

Bank Consolidation and Merger Activity Following the Crisis

By Michal Kowalik, Troy Davig, Charles S. Morris, and Kristen Regehr

The number of U.S. banks has trended lower over the past 30 years, dropping from about 14,500 in the mid-1980s to 5,600 today. The number of banks declined for many reasons, such as failures during periods of crisis, consolidation spurred by the relaxation of state branching and national interstate banking restrictions, and voluntary mergers between unaffiliated banks. Since the end of the 2007-09 recession, voluntary mergers have been the primary reason for the decline.

Banks merge for a number of business-related reasons. Mergers allow banks to achieve economies of scale, enhance revenues and cut costs through operational efficiencies, and diversify by expanding business lines or geographic reach. Bank mergers can result in more efficient banks and a sounder banking system and thus benefit the economy, as long as banking markets remain competitive and communities' access to banking services and credit is not diminished.

This article analyzes the financial characteristics of banks with assets of \$1 billion or less that were acquired by an unaffiliated bank in a voluntary merger from 2011 to 2014. The analysis finds these mergers are consistent with the goals of greater economies of scale and improved

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efficiency. Acquired banks are generally smaller, less profitable, less efficient, and in weaker condition than their non-acquired peers. Section I reviews the reasons for bank mergers. Section II describes the data. Section III provides a qualitative assessment of acquired-bank characteristics. Section IV analyzes the mergers to determine the relative importance and significance of an acquired bank's characteristics.

I. Reasons for Bank Mergers

Bank mergers drove the long-term downward trend in the number of banks since 1985. Even in the crisis periods of the late 1980s, early 1990s, and 2007-09, the number of mergers exceeded the number of failures every year.¹ Chart 1 shows the number of community banks, defined as banks with assets of \$1 billion or less, along with mergers and failures from 2007-14. Community banks are the focus because mergers involving larger banks, particularly banks with assets of more than \$10 billion, are rare. For example, about 90 percent of the 1,500 mergers since 2007 involved a bank with less than \$1 billion in assets.²

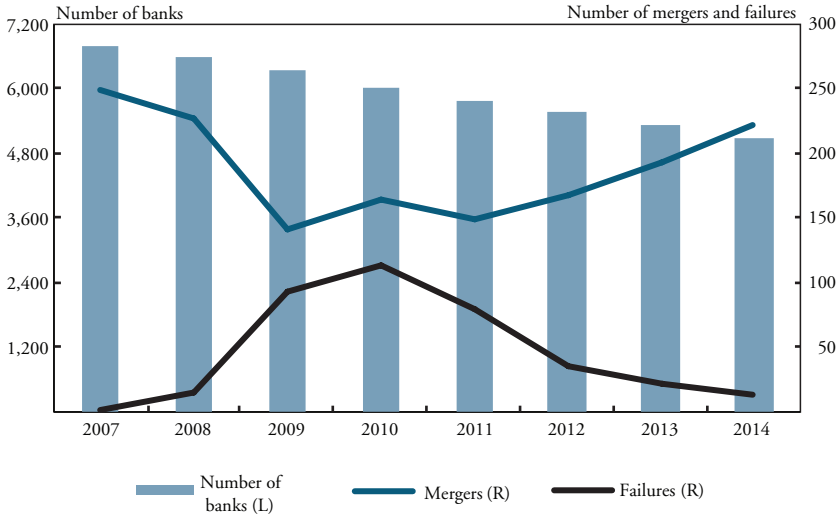
As Chart 1 shows, the number of community banks fell by almost 1,700, or 25 percent, from 2009-11. Although the crisis started in 2007, the effects of the crisis and recession did not work their way through the banking system for a couple of years. As a result, mergers fell and failures rose significantly in 2009, though failures never exceeded mergers. Since 2011, the decline in the number of community banks has been mostly due to voluntary mergers between banks.

Business-related reasons to merge reflect perceived opportunities to increase the total value of two or more separate banks by consolidating them into one entity (DeYoung and others).³ Owners of banks that are less profitable, less efficient, and in weaker condition (in the sense they are more susceptible to future financial problems) may seek to exit the industry by selling their businesses, while profitable and efficient banks may look for opportunities to expand (Hannan and Piloff; Jagtiani; Wheelock and Wilson).⁴

In addition to quickly expanding its own business, a bank can further increase its business and revenue over time by acquiring another bank and using its resources to expand loans and other business lines. These resources may have been underused due to ineffective management or insufficient capital. For example, acquiring a bank with excess

Chart 1

Change in the Number of Community Banks since 2008



Note: Community banks are defined as banks with assets of \$1 billion or less.

Source: Federal Reserve change-in-control data.

deposits provides the acquirer with a stable source of funds for expanding lending. Cyree finds that acquirers are willing to pay a larger premium over book value for a bank with a higher ratio of core deposits to assets, supporting the idea that banks with high deposit shares are attractive targets. Acquiring a bank in the same market or with similar products may allow the acquirer to capitalize on some particular expertise and thereby increase its business with modest expense.⁵ Acquiring a bank may also provide the acquirer with a broader client base to which they can cross-sell additional products and banking services. An acquisition can also boost the merged entity's revenue by increasing market share in a given location or business line. Finally, acquiring a bank can boost revenue growth if the acquired bank is in a market with strong economic activity.

In addition to potentially increasing revenue, acquiring a bank can also generate substantial efficiency gains, especially if the acquired bank is inefficient or has ineffective management. For example, an acquisition can allow banks to spread their costs over a larger asset base, reduce staff, and eliminate branches. Mergers can be especially beneficial to banks with similar business or geographical profiles as fewer

resources are needed to serve their combined business purpose (Cornett and others).⁶

Mergers can also reduce a bank's risk by diversifying its asset portfolio, funding sources, and fee generating activities. Acquiring a bank that operates in different markets or business lines will often increase diversification. To reduce risk, however, the acquiring bank must have a strong understanding of the new market's characteristics and risks, along with expertise in new business lines. Otherwise, the risk of the combined institution could increase.⁷

II. Bank Merger Data

The analysis focuses on voluntary mergers between unaffiliated banks that occurred between January 1, 2011, and December 31, 2014, in which the acquired banks had assets of \$1 billion or less. Acquired banks are grouped according to the year, or cohort, in which a merger took place, since economic conditions and motives for mergers may change as a business cycle matures. Characteristics of the different cohorts can then be analyzed over time.

From 2011 through 2014, the number of voluntary mergers increased each year. Mergers increased from 73 in 2011 to 162 in 2014. Table 1 divides the total number of banks into those that were acquired in each year and those that were not. The increase in mergers can be explained, in part, by an improvement in overall economic and banking conditions reflecting the transition from the recovery following the financial crisis to a relatively healthy expansion. Improved economic conditions make potential targets more attractive due to their healthier portfolios and the stronger markets in which they operate. Furthermore, improved economic conditions strengthen potential acquirers, giving them greater ability to acquire new banks.

In addition to the number of mergers, the data include comprehensive measures on bank balance sheets and performance collected from Call Reports, change-in-control data, and confidential supervisory ratings (see the Appendix for a data description). Call Reports provide balance sheet and performance information on banks. Federal Reserve change-in-control data provide information for identifying mergers and determining whether they are voluntary and between unaffiliated banks. Confidential ratings data provide information about the safety and soundness of banks that is not available in Call Reports or other public data.

Table 1

Community Banks—Acquired and Non-Acquired

Year	Acquired banks	Non-acquired banks	Total
2011	73	5,881	5,954
2012	116	5,598	5,714
2013	134	5,368	5,502
2014	162	5,117	5,279

Note: See Appendix for a data description.

Source: Federal Reserve change-in-control data.

III. Characteristics of Acquired Banks

Although banks are acquired for different reasons, they often share similar characteristics relative to banks that are not acquired. Comparing acquired community banks with their non-acquired peers reveals important differences in profitability, size, and condition. In general, acquired banks are often smaller, less profitable, less efficient, and in weaker condition than their non-acquired peers.

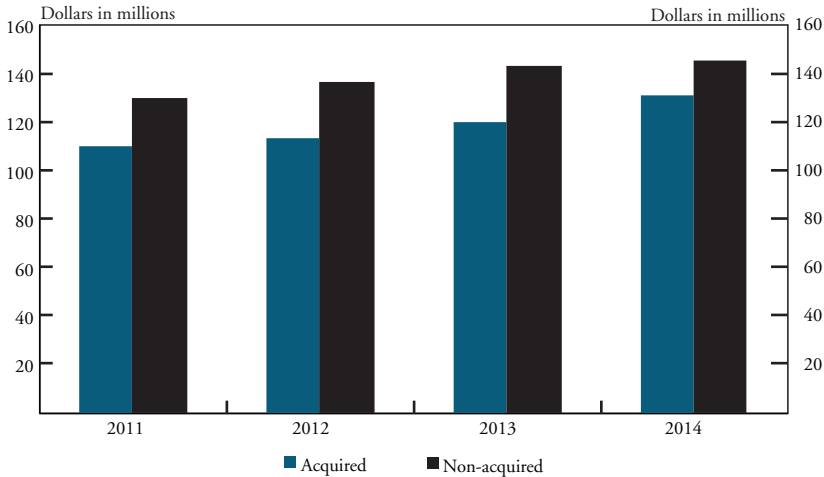
Differences in size, profitability, and efficiency

Chart 2 compares the median total assets of acquired and non-acquired banks from 2011-14. In general, the median acquired bank is about 15 percent smaller than its peers during the sample period. Acquired banks are also less profitable. Low profitability reflects lower returns from loans and other business lines and higher expenses. Panel A of Chart 3 shows the median return on average assets (ROA), the broadest measure of profitability, for non-acquired banks and each cohort of acquired banks. For each cohort, the chart shows the median ROA from 2008, the first full year of the crisis, through the year prior to the merger. For example, the data for the 2011 cohort show the median ROA for those banks from 2008-10. Panel A shows that acquired banks in every cohort were less profitable than the median non-acquired bank. In addition, Panel A shows that banks acquired further past the end of the crisis tended to be more profitable in the year before they were acquired (the end point of each of the cohort lines), likely due to the improving economy.

A bank's ROA can be divided into three components measuring the bank's revenue strength and cost structure. These three components are

Chart 2

Median Total Assets



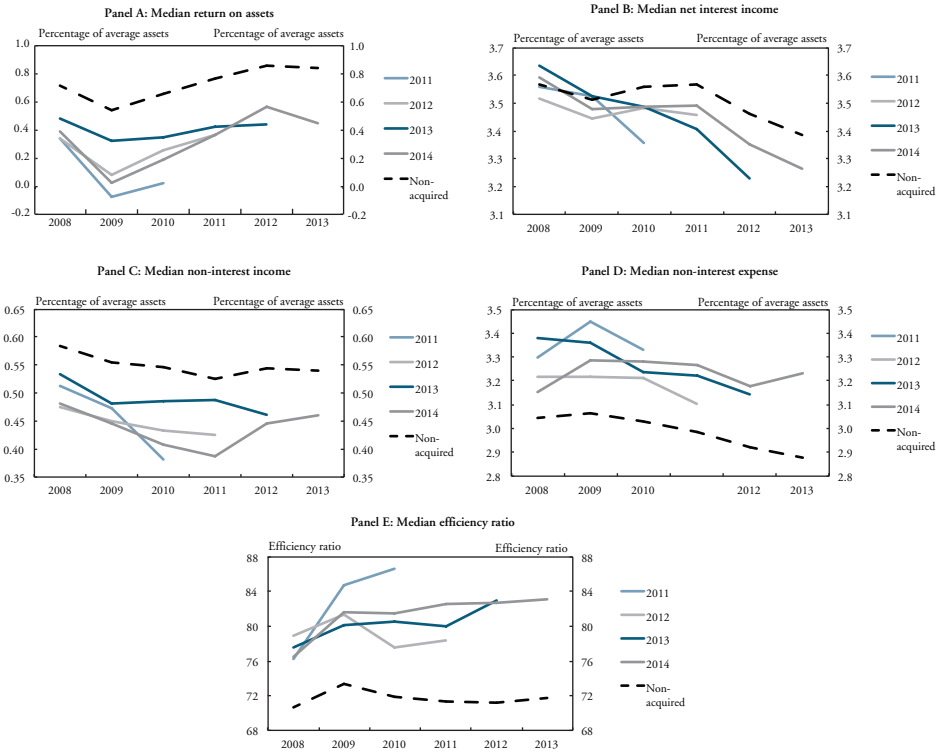
Notes: Median total assets for each cohort of acquired banks and non-acquired banks are as of the prior year-end. See Appendix for a data description.

Source: Reports of Condition and Income.

net interest income, which measures the profitability of making loans and investing in securities relative to the cost of deposits and other liabilities; non-interest income, which measures fees earned on non-lending services and activities; and non-interest expenses, which reflect the costs of running a bank other than interest paid on liabilities, such as the costs of personnel and maintaining buildings.

Acquired banks are generally less profitable due to lower levels of both net interest income and non-interest income, as well as relatively high operating costs. Panel B of Chart 3 shows the net interest income of acquired banks was mixed across cohorts relative to non-acquired banks through 2009. Since the end of the recession, however, all cohorts of acquired banks had net interest income below the median of non-acquired banks. In terms of non-interest income, Panel C shows acquired banks consistently underperformed across all cohorts. Furthermore, acquired banks consistently had higher non-interest expenses than their peers. Panel D of Chart 3 shows that expenses—including the costs of personnel, maintaining buildings, and data processing—were relatively high as a share of average assets.

Chart 3
Profitability Measures



Notes: Medians are as of year-end. See Appendix for a data description.
Source: Reports of Condition and Income.

A final common performance measure is a bank's efficiency ratio, defined as non-interest expenses divided by the sum of net interest income and non-interest income. The efficiency ratio increases as costs rise and income declines. Panel E shows that the median acquired bank operated less efficiently than the median non-acquired bank across all cohorts over the sample period. This is not surprising given the differences in income and expenses between acquired and non-acquired banks shown in Panels B-D of the chart.

Differences in condition

In addition to being less profitable and less efficient, acquired community banks also tended to be in weaker condition than non-acquired

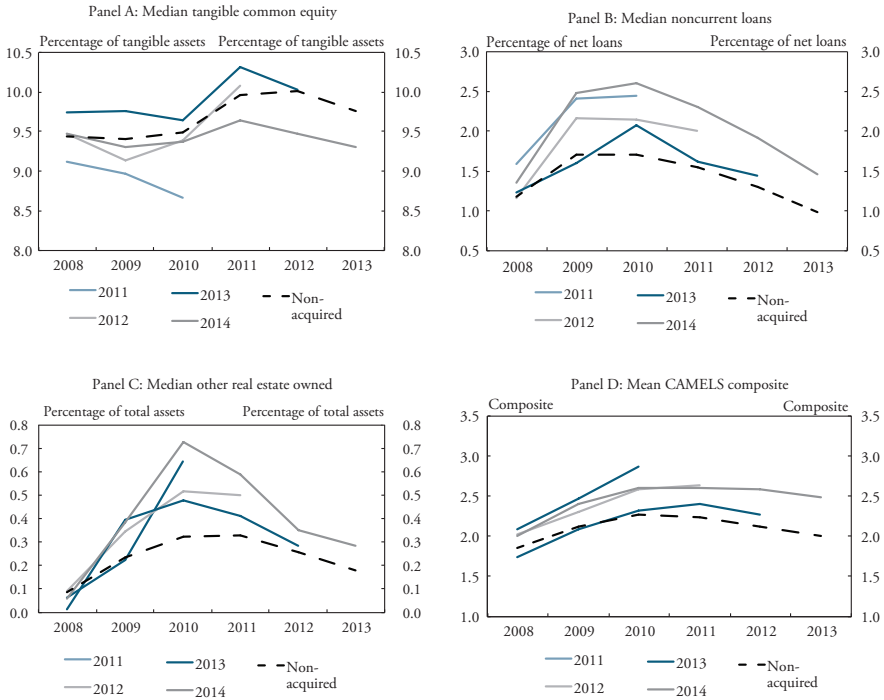
banks over the sample period. Acquired banks had relatively less capital, more problem assets, and lower regulatory ratings. Their weaker condition is consistent with their lower profitability and efficiency, since factors such as problem loans reduce interest income and lead to higher costs as banks work them out.

A bank's condition can be measured in many ways, but capital tends to be the first measure analysts examine. In many cases, losses resulting from the crisis left banks with less capital available to cover unexpected losses, making it more difficult for these banks to make new loans. Panel A of Chart 4 shows that at the time of their acquisition, acquired banks were generally less well-capitalized than non-acquired banks, based on the ratio of tangible common equity to tangible assets. The pattern is less pronounced or absent for banks acquired in 2012 and 2013, consistent with a gradual healing of the industry: the first banks to fail or be acquired were in the worst condition, and the remaining banks generally increased their capital ratios after the recession.

Two other common measures of a bank's condition are the quality of its asset portfolio, as measured by the share of noncurrent loans to net loans (Chart 4, Panel B), and the share of other real estate owned (OREO) to total assets (Chart 4, Panel C). Noncurrent loans are loans more than 90 days overdue or not accruing interest. The share of noncurrent loans thus provides a good measure of a loan portfolio's risk of default. High levels of OREO reflect past lending that ended in the borrower defaulting and the bank taking possession of the real estate used to collateralize the loan. As Panels B and C of Chart 4 show, both of these metrics increased for all banks during and after the crisis. The rise in these measures for acquired banks relative to non-acquired banks was substantial, suggesting that acquired banks invested in relatively riskier loans prior to the crisis.

A final measure of a bank's condition is the confidential supervisory risk rating (CAMELS) that the state and federal supervisory agencies use to summarize a bank's condition after an examination. The CAMELS rating is an aggregate measure on a scale of 1 (best) to 5 (worst), based on capital adequacy (C), asset quality (A), management quality (M), earnings (E), liquidity (L), and sensitivity to market risk (S). Chart 4, Panel D shows the mean ratings for acquired banks have been substantially worse than the industry average since the crisis, with the gap for 2014 mergers even wider than in 2008.⁸

Chart 4
Condition Measures

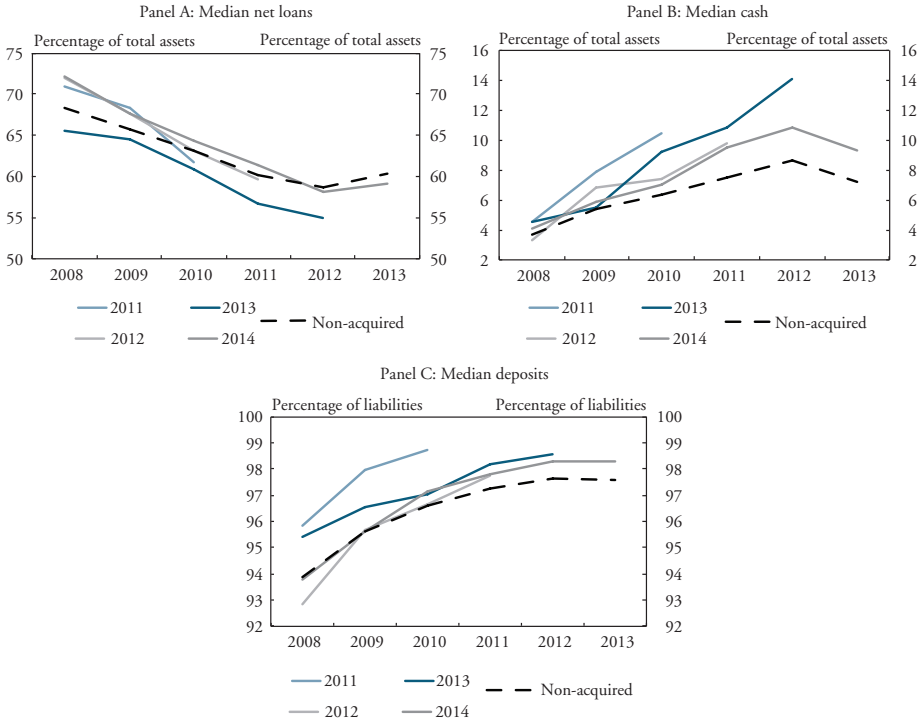


Notes: Medians/means are as of year-end. In Panel A, tangible common equity is total equity less perpetual preferred stock, goodwill, and other intangible assets. Tangible assets are total assets less goodwill and other intangible assets. In Panel B, noncurrent loans is the sum of loans 90 or more days past due and nonaccrual loans. See Appendix for a data description.
Source: Reports of Condition and Income.

Differences in balance sheet composition

Differences in a bank’s profitability and expenses reflect differences in the composition of its balance sheet, such as the share of loans, cash, and deposits held as a percentage of its total balance sheet. Panel A of Chart 5 shows acquired banks tended to have loan shares modestly higher than non-acquired banks until 2012. The 2013 cohort, which had significantly lower loan shares, is an exception to this trend. Panel B shows acquired banks had higher cash shares than non-acquired banks, and that the gap increased over time. On the liability side, Panel C shows acquired banks tended to have modestly higher deposit shares than non-acquired banks, particularly in the year prior to their

Chart 5
Balance Sheet Measures

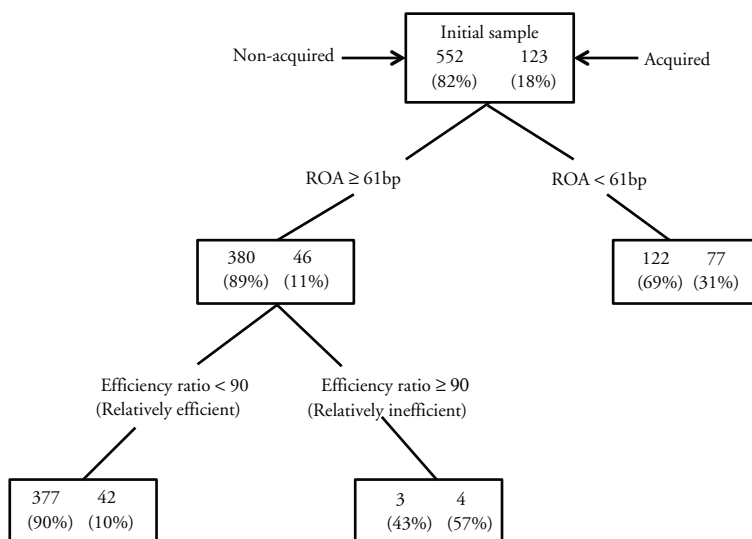


Notes: Medians are as of year-end. See Appendix for a data description.
Source: Reports of Condition and Income.

acquisition. These results suggest that acquiring banks may have targeted banks that would provide quick increases in loans and access to cash and deposits to support future loan growth. Cyree finds that acquirers are willing to pay a larger premium over book value for a bank with higher deposits to assets, supporting the idea that banks with high deposit shares are attractive targets.⁹ These motives are perhaps unsurprising given the lack of lending opportunities and loan demand during much of the recovery from the financial crisis.

Figure 1

Classification Tree for Bank Mergers in 2014



IV. The Relative Importance of the Characteristics of Acquired Banks

Although acquired community banks share many characteristics, the statistical or economic significance of these characteristics in determining which banks are acquired can differ. To rank the importance of the characteristics of banks most likely to be acquired, two analytical methods are used: classification trees and probit regression.

Classification trees, as the name suggests, classify data in successive steps according to various criteria, resulting in smaller groups as the analysis progresses. The objective is to create separate groups with similar characteristics, in this case, groups of banks that are likely to be acquired or not.

Splitting banks into groups requires identifying an appropriate variable on which to split, as well as the value used to separate the sample. The ideal variable and split value would result in two samples, or branches of the tree: one containing all acquired banks and the other containing all non-acquired banks. In practice, however, such a clean split is unlikely.

As an example, Figure 1 shows a classification tree based on banks that were acquired in 2014. The sample used to construct the tree comprises 675 banks, 123 of which were acquired. The tree shows that banks with an ROA below 61 basis points were more likely to be acquired. About 31 percent of banks with an ROA below this threshold were acquired, compared to about 11 percent of banks with an ROA above the threshold. It is perhaps not surprising that ROA is the first of the 24 variables to split the sample between acquired and non-acquired banks, given that Chart 3, Panel A showed ROA tends to distinguish acquired banks from other banks.¹⁰

The tree also shows that among the subset of banks with a higher ROA, those that are relatively inefficient are more likely to be acquired. Among the 426 banks with an ROA greater than 61 basis points, only seven were relatively inefficient with efficiency ratios above 90. It is not surprising that so few banks with relatively high profits would be relatively inefficient. However, four of these seven banks were acquired.

The example in Figure 1 is based on an actual subset of bank mergers occurring in 2014. In general, the vast majority of banks are not acquired. For example, only 3 percent of all the banks in the data set in 2014 were acquired. With such a low number of acquisitions, the classification tree analysis produces subsamples that primarily contain non-acquired banks simply because they dominate the data set. As a result, the criteria used to evaluate the subsets finds they are not sufficiently different, and the classification tree algorithm does not create additional branches of the tree.

Random sampling can address this issue by better balancing the number of observations between acquired and non-acquired banks. In this procedure, the sample includes all acquired banks and a random sample of non-acquired banks to create a 5:1 ratio of non-acquired to acquired banks. Although this ratio is much higher than what is observed in the data, it allows the classification algorithm to more sharply compare the characteristics of the acquired banks with those that were not acquired.

One issue with sampling the data is that the results may depend on the particular random subset of data selected. To mitigate this potential bias, 1,000 different subsamples are constructed for each cohort. The

classification tree analysis is then run on each subsample, generating 1,000 different trees. For each year of the sample, ROA and efficiency are identified as the most important variables in distinguishing acquired from non-acquired banks, suggesting that relatively unprofitable and inefficient banks are the most likely to be acquired. The average cutoff values for ROA are 10, 51, 49, and 46 basis points for banks acquired in 2011, 2012, 2013, and 2014, respectively. The corresponding cutoffs for efficiency ratios are 90, 95, 86, and 85. As an example of how these results are interpreted, in 2014, banks with ROA less than 46 basis points were more likely to be acquired, while banks with ROA equal to or greater than 46 basis points were more likely to be acquired if their efficiency ratio was equal to or greater than 85.

To understand the statistical and economic significance of the most important variables identified by the classification tree analysis, ROA and the efficiency ratio are used as independent variables in a probit regression.¹¹ The dependent variable indicates whether a bank is acquired. Table 2 shows the results for each cohort using observations for all community banks. The coefficient on ROA is significant at the 5-percent level for every year in the sample. The negative coefficient indicates that as ROA increases, the probability of being acquired declines. The coefficient on the efficiency ratio is positive as expected in every year except 2014, but it is not significant in explaining whether a bank is acquired in any year. The insignificance of the efficiency ratio may reflect that it is important for only a small number of acquisitions when simultaneously accounting for the effect of ROA, which was shown to be the dominant variable in the classification tree analysis.

To get a sense of the importance ROA has for a bank's probability of being acquired, Chart 6 shows how the estimated probabilities vary by cohort.¹² For banks with a high level of losses—for example, an ROA of -500 basis points—the probability of being acquired in 2014 was 0.48, substantially higher than the 0.07 probability in 2012 for a bank with the same ROA. As ROA increases and turns positive, however, the probability of being acquired falls to near zero regardless of the year.

The probability of a bank with a negative ROA being acquired is generally economically significant. For example, the estimated probabilities of being acquired in 2014 for banks with ROAs less than 100 basis points are significantly greater than the 0.03 probability of being acquired calculated from the raw data sample.

Table 2
Probit Regression of Acquired Banks

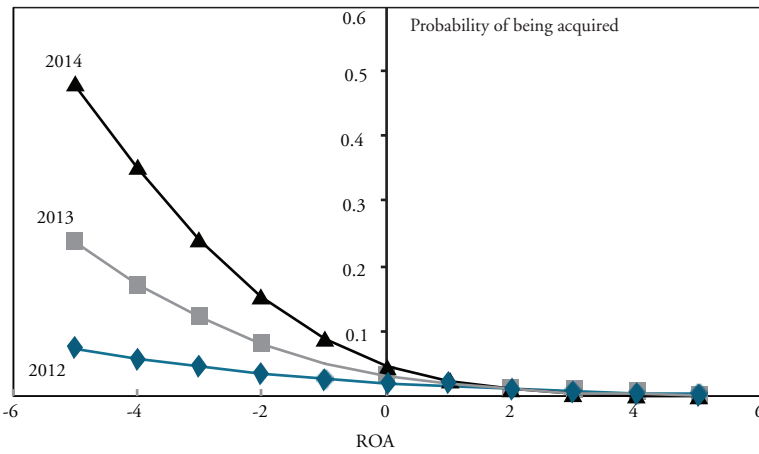
Year	ROA	Efficiency	Number of observations
2011	-0.14** (0.026)	0.0004 (0.001)	5,954
2012	-0.12** (0.035)	0.0006 (0.001)	5,714
2013	-0.23** (0.040)	0.0003 (0.009)	5,502
2014	-0.32** (0.047)	-0.0003 (0.001)	5,279

** Significant at the 5-percent level.

Notes: Dependent variable is whether a bank is acquired. Standard errors in parentheses.

Source: Reports of Condition and Income.

Chart 6
Probability of Being Acquired Due to Changes in ROA by Cohort



Notes: Probabilities derived from the probit regression results in Table 2. In calculating the probabilities, the coefficient on efficiency is set to zero because it is insignificant.

These results suggest that for a given ROA, the probability of being acquired increases as the effects of the financial crisis and recession recede. Improving economic and banking conditions have generally made banks stronger and more optimistic about the future of the economy. As a result, banks are looking for opportunities to grow and possibly expand into new markets and activities, which may explain why the number of mergers has increased.

V. Conclusion

The number of banks has declined sharply over the past 30 years, due in part to voluntary mergers between unaffiliated banks. In fact, voluntary mergers have been the primary factor in the decline since the end of the 2007-09 recession. This article analyzes the mergers of community banks over the past four years and finds they are consistent with the goals of achieving greater economies of scale and improving efficiencies. Acquired banks tend to be smaller and have a lower return on assets, lower net interest income, and higher non-interest expenses than non-acquired banks. Acquired banks may be less profitable because they tend to have lower loan and higher cash and deposit shares. In addition, the condition of acquired banks tends to be worse than their industry peers in terms of capital, supervisory examination ratings, and problem loans and assets. Among the characteristics that differentiate acquired banks, statistical analysis suggests profitability and efficiency are the most important factors.

The results suggest that mergers on average result in more efficient banks and a sounder banking system, which should lead to greater access to credit at lower cost and thus be beneficial for local communities. However, the benefits of mergers can be offset if mergers make local banking markets less competitive and reduce the communities' access to banking services and credit. Although federal banking regulatory agencies monitor mergers and do not approve those that are expected to result in uncompetitive banking markets, more research is needed to determine the net effect of bank mergers on local communities.

Appendix Data Description

The article focuses on unaffiliated bank mergers that occurred between 2011 and 2014 involving acquisitions of community banks, defined as banks with assets of \$1 billion or less. The data consist of 25 variables from Call Reports, the Federal Reserve System's database of changes in bank control, and confidential supervisory examination ratings. To eliminate outliers, banks with ROA greater than the 99.5 percentile or less than the 0.5 percentile are excluded from the analysis.

For mergers that involve bank holding companies (BHCs), unaffiliated bank mergers are defined as acquisitions that occur between banks not part of the same bank holding company (BHC). When BHCs merge, however, the banks are often not simultaneously merged. BHCs may delay bank mergers, for example, to determine the best way to consolidate operations and information technology systems or make personnel changes. For such mergers, the merger of the subsidiary banks is considered unaffiliated if it occurs within one year of the BHC merger. The one-year cutoff was chosen to ensure that banks merged in such a manner are not improperly classified as consolidations of banks part of the same BHC. The distinction between unaffiliated mergers and consolidations is important because the reasons driving these two events very likely differ. Including consolidations with unaffiliated mergers in the analysis could bias the results.

Endnotes

¹Other factors affect the change in the number of banks from year to year, the most important of which is newly chartered banks (referred to as *de novo* banks). Other than the crisis periods of the late 1980s, early 1990s, and 2007-09, the decline in the number of banks is almost entirely due to mergers of affiliated or unaffiliated banks, partially offset by *de novo* banks. For example, from 1995 to 2007, about 5,200 mergers were partially offset by about 2,000 *de novos* and only 47 bank failures.

²These numbers include mergers of affiliated and unaffiliated banks because both types of mergers reduce the number of banks. However, mergers of affiliated banks have declined sharply in recent years because most geographic restrictions were eliminated by the mid-1990s. As a result, the vast majority of mergers are between unaffiliated banks.

³DeYoung and others provide an extensive review of the merger and acquisition literature. In addition to business motives for mergers, private motives can also play an important role in a banker's decision to sell. For example, community banks are often family-owned and may lack successors or be located in declining rural markets that can become "overbanked." Alternatively, some owners start banks with the goal of quickly selling them to a larger institution, rather than operating them independently on a long-term basis. Although this latter example may sound like a business motive, it is primarily driven by the owner's private motive to cash out as quickly as possible.

⁴Hannan and Piloff show that banks are more likely to be acquired as their profitability declines and their inefficiency rises. Jagtiani shows acquirers tended to be more efficient and better managed than the targets. Wheelock and Wilson also find that increased inefficiency or decreased profitability lead to a greater probability of being acquired.

⁵For relatively small community banks, specializing in a business activity or location may allow them to diversify the idiosyncratic risk in their loan portfolios by reducing exposure to individual loans.

⁶Cornett et al. show significant increases in earnings in acquiring banks following a merger, particularly when mergers result in focusing activities or geographical reach, as opposed to diversifying.

⁷During the crisis, many community banks failed because they had expanded lending into out-of-territory areas where they had little understanding of the markets and associated risks. Since the crisis, one of the risks that has become more prevalent is strategic risk, which includes the risk of banks expanding into new business lines without sufficient expertise.

⁸A CAMELS rating of 3 means a bank's condition is less than satisfactory. The mean is used instead of the median because the discrete nature of the rating system leads to all of the medians being 2, which is not surprising since a 2 rating is near the middle of the range and not less than satisfactory.

⁹ While Cyree's analysis uses core deposits, the trend for core deposits and total deposits is similar for our sample over the period analyzed.

¹⁰ The full data set described in the Appendix has 25 variables. However, the data set used to conduct the classification tree analysis excludes the CAMELS rating and thus has only 24 variables. The CAMELS rating was excluded because, as a supervisory measure of a bank's overall condition, it reflects many of a bank's underlying characteristics, such as its balance sheet and condition variables. As a result, if the classification tree were to split on the CAMELS rating, especially at the first level, it would mask the underlying differences between acquired and non-acquired banks.

¹¹ Probit regression is a regression technique used when the dependent variable is a discrete "yes or no" variable, such as whether a bank is acquired or not, as opposed to a continuous variable.

¹² In Chart 6, the coefficient on efficiency is set to zero because it was insignificant. Alternatively, setting efficiency to the sample average for each cohort and using the estimated coefficients does not materially change the results.

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