

How Important Are Local Community Banks to Small Business Lending? Evidence from Mergers and Acquisitions

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Abstract

We investigate the shrinking community banking sector and the impact on local small business lending (SBL) in the context of mergers and acquisitions. From all mergers that involved community banks, we examine the varying impact on SBL depending on the local presence of the acquirers' and the targets' operations prior to acquisitions. Our results indicate that, relative to counties where the acquirer had operations before the merger, local SBL declined significantly more in counties where only the target had operations before the merger. This result holds even after controlling for the general local SBL market or local economic trends. These findings are consistent with an argument that SBL funding has been directed (after the mergers) toward the acquirers' counties. We find even stronger evidence during and after the financial crisis. Overall, we find evidence that local community banks have continued to play an important role in providing funding to local small businesses. The absence of local community banks that became a target of a merger or acquisition by non-local acquirers has, on average, led to local SBL credit gaps that were not filled by the rest of the banking sector (but may have been filled by non-bank lenders).

Keywords

Community Banks, Small Business Lending, Bank Mergers

1. Introduction

Small businesses are believed to have a significant role to play in local communi-

ties as they contribute to the local economic growth. They account for roughly half of private employment and more than half of total economic output—see Reference [1]. Further, small businesses and start-ups are disproportionately responsible for job creation—see Reference [2] and Reference [3]. In order to continue to play their critical roles in stimulating the local economy, small businesses are dependent on their ability to access funding as needed. Reference [4] shows that their declines in access to funding would depress long-term economic and employment growth. Thus, maintaining the functionality of the market for small business lending (SBL) is important to economic growth.

Community banks traditionally served as the primary source for small businesses' funding needs. Lending to small businesses often faces unique challenges since small firms and local start-ups tend to be opaque due to their short credit histories. Thus, SBL originations rely heavily on relationship-based lending and “soft” information, as discussed in Reference [5], Reference [6], and Reference [7]. The conventional wisdom suggests that community banks have a comparative advantage over large banks in collecting soft information and in relationship lending, leading to a comparative advantage in SBL funding to local small businesses. Local markets and geographic proximity do seem to be important in SBL according to Reference [8] and Reference [9]. Community banks' outsized role in SBL origination bolsters the economic importance of the community banking sector in the U.S. economy.

In contrast to the traditional paradigm, recent SBL trends suggest a new banking landscape in which large banks have become more active in providing funding to small businesses. Following this trend, large banks increasingly used credit scoring methods for small business borrowers (Reference [10]). This technique helped bridge the gap in SBL between large and small banks. Reference [11] noted the increasing distance between small business borrowers and lenders as a result of changes in lending technologies such as the adoption of credit scoring technologies by the lending banks. Reference [12] shows that, within the banking sector, large banks have doubled their market shares in SBL over the last decade. This evidence is consistent with a shift from relationship-based to formula-based underwriting for SBL as shown in Reference [13] and Reference [14]. Similarly, Reference [1] and Reference [15] find that large banks have been able to reach out to small businesses outside of their local markets (where they do not have any physical presence) in recent years, taking SBL share from local community banks. We suspect that the impact of these changes may not be occurring evenly across markets and geographical locations, but the distributional implications of these changes in the SBL landscape have not been well studied. We examine whether certain local markets may be disproportionately impacted.

In this paper, we explore the interplay among community banks' comparative advantages in SBL, their local presence, and their involvement in mergers and acquisitions (M&As). Our previous study in Reference [12] finds that as community banks become larger (through mergers and acquisitions), the combined

banking firm actually increased its lending to small businesses overall after the mergers (compared with the combined amount of SBL that the target and the acquirer originated prior to the merger). The results are even stronger when the acquiring bank is a large bank (larger than \$10 billion in assets). Superficially, these results suggest that there should be no negative impact on the overall SBL funding as the number of small community banks decline in recent years (through failures and bank M&A waves). However, it is quite possible that while the overall SBL funding increased after the merger, the acquirer could have diverted SBL funding from the target's local community. In this paper, with additional data, we are able to look deeper by incorporating into the analysis the specific location (community) where small business loans are made—*i.e.*, whether the increase in small business loans is occurring in the target's local community (or in the acquirer's local community) after the merger. Our results suggest that the increased SBL funding after the merger actually occur in the acquirer's own community, and that the merged banks are likely to decrease their SBL origination in the Target-Only counties (counties, where the target has operations in an acquirer, does not have operations in prior to the merger).

We recognize that the changes in SBL origination by banking firms that are involved in M&A may be offset by other banks so that there might be no net impact on the community. In addition, some new *de novo* banks could pop up in the local community to fill the SBL credit gap which was created by the mergers. In this study, we account for these possibilities in the analysis. We explore the net impact (allowing for other banks to fill the credit gap) by measuring the overall SBL activities in each local community and examine how the various type of community bank mergers that took place in the community may be related to the net change in local SBL funding. We find that the impact on local SCL varies—in particular, there is a net decline in SBL in Target-Only counties even after accounting for the possibility that other lenders could come in to fill the SBL credit gap. Overall, unlike in the Acquirer-Only counties, *de novo* banks and other banks do not fully compensate for the decline in SBL funding in the Target-Only counties.

Specifically, our results show that the merged (combined) banking firms are about 11 percentage points more likely to decrease their SBL activity in counties where only the target was operating prior to the merger, compared with counties where only the acquirer was operating before the merger. Furthermore, we find that reactions by other banking firms do not compensate for this SBL decrease. This evidence is consistent with an argument that local community banks still play an important role in providing SBL funding to local small businesses and that losing local community banks through a merger could potentially slow down SBL funding availability in the local community.

The rest of the paper is organized as follows: Section II reviews the existing literature on community bank mergers and our unique contributions to the literature. Section III describes our data sources. Section IV describes our identifi-

cation strategy. The empirical results and our conclusions and policy discussion are presented in Section V and Section VI, respectively.

2. Literature Review

Existing research on community banks and SBL covers the various advantages and disadvantages of relationship-based lending at community banks with the transaction-based lending technologies that are more common at larger banks. There also exists a rich literature on community bank M&A activity and its impact on SBL markets.

The first strand of research argues that small community banks have a comparative advantage in certain types of lending that enable them to compete with large banks. For example, Reference [16] finds that community banks have a comparative advantage in monitoring their consumers through relationship lending. Similarly, Reference [17] finds that for certain types of informationally intensive loans, small banks had a greater volume and a lower failure rate of loans leading up to the financial crisis, but they observe this advantage reversed after the crisis. Reference [18] finds that the majority of community bank mergers during 1990-2006 involved community bank acquirers, rather than large banks, contrasting the narrative that community bank acquisitions are motivated by a desire to gain the efficiency of a large bank.

The second strand of the literature suggests that large banks are better than community banks at certain important facets of SBL. Reference [14] and Reference [13] find that for SBL the small business credit scores (SBCS) used by large banks are superior to the consumer credit scores of small business owners (used by community banks). Also, SBCS have played an important role in allowing large banks to expand their lending to small businesses—Reference [12] shows that large banks have doubled their market shares in SBL (within the banking sector) over the last decade.

M&As are often used as a source of exogenous variation in the literature. Reference [19] uses M&As to study gasoline markets, and Reference [20] uses M&As to study health-insurance markets. Of particular relevance to our paper are References [9] [21], which both use mergers to study local banking markets. Similar to these papers, we believe that mergers provide a useful tool to study declines in community banking and changes in funding to local small businesses.

There is a rich literature examining mergers involving community banks and the impact on SBL. Reference [22] finds that while the short-term *static* effects of a community bank merger can result in a somewhat negative impact (reduction in SBL), the longer-term, *dynamic* effects tend to outweigh this negative impact when taking into account the reactions of local firms. This is further explained by Reference [23], which finds that *de novo* banks (state banks that have been in business for fewer than five years) emerge in the local community and issue small business loans to fill the credit gap. Similarly, using data from 1994 to 1997, Reference [24] finds that, unlike large bank mergers, community bank

mergers are associated with higher overall loan growth and a greater market share of local community banks; other local community banks tend to increase their own SBL following a local community bank merger.

Reference [12] examines community bank mergers, focusing on the impact of acquirer characteristics on SBL activities after the merger. Overall, they find that lending to small businesses by the merged bank surpasses the sum of its predecessor target and acquirer. Moreover, the authors found heightened effects when the acquirer was a large bank, with assets greater than \$10 billion—implying that becoming a part of a larger banking organization could further expand credit access to small businesses. Consistent with these findings, Reference [15] suggests that technological advances have recently enabled large banks to provide funding to small businesses in locations far away, taking market share from small, local community banks¹.

It is important to note that previous studies that find community bank mergers increase overall SBL volume are subject to significant geographic and time period limitations. Reference [22] used the Survey of the Terms of Bank Lending to Businesses, which is limited to about 300 disproportionately large banking institutions. Reference [24] imputes the geographic concentration of SBL using the summary of deposit data, which may not be a good proxy for SBL activities. Perhaps the closest study in the literature is by Reference [9], which uses mergers to construct an instrument for branch closings to study local markets' dependencies on branches. However, Reference [9] does not examine mergers generally and does not account for small community banks, because they fall below relevant reporting thresholds. Further, studies of bank mergers are concentrated in the period before the crisis, and their findings may no longer hold because of significant changes to bank competition and cost structures in the wake of the financial crisis; see Reference [25] and Reference [26]. We study this question in-depth in light of our improved data that are available for the post-crisis period.

We find that there are significant negative responses to declines in community banking. As mentioned earlier, the merged firms are more likely to decrease their SBL activity in counties where only the target was operating before the merger (compared with counties where only the acquirer was operating before the merger). We also find that acquirer size is important in determining the decline in the Target-Only counties. Our results overall suggest that local community banks still play an important role in lending to small businesses and that M&A that involve community bank targets could result in long-term declines in lending to local small businesses (which are not offset by other bank lenders).

3. Data

We use data from multiple sources and appropriately merge them for various analytical purposes. First, our bank merger sample consists of all bank mergers

¹The authors outline partnership opportunities between community banks and fintech lenders as a way to retain SBL market shares.

that took place during 2002-2014 that involved U.S. community bank targets, using two different definitions of community banks. Second, our data on SBL originations (by each bank, in each county, and in each year) cover the period from 2001 to 2015 (allowing us to analyze SBL activities for the period 12 months before and after the merger that took place in 2002-2014). It is important to note that we are able to identify the amount and the geographic location of each bank's SBL activities (*i.e.* the amount of SBL that each bank originated and purchased in each county each year)². Third, we collect information on the firms' structures premerger and postmerger. We use the Federal Reserve's bank structure database, along with the SBL allocation data, to evaluate changes in SBL allocation (at the county level and firm-level) across different merger types and county types. Merger types are classified by combinations of whether the target and acquirer have existing operations in the county: Target-Only, Acquirer-Only, or Both. Lastly, we use other data sources for local economic factors and general banking activities in each county. We describe each of the data sources in more detail below.

3.1. Data on Bank Mergers and Acquisitions

We collect transaction-level data on bank M&As from SNL Financial M&A Database. The database contains information about M&A targets, acquirers, and announcement/completion dates. The dataset also has financial information about the targets and the acquirers around the merger dates. We restrict the sample to M&A transactions during 2002-2014 that involved a community bank target. We also perform a separate analysis for M&A transactions that took place before and after the financial crisis to allow for the possibility that the nature of SBL activities may be significantly affected by the financial crisis³.

We define community banks in two ways: 1) banks with assets less than \$1 billion (in the main results), and 2) banks with assets less than \$10 billion⁴. While the definition of community banks was traditionally used for banks with assets less than \$1 billion for decades, the new definition with the threshold of \$10 billion became more common after the passage of the Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA) of 2010. See Reference [18], Reference [27], and Reference [28] for examples of research using the \$1 billion definitions. See Reference [12], Reference [15], Reference [25], and Reference [29] for examples of research using the \$10 billion definition.

²This enables us to compare the merger counterparties' (target and acquirer) SBL activities across counties before and after the mergers.

³We exclude minority interest acquisitions, government-assisted acquisitions, asset purchases, acquisitions with a foreign acquirer, and merger deals that had not been completed by the end of 2014.

⁴Under the DFA, bank stress testing (CCAR) started to be implemented based on bank asset size categories—banks with assets more than \$50 billion; those with assets between \$10 billion and \$50 billion; and banks smaller than \$10 billion. In addition, in 2012, the FDIC attempted to redefine community banks, using a definition that goes beyond asset size, but generally end up with banks with assets up to around \$10 billion. In 2018, the Congress passed the Economic Growth, Regulatory Relief and Consumer Protection Act, which defined "community banks" as those with less than \$10 billion in consolidated assets.

Our sample of community bank mergers changes according to the definition of community banks and the sample period. Our final samples for the entire period 2002-2014 include 1280 and 1366 community bank mergers when the target community banks are defined as having less than \$1 billion and less than \$10 billion, respectively. Of the 1280 community bank mergers (for the \$1 billion definitions), 477 mergers were completed during what we define as the post-crisis period of 2010-2014. Similarly, of the 1366 community bank mergers (for the \$10 billion definitions), 511 mergers took place during the 2010-2014 post-crisis period.

3.2. Small Business Lending (SBL) Data

We collect each bank's SBL activities in each county and each year from the Community Reinvestment Act (CRA) Disclosure Reports, which contain highly disaggregated information on SBL activities (newly originated and purchased SBL) at each banking institution in each county each year. These data are available for all banks that exceed a size threshold that varies over time⁵. Using the CRA data, we calculate, for each county in each year, a proportion of a bank's overall SBL activities that occur in a given year in each specific county. This calculated firm-county-year level of SBL ratio is applied to the outstanding SBL volume that a bank reports in the following June Call Report. In other words, the overall SBL *outstanding* as of June in each year is allocated to firm-county-level SBL activities, based on the banking firm's SBL origination and purchase activities reported by the bank in the CRA reports in the previous year.

For some small community banks that fall below the CRA reporting threshold, we use their deposit-taking location to allocate the overall SBL activities as reported in the Call Reports⁶, which are submitted to the Federal Reserve and the Federal Deposit Insurance Corporation (FDIC) by all banks⁷. We then geographically allocate total outstanding SBL volume into firm-county-level SBL following the allocation process used in Reference [15]. The FDIC Summary of Deposits contains the locations and the amount of deposits held at each branch of all FDIC-insured institutions, which can be aggregated to the county level. We apply the geographic distribution of bank deposits in each county to impute the annual firm-county-level SBL each year for this group of banks that do not sub-

⁵Firms below a size threshold are not required to submit CRA disclosure data. The threshold for CRA reporting has changed over time; for our sample, the threshold to submit the CRA report was for banks with assets of at least \$250 million during 2001-2005, at least \$1 billion of assets in 2006, and the threshold was indexed to CPI inflation after 2006. The full information on size thresholds to report the CRA data post-2006 can be found on the Federal Financial Institutions Examination Council (FFIEC)'s website at <https://www.ffiec.gov/cra/reporter.htm>.

⁶We recognize that this method of geographically allocating SBL based on deposit taking is not perfect. The plot in Figure A1 in Appendix 1 shows that deposit taking activities for small community banks performs reasonably well in estimating their SBL activities at the 5-digit zip code level.

⁷The relevant data items are available quarterly from 2010 forward but only available yearly in the June Call Reports until 2009. We collect the total outstanding SBL as of June each year for each bank for our entire sample period of 2001-2015.

⁸Reference [24] uses deposit taking to allocate SBL from Call Reports regardless of whether the firms report their actual CRA activities at the county level (from CRA reports). Rather than applying the deposit distribution to all sampled banks, we follow the process used in Reference [15] in which the actual CRA distribution from the CRA reports are used to allocate SBL to specific counties when the CRA data are available. Reference [15] argues for this approach on the grounds that it is unlikely for small community banks to engage in material lending outside of their immediate geographic footprint. For robustness testing, we show in Appendix 1 that, on average, the ratio of deposit taking in each county and the ratio of SBL origination in each county are highly correlated.

mit CRA reports⁸.

3.3. Branching and Bank Structure Data

We gather information on the banks' organizational structure from the Federal Reserve Structure Data, which allows us to identify the top and intermediate holders of a banking firm with details about the nature of the relationships. We use these data to classify target and acquirer size based on the top holder of each of the counterparties prior to the merger.

3.4. Economic Factors

We gather information on general county-level macroeconomic indicators from the Haver Analytics database to use as control variables. The imputed SBL market concentration variables are derived from several data sources—the CRA reports, the Call Reports, and the FDIC Summary of Deposits database. Our specific set of economic factors includes 1) *Population*, which we expect to be positively correlated with SBL, as larger (highly populated) counties with higher population density can support more small businesses, and 2) *Unemployment*, which allows us to observe the general macroeconomic health of the county and to capture variation across the business cycle, 3) *Per-Capita Personal Income* as another proxy for how relatively well off the county is, and 4) *Per-Capita Business and Personal Bankruptcy* to capture the credit risk exposure in each county on the aggregate level.

A brief summary of data sources for all the variables and the data period covered in our analysis is presented in Appendix 2.

4. Empirical Methodology

Our objective is to explore the impact of mergers that involved a community bank target on local small businesses' ability to access credit. We measure the overall impact in two ways. First, we examine SBL activities by the banking firms that were involved in the mergers—so-called the *firm-level* impact. Second, we examine the *county-level* impact by allowing for the possibility that other local banking firms (that were not involved in the mergers) might come in to offer additional SBL funding to close the local SBL credit gaps that were created by the mergers. We describe the firm-level analysis and the county-level analysis in detail in Sections 4.1 and 4.2 below.

4.1. Firm-Level Analysis—Impact of M&A on the Merged Bank's SBL Activities

First, in examining the *firm-level* responses, we ask whether the community bank M&A resulted in changes in SBL activity compared with the rest of the acquirers' operations. For example, we examine whether the acquirers would direct SBL funding from the Target-Only counties (counties where the target was operating before the merger) to its Acquirer-Only counties (counties where only the acquir-

er was operating before the merger).

We use a difference-in-differences approach—comparing the differences across different acquirer sizes and different types of counties (Target-Only, Acquirer-Only, Both) as classified by whether the target and/or acquirer (for each merger) was operating as of June the year prior to the merger year^{9,10}. The three-county categories are:

- (1,0) county—Acquirer-Only counties (only the acquirer is operating in);
- (1,1) county—Both counties (both the acquirer and the target are operating in);
- (0,1) county—Target-Only counties (only the target is operating in).

Our identification assumption is that firm-level effects on SBL would differ systematically based on whether acquiring firms had premerger operations in the county¹¹. Under this assumption, we can use Acquirer-Only counties as a quasi-experimental control group to identify the impacts of premerger operations in Target-Only counties. Since we are comparing firms with themselves, we avoid some typical identification challenges that arise in merger studies¹².

We measure SBL activities here in terms of dollar change (Equation (1)) as well as the ratio change (defined as SBL commitment as shown in Equation (2)). The increased SBL are represented in Equations (3) and (4) for dollar change and ratio change, respectively.

$$\text{Change_SBL}_{i,j,t} = \text{SBL}_{i,j,t+1} - \text{SBL}_{i,j,t-1} \tag{1}$$

$$\text{Change_SBLCommitment}_{i,j,t} = \frac{\text{SBL}_{i,j,t+1}}{\text{SBL}_{i,t+1}} - \frac{\text{SBL}_{i,j,t-1}}{\text{SBL}_{i,t-1}} \tag{2}$$

$$D_Increased_SBL_{i,j,t} = \begin{cases} 1 & \text{if } \text{Change_SBL}_{i,j,t} > 0 \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

$$D_Increased_SBLCommitment_{i,j,t} = \begin{cases} 1 & \text{if } \text{Change_SBLCommitment}_{i,j,t} > 0 \\ 0 & \text{otherwise} \end{cases} \tag{4}$$

where:

- $\text{SBL}_{i,j,t}$ represents our SBL measure for a the merger counterparties (target, acquirer) in merger i in county j at time t ;
- $\text{Increased_SBL}_{i,j}$ represents changes in SBL in inflation-adjusted dollar amounts;
- $\text{Increased_SBLCommitment}_{i,j,t}$ represents shifts the relative importance of county j to the counterparties in merger i at time t .

⁹We classify the status as of June the year prior to the merger because the data as of June of the merger year could reflect status after the merger (i.e., after the targets' SBL operations may have been eliminated).

¹⁰Postmerger, firms may start operations in counties outside of the set of counties where they were operating prior to the merger. However, data show that this effect represents on average of less than 1 percent of the combined firm's postmerger total lending. We focus on premerger operations only.

¹¹This assumption would not hold, for example, if there were dynamic, unobserved differences between the average acquirer's operating counties and the average target's operating counties. We include macroeconomic and year controls to help control for differences that may exist between the sets of counties.

¹²A common problem is that firms that merge are observably and unobservable different from firms that don't merge, which complicates selection of a control group.

The *Change_SBL* variable captures actual dollar amount changes in small business lending, whereas the *Change_SBLCommitment* variable captures strategic shifts (the change in the ratio of SBL in each county to the bank’s total SBL in all counties). We compare the combined firm’s SBL activities with the pre-merger SBL activities of the merger counterparties. If combined firms are systematically decreasing funding in the Target-Only counties, we should observe that trend in all four dependent variables in Equations (1) to (4). We use the continuous measures of SBL activities in the linear regression analysis and use the SBL increased dummy indicators in the probabilistic regression analysis as described next.

Equations (5) and (6) are the model specifications for $D_Increased_SBL_{i,j}$ and $D_Increased_SBLCommitment_{i,j}$, respectively. We estimate the coefficients using logistic regression analysis, with a standard log-odds link function and estimated via maximum likelihood. We then calculate and report the marginal effects on the probability of increased SBL ratio, using the marginal effects at representative values method.

$$\ln\left(\frac{\Pr(D_IncreasedSBL_{i,j} = 1)}{1 + \Pr(D_IncreasedSBL_{i,j} = 1)}\right) = \hat{\beta}_0 + \hat{\beta}_1 C_{i,j} + \hat{\beta}_2 \Delta M_j + \hat{\beta}_3 Y_i + \epsilon_{i,j} \quad (5)$$

$$\begin{aligned} & \ln\left(\frac{\Pr(D_IncreasedSBLCommitment_{i,j} = 1)}{1 + \Pr(D_IncreasedSBLCommitment_{i,j} = 1)}\right) \\ & = \hat{\beta}_0 + \hat{\beta}_1 C_{i,j} + \hat{\beta}_2 \Delta M_j + \hat{\beta}_3 Y_i + \epsilon_{i,j} \end{aligned} \quad (6)$$

where the independent variables:

$C_{i,j}$ represents a vector of indicator variables for the county classifications interacted with indicator variables for whether the acquirer is a community bank or not. The base case is for a (1,1) county and the acquirer being a community bank;

ΔM_j represents a vector of changes in macroeconomic conditions in county j between one year prior to the merger and one year after the merger;

Y_i represents a vector of merger completion year dummies. The base case is for mergers that were completed in 2002.

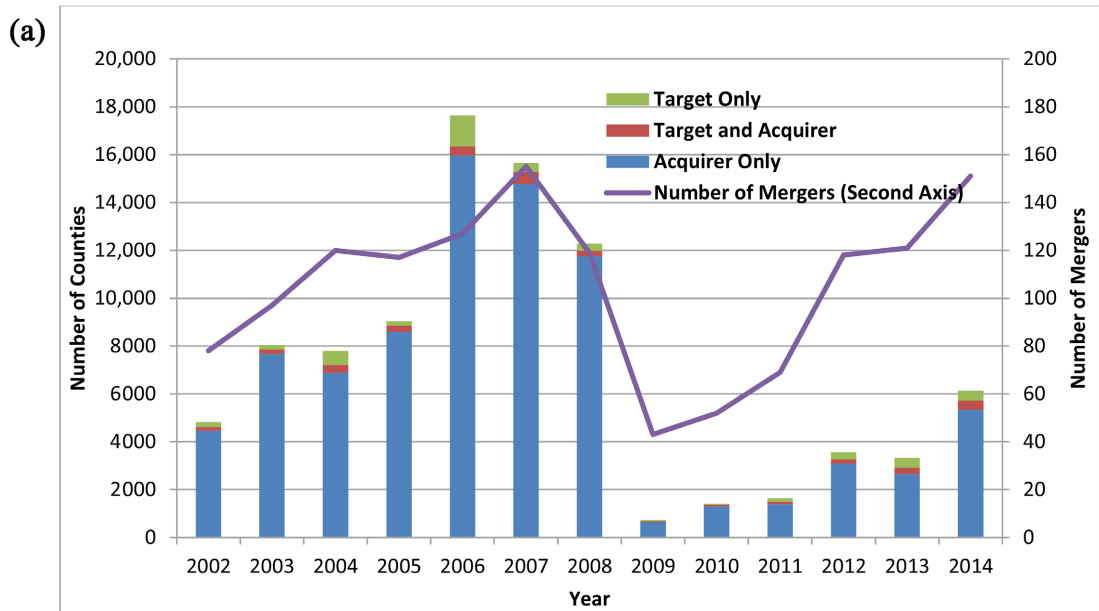
Similarly, the linear regressions are estimated using OLS and the model specifications are presented in Equations (7) and (8). All covariates have the same definitions as in Equations (5) and (6) noted previously.

$$Change_SBL_{i,j} = \hat{\beta}_0 + \hat{\beta}_1 C_{i,j} + \hat{\beta}_2 \Delta M_j + \hat{\beta}_3 Y_i + \epsilon_{i,j} \quad (7)$$

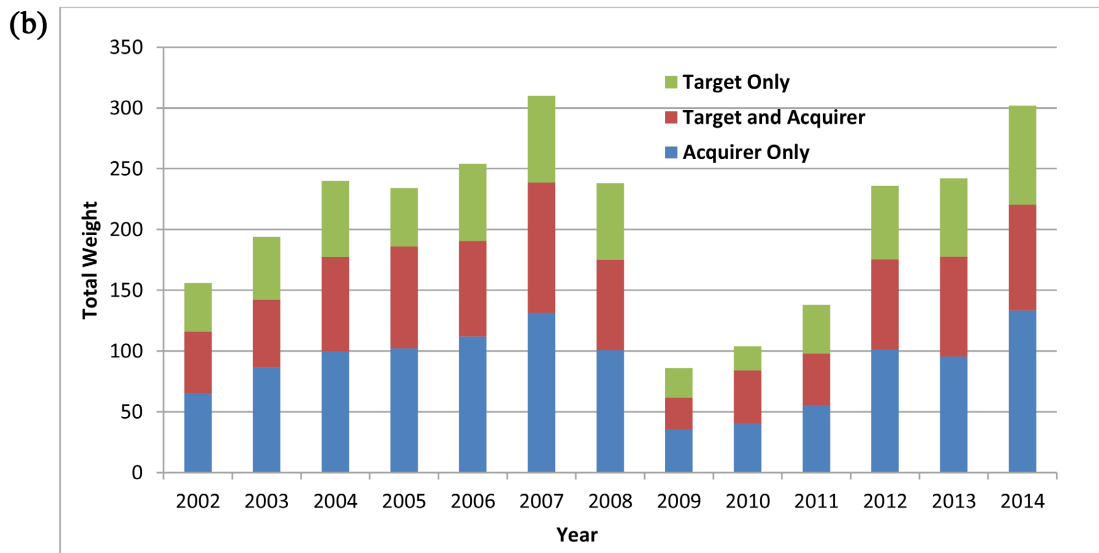
$$Change_SBLCommitment_{i,j} = \hat{\beta}_0 + \hat{\beta}_1 C_{i,j} + \hat{\beta}_2 \Delta M_j + \hat{\beta}_3 Y_i + \epsilon_{i,j} \quad (8)$$

We apply two minor econometric modifications to the previous specifications. First, we cluster all standard errors at the merger level to account for the possibility of correlations in residuals within mergers. Second, to ensure that we give all mergers equal weight regardless of the number of counties that the targets and/or the acquirers were operating in before the merger, we weight our regressions such that for each merger transaction, the total weight of the acquirer’s counties adds to 1, the total weight of a target’s counties adds to 1, and, for a

given county classification and merger, each county is weighted equally^{13,14}. The estimated coefficient vector $\hat{\beta}_1$ contains our primary coefficients of interest as it captures the merger impact for each county type. Our hypothesis is that SBL activities are more likely to increase after the mergers in counties where the acquirer has an operation before the merger. The sample and basic relationship are demonstrated in **Figure 1(a)**, **Figure 1(b)**, **Figure 2(a)**, and **Figure 2(b)**.



Data Sources: SNL Financial, CRA database, Call reports, Y-9C reports, and Summary of Deposits database.

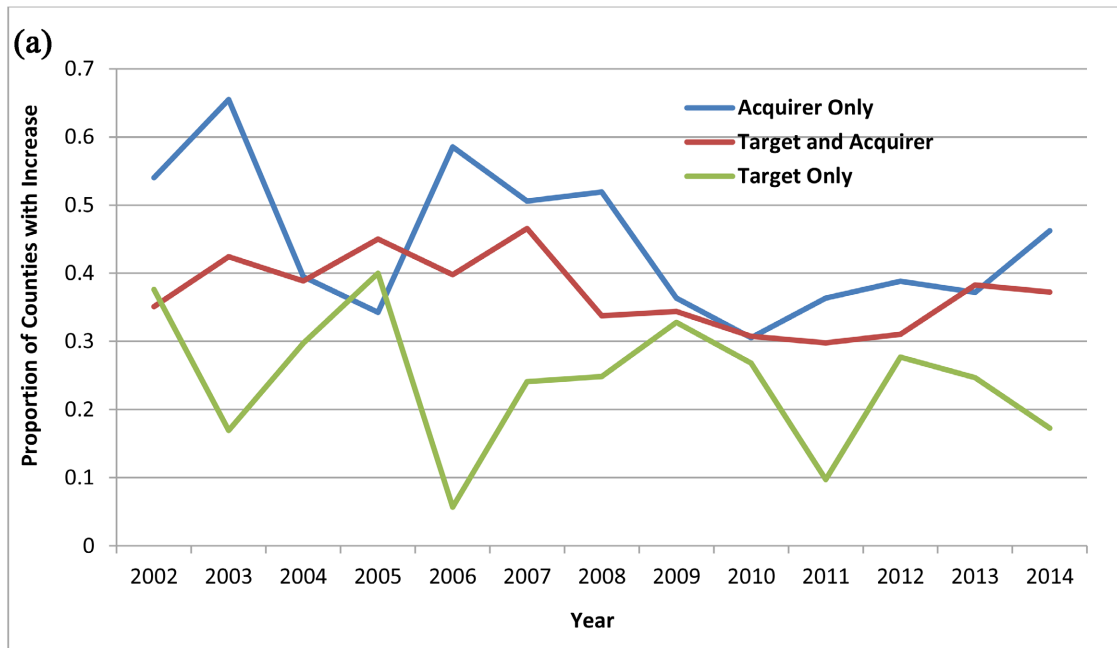


Data Sources: SNL Financial, CRA database, Call reports, Y-9C reports, and Summary of Deposits database.

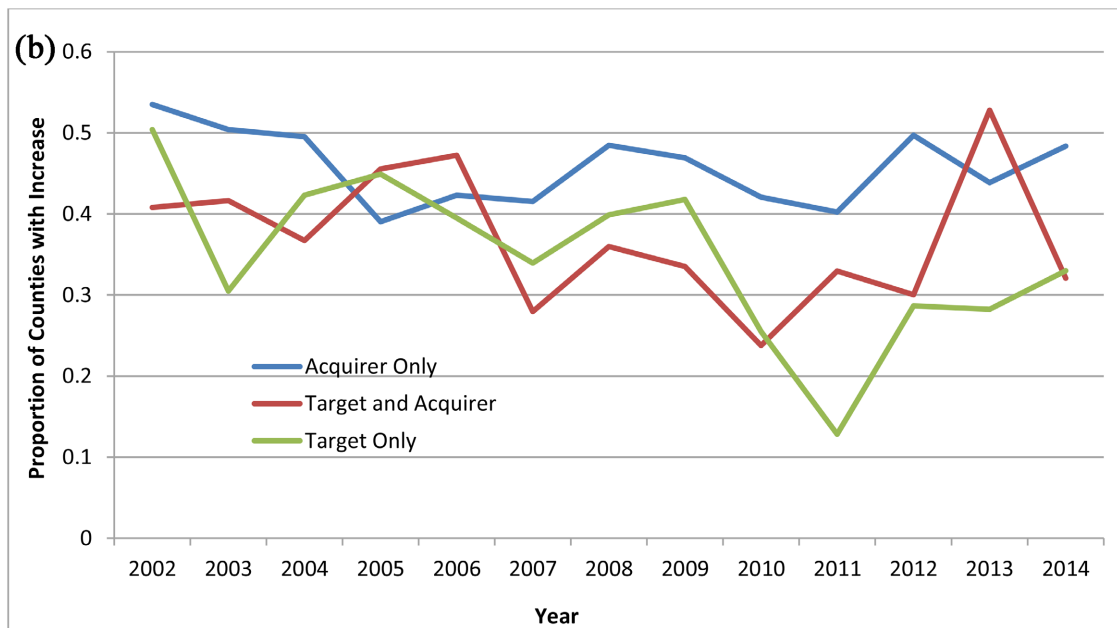
Figure 1. (a) Number of counties by merger types and year (unweighted); (b) Number of counties by merger types and year (equal-weighted for each merger).

¹³If we did not weight the regressions, the largest 10 percent of mergers would account for 72 percent of observations, and the top 50 percent would account for 97 percent of observations. This is primarily because of a highly skewed distribution of acquirer size. These mergers are almost certainly not representative of the typical merger.

¹⁴For example, in a merger with 30 (1,0) counties, 8 (1,1) counties, and 5 (0,1) counties, the weights would be 1/38 for the (1,0) counties, 1/38 + 1/13 for the (1,1) counties, and 1/13 for the (0,1) counties.



Data Sources: SNL Financial, CRA database, Call reports, Y-9C reports, and Summary of Deposits database.



Data Sources: SNL Financial, CRA database, Call reports, Y-9C reports, and Summary of Deposits database

Figure 2. (a) Proportion of counties with an increase in SBL after merger (unweighted)—by year of merger announcement; (b) Proportion of counties with increase in SBL After the merger (weighted)—by year of merger announcement.

Figure 1(a) and **Figure 1(b)** present the total number of counties that are involved in each type of merger. In **Figure 1(a)**, some counties may be included several times if there are several community bank mergers in the county. The plot shows that most of the counties are Acquirer-Only counties. This is because the acquirers are generally larger than the community bank target, and they have operations in more counties than the targets do. So, counties, where many ac-

quirers operate, would also be included several times. In **Figure 1(b)**, when we weight the sample so that each merger gets equal weighting, the number of counties that are Acquirer-Only declines significantly, especially during the financial crisis. The plot also shows that the merger activities as of 2014 look quite similar to that of 2007 (just prior to the financial crisis).

In **Figure 2(a)** and **Figure 2(b)**, we show the proportion of counties that experience an increased in SBL activities (with a positive increase in *ChangeSBLCommitment* after the merger)—for Acquirer-Only (1,0), Target-Only (0,1), and Both (1,1) counties. The observations are not weighted in **Figure 2(a)** and they are equally weighted for each merger in **Figure 2(b)**. The plots show that there are larger increases in SBL activities after the mergers in Acquirer-Only counties in most years. We further explore the relationship in the various regression analysis to control for other characteristics that may be important in influencing the SBL activities.

Post-crisis Mergers: We also perform a separate analysis using a sample of community bank mergers that took place in our 2010-2014 post-crisis period. During this period, there were very few mergers with a non-community bank acquirer. Thus, we make a couple of small modifications to Equations (5) to (8) for the post-crisis regressions to try to capture size effects¹⁵:

$$\ln\left(\frac{\Pr(D_Increased_SBL_{i,j} = 1)}{1 + \Pr(D_Increased_SBL_{i,j} = 1)}\right) = \hat{\beta}_0 + \hat{\beta}_1 C_{i,j} + \hat{\beta}_2 \Delta M_j + \hat{\beta}_3 Y_i + \hat{\beta}_4 A_i + \epsilon_{i,j} \tag{9}$$

$$\ln\left(\frac{\Pr(D_Increased_SBLCommitment_{i,j} = 1)}{1 + \Pr(D_Increased_SBLCommitment_{i,j} = 1)}\right) = \hat{\beta}_0 + \hat{\beta}_1 C_{i,j} + \hat{\beta}_2 \Delta M_j + \hat{\beta}_3 Y_i + \hat{\beta}_4 A_i + \epsilon_{i,j} \tag{10}$$

$$ChangeS_BL_{i,j} = \hat{\beta}_0 + \hat{\beta}_1 C_{i,j} + \hat{\beta}_2 \Delta M_j + \hat{\beta}_3 Y_i + \hat{\beta}_4 A_i + \epsilon_{i,j} \tag{11}$$

$$Change_SBLCommitment_{i,j} = \hat{\beta}_0 + \hat{\beta}_1 C_{i,j} + \hat{\beta}_2 \Delta M_j + \hat{\beta}_3 Y_i + \hat{\beta}_4 A_i + \epsilon_{i,j} \tag{12}$$

where:

$C_{i,j}$ represents county classifications *only* (that is, it does not interact with the community bank acquirer dummy), with a (1,1) county as the base case;

A_i represents the ratio of the premerger acquirer’s total assets to the premerger target total assets.

4.2. County-Level Analysis—Impact of M&A on County-Level SBL Activities

In this section, we examine the overall *county-level* responses, rather than the SBL activities of the merger counterparties. Our goal is to estimate the overall impact of community bank mergers at the county level (allowing for SBL activities by local non-merged banking firms to also be included in the analysis), con-

¹⁵All other variables keep the same definition as previously. Similar to the reference above, standard errors are clustered at the merger level, and we use the earlier described weighting scheme.

trolling for the level and type of community bank mergers that took place in the county. The analysis accounts for the possibility that local de novo or other banks (large or small and local or non-local) could potentially have filled the credit gap created by the merged firm’s reduction in SBL in the Target-Only counties. We investigate whether there is a relationship between the overall change in SBL activities in each county and the type of mergers that involved targets and/or acquirers in the county (in the prior period). Wherever possible, we also examine whether the size of the acquirer plays a role—*i.e.*, whether the county-level impact is affected by whether the acquirer is a community bank or a large bank. Our hypothesis is that a county is likely to lose SBL funding if many local small community banks have been targets of bank mergers that involved large out-of-state acquirers.

To accomplish our goal in this section, we construct a balanced panel of all counties in the United States from 2002 to 2014 and calculate total SBL activities by all banks in each county in each year¹⁶. We then construct a measure of county-level merger activity each year. For each merger that involves a target and/or acquirer that have operations in the county, we classify the merger based on the county type that the county represents for the merger. For example, a merger is classified as Acquirer-Only (1,0) county if only the acquirer has a presence in the county, classified as Target-Only (0,1) county if only the target has a presence in the county, and classified as a (1,1) County if both the acquirer and the target have a presence in the county¹⁷. If acquirers divert SBL funding towards their own community, we would expect to observe that counties that had high frequency (and volume) of Target-Only mergers would tend to lose SBL funding, unless other banks increase the SBL activities to fill the credit gap.

For each type of merger in each county, we calculate the total amount of SBL in the county before and after the merger. We then calculate the share of SBL in the county that is associated with each type of merger that took place the county in each year.

$$MktShare_{\{x,y\},AcqSize,j,t} = \frac{\sum_{i \in C_{\{x,y\},AcqSize}} SBL_{i,j,t-1}}{SBL_{j,t-1}} \quad (13)$$

where:

$\{x,y\}$ represents one of $\{1,0\}$, $\{0,1\}$, $\{1,1\}$;

$AcqSize$ represents an indicator of being a community bank or a large bank;

$C_{\{x,y\},AcqSize}$ represents the set of all firm-county observations that have county classification $\{x,y\}$ with an acquirer of $AcqSize$.

As an illustration, in year t , the total SBL funded by all banks in county j is \$50 million. That year, three mergers involved banks that operated in county j in year $t - 1$. Two of the mergers classify county j as an Acquirer-Only (1,0) county

¹⁶Our identification assumption is that variation in a county’s exposure to community bank mergers is unrelated to unobserved determinants of changes in the SBL markets or activities.

¹⁷In the event that a firm is involved in multiple mergers with the same county classification for a given county in a single year, we only include it once in the county-level regressions to avoid the possibility of a market share measure greater than one.

(because only the acquirers had operations in county j before the merger); one of the mergers classifies county j as a Target-Only (0,1) county (because only the target had operations in county j before the merger). All three acquirers are community banks. If the sum of all the premerger SBL made by the targets and the acquirers in county j was \$10 million for the two (1,0) type mergers and \$6.5 million for the only (0,1) type merger in county j , the calculated market share measures for county j in year t for community bank acquirers would be 0.20 for (1,0) type, 0.00 for (1,1) type, and 0.13 for (0,1) type; for noncommunity bank acquirers, they would all be zero.

We then estimate the model as specified in Equation (14) with the market share measures described previously included on the right-hand side to determine how the change in county-level SBL activities may be influenced by the various types of mergers that took place in the county¹⁸. We cluster standard errors at the county level.

$$\begin{aligned}
 &SBL_{j,t+1} - SBL_{j,t-1} \\
 &= \beta_0 + \hat{\beta}_1 \mathbf{MktShare}_{AcqSize,j,t} + \hat{\beta}_2 \mathbf{M}_{j,t} + \hat{\beta}_3 \Delta \mathbf{M}_{j,t} + \hat{\beta}_4 \mathbf{Y}_{j,t} + \epsilon_{j,t}
 \end{aligned} \tag{14}$$

where:

$\mathbf{MktShare}_{AcqSize,j,t}$ represents a vector of (1,1), (1,0), and (0,1) merger market share measures as described previously for acquirers of size classification *Acq-Size* in county j at time t

$\mathbf{M}_{j,t}$ represents a vector of macroeconomic conditions in county j at time t

All other variables are as defined earlier.

5. Empirical Results

The basic summary statistics of the sample are presented in **Table 1**. Panel A presents summary statistics for the *firm-level* analysis of the merged firms; Panel B presents summary statistics for the *county-level* analysis of the aggregated impact in the county. The empirical results are presented in three subsections.

First, we present the results based on Equations (5)-(6) and Equations (9)-(10) in **Table 2** for each definition of community banks. **Table 2** examines whether the *probability* of an increase in SBL activities (in both dollar volume and the ratio of SBL in a specific county to overall SBL activities) by a merged firm in a particular county is a function of merger types, controlling for all other relevant factors. We then show the results of Equations (7)-(8) and Equations (11)-(12) in **Table 3**, which examines whether the *change* in SBL activities (both in dollar volume and the ratio) is a function of merger types, controlling for all other relevant factors. Finally, the results from Equation (14) are presented in **Table 4**, which examines whether the overall change in SBL at the county level is a function of the type of merger activities that occurred in the county in the previous period.

The results are presented for the entire sample period (for all mergers that took place in 2002-2014) and for the post-crisis sample (for mergers that took

¹⁸We winsorize the dependent variable at the 1st and 99th percentiles to take care of the extreme values and outliers.

Table 1. Summary statistics of the sample. The samples use two different definitions of community bank target (\$1 billion and \$10 billion) for two sample periods (Full sample 2002-2014 and Post-Crisis sample 2010-2014 mergers).**Panel A: Panel Data (Firm-Level Analysis)**

Observation represents SBL activities of a merger counterparty bank in each county. Means are weighted as explained in the text of the paper.

Variable	Full Sample \$1B Definition		Full Sample \$10B Definition		Post-Crisis Sample \$1B Definition		Post-Crisis Sample \$10B Definition	
	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev
\$1000s Change in Lending	-1981.10	17,524.47	-1902.26	18,782.58	-3101.73	14,367.58	-2980.13	14,478.35
D_Lending_Increased	0.41	0.50	0.40	0.50	0.38	0.49	0.38	0.49
Change in Commitment	-0.02	0.03	-0.02	0.02	-0.02	0.03	-0.02	0.03
D_Commitment_Increased	0.34	0.49	0.34	0.49	0.35	0.49	0.35	0.49
CB Acquirer, (1,0) county	0.25	0.26	0.39	0.47	0.26	0.30	0.40	0.47
CB Acquirer, (0,1) county	0.19	0.12	0.24	0.19	0.20	0.17	0.25	0.24
Non-CB Acq, (1,1) county	0.13	0.13	0.03	0.11	0.12	0.17	0.01	0.12
Non-CB Acq, (1,0) county	0.18	0.33	0.03	0.49	0.16	0.40	0.02	0.38
Non-CB Acq, (0,1) county	0.07	0.11	0.01	0.10	0.06	0.13	0.01	0.13
County Population Change	9486.09	17,861.70	9580.50	17,277.75	11,699.88	19,637.28	11,742.86	19,787.17
Unemployment Rate Chg.	-0.09	1.98	-0.10	2.19	-1.44	1.14	-1.46	1.11
Per-Capita Income Chg.	2523.70	2886.05	2532.74	2899.33	2727.76	3137.86	2730.36	3020.19
Per-Capita Business Bankruptcy Chg.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Per-Capita Personal Bankruptcy Chg.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Ratio of Acq. to Tgt. Assets	-	-	-	-	9.87	30.56	9.49	28.11
Number of Observations	66,882	-	89,504	-	12,336	-	15,734	-
Number of Mergers	1280	-	1366	-	477	-	511	-

Panel B: Panel Data (County-Level Analysis)

Observation represents SBL activities in each county. Note that the county classifications listed here represent the total market share of firms that merged with that county classification for that county.

Variable	Full Sample \$1B Definition		Full Sample \$10B Definition		Post-Crisis Sample \$1B Definition		Post-Crisis Sample \$10B Definition	
	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev
\$1000s Change in Lending	3191.269	51,847.48	3191.269	51,847.48	-7590.136	43,345.95	-7590.136	43,345.95
CB Acquirer, (1,0) county	0.011	0.06	0.033	0.10	0.009	0.06	0.033	0.10
CB Acquirer, (1,1) county	0.002	0.03	0.006	0.04	0.002	0.03	0.006	0.04
CB Acquirer, (0,1) county	0.003	0.03	0.005	0.04	0.003	0.03	0.005	0.04
Non-CB Acq, (1,0) county	0.050	0.11	0.042	0.10	0.024	0.08	0.006	0.04
Non-CB Acq, (1,1) county	0.003	0.03	0.002	0.02	0.003	0.03	0.001	0.02
Non-CB Acq, (0,1) county	0.002	0.02	0.001	0.01	0.001	0.02	0.001	0.01
County Population	97,268	310,410.40	97,268	310,410.40	100,665	320,100.40	100,665	320,100

Continued

Unemployment Rate	6.713	2.83	6.713	2.83	7.918	3.00	7.918	3.00
Per-Capita Income	32,481.06	9959.95	32,481.06	9959.95	37,245.19	10,640.35	37,245.190	10,640.35
Per-Capita Business BK	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Per Capita Personal BK	0.004	0.00	0.004	0.00	0.003	0.00	0.003	0.00
County Population Chg.	1669.461	7985.64	1669.461	7985.64	1557.290	7602.17	1557.290	7602.17
Unemployment Rate Chg.	0.076	2.21	0.076	2.21	-1.327	1.33	-1.327	1.33
Per-Capita Income Chg.	2298.494	3240.79	2298.494	3240.79	2719.931	3712.54	2719.931	3712.54
Business BK rate Chg.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Personal BK rate Chg.	0.000	0.00	0.000	0.00	-0.001	0.00	-0.001	0.00
Number of Observations	40,019	-	40,019	-	15,387	-	15,387	-

Data Sources: SNL Financial, Haver Analytics, CRA database, Call reports, Y-9C reports, and Summary of Deposits database.

Table 2. Firm-Level Analysis—Logistic Regression Results. This table presents the results from logistic regressions, based on Equations (1) and (3). The dependent variable is the probability that the merged firm would increase SBL in each of the counties. The results are presented for the \$1 billion in assets and \$10 billion in assets definitions of community bank, with separate analyses for the Full sample (2002-2014) and the Post-Crisis sample (2010-2014) as well as for our two measures of increased SBL (dollar volume and ratio). Standard errors are clustered at the merger level and presented in parenthesis below parameter estimates. The *, **, and *** indicate significance at the 1%, 5%, and 10% levels, respectively.

Variable	Dollar Amount of SBL				Ratio of Firm-County-SBL to total Firm-SBL			
	\$ 1 Billion Definition		\$10 Billion Definition		\$ 1 Billion Definition		\$10 Billion Definition	
	Full Sample (1)	Post-Crisis (2)	Full Sample (3)	Post-Crisis (4)	Full Sample (5)	Post-Crisis (6)	Full Sample (7)	Post-Crisis (8)
(0,1) County	-	-0.377** (0.182)	-	-0.409** (0.171)	-	0.161 (0.186)	-	0.0630 (0.172)
(1,0) County	-	0.514*** (0.144)	-	0.474*** (0.134)	-	1.098*** (0.157)	-	0.997*** (0.144)
Ratio of Acq. to Tgt. Assets	-	-0.00875** (0.00381)	-	-0.00837** (0.00365)	-	-0.00960*** (0.00365)	-	0.00950*** (0.00352)
CB Acquirer, (1,0) county	0.422*** (0.121)	-	0.386*** (0.0831)	-	0.882*** (0.133)	-	0.802*** (0.0908)	-
CB Acquirer, (0,1) county	-0.0481 (0.137)	-	-0.0746 (0.104)	-	0.249* (0.144)	-	0.179 (0.110)	-
Non-CB Acq., (1,1) county	-0.434*** (0.146)	-	-0.00177 (0.176)	-	-0.353** (0.150)	-	0.256 (0.167)	-
Non-CB Acq., (1,0) county	-0.0479 (0.113)	-	0.200** (0.0993)	-	0.402*** (0.115)	-	0.650*** (0.0912)	-

Continued

Non-CB Acq., (0,1) county	-0.778*** (0.181)	-	-0.645*** (0.233)	-	-0.535*** (0.189)	-	-0.205 (0.232)	-
County Population Change	0.00000411*** (0.00000138)	0.00000523** (0.0000)	0.00000330** (0.00000129)	0.00000505** (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Unemployment Rate Chg.	0.0110 (0.0339)	0.0669 (0.0620)	0.0192 (0.0321)	0.0777 (0.0580)	-0.0106 (0.0283)	0.126** (0.0521)	-0.00229 (0.0271)	0.122** (0.0485)
Per-Capita Income Chg.	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Business BK rate Chg.	-76.76 (210.5)	-724.8 (556.6)	-64.24 (209.7)	-641.8 (532.3)	92.07 (228.0)	-1026.9* (526.2)	94.88 (226.7)	-951.1* (505.2)
Personal BK rate Chg.	28.50 (29.41)	53.11 (74.60)	22.28 (27.84)	46.35 (70.84)	11.55 (25.37)	89.60 (71.56)	8.381 (23.99)	87.04 (67.32)
Intercept	-0.158 (0.187)	-0.887*** (0.261)	-0.269 (0.170)	-0.848*** (0.248)	-0.835*** (0.154)	-0.920*** (0.192)	-0.926*** (0.132)	-0.852*** (0.180)
Year Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Probability of Increase for elements of $C_{i,j}$ vs. base case								
(1,1) County	-	0.353*** (0.0294)	-	0.355*** (0.0275)	-	0.240*** (0.024)	-	0.253*** (0.0230)
(1,0) County	-	0.475*** (0.0151)	-	0.468*** (0.0144)	-	0.483*** (0.015)	-	0.476*** (0.0142)
(0,1) County	-	0.274*** (0.0251)	-	0.269*** (0.0237)	-	0.270*** (0.025)	-	0.265*** (0.0236)
CB Acquirer, (1,1) county	0.410*** (0.0258)	-	0.372*** (0.0176)	-	0.281*** (0.023)	-	0.258*** (0.0150)	-
CB Acquirer, (1,0) county	0.513*** (0.014)	-	0.464*** (0.009)	-	0.486*** (0.136)	-	0.437*** (0.009)	-
CB Acquirer, (0,1) county	0.398*** (0.021)	-	0.355*** (0.0166)	-	0.334*** (0.020)	-	0.294*** (0.0156)	-
Non-CB Acq., (1,1) county	0.311*** (0.021)	-	0.371*** (0.0367)	-	0.216*** (0.017)	-	0.310*** (0.0314)	-
Non-CB Acq., (1,0) county	0.398*** (0.007)	-	0.419*** (0.0155)	-	0.370*** (0.006)	-	0.400*** (0.0110)	-
Non-CB Acq., (0,1) county	0.243*** (0.0264)	-	0.238*** (0.0397)	-	0.187*** (0.023)	-	0.221*** (0.0374)	-
Number of Obs.	66,882	12,336	89,504	15,734	66,882	12,336	89,504	15,734
Cluster Level	Merger	Merger	Merger	Merger	Merger	Merger	Merger	Merger
No. of Clusters	1280	477	1366	511	1280	477	1366	511

Data Sources: SNL Financial, Haver Analytics, CRA database, Call reports, Y-9C reports, and Summary of Deposits database.

Table 3. Firm-Level Analysis—Linear Regression Results. This table presents the results of the OLS regressions based on Equations (2) and (4). Dependent variable is change in a bank’s SBL in each county in each year, controlling for merger category (Acquirer-Only, Target-Only, Both). The results are presented for the \$1 billion in assets and \$10 billion in assets definitions of community bank, with separate analyses for the Full sample (2002-2014) and the Post-Crisis sample (2010-2014) as well as for our two measures of increased SBL (dollar volume and ratio). Standard errors are clustered at the merger level and presented in parenthesis below parameter estimates. The *, **, and *** indicate significance at the 1%, 5%, and 10% levels, respectively.

Variable	\$\$ Amount of SBL				Ratio of County SBL to total SBL			
	\$ 1 Billion Definition		\$10 Billion Definition		\$ 1 Billion Definition		\$10 Billion Definition	
	Full Sample	Postcrisis	Full Sample	Postcrisis	Full Sample	Postcrisis	Full Sample	Postcrisis
(0,1) County	–	726.0 (1500.9)	–	604.4 (1408.5)	–	–0.00192 (0.00867)	–	–0.00262 (0.00808)
(1,0) County	–	6557.8*** (1390.4)	–	6295.7*** (1313.8)	–	0.0432*** (0.00752)	–	0.0401*** (0.00706)
Ratio of Acq. to Tgt. Assets	–	–13.34 (30.10)	–	–19.57 (31.04)	–	0.0000712 (0.0000719)	–	0.0000453 (0.0000679)
CB Acquirer, (1,0) county	4621.3*** (1112.5)	–	5253.7*** (1251.6)	–	0.0485*** (0.00798)	–	0.0426*** (0.00519)	–
CB Acquirer, (0,1) county	98.22 (1150.8)	–	401.7 (1301.5)	–	0.00618 (0.00822)	–	0.00514 (0.00563)	–
Non-CB Acq., (1,1) county	–2853.9 (2737.3)	–	348.8 (4141.7)	–	0.0121 (0.00820)	–	0.0332*** (0.00544)	–
Non-CB Acq., (1,0) county	3545.8*** (1095.9)	–	4804.5*** (1456.0)	–	0.0461*** (0.00734)	–	0.0410*** (0.00473)	–
Non-CB Acq., (0,1) county	–4451.4** (2049.7)	–	–7599.4 (7659.3)	–	0.0185** (0.00819)	–	0.0341*** (0.00591)	–
County Population Change	–0.00699 (0.0456)	0.0794** (0.0330)	–0.00720 (0.0425)	0.0716** (0.0321)	–2.04e–08 (0.0000)	6.27e–08 (0.0000)	–1.45e–08 (9.71e–08)	6.28e–08 (0.0000)
Unemployment Rate Chg.	102.3 (346.6)	843.0* (498.5)	217.6 (333.2)	894.7* (477.0)	–0.000453 (0.00141)	0.00405 (0.00255)	–0.000532 (0.00132)	0.00371 (0.00237)
Per-Capita Income Chg.	0.182 (0.127)	0.123 (0.148)	0.146 (0.121)	0.0825 (0.145)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Business BK rate Chg.	517058.6 (1348200.4)	249062.0 (2912766.7)	540449.0 (1280569.5)	281690.4 (2794759.7)	4.750 (8.366)	6.871 (19.03)	3.892 (8.070)	6.590 (18.30)
Personal BK rate Chg.	306798.0 (310806.5)	957763.0 (738378.2)	217816.2 (302807.5)	767370.0 (707347.1)	0.604 (1.523)	9.828* (5.339)	0.561 (1.439)	9.481* (5.082)
Intercept	–1702.1 (1759.1)	–9751.6*** (2209.5)	–2464.1 (1950.6)	–9086.0*** (2174.9)	–0.0378*** (0.0126)	–0.0286*** (0.00790)	–0.0338*** (0.0117)	–0.0269*** (0.00751)
Year Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation Level	Merger- County	Merger- County	Merger- County	Merger- County	Merger- County	Merger- County	Merger- County	Merger- County
Number of Obs.	66,882	12,336	89,504	15,734	66,882	12,336	89,504	15,734
Cluster Level	Merger	Merger	Merger	Merger	Merger	Merger	Merger	Merger
No. of Clusters	1280	477	1366	511	1280	477	1366	511
R ²	3.0%	5.6%	2.4%	4.7%	4.9%	7.0%	4.8%	6.5%

Data Sources: SNL Financial, Haver Analytics, CRA database, Call reports, Y-9C reports, and Summary of Deposits database.

Table 4. County-Level Regression Results. This table presents the results of the OLS regressions based on Equation (5). Dependent variable is change in overall SBL volume in each county in each year. The results are presented for the \$1 billion in assets and \$10 billion in assets definitions of community bank, with separate analyses for the Full sample (2002-2014) and the Post-Crisis sample (2010-2014). Standard errors are clustered at the merger level and presented in parenthesis below parameter estimates. The *, **, and *** indicate significance at the 1%, 5%, and 10% levels, respectively.

Variable	Full Sample	Full Sample	Post-Crisis Sample	Post-Crisis Sample
	\$1 Billion Definition	\$10 Billion Definition	\$1 Billion Definition	\$10 Billion Definition
Market Share of (1,0) mergers	-2863.8	2565.1	4145.3	-1244.4
CB Acquirer	(2615.5)	(1872.5)	(2603.9)	(2796.3)
Market Share of (1,1) mergers	-19,929.1***	-8954.9*	-20,049.3**	-20,868.9***
CB Acquirer	(6376.9)	(5110.6)	(8866.4)	(6406.0)
Market Share of (0,1) mergers	-9846.9***	-10,280.8***	-12037.1**	-20,967.3***
CB Acquirer	(3482.8)	(3468.3)	(5102.5)	(5392.4)
Market Share of (1,0) mergers	5309.5**	9502.2***	-4881.5	-6842.0
Non-CB Acquirer	(2144.0)	(2550.7)	(3978.1)	(7152.0)
Market Share of (1,1) mergers	24,946.0*	87,294.8***	-32,534.7***	-41,381.5*
Non-CB Acquirer	(13130.0)	(22,041.7)	(11851.1)	(22,512.5)
Market Share of (0,1) mergers	-18,060.8**	-33,558.4***	-47,385.9***	-53,095.3**
Non-CB Acquirer	(8094.8)	(8986.7)	(9175.8)	(22,228.7)
County Population	0.0103***	0.00999**	-0.0144***	-0.0143***
	(0.00399)	(0.00396)	(0.00538)	(0.00537)
Unemployment Rate	-380.4***	-393.4***	126.6	139.8
	(105.7)	(105.7)	(137.7)	(137.3)
Per-Capita Income	0.241***	0.232***	-0.0609	-0.0614
	(0.0636)	(0.0627)	(0.0628)	(0.0630)
Business Bankruptcy Rate	-17,011,135.8***	-17,023,316.8***	-16,578,400.6***	-16,603,532.7***
	(1,420,053.1)	(1,421,329.9)	(2,387,683.0)	(2,387,449.4)
Personal Bankruptcy Rate	-744,304.3***	-737,766.7***	-2,585,440.3***	-2,596,084.3***
	(116,317.3)	(116,517.8)	(257,862.7)	(258,820.1)
County Population Change	0.738***	0.725***	0.812***	0.812***
	(0.103)	(0.103)	(0.187)	(0.187)
Unemployment Rate Chg.	-5.618	2.290	-336.2	-337.7
	(172.0)	(172.1)	(274.7)	(274.8)
Per-Capita Income Chg.	0.721***	0.729***	0.430***	0.437***
	(0.0870)	(0.0871)	(0.0857)	(0.0862)
Business BK rate Chg.	1,990,139.8**	1,897,188.9**	1,576,841.1	1,513,277.8
	(828,183.3)	(824,805.7)	(1,320,356.1)	(1,319,985.3)
Personal BK rate Chg.	-1,961,648.6***	-1,964,419.5***	-2,405,421.4***	-2,390,974.6***
	(249,914.8)	(250,623.1)	(403,686.2)	(403,988.8)
Intercept	2658.5	2599.0	-14,973.4***	-15,093.2***
	(2106.7)	(2073.7)	(3268.2)	(3264.2)
Year Dummies?	Yes	Yes	Yes	Yes
Observation Level	County-Year	County-Year	County-Year	County-Year
Number of Obs	40,019	40,019	15,387	15,387
Cluster Level	County	County	County	County
Number of Clusters	3079	3079	3078	3078
R ²	15.1%	15.2%	9.7%	9.7%

Data Sources: SNL Financial, Haver Analytics, CRA database, Call reports, Y-9C reports, and Summary of Deposits database.

place during 2010-2014). In **Table 2** and **Table 3**, Columns 1 to 4 report the results on the change in dollar volume of SBL activities (*ChangeSBL*); Columns 5 to 8 report the results on the change in the ratio of SBL activities (*ChangeSBLCommitment*). **Table 4** focuses on the change in the dollar of SBL volume in each county.

5.1. Firm-Level Results—Logistic Regressions

The dependent variable here is the probability that the combined (merged) firm would increase SBL origination in a specific county after the merger, compared with the SBL activities of the acquirer and the target in that county before the merger. **Table 2** presents the results of our logistic regressions, based on equations (5) and (6), using both definitions of community bank (\$1 billion and \$10 billion asset threshold), to investigate changes in SBL activities both in terms of SBL dollar volume and SBL ratio. We also perform a separate analysis using a subsample of mergers, based on Equations (9) and (10), which took place after the financial crisis (2010-2014) instead of the full sample 2002-2014.

The results in **Table 2** show that the coefficients of the Acquirer-Only (1,0) county are consistently significantly positive relative to the Target-Only (0,1) counties across all model specifications for mergers (both full sample and the post-crisis subsample). That is, the combined merged banking firms tend to increase their SBL funding in their own Acquirer-Only (1,0) counties relative to the Target-Only (0,1) counties, even after controlling for other economic and risk factors. The differences are statistically and economically significant with differences ranging from 11 percentage points to 21 percentage points. The effect tends to be the largest for large (non-community bank) acquirers and during the post-crisis period. Target-Only (0,1) counties experience a decline in SBL origination by the combined firm after the merger.

While the Acquirer-Only (1,0) counties tend to do better than Target-Only (0,1) counties, the relative change between Both (1,1) counties and Acquirer-Only (1,0) counties is less clear—probably because acquirers have a presence in both (1,1) and (1,0) counties. For mergers that involved community bank acquirers, the Acquirer-Only (1,0) counties are statistically and economically more likely to increase SBL, regardless of our definition of a community bank or how we measure the change in SBL (dollar volume or ratio as proxy for SBL commitment). For mergers that involved large acquirers, the results are less robust to different model specifications.

5.2. Firm-Level Results—Linear Regressions

The dependent variable is the increase in SBL activities by the combined firm compared to the acquirer's and the target's SBL activities in the county prior to the merger. Consistent with previous results on the probability of increasing SBL, the results presented, based on Equations (7) and (8) for the full sample and Equations (11) and (12) for the subsample, in **Table 3** show that the com-

bined firms tend to increase their SBL funding both in terms of dollar volume and the commitment (SBL ratio) in counties where only the acquirers had operations in before the merger. The coefficients of the Acquirer-Only (1,0) counties are consistently significantly positive across all model specifications (for the full sample as well as the post-crisis subsample). These differences are significant relative to Target-Only (0,1) and Both (1,1) counties.

The magnitude of the effect varies, depending on whether the acquirer is a community bank and when the acquisitions took place. For the full sample, community bank acquirers tend to increase their SBL lending by about \$5 million more in Acquirer-Only (1,0) counties than in Target-Only (0,1) counties. For large bank acquirers, they would increase SBL lending by \$8 million to \$13 million more in the (1,0) counties than in the (0,1) counties. This translates to a relative commitment change of about 4 percent for community bank acquirers and about 0.7 percent to 2.5 percent for large acquirers, depending on the definition of the community bank threshold. These effects continue in the post-crisis period, with an average magnitude of about \$6 million or a 4 percent change in the commitment for Acquirer-Only (1,0) counties relative to the Target-Only (0,1) counties¹⁹.

Overall, across all the 16 specifications reported in **Table 2** and **Table 3**, we find an economically and statistically significant difference between Acquirer-Only (1,0) counties and Target-Only (0,1) counties. The results are robust – specifically, the results hold regardless of acquirer size, the definition we use to define community banks, and the sample period. Despite this robust difference between Acquirer-Only counties and Target-Only counties, we find that the results for counties where both the Acquirer and the Target have presences, the (1,1) counties, are inconsistent. Additionally, the macroeconomic variables tend to be unimportant across all specifications.

One interesting trend that emerges in the results is that the definition of a *community bank* (whether \$1 billion or \$10 billion thresholds) tends not to matter all that much in most cases. It is, however, important whether the acquirer is a community bank or a large bank—especially for the non-community bank Acquirer-Only (1,0) counties. This is broadly consistent with Reference [12], which found that acquirer size was important in determining the SBL activities after the merger, although they only focus their analysis on the overall SBL volume, rather than SBL in any specific local community (at the county level). Our paper delves deeper into the geographic location of the SBL, and we find that the increased SBL (after the merger) by large bank acquirers generally occur in the counties where the acquirers had existing operations before the merger.

¹⁹The F-test for equivalence of the coefficients on (0,1) and (1,0) counties for noncommunity bank acquirers for the ratio change regression is rejected with a p-value of 0.060 for the \$10 billion definition. We fail to reject the difference between the coefficients on (0,1) and (1,0) counties for non-community bank acquirers for the dollar amount change regression with a p-value of 0.108 for the \$10 billion definition. All other differences between the (1,0) county and (0,1) county coefficients are rejected with p-values of <0.0001.

5.3. County-Level Results—Allowing for Substitution by Other Banks

The dependent variable here is the overall change (net increase) in SBL activities in each county from the pre-merger to post-merger period. The results, based on equation (14), are presented in **Table 4**. We find that the overall county-level impact of the type of mergers that took place in the county on SBL funding does vary depending on whether the acquirer is a large bank. For large bank acquirers, the coefficient of the Acquirer-Only (1,0) merger variable is strongly and economically significant, indicating that the SBL activities increased in counties that were involved in more Acquirer-Only (1,0) type of mergers. Again, the results confirm our previous findings that large acquirers would move SBL funding toward counties that they had operations in before the merger. The coefficients of the variable *Market Share of (1,0) mergers * Non-CB Acquirer* are consistently positive and significant for the full sample period. For community bank acquirers, however, there is no significant SBL impact. The coefficients of the variable *Market Share of (1,0) mergers * CB Acquirer* are consistently insignificant, which suggests that those counties follow the overall market trend.

In terms of economic significance, the coefficients of the variable *Market Share of (1,0) mergers * Non-CB Acquirer* indicate that counties with large-acquirers mergers have statistically significant positive effects of about \$530,000 (and \$950,000) increase in SBL for each 10 percent increase in its market share of SBL in the county for the \$1 billion (and \$10 billion) size thresholds of the community bank, respectively.

For counties with significant exposure to Target-Only (0,1) merger classifications, we find strong and significant negative impacts on the SBL volume in the county after the merger, regardless of the size of the acquirers or the sample period. Our results on the decline in SBL activities in the Target-Only counties, which we presented earlier in the firm-level analysis, remain strong even after allowing for other banks to substitute and fill the credit gap.

During the full sample period 2002-2014, the marginal negative effect is about a \$1 million decline in SBL for each 10 percent increase in market share of community bank target in the overall SBL lending in the county before the merger. The coefficients of the variables *Market Share of (0,1) mergers * CB Acquirer* and the variable *Market Share of (0,1) mergers * Non-CB Acquirer* are both strongly negative across all specifications. This effect is even larger when the acquirers are large banks—with a marginal negative effect of about \$1,800,000 (and \$3,350,000) decline in SBL volume for each 10 percent increase in market share of SBL by large acquirers in the county—for the \$1 billion (and \$10 billion) size thresholds, respectively.

Our results overall are consistent with the conventional belief that there would be an adverse impact on credit availability to the local small businesses in the counties where small community banks are acquired by large banks (especially those that operate mostly outside the target's local community).

6. Conclusions

The decline in the number of community banks in the past two decades along with the significant decline in their market share of SBL have spurred concerns about potential unintended consequences of community bank mergers. As more community banks have disappeared through mergers and failures, there might be a shortage of funding supply available to local small businesses. Previous studies have produced mixed results. In this paper, we fill the literature gap by focusing on the local community impacts and accounting for the merger types and characteristics of the acquirers.

Reference [12] finds that the *overall* funding for SBL tends to increase after the merger (for the combined firm), relative to SBL funded by the target and the acquirer before the merger. In addition, they find that the increased SBL amount is even larger when the acquirers are large banks. In this paper, we look deeper into the geographic location of the increased SBL. Specifically, we look at where (*i.e.*; in the local community where the target was operating vs. elsewhere) the increased SBL takes place, and we explore the key determinants of the changes in local SBL activities. Our empirical findings indicate that the increased SBL funding actually did not occur in counties where the community bank targets were located.

The overall impact of community bank mergers depends significantly on where the acquirers and the targets had operations before the mergers. We find a statistically significant increase in the SBL activities in counties where only the acquirers operated, which is met with a corresponding SBL decline in counties where only the target operated (before the merger). These changes in SBL activities are significant even after controlling for the general market trends or changes in the local macroeconomic variables. Funding availability to small businesses seems to be directed away from the target's community especially if the acquirers did not also have operations in the same county before the merger. We observe an even stronger result (with a larger decline in SBL in the target's local community) when the acquiring bank is a large bank.

Although the magnitude of this decline in SBL in the target community varies from specification to specification, it is always statistically and economically significant regardless of whether the acquirers are a community bank or large banks. Our results are also robust to different estimation techniques, different measures of changes in SBL activities, different definitions of the community bank, and different sample periods.

Overall, our results are consistent with the hypothesis that community banks have continued to play an important role in providing funding to local small businesses. The absence of local community banks that became a target of a merger or acquisition by non-local acquirers has, on average, led to local SBL credit gaps that were not filled by other banking firms (including local *de novo* banks). This SBL credit gap could portend significant negative economic consequences in the absence of new interventions to ensure the continuing func-

nality of SBL markets and community banks' niches within these markets²⁰.

Finally, we note that our findings are based on the specific data period and economic environment. Due to the data limitation associated with those small banks that chose not to submit CRA reports annually during our study period, we had to resort to our own calculation of the bank's SBL share in each county each year. This calculation assumes that the bank's SBL origination share in each county would resemble its deposit-taking share in the county. This is a reasonable assumption because these banks are mostly very small and focus their activities primarily on the local geographic footprint only. The plot in Appendix 1 provides support for our assumption during the study period. In addition, it is also possible that the local credit gap may be filled by nonbank or fintech lenders which are not included in our analysis in this paper.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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²⁰Note, however, that these gaps could have been filled by nonbank lenders, including Fintech SBL lenders, that are not included in our analysis.

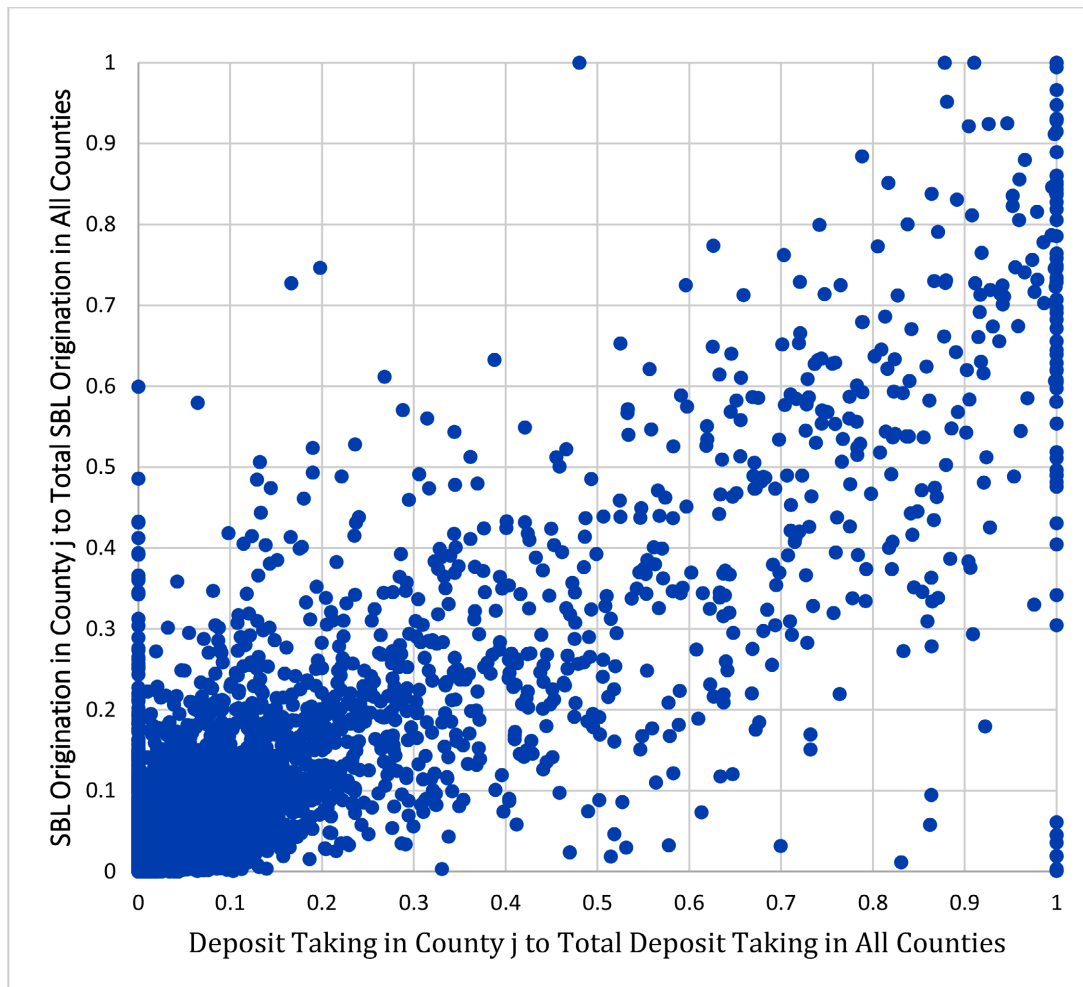
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Appendix 1

The plot below presents the relationship between deposit taking and SBL origination ratio at the county level. The sample includes small banks with total assets less than \$10 billion that filed the CRA Reports. The vertical axis is the ratio of SBL originated (and purchased) by Bank *i* in County *j* to total SBL originated (and purchased) by Bank *i* in all counties. The horizontal axis is the ratio of deposit taking by Bank *i* in County *j* to total deposit taking by Bank *i* in all counties in the same period.



Sources: Call reports, FDIC summary of deposits data, and CRA reports.

Figure A1. Strong positive relationship between deposit taking ratio and SBL origination ratio (at county level).

Appendix 2. Summary of the Data Sources and Data Period

Data Type and Variables	Data Sources	Data Period
<p>Small Business Lending</p> <p>\$ SBL loans amount that each bank made in each county in each year</p>	<p><i>For CRA Reporters:</i> \$ SBL are from the Community Reinvestment Act Disclosure Reports that are submitted annually</p> <p><i>For CRA Non-Reporters:</i> \$ SBL are calculated based on each bank's total SBL from the Call Report Data and the fraction of activities allocated to each county from the FDIC Summary of Deposits Data</p>	<p>Data period includes one year prior to the M&A date and one year after the M&A completion date—thus, data period is from 2001-2015</p>
<p>Mergers & Acquisitions:</p> <p>Target vs. Acquirer</p> <p>Date of acquisition</p> <p>Name of target/acquirer</p> <p>Location of target/acquirer</p> <p>Ticker/ID of target/acquirer</p>	<p>SNL Financial M&A Database</p>	<p>For all mergers that took place during 2002-2014.</p>
<p>Bank Structure</p> <p>This dataset allows us to identify all the bank subsidiaries under each of the BHCs in each year and its location. Thus, it allows us to identify (for each merger) whether a county is a target-only, acquirer-only, or both.</p>	<p>Federal Reserve Structure Data</p>	<p>Matching the data with each merger transaction as of merger announcement date (2002-2014)</p>
<p>Economic Factors: Unemployment</p> <p>Per-capita income</p> <p>Personal bankruptcy rate</p> <p>Business bankruptcy rate</p> <p>County population density</p> <p>etc.</p>	<p>Haver Analytics Database</p>	<p>Local economic data in each county as of merger announcement date (2002-2014)</p>