Effects of Small Loans on Bank and Small Business Growth

by

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Executive Summary

In this paper, we study banks' entry, growth, and exit behavior, with a focus on the performance of small banks, and implications of small business loans for selected small business birth and growth measures.

To conduct this analysis, we use Federal Deposit Insurance Corporation (FDIC) Call Reports to study the determinants of quarterly asset growth for all banks by age and size groups and use Community Reinvestment Act (CRA) and Business Dynamic Statistics (BDS) databases to further study effects of small business loan availability on business birth and growth rates at the Metropolitan Statistical Area (MSA) level.

Our main findings are:

- Using four asset size groups, we calculate transition matrices over the period 1992-2019, for three decades separately. We observe a decline in industry dynamism and vertical transition with respect to size: (i) entry and exit rates slowed down significantly; (ii) asset distribution has shifted towards larger sized banks; and (iii) probability of staying in the same asset bracket increases over time.
- Second, we study differences between the growth rates of banks that have participated in at least one merger and acquisition (M&A) in their lifecycles and banks that have not at all. The annual asset growth rate of banks participating in M&A is 0.6 percentage points higher, on average. However, this observed difference disappears during nonmerger periods.
- Third, we analyze bank behavior prior to exit. The descriptive figures reveal that exiting banks start their decline (compared to average performance measures) at least 2 years prior to exit.
- Fourth, using a fixed effects panel ordinary least squares estimation, we find that the portfolio share of small loans is positively and significantly associated with higher asset growth rates for all bank age groups. This effect is stronger for banks with less than \$10 billion in assets.
- Finally, we analyze the relationship between the small business loan availability (CRA data) and business growth and entry rates (BDS data) at MSA level controlling for state and year fixed effects. Additionally, we tested the nature of the underlying relationship using a Vector Autoregressive (VAR) estimation. The results provide evidence that small business loans (especially loans less than \$100k with stronger effects) have a statistically and economically significant impact on small business employment growth and small business entry.

1. Introduction

The structure of the U.S. banking industry has changed considerably over the last 40 years. The industry has consolidated; the number of commercial banks declined from 14,400 to 4,600 since 1980. Industry consolidation has affected banks of different sizes and ages in different ways, and many smaller sized banks have disappeared during this period, via mergers or failures. Moreover, the entry rates also decreased significantly over the same time period. Many factors have contributed to the decline in the number of small banks over the past few decades, such as declining interest rates (which, in turn, declined profitability), economies of scale advantages, and regulatory changes. Most importantly, after the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994,¹ mergers and acquisitions (M&As) have reshaped the competitive landscape and increasing consolidation naturally has led to a decline in the number of small banks.

To study the evolution of the banking industry, we pay particular attention to bank size, bank age, and loan portfolios. We use banks' asset size to categorize banks into various size groups, utilizing multiple cut-offs. Because the term "small" is relative by definition and a vast majority of small banks are community banks, we use the terms "small" banks and "community" banks interchangeably throughout this study. Numerically, we use this term to generally refer to banks with less than \$10 billion in assets (the threshold used by the Federal Reserve Board), although we use multiple other refined levels of thresholds: \$1 billion (industry standard),² \$600 million (SBA's threshold), or \$100 million (Peek and Rosengren, 1998) as alternative cut-offs.³

We use several age brackets to understand banks' asset growth behavior over their life-cycle. Most researchers and the FDIC focus on the term "de novo" to capture newly formed banks and banking industry entry dynamics.⁴ Researchers find that the number of de novo banks has fallen sharply since 2010, consistent with the decline of new bank entries.⁵ Between 2000 and 2009, the number of new FDIC-insured bank charters was 1,266 (at a rate of approximately 127 banks

(<u>https://www.federalreserve.gov/newsevents/testimony/hunter20110406a.htm</u>, last accessed on 9/22/2020). FDIC has additional criteria regarding whether the bank takes deposits and makes loans, how its assets are employed or whether it is engaged in basic banking activities or not. For further technical details, the link is provided (<u>https://www.fdic.gov/regulations/resources/cbi/report/cbi-full.pdf</u>, last accessed on 9/22/2020). SBA defines small banks as those with less than \$600 million in asset size (<u>https://www.sba.gov/document/support-table-size-standards</u>, last accessed on 9/22/2020). Due to conditions other than bank size, not all small banks are community

¹ <u>https://www.fdic.gov/regulations/laws/important/</u>, last accessed on 9/22/2020.

² <u>https://fas.org/sgp/crs/misc/R45051.pdf</u>, last accessed on 9/22/2020.

³ There is no consensus on the definition of community banks. Although many studies and reports in the literature use \$1 billion as the threshold for the definition of community banks, as of 2019, the Fed defines community banking organizations as those with less than \$10 billion in assets

banks. However, in the Call Reports, only 6 percent (303 of 5120) of banks with less than \$10 billion assets are not community banks in 2019Q3. If we instead use the cut-off as \$1 billion, then this share is even less, at only 2 percent (103 of 4351).

⁴ FDIC uses the following definition for *de novo* banks: "*newly established institutions with no existing operations and new institutions that result from the conversion of an operating, non-insured entity.*" Because of the non-standard usage of this term in the literature, throughout our work, we avoid making a distinct definition for de novo banks. Instead, we utilize banks' asset size and bank age to create brackets.

https://www.fdic.gov/regulations/applications/depositinsurance/handbook.pdf, last accessed on 9/22/2020. ⁵ There are different ways new banks are established. It could be converting a charter, spin-off, or new formation. In the Call Reports, each bank has a unique identifier and we handle the first observation of each bank as an entry.

per year), whereas after 2010 this number was 18 in total. While the entry rate has declined significantly, the exit rate stayed stable. The following cross sectional distributional charts summarize the transition in the industry.⁶



Figure 1: Age and size distribution in 2000 (winsorized)

Source: Authors' Analysis of FFIEC Call Report Data



Figure 2: Age and size distribution in 2019 (winsorized)

Source: Authors' Analysis of FFIEC Call Report Data

Loan Supply

This structural change most likely has a significant impact on the loan markets because the lending behaviors of small and large banks differ. Larger banks lend primarily to larger firms with good accounting records (Berger et al., 2004). These banks have a comparative advantage in processing well-documented track records of firms and are less willing to lend to firms with informationally "difficult" credit. Besides, small banks may lack the resources to lend to large businesses that demand high loan amounts. On the other hand, small banks are better at collecting "soft" information (typically qualitative, context-specific information) and specialize in lending to small businesses, which have poor or even no financial record and are informationally

⁶ Age is defined in terms of years.

opaque (Berger et al., 2004). They are more involved in riskier loans than more established banks. As a result of this difference, consolidation may have a significant effect on small business formation and growth, and it may decrease the supply of loans to small businesses. For example, in 1993, banks with less than \$10 billion in assets accounted for 66 percent of the small business lending (commercial and industrial loans of less than \$1 million) market share issued by commercial banks.⁷ By 2019, the market share of small business lending (loans of less than \$10,000), which decreased from 67 percent to 14 percent.⁸ Jagtiani and Lemieux (2016) have observed a similar decline in the share of small business lending by small banks. They claim that this decline is not only because of strong competition from large banks but also due to the entrance of fast-growing nonbank lenders (such as online lenders that do not engage in traditional deposit collection activities, hence not covered by FDIC data).⁹

Loan Demand

The demand channel in the loan market is also crucial for understanding the dynamics between the loan market and small businesses. According to the Fed's Small Business Credit Survey 2019, a report on employer firms, 43 percent of small firms seek external funds for their businesses.¹⁰ 84 percent of these applicant firms look for loans less than \$250,000. 78 percent receive at least some financing as a result of their applications. However, more than half (53 percent) of the applicants obtain less funding than they seek. The report also finds that small business owners tend to have different rates of success obtaining financing depending on the size of the bank they apply to. The approval rate by small banks is 71 percent, whereas it is 58 percent for large banks.¹¹ Also, for loan recipients, the satisfaction rate is 79 percent if they worked with small banks, 67 percent with large banks and only 49 percent with online banks.

In addition, among 57 percent of small firms, many may also have unmet financing needs because they report that they are debt-averse or discouraged to apply for a loan. Less than half of these non-applicants (49 percent) report that they have sufficient financing so that they do not seek external financing. Therefore, the remaining small businesses constitute the potential unmet demand for small business loans and might be financially constrained, which contributes

⁷ Authors' calculation. By using the Consumer Price Index (CPI), the asset sizes of banks are adjusted to 2019 prices. Then, we categorize small banks and large banks by using \$10 billion as the threshold. However, the threshold for small business loans stays the same over the years and it has not been adjusted for inflation since 1992. Therefore, some of this stark decline can be attributed to a lack of adjustment for the loan size threshold. ⁸ Authors' calculation. Small business loans are defined as loans of \$1 million or less. In the FDIC Call Reports, small

business loans are further categorized into three groups by size and loans of less than \$100,000 is one of these categories.

⁹ According to Census Bureau Statistics of U.S. Businesses, in 1998 commercial banks and saving institutions constituted 41 percent and 9 percent of all firms in the depository credit intermediation sector, respectively. Credit unions and other depository institutions are the remaining share. In 2016, these values became 44 percent and 8 percent of all firms, respectively. Over the years the shares remain quite stable, but the lending behavior of these institutions might have changed over time. Since the Call Reports do not include credit unions, it is not possible to analyze the shares of small business lending among these institutions.

¹⁰ The remaining 57 percent constitutes non-applicant firms and 71 percent of these non-applicants actually regularly use external financing, according to SBCS 2019.

¹¹ The Fed defines a large bank as more than \$10 billion in assets in this survey.

to a lack of growth, job losses (47.3 percent of the private workforce are employed by small businesses),¹² or even to failures.

<u>Hypothesis</u>

All these factors highlight the importance of small banks as the source of loans that are critical to small business success. Therefore, an analysis of the life-cycle dynamics of banks and the relationship between banks and small businesses is needed for more informed policy decisions that support small banks and small businesses.

In this study, we first provide a descriptive analysis of the life-cycle dynamics of bank sizes by employing Markov transition matrices. Second, we analyze the determinants of bank asset growth by size and by age, controlling for macroeconomic and bank specific factors over time. We pay particular attention to the role of small business loans for bank performance. Third, we analyze the linkages between small business loan availability and small business growth measures at the Metropolitan Statistical Area (MSA) level, using Community Reinvestment Act (CRA) and Business Dynamic Statistics (BDS) databases.

2. Literature Review

Access to financial capital is a key concern for many small and burgeoning businesses throughout the country. As Berger, Kashyap, and Scalise (1995) as well as Jones and Critcheld (2005) detail, the U.S. banking industry has undergone dramatic shifts since the late 1970s and early 1980s. Mergers and acquisitions have led to a more consolidated banking industry in which several large firms operate across the country while relatively few small banks serve regions and communities. These trends have raised some concerns for the financial health of the nation's small businesses.

Recent literature extensively compares lending behaviors of small and larger banks. Berger et al. (2004) find that small banks have an advantage over large banks in lending to small businesses at least in part due to small banks' comparative advantage in processing "soft" information (typically qualitative, context-specific information). Because larger banks prefer and are better able to use the sort of "hard" information (e.g., structured quantitative data, such as well-maintained financial records) that small firms usually lack, it is easier for large banks to lend to large businesses. Similarly, Backup and Brown (2014) also document the strength of community banks in providing banking service in their local communities. This finding is theoretically consistent with the conclusions reached by Stein (2002), who find that when available, economic information is "soft." Therefore, a decentralized market structure is more efficient whereas a more centralized market is advantageous when "hard" information is readily available. Jimenez and Saurina (2004) reached a similar conclusion, examining loan records collected from the Bank of Spain between 1998 and 2000. Their study shows that, controlling for collateral, larger loans had a lower probability of default. Analyzing the loan portfolio of a large Belgian bank, Degryse and Ongena (2005) find that larger loans were typically charged lower

¹² According to Statistics of U.S. Businesses (SUSB), 2016 report.

interest rates than smaller ones (favoring larger, better established businesses as loan recipients). The FDIC Small Business Lending Survey (2018) mentions that small banks are less likely to require a minimum loan, but they rely on collateral to mitigate the risk of lending to small businesses.¹³ On the other hand, large banks can mitigate risks by lending in multiple markets with a higher amount of loans, i.e., by diversifying.

Goldberg and White (1998) show that the portfolios of newly chartered banks typically contained significantly higher proportions of small business loans (loans of \$1 million or less) than those of larger banks. The authors also propose that de novo banks could help bolster small businesses' access to credit in an increasingly consolidated financial market. As recent evidence, the U.S. Small Business Administration Office of Advocacy's report Small Business Lending in the United States, 2019 states that banks with asset size of \$500 million to \$1 billion have small business loans as 42 percent of their total business loans, whereas this ratio is 21 percent for the banks with more than \$10 billion assets and as high as 88 percent for the banks with less than \$100 million assets.¹⁴ According to Hunter and Srinivasan (1990), the three factors that play the largest role in determining the long-run success of a de novo bank are its: "...credit policy, measured by the bank's ratio of net loan losses to total assets; operating costs, indicated by the ratio of wages and salaries to total assets; and the level of equity capitalization." Berger et al. (2004) conclude that markets (both MSAs and non-MSA areas) that had recently seen mergers and/or acquisitions in the banking industry were more likely to witness the entry of new banks as well. Examining the performance of de novo banks in the wake of the 2008 financial crisis, Lee and Yom (2016) reach a similar conclusion, finding that banks chartered before the recession were more frequently founded in markets that had recently experienced mergers or acquisitions. This research indicates that de novo banks enter such markets to meet that market's demand for small business loans. However, the authors find that this was not necessarily the case after the financial crisis, concluding instead that de novo banks tended to enter less, not more, concentrated markets after 2009.

Charter choices also influence the lifetime trajectory of banks and their likelihoods to exit through failure or mergers and acquisitions. According to Whalen (2008), there has been a clear shift away from national charters. Whalen (2012) finds that although banks holding national charters had no difference in their failure rates from those holding state charters, banks changing their supervisors (FDIC or State banks) were significantly more likely to fail. They also find that de novo banks initially choosing national charters had higher likelihoods of mergers. DeYoung (1999) concludes that newly chartered banks tend to follow a particular life-cycle pattern by studying the period between 1980 and 1985. In the first few years of this cycle, banks were no more likely to fail than small, well-established banks, due in part to the "cushion" of initial capital needed to acquire a charter for a new bank and in part to state and federal regulations prohibiting the acquisition of young and newly chartered banks. However, as a de

¹³ SBA's 7a loan program (among others) also provides various levels of loan guarantees for all bank sizes and bank loans less than \$5 million <u>https://www.sba.gov/partners/lenders/7a-loan-program/types-7a-loans</u>, last accessed on 9/22/2020.

¹⁴ Page 10 at <u>https://cdn.advocacy.sba.gov/wp-content/uploads/2020/09/10092858/Report-2019-Small-Business-Lending-Report.pdf</u>, last accessed on 9/22/2020.

novo bank's initial capital begins to wither because of aggressive lending, and it becomes old enough to be acquired by another, larger bank, the probability of failure or acquisition increases dramatically. If a de novo bank manages to survive its first decade, the failure rate declines and finally converges with those of established banks. DeYoung later expanded on this study, concluding that de novo banks were more likely to be acquired than they were to fail and that acquisition was more closely associated with market conditions than the financial health and well-being of the bank itself (DeYoung, 2003).

Lee and Yom (2016) also study the life-cycle pattern of de novo banks. Studying banks established between 2000 and 2008, they found that younger banks were more involved in riskier assets (commercial and industrial (C&I), construction and development (C&D), and commercial real estate loans) than older banks. They also held a higher proportion of non-core assets. Since de novo banks do not have the customer base and brand recognition, they depend on these assets to grow in their initial years. As the loans age and the banks get more established, they also start earning income, but their underperformance compared to others and relatively smaller (compared to the start) capital makes them more vulnerable to economic shocks. These both contributed to higher failure rates for de novo banks. They argue that these imply a life-cycle pattern for de novo banks in addition to the regular business cycles.

Janicki and Prescott (2006) also discuss the issue of changing banking landscapes and are one of the first ones to use Markov transition matrices to analyze the dynamics of bank growth and entry/exits. Using transition probabilities, they show that bank sizes followed Gibrat's law, which states that in the 60s and 70s, before deregulations, the proportional rate of growth of a firm/bank is independent of its absolute size. However, with the removal of regulatory limits on bank size that existed through the 1970s, large banks grew faster than small banks. In addition, they show that bank entries were stable: around 1.5 percent of all banks per year. They also forecast that the decline in the number of banks will continue, but that its rate is slowing down.

Robertson (2001) also utilizes Markov transition matrices in the context of mergers and acquisitions. Using the Call Reports from 1960 to 2000, he calculates Markov chain transition probabilities and uses a likelihood ratio test to empirically find 9 distinct periods of mergers and acquisitions where the transition matrix is stationary. He concludes that the rate of consolidation of the banking industry has not been stable and instead it consists of multiple episodes. Transition matrices from the last few years again enable him to make predictions and he provides short-range structural forecasts of the banking industry.

Markov chains have successfully been applied in similar lending contexts as well. Hu et al. (2002) use transition matrices to estimate sovereign credit ratings. By using default data and other similar characteristics, they generate Markov transition matrices. They find that their model accurately predicts sovereign defaults/not defaults. Jones (2005) similarly uses Markov chains in the context of credit risk. They use FDIC's Statistics on Banking data to estimate risk for non-performing loans. Grimshaw and Alexander (2011) use Markov chain models for accounts receivables. They find that their forecasts show agreement with delinquency states in a \$7 billion dollar mortgage portfolio.

There is an extensive amount of research discussing the integral relationship between small banks and small businesses. Jayaratne and Wolken (1999) test whether small business lending depends on small banks by using the 1993 Survey of Small Business Finances (SSBF) data. If there is a strong connection, then small firms in areas with few small banks should be more credit constrained than firms in areas with many small banks. They conclude that a reduced presence of small banks may reduce access to bank credit by small businesses only in the short-run, but not in the long-run. Using the same survey, Haynes et al. (1999) document a significant correlation between firm size and bank size; larger firms are more likely to borrow from larger banks.

In a recent report, Cole (2018) states that although total-business lending saw a nearly full recovery after the Great Recession, small business lending plummeted during the Great Recession and never fully recovered. The main finding is that the outstanding loans originated in amounts less than \$1 million (small business loans) in 2015 remained more than 17 percent below the pre-crisis high. However, the loans originated in amounts greater than \$1 million (big business loans) in 2015 surpassed the pre-crisis level by more than 35 percent. Jagtiani and Lemieux (2016) document that the decline in small business lending by community banks did not begin after the Great Recession but at least a decade before the crisis. In addition to large banks, non-bank institutions like online lenders might have gained more market share in total small business lending over recent years. According to SBCS 2019, among the firms that apply for loans, the share of firms that applied to online lenders increased from 19 percent in 2016 to 32 percent in 2018. Moreover, in 2018, the applicants to online lenders experienced an 82 percent approval rate, whereas this is 71 percent and 58 percent at small and large banks, respectively.

Flannery and Lin (2016) conduct analysis using CRA data that house price appreciation was associated with small business loans, after controlling for local economic conditions. They follow the regression framework in Mian and Sufi (2011) to estimate this impact. They also use small business loans at the county level (from CRA data) to decompose the loan growth into supply and demand shocks. Lastly, they show that at the county level small business loans are positively correlated with employment growth.

Regarding the consolidation of the banking industry, Jagtiani and Maingi (2019) investigate the impact of M&As in the banking industry and provide empirical evidence that the total amount of small business lending tends to increase after a large bank acquires a community bank. They claim that as a result of mergers, the safety of the banking system improved without negatively affecting small business lending.

Regulatory changes in the banking sector are quite frequent and often substantially change the structure of the sector. In the literature, many papers analyze the effect of regulations on the banking industry and businesses. For example, Wei (2019) investigates how interstate branching deregulation (Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) of 1994) transmits into the businesses and labor market. Using SSBF, he shows that this act led to

a positive credit supply shock, particularly for small and medium-sized firms. Large and public firms could already borrow from the different states and internally move the loan across states, making the impact negligible for large firms.

After the crisis, banks faced higher compliance costs. McCord et al. (2015) state that higher capital requirements and significant regulatory costs because of the Dodd-Frank Act led to the failure of many community banks and hampered bank entry. Similarly, Peirce et al. (2014) claim Dodd-Frank, which insists on the standardization of bank products and services, might be harmful to small banks that tend to serve idiosyncratic markets. Large banks do not serve certain types of customers with their standardized product, but with the banking regulations, the small banks cannot serve them anymore either, which is harmful to small banks and their customers.

In addition, Bordo and Duca (2018) show that the small loan share of commercial and industrial (C&I) loans at large banks has declined by nine percent since 2010, with the magnitude of the decline twice as large at small banks. These declines in small loan share of C&I loans after 2010 are almost all statistically attributed to the change in the regulatory regime, after controlling for cyclical effects and bank size.

Adams and Gramlich (2016) employ a probit regression to analyze the causes of the decline in bank entry, especially after 2010. As opposed to the common understanding that the decline is due to the regulatory burden, they find that declining interest rates and other non-regulatory factors can explain 75-80 percent of the decline in new charters. They also detect a structural-shift after the Great Recession but claim that it is not possible to state that Dodd-Frank Act is the reason for the shift. Higher risk, economic uncertainty, or low interest rates close to the zero lower bound might be the reasons behind this shift as well.

According to a 2018 Government Accountability Office report, the amount of small business lending declined immediately following the crisis but then increased from 2013 through 2017 by 5 percent, after controlling for exits and mergers. The report also claims that the changes in small business lending and the decline in the number of banks since 2010 can be explained largely with macroeconomic dynamics, local market conditions, and bank characteristics. The explanatory power of regulatory changes is low, which is consistent with the findings of Adams and Gramlich (2016).

We contribute to the previous literature in two ways. First, we estimate the impact of portfolio share of small business loans on the asset growth rate of banks, which has not been addressed before. Second, we estimate and causally test the impact of small business loans on the real economic variables such as small business employment growth and small business entry at the MSA level, using panel VAR model. To our knowledge, previous studies either focused on the bank-borrower relationship, or macroeconomic level estimation. Our estimation uses MSA level small loan data and not bank specific data. We see this is a necessary angle considering the transition towards online banking and decreasing dependence on distance between banks and borrowers, as discussed by Berger et al. (2014) and Duqi et al. (2018).

3. Data

We use the following data sources in our study:

<u>FDIC Consolidated Reports of Condition and Income (Call Report)</u>: Every national bank, state member bank, insured state non-member bank, and savings association (institution) is required to file a Consolidated Reports of Condition and Income (Call Report) as of the close of business on the last day of each calendar quarter, i.e., the report date. The specific reporting requirements depend upon the size of the institution, the nature of its activities, and whether it has any foreign offices.¹⁵ Call Reports contain items such as the bank's income statement, balance sheet, loan information, ¹⁶ deposit information, investment information, changes in the bank's viability and financial health. Multiple Call Reports can be analyzed to provide insight regarding the welfare of the U.S. banking system.

We use FDIC Call Reports to analyze banks asset trajectory: entry, growth in asset and exit behavior of 21,818 unique¹⁷ banks within the time period of 1984 Q1 to 2019 Q4, which covers all publicly available data to date. These reports also are linkable to FDIC's M&A database,¹⁸ and allow us to identify the source of growth. Since the database includes age, asset size, and loan type variables, it is suitable for life-cycle analysis. FDIC Call Reports have also been used for the Markov transition matrices.

The following table presents a set of summary statistics, regarding banks' total assets (foreign and domestic combined), total loans and commercial and industrial ("CI") loans, as follows:¹⁹

¹⁵ <u>https://www.fdic.gov/regulations/resources/call/index.html</u>, last accessed on 9/22/2020.

¹⁶ Most importantly, this dataset has a separate variable for small business loans as well. In addition to loans and lines of credit, business credit cards are also considered as a type of small business loan. Banks report the sum of all of the employee/business credit cards' credit limits opened on a particular date as one small business loan for the business. If there is an increase in the credit line, the added amount is reported as a new origination. Since 55 percent of small firms use loans or line of credit and 52 percent regularly use credit cards as external financing (according to SBCS 2018), this is the most important variable in our analysis on the dynamics of small business lending.

¹⁷ There are bank entries and exits each quarter, therefore the panel data is not balanced. The number of total banks is decreasing over time. However, in total, we observe 21,818 different banks in the given time period.

¹⁸ This database catalog events that transform entities. These events include the merger of two or more entities or the split of an entity into two or more entities. This database will allow us to analyze 47,578 unique events that happened between 1984 and now. <u>https://www.ffiec.gov/npw/FinancialReport/DataDownload</u>, last accessed on 9/22/2020.
¹⁹ The summary statistics are reported only for commercial banks and the average is weighted with bank assets. Since small loans are available for only 2nd quarters until 2010 in the dataset, we analyze the statistics for Q2-2000

and Q2-2019. For all details about the filters applied to the FDIC database, see Appendix Section 7.1.

Asset Size (Consolidated)	Count	Small Cl/Asset	CI/Asset	Small Cl/Cl	Small Loan/Loan	Net Interest Margin	Return on Asset
Less than \$100M	3773	6.6	6.9	97.4	50.3	4.55	1.02
Between \$100M-1B	4128	6.1	7.7	82.8	36.8	4.56	1.28
Between \$1B-10B	408	3.6	8.7	49.8	18.4	4.37	1.32
More than \$10B	106	1.6	12.7	16.7	6.6	3.74	1.10

Table 1: FDIC Asset and Loan Size Statistics (Year 2000)

Source: Authors' Analysis of FFIEC Call Report Data

Asset Size (Consolidated)	Count	Small CI/Asset	CI/Asset	Small Cl/Cl	Small Loan/Loan	Net Interest Margin	Return on Asset
Less than \$100M	1014	6.5	7.5	90.0	43.8	3.88	0.98
Between \$100M-1B	2821	5.2	9.3	62.9	26.0	3.89	1.27
Between \$1B-10B	531	3.7	12.3	35.8	13.4	3.64	1.30
More than \$10B	120	1.7	12.6	13.7	4.0	3.21	1.28

Table 2: FDIC Asset and Loan Size Statistics (Year 2019)

Source: Authors' Analysis of FFIEC Call Report Data

We observe that depending on the asset size, the characteristics of banks vary significantly. Smaller banks provide relatively more small business loans and net interest margin is consistently higher for smaller banks, both in 2000 and in 2019. We also see a large drop in the number of banks, especially in small sized ones, consistent with a rightward shift in return on assets in favor of larger sized banks, from 2000 to 2019.

<u>The Business Formation Statistics (BFS)</u>: The dataset contains the number of business formations and applications at the State level for the period 2004 – 2019, which is available quarterly. The following variables are present as measures of business formation by chances of success:



Source: US Census Bureau²⁰

²⁰ <u>https://www.census.gov/programs-surveys/bfs/technical-documentation/methodology.html</u>, last accessed on 9/22/2020.

- Business application (BA): all applications for an employer identification number (EIN), except for applications for tax liens, estates, trusts, or certain financial filings.
- High-propensity BA (HBA): BA that have a high propensity of turning into businesses with payroll (i) for a corporate entity; (ii) hiring employees, purchasing a business, or changing organizational type; (iii) that provide a first wages-paid date (planned wages); or (iv) that have a NAICS industry code.
- Business Applications with Planned Wages (WBA) (HBA with planned wages): indicates a first wages-paid date on the IRS Form.
- Corporation Business Application (CBA) (HBA from a corporation): HBAs from a corporation or personal service corporation, based on the legal form of the organization stated in the IRS Form.





Source: Authors' Analysis of BFS data

FFIEC Community Reinvestment Act (CRA):

The Community Reinvestment Act is intended to encourage depository institutions to help meet the credit needs of the communities in which they operate, including low- and moderate-income neighborhoods, consistent with safe and sound banking operations. It was enacted by Congress in 1977 (12 U.S.C. 2901) and is implemented by regulations 12 CFR parts 25, 228, 345, and 195.²¹

All institutions regulated by the Office of the Comptroller of the Currency, Federal Reserve System, Federal Deposit Insurance Corporation, and the Office of Thrift Supervision that meet the asset size threshold are subject to data collection and reporting requirements.

²¹ <u>https://www.ffiec.gov/cra/regulation.htm</u>, last accessed on 9/22/2020.



Figure 5: Small Business Loans and Business Loan issued to Small Businesses

Source: Authors' Analysis of CRA data

The CRA lending database is compiled at the bank level but focuses on the location and the size of the borrower (unlike FDIC, which is based on lender information). The CRA dataset is the only publicly available alternative to the Call Reports for studying small business loans. The dataset is available annually, from 1996 to 2017.²² CRA consists of small business loans, small farm loans, and community development loans. Among those, we only focus on small business loans since we want to analyze the connection between small loans and non-farm business dynamics (using BDS data – see below). We use the CRA data to analyze the effects of loan availability on the local business growth statistics (coming from BDS).

<u>Business Dynamics Statistics (BDS)</u>: BDS provides annual measures of business dynamics (such as job creation and destruction, establishment births and deaths, and firm startups and shutdowns) for the economy and aggregated by the establishment and firm characteristics.²³

BDS includes the variables for the entry/exit and growth rates of businesses and the job creation and destruction rates by the age, size, and location (MSA level) of the firms. The dataset covers the private non-farm economy (excludes self-employed, agricultural production workers, most government employees) and is available annually from 1977 to 2014. This dataset is advantageous to understand firm size growth especially and can be used to support the use of BFS databases.

²² <u>https://www.ffiec.gov/cra/pdf/2015_CRA_Guide.pdf</u>, last accessed on 9/22/2020.

²³ https://www.census.gov/programs-surveys/bds/documentation/methodology.html, last accessed on 9/22/2020.





Source: Authors' Analysis of BDS data

4. Methodology and Estimation

Our main question of interest is to better understand the effects of small business loans on small banks and small business growth. In order to answer this question, we first focus our attention to better understanding banks' asset movements over time, using (i) descriptive analysis of discretized asset transition matrices, and (ii) panel econometric estimation. Next, we analyze the effects of business loans on small businesses at the MSA level using panel estimation and a panel vector autoregressive (VAR) model to test for causality.

First, in section 4.1, we run basic descriptive analysis to help inform our model selection. We use Markov transition matrices to summarize the movements of banks over time, across discrete size brackets and we inquire the role of mergers on asset growth and bank exits since mergers and bank growth are closely related.

Second, in section 4.2, using the same dataset (but using continuous variables) we run panel fixed effects regressions to understand the factors affecting asset growth (especially effects of loan portfolio), after controlling for macroeconomic (time fixed effects) and standard bank performance variables.

Third, in section 4.3, we use CRA and BDS data sets to analyze the effect of local small business loan availability on the small business dynamics such as employment growth, job creation, and destruction rates. In a similar analysis, we further utilize BFS data for understanding the effects of lending availability on business application rates. While reporting our findings, we refer to survey findings many times to support our arguments in the analysis.

4.1. Descriptive Analysis on Determinants of Asset Growth

4.1.1. Transition Matrices

In this section, we estimate Markov transition matrices using bank-level asset movements from year to year. Transition matrices are calculated by counting the fraction of banks that move from size category *i* to *j* each year from 1992 to 2019. 24,25

The categories are selected based on the total asset size of the banks: less than 100M, between 100M and 600M, between 600M and 10B, and more than 10B. The exit probability is the ratio of bank exits from an asset category to the total number of banks in that particular asset category. However, entry probability is calculated as the ratio of bank entries into an asset category to the total number of banks in that year. In tables 3-5, we present the average of transition probabilities for three different periods, which are 1992-1999, 2000-2009 and 2010-2019.

Asset Size	Less than 100M	Between 100M-600M	Between 600M-10B	More than 10B	Exit
Less than \$100M	91.18%	5.08%	0.02%	0.00%	3.73%
Between \$100M-600M	1.10%	91.74%	1.76%	0.00%	5.40%
Between \$600M-10B	0.03%	1.63%	88.36%	1.39%	8.59%
More than \$10B	0.00%	0.00%	2.27%	91.18%	6.66%
Entry (% of existing banks)	1.18%	0.08%	0.05%	0.00%	-
Entry (of all entrants) ²⁶	89.68%	6.46%	3.77%	0.09%	-

Table 3: Transition Probabilities: 1992-1999 Period

Source: Authors' Analysis of FFIEC Call Report Data

Table 4: Transition Probabilities: 2000-2009 Period

Asset Size	Less than 100M	Between 100M-600M	Between 600M-10B	More than 10B	Exit
Less than \$100M	88.99%	7.69%	0.02%	0.00%	3.30%
Between \$100M-600M	1.06%	92.80%	2.28%	0.00%	3.85%
Between \$600M-10B	0.00%	1.63%	91.64%	0.74%	5.99%
More than \$10B	0.00%	0.00%	1.17%	91.58%	7.25%
Entry (% of existing banks)	1.48%	0.11%	0.02%	0.01%	-
Entry (of all entrants)	91.69%	6.63%	1.19%	0.49%	-

Source: Authors' Analysis of FFIEC Call Report Data

²⁴ The direction of transitions is from *i*th column to *j*th row in the tables.

²⁵ In the Call Reports, the variables for small business loans are not available before 1992. To keep the analysis consistent, we restrict our sample to 1992-2019 for each part of the project. Another reason is that many performance variables, which we use as control variables in regressions, are consistently available over this period.
²⁶ Unlike other variables, we first pooled all entry data for the entire 10 years, and then calculated entrants by size,

due to lack of sufficient entry on a yearly basis, particularly after 2010. In addition, the first row for entry shows the ratio of entrants to all banks. The second raw for entry displays the ratio of entrants for a particular bracket to all entrants.

Asset Size	Less than 100M	Between 100M-600M	Between 600M-10B	More than 10B	Exit
Less than \$100M	90.86%	4.24%	0.00%	0.00%	4.90%
Between \$100M-600M	1.03%	93.34%	1.58%	0.00%	4.06%
Between \$600M-10B	0.01%	1.52%	93.33%	0.66%	4.48%
More than \$10B	0.00%	0.00%	1.01%	96.29%	2.70%
Entry (% of existing banks)	0.03%	0.01%	0.02%	0.00%	-
Entry (of all entrants)	51.39%	13.60%	31.65%	3.36%	-

Table 5: Transition Probabilities: 2010-2019 Period

Source: Authors' Analysis of FFIEC Call Report Data

Over time, the probability of exit for banks with more than \$600 million in assets has declined substantially whereas it is somewhat unchanged for banks with less than \$600 million in assets, although we observe a slight increase in exit probability for banks with less than \$100M in assets. In addition, the probability of moving to an upper asset size category has also declined in the last decade, particularly for smaller banks (see Appendix). The probability of moving down stays nearly the same for small banks, but it declines significantly for large banks (assets >\$10B), from 2.27 percent to 1.01 percent.

Entry dynamics in the banking industry have changed in time as well. After 2010, the probability of entry is very close to zero. Also, the asset sizes of the entrants are larger at entry compared to before the Great Recession. Consistent with all these facts, the probability of staying in the same asset bracket increases for banks, particularly for the ones with more than \$600 million in assets.

As a robustness check, we exclude the mergers from the sample²⁷ and recalculate the transition matrices. We use the FDIC data to identify mergers and acquisitions. This dataset has all the M&As including credit unions and non-depository institutions, which are not included in the Call Reports. As expected, the probability of moving up is lower when the mergers are excluded. As a result, the probability of staying in the same category is higher for each asset size compared to the results obtained with the full sample.

We observe a significant change in exit probabilities as well. Since most of the exits are in the form of mergers, the probability of exit declines significantly when we exclude mergers. In other words, failure rates are generally very low. Only during and after the 2007-2009 financial crisis, the failure rate experienced a spike, up to 6 percent compared to less than 1 percent average during all other times, as shown below:

²⁷ If a bank experiences a merger in a year, then we remove the transition in that particular year to control for jumps in the asset size.

Asset Size	Less than 100M	Between 100M-600M	Between 600M-10B	More than 10B	Exit
Less than \$100M	95.12%	4.80%	0.01%	0.00%	0.07%
Between \$100M-600M	1.21%	97.55%	1.17%	0.00%	0.07%
Between \$600M-10B	0.05%	2.34%	96.91%	0.66%	0.05%
More than \$10B	0.00%	0.00%	5.08%	94.92%	0.00%
Entry (% of existing banks)	1.18%	0.08%	0.05%	0.00%	-

Table 6: Transition Probabilities: 1992-1999 Period (mergers excluded)

Source: Authors' Analysis of FFIEC Call Report Data

Table 7: Transition Probabilities: 2000-2009 Period (mergers excluded)

Asset Size	Less than 100M	Between 100M-600M	Between 600M-10B	More than 10B	Exit
Less than \$100M	92.24%	7.57%	0.00%	0.00%	0.18%
Between \$100M-600M	1.14%	96.82%	1.79%	0.00%	0.25%
Between \$600M-10B	0.00%	2.00%	96.98%	0.36%	0.66%
More than \$10B	0.00%	0.00%	1.67%	97.96%	0.37%
Entry (% of existing banks)	1.48%	0.11%	0.02%	0.01%	-

Source: Authors' Analysis of FFIEC Call Report Data

Table 8: Transition Probabilities: 2010-2019 Period (mergers excluded)

Asset Size	Less than 100M	Between 100M-600M	Between 600M-10B	More than 10B	Exit
Less than \$100M	95.66%	3.95%	0.00%	0.00%	0.39%
Between \$100M-600M	1.10%	97.15%	1.19%	0.00%	0.56%
Between \$600M-10B	0.02%	1.89%	97.10%	0.24%	0.75%
More than \$10B	0.00%	0.00%	1.62%	98.19%	0.19%
Entry (% of existing banks)	0.03%	0.01%	0.02%	0.00%	-

Source: Authors' Analysis of FFIEC Call Report Data

4.1.2. Role of Merger and Acquisitions

Consolidation in the banking sector is well studied, and mergers and acquisitions are the most important factor behind this trend. There are more than 200 M&A activities every year on average. As shown in Figure 7 below, the percent of banks participating in M&As peaked following the Riegel-Neal Act, and steadily went down over time.



Figure 7: M&A Summary Statistics over years, by Bank Size

To assess M&A activity's role in the overall consolidation trend, we test whether banks that have ever been involved in M&A activities are characteristically different from banks that have never involved in M&A activities, in terms of their growth statistics. For that purpose, we divide the banks into two groups based on their participation history in any M&A activity. If a bank has ever participated in at least one M&A in its life-cycle, then it is labeled as "Banks with M&A records." Otherwise, banks are labeled as "Banks without M&A records."

According to Table 9, the size distributions of banks with M&A records and banks without M&A records are different. As of 2019-Q4, 81 percent of banks with larger than \$1 billion in assets have participated in at least one M&A activity, whereas this ratio is 27 percent for banks with assets less than \$1 billion.²⁸

Asset Group	# of Banks Participating in at least one M&As (Banks w M&A records)	# of Banks never Participating in M&As (Banks w/o M&A records)	% Participating in at least one M&As
<\$100M	90	924	9%
\$100M < x < \$1B	929	1892	33%
\$1B < x < \$10B	415	116	78%
>\$10B	109	11	91%

Table 9: Descriptive Statistics, 2019

Source: Authors' Analysis of FFIEC Call Report Data

Source: Authors' Analysis of FFIEC Call Report Data

²⁸ Weighted averages of shown values in Table 9.

We observe below that the asset growth rate of banks with M&A records is 0.6 percentage points higher, on average (Figure 8a). Similarly, the return on assets is 0.2 percentage points higher compared to banks without any M&A records (Figure 8b).



Figures 8a and 8b: Asset Growth and Return on Asset over years (all banks, all quarters)

It is crucial to note that banks participating in M&As are directly affecting the asset growth rates only in the quarter the M&A activity occurs, due to newly obtained assets. If we drop the observations (quarters) during which M&As occur (i.e., control for the immediate one-time asset acquisition), which constitute 1 percent of all observations, then the difference in asset growth rate disappears completely (Figure 9a compared to Figure 8a). However, the difference in return on assets persists completely (Figure 9b compared to Figure 8b), meaning that the bank characteristics of these two groups of banks might indeed be different.





Source: Authors' Analysis of FFIEC Call Report Data

Source: Authors' Analysis of FFIEC Call Report Data

4.1.3. Bank Exits

Almost 9,500 banks exited the industry from 1992 to 2019. 93 percent of these exits are in the form of M&As and the remaining consists of failures. In this section, we analyze the behavior of all exiting banks (both failure and M&As) a few years before actual exits. According to Figure 10, the slowdown in asset growth starts around three years prior to exit.



Figure 10: Asset Growth Rate (average) of Exiting Banks

Source: Authors' Analysis of FFIEC Call Report Data





Source: Authors' Analysis of FFIEC Call Report Data

Figure 11 shows that return on assets declines significantly within two and a half years of exit and the net charge-off rate rises rapidly within three years of exit:

Time Period	Asset Growth	Return on Asset	Charge-off Rate	Noncurrent Loan/Tot. Loan
Average up to two- years before Exit	3.15	0.93	0.33	1.36
Average within two- years of Exit	1.32	0.66	0.58	1.96

Table 10: Averages	of Selected Exitin	g Bank Characteristics
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Source: Authors' Analysis of FFIEC Call Report Data

In Table 10, the means of some performance variables are reported for exiting banks based on years before exit. We observe that within the last two years of banks' exit, the change in the performance variables is very rapid in the negative direction. Therefore, it is crucial to control for this significant change in variables in the regression analysis.



Figure 12: Probability of Exit for New Banks (Quarterly)

Source: Authors' Analysis of FFIEC Call Report Data

Lastly, we calculate the probability of exit for de novo banks in a similar fashion to DeYoung (1999):

$$P(t) = \frac{number of bank exits at age t}{number of banks at age t}$$

According to Figure 12 the probability of exit increases until age 10 and the peak rate is around 2-2.5 percent. By the time a bank has been around for 30 years the probability declines to around 1.1 percent, which is the average exit rate of the full sample.

4.2. Estimation: Asset Growth and Loan Behavior

Next, we analyze the factors that affect the asset growth of banks. Using the unbalanced panel FDIC Call Reports data,²⁹ we run the following ordinary least squares regression:

 $\Delta Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_{it} + c_i + \delta_t + \varepsilon_{it}$

where *i* represents panel unit (bank) and *t* stands for years. The dependent variable ΔY_{it} is annual asset growth, X_{it} is the vector of variables of interest, i.e., different size categories of small loan to loan ratio, and small loan to asset ratio.³⁰ Although FDIC variables are available quarterly, small business loans are available only Q2 of each year until 2010 and every quarter after 2010. Z_{it} includes vector of performance and control variables, c_i is bank fixed effects and δ_t stands for time fixed effects as described in Table 11a below. We next discuss the variable selection procedure in detail.

Variable Selection

Our main variable of interest is the small loan to total loan ratio, since we want to estimate the impact of banks' small loan portfolio shares on their asset growth rates. There are three types of small business loans in Call Reports: C&I loans, loans secured by nonfarm nonresidential properties, and loans secured by farmland and loans to finance agricultural production. In this paper, we only focus on the sum of the first two loan types as small business loans, as our main analysis of interest is the effects of small business loans on private nonfarm economy.³¹

Among the potential control variables available in the FDIC database, we only use a subset of variables that are commonly used in the literature. Our dependent variable is the annual asset growth rate and we want to analyze the effect of small loan to total loan ratio and loan to asset ratio. As control variables, we decided to include main performance variables such as net interest margin, return on equity, net charge-off to loans, and equity capital to assets among the FDIC defined variables.³² Table 11a below shows why some other performance measures are excluded from the analysis:

²⁹ Due to entry and exits, the panel structure is unbalanced. The results obtained with pooled ordinary least squares are not very different than the output of panel regression, which we present here.

³⁰ The variables are expressed in terms of percentage points.

³¹ As discussed in the data section above, BDS data is limited to private nonfarm economy, and our paper eventually focuses on effects of small business loans on small business growth using the BDS data.

³² <u>https://www7.fdic.gov/sdi/sitemap.asp</u>, (last accessed on 9/22/2020) and click "Performance and Condition Ratios" in the left bottom). All performance variables are predefined in the dataset.

Variable	Role	Inclusion Notes	Inclusion Decision
Small Loan to Total Loan	Policy Related Control	Hypothesis testing-	Yes
Loan to Asset	Variables of Interest	Authors' Decision	Yes
Net Interest Margin		Following DePrince and Morris (2007)	Yes
Net Charge off to loans		To control performance for loan specific variables	Yes
Noncurrent loans to loans	Performance Variables	Highly correlated with net charge- off	No
Equity capital to assets		Author's decision	Yes
Leverage		Existing collinearity with net interest margin	No
Return on equity		Existing collinearity with net interest margin	No
Lagged GDP growth	Control Variable –	Time fixed effects makes them	No
Lagged Fed Funds R.	Macro level	redundant	No
Merger Dummy	• • • • • • • •	Authors' Decision to Control for	Yes
Pre-Exit Dummy	Control Variable Time Fixed Effects		Yes
Year Dummy			Yes

Source: Author's explanations

Net interest margin is defined as the total interest income less total interest expense as a percentage of average earning assets. This variable is widely used in the literature (DePrince and Morris, 2007; Cornett et al., 2006; Hagendorff and Keasey, 2009) to measure bank performance. In addition, we include net charge-offs to loans ratio, which is defined as loans charged-off less amounts recovered on loans and leases previously charged-off. Similarly, we use equity capital to asset ratio in the model to control for variations in the liability side of balance sheets. By adding time fixed effects, we control for Fed Funds rate, decline in real interest rate, GDP growth or any macro level factors, including aggregate shocks and policy that affect all states.

We also control for bank-specific factors: age, equity share of assets, and the merger dummy. We introduce the age variable as multiple dummies to account for nonlinearities because, as Figure 13 below demonstrates, the asset growth is very rapid at the beginning of the life-cycle (first 10 quarters) but it stays very stagnant afterwards.

Consistent with our findings in Section 4.1, we control for asset size, M&A activity, and bank exits. Therefore, we add log of assets, merger dummies for survivors, and also acquired (exit) dummies (for the decline in target banks) into the model.³³ The merger dummy takes value one

³³ When we exclude mergers and acquisitions from the sample, the coefficients of other variables have not changed significantly.

when a bank acquires another bank, zero otherwise, to control for the immediate increase in its asset size.



Figure 13: Asset Growth Rate for New Banks

Source: Authors' Analysis of FFIEC Call Report Data

Similarly, when a bank exits, we use a dummy to control for the sudden decrease in its asset size. Table 11b below presents summary statistics regarding the main variables of interest:

Variables	Mean	Std. Dev	10 ^t h	50 ^t h	90 ^t h
Asset Growth	1.93	4.98	-3.00	1.25	7.23
CI Ioan/Loan	15.44	9.55	5.22	13.47	28.44
Loan/Asset	45.42	14.84	26.63	44.30	66.03
Net Int Margin	4.20	0.85	3.18	4.15	5.30
ROE	10.19	7.75	2.22	10.46	18.92
ROA	0.99	0.82	0.23	1.06	1.80
Equity Cap/Asset	10.64	3.51	7.39	9.81	14.76
Net Charge-off	0.25	0.53	-0.04	0.07	0.74
Noncurrent loans	1.24	1.56	0.01	0.71	3.13

Table 11b: Summary Statistics (pooled data)

Source: Authors' Analysis of FFIEC Call Report Data

Note: The values are all in percentages.

We use bank fixed effects to control for bank-level heterogeneity and time fixed effects to control for macroeconomic factors as explained above. In the following regressions, we remove observations for the first two years of banks' Call Reports, to eliminate temporary starting period accounting effects, along with bottom and top 1 percent of the outliers, as discussed in detail in Appendix Data Filters Section (7.1). We present our main findings based on the asset size groups,³⁴ as follows in Tables 12a and 12b:

³⁴ The analysis covers the period 1998-2019. The small loan variables are available for 1994-1997 in a more detailed fashion. For consistency, we decided to keep them out of the analysis.

	(1)	(2)	(3)	(4)
	Asset Growth Asset>10B	Asset Growth 1B <asset<10b< td=""><td>Asset Growth 100M<asset<1b< td=""><td>Asset Growth Asset<100M</td></asset<1b<></td></asset<10b<>	Asset Growth 100M <asset<1b< td=""><td>Asset Growth Asset<100M</td></asset<1b<>	Asset Growth Asset<100M
Age	-0.083*	-0.000	-0.064*	-0.266***
	(0.047)	(0.061)	(0.036)	(0.023)
Age<=5 Dummy	-13.538***	15.242***	18.174***	13.704***
	(3.853)	(2.824)	(0.466)	(0.917)
5 <age<=10 dummy<="" td=""><td>-5.562*</td><td>7.569***</td><td>4.064***</td><td>3.300***</td></age<=10>	-5.562*	7.569***	4.064***	3.300***
	(2.898)	(1.410)	(0.275)	(0.630)
<\$100k small Loan	0.049	0.012	0.006	0.014*
	(0.091)	(0.030)	(0.007)	(0.008)
\$100k-250k small Loan	-0.082	0.013	0.010	0.028***
	(0.139)	(0.049)	(0.009)	(0.008)
Small Loan to Total Loan	0.054	0.106***	0.046***	0.026**
	(0.196)	(0.039)	(0.008)	(0.013)
Loan to Asset	-0.157	-0.027	-0.061***	-0.097***
	(0.118)	(0.035)	(0.010)	(0.016)
Net Interest Margin	1.136	1.396***	1.744***	1.280***
	(1.123)	(0.456)	(0.147)	(0.241)
Equity capital to assets	-0.135	-0.429***	-0.408***	0.199***
	(0.232)	(0.131)	(0.039)	(0.063)
Net charge-offs to loans	-5.841***	-5.759***	-5.585***	-3.943***
	(1.185)	(0.441)	(0.133)	(0.194)
Ln(asset)	4.568***	5.169***	3.595***	13.097***
	(1.688)	(0.867)	(0.291)	(0.710)
Merger Dummy	14.819***	21.000***	30.239***	35.222***
	(1.081)	(0.639)	(0.561)	(2.649)
Exit Dummy	-9.146***	-5.460***	-3.293***	-1.089**
	(3.439)	(1.616)	(0.438)	(0.542)
Constant	-53.248*	-66.794***	-37.889***	-129.333***
	(30.966)	(13.444)	(4.183)	(8.088)
Obs.	2048	10946	84440	32238
R-squared	0.229	0.345	0.311	0.163

Table 12a: Regression results by Asset Size Brackets - Effects of Small Loans on Asset Growth

Standard errors are in parenthesis

***p < 0.01, **p < 0.05, *p < 0.1Source: Authors' Analysis of FFIEC Call Report Data

	(1)	(2)	(3)	(4)
	Asset Growth Asset<10B (FRB cut-off)	Asset Growth Asset<5B	Asset Growth Asset<1B	Asset Growth Asset<600M (SBA cut-off)
Age	-0.050**	-0.050*	-0.073**	-0.052
	(0.026)	(0.027)	(0.036)	(0.040)
Age<=5 Dummy	16.894***	16.980***	17.156***	16.969***
	(0.383)	(0.384)	(0.388)	(0.389)
5 <age<=10 dummy<="" td=""><td>4.173***</td><td>4.186***</td><td>3.991***</td><td>3.915***</td></age<=10>	4.173***	4.186***	3.991***	3.915***
	(0.252)	(0.252)	(0.251)	(0.256)
<\$100k small Loan	-0.007	-0.006	0.001	0.003
	(0.005)	(0.005)	(0.005)	(0.005)
\$100k-250k small Loan	0.013**	0.014**	0.018***	0.020***
	(0.006)	(0.006)	(0.006)	(0.006)
Small Loan to Total Loan	0.055***	0.056***	0.054***	0.050***
	(0.007)	(0.007)	(0.007)	(0.007)
Loan to Asset	-0.046***	-0.048***	-0.059***	-0.062***
	(0.008)	(0.008)	(0.008)	(0.009)
Net Interest Margin	1.350***	1.368***	1.420***	1.393***
	(0.122)	(0.122)	(0.126)	(0.130)
Equity capital to assets	-0.313***	-0.310***	-0.232***	-0.160***
	(0.033)	(0.034)	(0.035)	(0.037)
Net charge-offs to loans	-5.463***	-5.485***	-5.323***	-5.235***
	(0.111)	(0.111)	(0.113)	(0.117)
Ln(asset)	3.289***	3.455***	4.796***	5.796***
	(0.209)	(0.213)	(0.245)	(0.279)
Merger Dummy	27.093***	27.621***	30.453***	32.239***
	(0.440)	(0.451)	(0.551)	(0.660)
Exit Dummy	-2.712***	-2.739***	-2.707***	-2.569***
	(0.359)	(0.347)	(0.354)	(0.362)
Constant	-34.468***	-36.577***	-51.549***	-64.495***
	(3.011)	(3.086)	(3.621)	(4.125)
Obs.	127624	126340	116678	107764
R-squared	0.273	0.274	0.268	0.258

Standard errors are in parenthesis

***p < 0.01, **p < 0.05, *p < 0.1Source: Authors' Analysis of FFIEC Call Report Data

	(1)	(2)	(3)
	Asset Growth Age>100	Asset Growth 100>Age>20	Asset Growth 20>Age>2
Age	0.189***	-0.147**	-1.190***
	(0.039)	(0.069)	(0.416)
Age<=5 Dummy			7.693***
			(0.540)
5 <age<=10 dummy<="" td=""><td></td><td></td><td>-0.966***</td></age<=10>			-0.966***
			(0.337)
<\$100k small Loan	0.003	-0.011*	-0.010
	(0.010)	(0.007)	(0.019)
\$100k-250k small Loan	-0.007	0.013*	-0.024
	(0.010)	(0.008)	(0.020)
Small Loan to Total Loan	0.028**	0.050***	0.033**
	(0.012)	(0.010)	(0.016)
Loan to Asset	-0.056***	-0.039***	-0.115***
	(0.014)	(0.012)	(0.025)
Net Interest Margin	1.405***	1.353***	1.245***
	(0.215)	(0.171)	(0.303)
Equity capital to assets	-0.400***	-0.496***	0.376***
	(0.070)	(0.046)	(0.081)
Net charge-offs to loans	-4.364***	-4.511***	-7.238***
	(0.180)	(0.149)	(0.256)
Ln(asset)	4.339***	3.664***	5.281***
	(0.480)	(0.330)	(0.519)
Merger Successor Dummy	23.216***	25.824***	30.599***
	(0.691)	(0.599)	(1.054)
Exit Dummy	-1.425***	-1.971***	-3.091***
	(0.342)	(0.249)	(0.367)
Constant	-68.581***	-32.349***	-48.503***
	(7.418)	(5.688)	(6.571)
Observation.	36058	64794	28820
R-squared	0.277	0.251	0.318

Standard errors are in parenthesis

*** p<0.01, ** p<0.05, *p<0.1

Source: Authors' Analysis of FFIEC Call Report Data

As shown in Table 13 above, we then run a similar regression model for subsamples based on age brackets. The following regressions are conducted for three different subsamples: older than 100, younger than 100 and older than 20, and younger than 20.

As displayed above in Tables 12a, 12b, and 13, our main variable of interest, which is the small loan share of banks' loan portfolio, is statistically significant for all size and age groups, except banks with assets larger than \$10 billion. This finding indicates that higher loan portfolio shares of small business loans are associated with higher observed asset growth rates for nearly all banks except for the largest ones.

4.3. Estimation: Business Loans and Small Businesses

In this section, we answer two questions to understand how changes in the supply of small business loans affect (i) BDS small business performance variables at the MSA level, and (ii) the business formation rates (BFS data) at the state level. For both questions, we approximate the supply of small business loans³⁵ (i.e., capital availability) by CRA data.³⁶

We estimate two models for the first question, and a third model for the second question, as listed below:

- i. We regress MSA level BDS entry/exit/growth on the total small business loans and local/macro control variables, using a panel fixed effects model.
- ii. We estimate a panel vector autoregressive model allowing small business loan growth and employment growth to be endogenously determined and be time dependent to their past values.
- iii. We regress BFS data at the state level, on the total small business loan amounts in that state, with multiple lag options.

4.3.1. Panel Fixed Effects: Small Loans and Small Businesses

In the panel data, we follow the firms aggregated at size categories and MSAs.³⁷ Then, we run the following fixed effects regression:

 $\Delta Y_{it} = \beta_0 + \beta_1 \Delta Unemployment_{it} + \beta_2 \Delta Population_{it} + \beta_3 \Delta Loan1_{it} + \beta_4 \Delta Loan1_{i,t-1} + \beta_5 \Delta Loan2_{it} + \beta_6 \Delta Loan3_{it} + c_i + c_s + \delta_t + \varepsilon_{it}$

where *i* refers to aggregated firm groups at MSA level and *t* stands for years. The dependent variable ΔY_{it} can be employment growth, firm growth (net firm entry rate), job destruction rate,

³⁵ CRA data consists of small business loans (including credit card lines), small farm loans, and community development loans, but there is no information on home mortgage loans. We only keep small business loans at MSA level as our sample to run regressions.

³⁶ Econometric model selection is subject to change.

³⁷ BDS data does not allow us to create combinations of age and size categories. In the publicly available data, age categories are not defined for each size category. Ideally, one needs to control for age.

and job creation rate (data from BDS).³⁸ We control for unemployment and population at the MSA level for each regression.³⁹ Our main variables of interest: *Loan1* refers to the growth of loans less than \$100k, *Loan2* is the growth of loans more than \$100k and less than \$250k, and *Loan3* is the growth rate of loans more than \$250k and less than \$1M.⁴⁰ δ_t stands for time fixed effects, c_i includes MSA fixed effects, and c_s includes state fixed effects. All the variables are expressed in percentages.

³⁸ An establishment is a single physical location where business is conducted, whereas a firm is defined as a business organization consisting of one or more establishments, by BDS.

 ³⁹ Due to underlying endogeneity between unemployment rate and GDP growth, we omitted GDP from the regressions. If GDP is added in place of unemployment, the significance of coefficients in interest stays unchanged.
 ⁴⁰ We omitted lagged loan availability for groups 2 and 3 because the non-lagged versions of the variables were also non-significant.

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment	Number of Firms	Establishment Entry Rate	Establishment Exit Rate	Job Creation Rate	Job Destruction Rate
Population growth	0.179	0.160	0.004	0.006	0.046	-0.021
	(0.243)	(0.148)	(0.056)	(0.039)	(0.105)	(0.095)
Unemp. Rate	-0.138	-0.023	0.086	-0.079	-0.265	-0.340
	(0.379)	(0.214)	(0.106)	(0.062)	(0.190)	(0.214)
Loan<\$100k	0.031***	0.019***	0.004**	-0.002*	0.017***	-0.014***
	(0.008)	(0.004)	(0.002)	(0.001)	(0.003)	(0.003)
Lag Loan<\$100k	0.011*	0.011***	0.004***	-0.002	0.007***	-0.006**
	(0.007)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
\$100k <loan<\$250k< td=""><td>-0.003</td><td>-0.002</td><td>-0.001</td><td>0.000</td><td>-0.002</td><td>0.001</td></loan<\$250k<>	-0.003	-0.002	-0.001	0.000	-0.002	0.001
	(0.006)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)
\$250k <loan<\$1m< td=""><td>0.001</td><td>0.000</td><td>-0.000</td><td>-0.001</td><td>-0.001</td><td>-0.002</td></loan<\$1m<>	0.001	0.000	-0.000	-0.001	-0.001	-0.002
	(0.005)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Constant	1.711	0.353	6.106***	5.111***	17.266***	16.430***
	(2.930)	(1.583)	(0.759)	(0.446)	(1.292)	(1.497)
Obs.	36970	36970	36970	36970	36970	36970
State Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.025	0.034	0.133	0.069	0.110	0.093

Table 14: Regression results - Effects of Small Business Loan Supply on BDS Measure	able 14: Regression results	- Effects of Small Business	Loan Supply on BDS Measures
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Standard errors are in parenthesis. ***p < 0.01, **p < 0.05, *p < 0.1Source: Authors' calculations Next, we present our findings grouped by firm size in the BDS, in Table 15 below:

		U			11.2	
	(1)	(2)	(3)	(4)	(5)	(6)
	Employm ent	Number of Firms	Establishment Entry Rate	Establishment Exit Rate	Job Creation Rate	Job Destruction Rate
Size 1-10						
Loan<\$100k	0.025***	0.024***	0.015***	-0.007***	0.029***	-0.016***
	(0.006)	(0.004)	(0.003)	(0.002)	(0.004)	(0.003)
Lag Loan<\$100k	0.002	0.010***	0.009***	-0.004***	0.012***	-0.004
	(0.005)	(0.004)	(0.002)	(0.002)	(0.003)	(0.003)
Size 10-100						
Loan<\$100k	0.040***	0.027***	0.002	-0.001	0.021***	-0.022***
	(0.008)	(0.006)	(0.002)	(0.002)	(0.003)	(0.003)
Lag Loan<\$100k	0.000	0.013**	0.003**	-0.000	0.002	-0.001
	(0.006)	(0.005)	(0.002)	(0.001)	(0.003)	(0.003)
Size 100-1000						
Loan<\$100k	0.034*	0.007	-0.001	-0.001	0.011	-0.016**
	(0.019)	(0.010)	(0.004)	(0.003)	(0.007)	(0.007)
Lag Loan<\$100k	0.009	0.017**	0.001	-0.004	0.002	-0.000
	(0.017)	(0.008)	(0.004)	(0.003)	(0.006)	(0.006)
Size 1000+						
Loan<\$100k	0.024	0.017**	0.004	-0.003	0.012*	-0.006
	(0.018)	(0.007)	(0.004)	(0.003)	(0.007)	(0.007)
Lag Loan<\$100k	0.028*	0.005	0.005	0.001	0.011**	-0.015***
	(0.017)	(0.006)	(0.003)	(0.002)	(0.005)	(0.006)

Table 15: Results by BDS size categories - Small Business Loan Supply on BDS Measures

Standard errors are in parenthesis

*** *p*<0.01, ** *p*<0.05, **p*<0.1

Source: Authors' Analysis of FFIEC Call Report Data

According to our results, the smallest loan size (loans less than \$100k) is associated with increased employment or opening a new firm, whereas loans larger than \$100k do not have a significant impact on job or firm creation. However, the magnitude is economically small; a 10 percentage point increase in the growth of loans less than \$100k is associated with an increase of 0.31 percentage points in employment growth rate, and 0.19 percentage points in firm growth

rate. This finding is consistent with the survey data. According to SBCS 2018, 72 percent of firms which applied for financing and have annual revenue of less than \$1M seek loans less than \$100k. 54 percent of firms seek financing to expand business, which is associated with some level of job creation, along with other investments such as capital, information technologies, etc. From BDS data, we also know that most of the job creation comes from young and small firms, which seek loans less than \$100k according to SBCS 2018. Table 15 demonstrates the significance of small business loans particularly for small firms. For the sample of firms with more than 100 employees, the coefficient of growth in small business loans is again positive but not significant. This is consistent with the data as discussed above.

One limitation of our finding is that small loan supply and MSA level small business performance measures are endogenously determined in equilibrium, which could potentially affect the interpretation of our findings, yielding correlational rather than causal inferences. In the next section, we discuss an alternative model specification that focuses on the endogenous nature of the relationship between small business loans and the business measures, allowing us to further explore evidence for causality of the relationship.

4.3.2. VAR: Small Loans and Small Businesses

In the above specification, despite the observed strong correlational relationship (see Figure 14 below, and Tables 14 and 15 above) there is a possibility of endogeneity between real macroeconomic variables and loan growth, which prevents us from drawing causal conclusions. This is especially true considering CRA loans is an equilibrium variable and is likely a function of loan demand by the small businesses located in that MSA. One needs to use either instrumental variable method or Vector Autoregression (VAR) models to address such concerns, given the nature of the data.



Figure 14: Small loans vs Employment Growth, MSA level pooled 2006 - 2014

Here, we choose to present results obtained with VAR analysis instead of instrumental variables approach,⁴¹ which is well-known in econometrics applied to macroeconomic data.

Following Abrigo and Love (2016), we can present the panel VAR model as:

$$Y_{it} = Y_{i,t-1}A_1 + Y_{i,t-2}A_2 + \dots + Y_{i,t-p+1}A_{p-1} + Y_{i,t-p}A_p + X_{i,t}B + u_i + e_{it}$$

where *i* represents panel unit (MSA) and *t* stands for years. Y_{it} is (1xk) vector of dependent variables. In our case, they are real variables from BDS (employment growth, growth of number of firms)⁴² and small business loan growth. *p* is the order of VAR, which is specified as one due to the small number of periods (from 2006 to 2014). $X_{i,t}$ includes MSA level control variables like minority rate, educational attainment, and population. u_i stands for panel fixed effects.

Source: Authors calculations

⁴¹ In a macro-level panel setting, it is hard to find suitable instruments. We tried instrumenting small loan growth rate with bank entry as an instrument, but in the first stage regression we could not find a significant relation, which means the failure of relevance assumption. In addition, since the number of periods is low here, it is not possible to run models like Vector Error Correction Model (VECM) in case of cointegration.

⁴² We focus on firm growth and employment growth for firms less than 499 employees only.

VAR requires stationarity of the endogenous variables. Since the level of dependent variables are not stationary,⁴³ we use the growth rate of real variables and small business loans, which are stationary according to unit root tests. Then, we run the panel vector autoregression model specified above and estimate the orthogonalized impulse response functions (IRFs) based on Cholesky decomposition, which requires the ordering of endogenous variables.⁴⁴ For that, we use Granger causality tests and economic intuition.

Null Hypothesis	χ^2	Prob.	Result
Employment Growth does not Granger cause Small Loan Growth	0.041	0.840	Cannot Reject
Small Loan Growth does not Granger cause Employment Growth	54.408	0.000	Reject
Firm Growth does not Granger cause Small Loan Growth	1.136	0.287	Cannot Reject
Small Loan Growth does not Granger cause Firm Growth	45.438	0.000	Reject

	Table 16:	Granger	Causality	Test Result	s
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Note: Lag length is 1 Source: Authors' calculations

The ordering requires us to put first the most exogenous one of our endogenous variables. The ordering is loan growth rate leading the employment growth rate. This implies that a shock to loan growth affects both loan growth and employment growth, but a shock to employment growth equation only affects employment growth.

We understand that in the literature researchers treat Fed Funds rate as the most endogenous variable in VAR setting, based on the assumption that it has no contemporaneous effect on macroeconomic variables (Coibion, 2012). However, our data is annual (and not quarterly), and at the MSA level, so it is not possible to mode FED rates to be endogenous both due to time and panel dimensions.⁴⁵ As a result, the orthogonalized IRFs we estimate are as follows:

⁴³ We used *xtunitroot* to test the stationarity of the series.

⁴⁴ Simple IRFs cannot be used to assess contemporaneous reactions of variables, therefore it is not useful in this setting.

⁴⁵ Nevertheless, we ran 2 other versions of our VAR model allowing FED rates to be endogenous, our underlying causal relationship between employment growth and loan growth is unaffected.



Figure 15: VAR post-estimation Impulse Response Functions: Employment Growth

Source: Authors' calculations.

The IRFs show that a unit shock to small loan growth significantly increases the employment growth and the effect decays over time. However, it is not possible to claim that a shock to employment growth increases the small loan growth. These estimates provide evidence for the direction of the causality between employment growth and small loan growth. A one-standard deviation increase in loan growth rates (i.e., ~ 22 percentage point increase) is associated with a 1.6 percentage point increase in employment growth rates in the metropolitan area (standard deviation of employment growth rates is around 3 percent). In other words, for an MSA with 100,000 initial employment, a 22 percentage point increase in loans of 100k or less in the MSA area is expected to increase employment by 1,500 people.



Figure 16: VAR post-estimation Impulse Response Functions: Firm Growth

impulse response i unclous over line

Source: Authors' calculations.

Similarly, a one-standard deviation increase in small loan growth rates (i.e., ~22 percentage point increase) is associated with a 0.72 percentage point increase in firm growth rates (standard deviation of firm growth is around 2.1 percent). In other words, in an MSA area with 1,000 firms, a 22 percentage point increase in small business loans is expected to lead to 7 new firms to enter.

Our estimation results are robust and consistent to using different loan size groups, although we find that loans smaller than \$100k are most effective in generating small business employment, and the relationship remains significant but weaker as the loan size gets larger.

4.3.3. Small Loans and Business Formation

Lastly, we explored the relationship between business applications and loan availability within that state, using a panel regression model, similar to model specification defined in Section

4.3.1 using state level data. However, we do not find any significant relationship, most likely due to (i) the aggregate nature of the data and (ii) most small businesses report that they take loans out to expand their business and not to form their business.

Table 17: Regression results - Effects of Loan Supply on BFS Application Measures					
	(1)	(2)	(3)	(4)	
	All Business Applications - Growth	Corporation Business Appl. - Growth	High-propensity Business Appl. - Growth	Wages-based Business Appl. - Growth	
Population growth	-0.186	-1.116	-0.085	-0.220	
	(0.574)	(0.788)	(0.647)	(0.899)	
Loan <\$100k	0.019	0.007	0.013	0.017	
	(0.018)	(0.020)	(0.018)	(0.024)	
\$100k <loan<\$250k< td=""><td>-0.042</td><td>0.013</td><td>-0.004</td><td>0.006</td></loan<\$250k<>	-0.042	0.013	-0.004	0.006	
	(0.032)	(0.047)	(0.028)	(0.026)	
\$ 250k <loan<\$1m< td=""><td>0.019</td><td>-0.017</td><td>-0.007</td><td>-0.019</td></loan<\$1m<>	0.019	-0.017	-0.007	-0.019	
	(0.029)	(0.040)	(0.026)	(0.032)	
Constant	6.424***	6.757***	5.426***	5.808***	
	(0.907)	(1.491)	(1.078)	(1.530)	
Obs.	586	586	586	586	
R-squared	0.525	0.588	0.680	0.752	
Year Dummy	Yes	Yes	Yes	Yes	

Source: Authors' Analysis of FFIEC Call Report Data

5. Policy Implications and Discussion

In this study we present empirical evidence as to why small loans are crucial for small business performance measures, in terms of both employment and firm growth rates, at the MSA level. Moreover, we present empirical evidence that banks with a higher share of small business loans (commercial, industrial, and nonfarm nonresidential property loans) within their overall loan portfolio observe higher asset growth rates, except for banks with more than \$10 billion in assets. In summary, our results emphasize the importance of small loans for the success of small banks and small businesses.

Policies focused on small business loan availability should be given a high priority because small business loans have large and significant effects on employment growth and job creation, particularly for firms with less than 100 employees. We estimate that doubling loans less than \$100k is associated with increases in employment by ~ 7 percentage points within one year,

where the effects last two years,⁴⁶ which is very significant considering that the average historical employment growth rates typically fluctuate within the -4 to 4 percent range in the U.S. since 1990.⁴⁷ Similarly, doubling availability of loans less than \$100k is associated with ~ 3 percentage point increase in firm growth within one year. It is important to note that CRA's small business loan data includes lines of credit issued by banks' credit cards, as well as direct loan originations. Because it is not possible to separate the two from each other, we are cautious to interpret our findings as the impact of loan availability, rather than usage, although the two are certainly tightly related.

Moreover, our findings indicate that small business loans also increase the asset growth rate of banks, especially for the banks with assets less than \$10 billion. This effect is robust to bank age categories as well and makes any policy that promotes small business loans a beneficial one for small banks. This result emphasizes the potential risks of relying on large banks to fill in for small banks' role in providing the small business loans. Consistent with the previous academic studies (i.e., their organizational structure is less suitable for small business lending), our empirical findings reiterate that large banks do not have as much incentive to provide smaller loans to small businesses (i.e., it does not significantly help them grow their assets). As a result, a solid monitoring scheme on large banks' small business lending behavior is required to maintain the healthy functioning of the small business loans market.

These findings shall guide policy makers on several important issues such as small business dynamism, the importance of small banks and the connection between small bank success, and small business success. In particular, we suggest that policy makers pay very close attention to small loan availability to maintain small business and small bank growth, especially given that the number of small banks and bank entry rates have both been decreasing over time. Together, small business loan supply availability will be heavily and increasingly dependent on large banks filling in for small banks' role. Policies that will encourage banks of all sizes (large ones in particular unless consolidation trends are reversable) to continue to supply small business loans is essential to meet financial needs of small businesses. These policies can be in the form of increasing financial incentives to banks to offer smaller loans (which are inherently riskier and require more monitoring), such as extending the scope of small business loan guarantee programs such as the SBA's 7a program. Alternatively, the FDIC can develop gamification strategies to create and publish impact scores for banks to give more small business loans to their customers. Mechanisms like these could provide incentives to maintain and increase brand reputation to banks that participate in higher small business loan approvals.

⁴⁶ As discussed in Section 4.3.3., doubling loans of size less than \$100k is equivalent to 4.5 standard deviations from the average growth rates.

⁴⁷ See <u>https://fred.stlouisfed.org/series/PAYEMS</u>, (last accessed on 9/22/2020). Our finding is consistent with the fact that after the 2007-2009 financial crisis, it took six years for unemployment rates to return to pre-crisis levels and during the same time period small business loans (originated in amounts less than \$1 million) also remained 17 percent below the pre-crisis high (Cole, 2018).

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7. Appendix

7.1. Data Filters

The following filters were applied as pre-estimation cleaning procedures:

Tables 12a, 12b, 13 - Call Reports:

- Keep the period 1992-Q4, 2019-Q4
- Keep if "rssd9048" is equal to 200, i.e., keep only commercial banks
- Redefine all variables in annual frequency (using weighted average based on asset or loan), because the small loans are available only for 2nd quarters until 2010
- Remove the bottom 1 percent and top 1 percent for the following variables: asset growth, equity capital to asset ratio, net charge-off to loan ratio, net interest margin
- Remove the banks younger than 2 years old
- Remove if one type of small business loans (loans with less than \$100k) constitute all of the small business loans for a bank (we interpret these observations as misreported)

Tables 14, 15 - BDS public data and CRA

- Remove the observations with disclosure flag
- Remove the bottom 1 percent and top 1 percent for the following variables: employment growth, firm growth, growth of small loans (all three types)

Table 17 - BFS public data and CRA

- Keep the period 2005-2018 (BFS data is not available for all quarters in 2004)
- Remove the bottom 1 percent and top 1 percent for the following variables: business applications (BA), business applications from a corporation (CBA), high-propensity business applications (HBA), business applications with planned wages (WBA)

7.2. Data Structure



7.3. Other Data Sources

v. <u>Small Business Credit Survey (SBCS)</u>: The Small Business Credit Survey (SBCS) is a national collaboration of the 12 Reserve Banks of the Federal Reserve System that provides intelligence on small business financial needs, decisions and outcomes to policy makers, researchers and service providers.

Established in 2010 by the New York Fed, the Small Business Credit Survey (SBCS) reports information about business performance, financing needs, and choices, and borrowing experiences. The SBCS captures the perspectives of businesses with fewer than 500 employees and results are weighted to reflect the full population of small businesses in the covered states.

The 2016 survey was the first iteration conducted on a national scale with involvement from all 12 Federal Reserve Banks and input collected across all 50 states and the District of Columbia. Over 15,990 responses were received, of which 10,303 were from employer firms.

The survey data allows us to understand the demand side of the loan market, which is crucial to understand the linkages between the availability of credit for small businesses and small business dynamics. The survey questions are quite detailed so that we can understand the preferences of small businesses by age, size, and revenue. For example, according to the 2019 Survey, 43 percent of firms applied for financing in the prior 12 months and 76 percent of the applicants sought less than \$250,000. 49 percent of applicants applied to large banks, whereas 44 percent applied to small banks. The dataset is not available at the micro-level and it is available annually for the period 2016-2018.

vi. <u>Survey of Small Business Finances (SSBF)</u>: The questions in this survey are much more detailed compared to SBCS. However, the data is available only for 1987, 1993, 1998 and 2003, and is not suitable for studying recent economic trends.

vii. <u>Survey of Terms of Business Lending - E.2</u>: The survey comprises three reporting forms: the FR 2028A, Survey of Terms of Business Lending; the FR 2028B, Survey of Terms of Bank Lending to Farmers; and the FR 2028S, Prime Rate Supplement to the Survey of Terms of Lending. The FR 2028A and FR 2028B collect detailed data on individual loans made during the survey week, and the FR 2028S collects the prime interest rate for each day of the survey from both FR 2028A and FR 2028B respondents.

From these sample STBL data, estimates of the terms of business loans and farm loans extended during the reporting week are constructed. The aggregate estimates for business loans are published in the quarterly E.2 release, Survey of Terms of Business Lending. It was discontinued after 2017.⁴⁸

viii. <u>Small Business Lending Survey</u>: The Small Business Lending Survey is a quarterly collection of quantitative and qualitative information that will be used to understand credit market conditions for bank lending to small businesses. The survey captures detailed, comprehensive information that is not otherwise available about small business lending and how it changes from quarter to quarter. Specifically, quantitative information is collected on commercial and industrial (C&I) loan amounts, interest rates, maturities, lending terms for term loans, and lines of credit with fixed and variable interest rates, and applications received and approved. In addition, qualitative information is collected on changes in credit standards and terms and loan demand, as well as reasons for those changes.⁴⁹

vi. <u>Other Control Variables</u>: We use a variety of other publicly available data sources as control measures such as demographics, education, income, etc. In particular, we use E.2 Survey of Terms of Business Lending (FR 2028A) & Small Business Lending Survey (FR 2028D), which provide control for national levels of lending availability. Similar to CRA, business credit card limits are considered as small business loans in E.2 Survey.

⁴⁸ Includes credit card loans:

https://www.federalreserve.gov/reportforms/formsreview/FR2028A_FR2028B_FR2028S_20120620_omb.pdf, last accessed on 9/22/2020.

⁴⁹ <u>https://www.kansascityfed.org/research/indicatorsdata/smallbusinesslendingsurvey</u>, last accessed on 9/22/2020.

The survey is categorized for small and large banks separately but the cut-off for bank size is not constant over the years. In 2003, the cut-off was \$3.7 billion. It became \$4.5 billion and \$5.5 billion in 2012 and 2017, respectively.