small businesses.

Overall, this lack of financial incentives for SBL for large banks is not compensated by the surged incentives for community banks after 2015. Although as an unintended consequence, Dodd-Frank Act has contributed to the slow recovery of SBL by changing the capital market incentives for large banks' lending strategy. Large banks are important for the credit access of small businesses, because 70% of small businesses cited a large bank as their primary financial institution (Prager and Wolken, 2008) and the total amount of SBL by large banks is 1.2—1.4 times of that by smaller ones according to my estimation. While community banks are traditionally specialized in SBL through relationship lending, there are two advantages

of large banks that are not replaceable by community banks. First, their SBL models use hard information and quantitative metrics, which are able to facilitate large volume of SBL. Second, SBL by large banks are relatively cheaper and more convenient compared to those made by community banks, due to the economies of scale. Although the credit gap has been gradually filled by smaller banks and fintech (Chen, Hanson, and Stein, 2017; Jagtiani and Lemieux, 2018), it takes time for adjustments and small businesses might face higher interest rates (Buchak et al., 2018).

Ironically, regulations are designed for financial stability, but when risk is lower, loans decrease too. Since the relief plan for smaller banks successfully improved their capital market incentives to lend to small businesses, we expect that the de-regulation law of 2018 for larger banks would also help alleviate the problem. Whether this round of deregulation would lead to a riskier financial market is an issue for future study. The preference of the public does not always agree with that of the regulators. One of the policy implications of this paper is that regulators need to consider both when designing regulations.

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Appendix A. Regulatory Relief for Smaller Banks and Heightened Standards for SIBs

Table A.1: The Relief Rules for Smaller Banks

Effective Date	Affected Party	Rules
CAPITAL		
1/30/2015	Savings and Loan holding companies (< **$500 million**) and meet requirements of Policy Statement	Exempted from minimum capital requirement (link)
5/15/2015	Savings and Loan holding companies (**$500 million − $1 billion**)	Exempted from minimum capital requirement (link)
FILING		
1/30/2015	Savings and Loan holding companies (<**$500 million**) and meet requirements of Policy Statement	Exempted from Schedule SC-R, Part I (Regulatory Capital Components and Ratios), of form FR Y-9SP (Parent Company Only Financial Statements for Small Holding Companies) (link)
5/15/2015	Savings and Loan holding companies (<**$1 billion**) and BHC (**$500 million–$1 billion**)	Exempted from a number of filing and other provisions in Regulation Y and LL (link)
POLICY STATEMENT		
5/15/2015	BHC (**$500 million–$1 billion**)	Qualified for Policy Statement (which permits small BHCs to use higher levels of debt to finance acquisition of banks and exemption from capital guidelines) (link)
EXAMINATION		
2/29/2016	Insured depository institutions (**$500 million–$1 billion**)	Increase on-site examination cycle from 12 month to 18 month; previously, only institutions with assets below $ 500 million qualified (link)

Table A.2: The Dodd-Frank and Basel III Rules for Large Banks

Regulation	Effective Date	Affected Party	Rules
Basel III	1/1/2014	BHCs (> **$50 Billion**)	Regulatory Capital, Implementation of Basel III, Capital Adequacy, Transition Provisions, Prompt Corrective Action, Standardized Approach for Risk-weighted Assets, Market Discipline and Disclosure Requirements, Advanced Approaches Risk-Based Capital Rule, and Market Risk Capital Rule (link)
Section 165 of Dodd-Frank Act	6/1/2014	BHCs (> **$50 Billion**) and some BHCs (**$10 Billion–$50 Billion**)	Risk-based and leverage capital requirements, liquidity standards, risk management, stress-test requirements, 15-to-1 debt-to-equity limit (link)
Dodd-Frank Act: safety and soundness standards regulations	11/10/2014	Large insured national banks, insured Federal savings associations, and insured Federal branches of foreign banks (> **$50 Billion**)	Guidelines establishing heightened standards (link)
Basel III	1/1/2015	Large BHCs, certain savings and loan holding companies, and depository institutions (> **$250 Billion**) or meet other requirements	Quantitative minimum liquidity coverage ratio (link)
Section 165 of Dodd-Frank	12/1/2015	Global systemically important bank holding company	Risk-based capital surcharges (link)

Appendix B. Systemically Important Banks

Figure B.1: Scattered Plot SBL by SIBs during 2001-2017
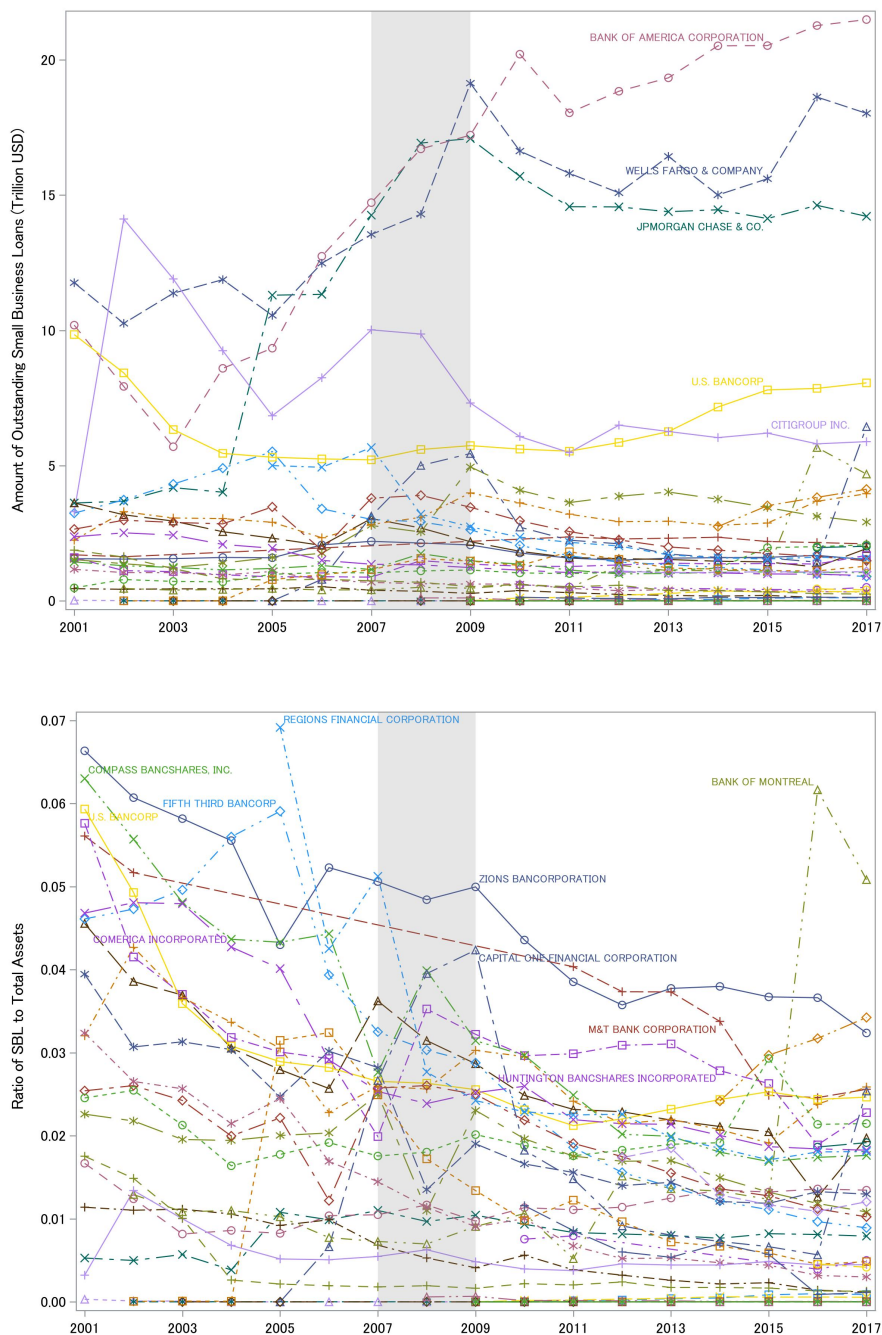
Notes: SIB refers to the large bank which was labeled as systemically important and under Federal Reserves' stress test for at least once (including 12 foreign banks). The amount of SBL is adjusted by using the inflation level in 2001 as benchmark.

Table B.3: The List of 19 SIBs in 2009 SCAP

SIBs	2009*	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ally Financial	Y	Y	Y	Y	Y	Y	Y	Y	Y	**N**
American Express	Y	Y	Y	Y	Y	Y	Y	Y	Y	**N**
Bank of America	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank of NY Mellon	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
BB&T	Y	Y	Y	Y	Y	Y	Y	Y	Y	**N**
Capital One	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Citigroup	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fifth Third	Y	Y	Y	Y	Y	Y	Y	Y	Y	**N**
Goldman Sachs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
JPMorgan Chase	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Keycorp	Y	Y	Y	Y	Y	Y	Y	Y	Y	**N**
MetLife*	Y	Y	Y	-	-	-	-	-	-	-
Morgan Stanley	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PNC Financial	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Regions Financial	Y	Y	Y	Y	Y	Y	Y	Y	Y	**N**
State Street	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SunTrust	Y	Y	Y	Y	Y	Y	Y	Y	Y	**N**
U.S. Bancorp	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Wells Fargo	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Y	19	19	19	18	18	18	18	18	18	11

[1] The list contains 19 banks which participated in 2009 SCAP and most of them have remained under heightened regulations. There was no FDAST or CCAR in 2010. In 2011 and 2012, SIBs only participated in CCAR because the implementing rules for FDAST have not been developed yet. Since 2013, SIBs have been subject to both FDAST and CCAR.

[2] Y represents participating in Federal Reserve annual stress test and CCAR in that year. N represents not under stress test and the asset data is not available.

[3] MetLife failed the stress test in 2012 and sold the banking unit to GE Capital in the same year to avoid the heightened financial regulations. Although MetLife appeared in the list of stress test in 2012, the year-end bank data for MetLife in 2012 does not exist and I exclude this data point from my list of SIBs.

[4] In 2019, the asset threshold was increased from $50 billion to $100 billion and therefore several BHCs did not participate in the FDAST and CCAR in 2019.

Table B.4: The List of SIBs Joined in 2014 or Later

SIBs	2009*	2011	2012	2013	2014	2015	2016	2017	2018	2019
BNP Paribas*	C	C	C	C	C	C	**Y**	**Y**	**Y**	N
BBVA Compass*	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	N
BMO Financial*	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	N
Barclays*	-	-	-	-	-	-	C	C	**Y**	**Y**
CIT Group	C	N	N	N	N	C	C	**Y**	C	N
Comerica	C	C	C	C	**Y**	**Y**	**Y**	**Y**	C	N
Credit Suisse*	-	-	-	-	-	-	C	C	**Y**	**Y**
Deutsche Bank*	C	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**
Discover	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	N
HSBC*	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Huntington	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	N
M&T	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	N
Northern Trust	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Citizens	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	N
RBC*	C	C	-	-	-	C	C	C	**Y**	N
Santander*	-	-	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	N
TD Group	C	C	C	C	C	C	**Y**	**Y**	**Y**	**Y**
UBS*	-	-	-	-	-	-	C	C	**Y**	**Y**
MUFG*	C	C	C	C	**Y**	**Y**	**Y**	**Y**	**Y**	N
Zions	C	C	C	C	**Y**	**Y**	**Y**	**Y**	-	-
Number of Y	0	0	0	0	12	13	15	16	17	7

[1] The list contains 19 banks which participated in 2009 SCAP and most of them have remained under heightened regulations. There was no FDAST or CCAR in 2010. In 2011 and 2012, SIBs only participated in CCAR because the implementing rules for FDAST have not been developed yet. Since 2013, SIBs have been subject to both FDAST and CCAR.

[2] Y represents participating in Federal Reserve annual stress test and CCAR in that year. N represents not under stress test and the asset data not available or less than the threshold. C represents not under stress test and with more than $50 billion in assets.

[3] In 2019, the asset threshold was increased from $50 billion to $100 billion and therefore several BHCs did not participate in the FDAST and CCAR in 2019.

[4] Banks with * are foreign banks operating in the U.S. and some of them did not file Y9C or Call reports for several years.

[5] Zions bank left the list after 2018 by shedding its BHC structure. CIT has also not been designated as a SIB since 2017 as it strategically sold its assets. Comerica also left the list in the same year.

In Figure B.2, I compare the SBL of SIBs and non-SIBs in 2009-2016, scaled by their levels in 2010 when Dodd-Frank Act was signed. Although the total amount of SBL from SIBs was larger and grew faster than that of non-SIBs, the average amount of SBL by SIBs dropped below its 2010 level after 2014. After scaled by assets, the total amount of SBL from SIBs has been declining since 2011, but non-SIBs started to steadily increase SBL from 2013. The median of ratio of SBL to assets, which can show how devoted a "typical" bank to SBL, has dramatically declined for SIBs since 2010, but non-SIBs have maintained a stable median value of the ratio.

Figure B.2: SBL by SIBs and non-SIBs during 2009-2016
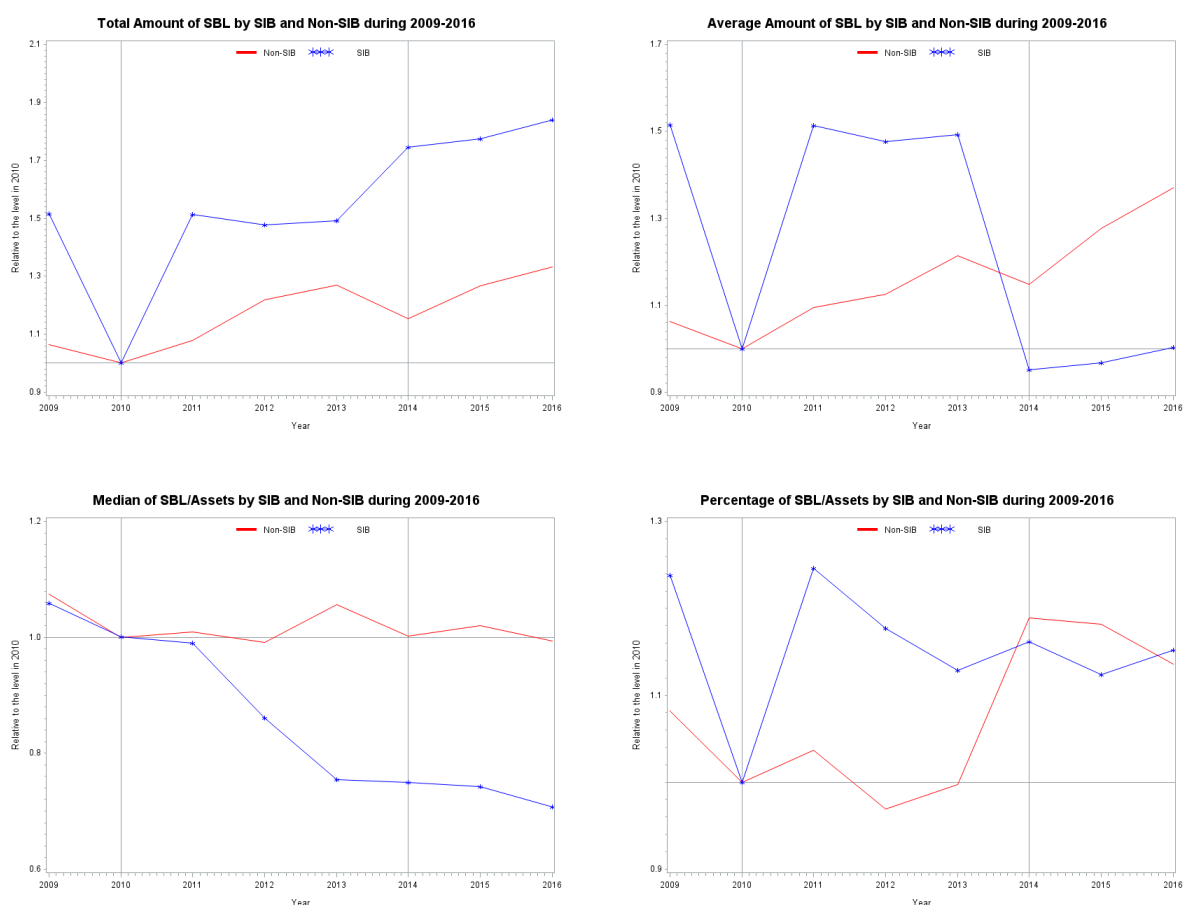
Source: The SBL data is from the CRA reports in 2009-2016, summed up to BHC level. Data is scaled by the level in 2010, when Dodd-Frank Act was implemented.

Appendix C. Data Manual: The Construction of Bank Holding Company-Level Data

C.1 Overview

The purpose of this manual is to provide detailed information about how to construct BHC level data using raw regulatory data from the Federal Reserve System and other sources. The data construction process is very complex due to many reasons. First, the definitions of bank accounting variables are complicated and changing over time, so they should be defined and clarified carefully. Second, different types of banks report to Federal Reserve System, the Federal Deposit and Insurance Corporation (FDIC), the comptroller of the Currency, and the Federal Financial Institutions Examination Council (FFIEC) with responsibilities of Community Reinvestment Act (CRA), so the sample should be filtered according to certain criteria. Third, the bank-level data needs to be aggregated to BHC level data, because the banks under the same BHC will behave collectively. Lastly, some control variables, such as GDP and the Herfindahl-Hirschman index (HHI), need to be weighted by the bank deposit share in each state.

This manual combines BHC accounting data collected from Federal Reserve Y-9C reports,[39] market value data from Wharton Research Data Service (WRDS) Compustat, small business lending (SBL) data from the Consolidated Reports of Condition and Income (Call Reports),[40] branch-level bank deposit data from Summary of Deposits,[41] and GDP and income per capita data from Bureau of Economic Analysis.[42] The time period of interest is 2001–2017, covering both before and after the financial crisis. Except for SBL and deposits data, other data is collected at the end of each year during 2001-2017. The methodology of this manual mainly follows Hughes et al. (2019).

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[39] Available from the Federal Reserve Bank of Chicago (`https://www.chicagofed.org/banking/financial-institution-reports/bhc-data`).

[40] Available from the FDIC (`https://cdr.ffiec.gov/public/`).

[41] Available from the FDIC (`https://www5.fdic.gov/sod/sodMarketBank.asp?barItem=2`).

[42] Website of BEA: `https://www.bea.gov`

C.2 Bank Accounting Data from Y-9C Reports

Federal Reserve Y-9C data are quarterly collected for all domestic holding companies with certain levels of consolidated assets. This manual only collects data in the fourth quarter during 2001-2017. The filtering criteria and accounting variable definitions in this section closely follow Hughes et al. (2019).

C.2.1 Bank data filtering criteria

There are approximately 5000 observations in each year's raw dataset, and several criteria are used to filter the data:

1. The observations with missing values or non-positive values for total assets are deleted (BHCK2170>0).

2. Keep BHCs (RSSD9331=28) and thrift holding company (RSSD9331=37), and exclude "not available" (RSSD9331=0).

3. The legal structure of the organization should be corporation (RSSD9047=1).

4. Keep holding company (RSSD9048=500) and securities broker or dealer (RSSD9048=700), and exclude insurance broker or company (RSSD9048=550), utility company (RSSD9048=710), and other non-depository institution (RSSD9048=720). Notice that Goldman Sacks, Morgan Stanley, Ally, and American Express are kept, although they are not in the desired category.

5. Drop Grandfathered savings and loan holding company (RSSD9425=18).

6. Drop lower-tier holding companies whose higher-tier also files Y-9C (BHCK9802=2).

Note that I restrict the sample to banks that are holding company corporations with positive total assets. In the fourth criterion, I include four companies because they are systemically

important, even though they are not in the desired category. In the sixth criterion, I cannot keep both lower-tier and higher-tier holding companies because I will combine the data to the higher-tier, which could lead to double counting.

The list of number of observations in each year and in total is provided in Table C.5 Notice that during 2001-2005, there were approximately 2000 observations each year, but during 2006-2014, there were about 1000 observations and afterwards, there were only around 570 observations. This is because the asset-size threshold for filing the FR Y-9C increased from $150 million to $500 million in March 2006, and it increased further to $1 billion in March 2015. This respondent burden reduction is to reflect the influences of inflation, industry consolidation, and normal asset growth of BHCs.

Table C.5: Number of Y-9C Observations in My Sample during 2001-2017

Year	2001	2002	2003	2004	2005				
N of Obs.	1791	1926	2073	2190	2202				
Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
N of Obs.	942	918	921	958	947	952	1003	1012	1005
Year	**2015**	**2016**	**2017**						
N of Obs.	576	566	564						

C.2.2 Definition of Accounting Variables

The bank accounting items[43] with corresponding codes from Y-9C reports and descriptions are listed in the Table C.6. Below are some additional explanations for the accounting variables.

Book value and market value of assets Although BHCK2170 is usually used as total assets, I subtract goodwill (BHCK3163) from total assets and use it as the proxy of book value of assets. To calculate the Tobin's Q ratio, I use BHCK2948 as book value of liabilities,

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[43]Note that all accounting amounts are in Thousand dollars.

Table C.6: Accounting Variables in Y-9C Reports

Class	Variable	My Code	Code in Y-9C	Note
Identifier	Entity Short Name	ID NAME	RSSD9001 RSSD9010	
Liabilities	Book Value of Liabilities	TLIB	BHCK2948	
Assets	Book Value of Assets Net of Goodwill Total Assets Liquid Assets	BVA TOTA LQA	BHCK2170 -BHCK3163 BHCK2170 BHCK0081 +BHCK0295 +BHCK0397 +BHDMB987 +BHCK1754 +BHCK1773 +BHCKB989	
Revenue	Total Revenue	REVENUE	BHCK4079 +BHCK4107	
Loans	Total loans Total Business Loans Residential RE Loans Commercial RE Loans Consumer Loans (including credit cards)	LSUM LCIL LRRE LCRE LIND	BHCK2122 +BHCK2123 BHCK1763 +BHCK1764 BHDM1797 +BHDM5367 +BHDM5368 BHCK1410 -LRRE BHDM1975	Before 1991/03: not exist
Equity	Tier 1 Capital Tier 2 Capital	ECAP FCAP	BHCK3210 BHCK3210 +BHCK4062 +BHCK3123	
Interest Rate	Interest on Loans Interest on Lease Total Interest Income Contractual Rate	INT_LOANS INT_LEASES INTL LTOTROA	BHCK4435 +BHCK4436 +BHCKF821 +BHCK4059 BHCK4065 INT_LOANS +INT_LEASES INTL/LTOT	2001/03 – 2007/12: BHCK4010
Cost of Funding	Interest Expense Total Deposits Other Borrowed Funds Cost of Funding	INTEXP TDEP OBMO	BHCK4073 BHDM6631 +BHDM6636 +BHFN6631 +BHFN6636 BHCK3190 INTEXP/(TDEP+OBMO)	
Nonperforming Loans	Past Due but Accruing Non-accruing Gross Charge-offs Nonperforming C&I Total NPL Other Owned RE	 BNPL NPL ORO	BHCK5525 +BHCK5524 BHCK5526 BHCK4635 BHCK1606 +BHCK1607 +BHCK1608 BHCK5525 +BHCK5524 +BHCK5526 +BHCK4635 BHCK2150	 1990/09-2009/03: BHCK2744 +BHCK2745

and then calculate the sum of the market value of bank equity and the book value of its liabilities as the proxy of market value of assets.

Loans   The amount of total loans is calculated as the sum of BHCK2122 and BHCK2123, because BHCK2122 is the sum of different types of loans minus the unearned income on loans (BHCK2123). Total business loans, or Commercial & Industrial loans, include business loans both from domestic and foreign offices. Residential real estate loans include loans secured by residential properties and extended under lines of credit and other loans secured by residential properties as first liens or junior liens. Commercial real estate loans include construction loans, loans secured by farmland, 1-4 family and multi-family residential real estate loans, and other real estate loans. Consumer loans include credit cards, revolving credit plans, automobile loans, and other consumer loans such as student loans. Note that automobile loans (BHCKK137) and other consumer loans (BHCKK207) are not available until 2011.

Cost of Funding and Contractual Loan Interest Rate   Cost of funding and contractual loan interest rate are very important for the analysis of credit access. Cost of funding is calculated as interest expense divided by the sum of total deposits and other borrowed funds. Contractual loan interest rate is calculated as the sum of interest and fees on loans and interest on lease divided by the total loan amount. Note that before 2008, the item of interest and fees on loans is available as BHCK4010 and afterwards it is calculated as the sum of BHCK4435, BHCK4436, BHCKF821, and BHCK4059. The spread is defined as the difference between cost of funding and contractual loan interest rate. The observations are deleted if either funding cost or loan rate is larger than 50%, or the spread is less than -10%.

Non-performing loans   Nonperforming loan-to-total loan ratio is usually used to measure one bank's loan quality. Nonperforming loans (NPL) are calculated by summing up the delinquent loans and gross charge-offs. Charge-offs are uncollectible loans and leases whose amounts are charged off against the allowance for credit loss. Net charge-offs are calculated

as gross charge-offs minus recoveries. Delinquent loans include those past due and still accruing interest and those not accrual. Because gross charge-offs are not included in the total loans, NPL ratio is defined as the amount of NPL divided by the sum of total loans and gross charge-offs. Although some literature included other real estate owned in calculation of NPL, which is foreclosed real estate which is nonaccrual but have not been sold for recoveries yet, I do not include this item. Outliers are eliminated by deleting the banks with the value of charge-offs more than four times of that of delinquent loans.[44]

C.3   Bank Market Values from Compustat

The market values for banks are collected from WRDS Compustat. The market value of asset is proxied by the sum of the market value of equity and the book value of liability, and the market value of equity is calculated as the product of stock prices and outstanding shares by the end of each fourth quarter. Specifically, this manual uses the quarterly close market price (PRCCQ) and the quarterly shares outstanding number (CSHOQ) for the fourth quarter of each year during 2001-2017, instead of the monthly close market price (PRC) and the shares outstanding (SHROUT) on Center for Research in Securities Prices (CRSP), because CRSP data only contains one single class of stock. Note that the unit of CSHOQ is Million, so the unit of MVE should be adjusted to thousand to match that of Y9C accounting information.

To connect the unique bank identifier assigned by the Federal Reserve System (RSSD) with that used in CRSP (PERMCO), this manual uses the link created by the Federal Reserve Bank of New York.[45] However, since Compustat does not use PERMCO, this manual first connects RSSD with PERMCO, and then links PERMCO with CUSIP, which is used in Compustat.

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[44]Although the magnitude of delinquent loans is usually more than three time of that of charge-offs (https://www.federalreserve.gov/releases/chargeoff/delallnsa.htm), I do not want to reduce much of the sample size. Further discussion are needed.

[45]Available here: https://www.newyorkfed.org/research/banking_research/datasets.html

C.4 Deposit Weighted HHI and GDP, and Holding Company-level Data

Summary of Deposit provides bank branch-level data on deposits for FDIC-insured banks in June. This data is used for three purposes. First, the Herfindahl-Hirschman index (HHI), as a measure of market concentration, is calculated by taking square of market share of each BHC's deposits in the market and then summing up to the state-level. The county-level HHI can be calculated using zip codes of branches.[46] Second, I calculate each BHC's share of deposits in each operating counties as weights to get weighted HHI. Similarly, using the state-level GDP data from the Bureau of Economic Analysis, I calculate the weighted average GDP growth rate for each holding company to control the economic fundamentals. Third, SOD contains the relationship structure of banks with their BHCs, which can be extracted and used to sum all the bank-level data can be summed up to top-tier holding company level.

There are approximately 90,000 observations in each year's raw dataset, and several criteria are used to filter or revise the data:

1. For banks without holding companies, use their bank identifier (RSSDID) as their holding company identifier (RSSDHCR), and drop banks without valid identifier.

2. Drop branches with no deposits (DEPSUMBR =0).

3. Drop branches in in U.S. territories (STNUMBR in (60 64 66 68 69 70 72 78)).

4. Drop holding companies with no domestic deposits (DEPDOM =0).

5. Create FIPS code[47] by combining state identifier (STNUMBR) and county identifier(CNTYNUMB), and note that if county identifier is not 3 digit then put 0 or 00

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[46]According to FDIC Small Business Lending Survey (2018), banks usually view local banks of similar size as major competitors and local banks of other size as frequent competitors. Therefore, county-level HHI is a better proxy for market competition than state-level HHI.

[47]FIPS code, or "GEO.id2", is used by United States Census Bureau in American Community Survey to identify the state and the county.

in front.

The state-level GDP data can be downloaded from Bureau of Economic Analysis. I use the real GDP by state measured by chained 2009 dollars and unit is million dollars. Five-year average GDP growth rate is calculated. Since there is no county-level GDP data available, I use the county-level income per capita data from American Community Survey instead. Because this annual data is only available from 2005 to 2016,[48] I cannot calculate five-year average growth rate. I use the county-level income per capita divided by the nation-wide average level as the control for economic fundamental.

The HHI, as a measure of market concentration, is calculated by taking square of market share of each BHC in the market and then summing up to the state-level or county-level. The steps are:

1. Sum up all the bank deposits in each state.

2. Calculate each BHC's share of deposits out of total deposits in each state.

3. Calculate the sum of squares of deposit share in each state as the HHI of this state.

4. Sum up all the deposits for each BHC.

5. Calculate the share of its deposits in each operating state out of its total deposits as the weight for each BHC.

6. Calculate the weighted average HHI and GDP for each BHC.

This HHI value can be normalized by using the formula below, but since the difference between normalized and standard HHI is not large, I will use standard HHI in this manual.

$$NormalizedHHI = \frac{HHI - \frac{1}{n}}{1 - \frac{1}{n}}$$

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[48]In 2005-2006, the data was simply estimated; in 2007-2008, the data was a three-year estimation; in 2009-2016, the data was a five-year estimation.

The county-level HHI can be calculated similarly by using FIPS codes of branches. The county-level HHI tends to be larger and maybe more accurate than the state-level one.

Because the bank code indicator (RSSDID) and its holding company code indicator (RSSD-HCR) are both listed in Summary of Deposit, bank-level data can be summed up to top-tier holding company level according to the corresponding relationships. The same process is applied to SBL data and market values.

C.5 SBL from the Call Reports

The Call Report refers to the Consolidated Report of Condition and Income that U.S. banks are required to fill out quarterly. In Schedule RC-C Part II, the loans to small business and small farms are defined as the sum of (a) the outstanding commercial and industrial (C&I) loans with origination amount of $1 million or less, (b) the outstanding commercial real estate loans with origination amounts of $1 million or less, and (c) the agricultural production and farmland loans of $500 thousand or less. In most studies, SBL refers to small C&I loans captured in (a).

Table C.7: The Definitions of SBL in Call Reports

Variable	Code
Number of loans with origination amount less than $100,000	RCON5570
Outstanding balance for loans with origination amount less than $100,000	RCON5571
Number of loans with origination amount $100,000 - $250,000	RCON5572
Outstanding balance for loans with origination amount $100,000 - $250,000	RCON5573
Number of loans with origination amount $250,000 - $1,000,000	RCON5574
Outstanding balance for loans with origination amount $250,000 - $1,000,000	RCON5575
Total commercial and industrial loans	RCON1766
Whether all the commercial and industrial loans have origination amount less than $100,000:	RCON6999
SBL = RCON5571+ RCON5573+ RCON5575	if =False
or SBL= RCON1766	if =True

Specifically, banks are required to report the number and amount of outstanding of commer-

Figure C.3: Total Amount and Number of SBL from Call Report during 2001–2017
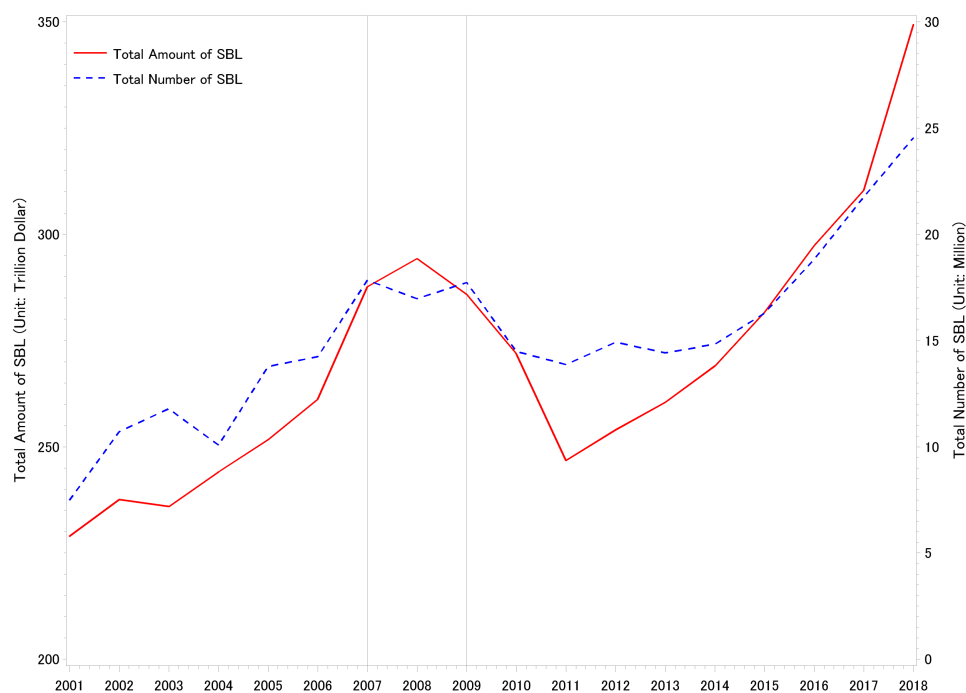
Data Source: Call Reports in 2001–2017.

cial and industrial loans to U.S. addresses with original amounts of $100,000 or less, more than $100,000 through $250,000, and more than $250,000 through $1,000,000 respectively. This manual uses the total amount of outstanding commercial and industrial loans with original amounts of less than one million dollars as the small business lending amount. In Schedule RC-C Part II, banks are also asked whether all commercial and industrial loans have original amounts of $100,000 or less. If the answer is yes, then the total amount of commercial and industrial loans is counted as small business lending. The definitions and details are summarized in Table C.7. Because the SBL data was only collected in June reports before 2010, Call Report in June, instead of those in December, are used for each year. The total amount of SBL and the number of originations of SBL are plotted in Figure C.3.

Note that FDIC Small Business Lending Survey (2018) criticized this SBL proxy from the Call Report because it failed to capture larger C&I loans with origination amounts of more than $1 million and loans secured by residential real estate that are also extended to small

businesses. The limit of $1 million was set by the regulators in the early 1990s and was never adjusted for inflation. If adjusted by CPI, the limit would be over $1.6 million in 2015. Business loans secured by one-to-four-family residential properties in the Call Report are considered as home mortgages rather than business loans because they are recorded by their primary collateral rather than by purpose. According to FDIC's estimation, SBL in the U.S. was understated by at least 12% or $37 billion in 2015.

Nevertheless, C&I loans under $1 million in the Call Report is still the best available measure of SBL in the U.S. First, loan size is highly correlated to business size, therefore the borrowers of small loans are usually businesses that are small. More importantly, all banks tract the size of loans but not all banks track the size of businesses. Many banks, particularly smaller ones, were unable to report loans by size of small businesses without substantial increase of staff resources.

C.6 SBL from CRA

C.6.1 Background

The Community Reinvestment Act of 1977 (CRA) was enacted to encourage federally insured commercial banks and savings banks and associations to meet the credit demand of local communities. A revision to the CRA in 1995 required commercial banks and savings banks associations with more than approximately $1 billion assets to report the data regarding their lending to small businesses to monitor their performance in reinvesting local community. These records are evaluated regularly and the CRA ratings record is taken into account in considering applications for deposit facilities, including mergers and acquisitions. The CRA has compiled annual county-level small business loans data since 1996.

This manual uses the branch-level *newly originated* SBL data in Disclosure Reports during 2001-2016. The SBL is defined as the loan amount of small business loans originated with loan amount at origination less than $1 million. The branch-level data is summed up to

institution-level data by applying ID list in Transmittal Sheets of CRA. The institution-level data is summed up to the holding company level according to the link provided by the Summary of Deposit.

C.6.2 Comparison between the Call Report and CRA

Comparing the SBL data in the Call Reports to that in CRA, I find that the trending patterns are obviously different in the two datasets, which might be due to several reasons. First, the definition of SBL is different. CRA defines SBL as loans with amount of $ 1 million or less, which can be commercial real estate loans or commercial and industrial loans, while Call Reports only consider small commercial and industrial loans with origination amount less than $1 million. Second, SBL data reported in CRA is loans newly originated or purchased, which are flow data, while SBL in Call Reports are outstanding balance, which are stock data. Third, not all banks report SBL data to CRA. CRA requires commercial banks and savings institutions with total assets of approximately more than $ 1 billion to collect and report SBL, while all FDIC-insured banks are required to file Call Reports. However, some banks with assets less than the mandatory reporting threshold also reported the SBL data either voluntarily or because they were elected to be evaluated as larger banks. For example, in 2016, there were 726 banks reported SBL data, within which 202 banks with assets below the threshold, and the SBL data in CRA "account for about 71 percent of small business loans outstanding by dollars".[49] Therefore, SBL reported in CRA data covers a large portion of that in Call Reports.

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[49]See https://www.fdic.gov/news/news/press/2017/pr17088a.pdf

Appendix D. The SBL Lending Behavior of Banks of Different Sizes

To check the performance of banks of different sizes, I categorize them by assets. The cut-off points are $1 billion, $10 billion, $50 billion, $250 billion, and $1 trillion. All banks have been slowly recovering their SBL since the recession, except for banks with assets of less than $1 billion, which have decreased 90% amount of SBL since 2005.

Graph D.4 shows the total amount of SBL by banks in different sizes. However, this data is not adjusted by the change of number or the change of assets, so the information is vogue. Therefore, in D.5, I plot the amount and the median share of SBL for banks in different sizes. During the post-crisis period, the median ratio of SBL/assets has remained at a level lower than pre-crisis. For banks with assets more than $50 billion, the median ratio of SBL/assets has been stable within 0.1-0.2 throughout the 16 years. For the smaller banks, the ratio has dropped dramatically. The smaller the bank size, the larger the drop of the ratio.

In Graph D.6, I plot the number of banks in different sizes. Banks with assets less than $1 billion decreased 65% in 2005 and has been continuously decreasing since then, while the number of banks in larger size has not changed much. The size of SBL is calculated as the amount of SBL divided by the number of SBL for banks in each size category.

As in Graph D.7, the average amount of loans has been growing steadily over time, not affected by the financial crisis. For banks with assets less than $250 billion, the size of SBL originated is within $150,000 - $200,000, while the largest banks offer average SBL of $25,000. For banks with assets between $250 billion and $1 trillion, the SBL size has been very volatile and increased dramatically after the recession.

Figure D.4: The Amount of SBL by Banks in Different Sizes during 2001-2016
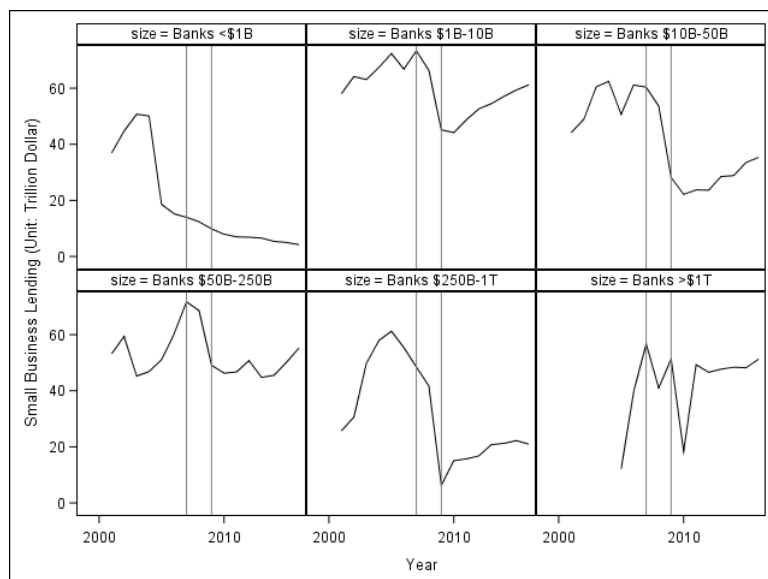
Source: the Community Reinvestment Act. SBL is defined as business loans with originated amounts less than $1 million. The total assets in CRA, which I use to calculate the ratio of SBL to assets, are the values of total assets in Call Reports of the previous year.

Figure D.5: The Median of Ratio of SBL/Assets for Banks in Different Sizes during 2001-2016
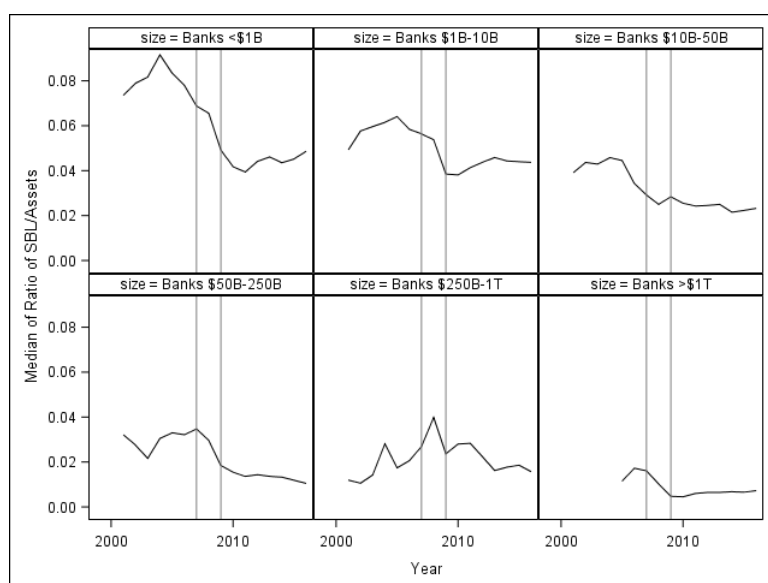
Source: the Community Reinvestment Act. SBL is defined as business loans with originated amounts less than $1 million. The total assets in CRA, which I use to calculate the ratio of SBL to assets, are the values of total assets in Call Reports of the previous year.

Figure D.6: The Number of SBL by Banks in Different Sizes during 2001-2016
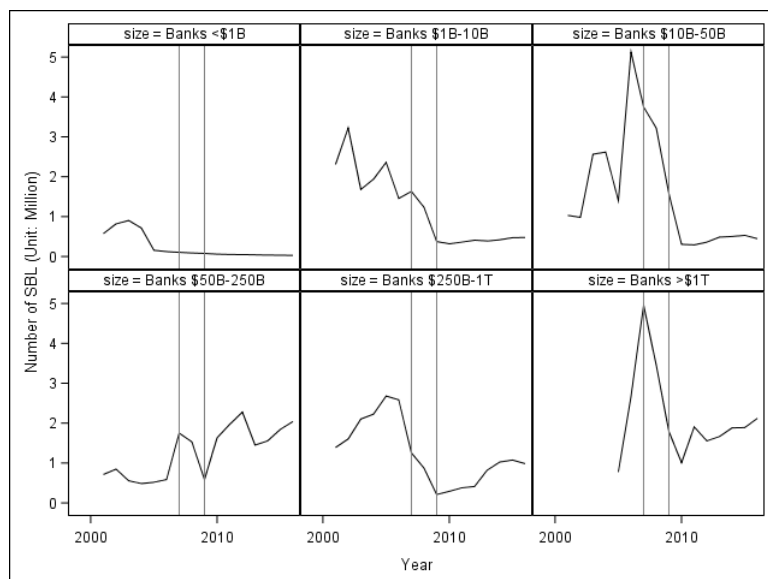
Source: the Community Reinvestment Act. SBL is defined as business loans with originated amounts less than $1 million. The total assets in CRA, which I use to calculate the ratio of SBL to assets, are the values of total assets in Call Reports of the previous year.

Figure D.7: The Ratio of Sum(SBL)/Sum(Assets) for Banks in Different Sizes during 2001-2016
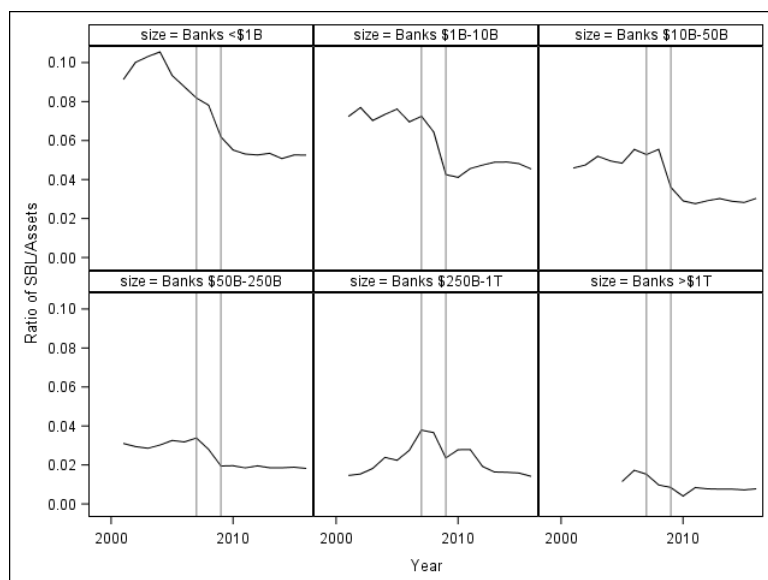
Source: the Community Reinvestment Act. SBL is defined as business loans with originated amounts less than $1 million. The total assets in CRA, which I use to calculate the ratio of SBL to assets, are the values of total assets in Call Reports of the previous year.

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Appendix E. SBL Coefficients in Cross-sectional Baseline Models

Table E.8: OLS Estimates of (SBL-Large Business Loans)/Assets in Cross-sectional Baseline Models

Dependent variable: Tobin's Q Ratio 2001-2017

The difference between coefficients of SBL/assets ratio and large business-loans/assets ratio in baseline models, as shown in Graph 7, represent financial incentives for banks to replace large business loans with SBL.

|	**All Banks**				**Large&Regional**	**Banks**	(>$10Billion)	
Year	SBL/Assets	Std.Dev.	Adj. R^2	N	SBL/Assets	Std.Dev.	Adj. R^2	N
2001	0.191*	0.113	0.358	375	-1.287	1.115	0.484	39
2002	0.082	0.099	0.288	407	0.188	0.721	0.368	42
2003	0.045	0.12	0.217	440	0.949	0.773	0.519	42
2004	0.089	0.108	0.2	465	-0.205	0.651	0.478	45
2005	0.236*	0.093	0.287	456	-0.473	0.483	0.464	47
2006	0.328***	0.095	0.403	375	0.094	0.614	0.433	52
2007	0.076	0.082	0.376	355	-0.299	0.421	0.339	49
2008	0.097	0.115	0.325	345	-0.673*	0.368	0.592	50
2009	0.08	0.092	0.281	345	-0.087	0.295	0.571	55
2010	0.039	0.103	0.3	325	-0.84**	0.314	0.375	54
2011	0.242**	0.115	0.22	323	-0.454	0.313	0.322	54
2012	0.283***	0.099	0.201	329	-0.35	0.274	0.287	57
2013	0.2	0.125	0.22	331	-0.27	0.266	0.415	60
2014	0.182	0.122	0.198	326	-0.277	0.273	0.219	66
2015	0.08	0.106	0.205	281	-0.213	0.229	0.367	67
2016	0.537***	0.177	0.268	284	-0.304	0.303	0.387	76
2017	0.273*	0.151	0.384	264	-0.385	0.235	0.625	78

	Regional	**Banks**	($10-50Billion)		**Community**	**Banks**	(<$10Billion)	
Year	SBL/Assets	Std.Dev.	Adj. R^2	N	SBL/Assets	Std.Dev.	Adj. R^2	N
2001	-1.119	1.445	0.768	23	0.242**	0.106	0.269	336
2002	0.695	1.119	0.333	25	0.062	0.1	0.298	365
2003	0.526	1.243	0.395	25	0.025	0.122	0.198	398
2004	-0.41	1.003	0.444	27	0.095	0.113	0.211	420
2005	-1.071	0.854	0.478	28	0.226**	0.099	0.271	409
2006	-0.968	0.88	0.543	33	0.273***	0.097	0.384	323
2007	-0.986	0.621	0.193	29	0.097	0.088	0.36	306
2008	-1.283***	0.36	0.783	30	0.224*	0.117	0.427	295
2009	-0.256	0.37	0.512	31	0.08	0.102	0.296	290
2010	-0.693*	0.388	0.354	30	0.109	0.108	0.396	271
2011	-0.265	0.33	0.408	31	0.397***	0.122	0.338	269
2012	-0.307	0.278	0.35	36	0.443***	0.104	0.323	272
2013	-0.313	0.244	0.502	38	0.361***	0.127	0.38	271
2014	-0.523*	0.268	0.395	44	0.23*	0.127	0.368	260
2015	-0.339	0.257	0.421	44	0.129	0.116	0.317	214
2016	-0.807**	0.357	0.367	52	0.675***	0.193	0.448	208
2017	-0.797***	0.255	0.697	53	0.474***	0.179	0.408	186

[1] *** stands for p<0.01; ** stands for p<0.05; * stands for p<0.1.

Table E.9: OLS Estimates of (SBL-OtherLoans)/Assets in Cross-sectional Baseline Models

Dependent variable: Tobin's Q Ratio 2001-2017

The difference of coefficients of SBL/assets ratio and non-business loans/assets ratio in baseline models, as shown in Graph 8, represent financial incentives for banks to replace non-business loans with SBL.

	All Banks				**Large&Regional**	**Banks**	(>$10Billion)	
Year	(SBL+C&I)/Assets	F-stat	Adj. R^2	N	(SBL+C&I)/Assets	F-stat	Adj. R^2	N
2001	-0.007	0.009	0.358	375	-1.836	2.764	0.484	39
2002	-0.058	0.826	0.288	407	-0.251	0.14	0.368	42
2003	-0.05	0.387	0.217	440	0.342	0.245	0.519	42
2004	0.004	0.003	0.2	465	-0.476	0.641	0.478	45
2005	0.192***	9.249	0.287	456	-0.615	1.901	0.464	47
2006	0.217***	9.358	0.403	375	-0.062	0.011	0.433	52
2007	0.086	1.904	0.376	355	-0.312	0.563	0.339	49
2008	-0.024	0.066	0.325	345	-0.72*	3.877	0.592	50
2009	-0.051	0.483	0.281	345	-0.247	0.774	0.571	55
2010	-0.039	0.23	0.3	325	-0.974***	10.52	0.375	54
2011	0.104	1.051	0.22	323	-0.629*	3.941	0.322	54
2012	0.12	1.84	0.201	329	-0.511*	3.32	0.287	57
2013	0.039	0.117	0.22	331	-0.368	1.852	0.415	60
2014	0.131	1.429	0.198	326	-0.319	1.322	0.219	66
2015	0.034	0.128	0.205	281	-0.239	1.12	0.367	67
2016	0.507***	10.251	0.268	284	-0.252	0.753	0.387	76
2017	0.316**	5.334	0.384	264	-0.303	1.808	0.625	78

	Regional	**Banks**	($10-50Billion)		**Community**	**Banks**	(<$10Billion)	
Year	(SBL+C&I)/Assets	F-stat	Adj. R^2	N	(SBL+C&I)/Assets	F-stat	Adj. R^2	N
2001	-1.869	2.284	0.768	23	0.039	0.33	0.269	336
2002	0.251	0.064	0.333	25	-0.057	0.895	0.298	365
2003	0.074	0.005	0.395	25	-0.036	0.215	0.198	398
2004	-0.593	0.508	0.444	27	0.015	0.044	0.211	420
2005	-1.001	1.797	0.478	28	0.20***1	9.905	0.271	409
2006	-0.951	1.424	0.543	33	0.194***	8.002	0.384	323
2007	-0.715	1.676	0.193	29	0.114*	3.154	0.36	306
2008	-1.14***	9.464	0.783	30	0.07	0.596	0.427	295
2009	-0.298	0.874	0.512	31	-0.009	0.016	0.296	290
2010	-0.65*	3.993	0.354	30	0.042	0.273	0.396	271
2011	-0.517*	3.005	0.408	31	0.217**	4.571	0.338	269
2012	-0.425	2.518	0.35	36	0.201**	5.316	0.323	272
2013	-0.317	1.802	0.502	38	0.128	1.321	0.38	271
2014	-0.433	2.758	0.395	44	0.168	2.396	0.368	260
2015	-0.204	0.709	0.421	44	0.114	1.35	0.317	214
2016	-0.545	2.629	0.367	52	0.665***	15.857	0.448	208
2017	-0.647***	7.629	0.697	53	0.499***	10.015	0.408	186

[1] *** stands for p<0.01; ** stands for p<0.05; * stands for p<0.1.

Table E.10: OLS Estimates of SBL/Assets
in Cross-sectional Baseline Models
Dependent variable: Tobin's Q Ratio 2001-2017

The coefficients of SBL/assets ratio in baseline models, as shown in Graph 6, represent financial incentives for banks to increase SBL/assets.

	All Banks				Large&Regional Banks		(>$10Billion)	
Year	Sum/Assets	F-stat	Adj. R^2	N	Sum/Assets	F-stat	Adj. R^2	N
2001	0.179*	3.304	0.358	375	-1.5	2.015	0.484	39
2002	-0.077	0.608	0.288	407	0.029	0.14	0.368	42
2003	0.22*	2.84	0.217	440	0.763	1.212	0.519	42
2004	0.4***	9.195	0.2	465	-0.124	0.04	0.478	45
2005	0.587***	25.601	0.287	456	-0.369	0.674	0.464	47
2006	0.658***	29.694	0.403	375	0.284	0.185	0.433	52
2007	0.187**	4.948	0.376	355	0.063	0.019	0.339	49
2008	-0.033	0.066	0.325	345	-0.545	1.307	0.592	50
2009	-0.022	0.048	0.281	345	0.122	0.136	0.571	55
2010	0.1	0.873	0.3	325	-0.792**	6.662	0.375	54
2011	0.178	2.241	0.22	323	-0.596*	2.937	0.322	54
2012	0.2*	3.18	0.201	329	-0.544*	3.484	0.287	57
2013	0.213	2.165	0.22	331	-0.397	1.811	0.415	60
2014	0.275*	3.78	0.198	326	-0.285	0.842	0.219	66
2015	0.245*	3.471	0.205	281	-0.024	0.009	0.367	67
2016	0.941***	23.82	0.268	284	-0.184	0.32	0.387	76
2017	0.6***	11.94	0.384	264	-0.321	1.465	0.625	78

	Regional Banks		($10-50Billion)		Community Banks		(<$10Billion)	
Year	Sum/Assets	F-stat	Adj. R^2	N	Sum/Assets	F-stat	Adj. R^2	N
2001	-1.664	1.529	0.768	23	0.341***	9.926	0.269	336
2002	0.763	0.597	0.333	25	-0.437***	15.277	0.298	365
2003	0.574	0.319	0.395	25	0.091	0.221	0.198	398
2004	0.031	0.002	0.444	27	0.314*	2.861	0.211	420
2005	-0.402	0.371	0.478	28	0.385**	5.13	0.271	409
2006	-0.331	0.13	0.543	33	0.564***	10.103	0.384	323
2007	-0.376	0.293	0.193	29	0.081	0.683	0.36	306
2008	-1.556**	5.832	0.783	30	-0.269*	3.572	0.427	295
2009	-0.387	0.419	0.512	31	-0.215*	3.434	0.296	290
2010	-0.45	1.244	0.354	30	0.021	0.032	0.396	271
2011	-0.766**	4.411	0.408	31	0.131	1.189	0.338	269
2012	-0.529*	3.501	0.35	36	0.171	1.856	0.323	272
2013	-0.441	2.487	0.502	38	0.012	0.006	0.38	271
2014	-0.631*	3.592	0.395	44	0.089	0.311	0.368	260
2015	-0.436	1.917	0.421	44	-0.027	0.018	0.317	214
2016	-0.71*	2.979	0.367	52	1.091***	16.274	0.448	208
2017	-0.808**	4.993	0.697	53	0.793***	8.291	0.408	186

[1] *** stands for p<0.01; ** stands for p<0.05; * stands for p<0.1.

Appendix F. Robustness Check

Table F.11: OLS Estimates of the Interaction Effect of Regulation Change and Small Business Loans on Bank Financial Performance

Dependent variable: Tobin's Q Ratio 2002-2017

Coefficients are estimated using annual BHC level data spanning 2002-2017. SBL is defined as business loans with original amount of $1 million or less. LARGE is a dummy variable,which equals 1 for banks with assets more than $50 billion. DFA2 is a dummy variable with value of 1 during 2015-2017 and 0 during 2010-2014. DFA is a dummy variable with value of 1 during 2010-2017 and 0 during 2002-2009. gSBL is the growth rate of SBL/assets from the previous year. Other bank controls include nonperforming loans, consumer loans, residential real estate loans, commercial real estate loans, ratio of liquid assets to total assets, ratio of non-interest income to revenue, and ratio of deposits to all funding. All loan variables are scaled by assets. GDP is the sum of state-level GDP weighted by each BHC's deposit weight in operating state. HHI is the sum of county-level Herfindahl-Hirschman index weighted by each BHC's deposit weight in operating county. The F-test statistics are in parentheses.

	2002-2017	2010-2017	2002-2009
gSBL	0.001	0.002	0.001
	(0.001)	(0.002)	(0.002)
gSBL*LARGE	0.005	-0.018*	-0.012
	(0.009)	(0.01)	(0.01)
gSBL*LARGE*DFA	-0.032***		
	(0.011)		
gSBL*LARGE*DFA2		-0.004	
		(0.014)	
SBL/Assets	0.227***	0.134***	0.328***
	(0.033)	(0.051)	(0.043)
(SBL/Assets)*LARGE	-0.853***	-1.858***	-0.859***
	(0.204)	(0.273)	(0.224)
(SBL/Assets)*DFA	0.067		
	(0.045)		
(SBL/Assets)*LARGE*DFA	-1.298***		
	(0.302)		
(SBL/Assets)*DFA2		0.336***	
		(0.078)	
(SBL/Assets)*LARGE*DFA2		-0.677	
		(0.459)	
Bank Controls?	YES	YES	YES
Year Effect?	YES	YES	YES
Adj.R^2	0.497	0.454	0.489
N	5358	2340	3018
Marginal Effect of 1 p.p. Increase in SBL/Assets:			
Pre-DFA + non-LARGE	0.227***		0.328***
Post-DFA + non-LARGE	0.293***		
	(42.47)		
DFA1 + non-LARGE		0.134***	
DFA2 + non-LARGE		0.47***	
		(38.36)	
Pre-DFA + LARGE	-0.626***		-0.531
	(9.21)		(5.53)
Post-DFA + LARGE	-1.857***		
	(55.17)		
DFA1 + LARGE		-1.724***	
		(38.91)	
DFA2 + LARGE		-2.065***	
		(24.91)	

[1] Standard errors in parenthesis under estimated coefficients; F-test values in parenthesis under marginal effect.
[2] *** stands for p<0.01; ** stands for p<0.05; * stands for p<0.1.
[3] Data are collected from Call Reports, Y-9C Reports, WRDS Compustat, Summary of Deposit, and Bureau of Economic Analysis.

Table F.12: Pooled OLS Results

This table reports results of pooled OLS regression of Tobin's Q on ratio of SBL/assets and its interaction with dummy variables. Coefficients are estimated using annual BHC level data spanning 2001–2009. SBL is defined as business loans with original amount of \$1 million or less. FC is a dummy variable for the 2008 financial crisis period and equals 1 from 2007 to 2009 and 0 before 2007. SIB is a dummy variable and equals 1 for large banks which were once labeled as systematically important bank and 0 otherwise. Bank controls include nonperforming loans, consumer loans, residential real estate loans, commercial real estate loans, ratio of liquid assets to total assets, ratio of non-interest income to revenue, and ratio of deposits to all funding. All loan variables are scaled by assets. Fundamental controls are weighted state-level 5-year GDP growth rate and weighted county-level Herfindahl-Hirschman index. All standard errors are clustered at individual BHC level. Joint effects are estimated by using heteroscedasticity consistent covariance.

	Tobin's Q Ratio in 2001–09						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SBL/Assets	0.155	0.156	0.205*	0.154	0.201*	0.159	0.212*
(a)	(0.103)	(0.104)	(0.113)	(0.105)	(0.112)	(0.105)	(0.113)
(SBL/Assets)*SIB		-0.596	-0.716			-0.514	-0.602
(b)		(0.377)	(0.532)			(0.385)	(0.542)
(SBL/Assets)*FC				0.002	-0.011	-0.006	-0.021
(c)				(0.063)	(0.064)	(0.062)	(0.063)
(SBL/Assets)*SIB*FC						-1.846***	-1.949***
(d)						(0.637)	(0.676)
Bank Controls?	YES	YES	YES	YES	YES	YES	YES
Year FE?	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES
Regional Banks Removed?			YES		YES		YES
Obs.	3657	3657	3385	3657	3385	3657	3385
Adj.R^2	0.469	0.471	0.457	0.469	0.455	0.472	0.459
Marginal Effect of 1 p.p. Increase in SBL/Assets:							
Once Labeled as SIB		-0.44*	-0.511*				
(a+b)		(3.8)	(3.03)				
During Crisis				0.157*	0.19**		
(a+c)				(3.57)	(4.46)		
SIB in Pre-Crisis						-0.355	-0.39
(a+b)						(2.42)	(1.7)
Non-SIB during Crisis						0.153*	0.191**
(a+c)						(3.37)	(4.4)
SIB during Crisis						-2.207***	-2.36***
(a+b+c+d)						(14.93)	(15.82)

[1] Clustered standard errors in parenthesis under estimated coefficients; Chi-Square values in parenthesis under marginal effect.

[2] *** stands for p<0.01; ** stands for p<0.05; * stands for p<0.1.

[3] Data are collected from Call Reports, Y-9C Reports, WRDS Compustat, Summary of Deposit, and Bureau of Economic Analysis.

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