The Slow Recovery of Small Business Lending: Interactions between Capital Market Incentives and Dodd-Frank Regulations*

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Abstract

This paper addresses the problem of slow recovery of small business lending (SBL) by measuring how the new regulations imposed by Dodd-Frank Act of 2010 and its relief plan in 2015 altered the capital market incentives for banks to lend to small businesses. By constructing and analyzing a top-tier publicly-traded bank holding company-level data spanning 2001–2017, I find that, overall, the capital market evaluates SBL as a profitable opportunity for community banks but an unimportant or nonprofitable asset for larger banks. Since Dodd-Frank Act of 2010, for banks with assets of more than $50 billion, financial performance proxied by Tobin's Q ratio would decrease by about 2 percentage point (p.p.) for a 1 p.p. in SBL/assets ratio, and systemically important banks were penalized more severely, which contributed to the slow recovery of SBL. Contrarily, smaller banks with assets under $50 billion were encouraged for SBL throughout the sample period, with an average of 0.16 p.p. increase of Tobin's Q ratio for a 1 p.p. increase of SBL/Assets at margin. Moreover, the regulatory relief plan for smaller banks in 2015 further improved their financial incentives for SBL.

JEL classification: G21, G28, G01

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

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1 Introduction

Ten years after the 2008 financial crisis, the financing flowing to small businesses has recovered slowly, remaining below the pre-crisis level. Since small businesses usually do not have access to debt or equity markets, small business loans (SBL), commonly defined as business loans (Commercial & Industrial loans) under $1 million, is one of their primary funding sources. I plot the annual new originations of SBL from 2001 to 2016 in Figure 1, which shows that the flow of small business financing, both in absolute amount and in ratio to total assets, has been recovering sluggishly. Small businesses' lack of access to bank financing would slow down economic recovery. Liu and Tai (2016) suggested that U.S. credit recovery pace of the recent recession "has been the slowest of any recession since the early 1960s" and is likely to have contributed to the slow recovery of investment and output, as shown in Figure 2.[1].

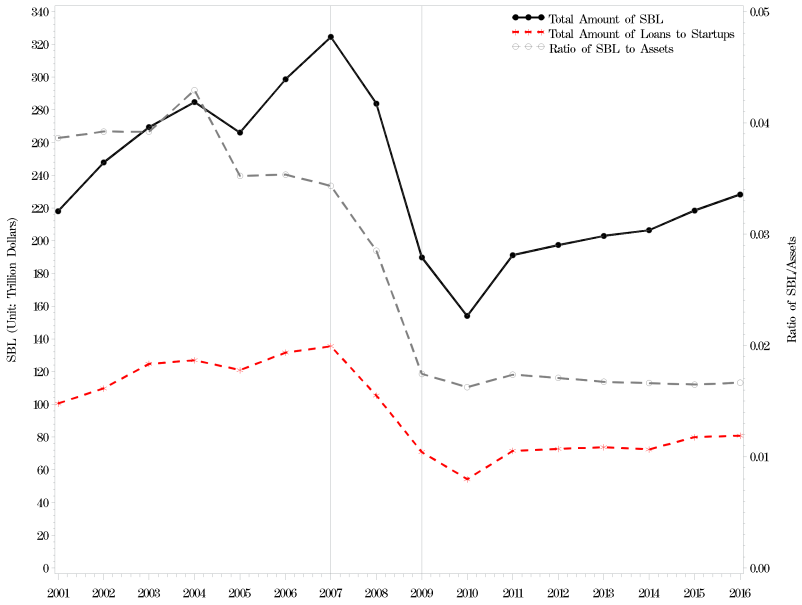
Although *The Federal Reserve Report to the Congress on the Availability of Credit to Small Business (2017)* attributed the slow recovery of SBL to weak credit demand[2], many[3] are concerned about the credit rationing from banks. Chen, Hanson, and Stein (2017) identified and analyzed the large decline of SBL during the recent recession by large banks, especially top 4 banks, but they did not provide explanations. A heatedly discussed factor is Dodd-Frank Act of 2010, which imposed heightened restrictions and annual stress test to large banks with assets above $50 billion. Although not directly targeted by the Act, many community banks also have been complaining that they had to cut some services and products due to the compliance costs imposed by Dodd-Frank regulations (American Bank Association, 2012). Nevertheless, other surveys and interviews showed completely opposite

[1]Graphs of the total private credit and the private credit by banks as a percentage to GDP also show similar pattern, as shown in Figure A.1 in appendix.

[2]The report 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.

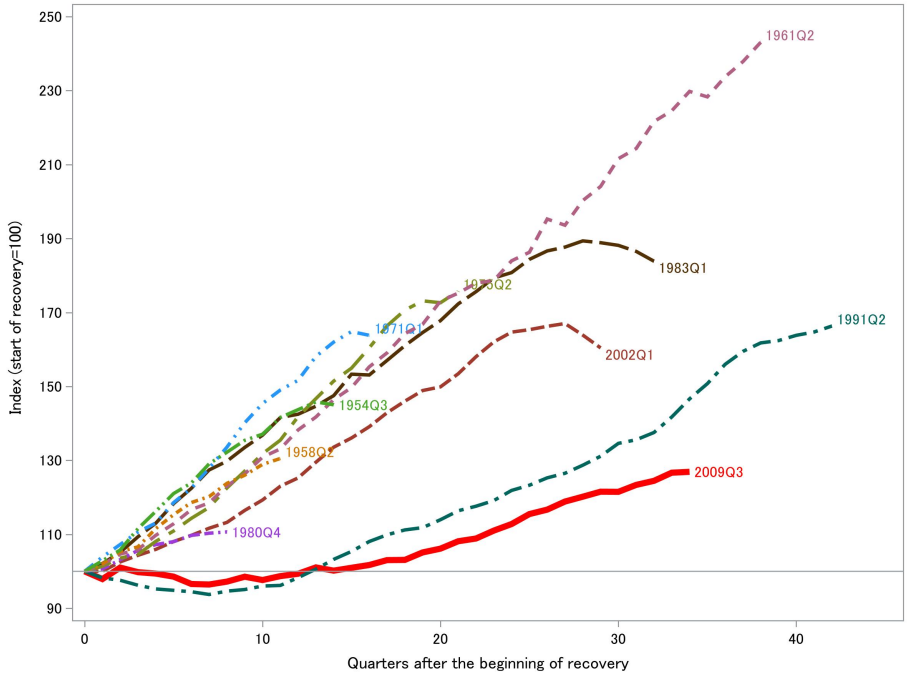
[3]For example, Mills and McCarthy (2016) provided indirect evidence for a significant credit gap for U.S. small businesses, especially for very small loans (less than $50,000).

Figure 1: Annual New Originations of Small Business Loans by U.S. Banks during 2001-2016



Source: the Community Reinvestment Act (CRA). 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. 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 2: Credit to Private Non-Financial Sector by Banks during Recoveries



Source: BIS, FRED, NBER, and Liu and Tai (2016). 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.

results.

This paper addresses 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 how shareholders evaluate changes in regulations would affect banks' lending strategy, assuming that bankers would maximize shareholders' value. If the capital market or shareholders consider certain types of loans 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.

In additiona, this paper aims to examine 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.

My paper contributes to the literature in four aspects. First, my research fills up the gap of studies on U.S. SBL recovery after the recent recession. Most of the related research[4] 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 it. My paper confirms one of their hypotheses that financial regulations played an important role in the large decline in SBL by big banks. While Bordo and Duca (2018)

[4]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.

found that Dodd-Frank Act hampers SBL and business formation speed, my paper confirms their results by suggesting another transmission mechanism.

Second, my work contributes to the discussion about the role of banks in different sizes played in financing small businesses, where the current 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 the 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 crisis when large banks had liquidity shocks. My paper supports Berger, Bouwman, and Kim (2017) from capital market perspectives 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.[5] Moreover, some banks do not report detailed non-interest expenses in Call reports, so some items, such as advisory

[5]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 tract 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 captures the effects of regulatory compliance on financial performance of banks in different sizes.

Lastly, one challenge of this study is to combine datasets from various sources. Based on Hughes, Jagtiani, and Mester (2016), I constructed a top-tier publicly-traded bank holding company (BHC)-level panel data spanning 2001-2017 by combining data from call reports, Y-9C reports, Summary of Depostis, Compustat, and Bureau of Economic Analysis, which provides a data-merging methodology and a multidimensional dataset for future research on this topic.

The remaining parts of this paper are organized as follows. In section 2 and 3, I introduce background of Dodd-Frank Act, bank data, and identification strategy. Section 4 and 5 present empirical results from repeated cross-sectional and panel regressions, and section 6 provides robustness check. Section 7 summarizes the results and places this study in the context of literature, and then concludes.

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 in a heavily partisan vote. The Dodd–Frank Act was designed to target the systemically important financial institutions whose excess leverage and growth were believed to be the cause of the crisis in 2008. To prevent crises like this in future, the act requires large banks with assets more than $50 billion to submit to annual stress tests administered by the Federal Reserve. However, the stress tests might provide disincentives for large banks to lend to small businesses, because SBL is likely to be under higher risk assessments.

Although Dodd-Frank regulations target large banks, many researchers and bankers have concluded 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, many studies claimed that the increased fixed regulatory compliance cost would discourage banks to make SBL.

However, the overall effects of regulatory compliance costs on community banks are conflicting according to different surveys and interviews. FDIC conducted interviews with 9 community bankers in 2012 to ask about regulatory compliance costs.[6] 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[7] 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, who 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).

But 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).

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

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

However, the Government Accountability Office (2015) criticized the survey by the Mercatus Center, 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.

Although many provisions in Dodd-Frank Act might cumulatively affect banks' ability to lend to small businesses, I found that only section 1071 under title X is *directly* related to SBL.[8] Section 1071 "Small Business Data Collection" amended the Equal Credit Opportunity Act by additionally requiring financial institutions to ask borrowers if their business is minority or women owned by of it is a small business, and compile and maintain a record of the information. This record contains many details, 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. The Government Accountability Office (2012) conducted interviews with 16 officials from state associations, community banks, and credit unions. 12 of the 16 officials expected section 1071 to negatively affect their institutions and their SBL by increasing compliance and other costs and by forcing them to develop standardized criteria for SBL to avoid being penalized by regulators. 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.

Although various surveys and interviews showed that bankers have been concerned about section 1071, it has in fact never been implemented and has been reclassified "from pre-rule status to longer-term action status" in Fall 2018 rulemaking agenda of Consumer Financial Protection Bureau.[9]

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

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

Another possible channel for Dodd-Frank Act to affect SBL is through the new regulations related to mortgage lending, because 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. 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).

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 Government Accountability Office (2015) used data from Call Reports to construct indicators of the cumulative compliance costs associated with the DFA, 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.[10] 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."

However, these measures are crude and inaccurate. Non-interest expenses obviously contain expenses not related to regulatory compliance. 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

[10]However, there are studies showing opposite results. For an example, Cyree (2016) found lower pre-tax 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 DFA 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 DFA.

total such expenses. Yet, these survey results have large variance, as the median values are dramatically smaller than the mean values. Therefore, the limitation of data constrains our ability to accurately measure regulatory compliance cost. Given this limitation, dummy variables for policy changes could be a better proxy.

2.2 The Regulatory Relief Plan and Its Effects

In 2015, the regulatory relief bill for banks in the 114th Congress made changes to Dodd-Frank Act, which provides 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 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, effective from first quarter of 2015.

Nevertheless, 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."

To demonstrate the divergence of SBL by SIBs and non-SIBs, I created a list of SIBs in Table B.1, based on the stress test requirements by the Federal Reserve. The list includes

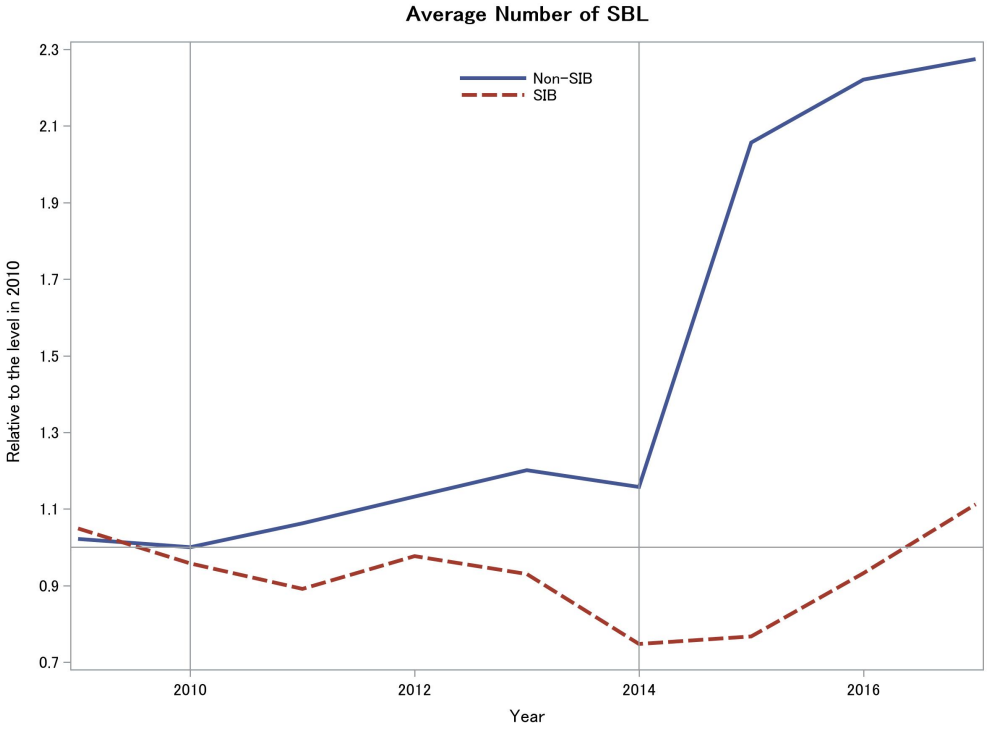
both global and domestic SIBs with headquarters in the U.S. My list includes 12 SIBs[11] during 2009-2013 and 17 SIBs[12] from 2014.

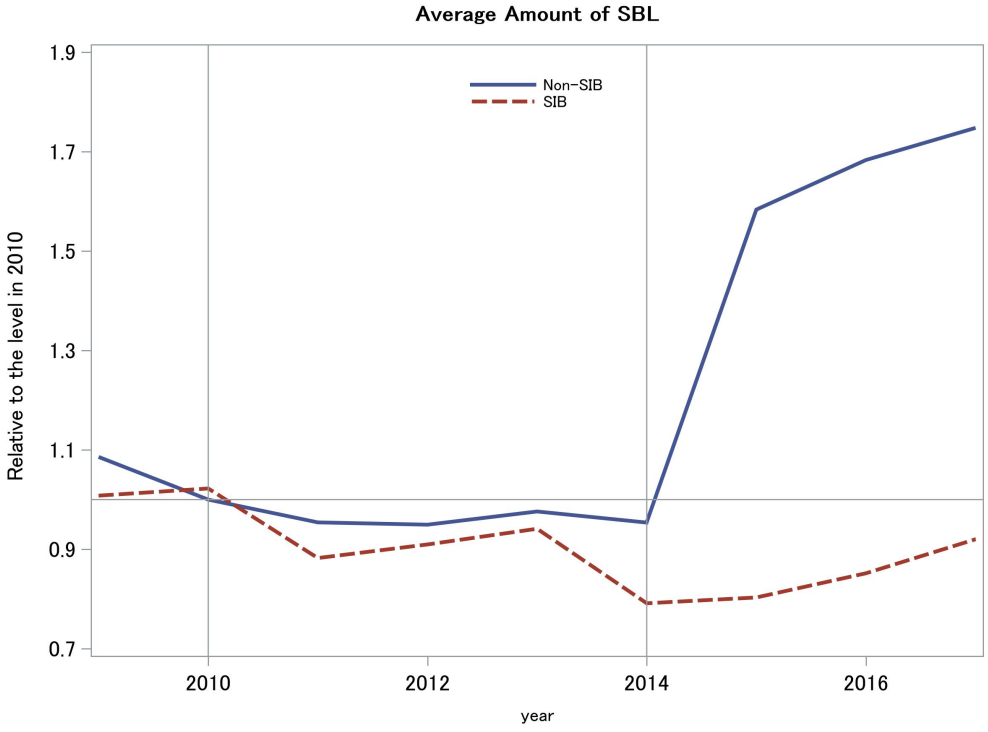
In Figure 3, I compare the average SBL by SIBs and non-SIBs in 2009-2017, scaled by their levels in 2010 when Dodd-Frank Act was signed. For SIBs, both the average amount and number of SBL have been mostly below its 2010 level after 2014. The divergence between SIBs' and Non-SIBs' started from 2014 when the relief plan was announced by the Federal Reserve. Non-SIBs have been dramatically increasing both the amount and the number of loans to small businesses since 2014. Similar trends from CRA data are in Figure B.2.

[11]They are Ally Financial, BB&T, Capital One, Fifth Third Bank, KeyCorp, PNC Financial, Regional Financial, SunTrust Banks, US Bancorp, Bank of America, Citigroup, JPMorgan Chase, and Wells Fargo.

[12]Four BHCs added to the list are Comerica, Huntington, M&T Bank, and Zions.

Figure 3: Average SBL by SIBs and non-SIBs during 2009-2017 (Scaled by the 2010 level)





Source: Call reports. SBL data are summed up to BHC level. The average level is calculated as total amount divided by the number of banks. Data is scaled by the level in 2010, when Dodd-Frank Act was signed. The trends diverged from 2014 when Fed announced a relief plan for smaller banks.

3 Data and Methodology

3.1 Data Description

This paper uses holding company accounting data[13] collected 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. The time period of interest is 2001-2017, covering before, during, and after the financial crisis. 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 consolidated assets of $1 billion or more.[14] This paper analyzes data in the fourth quarter of each year. There are around 5000 observations in each year's raw dataset, and several criteria are used to filter the data.

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. 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.[15] This paper uses the total amount of outstanding C&I

[13]Data manual in Appendix C

[14]The reporting requirements in terms of total assets changed in 2006 and 2015, to raise the minimum consolidated assets that require reporting. In 2015, the minimum assets was raised from $0.5 billion to $ 1 billion. There are some requirements that ask smaller banks to file Y-9C after 2015, but the number is reduced.

[15]In Schedule RC-C Part II, banks are also asked whether all C&I loans have original amounts of $100,000

loans under $1 million as the amount of SBL.[16] Due to the data limitation of SBL before 2010, Call Reports in second quarters are used for each year. A summary of average amount of SBL by banks of different sizes is shown in Table 1.

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

Year	All Banks	Large	Mid-tier	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

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

Summary of Deposit provides bank branch-level data on deposits, so the weight of deposit in the operating counties and states can be calculated. The branches with zero deposits or in U.S. territories are dropped. The Herfindahl-Hirschman index (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. The county-level HHI can be calculated using zip codes of branches.[17] Because of the BHC code indicator (RSSDHCR) in Call

or less. If the answer is yes, then the total amount of C&I loans is counted as SBL.

[16] 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.

[17] According to FDIC Small Business Lending Survey (2018), banks usually view local banks of similar

Report, all the bank-level data can be summed up to top-tier holding company level.

The state-level GDP data is collected from the Bureau of Economic Analysis. Using the deposits of all banks in one holding company in each operating state as weights, this paper calculates the weighted average GDP growth rate for each holding company to control the economic fundamentals.

Table 2: The Mean Table for Key Variables (N=6026)

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Tobin's Q	1.054	0.071	0.616	1.514
SBL/Assets	0.05	0.039	0	0.455
Business-Loan/Assets	0.108	0.074	0	0.579
Total-Loan/Assets	0.682	0.134	0.012	0.966
Log(Assets)	14.701	1.646	11.941	21.65
GDP	0.019	0.013	-0.031	0.092
HHI	0.191	0.084	0.061	0.895
Liquid-Assets/Assets	0.262	0.121	0.016	0.952
Noninterest-Income/Revenue	0.189	0.132	-1.129	0.977
Nonperforming-Loan/Assets	0.021	0.024	0	0.316
Deposits/Funding	0.906	0.096	0.041	1

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

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.

This paper also collects the branch-level SBL data in CRA Disclosure Reports during 2001-2016. The SBL is defined as the loan amount of small business loans originated with loan amount less than $1 million, and it is flow data.[18] The branch-level data is summed up to bank-level data by applying ID list in Transmittal Sheets of CRA. The bank-level data is summed up to holding company level according to the link implied by the Summary of

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.

[18]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.

Deposit. The data would be used for a robustness check. The plotted SBL data for banks in different sizes are in the Appendix.

3.2 Methodology

To measure capital market incentives in *each year* for banks to make SBL, I build a baseline repeated cross-sectional regressions of holding companies' financial performance on SBL from 2001 to 2017, based on Hughes, Jagtiani, and Mester (2016). The financial performance is proxied by the commonly used Tobin's Q ratio, defined as the ratio of the market value of assets to the replacement cost. The proxy for market value of assets (MVA) of one BHC is computed as the sum of the market value of its equity and the book value of its liabilities. The proxy for replacement cost is the book value of assets net of goodwill (BVA). Therefore, Tobin's Q ratio of one BHC is calculated as its MVA divided by its BVA. The baseline BHC level cross-sectional regression is

$$FinancialPerformance_i = \alpha + \beta_1 \frac{SBL_i}{Assets_i} + \beta_2 \frac{LBL_i}{Assets_i} + \beta_3 \frac{NBL_i}{Assets_i} + \gamma' X_i + \epsilon_i \qquad (1)$$

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[19] with SBL.

Depending on the size of consolidated assets, banks are categorized into mid-tier and large banks[20] (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)[21]. The repeated cross-sectional regression is conducted for each bank category during 2001–2017. The coefficients of interest in cross-sectional regressions will provide guidance for the policy impact measurement.

To capture the impact of regulatory changes on SBL, I specify the panel regression and further add dummy variables interacting with SBL to estimate the overall effects during the entire sample period as well as in each period under specific policy, based on Bordo and Duca (2018). The panel estimation takes the form:

$$\begin{aligned} FinancialPerformance_{it} = \alpha_0 + \alpha_t + \beta_1 \frac{SBL_{it}}{Assets_{it}} + \beta_2 \frac{SBL_{it}}{Assets_{it}} * PolicyDummy \\ + \beta_3 \frac{SBL_{it}}{Assets_{it}} * SizeDummy + \beta_4 \frac{SBL_{it}}{Assets_{it}} \\ * PolicyDummy * SizeDummy + \gamma' X_{it} + \epsilon_{it} \end{aligned} \tag{2}$$

where $FinancialPerformance_{it}$ is the Tobin's Q ratio of BHC i in year t, α_t is the year effect, $PolicyDummy$ is a dummy variable, equals 1 in years under certain regulatory policies

[19]Other types of loans include real estate loans, loans to other banks, loans to other financial institutions, agricultural loans, consumer loans, and loans to foreign governments.

[20]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.

[21]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.

and 0 otherwise, and SizeDummy is a dummy variable, equals 1 for large banks with assets of more than $50 billion or with other conditions, and 0 otherwise. The control variables are the same as those in regression (1).

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.

4 Repeated Cross-sectional Estimation – Divergence between Community and Larger Banks

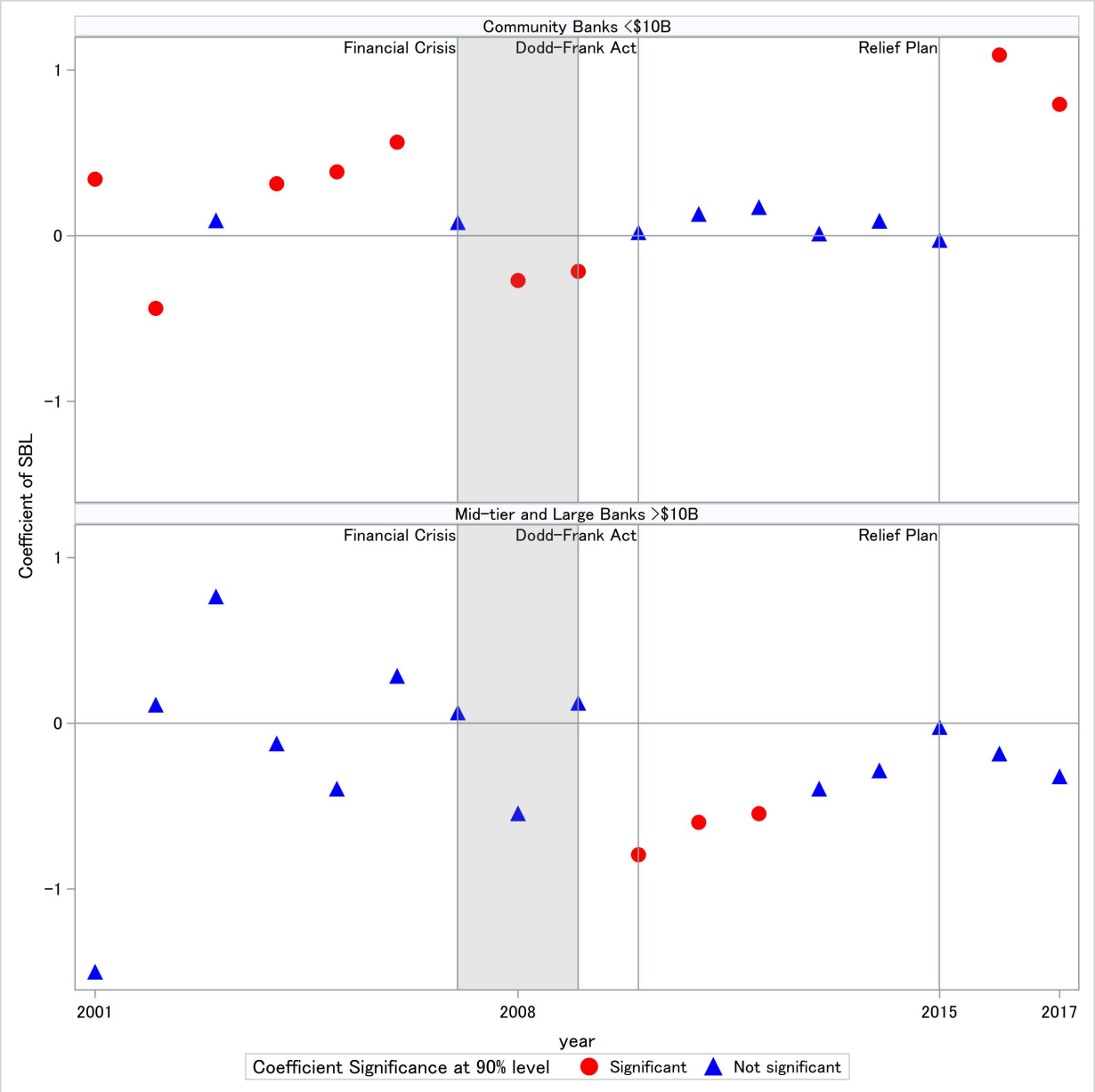
The baseline repeated cross-sectional model was estimated for each year from 2001-2017 for banks with different sizes. Table E.7, E.5, and E.6 in Appendix summarize the results of interest. Although some coefficients are not statistically significantly different from zero, there exist obvious divergences between large banks and smaller banks, as shown in Figures 4, 5, and 6.

4.1 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 mid-tier & large banks,[22] as shown in Figure 4. 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.

[22]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 4: Financial Incentive (Tobin's Q Ratio) on Increasing SBL/Assets for Banks of Different Sizes during 2001–2017



The figure shows the coefficients of SBL ratio in repeated cross-sectional regressions (see Table E.7) 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; mid-tier banks refer to banks with consolidated assets of $10-50 Billion; large banks refer to banks with consolidated assets of more than $50 Billion.

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 mid-tier & 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.

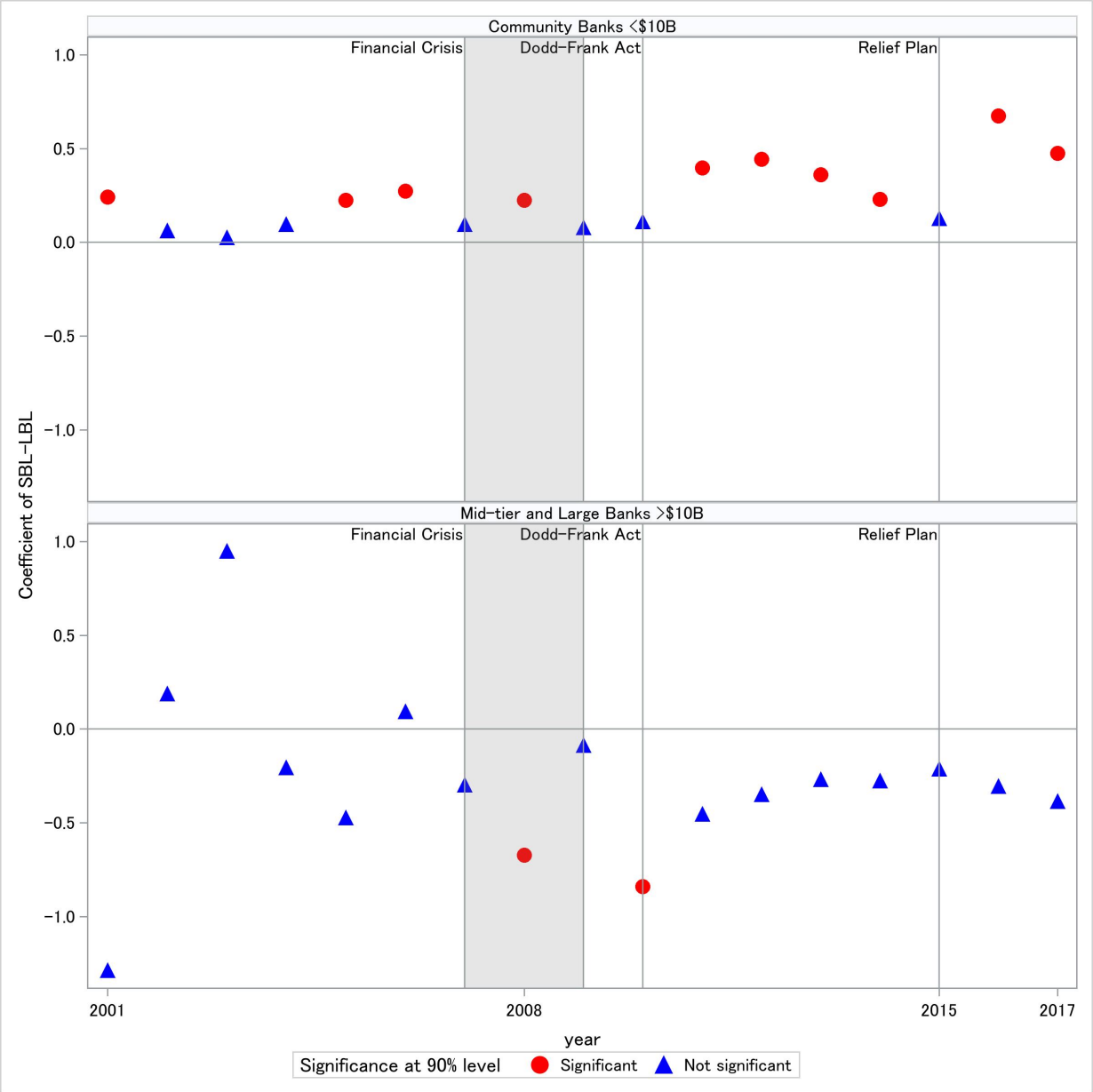
4.2 Replacing SBL with Large Business Loans?

To measure the impact of replacing large business loans with SBL on banks' financial performance for community banks and mid-tier & 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 5. 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, and the magnitude of financial incentives is gradually getting larger and more significant after 2010. 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 relative advantage of community banks for SBL, but it could be related to the recent consolidation trend too. Further research is needed.

For mid-tier & large banks, the coefficients have been mostly negative and statistically insignificant, except for year 2008 and 2010. If replacing 1% of SBL ratio with 1% of large

Figure 5: Financial Incentive (Tobin's Q Ratio) on Replacing Large Business Loans with SBL for Banks of Different Sizes during 2001–2017



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.5), 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; mid-tier banks refer to banks with consolidated assets of $10-50 Billion; large banks refer to banks with consolidated assets of more than $50 Billion.

business loans-to-assets, Tobin's Q ratio of mid-tier & large banks would increase by more than 0.5 p.p. in 2008 and 2010. This is probably due to the fact that large firms are less likely to default the loans compared to small businesses during crises or recessions, which is easier to understand than the case of community banks.

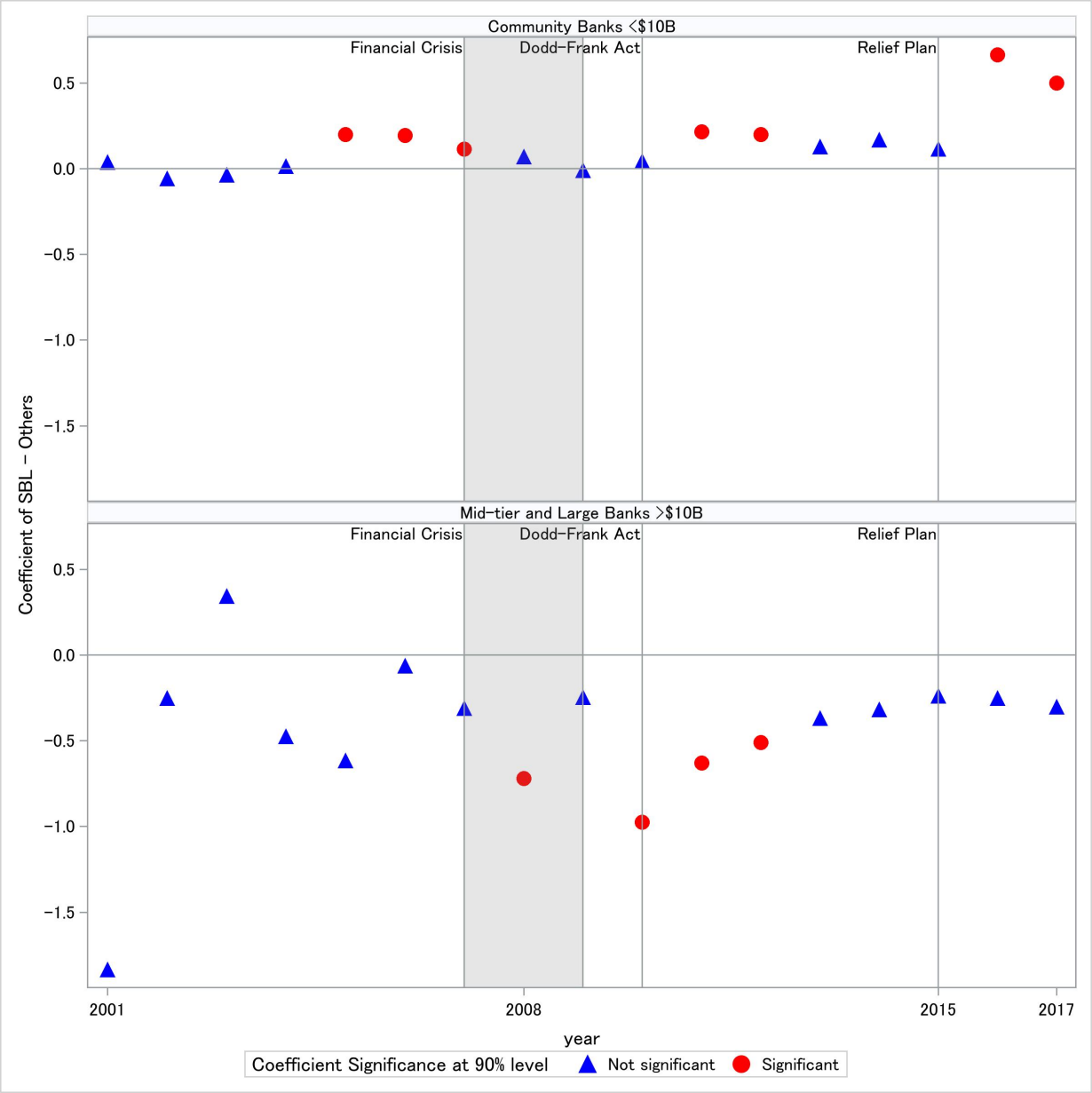
4.3 Replacing SBL with Non-business Loans?

To measure the impact of replacing non-business loans with SBL on banks' financial performance for community banks and mid-tier & large banks in each year, I plot the estimated coefficients of SBL/assets ratio minusing those of non-business loans/assets ratio, as shown in Figure 6. Significantly positive coefficient represents that banks have incentives from the capital market to replace non-business loans (such as residential or commercial real estate 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 5, community banks have financial incentives to replace non-business loans with SBL. This implies that the capital market consider SBL would be more profitable than other types of loans for community banks. For mid-tier & large banks, the coefficients have been mostly negative and statistically insignificant, except for year 2008 and 2010–2012. The trends in Figure 6 is similar to those shown in Figure 5, 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 mid-tier & 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 mid-tier & large banks, their lending

Figure 6: Financial Incentive (Tobin's Q Ratio) on Replacing Non-business Loans with SBL for Banks of Different Sizes on during 2001–2017



The points show the result of coefficients of SBL ratio minus non-business loan ratio in the cross-sectional regressions (see Table E.6), 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; mid-tier banks refer to banks with consolidated assets of \$10-50 Billion; large banks refer to banks with consolidated assets of more than \$50 Billion.

strategy related to SBL did not affect their financial performance, which might be due to the relatively lower share of SBL to assets in mid-tier and large banks, as shown in Figure D.10 and Figure D.12 in the Appendix. During and after the recent crisis, shareholders started to evaluate SBL in mid-tier & large banks as risky and nonprofitable and thus mid-tier & 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.

5 Panel Estimation – Effects of Regulation Changes

Although repeated cross-sectional regressions provide the specific SBL effect on financial performance for banks in different sizes for each year, the estimation results might suffer from relatively small sample size for each bank category.[23] More importantly, panel regressions are required to capture regulatory policy effects.

5.1 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 for large and smaller banks, I include another dummy variable *Large*, which equals 1 for BHCs with consolidated assets of more than $50 billion and 0 for community and mid-tier banks with assets under $50 billion. This is to capture the effects that Dodd-Frank Act imposes heightened restrictions

[23]The sample sizes for each regression are summarized in Table E.5, Table E.6, and Table E.7.

Table 3: OLS Estimates of the Interaction Effect of Dodd-Frank Act and Small Business Loans on Bank Financial Performance

Dependent variable: Tobin's Q Ratio 2001-2017

Coefficients are estimated using annual BHC level data spanning 2001-2017, with 6019 observations. 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 with more than $50 billion assets and 0 for smaller banks. 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 5-year GDP growth rate 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 coefficient of SBL/Assets is list at "pre-DFA+non-LARGE". For "pre-DFA+LARGE" banks, the marginal effect of SBL is calculated by adding the coefficient of (SBL/Assets)*LARGE to the effect for "pre-DFA+non-LARGE". The effect for "DFA+non-LARGE" banks is calculated by adding the coefficient of (SBL/Assets)*DFA to the effect for "pre-DFA+non-LARGE". The effect for "DFA+LARGE" is calculated by adding the coefficients of (SBL/Assets)*DFA*LARGE and (SBL/Assets)*DFA to the effect for "pre-DFA+LARGE".

	Model 1	**Model 2**	**Model 3**
SBL/Assets	0.135***	0.022	0.115***
	(0.029)	(0.022)	(0.03)
(SBL/Assets)*DFA		0.185***	0.156***
		(0.047)	(0.045)
(SBL/Assets)*LARGE		-0.771***	-0.652***
		(0.178)	(0.171)
(SBL/Assets)*DFA*LARGE		-1.881***	-1.843***
		(0.278)	(0.266)
ln(Assets)	0.014***	0.014***	0.016***
	(0.001)	(0.001)	(0.001)
GDP	0.384***	0.583***	0.4***
	(0.072)	(0.072)	(0.071)
HHI	-0.02**	-0.022**	-0.019**
	(0.009)	(0.009)	(0.009)
LBL/Assets	0.045**		-0.073***
	(0.023)		(0.023)
Other Loans/Assets	0.111***		0.13***
	(0.022)		(0.021)
Other Bank Controls?	YES	NO	YES
Year Effect?	YES	YES	YES
Adj.R^2	0.447	0.39	0.459
Marginal Effect of 1 p.p. Increase in SBL/Assets:			
pre-DFA + non-LARGE		0.022	0.115***
DFA + non-LARGE		0.207***	0.271***
		(100.15)	(35.75)
pre-DFA + LARGE		-0.749***	-0.537***
		(23.83)	(9.52)
DFA + LARGE		-2.445***	-2.224***
		(17.25)	(87.71)

[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.

on large banks.[24] Table 3 presents results from panel estimation spanning 2001-2017.

Results in Table 3 are statistically significant with decent goodness-of-fit, confirming the hypothesis that Dodd-Frank regulations changed capital market incentives for large banks to lend to small businesses. In Model 3, the negative and highly statistically significant coefficients of (SBL/Assets)*LARGE and (SBL/Assets)*DFA*LARGE suggest that the capital market has been punishing large banks for increasing SBL.[25] The magnitude of penalty dramatically intensified after 2010 when Dodd-Frank Act was signed. Model 2 does not include bank characteristic controls and thus might be suffered from endogeneity problem, but the coefficients of interest are not much different from those in Model 3. Model 1 does not include policy dummy or size dummy so as to serve as a benchmark.

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 botton of Table 3. The effects of policy change and bank size are highly significant, supporting of the hypothesis of divergence between large banks and smaller banks. In model 3, a 1 p.p. increase in SBL/assets would decrease the Tobin's Q ratio of large banks by more than 2 p.p. before Dodd-Frank Act, down from the marginal effect of about 0.5 p.p. before 2010. For community and mid-tier banks, a 1 p.p. increase in SBL/assets would increase their Tobin's Q ratio by 0.27 p.p. after 2010, up from the marginal effect of 0.1 p.p. before the Act.

The worsen financial incentives for large banks can be explained by the heightened supervision standards imposed by Dodd-Frank Act. But the improved financial incentives for smaller banks are difficult to understand, 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

[24]Because the list of SIBs is available after 2009, I use the dummy for large banks instead of SIBs for the convenience of comparison with pre-crisis era.

[25]The panel estimation in pre-Act period shows that the capital market was insensitive to large banks lending strategy of SBL before the recession. So this negative coefficient is actually driven by the disincentives during the recent crisis.

community banks after 2015 in the previous section also suggests a change in incentives.

5.2 The Impact of the Relief Plan for Dodd-Frank Act

To further examine the effects of policy change for Dodd-Frank Act, I focus 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 4 lists panel estimation results of adding dummy *LARGE* and *DFA2*. Results are highly statistically significant with decent goodness-of-fit, confirming the hypothesis that the regulation relief plan for small banks provided positive incentives for them to lend to small businesses. In Model 3, the estimated coefficient of (SBL/Assets)*DFA2 is positive and statistically significantly different from zero. The coefficient of (SBL/Assets)*LARGE is negative and statistically significant with a large magnitude, suggesting that the capital market continued to penalize large banks for SBL after 2010, consistent with previous results. The coefficient of (SBL/Assets)*LARGE*DFA2 is also negative and statistically significant, implying that large banks have even more financial incentives for reducing loans to small businesses after the policy change.

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 bottom of Table 4. A 1 p.p. increase in SBL/assets would decrease large banks' Tobin's Q ratio by about 1.8 p.p. during 2010–2014, and it further drop to 2.45 p.p. after 2015. For smaller banks, the regulatory relief plan greatly improves their financial incentives for SBL. After the relief plan, a 1 p.p. increase of SBL/assets would increase Tobin's Q ratio

Table 4: OLS Estimates of the Interaction Effect of Regulation Change and Small Business Loans on Bank Financial Performance

Dependent variable: Tobin's Q Ratio 2010-2017

Coefficients are estimated using annual BHC level data spanning 2010-2017, with 2463 observations. SBL is defined as business loans with original amount of $1 million or less. LARGE is a dummy variable and 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 (I refer as DFA1). 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 growth rate 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 coefficients of SBL/Assets is list at "DFA1+non-LARGE". For "DFA1+LARGE" banks, the marginal effect of SBL is calculated by adding the coefficient of (SBL/Assets)*SIB to the effect for "DFA1+non-LARGE". The effect for "DFA2+non-LARGE" is calculated by adding the coefficient of (SBL/Assets)*DFA2 to the effect for "DFA1+non-LARGE". The effect for "DFA2+LARGE" is calculated by adding the coefficients of (SBL/Assets)*LARGE and (SBL/Assets)*LARGE*DFA2 to the effect for "DFA2+non-LARGE".

	Model 1	**Model 2**	**Model 3**
SBL/Assets	0.232***	0.084*	0.165***
	(0.048)	(0.044)	(0.03)
(SBL/Assets)*LARGE		-1.85***	-1.946***
		(0.263)	(0.253)
(SBL/Assets)*DFA2		0.363***	0.348***
		(0.084)	(0.08)
(SBL/Assets)*LARGE*DFA2		-1.339***	-1.017**
		(0.423)	(0.398)
ln(Assets)	0.013***	0.011***	0.016***
	(0.001)	(0.001)	(0.001)
GDP	0.322***	0.554***	0.373***
	(0.105)	(0.106)	(0.103)
HHI	-0.007	-0.008	-0.007
	(0.013)	(0.013)	(0.013)
LBL/Assets	0.084***		0.121**
	(0.032)		(0.031)
Other Loans/Assets	0.147***		0.171***
	(0.036)		(0.036)
Other Bank Controls?	YES	NO	YES
Year Effect?	YES	YES	YES
Adj.R^2	0.417	0.366	0.447
Marginal Effect of 1 p.p. Increase in SBL/Assets:			
DFA1 + non-LARGE		0.084*	0.165***
DFA2 + non-LARGE		0.447***	0.513***
		(43.64)	(45.96)
DFA1 + LARGE		-1.766***	-1.781***
		(51.85)	(47.89)
DFA2 + LARGE		-2.742***	-2.45***
		(38.14)	(44.87)

[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.

of smaller banks by more than 0.5 p.p., up from 0.165 p.p. during 2010–2014.

Therefore, the capital market has completely different evaluation of SBL for large banks and smaller banks and the incentives changed dramatically by the regulatory policies. 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 about 2 p.p. for increasing 1 p.p. of SBL/assets after Dodd-Frank Act, and the disincentive might have been intensified after 2015 when Federal Reserve announced a regulatory relief plan for smaller banks. On the other hand, smaller banks were encouraged for SBL throughout the sample period, with an average of 0.16 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 0.5 p.p. for a 1 p.p. increase in SBL/assets.

6 Robustness Check

6.1 Systemically Important Banks

SIBs are included in large banks. Actually, Dodd-Frank Act targets SIBs instead of large banks, and SIBs' capital market incentives are of interest. But because the list of SIBs is available after 2009, I use size dummy in my panel estimations for the convenience of comparison with the pre-crisis levels. To examine how Dodd-Frank regulations and the relief plan altered capital market incentives for SIBs, I use a dummy variable *SIB* to replace dummy *LARGE* in Table F.9, in which *SIB* equals 1 for SIBs which is defined as large banks with assets above $50 billion *and* under heightened supervision standards and annual stress test by the Federal Reserve (listed in Table B.1), 0 otherwise. The results remain consistent with former ones. As expected, SIBs were penalized for SBL even more severe than large banks were. The result is intuitive because those large banks not included in the list of SIBs

are not under the heightened supervision standards or stress test, so the shareholders would not consider SBL to be as risky for non-SIB large banks as for SIBs.

6.2 Dynamic Effect

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.8 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 7. Before Dodd-Frank Act, there is no obvious divergence, but since 2010, the bottom 10 banks with lowest growth rate of SBL/assets[26] has been outperforming the top 10 banks which increased SBL ratio most, in terms of financial performance.

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

Figure 7: 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.

7 Discussion and Concluding Remarks

The slow recovery of SBL concerns many researchers and policymakers. This paper looks at this problem in terms of 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 how shareholders evaluate changes in regulations would affect banks' lending strategy. This study requires the combination of data from various sources, so I construct a top-tier publicly-traded BHC level data spanning 2001–2017.

According to my repeated cross-sectional estimation results, overall, the capital market views SBL as a profitable asset for community banks but an unimportant or nonprofitable asset for mid-tier & large banks. Particularly, ever since the 2008 financial crisis, mid-tier & large banks have incentives to decrease SBL or replace it with other loans to improve financial performance. Even for community banks, in most of years during 2010-2015, the capital market did not provide significant incentives for SBL. However, after 2015 when the relief plan for smaller banks was announced, community banks regained strong financial incentives to increase SBL or replace other loans with SBL. These results imply that regulation changes could alter capital market incentives, suggesting panel regressions to capture policy effects.

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 3, 4, F.9 and F.10[27]. Banks are grouped by their consolidated asset size: smaller banks refer to banks with assets under $50 billion and large banks refer to banks with assets above $50 billion. SIBs are large banks which are additionally under heightened supervision standards and annual stress test, whose data is available from 2009.

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

[27]To complete the story, I conduct similar panel regressions for pre-Act period and results are summarized in Table F.10

Table 5: Marginal Effects of 1 p.p. Increase in SBL/Assets on Bank Financial Performance in Subsample Periods

Size	Sample Period			
Smaller Bank	2001–2009		2010–2017	
	0.115* **		**0.271*** **	
	2001–2006	2007–2009	2010–2014	2015–2017
	0.167* **	**0.142** **	**0.165*** **	**0.543*** **
Large Banks	2001–2009		2010–2017	
	-0.537* **		**-2.224*** **	
	2001–2006	2007–2009	2010–2014	2015–2017
	0.024	**-2.162*** **	**-1.781*** **	**-2.45*** **
SIBs			**-2.22*** **	**-2.504*** **

[1] The marginal effect coefficients are summarized from Table 3, 4, F.10 and F.9.
[2] Large banks are defined as banks with consolidated assets of more than $50 billion; smaller banks refer to those with assets under $50 billion; SIBs are defined as large banks which are submit to annual stress test and heightened restrictions imposed by Dodd-Frank Act.

divide the pre-Act period of 2001–2009 into pre-crisis and recession periods, and divide the post-Act period of 2010–2017 into pre-relief and post-relief periods.

For smaller banks, capital market incentives were significantly positive and steady during 2001–2014, as Tobin's Q ratio would increase more than 0.16 p.p. for a 1 p.p. increase in SBL/assets, even during the recent financial crisis the marginal effects were just slightly lowered with a slightly reduced significance level. 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 0.5 p.p. increase in Tobin's Q ratio for a 1 p.p. increasing in their SBL/assets ratio, which is about four times larger than before. 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 relative 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 about 2 p.p. for a 1 p.p. increase in SBL/assets. Although during 2010-2014, capital market penalty relieved slightly from the crash during the financial crisis, it failed to recover to the pre-crisis level. Before the crisis, the capital market was neutral to SBL business of large banks, which might be related to the fact that, traditionally, large banks tend to be less committed to SBL than small banks do. But afterwards SBL has been evaluated as a risky and nonprofitable assets by shareholders. There are different explanations for the three periods. 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 solvency 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 faced worsened capital market incentives 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.

Then, I examine the case of SIBs after Dodd-Frank Act. As expected, SIBs faced a more severe penalty from the capital market than other large banks, as some large banks are not submit to annual stress tests and heightened supervision standards. During 2010-2014, for a 1 p.p. increase in SBL/assets, SIBs' Tobin's Q ratio would decrease 2.22 p.p., about 0.5 p.p. more than large banks' penalty.

Although this lack of financial incentives for SBL for large banks is an unintended consequence of Dodd-Frank Act, it might have contributed to the slow recovery of SBL, because 70% of small businesses cited a big bank as their primary financial institution (Prager and Wolken, 2008) and the total amount of SBL by SIBs is 1.2—1.4 times of that by non-SIBs according to my estimation. Moreover, there are two advantages of large banks that are 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. The credit gap has been filled by smaller banks and fintech (Chen, Hanson, and Stein, 2017; Jagtiani and Lemieux, 2018), but it takes time for adjustments and small businesses might face higher interest rates (Buchak et al., 2018). Since the relief plan for smaller banks successfully improved their capital market incentives to lend to small businesses, a well-designed relief plan for large banks, especially SIBs, would help alleviate the problem.

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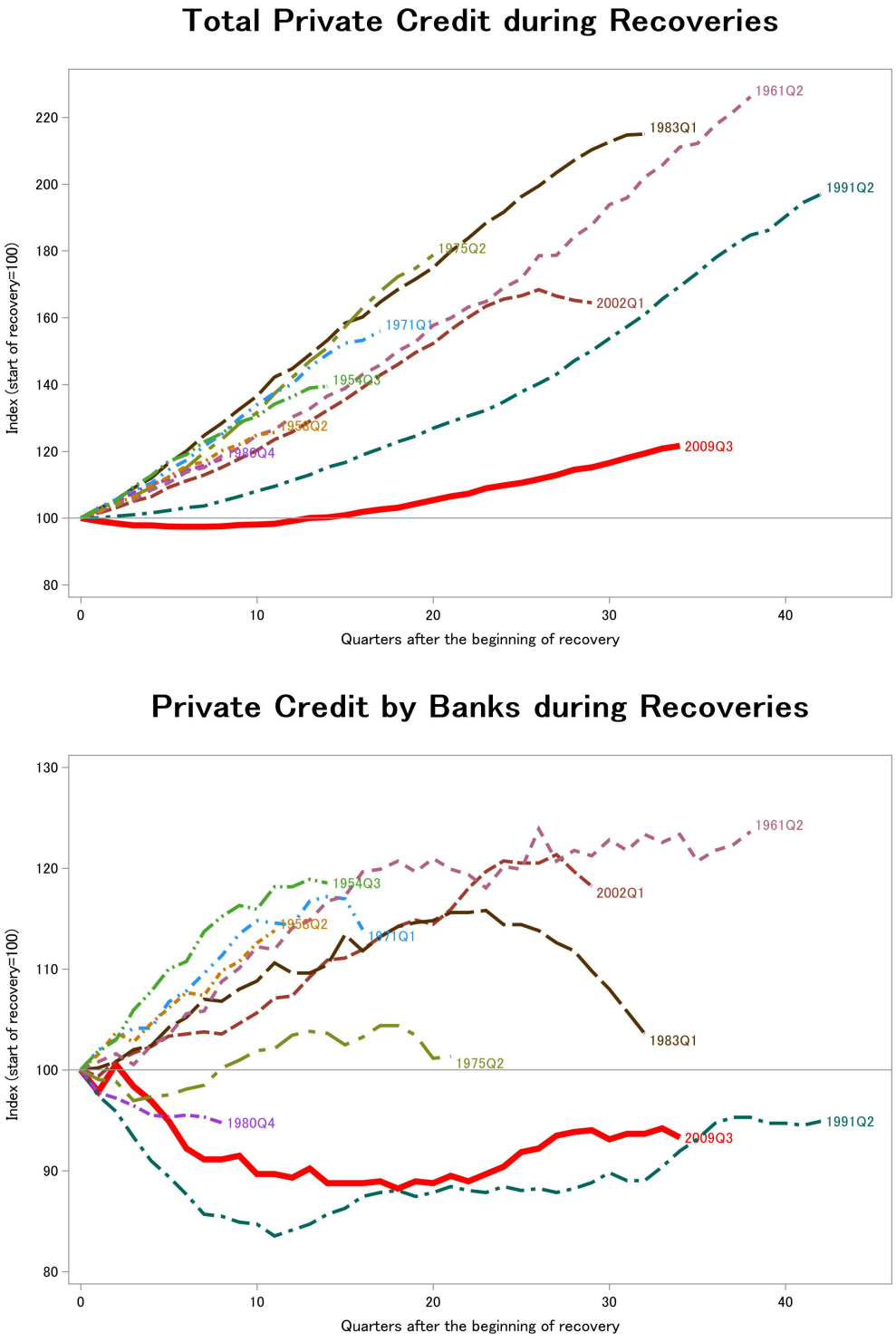
Appendix A. Credit to Private Non-Financial Sector

Figure A.1: Credit to Private Non-Financial Sector during Recoveries



Source: BIS, FRED, and NBER. The total private credit is provided not only by banks but also by other sectors and non-residents. 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 data is collected and adjusted by BIS and retrieved from FRED. Note that the unit for total private credit is billions of USD but that for private credit by banks is percentage of GDP.

Appendix B. Systemically Important Banks

Table B.1 lists global and domestic SIBs with headquarters in the U.S. which are used in my analysis. My list includes 12 SIBs during 2009-2013 and 17 SIBs from 2014.Note that I exclude Goldman Sachs, Morgan Stanley, Bank of NY Mellon, State Street, Northern TR, American Express, Discover, and Metlife, because they made few or even no SBL (the cut-off line is $1 billion dollar). I also exclude BBVA Compass, BMO Financial, HSBC NA, RBS Citizens Financial, Santander USA, and Union BanCal, because they are subsidiaries of foreign BHCs.

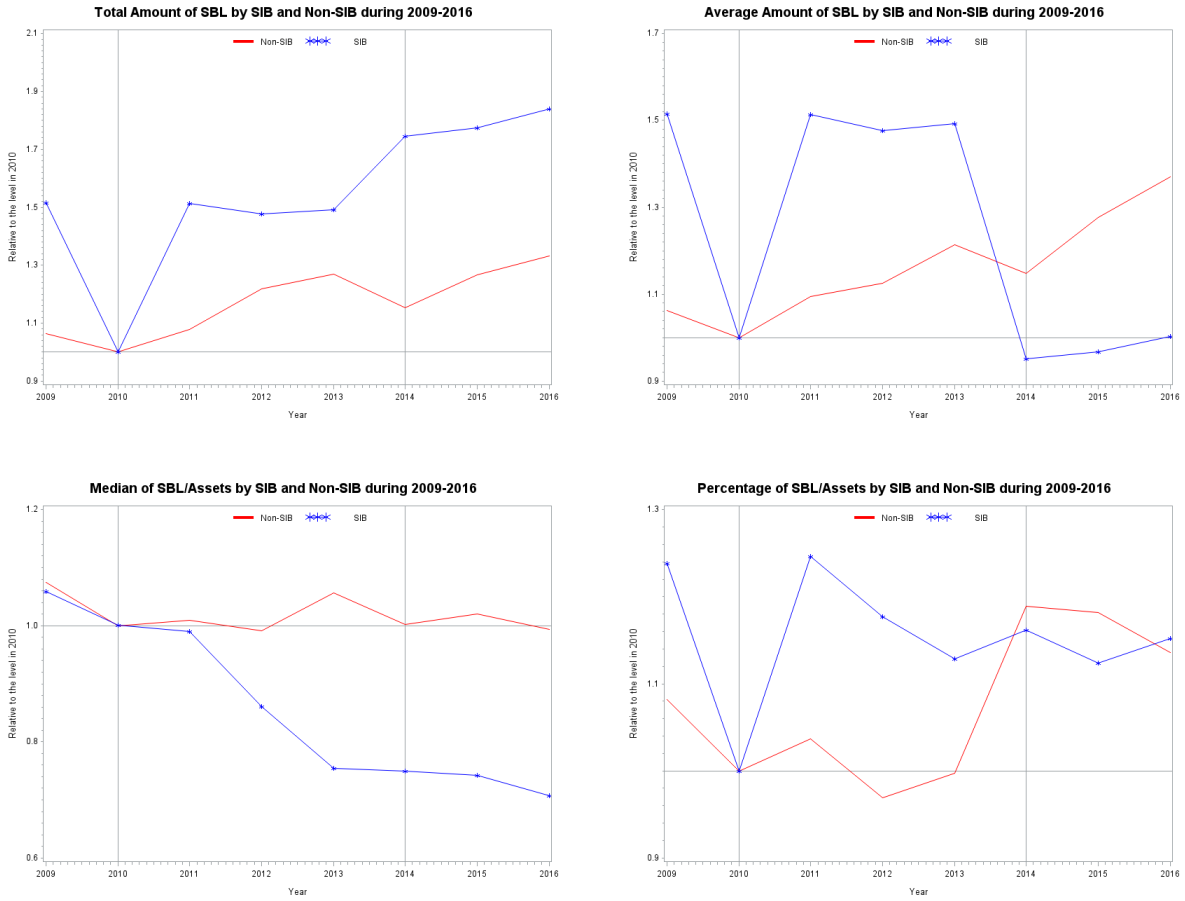
Table B.1: The List of SIBs

	D-SIB	RSSDHCR	G-SIB	RSSDHCR
Since 2009	Ally Financial	1562859	Bank of America	1073757
	BB&T	1074156	Citigroup	1951350
	Capital One	2277860	JP Morgan Chase	1039502
	Fifth Third Bank	1070345	Wells Fargo	1120754
	KeyCorp	1068025		
	PNC Financial	1069778		
	Regional Financial	3242838		
	SunTrust Banks	1131787		
	US BanCorp	1119794		
Since 2014	Comerica	1199844		
	Huntington	1068191		
	M&T Bank	1037003		
	Zions	1027004		

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,[28] 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),[29] branch-level bank deposit data from Summary of Deposits,[30] and GDP and income per capita data from Bureau of Economic Analysis.[31] The time period of interest is 2001–2017, covering both before and after the financial crisis. Except for SBL data, other data is collected at the end of each year during 2001-2017. The methodology of this manual basically follows Hughes, Jagtiani, and Mester (2016).

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

Federal Reserve Y-9C data are quarterly collected for all domestic holding companies with consolidated assets of $1 billion or more. 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, Jagtiani, and Mester (2016).

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

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

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

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

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.2 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.2: 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[32] with corresponding codes from Y-9C reports and descriptions are listed in the Table C.3. 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 total assets by the goodwill (BHCK3163) 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, 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

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

Table C.3: Accounting Variables in Y-9C Reports

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

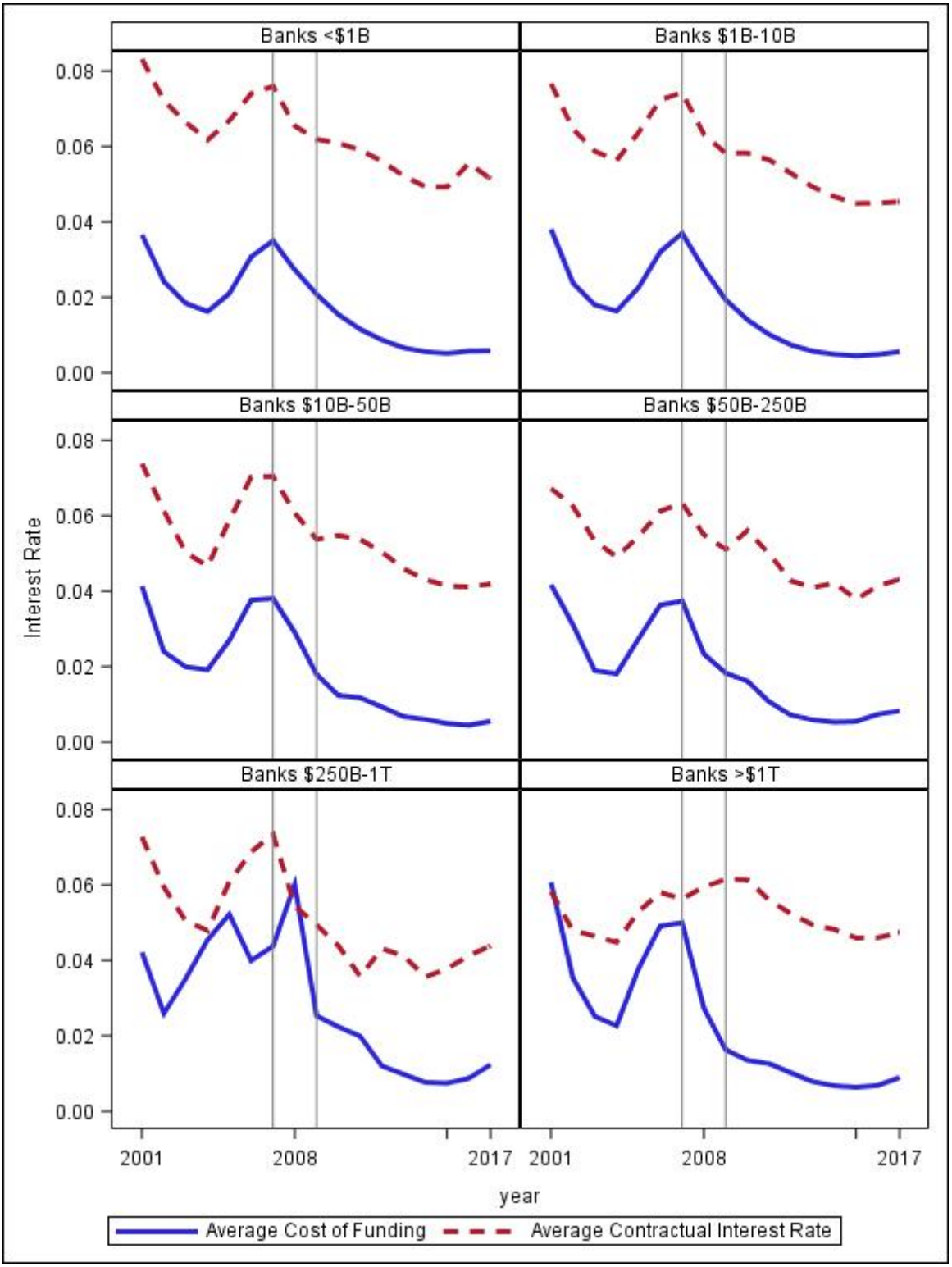
secured by residential properties and extended under lines of credit and other loans secured by residential properties as first liens or junior liens. Commercial real estate loans include construction loans, loans secured by farmland, 1-4 family and multi-family residential real estate loans, and other 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%.

In Graph C.3, the cost of funding and the contractual loan interest rate are plotted for banks in different sizes during 2001-2017. There is no obvious structure break, but both curves demonstrate downward sloping trends. In particular, between the dotcom bubble in 2001 and the subprime debt crisis in 2007, both rates were in a U shape; after 2007, both declined gradually. The only exception is the top 3 or 4 banks with assets more than $1 trillion. Their contractual loan interest rate remained at the same level as in the pre-crisis period, while their cost of funding decreased dramatically during the crisis and continued to drop following the pace of other banks.

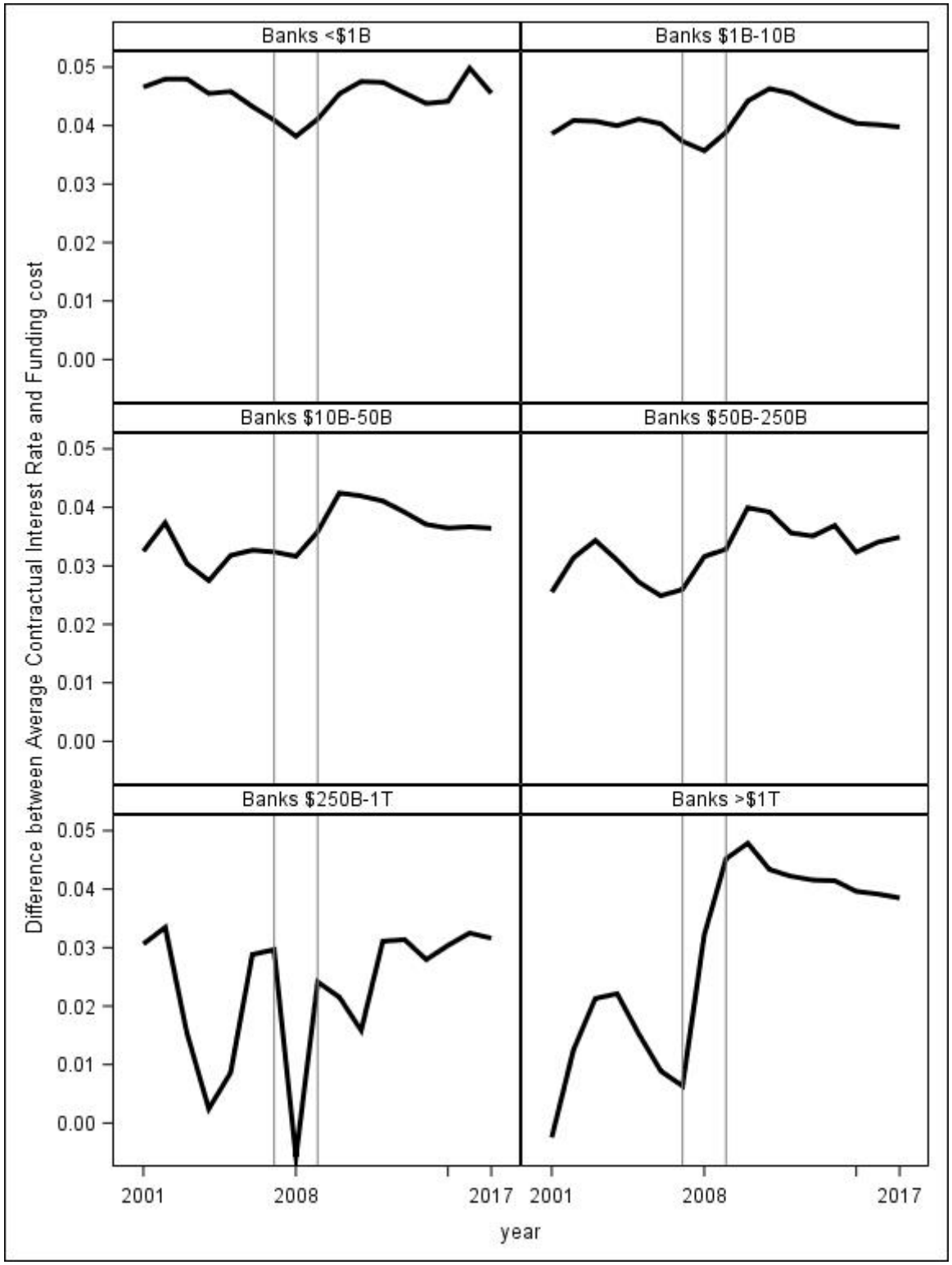
The spread between cost of funding and contractual loan interest rate is plotted in Graph C.4. Except for the top 3 or 4 banks, all banks maintained relatively stable spread before and after the crisis. The spread of community banks (with assets less than $10 billion) was

Figure C.3: The Average Cost of Funding and the Average Contractual Interest Rate of U.S. Banks during 2001–2017 (grouped by assets sizes)



Data Source: Federal Reserve Bank Y9C Report. Average Cost of Funding is calculated as interest expenses divided by the sum of deposits and other borrowed funds. Average Contractual Interest Rate is calculated as interest income on loans and lease divided by the total amount of loans.

Figure C.4: The Spread between the Average Cost of Funding and the Average Contractual Interest Rate of U.S. Banks during 2001–2017 (grouped by assets sizes)



Data Source: Federal Reserve Bank Y9C Report. The spread is calculated as Average Contractual Interest Rate minus Average Cost of Funding. Average Cost of Funding is calculated as interest expenses divided by the sum of deposits and other borrowed funds. Average Contractual Interest Rate is calculated as interest income on loans and lease divided by the total amount of loans.

relatively high and ranged from 4% to 5%. The spread of medium-sized banks (with assets \$10-250 billion) was lower than that of community banks and ranged from 3% to 4%. The spread of large banks (with assets between \$250 billion and \$1 trillion) fluctuated around 3%. For community banks and medium-sized banks, the spread increased slightly during the crisis and in the early recovery and then started to decline gradually. For the top 3 or 4 banks, the spread was nearly 0 in 2001, reached almost 5% in 2011 and then remained above 4%.

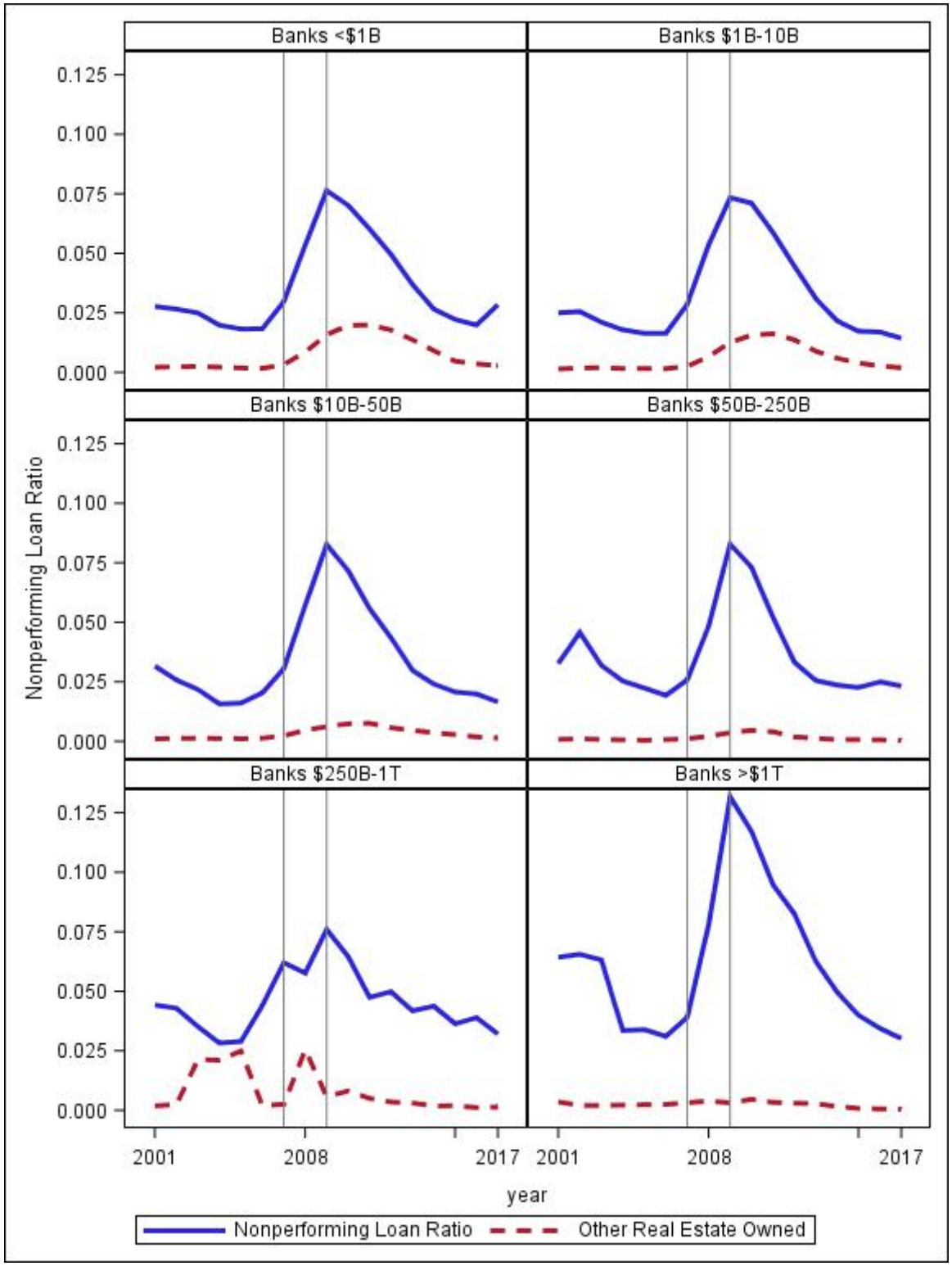
Non-performing loans Nonperforming loan-to-total loan ratio is usually used to measure one bank's loan quality. Nonperforming loans (NPL) are calculated by summing up the delinquent loans and gross charge-offs. Charge-offs are uncollectible loans and leases whose amounts are charged off against the allowance 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.[33]

The NPL ratio and the other real estate owned-to-total loans ratio[34] are plotted for banks in different sizes in Graph C.5. The NPL ratio for all banks increased dramatically during the financial crisis and then gradually returned to the pre-crisis level. Both before the financial crisis and during the recovery in recent years, large banks maintained a relatively high NPL ratio than smaller banks. The other real estate owned ratio increased after the recent recession for community banks. This might be related to the strict mortgage regulations imposed by Dodd-Frank Act. Further researches are needed.

[33]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.

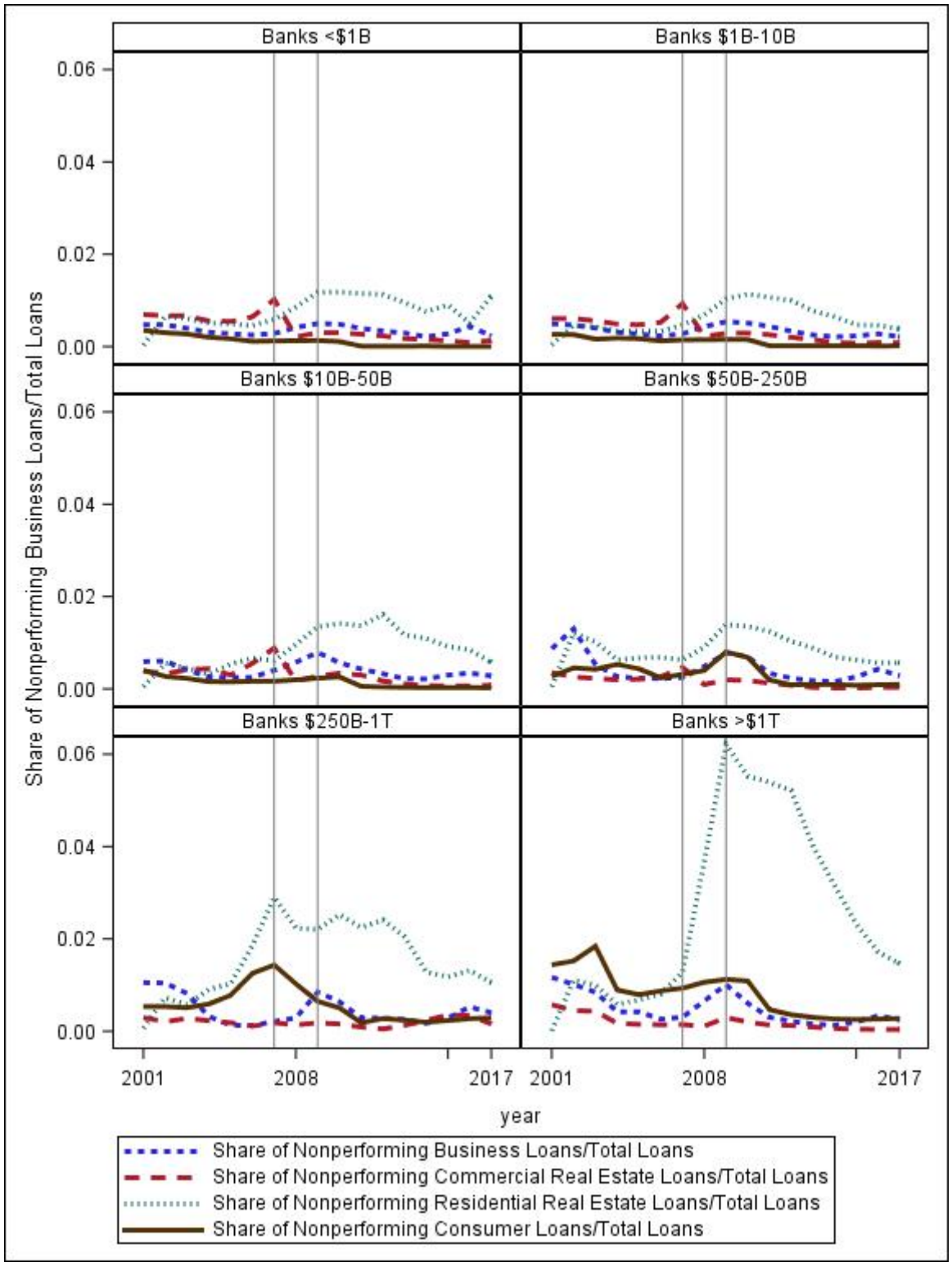
[34]Outliers with ratios larger than 0.2 are dropped.

Figure C.5: The Nonperforming Loan Ratio of U.S. Banks during 2001–2017 (grouped by assets sizes)



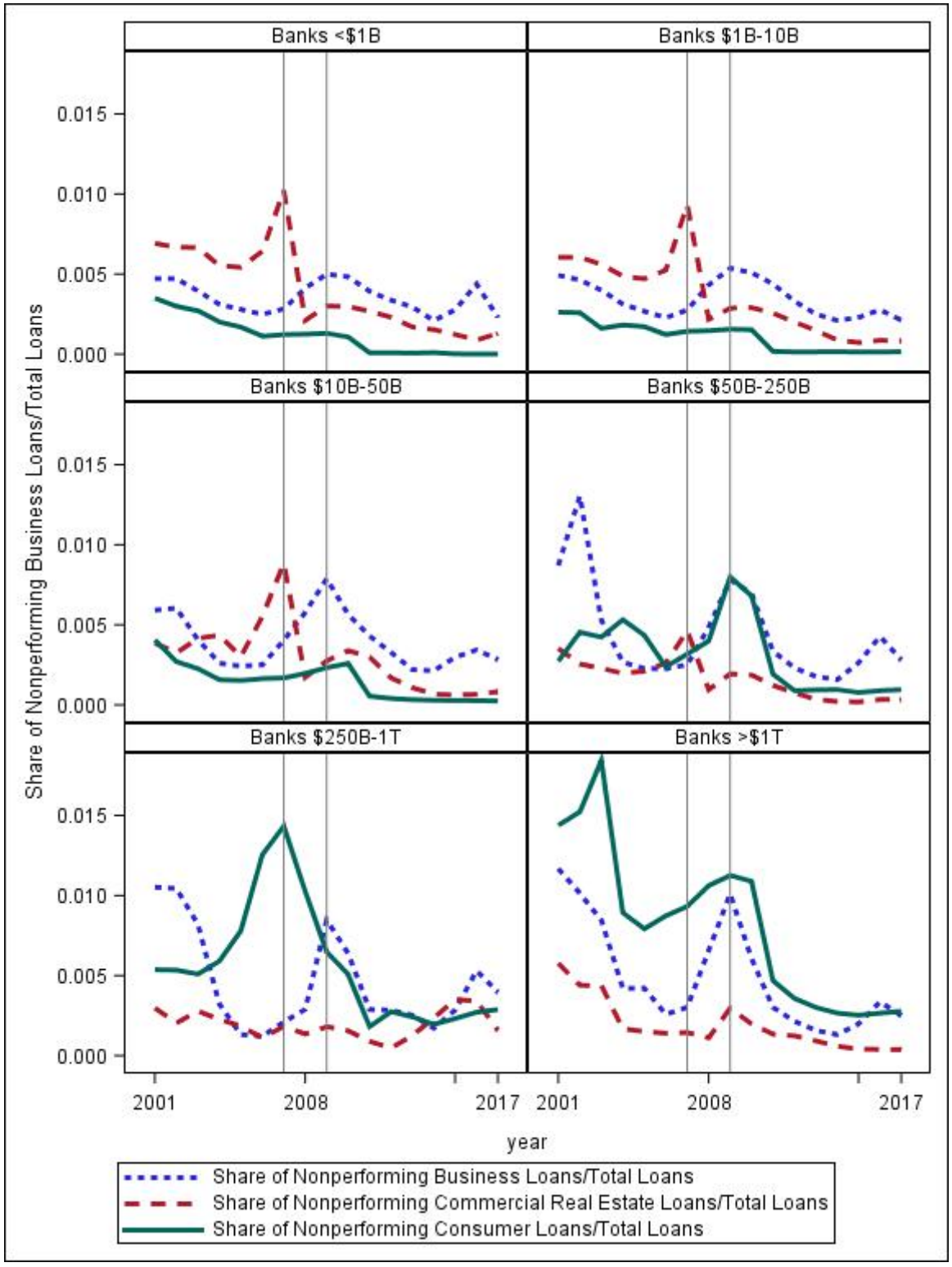
Data Source: Federal Reserve Bank Y9C Report. The Nonperforming Loan Ratio is calculated as the amount of nonperforming loans divided by the total amount of loans. The nonperforming loans include the past due loans less than and more than 90 days plus non-accruing loans, lease financing receivables, placements, and other assets, as well as gross charge-offs, but I do not include other real estate owned in the calculation of nonperforming loan. Other real estate owned in calculation of NPL, which is foreclosed real estate which is non-accrual but have not been sold for recoveries yet. The Ratio of Other Real Estate Owned is calculated as the amount of other real estate owned divided by the total amount of loans.

Figure C.6: The Decomposition of the Nonperforming Loan Ratio of U.S. Banks during 2001–2017 (grouped by assets sizes)



Data Source: Federal Reserve Bank Y9C Report. The loans past due is decomposed into nonperforming loans to business, commercial real estate, residential real estate, and consumer activities.

Figure C.7: The Decomposition of the Nonperforming Loan Ratio of U.S. Banks during 2001–2017
(excluding Residential Real Estate Nonperforming Loans)
(grouped by assets sizes)



Data Source: Federal Reserve Bank Y9C Report. The loans past due is decomposed into nonperforming loans to business, commercial real estate, residential real estate, and consumer activities, but I exclude residential real estate nonperforming loans in this graph because it has been too high for top 4 banks since the recent recession.

I decompose the loans past due into nonperforming loans to business, commercial real estate, residential real estate, and consumer activities. In Graph C.6, the share of nonperforming residential real estate loans to total loans has increased dramatically since the financial crisis and declined slowly for top 4 banks. I remove the nonperforming residential real estate loans and plot the other types of nonperforming loans in Graph C.7. The nonperforming consumer loans comprise a largest part for large banks with assets above $250 billion, while it was lower in smaller banks. For community and medium-sized banks, the share of nonperforming commercial real estate loans out of total loans raised dramatically around 2007 and then declined rapidly within one year, following a gradual decrease. The share of business loans out of total loans fluctuated around 0.005 for all banks, but it was relatively stable for community banks.

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.[35] However, since Compustat does not use PERMCO, this manual first connects RSSD with PERMCO, and then links PERMCO with CUSIP, which is used in

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

Compustat.

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

Summary of Deposit provides bank branch-level data on deposits annually by the end of June, so the weight of deposit in the operating counties and states can be calculated and be used to calculate weighted average HHI and GDP for BHCs.

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[36] by combining state identifier (STNUMBR) and county identifier(CNTYNUMB), and note that if county identifier is not 3 digit then put 0 or 00 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,[37] I cannot calculate five-year

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

[37]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.

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.

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

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.4: 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 commercial 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.4. Because the SBL data was only collected in June

Figure C.8: Total Amount and Number of SBL from Call Report during 2001–2017

Data Source: Call Reports in 2001–2017.

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 Graph C.8.

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 Small Business Loans (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 originated or purchased, which is 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".[38] Therefore, SBL reported in CRA data covers a large portion of that in Call Reports.

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

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

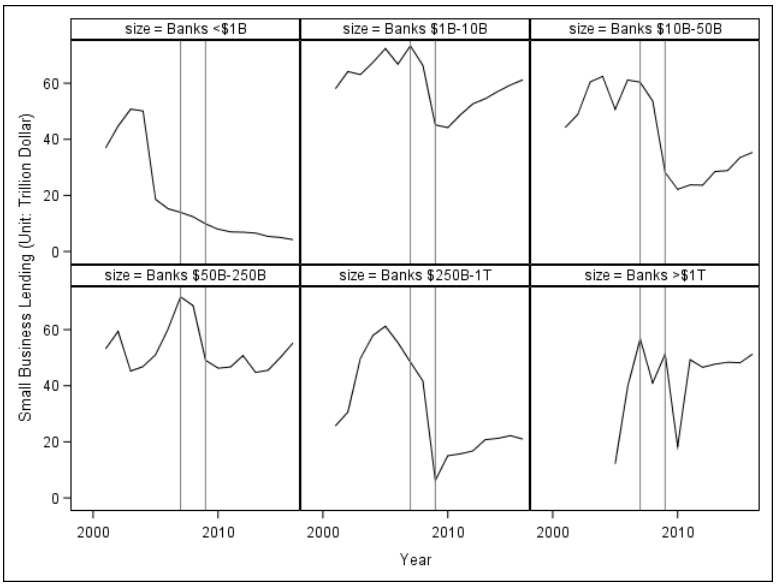
To check the performance of banks of different sizes, I categorize them by assets. The cut-off points are $1 billion, $10 billion, $50 billion, $250 billion, and $1 trillion. All banks have been slowly recovering their SBL since the recession, except for banks with assets of less than $1 billion, which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

Graph D.9 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.10, 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.11, 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.

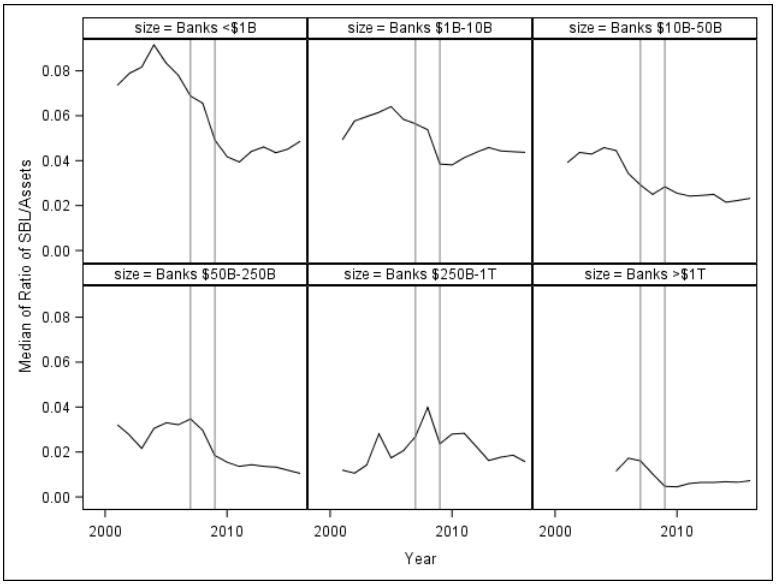
As in Graph D.12, the average amount of loans has been growing steadily over time, not affected by the financial crisis. For banks with assets less than $250 billion, the size of SBL originated is within $150,000 - $200,000, while the largest banks offer average SBL of $25,000. For banks with assets between $250 billion and $1 trillion, the SBL size has been very volatile and increased dramatically after the recession.

Figure D.9: The Amount of SBL by Banks in Different Sizes during 2001-2016



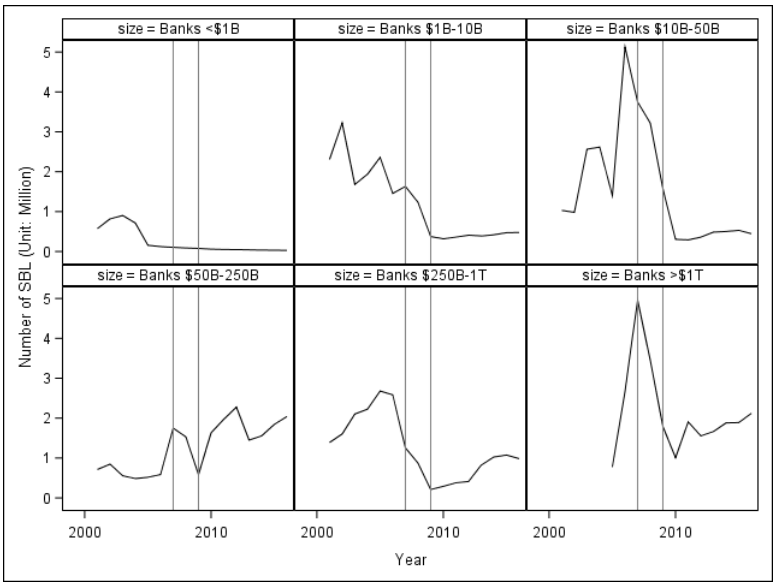
Source: the Community Reinvestment Act. SBL is defined as business loans with originated amounts less than $1 million. The total assets in CRA, which I use to calculate the ratio of SBL to assets, are the values of total assets in Call Reports of the previous year.

Figure D.10: The Median of Ratio of SBL/Assets for Banks in Different Sizes during 2001-2016



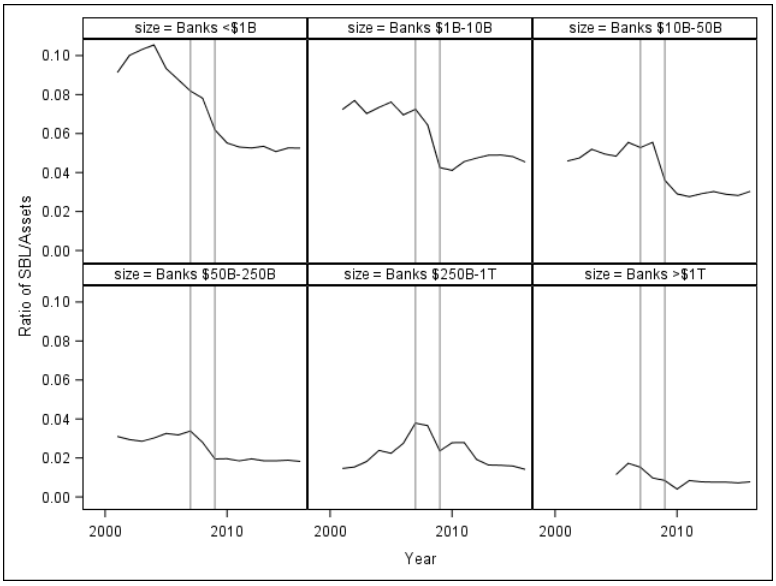
Source: the Community Reinvestment Act. SBL is defined as business loans with originated amounts less than $1 million. The total assets in CRA, which I use to calculate the ratio of SBL to assets, are the values of total assets in Call Reports of the previous year.

Figure D.11: 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.12: 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.

Appendix E. SBL Coefficients in Cross-sectional Baseline Models

Table E.5: 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 5, represent financial incentives for banks to replace large business loans with SBL.

	All Banks				**Large&Mid-tier**	**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
	Mid-tier	**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.6: 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 6, represent financial incentives for banks to replace non-business loans with SBL.

	All Banks				**Large&Mid-tier 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
	Mid-tier 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.7: 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 4, represent financial incentives for banks to increase SBL/assets.

	All Banks				**Large&Mid-tier 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
	Mid-tier 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.8: 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.9: OLS Estimates of the Interaction Effect of Regulation Change and Small Business Loans on Bank Financial Performance

Dependent variable: Tobin's Q Ratio 2010-2017

Coefficients are estimated using annual BHC level data spanning 2010-2017, with 2420 observations. SBL is defined as business loans with original amount of $1 million or less. SIB is a dummy variable,which equals 1 for systemically important banks. DFA2 is a dummy variable with value of 1 during 2015-2017 and 0 during 2010-2014 (I refer as DFA1). 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 coefficients of SBL/Assets is list at "DFA1+non-SIB". For "DFA1+SIB" banks, the marginal effect of SBL is calculated by adding the coefficient of (SBL/Assets)*SIB to the effect for "DFA1+non-SIB". The effect for "DFA2+non-SIB" is calculated by adding the coefficient of (SBL/Assets)*DFA2 to the effect for "DFA1+non-SIB". The effect for "DFA2+SIB" is calculated by adding the coefficients of (SBL/Assets)*SIB and (SBL/Assets)*SIB*DFA2 to the effect for "DFA2+non-SIB". The F-test statistics are in parentheses.

	Model 1	**Model 2**	**Model 3**
SBL/Assets	0.232***	0.065	0.161***
	(0.048)	(0.044)	(0.052)
(SBL/Assets)*SIB		-2.868***	-2.381***
		(0.341)	(0.326)
(SBL/Assets)*DFA2		0.357***	0.342***
		(0.085)	(0.08)
(SBL/Assets)*SIB*DFA2		-0.603	-0.626
		(0.468)	(0.445)
ln(Assets)	0.013***	0.014***	0.017***
	(0.001)	(0.001)	(0.001)
GDP	0.322***	0.581***	0.33***
	(0.105)	(0.107)	(0.104)
HHI	-0.007	-0.015	-0.013
	(0.013)	(0.013)	(0.013)
LBL/Assets	0.084***		0.075**
	(0.032)		(0.035)
Other Loans/Assets	0.147***		0.157***
	(0.036)		(0.039)
Other Bank Controls?	YES	NO	YES
Year Effect?	YES	YES	YES
Adj.R^2	0.417	0.379	0.447
Marginal Effect of 1 p.p. Increase in SBL/Assets:			
DFA1 + non-SIB		0.069	0.161***
DFA2 + non-SIB		0.435***	0.503***
		(64.43)	(42.18)
DFA1 + SIB		-2.772***	-2.22***
		(58.41)	(44.95)
DFA2 + SIB		-3.007***	-2.504***
		(34.7)	(44.25)

[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.10: OLS Estimates of the Interaction Effect of Regulation Change and Small Business Loans on Bank Financial Performance

Dependent variable: Tobin's Q Ratio 2001-2009

Coefficients are estimated using annual BHC level data spanning 2001-2009, with 3556 observations. 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. FC is a dummy variable with value of 1 during 2007-2009 and 0 during 2001-2006. 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 coefficients of SBL/Assets is list at "Pre-FC+non-LARGE". For "Pre-FC+LARGE" banks, the marginal effect of SBL is calculated by adding the coefficient of (SBL/Assets)*LARGE to the effect for "Pre-FC+non-LARGE". The effect for "FC+non-LARGE" is calculated by adding the coefficient of (SBL/Assets)*FC to the effect for "Pre-FC+non-LARGE". The effect for "FC+LARGE" is calculated by adding the coefficients of (SBL/Assets)*LARGE and (SBL/Assets)*LARGE*FC to the effect for "FC+non-LARGE". The F-test statistics are in parentheses.

	Model 1	**Model 2**	**Model 3**
SBL/Assets	0.157***	0.045*	0.167***
	(0.037)	(0.027)	(0.039)
(SBL/Assets)*LARGE		-0.37	-0.143
		(0.234)	(0.222)
(SBL/Assets)*FC		-0.031	-0.025
		(0.058)	(0.054)
(SBL/Assets)*LARGE*FC		-2.002***	-2.161***
		(0.468)	(0.354)
ln(Assets)	0.013***	0.016***	0.015***
	(0.001)	(0.001)	(0.001)
GDP	0.43***	0.63***	0.436***
	(0.096)	(0.096)	(0.095)
HHI	-0.029**	-0.031**	-0.03**
	(0.012)	(0.0132)	(0.012)
LBL/Assets	0.051		0.067**
	(0.033)		(0.033)
Other Loans/Assets	0.154***		0.167***
	(0.029)		(0.029)
Other Bank Controls?	YES	NO	YES
Year Effect?	YES	YES	YES
Adj.R^2	0.437	0.361	0.446
Marginal Effect of 1 p.p. Increase in SBL/Assets:			
Pre-FC + non-LARGE		0.045*	0.167***
FC + non-LARGE		0.014	0.142**
		(0.07)	(6.39)
Pre-FC + LARGE		-0.324	0.024
		(1.91)	(0.01)
FC + LARGE		-2.357***	-2.162***
		(50.25)	(46.35)

[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.