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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 nonlocal acquirers has, on average, led to local SBL credit gaps that were not filled by the rest of the banking sector.

Keywords: community banks, small business lending, bank mergers

JEL Classifications: G21, G28, G34

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I. Introduction

Small businesses are believed to play a significant role in local communities 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 Laderman (2008). Further, small businesses and startups are disproportionately responsible for job creation; see Neumark, Wall, and Zhang (2011), Haltiwanger, Jarmin, and Miranda (2013). To continue to play their critical roles in stimulating the local economy, small businesses are dependent on their ability to access funding as needed. Drechsler, Savov, and Schnabl (2017) show 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 involves unique challenges since small firms and local startups tend to be opaque because of their short credit histories. Thus, SBL originations rely heavily on relationship-based lending and "soft" information, as discussed in Petersen and Rajan (1994), Berger and Udell (1995), and Cole (1998). 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 seem to be important in SBL, according to Berger and DeYoung (2001) and Nguyen (2017). 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 (Berger and Frame (2007)). This technique helped bridge the gap of SBL between large and small banks. Peterson and Rajan (2002) noted 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. Jagtiani, Kotliar, and Maingi (2016) show 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 Berger, Frame, and Miller (2005) and Berger, Cowan, and Frame (2011). Similarly, Jagtiani and Lemieux (2016) and Laderman (2008) find that large banks have been able to reach small businesses outside of their local markets (where they do not have any physical presence) in recent years, taking the SBL share from local community banks. We suspect that the impact of these

changes may not be occurring evenly across markets and geographical location, 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 Jagtiani, Kotliar, and Maingi (2016) find 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 declined 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 occurs 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 and the acquirer does not have operations prior to the merger).

We recognize that the changes in SBL origination by banking firms involved in M&As may be offset by other banks so there might be no net impact to the community. In addition, some new de novo banks (state banks that have been in business for less than than five years) could pop up in the local community to fill the SBL credit gap that 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 types 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 SBL 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 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 identification strategy. The empirical results and our conclusions and policy discussion are presented in Section V and Section VI, respectively.

II. The Literature Review

Existing research on community banks and SBL covers the various advantages and disadvantages of relationship-based lending at community banks with 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 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, Kowalik (2014) finds that community banks have a comparative advantage in monitoring their consumers through relationship lending. Similarly, Berger, Cerqueiro, and Penas (2014) find 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 a reversal of this advantage after the crisis. Jagtiani (2008) 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. Berger, Cowan, and Frame (2011) and Berger, Frame, and Miller (2005) 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; Jagtiani, Kotliar, and Maingi (2016) show 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. Hastings and Gilbert (2005) use M&As to study gasoline markets, and Dafny, Duggan, and Ram (2012) use M&As to study health-insurance markets. Of particular relevance to our paper are Garmaise and Moskowitz (2006) and Nguyen (2017), who 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.

Mergers in community banking and SBL are reflected in a rich literature. Berger, Scalise, Saunders, and Udell (1998) find 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 Berger, Bonime, Goldberg, and White (2004) who find that de novo banks emerge in the local community and issue SBL to fill the credit gap. Similarly, using data from 1994 to 1997, Avery and Samolyk (2004) find that, unlike large bank mergers, community bank mergers are associated with a 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.

Jagtiani, Kotliar, and Maingi (2016) examine 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 banking firm 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, Jagtiani and Lemieux (2016) suggest that technological advances have recently enabled large banks to provide funding to small businesses in distant locations, taking market share from small, local community banks.[1]

It is important to note that previous research findings on community bank mergers that increase overall SBL volume are subject to significant geographic and time period limitations. Berger et al. (1998) used the Survey of the Terms of Bank Lending to Businesses, which is limited to about 300 disproportionally large banking institutions. Avery and Samolyk (2004) impute

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

geographic concentration of SBL using summary of deposit data, which may not be a good proxy for SBL activities. Perhaps the closest study in the literature is by Nguyen (2017), who uses mergers to construct an instrument for branch closings to study local markets' dependencies on branches. However, Nguyen 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 Hughes, Jagtiani, Mester, and Moon (2019) and Powell (2016). 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&As involving a community bank target could result in long-term declines in lending to local small businesses (which are not offset by other bank lenders).

III. The 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 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 in each year).[2]

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

- 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 at the 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.
- Last, 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 next.

III.1 Data on Bank Mergers and Acquisitions

We collect transaction-level data on bank M&As from SNL Financial's M&A Database. The database contains information about M&A targets, acquirers, and announcement/completion dates. The data set 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 crisis.[3]

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 billion.[4] 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 of 2002–2014 include 1,280 and 1,366 community bank mergers when the target community banks are defined as having less than $1 billion and less than $10 billion, respectively. Of the 1,280 community bank mergers (for the $1 billion definition), 477 mergers were completed during what we define as the *postcrisis period of 2010–2014*. Similarly, of the 1,366 community bank mergers (for the $10 billion definition), 511 mergers took place during the 2010–2014 postcrisis period.

[3] We 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.

[4] Both of these definitions have been widely used in the literature. The $1 billion definition used to be more common, but the $10 billion definition has become more popular after the passage of the Dodd–Frank Wall Street Reform and Consumer Protection Act of 2010. See, e.g., Critchfield, Davis, Davison, Gratton, Hanc, and Samolyk (2004); DeYoung, Hunter, and Udell (2004); Jagtiani (2008); and Jagtiani and Lemieux (2016) for the $1 billion definition or Hughes, Jagtiani, and Mester (2016); Jagtiani and Lemieux (2016); and Rice and Rose (2016) for the $10 billion definition.

III.2 Small Business Lending (SBL) Data

We collect each bank's SBL activities in each county and in 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 in each year. These data are available for all banks that exceed a size threshold that varies over time.[5] 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 the SBL ratio is applied to the outstanding SBL volume that a bank reports in the following June Call Reports. 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 Reports,[6] which are submitted to the Federal Reserve and the Federal Deposit Insurance Corporation (FDIC) by all banks.[7] We then geographically allocate total outstanding SBL volume into firm-county-level SBL following the allocation process used in Jagtiani and Lemieux (2016). The FDIC Summary of Deposits contains the locations and 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 in each year for this group of banks that do not submit CRA reports.[8]

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[5] Firms below a certain threshold size 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 and at least $1 billion of assets in 2006; 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 www.ffiec.gov/cra/reporter.htm.

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

[7] The 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.

[8] Avery and Samolyk (2004) use 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 Jagtiani and Lemieux (2016) in which the actual CRA distribution from the CRA reports are used to allocate SBL to specific counties when the CRA data are available. Jagtiani and Lemieux argue 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

III.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.

III.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 the 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, 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.

IV. The 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, described as 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 Section IV.1 and IV.2.

IV.1 Firm-Level Analysis — Impact of M&As on the Merged Bank's SBL Activities

First, in examining the firm-level responses, we asked whether the community bank M&Asresulted in changes in SBL activity compared with the rest of the acquirers' own operations. For example, we

robustness testing, we show in the Appendix that, on average, the ratio of deposit taking in each county and the ratio of SBL origination in each county are highly correlated.

examine whether the acquirers would direct SBL funding from the Target-Only counties (counties where the target was operating before the merger) to its own Acquirer-Only counties (counties where only the acquirer 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) has operations in the county as of June the year prior to the merger year.[9, 10] The three county categories are:

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

Our identification assumption is that firm-level effects on SBL would differ systematically based on whether acquiring firms had premerger operations in the county.[11] 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 studies.[12]

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.

$$Change\_SBL_{i,j,t} = SBL_{i,j,t+1} - SBL_{i,j,t-1} \quad (1)$$

$$Change_{SBLCommitment_{i,j,t}} = \frac{SBL_{i,j,t+1}}{SBL_{i,t+1}} - \frac{SBL_{i,j,t-1}}{SBL_{i,t-1}} \quad (2)$$

$$D\_Increased\_SBL_{i,j,t} = \begin{cases} 1 \; if \; Change\_SBL_{i,j,t} > 0 \\ 0 \; otherwise \end{cases} \quad (3)$$

$$D\_Increased\_SBLCommitment_{i,j,t} = \begin{cases} 1 \; if \; Change\_SBLCommitment_{i,j,t} > 0 \\ 0 \; otherwise \end{cases}, \quad (4)$$

where

[9] We 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).

[10] Postmerger, 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 an average of less than 1 percent of the combined firm's postmerger total lending. We focus on premerger operations only.

[11] This 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.

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

- $SBL_{i,j,t}$ represents our SBL measure for the merger counterparties (target, acquirer) in merger *i* in county *j* at time *t*;
- $Increased\_SBL_{i,j}$ represents changes in SBL in inflation-adjusted dollar amounts;
- $Increased\_SBLCommitment_{i,j,t}$ represents shifts the relative importance of county *j* to the counterparties in merger *i* at time *t.*

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 premerger SBL activities by 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 a 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.

$$\ln\left(\frac{\Pr(D\_IncreasedSBL_{i,j}=1)}{1+\Pr(D\_IncreasedSBL_{i,j}=1)}\right)=\hat{\beta}_0+\widehat{\boldsymbol{\beta}}_1\boldsymbol{C}_{i,j}+\widehat{\boldsymbol{\beta}}_2\Delta\boldsymbol{M}_j+\widehat{\boldsymbol{\beta}}_3\boldsymbol{Y}_i+\epsilon_{i,j} \quad (5)$$

$$\ln\left(\frac{\Pr(D\_IncreasedSBLCommitment_{i,j}=1)}{1+\Pr(D\_IncreasedSBLCommitment_{i,j}=1)}\right)=\hat{\beta}_0+\widehat{\boldsymbol{\beta}}_1\boldsymbol{C}_{i,j}+\widehat{\boldsymbol{\beta}}_2\Delta\boldsymbol{M}_j+\widehat{\boldsymbol{\beta}}_3\boldsymbol{Y}_i+\epsilon_{i,j}, \quad (6)$$

where the independent variables

- $\mathbf{C}_{i,j}$ 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;
- $\Delta\mathbf{M}_j$ represents a vector of changes in macroeconomic conditions in county *j* between one year prior and one year after the merger;
- $\mathbf{Y}_i$ 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.

$$Change\_SBL_{i,j} = \hat{\beta}_0 + \widehat{\boldsymbol{\beta}}_1 \boldsymbol{C}_{i,j} + \widehat{\boldsymbol{\beta}}_2 \Delta \boldsymbol{M}_j + \widehat{\boldsymbol{\beta}}_3 \boldsymbol{Y}_i + \epsilon_{i,j} \quad (7)$$

$$Change_{SBLCommitment_{i,j}} = \hat{\beta}_0 + \widehat{\boldsymbol{\beta}}_1 \boldsymbol{C}_{i,j} + \widehat{\boldsymbol{\beta}}_2 \Delta \boldsymbol{M}_j + \widehat{\boldsymbol{\beta}}_3 \boldsymbol{Y}_i + \epsilon_{i,j}. \quad (8)$$

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 $\widehat{\boldsymbol{\beta}}_1$ 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 Figures 1A, 1B, 2A, and 2B.

Figures 1A and 1B present the total number of counties that are involved in each type of merger. In Figure 1A, 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 acquirers operate would also be included several times. In Figure 1B, 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 Figures 2A and 2B, we show the proportion of counties that experience increases in SBL activities (with positive increases in *ChangeSBLCommitment* after the merger) — for Acquirer-Only

[13] If we did not weight the regressions, the largest 10 percent of the 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.

[14] For 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.

(1,0), Target-Only (0,1), and Both (1,1) counties. The observations are not weighted in Figure 2A, and they are equally weighted for each merger in Figure 2B. 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 SBL activities.

Postcrisis Mergers: We also perform a separate analysis using sample of community bank mergers that took place in our 2010–2014 postcrisis period. During this period, there were very few mergers with a noncommunity bank acquirer. Thus, we make a couple small modifications to equations 5 to 8 for the postcrisis regressions to try to capture size effects:[15]

$$\ln\left(\frac{\Pr\left(D\_Increased\_SBL_{i,j}=1\right)}{1+\Pr\left(D\_Increased\_SBL_{i,j}=1\right)}\right)=\hat{\beta}_0+\widehat{\boldsymbol{\beta}}_1\boldsymbol{C}_{i,j}+\widehat{\boldsymbol{\beta}}_2\Delta\boldsymbol{M}_j+\widehat{\boldsymbol{\beta}}_3\boldsymbol{Y}_i+\hat{\beta}_4A_i+\epsilon_{i,j} \quad (9)$$

$$\ln\left(\frac{\Pr\left(D\_Increased\_SBLCommitment_{i,j}=1\right)}{1+\Pr\left(D\_Increased\_SBLCommitment_{i,j}=1\right)}\right)$$
$$=\hat{\beta}_0+\widehat{\boldsymbol{\beta}}_1\boldsymbol{C}_{i,j}+\widehat{\boldsymbol{\beta}}_2\Delta\boldsymbol{M}_j+\widehat{\boldsymbol{\beta}}_3\boldsymbol{Y}_i+\hat{\beta}_4A_i+\epsilon_{i,j} \quad (10)$$

$$ChangeS\_BL_{i,j}=\hat{\beta}_0+\widehat{\boldsymbol{\beta}}_1\boldsymbol{C}_{i,j}+\widehat{\boldsymbol{\beta}}_2\Delta\boldsymbol{M}_j+\widehat{\boldsymbol{\beta}}_3\boldsymbol{Y}_i+\hat{\beta}_4A_i+\epsilon_{i,j} \quad (11)$$

$$Change_{SBLCommitment_{i,j}}=\hat{\beta}_0+\widehat{\boldsymbol{\beta}}_1\boldsymbol{C}_{i,j}+\widehat{\boldsymbol{\beta}}_2\Delta\boldsymbol{M}_j+\widehat{\boldsymbol{\beta}}_3\boldsymbol{Y}_i+\hat{\beta}_4A_i+\epsilon_{i,j}, \quad (12)$$

where:

- $\mathbf{C}_{i,j}$ represents county classifications *only* (that is, it is not interacted with the community bank acquirer dummy), with a (1,1) county as the base case;
- A_i represents the ratio of the premerger acquirer total assets to premerger target total assets.

IV.2 County-Level Analysis — Impact of M&As on County-Level SBL Activities

In this section, we examine the overall *county-level* responses, rather than 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 nonmerged banking firms to also be included in the analysis), controlling 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

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

and local or nonlocal) 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 size of the acquirer plays a role (i.e., whether the county-level impact is affected if 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 the total SBL activities by all banks in each county in each year.[16] We then construct a measure of county-level merger activity in each year. For each merger that involves a target and/or an acquirer that has operations in the county, we classify the merger based on county type that the county represents for the merger. For example, a merger is classified as an Acquirer-Only (1,0) county if only the acquirer has a presence in the county, classified as a 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 county.[17] If acquirers divert SBL funding toward their own community, we would expect to observe that counties with a 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 in the county in each year:

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

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*.

[16] Our 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.

[17] In 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.

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 (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 county.[18] We cluster standard errors at the county level.

$$SBL_{j,t+1} - SBL_{j,t-1} = \beta_0 + \widehat{\boldsymbol{\beta}}_1 \boldsymbol{MktShare}_{AcqSize,j,t} + \widehat{\boldsymbol{\beta}}_2 \boldsymbol{M}_{j,t} + \widehat{\boldsymbol{\beta}}_3 \Delta \boldsymbol{M}_{j,t} + \widehat{\boldsymbol{\beta}}_4 \boldsymbol{Y}_{j,t} + \epsilon_{j,t} \qquad (14)$$

where

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 *AcqSize* in county *j* at time *t*;

M$_{j,t}$ represents a vector of macroeconomic conditions in county *j* at time *t*; all other variables are as defined earlier.

V. The 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 specific county to overall SBL activities)

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

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 postcrisis sample (for mergers that took place during 2010–2014). In Tables 2 and 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 dollar volume of SBL volume in each county.

V.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 in 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 postcrisis 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 (noncommunity bank) acquirers and during the postcrisis 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 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.

V.2 Firm-Level Results — Linear Regressions

The dependent variable is the increase in SBL activities by the combined firm compared with 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 combined 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 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 postcrisis 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 community bank threshold. These effects continue in the postcrisis 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) counties.[19]

Overall, across all the 16 specifications reported in Tables 2 and 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

[19] The 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 noncommunity 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.

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 threshold) tends not to matter much in most cases. It is, however, important whether the acquirer is a community bank or a large bank, especially for the noncommunity bank Acquirer-Only (1,0) counties. This is broadly consistent with Jagtiani, Kotliar, and Maingi (2016), which find 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 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.

V.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 premerger to postmerger period. The results, based on equation (14), are presented in Table 4. We find that the overall county-level impact of merger types that took place in the county on SBL funding varies 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 it 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 a $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 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 of 2002–2014, the marginal negative effects is about a $1 million decline in SBL for each 10 percent increase in market share of the 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 a $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).

VI. The 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.

Jagtiani, Kotliar, and Maingi (2016) find 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 versus 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 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's community vary from specification to specification, it is always statistically and economically significant regardless of whether the acquirers are community bank or large banks. Our results are also robust to different estimation techniques, different measures of changes in SBL activities, different definitions of 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 SBL funding to local small businesses. The SBL credit gaps that emerge in Target-Only counties (after the mergers) are 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 functionality of SBL markets and community banks' niche within these markets.[20]

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

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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 Postcrisis 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.

	Full Sample $1B Definition		Full Sample $10B Definition		Postrisis Sample $1B Definition		Postcrisis Sample $10B Definition	
Variable	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev
$1000s Change in Lending	-1981.10	17524.47	-1902.26	18782.58	-3101.73	14367.58	-2980.13	14478.35
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	17861.70	9580.50	17277.75	11699.88	19637.28	11742.86	19787.17
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.

	Full Sample $1B Definition		Full Sample $10B Definition		Postcrisis Sample $1B Definition		Postcrisis Sample $10B Definition	
Variable	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev
$1000s Change in Lending	3191.269	51847.48	3191.269	51847.48	-7590.136	43345.95	-7590.136	43345.95
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	310410.40	97,268	310410.40	100,665	320100.40	100,665	320,100
Unemployment Rate	6.713	2.83	6.713	2.83	7.918	3.00	7.918	3.00
Per Capita Income	32481.06	9959.95	32,481.06	9959.95	37245.19	10640.35	37245.190	10640.35
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 Postcrisis 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.

	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	
Variable	Full Sample	Postcrisis	Full Sample	Postcrisis	Full Sample	Postcrisis	Full Sample	Postcrisis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(0,1) County	--	-0.377**	--	-0.409**	--	0.161	--	0.0630
		(0.182)		(0.171)		(0.186)		(0.172)
(1,0) County	--	0.514***	--	0.474***	--	1.098***	--	0.997***
		(0.144)		(0.134)		(0.157)		(0.144)
Ratio of Acq. to Tgt. Assets	--	-0.00875**	--	-0.00837**	--	-0.00960***	--	0.00950***
		(0.00381)		(0.00365)		(0.00365)		(0.00352)
CB Acquirer, (1,0) county	0.422***	--	0.386***	--	0.882***	--	0.802***	--
	(0.121)		(0.0831)		(0.133)		(0.0908)	
CB Acquirer, (0,1) county	-0.0481	--	-0.0746	--	0.249*	--	0.179	--
	(0.137)		(0.104)		(0.144)		(0.110)	
Non-CB Acq., (1,1) county	-0.434***	--	-0.00177	--	-0.353**	--	0.256	--
	(0.146)		(0.176)		(0.150)		(0.167)	
Non-CB Acq., (1,0) county	-0.0479	--	0.200**	--	0.402***	--	0.650***	--
	(0.113)		(0.0993)		(0.115)		(0.0912)	
Non-CB Acq., (0,1) county	-0.778***	--	-0.645***	--	-0.535***	--	-0.205	--
	(0.181)		(0.233)		(0.189)		(0.232)	
County Population Change	0.00000411***	0.00000523**	0.00000330**	0.00000505**	0.0000	0.0000	0.0000	0.0000
	(0.00000138)	(0.0000)	(0.00000129)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Unemployment Rate Chg.	0.0110	0.0669	0.0192	0.0777	-0.0106	0.126**	-0.00229	0.122**
	(0.0339)	(0.0620)	(0.0321)	(0.0580)	(0.0283)	(0.0521)	(0.0271)	(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	-724.8	-64.24	-641.8	92.07	-1026.9*	94.88	-951.1*
	(210.5)	(556.6)	(209.7)	(532.3)	(228.0)	(526.2)	(226.7)	(505.2)
Personal BK rate Chg.	28.50	53.11	22.28	46.35	11.55	89.60	8.381	87.04
	(29.41)	(74.60)	(27.84)	(70.84)	(25.37)	(71.56)	(23.99)	(67.32)
Intercept	-0.158	-0.887***	-0.269	-0.848***	-0.835***	-0.920***	-0.926***	-0.852***
	(0.187)	(0.261)	(0.170)	(0.248)	(0.154)	(0.192)	(0.132)	(0.180)
Year Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Probability of Increase for elements of $\mathbf{C}_{i,j}$ vs. base case								
(1,1) County	--	0.353***	--	0.355***	--	0.240***	--	
		(0.0294)		(0.0275)		(0.024)		0.253***
(1,0) County	--	0.475***	--	0.468***	--	0.483***	--	(0.0230)
		(0.0151)		(0.0144)		(0.015)		0.476***
(0,1) County	--	0.274***	--	0.269***	--	0.270***	--	(0.0142)
		(0.0251)		(0.0237)		(0.025)		0.265***
CB Acquirer, (1,1) county	0.410***	--	0.372***	--	0.281***	--	0.258***	(0.0236)
	(0.0258)		(0.0176)		(0.023)		(0.0150)	--
CB Acquirer, (1,0) county	0.513***	--	0.464***	--	0.486***	--	0.437***	
	(0.014)		(0.009)		(0.136)		(0.009)	--
CB Acquirer, (0,1) county	0.398***	--	0.355***	--	0.334***	--	0.294***	
	(0.021)		(0.0166)		(0.020)		(0.0156)	--
Non-CB Acq., (1,1) county	0.311***	--	0.371***	--	0.216***	--	0.310***	
	(0.021)		(0.0367)		(0.017)		(0.0314)	--
Non-CB Acq., (1,0) county	0.398***	--	0.419***	--	0.370***	--	0.400***	
	(0.007)		(0.0155)		(0.006)		(0.0110)	--
Non-CB Acq., (0,1) county	0.243***	--	0.238***	--	0.187***	--	0.221***	
	(0.0264)		(0.0397)		(0.023)		(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). The dependent variable is the 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 a community bank, with separate analyses for the Full sample (2002–2014) and the Postcrisis 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.

	$$ Amount of SBL				Ratio of County SBL to Total SBL			
	$ 1 Billion Definition		$10 Billion Definition		$ 1 Billion Definition		$10 Billion Definition	
Variable	Full Sample	Postcrisis	Full Sample	Postcrisis	Full Sample	Postcrisis	Full Sample	Postcrisis
(0,1) County	--	726.0	--	604.4	--	-0.00192	--	-0.00262
		(1500.9)		(1408.5)		(0.00867)		(0.00808)
(1,0) County	--	6557.8***	--	6295.7***	--	0.0432***	--	0.0401***
		(1390.4)		(1313.8)		(0.00752)		(0.00706)
Ratio of Acq. to Tgt. Assets	--	-13.34	--	-19.57	--	0.0000712	--	0.0000453
		(30.10)		(31.04)		(0.0000719)		(0.0000679)
CB Acquirer, (1,0) county	4621.3***	--	5253.7***	--	0.0485***	--	0.0426***	--
	(1112.5)		(1251.6)		(0.00798)		(0.00519)	
CB Acquirer, (0,1) county	98.22	--	401.7	--	0.00618	--	0.00514	--
	(1150.8)		(1301.5)		(0.00822)		(0.00563)	
Non-CB Acq., (1,1) county	-2853.9	--	348.8	--	0.0121	--	0.0332***	--
	(2737.3)		(4141.7)		(0.00820)		(0.00544)	
Non-CB Acq., (1,0) county	3545.8***	--	4804.5***	--	0.0461***	--	0.0410***	--
	(1095.9)		(1456.0)		(0.00734)		(0.00473)	
Non-CB Acq., (0,1) county	-4451.4**	--	-7599.4	--	0.0185**	--	0.0341***	--
	(2049.7)		(7659.3)		(0.00819)		(0.00591)	
County Population Change	-0.00699	0.0794**	-0.00720	0.0716**	-2.04e-08	6.27e-08	-1.45e-08	6.28e-08
	(0.0456)	(0.0330)	(0.0425)	(0.0321)	(0.0000)	(0.0000)	(9.71e-08)	(0.0000)
Unemployment Rate Chg.	102.3	843.0*	217.6	894.7*	-0.000453	0.00405	-0.000532	0.00371
	(346.6)	(498.5)	(333.2)	(477.0)	(0.00141)	(0.00255)	(0.00132)	(0.00237)
Per Capita Income Chg.	0.182	0.123	0.146	0.0825	0.0000	0.0000	0.0000	0.0000
	(0.127)	(0.148)	(0.121)	(0.145)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Business BK rate Chg.	517058.6	249062.0	540449.0	281690.4	4.750	6.871	3.892	6.590
	(1348200.4)	(2912766.7)	(1280569.5)	(2794759.7)	(8.366)	(19.03)	(8.070)	(18.30)
Personal BK rate Chg.	306798.0	957763.0	217816.2	767370.0	0.604	9.828*	0.561	9.481*
	(310806.5)	(738378.2)	(302807.5)	(707347.1)	(1.523)	(5.339)	(1.439)	(5.082)
Intercept	-1702.1	-9751.6***	-2464.1	-9086.0***	-0.0378***	-0.0286***	-0.0338***	-0.0269***
	(1759.1)	(2209.5)	(1950.6)	(2174.9)	(0.0126)	(0.00790)	(0.0117)	(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

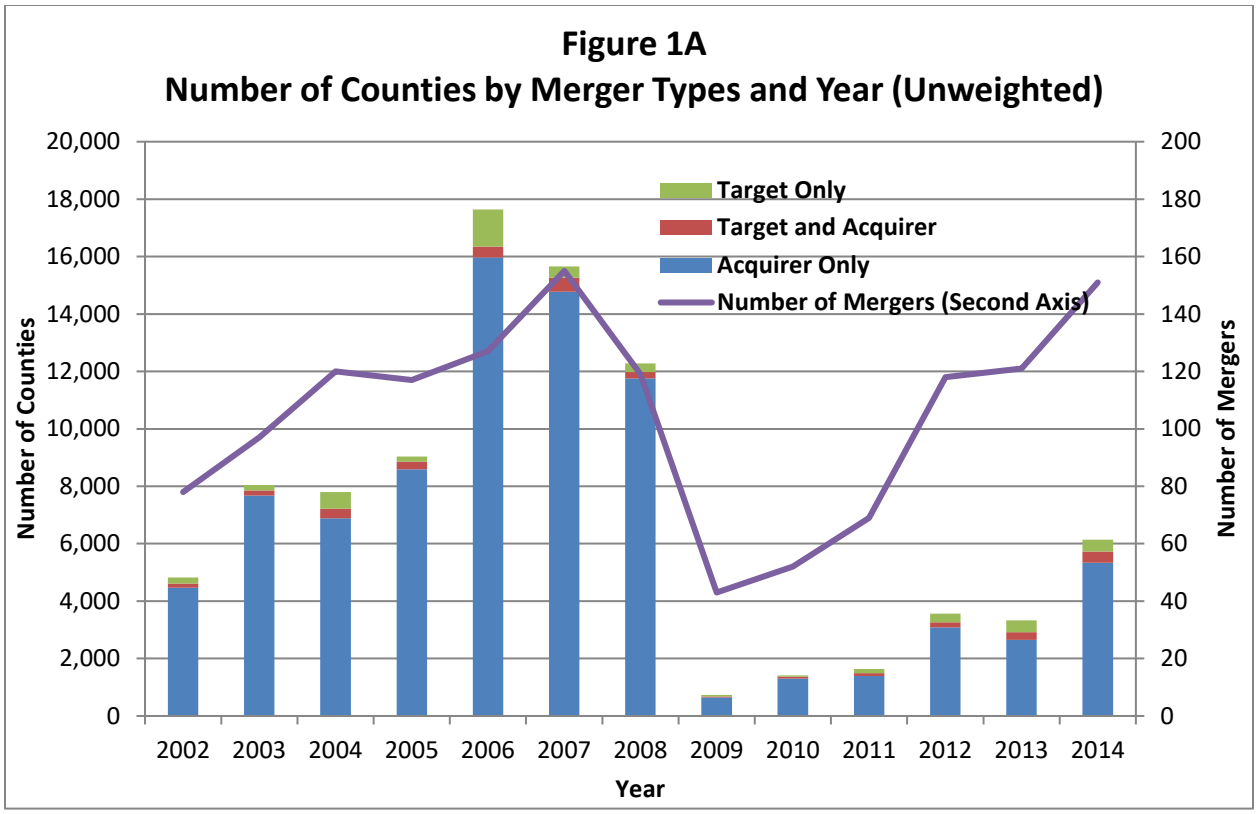
Table 4: County-Level Regression Results

This table presents the results of the OLS regressions based on equation (5). The dependent variable is the 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 Postcrisis 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.

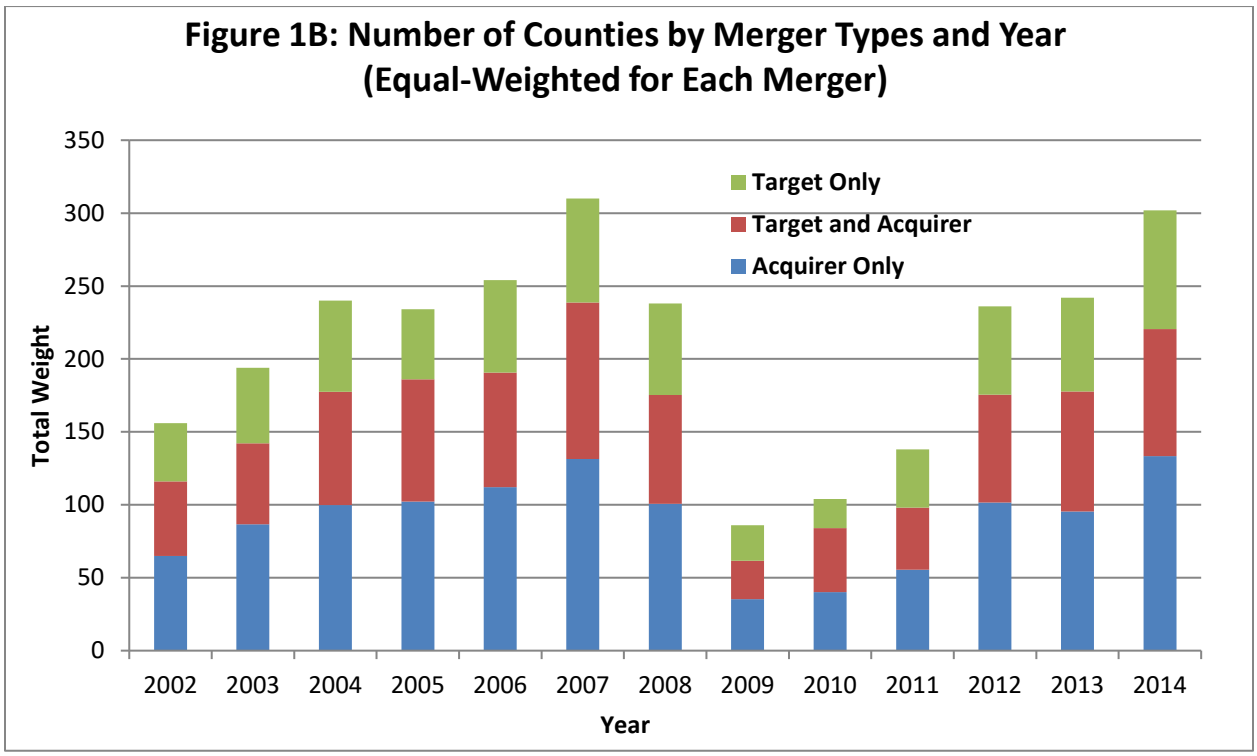
Variable	Full Sample $1 Billion Definition	Full Sample $10 Billion Definition	Postcrisis Sample $1 Billion Definition	Postcrisis Sample $10 Billion Definition
Market Share of (1,0) mergers CB Acquirer	-2863.8	2565.1	4145.3	-1244.4
	(2615.5)	(1872.5)	(2603.9)	(2796.3)
Market Share of (1,1) mergers CB Acquirer	-19929.1***	-8954.9*	-20049.3**	-20868.9***
	(6376.9)	(5110.6)	(8866.4)	(6406.0)
Market Share of (0,1) mergers CB Acquirer	-9846.9***	-10280.8***	-12037.1**	-20967.3***
	(3482.8)	(3468.3)	(5102.5)	(5392.4)
Market Share of (1,0) mergers Non-CB Acquirer	5309.5**	9502.2***	-4881.5	-6842.0
	(2144.0)	(2550.7)	(3978.1)	(7152.0)
Market Share of (1,1) mergers Non-CB Acquirer	24946.0*	87294.8***	-32534.7***	-41381.5*
	(13130.0)	(22041.7)	(11851.1)	(22512.5)
Market Share of (0,1) mergers Non-CB Acquirer	-18060.8**	-33558.4***	-47385.9***	-53095.3**
	(8094.8)	(8986.7)	(9175.8)	(22228.7)
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	-17011135.8***	-17023316.8***	-16578400.6***	-16603532.7***
	(1420053.1)	(1421329.9)	(2387683.0)	(2387449.4)
Personal Bankruptcy Rate	-744304.3***	-737766.7***	-2585440.3***	-2596084.3***
	(116317.3)	(116517.8)	(257862.7)	(258820.1)
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.	1990139.8**	1897188.9**	1576841.1	1513277.8
	(828183.3)	(824805.7)	(1320356.1)	(1319985.3)
Personal BK rate Chg.	-1961648.6***	-1964419.5***	-2405421.4***	-2390974.6***
	(249914.8)	(250623.1)	(403686.2)	(403988.8)
Intercept	2658.5	2599.0	-14973.4***	-15093.2***
	(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%

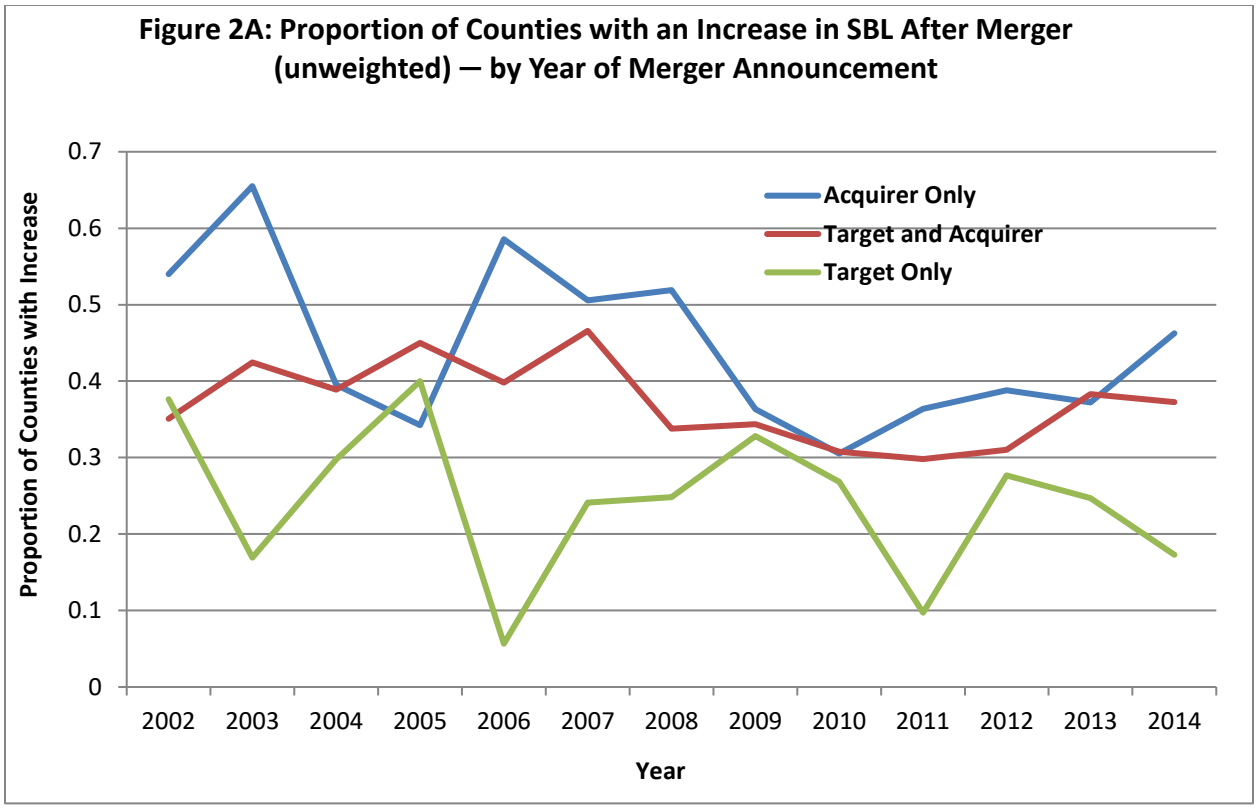
Data sources: SNL Financial, Haver Analytics, CRA database, Call Reports, Y-9C reports, and Summary of Deposits database



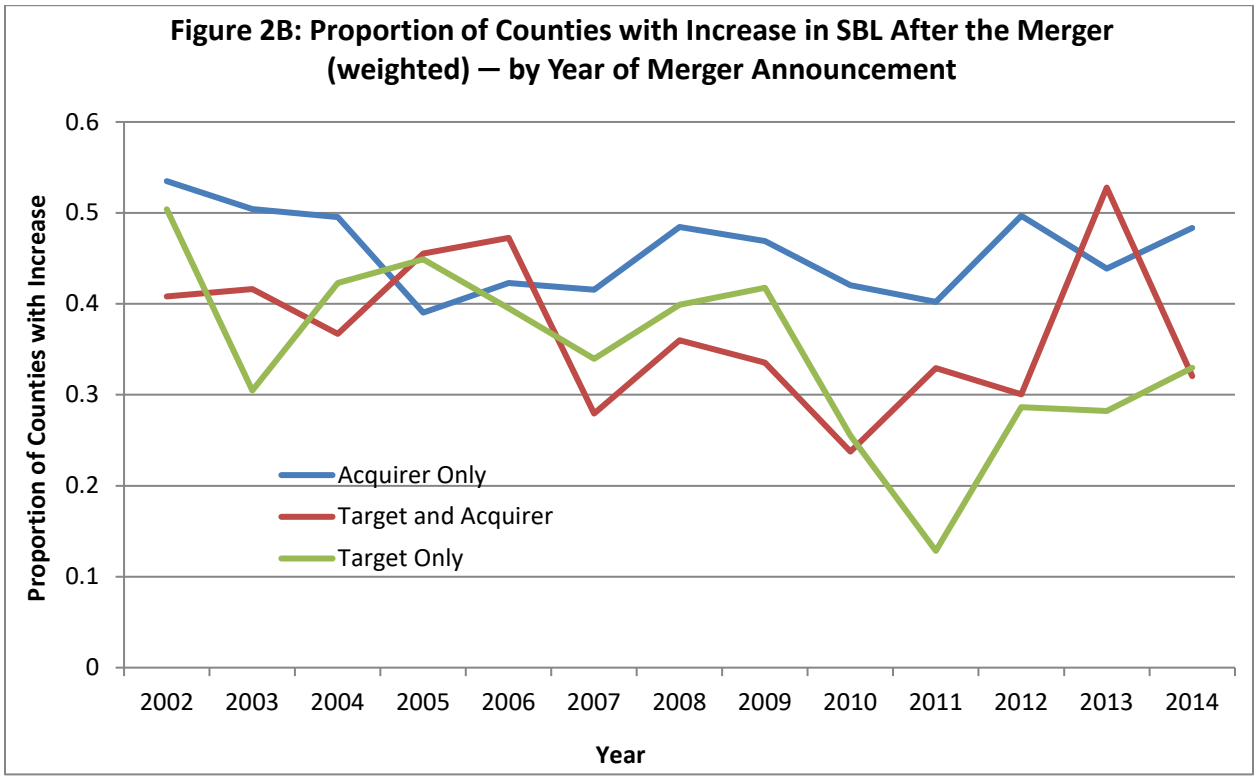
Data sources: SNL Financial, CRA database, Call Reports, Y-9C reports, and Summary of Deposits database



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



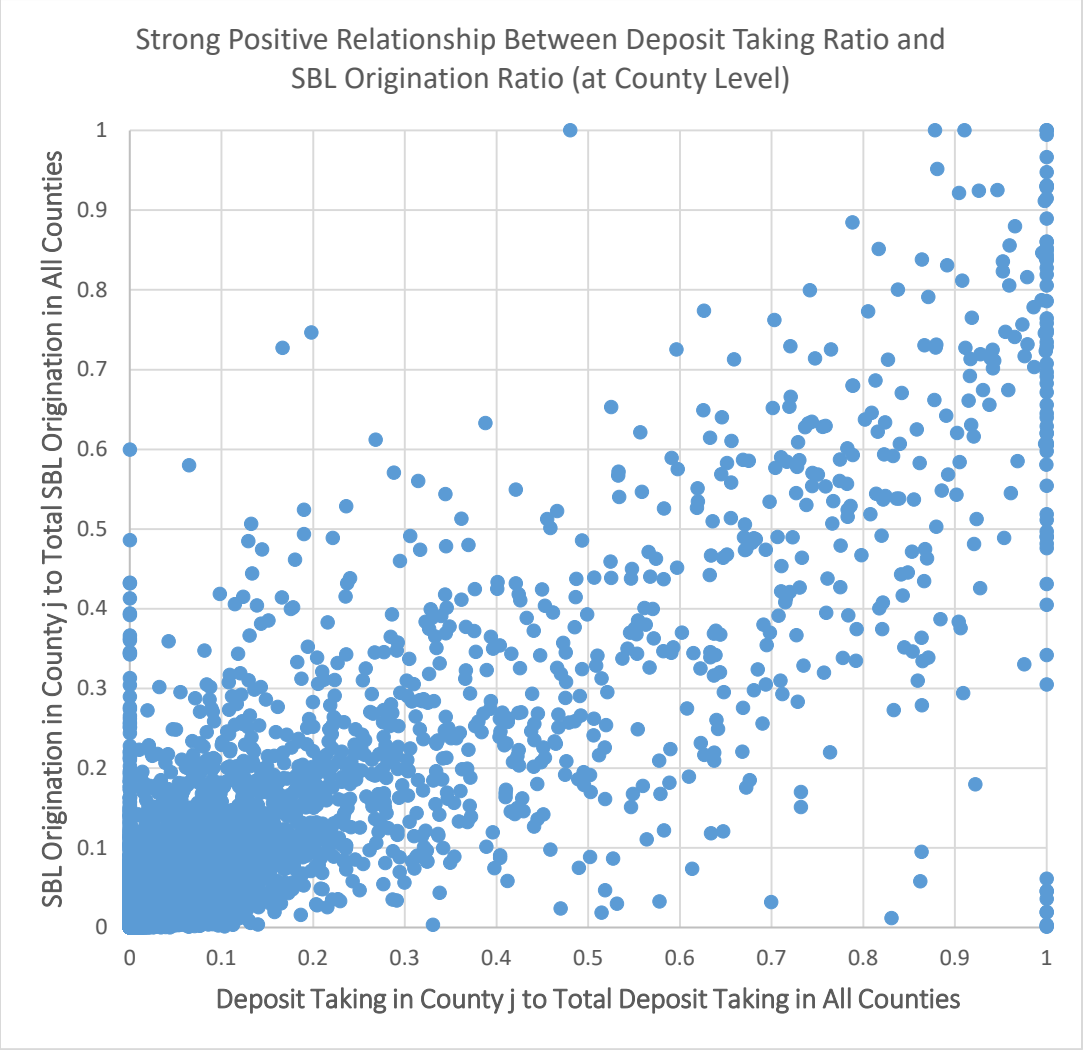
Data sources: SNL Financial, CRA database, Call Reports, Y-9C reports, and Summary of Deposits database



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

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