The Competitive Effects of Megabanks on Community Banks *

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Abstract

The effects of industry consolidation are felt acutely at the branch level: in 1994, branches of banking organizations with fewer than $1 billion in assets represented 37% of the over 81,000 national bank branches. By 2016, small bank branches had fallen to 26% of the national total despite bank branches increasing by 13% industry-wide. We provide new insights on the effects of consolidation within the banking industry by documenting the variation of these trends across the metropolitan statistical area (MSA) and non-MSA divide. We show that overall branch and deposit growth is highest in MSAs both in relative and absolute terms. While small bank branches and deposits have declined within and outside of MSAs, we find that the decline is steeper in the MSAs, which also happen to be where large bank expansion is concentrated. We employ a difference-in-differences approach to consider the role that large bank competition plays in the performance of community banks. We use large bank expansion through mergers and acquisitions of medium-sized banks as a quasi-experiment to changes in the small bank competitive environment. We find that large bank entrance impacts small banks positively: branches of small banks that are more exposed to large bank entrance do not display worse performance outcomes, and areas of greater exposure exhibit increased small bank expansion following large bank merger activity. These results are supportive of economic theory, survey evidence on bank competition and the existing literature.

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1 Introduction

Two concurrent trends have defined the banking industry in recent decades. From 1994 to 2016, banking organizations with real assets exceeding $50 billion[1] increased their share of industry deposits from 33% to 68%. Over the same period, the number of banks with real assets fewer than $1 billion decreased from 10,856 to 5,267, accounting for over 80% of the total decrease in banking institutions. The effects of industry consolidation are felt acutely at the branch level: in 1994, branches of banking organizations with fewer than $1 billion in assets represented 37% of the over 81,000 national bank branches. By 2016, small bank branches had fallen to 26% of the national total despite bank branches increasing by 13% industry-wide. The literature points to changes in regulation, technology, and competition as the driving force behind these trends.[2,3]

In this paper, we provide new insights by first documenting the variation of these trends across the urban-rural divide. We show that overall branch and deposit growth is highest in metropolitan statistical areas (MSAs) both in relative and absolute terms. This is not surprising, as MSAs have seen more growth in population and income than their non-MSA counterparts. However, while small bank branches and deposits have declined both inside and outside of MSAs, we find that the decline is steeper in the MSAs. The presence of small banks has diminished the most in areas where the economy and the banking sector as a whole have undergone the greatest expansion: there appears to be a "growth-economy small-bank gap."

Meanwhile, large bank expansion is concentrated in counties that saw the greatest economic and banking sector growth from 1994 to 2016. Large banks' growth accounted for all of the banking industry gains in branches (16%) and deposits (136%) in MSAs, in addition

[1] Unless otherwise noted, all dollar values are in constant 2010 dollars. We define a bank's size according to bank holding company assets.

[2] e.g. Carter and McNulty (2005), Akkus, Cookson, and Hortacsu (2015), DeYoung, Hunter, and Udell (2004), Carey, Post, and Sharpe (1998), Petersen and Rajan (1995)

[3] Hereafter we refer to banking organizations with less than $1 billion in assets in 2010 dollars as small banks and those with more than $50 billion in assets in 2010 dollars as large banks. We refer to all others as medium-sized banks.

to capturing some of the market that had previously been held by small and medium-sized banks in 1994. (Branches and deposits in non-MSAs grew by 2% and 16%, respectively.) Even as large banks have moved away from retail branches in more recent years, they have done so asymmetrically across the urban-rural divide.

Given the expansion of large banks into MSAs (and growing economies in general) and the decline of small banks in those same geographies, we examine the extent to which large banks impose competitive pressures upon small banks.

Economically, the composition of the banking industry is thought to matter given the role that small banks play in providing small business financing (Berger and Udell (2002) and references therein) and the subsequent role that small and medium-sized enterprises play in driving economic growth (Neumark, Wall, and Zhang (2011)). As large banks expand, understanding the direct competitive effects of their expansion on small banks is needed to understand broader effects in the real economy. Additionally, competition can amplify or dampen other factors contributing to structural changes in the banking sector. For example, if the competitive effects of large banks on small banks are negative, then regulatory or technology changes that benefit large banks will be amplified by industry competition. If, on the other hand, the competitive effects of large banks on small banks are positive, the industry competition mollifies regulatory and technological innovations.

The theoretical effects of large bank competition on small banks are ambiguous. The National Survey of Community Banks finds that small banks point to other small banks and mid-sized banks as their primary competitors for banking products. Survey evidence is further supported by a large literature that argues that small banks offer a differentiated product from large banks. In particular, the literature focuses on small banks' roles as "relationship lenders," providing credit and other financial services for opaque borrowers, especially small business.[4] Under this view, the expansion of large banks in particular–especially at the expense of mid-sized banks–could improve the competitive environment from small banks'

[4]See, for example, Berger, Miller, Petersen, Rajan, and Stein (2005), Chakraborty and Hu (2006), and Petersen and Rajan (1995).

perspective.

Large banks could have a detrimental effect on small banks if large banks have access to technologies that allow them to effectively compete for small bank business (Amel and Prager (2016)). Likewise, large bank competition could have a negative effect on small banks if banks have access to similar technologies but large banks benefit from economies-of-scale (e.g. Berger and White (2007)). For example, DeYoung, Frame, Glennon, and Nigro (????) argue that the historical boundaries that defined the small business lending model of small banks had nearly eroded by 2001. In particular, they attribute large increases in distances between small business borrowers and credit providers to the adoption of small business credit scoring as the source.

We adopt a difference-in-differences approach, using large bank expansion through mergers and acquisitions of medium-sized banks as a quasi-experiment to changes in the small bank competitive environment. Several features make this well-suited to the questions at-hand. First, unlike the creation of a new branch, when a large bank acquires another bank, the effect is not to create new sources of competition but, rather, to alter existing sources of competition; our measure of changes to large bank competition does not conflate changes in the number of branches within a market with changes in the size of existing branches. Second, by restricting our data to merger activity in which a sufficiently large number of branches are acquired, the exact location of any particular branch can be viewed as non-essential to the merger decision, and therefore exogenous. We tease out the identification more explicitly in Section 5.

Our overarching approach is to compare branch performance before and after merger activity between zip codes experiencing large bank merger activity and zip codes within the same county that did not contain an acquired branch. When a large bank expands into an area through a merger or acquisition, it enters the markets previously inhabited by the branches of the acquired bank. As such, large bank expansion occurs in certain areas and is not uniformly distributed across the broader market. We exploit variation between zip codes within a county experiencing large bank expansion. Branches acquired by the large

bank exist in some of the zip codes within the county but not all. Our analysis compares the performance of bank branches within zip codes experiencing merger activity to that of bank branches in zip codes within the same county that did not contain a branch acquired by the large bank.

We find, broadly, that large bank competition has positive effects for small banks. Consistent with some bank customers preferring a banking relationship with a non-large bank, we see lower deposit growth in acquired branches after acquisition by a large bank. Small branches within the same zip code do not see greater deposit growth compared to small branches in neighboring zip codes, however. Likewise, small branches with greater exposure to large bank entry display similar rates of branch existence following merger activity to those with less exposure.

Robust survey evidence reveals that while small banks view medium-sized banks as among their primary competitors, they do not view large banks as an equal source of competition. Thus, a large bank replacing a medium-sized bank may confer competitive benefits to small banks within the target's market. Yet, small banks better located to benefit from large bank merger activity do not see stronger deposit growth compared to those located in adjacent areas. A potential resolution lies in small bank expansion and entry: merger zip codes experience greater small bank expansion post-merger compared to zip codes within the same county that did not see any medium-sized branches acquired by a large bank. These findings are conistent with previous studies (Berger, Bonime, Goldberg, and White (2004)).

Economic theory suggests that if merger activity improves the small bank competitive environment for a given area, new entrants should target the area and any excess gains should not persist. Considering only zip codes containing an acquired branch, exposed small branches closest to the acquired branch – that is, those best-located to see improvement in banking condititions following the merger – do not display greater deposit growth than those located further away. We are currently exploring the location decisions of new small branch entrants into these merger zip codes.

Finally, in ongoing analysis, we explore how demographic changes relate to the small-bank

gap. In particular, we are examining the growth-economy small-bank gap as a function of a number of geographic and demographic characteristics. Given the literature's finding that small banks have a competitive advantage in relationship banking, we hypothesize that the small-bank gap should be smaller in regions that exhibit more population stability. Furthermore, technologically-savvy consumers may place lesser value on the traditional relationships provided by small banks. Consequently, we are using population turnover statistics and internet penetration as proxies for demographic stability and bank customer technological preferences to re-examine the small-bank gap.

Our paper contributes to a large literature on competition in the banking industry. One of the primary focuses of this literature is how competition affects the ability of community banks to lend on the expectation of repeated customer interactions (that is, "relationship lending").[5] Berger, Miller, Petersen, Rajan, and Stein (2005), Chakraborty and Hu (2006), Carter, McNulty, and Verbrugge (2004), and DeYoung, Hunter, and Udell (2004) all find that community banks have a comparative advantage for these types of loans. This advantage may emanate from community banks' superior knowledge of local markets[6] or through their flatter organizational structure.[7]

The theoretical and empirical effects of large bank competition on community banks' competitive advantage in relationship lending is ambiguous. Hauswald and Marquez (2006) argue that competition decreases banks' incentives to acquire information in lending markets and decreases the role of relationship lending. On the other hand, Yafeh and Yosha (2001) argue that increased competition through reduced regulation causes increased investment in relationship lending to create endogenous barriers to entry. Empirically, Presbitero and Zazzaro (2011) show that large out-of-market banks are detrimental to relationship lending. Petersen and Rajan (1995) also argue that competition erodes community banks' competitive advantage.

Differences in operating costs and access to capital markets may also affect the competitive

[5] Boot (2000).
[6] e.g. Petersen and Rajan (1994), Jagtiani and Lemieux (2016)
[7] e.g. Petersen and Rajan (1995), Udell (1989).

market for deposits between large banks and community banks. Park and Pennacchi (2008) demonstrate that large multi-market bank mergers decrease deposit rate competition as the larger banks are less inclined to compete for this funding source given their alternatives. Consistent with this view, Hannan and Prager (2004) show that multi-market banks offer lower retail deposit rates than single market banks. Furthermore, a greater presence of multi-market banks depresses deposit rates at single market banks.

In contrast to most of the existing literature, our primary focus is to determine the cumulative competitive effects of large banks on small banks. The above literature suggests that large banks compete with small banks' core lending (relationship loans) and funding (retail deposits) in ambiguous ways. With these mechanisms in mind, we address whether the net effect on small banks has contributed to their declining presence. We also differ from the aforementioned literature by making use of the localized manner through which banks compete. For example, Nguyen (2017) uses tract level data to show that aggregate small-business lending outcomes from branch closings dissipate within six miles. We rely on similar within-county variation in competition to estimate the effects of large bank competition on community banks.

Our paper also contributes to a broader literature on the competitive effects of large firms on local businesses. Jia (2008) finds that chain store entry into a market makes roughly 50% of small discount retail competitors unprofitable. As a result, 40-50% of the net change of small discount stores from the late 1980s to the late 1990s can be accounted for by Walmart's expansion during this period. Basker (2005) also looks at Walmart's expansion and uses an instrumental variables approach to understand the effect of entry on labor market outcomes. Our study considers a similar environment in which a large industry player enters a new market. However, a number of institutional features of the banking industry make it particularly interesting for examining the issue. First, all banks must submit detailed regulatory filings, giving researchers an insight into the often-opaque small, local-firm-side of competition. Second, large banks often expand via merger rather than the establishment of new branches. This lends itself to different methods and analysis, discussed further in Section 5.

Our paper is structured as follows. Section 2 documents the small bank gap. Section 3 discusses major regulatory changes affecting the banking industry during our sample period while Section 4 describes our data. Section 5 discusses mergers in the banking industry, the data, and empirical strategy. Section 5.2 discusses the results. Section 6 concludes and discusses possible directions for future empirical work.

2 Small-Bank Growth-Economy Gap

Though much of the literature documents the declining presence of small banks, we are the first to our knowledge to document the growth-economy small-bank gap.[8] In Figure 1, we document changes in the number of banks, bank branches, and bank deposits by bank size. Panel A depicts changes to the total number of banks using Call Report data and shows that the overall number of banks has declined, but that the vast majority of this decline has come from small banks. Panel B plots the total number of bank branches over this time. While the total number of bank branches increased from 1994 to 2016, small bank branches declined, medium-sized bank branches were roughly constant, and large bank branches expanded. Panel C demonstrates a similar trend to Panel B using deposits.

Population grew collectively by more than 23% in MSA counties from 1994 to 2015, while non-MSA counties' population grew by less than 7%. MSA counties' nominal economic growth was 60% from 1994 to 2015, while non-MSA counties' nominal economic growth was 40%. The overall banking sector reflects these differences: real deposit growth more than doubled in MSAs from 1994 to 2015, with non-MSA real deposit growth increasing by about 15%. Total bank branches increased by more than 16% in MSAs, but by less than 3% in non-MSAs.

In Figure 2 we show how the trends from Figure 1 differ between MSAs and non-MSAs.

[8] Critchfield, Davis, Davison, Gratton, Hanc, and Samolyk (2004) study 1984-2003 and find that the fall in community banks was similar independent across differences in regional economic factors and urban distinctions. However, the time period of study and focus of their study preclude an examination of the inverse relationship between bank industry performance and the performance of small banks that we document.

Panel A shows the real deposits for MSAs. For MSAs, real deposits grew by roughly $5.5 trillion dollars, more than doubling, from 1994 to 2016. Large bank domestic deposits grew by $6 trillion dollars; medium bank branch deposits grew by $287 billion dollars; and deposits held by small bank branches declined by $210 billion dollars. Panel B demonstrates these trends for non-MSAs: total real deposits grew by 16%; large bank branch deposits grew by almost $65 billion dollars; medium bank branch deposits grew by $54 billion dollars; and small bank branch deposits declined by $18 billion dollars. Panel C shows the relative change in deposits for small banks and all banks using 1994 as the base year. In relative terms, domestic deposits grew most in MSAs. Panel D plots the difference between cumulative total bank domestic deposit growth against small bank domestic deposit growth (again using 1994 as the base year). Figure 3 depicts similar differences between small bank branches in MSAs and non-MSAs.

Beginning in the mid-1990s small banks began underperforming the banking sector overall with regard to domestic deposits in both MSAs and non-MSAs. Beginning in the early 2000s, small bank deposit growth began significantly falling behind the banking industry overall in MSAs, a trend that abated temporarily in the years around the financial crisis, but continued to accelerate thereafter. By 2015, cumulative banking deposit growth exceeded small bank deposit growth by about 160% in MSAs and by about 20% for non-MSAs since 1994.

Macroeconomic indicators are also more positive in MSAs than non-MSAs. Figures 4 and 5 plot population and gross county product (GCP), respectively, for MSA versus non-MSA counties. In both cases, MSA counties appear to have real activity that would be most conducive to banking activity. Figure 5 shows that from 1994 to 2015, real economic growth in MSA counties was 60%, against only 40% in non-MSA counties. Figure 4 shows that population growth in MSA counties exceeded 20%, while it was about one-third of this amount in non-MSA counties. Despite the auspicious real economic activity and overall success of the banking industry in MSAs, small banks have seen no more success in these regions of the country. We call this the growth-economy small-bank gap.

3 Regulatory Environment

Over the past three decades, major regulatory changes accompanied dramatic changes to the structure of the banking industry. We begin our study after the passage of the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act, which ushered in a historic new wave of mergers (Berger, Bonime, Goldberg, and White (2004)).[9] Prior to 1994, banks could only branch across state lines based upon state-by-state negotiated agreements that had become increasingly popular in the prior decade. The Riegle-Neal Act effectively removed all restrictions on interstate banking, enabling more cross-state mergers. The ultimate effect of these mergers was to reduce the number of small banks and concentrate an increasing amount of the banking industry in a relatively constant number of medium and large banks (DeYoung, Hunter, and Udell (2002)). Our paper is motivated, in part, by the consolidation during this time period. Furthermore, our identification strategy relies on the heightened merger activity that accompanied this regulatory change.

Congress passed two other major pieces of banking legislation during our sample period, the Financial Services Modernization Act of 1999, also known as the Gramm-Leach-Bliley Act (GLBA), and the Dodd-Frank Wall Street Reform and Consumer Protection Act in 2010. Despite limited academic research surrounding GLBA and Dodd-Frank, a robust discussion in the popular press in both cases highlights the supposed effects of these acts on consolidation.[10] GLBA removed the remaining barriers that had been erected by the Glass-Steagall Act of 1933 between banks and securities companies and insurance companies. Avraham, Selvaggi, and Vickery (2012) note that nonbank subsidiaries grew dramatically subsequent to GLBA. The expansion in the scope of bank holding companies contributed to the increased concentration of bank holding companies' assets among the largest ten entities, which rose by approximately ten percentage points from 1998 to 2015.[11] Meanwhile, the Dodd-Frank Act instituted a number of new rules ranging from stress tests to those governing mortgage lending. Some

[9] For an excellent summary of changes to banking regulation and the industry structure leading up to and including much of this time period, see DeYoung, Hunter, and Udell (2004).

[10] For example, Sorkin (2016) and Nichols (2016).

[11] Source: Y-9C data.

non-academic papers and press (e.g., Peirce, Robinson, and Stratmann (2014)) argue that these rules increase "compliance" costs affecting scale economies in the banking industry and accelerated consolidation.

This paper does not aim to address the effects of these major pieces of legislation on banking industry consolidation directly. However, these federal laws are noteworthy for their role in the public debates about bank industry concentration. The primary focus of this paper is the role that direct competition between large and small banks plays in amplifying or mitigating industry consolidation trends.

4 Data

Our data set is constructed from several sources. Branch-level information, such as deposits and location, is from annual Summary of Deposits (SOD) submissions to the FDIC. We utilize a multi-step process to improve upon the latitude and longitude data contained within SOD.[12] We supplement branch observations with annual bank-level information from Consolidated Reports on Condition and Income (referred to as Call Reports). From the June Call Report filings we obtain data on the holdings and performance of the bank. Annual, county-level economic and demographic data from Moody's Analytics are matched to bank branches.

Our universe of bank mergers is drawn from the FDIC's Mergers Transactions Database. Our initial selection criteria include all mergers in which a banking organization with at least $25 billion in combined bank assets (real 2010 dollars) acquires and ultimately merges with a bank with at least 10 branches and the resulting banking organization has at least $50b in real combined bank assets. We exclude within-holding-company mergers. Mergers meeting these initial criteria are depicted in Tables 1 and 2.

There are often several distinct dates associated with a merger transaction.[13] Our main merger date variable pertains to the day the acquired certificate number is closed by the

[12] We thank Alex Marshall for help with this process.
[13] See more detailed discussion in Section 5.1.

acquiring bank. This is not the only date possible for our analysis, however. For example, Marquette Bank branches became legally identical to Wells Fargo branches on July 13, 2002 even though the holding company for Wells Fargo took ownership of Marquette Bank on February 1, 2002. Moreover, a purchase agreement was reported in the media at least as early as October 5, 2001.[14] Between the public announcement date of the merger and the official acquisition date, the acquiring institution has no legal control of the target bank's actions or strategy. The fuzziness around the precise date when competitive pressures are exerted by the acquirer and not the acquired bank leads us to adopt pre- and post-merger periods that surround but do not include our merger date variable.

From this merger universe, we restrict our attention according to several key factors. First, some of the branches in our data are thrifts that cannot readily be tracked over time. We require our minimium number of acquired branches (10) to apply to branches for which a time-series can be constructed. Second, to ensure the merger represents a tangible difference in competition, we remove mergers in which a large bank takes over another large bank. Third, to avoid potential conflation with other types of competitive effects, we remove mergers between large and small banks. Finally and most significantly, our main analysis retains only the first qualifying merger. That is, some counties saw multiple large bank acquisitions of medium-sized banks during our sample period. Our coefficients of interest are identified off of only the first of these mergers in our data.[15] Other minor and practical restrictions are also placed upon the data, such as the merger county containing at least one non-acquired small branch. Select merger summary statistics are contained in Table 3.

[14] See, for example, "Wells Fargo acquires Marquette Bank locations." Milwaukee Business Journal. October 5, 2001.

[15] We are exploring other approaches to handling multi-merger counties. In particular, it is possible that our treatment and control groups suffer from contamination via subsequent mergers. Ongoing robustness tests using only single-merger counties and placebo tests using mergers between two large banking organizations are in-progress to address these concerns.

5 Identification and Empirical Strategy

Our primary objective is to understand the effect of large bank competition on small banks. However, the real economy and the spatial environment in which banks compete are not randomly assigned. To overcome these challenges, we rely on two key features of the banking sector. First, evidence from the banking literature suggests that bank competition is highly localized. For example, Amel and Brevoort (2005) and Brevoort, Holmes, and Wolken (2010) use survey evidence to show that the median distance of small firms to their supplier of credit is three to five miles. Second, large banks frequently expand via mergers. Therefore, a large bank branch is often observed to enter an existing market in a way that does not disrupt the spatial arrangement of the competitors. We use these two features to argue that a large bank acquisition of a medium-sized bank provides a quasi-experimental environment suitable for our analysis.

Our identification strategy hinges on the assumption that when a large bank acquires a medium-sized bank, the merger decision is not predicated on the within-county location of any single branch of the acquired bank. In particular, we assume that medium-sized banks are sufficiently large so that the merger decision is not driven by otherwise unobservable local fundamentals at the sub-county level or selection into a particular sub-county local market.[16] A small bank branch is affected by the merger decision through a change in the composition its competitors. Whereas it had been competing previously with a medium-sized bank branch, it now competes with a large bank branch in the same location with no changes to competition on the external margin.

To see how this identification strategy works in practice, consider the merger of Wells Fargo and Marquette Bank in 2002 referenced earlier. Figure 6 demonstrates the merger at different geographies and its possible effects on small banks in the area. Starting with the bottom map, we first show the extent of the merger. Wells Fargo acquired 59 branches in the

[16]Indeed, large banks can and do engage in organic branch expansion by opening up new branches or buying a single branch from an existing bank. Consequently, the desire to open a branch at a specific location within a county can be achieved by means other than acquisition of a medium-sized bank.

merger with the $6 billion Minnesota-based bank, with notable presences in South Dakota and Iowa, as well. A big cluster of acquired branches were in the Minneapolis region. While a larger presence in each of these markets may have been part of the merger decision, it appears unlikely given the size of the acquisition that local fundamentals for a single branch drove the merger decision.

Moving counterclockwise in Figure 6, we zoom into Scott County. Marquette branches that were acquired by Wells as part of the merger are highlighted in large yellow circles, small banks are represented by medium-sized red circles, and other bank branches (medium and large branches not associated with the merger) are depicted as small blue circles. Our identification strategy focuses on the red circles and compares the outcomes of those "close" to the yellow circle to those further away. In Scott County, Marquette branches were acquired in the towns of Shakopee and Prior Lake, while the towns of New Prague and Belle Plaine saw no entry of Wells Fargo from the merger. In our county-level analysis, we compare the outcomes of small bank branches (red circles) in places like Belle Plaine to those in places like Shakopee before and after the Marquette mergers with Wells Fargo.

Finally, we conduct a zip code level difference-in-differences analysis to assess the competitive effects of large banks on small banks. In particular, the identifying assumption relies upon both the economic fundamentals to be similar across treated and affected small bank branches. In addition, we must assume that the merged out mid-sized bank competes with a small bank on the same terms as does any other mid-sized bank that does not undergo a merger during the period. For example, the merged out branches of Marquette Bank lie closer within Scott County (Shakopee and Prior Lake) to the urban center of the MSA than do other bank branches within the county. To make our assumption that economic environments are comparable between affected and unaffected small bank branches more credible, we extend our analysis to examine within zip code competitive effects. Moving counterclockwise to the top right graph, we demonstrate the concept of our empirical design using a zip code level analysis. Again, the merged out Marquette branch is represented by a large yellow dot and small bank branches are represented by medium red dots. We argue in our empirical design

that within Shakopee, the bank branches on the same block should feel the competitive effects of Wells entry differentially from those on the other side of town. Given the scope of the merger from the bottom map, we argue that it is quasi-random that within Shakopee, MN a bank branch in central Shakopee faced a greater change in its competitive landscape relative to bank branches in west or south Shakopee.

The narrow geography of zip codes is finer than the MSA or county-based measures for banking markets commonly employed in the literature (e.g. Prager and Hannan (1998) and Berger, Demsetz, and Strahan (1999)), but is not without precedent. For example, Garmaise and Moskowitz (2006) argue that the coarser definition of banking markets is based upon data availability more so than the nature of the market itself. Kwast, Starr-McCluer, and Wolken (1997) show that the median distance between small businesses and financial institutions that provide their mortgages is four miles. In addition, Nguyen (2017) shows that the effects of branch closures on the economy dissipate out by eight miles. Meanwhile, the median county is 586 square miles.

Given this framework, we use a variety of different approaches to tease out the effect of large bank competition on small banks. First, we employ a difference-in-differences approach between small bank presence in affected and unaffected zip codes consequent to large bank acquisitions of medium-sized banks. An affected zip code is one in which a large bank enters, while an unaffected zip code is one in which a merger took place within the county but no large bank enters the zip code from that merger. We compare branches in affected zip codes to unaffected zip codes within merger counties. For this analysis, we consider both the future existence and ownership of small bank branches as well as small bank branch deposits. Lastly, we use distances to acquired branches within a merger zip code to evaluate how proximity to a large bank affects small bank branches.

We examine these questions using models that broadly fit the following structure:

$$Y_{ict} = \alpha treated_{ict} + \beta Post_{ict} + \gamma treated_{ict} * Post_{ict} + Controls + \epsilon_{ict} \quad (1)$$

where Y is an outcome measured for small banks. In different regressions, Y represents small bank branches, small bank branch deposit growth or small bank branch rates on deposit and loan products. For banks with only one branch, we can also consider Y as bank variables.

The index i represents a small bank branch in an area or a collection of small bank branches aggregated to a finer geography than the county (e.g., zip code), c represents the geography affected by a qualifying merger, and t is the year. Depending on the specification, controls may include some subset of county macroeconomic variables, county-time fixed effects, and lagged bank level variables. For analysis in which i represents individual bank branches, we can also include bank fixed effects γ_b.

The key variable of interest in this regression is $treated_{ict} * Post_{ict}$. In some specifications, the variable $treated_{ict}$ is binary, taking on a value of one if the large bank acquisition includes a merger in the same zip code as the small bank. In other specifications, $treated_{ict}$ represents an intensity of treatment. Treatment intensity can alternatively be measured using the number of large bank target branches in some proximity to the small bank branch or a distance measure of the small bank branch to the nearest large bank target branch. The variable $Post_{ict}$ takes on the value of one for years after the large bank competitor enters and zero beforehand.

5.1 Dates

One challenge in our identification strategy is to determine the precise date at which the competitive environment changes for small banks. There are at least three relevant dates in this setting. First, there is the announcement date of the merger. At this time, the acquirer exerts no control over the target and cannot direct a change in strategy. However, the target bank and its competitors may begin changing behavior already at this date. For example, loan officers at the target bank may leverage the anticipated change in ownership to attract new clientele that might value the services of the larger bank. At the same time, loan officers of competitors may try to poach the target's clients that prefer the services of a smaller bank.

Behavioral changes may also manifest in branch deposit pricing behavior. The target and competitors may compete for depositors with heterogeneous preferences, while also seeking (or not) funds associated with anticipated changes in loan demand.

A second important date in the merger process is the date of acquisition. Banking organizations, and large banks in particular, are often organized as bank holding companies (BHCs). When banks merge, a BHC typically acquires the target bank as a separate subsidiary before integrating two banks into a single legal entity. Upon acquisition, the BHC has control rights over the operations of all its subsidiaries. Thus, changes resulting from large bank management's strategic decisions could be reasonably expected to occur after this date. However, the banks may neither be fully integrated at this point nor singly branded. Third, there is the merger date, when the two separate banks become one legal entity. At this point, there is a single bank name as the target bank ceases to exist.

Acknowledging the fuzziness of the event date for our study, we employ varying windows over which we measure pre-merger and post-merger activity. The merger dates in our sample all occur in the second-half of the year. Meanwhile, acquisition dates for the mergers in our sample are often in the first-half of the year. Given that the as-of date for the SOD data is June 30, behavioral changes associated with the merger could reasonably occur in the data year preceding the most recent SOD date.[17]

5.2 Results

5.2.1 Deposit Growth at Acquired Branches

Survey evidence reveals that small banks do not view large banks as their competitors.[18] Instead, small bank managers view their banks as operating within a competitive environment composed of regional banks and other small banks. This sentiment is reflected in anecdotal wisdom that acquired branches often experience deposit runoff following acquisition by a large

[17]Spot checking a few of the mergers, it appears that the announcement dates do not extend to the prior SOD year.

[18]See, for example, the Community Banking in the 21st Century National Survey conducted by the Federal Reserve and the Conference of State Bank Supervisors.

institution.

We formally test for statistically significant differences in deposit growth between acquired and non-acquired branches within the same county. Regression analysis supports the contention of decreased deposit growth at acquired branches. Table 4 presents results of regressions of deposit growth on an interaction term capturing acquired branches post-merger, indicator variables for post-merger and acquired branches, and bank assets.[19]

The dependent variable for the regression results is constructed in the pre- and post-periods as the difference between a branch's two-year deposit growth rate from the mean two-year deposit growth rate within the county. (The county mean is calcuated over all branches within that county.) The pre-period growth rate is computed between years $T = -3$ and $T = -1$ while the post-period growth rate is computed between $T = 1$ and $T = 3$. For example, the aforementioned Wells-Marquette merger took place in July, 2002. The pre-period growth rate is computed between 1999 and 2001 and the post-period growth rate is computed between 2003 and 2005.

The columns of Table 4 differ according to whether the natural logarithm of real assets is included as an explanatory variable and whether standard errors are clustured. Clustered standard errors are specified at the year-of-merger level. Since multiple mergers can take place within the same year in a county, this level of clustering is broader than clustering at the merger-level alone. Year fixed effects are included throughout and between-county variation in deposit growth is addressed by constructing the dependent variable in terms of deviations from county means.

The coefficients on the interaction term are negative and statistically significant. The magnitudes imply a treatment effect of 5-7% lower annual deposit growth for acquired branches even after accounting for size. The regression results provide stastitical support for claims that some customers are less inclined to maintain a relationship with a large banking organization. The results suggest some customers view large and medium-sized banks as different but not medium-sized and small banks. These customers do not remain as customers of the

[19]The largest and smallest 0.5% of deposit growth observations are winsorized in the regressions.

now-large bank branch.

5.2.2 Effects of Merger Activity on Small Branches

We now turn our attention to the effects on small branches of big bank acquisitions. Counties are composed of multiple zip codes, and not all zip codes within a county contain a branch acquired by a large bank during a merger. We begin by displaying branch trends (both overall and small) within merger-counties but separated by affected and non-afffected zip codes. Figure 7 depicts these trends in event-time. The large bank acquisition occurs between years $T = 0$ and $T = 1$, denoted with a vertical line. Figure 8 focuses on small branch counts while Figure 9 normalizes branch and small branch counts to their values at the merger-date. While overall branches decline slightly more post-merger in merger zip codes than in non-merger zip codes, small branches decline by less in merger zip codes.

Table 7 presents results from difference-in-differences regressions on the probability that a branch is small. The indepenent variable is an indicator for whether the branch belongs to a banking organization with fewer than $1 billion in real assets. The pre-period and post-period match the scales in the preceding graphics. The results, whether using a linear probability model or a logistic regression, indicate that affected zip codes display an overall lower frequency of small branch observations, but that treatment (exposure to a large bank acquiring a medium-sized bank) is associated with a statistically significant increase in small branch probability.

The results in Table 7 do not include clustering of standard errors. Instead, we collapse observations within zip codes and compute two-year growth rates in small branches in the pre- and post-periods. Table 8 shows that affected zip codes continue to exhibit a positive treatment effect on small branch presence. The results suggest that affected zip codes see approximately 2% higher growth annually in the number of small branches post-merger compared to non-affected zip codes within the same county.

Thus far, the graphics and regression results described above are compatible with multiple explanations for why affected zip codes see greater small branch growth following merger

activity than non-affected zip codes. One possibility is that small branches present at the time of merger display a higher likelihood of remaining in existence following treatment in merger zips than in non-merger zips. Another possiblity is that extant small branches remain small with greater likelihood. Alternatively, it may be that affected zip codes see greater entry and expansion following merger activity compared to non-affected zip codes within the same county. The following three sets of regression results help disentangle these possibilities.

Table 5 considers the subset of small branches present in the merger county at the time of the merger and computes the probabilities these small branches remain in existence in the ensuing years. The logistic regression results show that small branches extant at the time of merger activity are equally likely to remain in existence over the next five years in both affected and non-affected zip codes within the county. Table 6 provide the same conclusion about whether those branches that remain in existence also remain small.

Finally, we turn to the possibility that the relatively greater growth in small branches post-merger in affected zip codes may be due to new entry and expansion of small banks. Figure 10 displays the proportion of small branches that did not exist in the previous year for affected and non-affected zip codes. It appears that merger zip codes see less decline in small bank expansion following merger activity than non-merger zip codes. Table 10 contains the results of tests of this hypothesis at the branch and zip code level. The dependent variable in the first column is an indicator taking the value of 1 if a branch is small and new in the current year and a value of 0 if a branch is small but not new in the current year.

The dependent variable in the zip code analysis – the second column – sums the total number of new small branches within the zip code between years $T = -3$ to $T = -1$ and $T = 1$ to $T = 3$ and divides these sums by the number of small branches in the zip code at the time of the merger. The results indicate that small branches are more likely to be new post-treatment in affected zip codes compared to non-affected zip codes and that affected zip codes see more small branch expansion post-merger than non-affected zip codes. In a study of merger and acquisition activity in metropolitan markets, Berger, Bonime, Goldberg, and White (2004) find that bank merger activity is associated with increased entry in the relevant

markets.

In combination, the results of Tables 5, 6 and 10 are supportive of small branch expansion accounting for the positive treatment effect in affected zip codes relative to non-affected zip codes seen in Tables 7 and 8.

Our analysis of the effects of merger activity on small branches has, thus far, focused on branch existence. We now turn to whether small branches in affected zip codes display different rates of deposit growth compared to their counterparts in non-affected zip codes. While it appears that merger activity is conferring benefits upon small banks that were previously competing with an acquired medium-sized bank, the greater levels of small branch expansion into these same areas post-merger give reason to expect small branches to not display greater deposit growth in affected zip codes. Indeed, Table 9 reports such results. As in previous regressions, the dependent variable is the county de-meaned two-year deposit growth rate computed between $T = -3$ to $T = -1$ and $T = 1$ to $T = 3$. (The county mean for these regressions is computed using only small branches.) The results show no statistically significant difference in branch deposit growth rates following merger activity.

5.2.3 Distance to Acquired Branch as Exogenous Variation

Small branches exposed to merger activity by being co-located within an affected zip code differ according to their distance to the nearest acquired branch. We calculate the distance in miles between an exposed small branch and all acquired branches within the same zip code and compare deposit growth rates for banks closer and further from an acquired branch within their zip code.

Our subsample for this analysis is composed of exposed branches within merger zip codes. The results of several regression tests are reported in Table 11. There are two sets of three columns each that differ according to the construction of distance measures. The columns within each set vary the minimum number of exposed branches within a zip code required for inclusion in the analysis. The results consistently indicate that exposed small branches closer to an acquired branch within their zip code do not display higher deposit growth rates

compared to exposed small branches located further away. Table 11 employs year-over-year winsorized deposit growth as the dependent variable, but the results are the same when considering two-year growth rates constructed between $T = -3$ to $T = -1$ and $T = 1$ to $T = 3$. (These results are not reported here.)

These results are consistent with our earlier findings. We see evidence of large bank merger activity improving the competitive landscape for exposed small branches. We also see evidence, supported by economic theory, that if there is any improvement in conditions, the improvement is temporary as small banks expand into the areas offereing a better market outlook. In light of these dynamics, it is expected that we would see no greater deposit growth for closer small branches compared to those located further from the merger activity but still within the same zip code.

6 Conclusion

This paper studies the competitive effect of large bank merger activity on small branches at differing geographic levels. We find that altered competition through large bank acquisitions of intermediate-sized banks has generally positive effects on the branch vitality of nearby small banks. At the broadest geographic level, large bank merger activity often occurs in MSAs, which display stronger economic and demographic growth than non-MSAs. Small branches, however, appear to fare worse in MSAs relative to their counterparts in non-MSAs. This suggests a possible connection between large bank expansion and small branch declines in number and deposit growth. We do not find evidence of a robust negative channel between large bank merger activity and small bank vitality. Indeed, comparing the performance of small banks within counties experiencing a qualifying merger but separately identifying exposed small branches by whether the merger included an acquired branch within their zip code suggests that the large bank acquisition is not associated with slower deposit growth overall for small branches in merger zip codes, nor is it associated with decreased likelihood of branch existence. While the acquired branches display lower rates of deposit growth than

competing branches, nearby small branches do not display different rates of deposit growth between non-merger and merger zip codes. Narrowing our geographic focus further, we do not find that exposed small branches within a zip code that are closer to an acquired branch display different deposit growth rates than those further away. Squaring these findings, we display evidence of greater small bank expansion into affected zip codes post-merger compared to non-affected zip codes within the same county. These findings are consistent with both robust survey evidence of bank managers about how they view their competition as well as economic theory and previous findings in the literature.

References

Akkus, O. J., A. Cookson, and A. Hortacsu (2015): "The determinants of bank mergers: A revealed preference analysis," *Management Science*, 62(8), 2241–2258.

Amel, D., and K. P. Brevoort (2005): "The perceived size of small business banking markets," *Journal of Competition Law and Economics*, 1(4), 771–784.

Amel, D., and R. A. Prager (2016): "Community Bank Performance: How Important are Managers?," *Review of Industrial Organization*, 48(2), 149–180.

Avraham, D., P. Selvaggi, and J. I. Vickery (2012): "A Structural View of U.S. Bank Holding Companies," *FRBNY Economic Policy Review*, 18(2), 68–81.

Basker, E. (2005): "Job Creation or Destruction? Labor Market Effects of Wal-Mart Expansion," *Review of Economics and Statistics*, 87(1), 174–183.

Berger, Allen N., A. A. D. L. G. G., and L. J. White (2007): "Competition from large, multimarket firms and the performance of small, singleâĂŘmarket firms: Evidence from the banking industry," *Journal of Money, Credit and Banking*, 39(2-3), 331–368.

Berger, A. N., S. D. Bonime, L. G. Goldberg, and L. J. White (2004): "The

dynamics of market entry: The effects of mergers and acquisitions on entry in the banking industry," *Journal of Business*, 77(4), 797–834.

Berger, A. N., R. S. Demsetz, and P. E. Strahan (1999): "The consolidation of the financialservices industry: Causes, consequences, and implications for the future," *Journal of Banking and Finance*, 23, 135–194.

Berger, A. N., N. H. Miller, M. A. Petersen, R. G. Rajan, and J. C. Stein (2005): "Does function follow organizational form? Evidence from the lending practices of large and small banks," *Journal of Financial Economics*, 76(2), 383–400.

Berger, A. N., and G. F. Udell (2002): "Small business credit availability and relationship lending: The importance of bank organisational structure.," *The Economic Journal*, 112(477).

Boot, A. W. (2000): "Relationship Banking: What Do We Know?," *Journal of Financial Intermediation*, 9, 7–25.

Brevoort, K. P., J. A. Holmes, and J. D. Wolken (2010): "Distance Still Matters: The Information Revolution in Small Business Lending and the Persistent Role of Location 1993-2003," *Finance and Economics Discussion Series*.

Carey, M., M. Post, and S. A. Sharpe (1998): "Does corporate lending by banks and finance companies differ? Evidence on specialization in private debt contracting," *Journal of Finance*, 53(3), 845–877.

Carter, D. A., and J. E. McNulty (2005): "Deregulation, technological change, and the business-lending performance of large and small banks," *Journal of Banking and Finance*, 29(5), 1113–1130.

Carter, D. A., J. E. McNulty, and J. A. Verbrugge (2004): "Do small banks have an advantage in lending? An examination of risk-adjusted yields on business loans at large and small banks," *Journal of Financial Services Research*, 25(2–3), 233–252.

Chakraborty, A., and C. X. Hu (2006): "Lending relationships in line-of-credit and nonline-of-credit loans: Evidence from collateral use in small business," *Journal of Financial Intermediation*, 15(1), 86–107.

Critchfield, T., T. Davis, L. Davison, H. Gratton, G. Hanc, and K. Samolyk (2004): "Community Banks: Their Recent Past, Current Performance, and Future Prospects," *FDIC Banking Review*, 16(3), 1–56.

DeYoung, R., S. Frame, D. Glennon, and P. Nigro (????): "The information revolution and small business lending: The missing evidence," *Journal of Financial Services Research*, 39(1–2).

DeYoung, R., W. C. Hunter, and G. F. Udell (2002): "Whither the community bank? Relationship finance in the information age," *Chicago Fed Letter*, 178, 1–3.

——— (2004): "The past, present, and probable future for community banks," *Journal of Financial Services Research*, 25(2–3), 85–133.

Garmaise, M. J., and T. J. Moskowitz (2006): "Bank Mergers and Crime: The Real and SocialEffects of Credit Market Competition," *Journal of Finance*, 61(2), 495–538.

Hannan, T. H., and R. A. Prager (2004): "The competitive implications of multimarket bank branching," *Journal of Banking & Finance*, 28(8), 1889–1914.

Hauswald, R., and R. Marquez (2006): "Competition and strategic information acquisition in credit markets," *The Review of Financial Studies*, 19(3), 967–1000.

Jagtiani, J., and C. Lemieux (2016): "Lending relationships in line-of-credit and nonline-of-credit loans: Evidence from collateral use in small business," *FRB of Philadelphia Working Paper*, 16(8), 639–670.

Jia, P. (2008): "What happens when Wal-Mart comes to town: An empirical analysis of the discount retailing industry," *Econometrica*, 76(6), 1263–1316.

Kwast, M. L., M. Starr-McCluer, and J. D. Wolken (1997): "Market definition and theanalysis of antitrust in banking," *Antitrust Bulletin*, 42, 973–995.

Neumark, D., B. Wall, and J. Zhang (2011): "Do small businesses create more jobs? New evidence for the United States from the National Establishment Time Series," *The Review of Economics and Statistics*, 93(1), 16–29.

Nguyen, H.-L. Q. (2017): "Are credit markets still local? Evidence from bank branch closings," Haas School of Business, University of California at Berkeley.

Nichols, R. (2016): "Yes, community banks are struggling under Dodd-Frank," *Politico*.

Park, K., and G. Pennacchi (2008): "Harming depositors and helping borrowers: The disparate impact of bank consolidation," *The Review of Financial Studies*, 22(1), 1–40.

Peirce, H., I. C. Robinson, and T. Stratmann (2014): "How are small banks faring under Dodd-Frank?," *Mercatus Center Working Paper*, 14(5), 1–105.

Petersen, M. A., and R. G. Rajan (1994): "The benefits of lending relationships: Evidence from small business data," *The Journal of Finance*, 49(1), 3–37.

——— (1995): "The effect of credit market competition on lending relationships," *The Quarterly Journal of Economics*, 110(2), 407–443.

Prager, R. A., and T. Hannan (1998): "Do substantial horizontal mergers generate significant price effects? Evidence from the banking industry," *Journal of Industrial Economics*, 46, 433–452.

Presbitero, A. F., and A. Zazzaro (2011): "Competition and relationship lending: Friends or foes?," *Journal of Financial Intermediation*, 20(3), 387–413.

Sorkin, A. R. (2016): "One Thing Both Parties Want: To Break Up the Banks Again," *The New York Times*.

Udell, G. F. (1989): "Loan quality, commercial loan review, and loan officer contracting," *Journal of Banking and Finance*, 13(3), 367–382.

Yafeh, Y., and O. Yosha (2001): "Industrial organization of financial systems and strategic use of relationship banking," *Review of Finance*, 5(1–2), 63–78.

Table 1: Eligible Mergers

Year	Acquired Bank	Acquiring Bank
1993	MERITOR SAVINGS BANK FA	FIRST UNION NB OF FL
1993	CCNB BANK NA	PITTSBURGH NB
1993	INB BANKING CO	NBD BANK NATIONAL ASSN
1993	NBD BANK NATIONAL ASSN	INB NATIONAL BANK
1993	HOMEFED BANK	GREAT WESTERN BANK
1993	CITIZENS&PPL NB PENSACOL	BARNETT BANK OF WEST FL
1993	CALIFORNIA REPUBLIC BANK	FIRST INTERSTATE BK OF CA
1993	PEOPLES WESTCHESTER SB	FIRST FIDELITY BANK
1994	LIBERTY BANK	BANK OF AMERICA FSB
1994	BANCFLORIDA A FSB	FIRST UNION NB OF FL
1994	STERLING BANK	FLEET BANK OF MA NA
1994	COMMERCE BK CHARLESTON	HUNTINGTON NB WV
1994	MID-HUDSON SAVINGS	FIRST FIDELITY BANK NA NY
1994	PIONEER FINL A COOP BK	FIRST NB OF BOSTON
1994	HOLLYWOOD FSB	FIRST UNION NB OF FL
1994	WESTERN FEDERAL SAVINGS	HOME SAVINGS OF AM FSB
1994	STATE HOME SAVINGS BANK	SOCIETY NATIONAL BANK
1994	CITIZENS FIRST NB OF NJ	NAT WESTMINSTER BK NJ
1994	SACRAMENTO SAVINGS BANK	FIRST INTERSTATE BK OF CA
1994	CHELTENHAM BANK	CORESTATES BANK NA
1994	LEHIGH VALLEY BANK	CORESTATES BANK NA
1994	BUCKS COUNTY B&T CO	CORESTATES BANK NA
1994	GERMANTOWN SAVINGS BANK	CORESTATES BANK NA
1995	DEERFIELD FS&LA	NBD BANK
1995	AMERICAN SVG OF FLORIDA	FIRST UNION NB OF FL
1995	OMNIBANK SOUTHEAST	KEY BANK OF COLORADO
1995	CHEMICAL BANK NJ NA	PNC BANK NEW JERSEY NA
1995	COLUMBIA FIRST BANK A	FIRST UNION NB OF VA
1995	LIBERTY NB OF NORTHERN KY	BANK ONE CINCINNATI NA
1995	INTERCONTINENTAL BANK	NATIONSBANK OF FL
1995	SHAWMUT BANK NH	FLEET BANK-NH
1996	CHASE MANHATTAN BANK NA	CHEMICAL BANK
1996	CHASE FEDERAL BANK A FSB	NATIONSBANK NA SOUTH
1996	CHARTER NB HOUSTON	NATIONSBANK OF TX NA
1996	DELAWARE TRUST CO	CORESTATES BANK NA
1996	FIRST INTERSTATE BK OF AZ NA	WELLS FARGO BANK NA
1996	BANK IV NATIONAL ASSN	BOATMENS BANK OF KS
1996	CENTERBANK	FIRST FIDELITY BANK
1997	ROOSEVELT BANK	MERC BK OF PLATTSBURG
1997	BOATMENS BANK OF SO MO	NATIONSBANK NA
1997	BOATMENS NB OF OK	NATIONSBANK NA
1997	MARK TWAIN KC BANK	MERC BANK OF TOPEKA
1997	UNITED STATES NB OF OR	FIRST NB OF E GR FORKS
1997	BOATMENS NB OF AR	NATIONSBANK NA
1997	SUNWEST BK OF ALBQ NA	NATIONSBANK NA
1997	BOATMENS BANK IOWA NA	NATIONSBANK NA
1997	UNITED CAROLINA BANK	BB&T CO
1997	UNITED CAROLINA BK OF SC	BB&T CO OF SC
1997	FMB-FIRST MICHIGAN	HUNTINGTON NB
1997	FMB-FIRST MICHIGAN	HUNTINGTON NB
1997	GREAT WESTERN BANK	AM SAVINGS BANK FA
1997	CENTRAL BANK&TRUST	NORWEST BANK TX NA
1997	BOATMENS BANK OF TN	NATIONSBANK OF TN NA
1997	SIGNET BANK	FIRST UNION NB OF NC
1997	LIBERTY B&T CO OF TULSA	BANK ONE TRUST CO NA
1998	1ST UNITED BANK	WACHOVIA BANK NA
1998	SUNWEST BANK OF EL PASO	NATIONSBANK NA
1998	PALMETTO FSB OF SC	REGIONS BANK
1998	FEDERAL SAVINGS BANK	REGIONS BANK
1998	CITIZENS FED BK FSB A FSB	FIFTH THIRD B OF W OH
1998	LIFE SAVINGS BANK FSB	BB&T CO OF VA
1998	GLENDALE FEDERAL BANK	CALIFORNIA FED BK A FSB
1998	CENTRAL BANK	MERCANTILE BANK NA
1998	HOME SAVINGS OF AM FSB	WASHINGTON MUTUAL
1998	BARNETT BANK NA	NATIONSBANK NA
1998	MIDAMERICA BANK	NORWEST BANK MN NA
1998	FIRST COMMERCIAL BANK	REGIONS BANK
1998	FIRST STATE BANK	NORWEST BANK TEXAS NA
1998	MARYLAND FEDERAL BANK	BB&T CO
1998	CITY NB OF BATON ROUGE	BANK ONE TRUST CO NA
1998	FIRST NB OF LAFAYETTE	BANK ONE LA NA
1998	FIRST NB OF LAKE CHARLES	BANK ONE LA NA
1998	FIRST NB OF COMMERCE	BANK ONE LA NA
1998	RAPIDES B&T CO	BANK ONE LA NA
1998	CENTRAL BANK	BANK ONE LA NA
1998	FORT WAYNE NB	NAT CITY BANK OF IN
1998	VALLEY AMERICAN B&T CO	NAT CITY BANK OF IN
1998	BANK OF NEW MEXICO	NORWEST BANK NM NA
1998	BANK OF ARIZONA	NORWEST BANK AZ NA
1998	ALBANK FSB	CHARTER ONE BANK FSB

Table 2: Eligible Mergers (cont.)

Year	Acquired Bank	Acquiring Bank
1999	SOUTHERN CALIFORNIA BANK	U S BANK NA
1999	SANTA MONICA BANK	U S BANK NA
1999	FIRST AMERICAN NA	AMSOUTH BANK
1999	REPUBLIC NB OF NEW YORK	MARINE MIDLAND BANK
2000	PREMIER BANK	BB&TRUST CO
2000	MERCANTILE BANK NA	FIRSTAR BANK NA
2000	KEYSTONE FINANCIAL	M&T TR CO
2000	SCRIPPS BANK	U S BANK NA
2000	ONE VALLEY	BB&TRUST CO
2000	ONE VALLEY EAST NA	BB&TRUST CO
2000	ONE VALLEY SOUTH INC	BB&TRUST CO
2000	ONE VALLEY BANK INC	BB&TRUST CO
2000	ONE VALLEY CENTRAL VA N	BB&T CO OF VIRGINIA
2000	AMERIBANK	CIVITAS BANK
2000	FIRST SECURITY BK OF CA N A	WELLS FARGO BANK NA
2001	LIBERTY FEDERAL BANK	CHARTER ONE BANK FSB
2001	BANKFIRST	BB&TRUST CO
2001	EUROPEAN AMERICAN BANK	CITIBANK N A
2001	CENIT BANK	SOUTHTRUST BANK
2001	U S BANK NATIONAL ASSN	FIRSTAR BANK NA
2001	REPUBLIC SECURITY BANK	WACHOVIA BANK NA
2001	FIRST FEDERAL BANK	BB&T CO OF SC
2001	IMPERIAL BANK	COMERICA BANK-CA
2001	COMMERCE BANK	SOUTHTRUST BANK
2001	FIFTH THIRD BANK SW FSB	OLD KENT BANK NA
2002	AREA BANK	BB&TRUST CO
2002	MARQUETTE BANK NA	WELLS FARGO MN NA
2002	BANK OF LOUISVILLE	BB&TRUST CO
2002	MEDFORD SAVINGS BANK	CITIZENS BANK OF MA
2002	FIRST SOUTH BANK	BB&TRUST CO
2003	ADVANCE BANK	CHARTER ONE BANK NA
2003	CAMBRIDGEPORT BANK	CITIZENS BANK OF MA
2003	FIRST VA BANK BLUE RIDGE	BB&TRUST CO OF VA
2003	FIRST VA BANK HAMPTON	BB&TRUST CO OF VA
2003	FIRST VANTAGE BK TRI-CIT	BB&TRUST CO OF VA
2003	FIRST VIRGINIA BANK	BB&TRUST CO OF VA
2003	FIRST VA BANK COLONIAL	BB&TRUST CO OF VA
2003	FIRST VA BANK-SOUTHWEST	BB&TRUST CO OF VA
2003	FARMERS BANK OF MD	BB&TRUST CO
2003	ATLANTIC BANK	BB&TRUST CO
2004	COMPASS BANK FOR SAVINGS	SOVEREIGN BANK
2004	ALLEGIANT BANK	NAT CITY BANK OF MI IL
2004	QUAKER CITY BANK	BANCO POPULAR NA
2004	JACKSON FEDERAL BANK	UNION BANK OF CA
2004	EVERTRUST BANK	KEYBANK NA
2004	BANK ONE NATIONAL ASSN	JPMORGAN CHASE BANK
2004	BANK ONE NATIONAL ASSN	JPMORGAN CHASE BANK
2004	COMMUNITY FIRST NB	BANK OF THE WEST
2004	SAVINGS B&T	NATIONAL CITY BANK
2004	WAYNE NB OF WOOSTER	NATIONAL CITY BANK
2005	FIRST COMMUNITY BANK	WELLS FARGO BANK NA
2005	COMMERCIAL FED BK A FSB	BANK OF THE WEST
2006	SOUND FEDERAL SAVINGS	HUDSON CITY SAVINGS
2006	PIONEER B&T CO	NATIONAL CITY BANK
2006	MERCANTILE NB OF IN	HARRIS NATIONAL ASSN
2006	INDEPENDENCE COMM BK	SOVEREIGN BANK
2006	WESTSTAR BANK	U S BANK NA
2006	MAIN STREET BANK	BB&TRUST CO
2006	COMMERCIAL CAPITAL	WASHINGTON MUTUAL
2006	AMSOUTH BANK	REGIONS BANK
2007	NORTH FORK BANK	CAPITAL ONE NA
2007	COASTAL FEDERAL BANK	BB&TRUST CO
2007	FARMERS&MECHANICS	PNC BANK NA
2007	CITIZENS NATIONAL BANK	PNC BANK NA
2007	MERCANTILE E SHORE	PNC BANK NA
2007	MERCANTILE PENINSULA	PNC BANK NA
2007	ANNAPOLIS B&T CO	PNC BANK NA
2007	WESTMINSTER UNION	PNC BANK NA
2007	MERCANTILE COUNTY	PNC BANK NA
2007	MERCANTILE SO MD BANK	PNC BANK NA
2007	MERCANTILE-SAFE DEP&TR	PNC BANK NA
2007	SKY BANK	HUNTINGTON NA
2007	PLACER SIERRA BANK	WELLS FARGO BANK NA
2007	SYNERGY BANK	NY COMMUNITY BANK
2007	R-G CROWN BANK	FIFTH THIRD BANK NA
2007	PARTNERS TRUST BANK	M&T TR CO
2008	BLC BANK N A	PNC BANK NA
2008	LINCOLN STATE BANK	HARRIS NA
2008	WASHINGTON MUTUAL FSB	JPMORGAN CHASE BANK
2008	LASALLE BANK NA	BANK OF AMERICA NA
2008	LASALLE BANK MIDWEST NA	BANK OF AMERICA NA
2009	CHEVY CHASE BANK FSB	CAPITAL ONE NA
2009	MERRILL LYNCH B&T CO	BANK OF AMERICA NA
2009	NATIONAL CITY BANK	PNC BANK NA
2010	CAROLINA FIRST BANK	TD BANK NA
2011	MARSHALL&ILSLEY BANK	HARRIS NA
2011	STERLING BANK	COMERICA BANK
2012	BANKATLANTIC	BB&TRUST CO
2012	SANTA BARBARA B&T NA	UNION BANK NA
2015	SUSQUEHANNA BANK	BB&TRUST CO
2015	HUDSON CITY SAVINGS	M&T TR CO

Table 3: Merger Summary Statistics

	Acquired					Acquiring		
Year	Bank	Cert	Branches	Counties	BHC (mil.)	Bank	Cert	Combined BHC (mil.)
1993	HOMEFED	33628	17	5	6,983	GREAT WESTERN	29602	77,485
1993	CITIZENS & PEOPLES	3585	8	2	2,623	BARNETT BANK	144	57,271
1993	PEOPLES WESTCHESTER	16044	31	1	1,529	FIRST FIDELITY	33601	58,955
1994	STERLING BANK	90292	11	1	1,127	FLEET BANK	26305	70,099
1994	PIONEER	27459	15	3	4,367	FIRST NB OF BOSTON	2558	66,509
1994	SACRAMENTO SAVINGS	30678	13	5	4,046	FIRST INTSTATE BK OF CA	1226	86,935
1995	COLUMBIA FIRST	28093	1	1	5,591	FIRST UNION NB OF VA	6904	197,246
1996	CENTERBANK	18262	45	5	45,394	FIRST FIDELITY	9230	209,308
1997	US NB OF OREGON	2916	581	127	16,218	FIRST NB OF E G FORKS	5134	96,976
1997	SIGNET	11589	171	38	10,284	FIRST UNION	4885	309,091
1998	FEDERAL SAVINGS	28910	14	3	10,284	REGIONS	12368	53,789
1998	FIRST COMMERCIAL	13739	27	3	28,301	REGIONS	12368	53,789
1999	FIRST AMERICAN	4956	305	82	8,129	AMSOUTH	26800	55,775
2000	ONE VALLEY B	840	22	5	8,129	BB&T	9846	85,764
2000	ONE VALLEY B-EAST	6775	8	3	8,129	BB&T	9846	85,764
2000	ONE VALLEY B-SOUTH	9027	11	5	8,129	BB&T	9846	85,764
2000	ONE VALLEY BANK	12658	18	5	8,129	BB&T	9846	85,764
2000	ONE VALLEY B-CNTR VA	27639	28	15	28,937	BB & T CO OF VA	22584	85,764
2000	FIRST SECURITY CA	23496	1	1	1,789	WELLS FARGO	3511	358,213
2003	CAMBRIDGEPORT	90172	4	1	13,049	CITIZENS	18562	98,057
2003	FIRST VA BANK BLUE RIDGE	6134	15	8	13,049	BB & T CO OF VA	22584	122,079
2003	FIRST VA B HAMPTON	6141	15	9	13,049	BB & T CO OF VA	22584	122,079
2003	FIRST VANTAGE BK TRI-C	9982	8	3	13,049	BB & T CO OF VA	22584	122,079
2003	FIRST VIRGINIA BANK	17092	14	7	13,049	BB & T CO OF VA	22584	122,079
2003	FIRST VA BANK COLONIAL	20450	5	3	13,049	BB & T CO OF VA	22584	122,079
2003	FIRST VA BANK-SOUTHWEST	20877	29	10	13,049	BB & T CO OF VA	22584	122,079
2003	FARMERS BANK OF MD	4821	10	7	13,049	BB&T	9846	122,079
2003	ATLANTIC	21641	13	5	6,120	BB&T	9846	122,079
2004	COMPASS	23291	33	4	6,352	SOVEREIGN	29950	68,893
2004	COMMUNITY FIRST	3924	148	94	21,049	BANK OF THE WEST	3514	60,771
2006	INDEPENDENCE	16018	104	13	17,391	SOVEREIGN	29950	97,727
2007	SKY	5982	268	54	45,869	HUNTINGTON	6560	57,373
2010	CAROLINA FIRST	26849	151	49	11,577	TD BANK	18409	192,337
2011	MARSHALL & ILSLEY	1020	269	73	44,750	HARRIS NATIONAL	16571	89,284
2011	STERLING	21726	48	8	4,885	COMERICA	983	60,482
2012	BANK ATLANTIC	30559	3	1	3,617	BB&T	9846	168,970
2012	SANTA BARBARA	18169	11	4	5,586	UNION BANK	22826	96,827
2015	SUSQUEHANNA	7579	212	32	16,918	BB&T	9846	198,347
2015	HUDSON CITY	13074	41	13	32,347	M & T	588	114,550

Source: Summary of Deposits, Merger Transactions Database, Call Reports

Table 4: Branch Deposit Growth for Acquired and Non-Acquired Branches: The table regresses growth rates for acquired and non-acquired branches in counties affected by a qualifying merger for the cumulative two year periods around the merger (excluding data from the year of the merger). Post is a binary variable equal to one after the qualifying merger in the county (and zero otherwise). Acquired is a binary variable equal to one if the branch is acquired in the course of the merger (and zero otherwise). Interaction is the product of post and acquired.

	(1)	(2)	(3)
VARIABLES	Dep. Growth	Dep. Growth	Dep. Growth
interaction	-0.145***	-0.107***	-0.107*
	(0.0378)	(0.0378)	(0.0582)
acquired	-0.0639**	-0.0612**	-0.0612
	(0.0261)	(0.0261)	(0.0563)
post	0.00635	0.00786	0.00786
	(0.0119)	(0.0118)	(0.00553)
lnrasset		-0.0216***	-0.0216***
		(0.00160)	(0.00347)
Constant	0.00122	0.354***	0.354***
	(0.0241)	(0.0355)	(0.0559)
Observations	73,725	73,725	73,725
R-squared	0.001	0.003	0.003
Unit of Analysis	Branch	Branch	Branch
Model	Linear	Linear	Linear
Year FE	YES	YES	YES
Cluster			Merger year

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Survival of Small Bank Branches: This table presents logistic regressions of small bank branch survival for one, two, three, four, and five year periods after a qualifying merger in their county. The sample includes all small bank branches in existence in an affected county at the time of a qualifying merger. The left hand side variable is a binary variable equal to one if a branch is in existence t periods following the qualifying merger and zero otherwise. $Affected_zip$ is a binary variable equal to one if a branch is in a zip code in which a large bank entered as a result of the merger and zero otherwise.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	1 yr	2 yr	3 yr	4 yr	5 yr
$affected_zip$	-0.191	-0.153	-0.0685	0.0247	0.0542
	(0.127)	(0.104)	(0.0876)	(0.0783)	(0.0721)
Constant	2.051***	1.700***	1.481***	1.125***	1.000***
	(0.114)	(0.100)	(0.0932)	(0.0843)	(0.0818)
Observations	9,763	9,063	9,063	9,063	9,021
Unit of Analysis	Branch	Branch	Branch	Branch	Branch
Model	Logit	Logit	Logit	Logit	Logit
Year FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Survival of Branch as a Small Bank Branch: This table presents logistic regressions of bank branch survival as part of a small bank for one, two, three, four, and five year periods after a qualifying merger in their county. The sample includes all small bank branches in existence in an affected county at the time of a qualifying merger. The left hand side variable is a binary variable equal to one if a branch is in existence and part of a small bank t periods following the qualifying merger and zero otherwise. $Affected_zip$ is a binary variable equal to one if a branch is in a zip code in which a large bank entered as a result of the merger and zero otherwise.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	1 yr	2 yr	3 yr	4 yr	5 yr
$affected_zip$	-0.0212	-0.0466	-0.0405	-0.0226	-0.121**
	(0.0951)	(0.0775)	(0.0707)	(0.0625)	(0.0593)
Constant	3.933***	3.214***	2.376***	1.328***	0.966***
	(0.280)	(0.204)	(0.144)	(0.102)	(0.0946)
Observations	9,422	8,548	8,335	8,113	7,888
Unit of Analysis	Branch	Branch	Branch	Branch	Branch
Model	Logit	Logit	Logit	Logit	Logit
Year FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Difference-in-Differences on the Propensity of Small Banks: This table presents a difference-in-differences analysis of the propensity of small bank branches surrounding a qualifying merger in their county in time t. The sample includes all bank branches in an affected county for the five years preceding and following a qualifying merger. The left hand side is a binary variable equal to one if the branch is held by a small bank and zero otherwise. The pre-period is defined as the years $t-5$ through $t-1$. The post-period is defined as the years $t+1$ through $t+5$. The variable post is equal to one if the period is in the post period and zero if it is during the pre-period. $Affected_zip$ is a binary variable equal to one if a branch in the zip code is acquired as part of the qualifying merger and zero otherwise. Interaction is the product of $affected_zip$ and post.

VARIABLES	(1) Sm Branch	(2) Sm Branch	(3) Sm Branch
interaction	0.0139***	0.00741***	0.0607***
	(0.00250)	(0.00258)	(0.0156)
$affected_zip$	-0.0641***	-0.0608***	-0.101***
	(0.00196)	(0.00198)	(0.0108)
post	-0.0282***	0.00145	-0.0563***
	(0.00160)	(0.00322)	(0.0106)
Constant	0.267***	0.352***	-0.844***
	(0.00116)	(0.00914)	(0.0396)
Observations	415,512	415,512	415,512
R-squared	0.004	0.005	
Number of stcntybr	704	704	
Unit of Analysis	Branch	Branch	Branch
Model	Linear	Linear	Logit
Year FE	NO	YES	YES
County FE	YES	YES	NO

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Difference-in-Differences on Small Bank Branch Growth: This table presents a difference-in-differences analysis of small bank branch growth surrounding a qualifying merger in their county in time t. The sample includes all zip codes in an affected county. The left hand side is the zip code level growth of small bank branches for the two year periods before ($t-3$ to $t-1$) and after ($t+1$ to $t+2$) the merger. The variable post is equal to one if the period is in the post period and zero if it is during the pre-period. $Affected_zip$ is a binary variable equal to one if a branch in the zip code is acquired as part of the qualifying merger and zero otherwise. Interaction is the product of $affected_zip$ and post.

	(1)	(2)
VARIABLES	Sm Branch Gr	Sm Branch Gr
interaction	0.0483***	0.0462***
	(0.0165)	(0.0164)
$affected_zip$	0.000440	-0.0124
	(0.0114)	(0.0121)
post	-0.0152	0.105
	(0.0106)	(0.347)
Constant	1.066***	0.872*
	(0.0186)	(0.482)
Observations	8,556	8,556
R-squared	0.025	0.014
Unit of Analysis	Zip Code	Zip Code
Model	Linear	Linear
Year FE	YES	YES
County FE	NO	YES
Number of stcntybr	671	671

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Difference-in-Differences on Small Bank Branch Deposit Growth: This table presents a difference-in-differences analysis of small bank branch deposit growth surrounding a qualifying merger in their county in time t. The sample includes all small bank branches in an affected county in existence at time t. The left hand side is branch deposit growth rates relative to the county mean over the two year periods before ($t-3$ to $t-1$) and after ($t+1$ to $t+2$) the merger, winsorized at the 1% level. The variable post is equal to one if the period is in the post period and zero if it is during the pre-period. $Affected_zip$ is a binary variable equal to one if a branch in the zip code is acquired as part of the qualifying merger and zero otherwise. Interaction is the product of $affected_zip$ and post.

	(1)	(2)
VARIABLES	Dep. Growth	Dep. Growth
interaction	-0.0187	-0.0187
	(0.0312)	(0.0154)
$affected_zip$	0.00352	0.00352
	(0.0223)	(0.0197)
post	0.00637	0.00637
	(0.0224)	(0.00659)
Constant	-0.000221	-0.000221
	(0.0377)	(0.00124)
Observations	15,884	15,884
R-squared	0.000	0.000
Unit of Analysis	Branch	Branch
Model	Linear	Linear
Year FE	YES	YES
Cluster	-	Merger year

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Difference-in-Differences on New Small Bank Branches: This table presents a difference-in-differences analysis of new small bank branches surrounding a qualifying merger in their county in time t. The variable post is equal to one if the year is greater than t and zero if it is less than t. $Affected_zip$ is a binary variable equal to one if the zip code contains a branch acquired as part of the qualifying merger and zero otherwise. Interaction is the product of $affected_zip$ and post. The sample for Column (1) includes all small bank branches in an affected county from $t-3$ to $t+3$, leaving out the merger year t. The left hand side of Column (1) is a binary variable taking on the value one if the small bank branch is a new branch that year and zero otherwise. The sample for Column (2) is all zip codes in an affected county in an affected county from $t-3$ to $t+3$, leaving out the merger year t. The left hand side of Column (2) is the number of new small bank branches for a given year, scaled by the total number of small bank branches at time t.

	(1)	(2)
VARIABLES	New Sm Branch	Sm Br Ent
interaction	0.193***	0.0550**
	(0.0714)	(0.0256)
post	-0.156***	-0.121***
	(0.0508)	(0.0252)
$affected_zip$	0.114**	0.0398***
	(0.0485)	(0.0131)
Constant	-2.376***	-0.0226
	(0.122)	(0.0594)
Observations	57,751	9,469
R-squared		0.028
Unit of Analysis	Branch	Zip Code
Model	Logit	Linear
Year FE	YES	YES
County FE	NO	YES
Cluster		Merger year
Number of Counties		663

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Difference-in-Differences of Small Bank Branch Deposit Growth Within Merger Zip Codes: This table presents a difference-in-differences analysis of small bank branch deposit growth surrounding a qualifying merger in their zip code in time t. The variable post is equal to one if the year is greater than t and zero if it is less than t. The sample for Column (1) includes all small bank branches in an affected zip code from $t-3$ to $t+3$, leaving out the merger year t. The left hand side is year on year deposit growth. Columns (1), (2) and (3) use Lnmiles as a variable equal to the log distance plus one of miles to the nearest acquired branch with the interpretation that smaller values are more affected by large bank competition. In those columns, interaction reflects the product of post and Lnmiles. Columns (4), (5), and (6) use the variable close, which is a binary variable equal to one if the small bank branch is the closest branch in the zip code to the acquired branch and zero otherwise. In these columns, interaction represents the product of close and post. Minimum exposed branches is the minimum number of small bank branches required in the zip code for the specification.

VARIABLES	(1) Dep Gr	(2) Dep Gr	(3) Dep Gr	(4) Dep Gr	(5) Dep Gr	(6) Dep Gr
interaction	0.00224	0.0356	0.0483	-0.00351	0.0112	0.00596
	(0.0301)	(0.0390)	(0.0610)	(0.0145)	(0.0178)	(0.0614)
lnmiles	-0.00827	-0.0417	-0.0426			
	(0.0315)	(0.0306)	(0.0605)			
close				-0.000742	-0.00194	-0.0307
				(0.0180)	(0.0147)	(0.0620)
post	0.0226	-0.0263	-0.256***	0.0260	-0.00598	-0.222**
	(0.0510)	(0.0580)	(0.0678)	(0.0382)	(0.0452)	(0.0724)
Constant	1.594***	1.605***	0.923***	1.590***	1.588***	0.934***
	(0.0813)	(0.0925)	(0.142)	(0.0880)	(0.0939)	(0.126)
Observations	16,629	9,705	1,497	16,629	9,705	1,497
R-squared	0.025	0.022	0.047	0.025	0.021	0.047
Number of zipbr	540	225	22	540	225	22
Min. Exposed Branches	3	5	10	3	5	10
Zip Code FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Cluster	Merger year	Merger year	Merger year	Merger year	Merger year	Merger year

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 1: Banking Industry Trends. Total number of banks (Figure 1A), Bank Branches (Figure 1B), and Real Deposits in 2010 dollars (Figure 1C), by bank size. Big banks are defined as those with greater than $50 billion in assets in 2010 dollars and are depicted in red. Small banks are defined as those with less than $1 billion in assets in 2010 dollars and are depicted in blue. Banks with between $1 billion and $50 billion in assets in 2010 dollars are depicted in green.

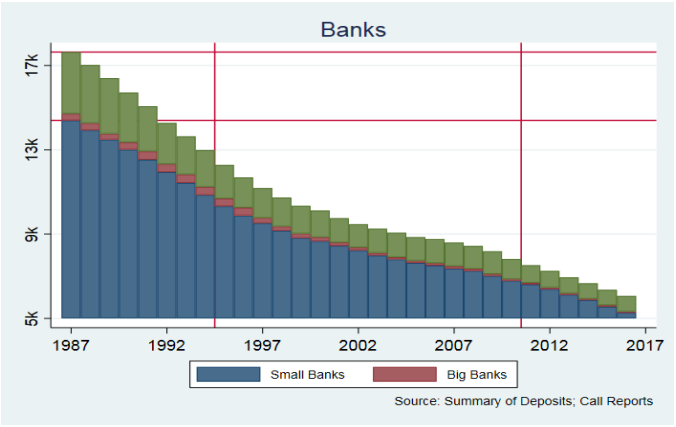


Figure 1A: Number of Banks

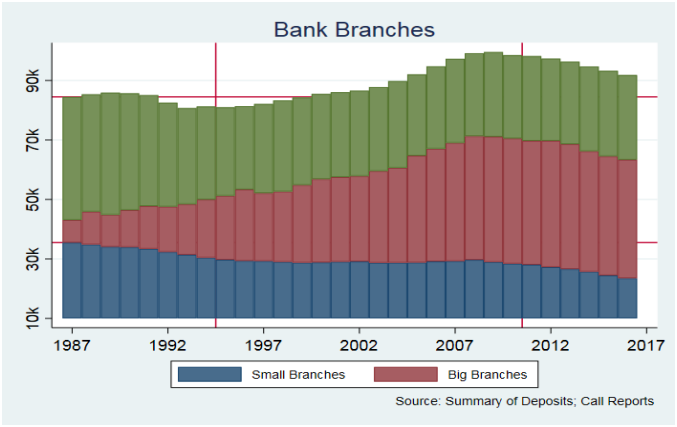


Figure 1B: Number of Bank Branches

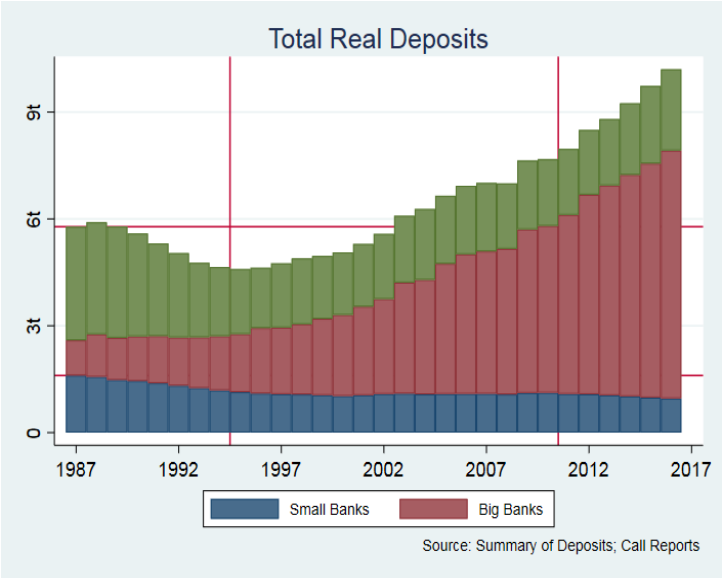


Figure 1C: Total Real Deposits, Trillions

Figure 2: Banking Industry Deposits, by MSA and non-MSA. Figure 2A depicts total real deposits (2010 dollars) held in MSAs for small, mid-sized, and large banks. Figure 2B depicts total real deposits held in non-MSAs for small, mid-sized, and large banks. Figure 2C depicts total real deposits and small bank branch deposits for MSAs and non-MSAs relative to 1994 (i.e. each variable is indexed to 1 in 1994). Figure 2D depicts the difference in relative growth rates between total real deposits and small bank branch deposits, for MSAs and non-MSAs.

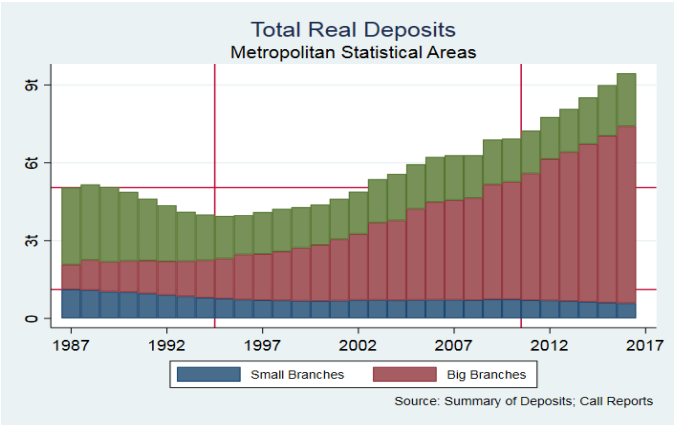


Figure 2A: Deposits MSAs

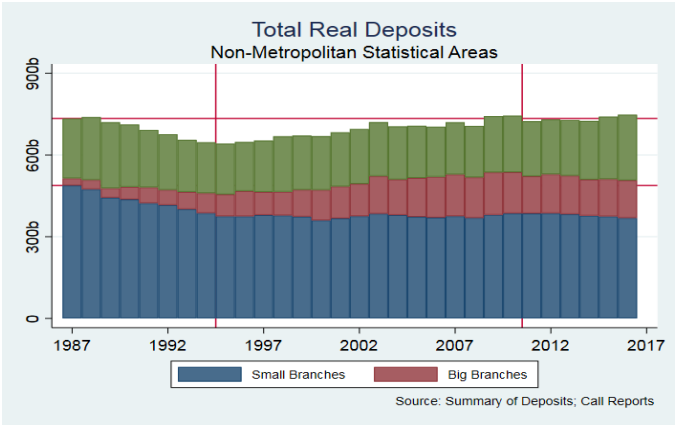


Figure 2B: Deposits Non-MSAs

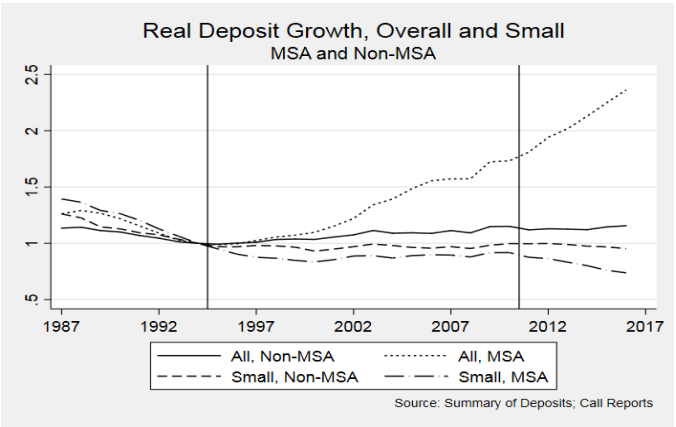


Figure 2C: Deposits Relative to 1994

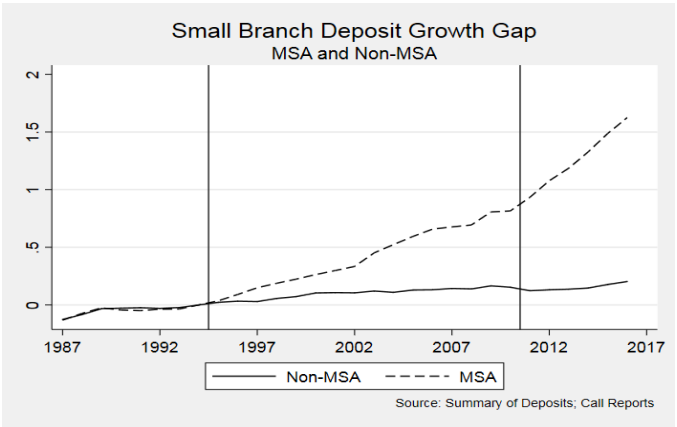


Figure 2D: Small Bank Gap

Figure 3: Banking Industry Branches, by MSA and non-MSA. Figure 3A depicts total branches held in MSAs for small, mid-sized, and large banks. Figure 3B depicts total branches in non-MSAs for small, mid-sized, and large banks. Figure 3C depicts total branches and small branches for MSAs and non-MSAs relative to 1994 (i.e. each variable is indexed to 1 in 1994). Figure 3D depicts the difference in relative growth rates between total branches and small bank branches, for MSAs and non-MSAs.

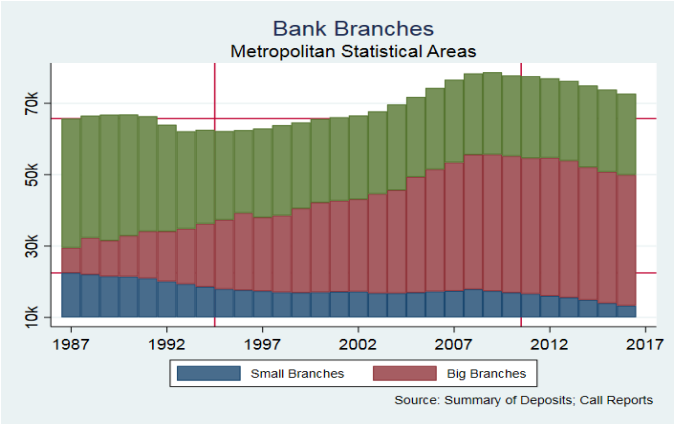


Figure 3A: Branches MSAs

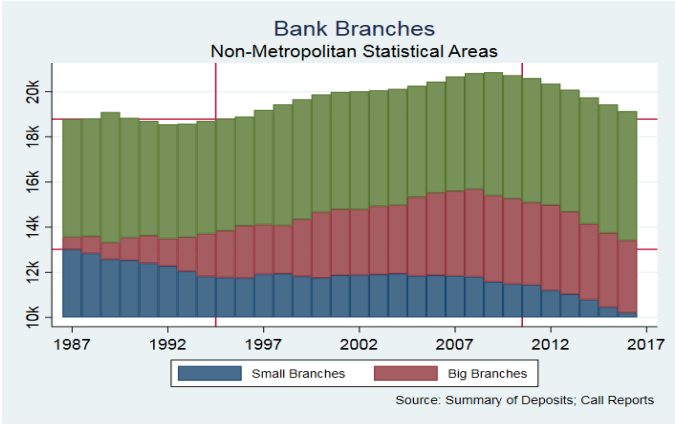


Figure 3B: Branches Non-MSAs

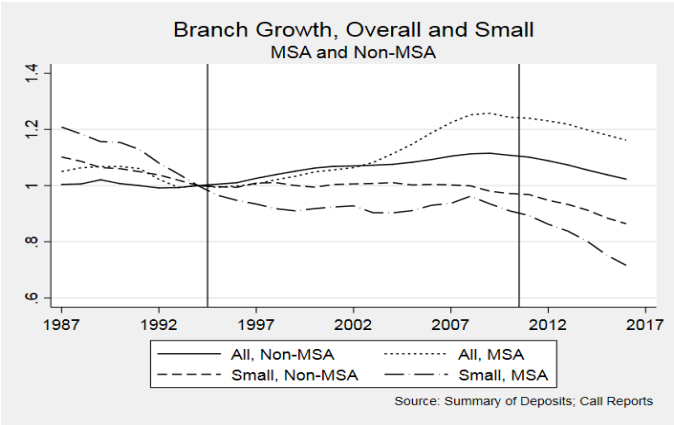


Figure 3C: Branches MSAs

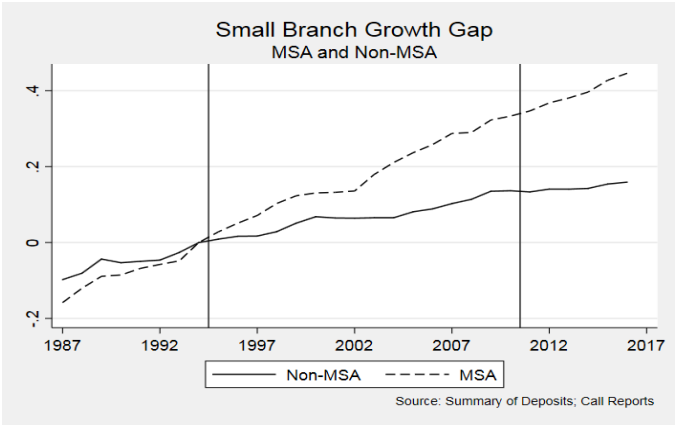


Figure 3D: Branches Non-MSAs

Figure 4: Population by MSA and non-MSA Relative to 1994

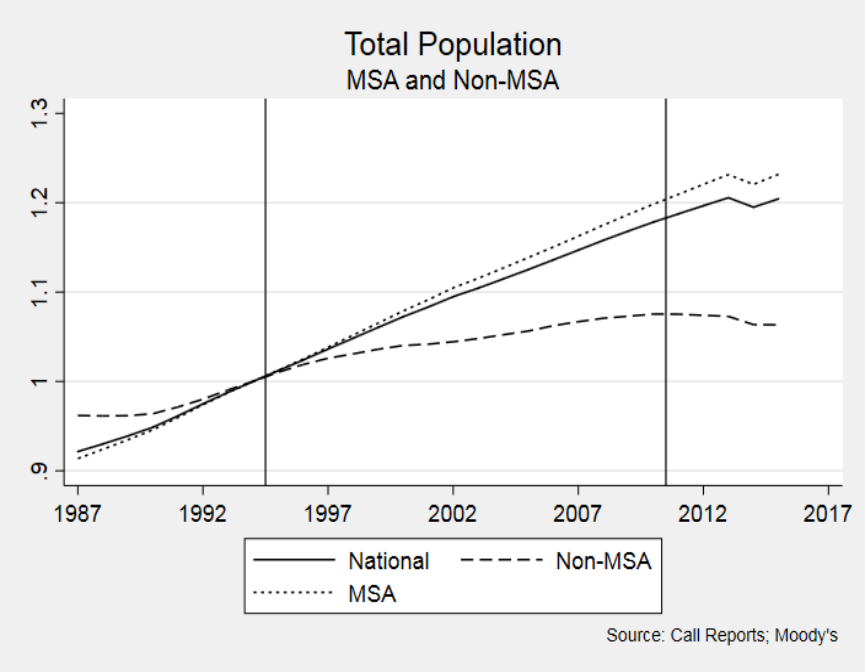


Figure 5: Nominal Output, by MSA and non-MSA Relative to 1994

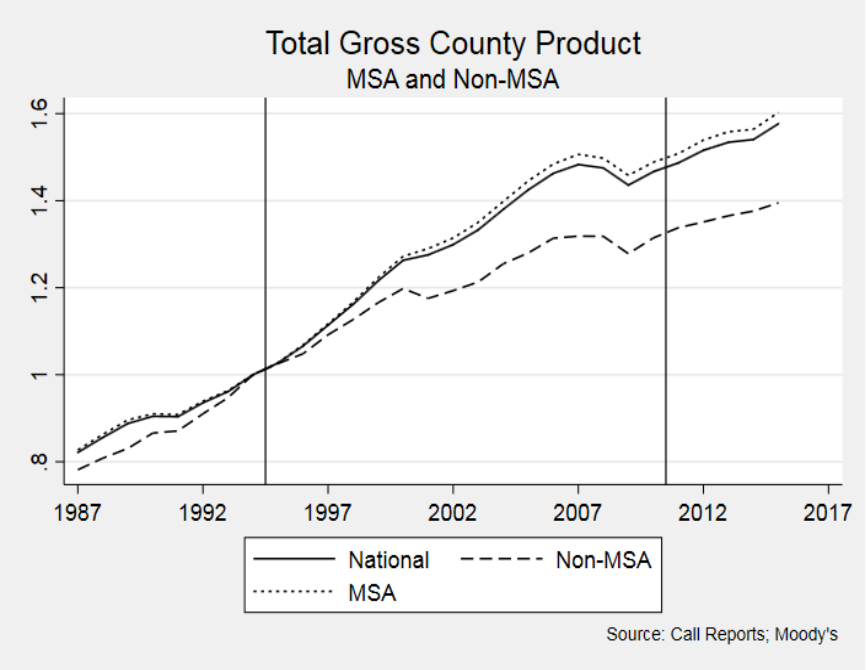
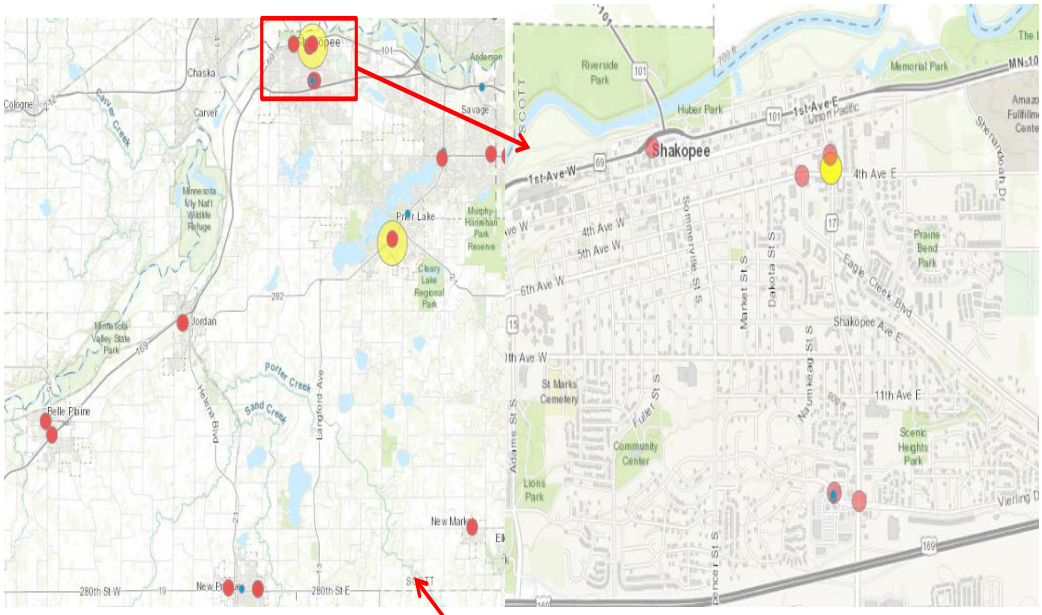


Figure 6: Example of a merger used in the difference-in-differences analysis between Marquette Bank and Wells Fargo in 2002. The bottom map depicts Marquette Bank branches in the Summary of Deposits data prior to the merger. Moving counter-clockwise, the top left map zooms in on the box in the bottom map: Scott County, MN. The top right map zooms in on the box in the top left graph: Shakopee, MN. In the top left and right maps: large yellow circles represent merged out Marquette branches; medium red circles represent small bank (< $1 billion) branches; small blue circles represent all other bank branches.

Marquette Acquisition.pdf



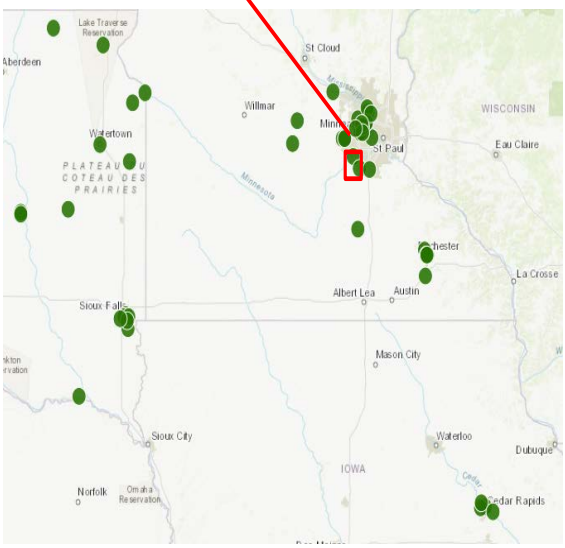


Figure 7: Branch Count, by Zip Code. Total branch count and small branch count within a county experiencing a merger, separated by zip codes containing an acquired branch and zip codes without an acquired branch. Merger activity occurs between years 0 and 1.

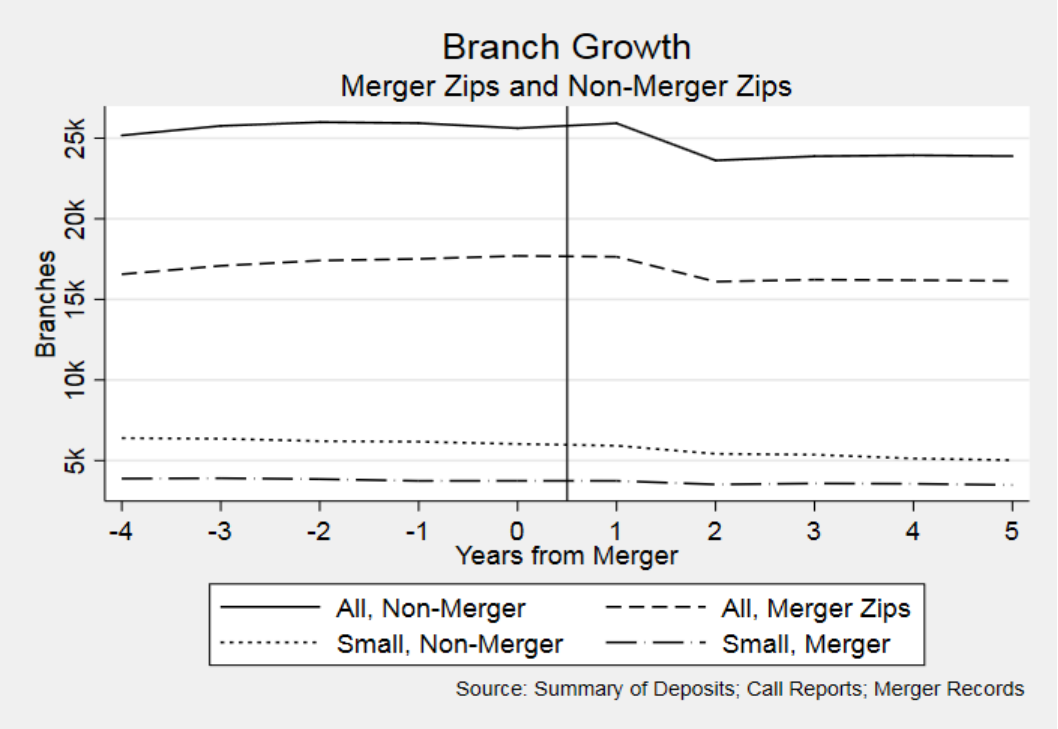


Figure 8: Small Branch Count, by Zip Code. Total small branch count within a country experiencing a merger, separated by zip codes containing an acquired branch and zip codes without an acquired branch. Merger activity occurs between years 0 and 1.

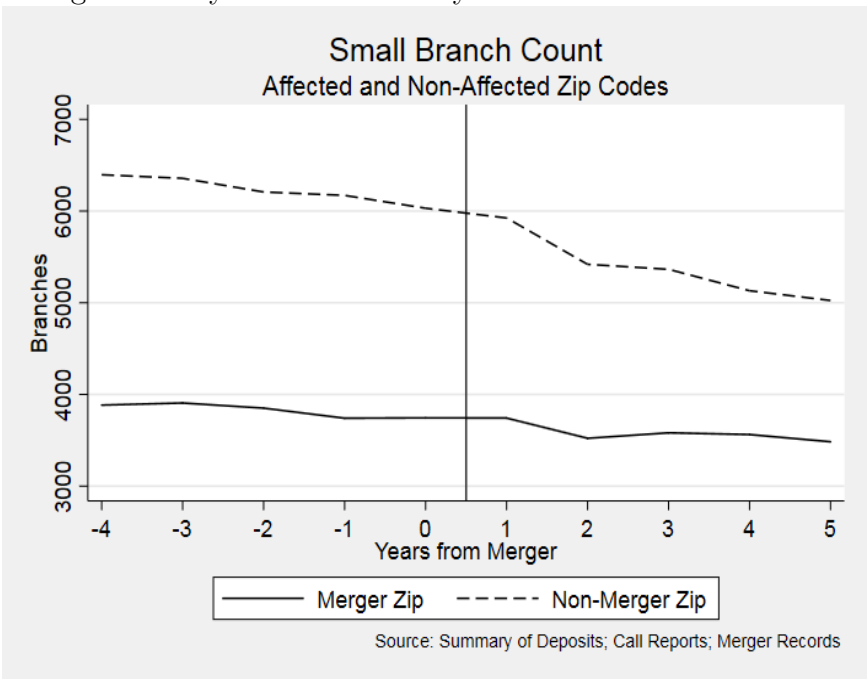


Figure 9: Branch Growth, Overall and Small, by Zip Code. Total branch growth and small branch growth for affected and non-affected zip codes, normalized by the number of branches in the year of merger activity. Merger activity occurs between years 0 and 1.

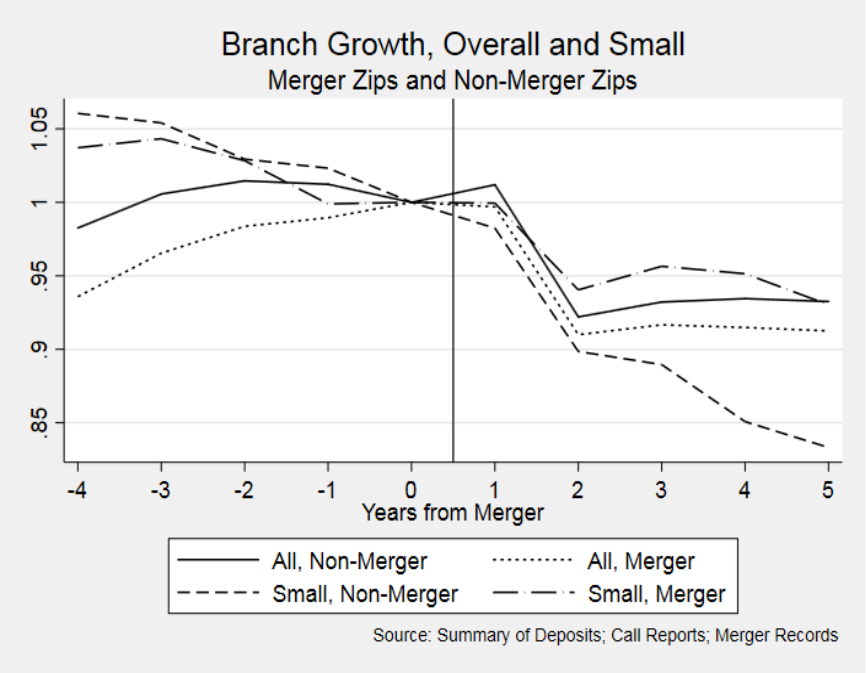


Figure 10: Percent of Small Branches That Are New, by Zip Code. Percentage of existing small branches that did not exist in the previous year. Merger activity occurs between years 0 and 1.