

**Why Do Banks Participate in a FDIC Failed Bank Auction?  
A study on both winning and non-winning bidders' performance**

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Edwards School of Business  
University of Saskatchewan  
Saskatoon, Saskatchewan, Canada

By  
Sicong (Solo) Zhang

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## **Abstract**

The recent Global Financial Crisis provides a great opportunity to study banking mergers, especially ones with failed targets and government assistance. In our study, we adopt multiple approaches to study two main questions. First, we are interested to learn if mergers lead to real economic synergies for combined entities using operating measures. We adopt Propensity Score Matching to compare failed bank acquirers to their close peers. Results show that acquirers in regulatory mergers experience significant improvements in both profitability and cost efficiency immediately after the merger transaction. In addition, we are interested in learning whether participation in a failed bank auction benefits a participant even when this participant is not eventually chosen as the acquirer. Our theory is that participation in the auction reduces information asymmetry and improves the credibility of the participant, a phenomena we call the “Certification Effect”. Traditional event study methodology is applied and results show that acquirers in regulatory mergers tend to experience significantly positive market reaction, which is rationalized by their outperformance in operation. More interesting, we find that the market reaction to first time participation in failed bank auctions is significantly higher than the market reaction to the announcement of participation by an experienced participant. This result holds for both the successful or unsuccessful bidder groups.

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## ***1. Introduction***

The 2007-2008 Global Financial Crisis started a completely new chapter for the entire world. Countless numbers of businesses globally were impacted. At the center of this economic storm, the U.S. banking industry experienced the worst 4-year period (08-11) of weak business conditions and had one of the biggest industry-wide reshuffles in history. During the period of 2008 to 2013, a total of 2022 mergers and acquisitions (hereafter M&As) occurred within the sector, of which 1448 cases took place between 2008 and 2011.<sup>1</sup>

Numerous studies have been devoted to investigate M&As in the banking industry and aimed to learn about these mergers for factors varying from the characteristics of the involved banks, impacts of the resolution mechanism, and market perceptions to motivation and outcomes. Regular merger<sup>2</sup> studies usually exclude mergers that are assisted by the Federal Deposit Insurance Corporation (FDIC), or at least do not distinguish them from non-assisted transactions as they are relatively rare during normal economic periods. Because of the recent financial crisis, however, a significant number of mergers were done through FDIC assistance during a short amount of time. This provides a great opportunity for us to look into this special group of mergers, hereafter, regulatory mergers. Within the regulatory merger group, a majority of them were sold to a healthier peer through FDIC failed bank auctions while only a small portion were kept by the FDIC itself and were eventually liquidated<sup>3</sup>. Among that 1448 M&As completed during the period of 2008 to 2011, there are only 401 regulatory mergers accomplished with FDIC assistance. These special M&As are characterized by official bankruptcy of targets, closed

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<sup>1</sup> These counts are at individual bank level. M&As at Bank Holding Company levels, with BHCs either as a target or an acquirer, are not included in this count, neither in our following studies.

<sup>2</sup> In our study, “regular mergers”, “non-assisted mergers” and “non-regulatory mergers” are interchangeable, and “non-regular”, “assisted mergers” and “regulatory mergers” are interchangeable.

<sup>3</sup> In these cases, the FDIC failed to find another financial institution to take over the failed targets. Therefore, the FDIC would simply pay back all insured deposits through mail while keeping all the target’s assets for later deposition. All loan customers, requested by the FDIC, should continue to make their payments as usual with no changes made to their loan terms.



auction with sealed bidding, cash-only method of payment, and most important, involvement of the FDIC as both an insurer and a partner<sup>4</sup>.

There are quite a few studies in the banking literature focusing purely on failed bank mergers from market reaction perspective. Contrary to almost unanimous findings discussed in non-regulatory M&As literature of which acquirers are often found to experience winner's curse, failed bank merger studies have two sides of findings. One side of the literature argues for evidences of negative abnormal returns experienced by acquirers with overbidding hypothesis (Pettway and Trifts, 1985; Giliberto and Varaiya, 1989; Zhang, 1997) while the other side of the literature argues that acquirers are found to experience significantly positive market reaction around merger announcement date with underbidding and wealth transfer hypothesis (James and Wier, 1987; Bertin et al., 1989; Cochran et al., 1995; Christoffersen et al., 2012; Loveland, 2012; Cowan and Salotti, 2013). The former group argues that bidders in failed bank auctions would tend to overbid, much like what would happen in a general auction, and thus experience winners' curse. The latter group, however, found evidences suggesting underbidding for reasons such as reduced overall purchase power of survivor banks during financial crisis, fire sales of failed banks due to increased supplies, and information asymmetry faced by potential bidders. In particular, Christoffersen et al. (2012) claimed that the FDIC's pricing power is impaired during financial crisis and thus wealth is expropriated from the FDIC by winning acquirers through underbidding. These studies also suggest that such a positive gain for acquirers, not surprisingly, is negatively related to bidding competitions.

From operating performance perspective, studies are usually conducted at a more general level. With variations of proxies, quite a few studies documented positive improvement in operating performances for combined banks (Cornett and Tehranian, 1992; Knapp et al., 2006; DeLong

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<sup>4</sup> According to its own website: 1. As an insurer, "the FDIC typically will reimburse 80 percent of losses incurred by the acquirer on covered assets up to a stated threshold amount (generally the FDIC's dollar estimate of the total projected losses on loss share assets), with the assuming bank absorbing 20 percent"; 2. As a partner, "if there are recoveries on assets that have been charged off by the failed bank or the assuming bank, then the FDIC receives the majority of the benefit. The assuming bank will reimburse the FDIC for 80 percent of the recoveries"; 3. Covering period for losses and benefits sharing varies for commercial assets and residential mortgages. More detailed information could be found at <https://www.fdic.gov/bank/individual/failed/lossshare/>.

and DeYoung, 2007; Al-Sharkas et al., 2008). Cornett and Tehranian found evidence of improved operating cash flow while DeLong and DeYoung (2007) found additional evidence of improvements in other aspects (discussed in literature review). Both studies also found a positive reaction in equity markets for merged banks rationalizing the results from operating performance tests. Knapp et al. (2006), however, failed to document the positive correlation between real economic synergy and market reaction even though they did find evidence of improvement in accounting performance from five different aspects.

Building on the previous knowledge, we are mainly interested in two questions in this study. First, we analyze regulatory mergers from the operating aspect. We would like to find out whether or not these mergers make economic sense. Specifically, we like to answer the question of whether acquiring a failed peer bank would allow the acquirer bank to achieve better operating performance. We analyze profitability (ROA) and cost efficiency (Cost-Income Ratio) as two performance measures, and we adopt the Propensity Score Matching (PSM) method to study changes in the performance of the acquirers. By focusing on a filtered merger sample<sup>5</sup> for the period of 2008 to 2011, our findings suggest that regulatory merger acquirers in general tend to experience improvements in both profitability and cost-income efficiency, especially for transactions done in later years of the period. While improvement in cost-income efficiency is robust and consistent, advancement in profitability is weaker and sensitive to matching methodologies. When comparing these results to those of non-regulatory merger acquirers, more distinct but interesting results show that acquirers of regulatory mergers outperformed their counterparts from non-regulatory mergers quite substantially, both compared to their close matches. In particular, acquirers of regulatory mergers done in 2009, 2010 or 2011 experienced significant improvements in both profitability and cost-income efficiency for at least 2 years following the merger transaction<sup>6</sup>, while acquirers of non-regulatory mergers experienced almost no improvements in either performance measurements throughout the entire study period.

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<sup>5</sup> This M&As sample is filtered for Propensity Score Matching. All cases remained are the ones such that this underlying merger transaction is associated acquirer's only merger transaction during the [-2Y, +2Y] window. More discussions on this could be found in data and methodology section.

<sup>6</sup> Robustness check, with [-3Y,+3Y] window, also shows that improvements in both synergy measures for merger deals done in 2009 and 2010 also extended to the third year following the transaction.

The second interest of ours is from market perspective. We would like to find out how investors perceive and react to failed bank mergers and more important we would like to test the “Certification Effect” in the FDIC failed bank auction. We adopt the basic event study methodology and the results from these tests show that acquirers of regulatory mergers in general experienced significantly positive reactions from equity investors around merger announcement date (same as closing date in regulatory merger cases), equaling to 3.53% for 0 to +1 day window. Sorting full sample into first time failed bank auction participants and senior participants shows 4.33% and 2.44% abnormal returns respectively.<sup>7</sup> Results from testing market reaction on release of unsuccessful bidder information indicate that first time failed bank auction participants, without actually winning the case, still experienced 1.41% abnormal return on average around 0 to +1 window. Thus, combining results from tests of both actual acquirers and unsuccessful bidders support our hypothesis of Certification Effect.

The remainder of this study is organized as follows. In section 2 and 3, we review the general process of the failed bank resolution and the relevant literatures respectively. Section 4 develops our hypotheses and section 5 contains a description of the data and sample filtering process. Our methodology and empirical results are discussed in section 6 and section 7 respectively. Then section 8 concludes.

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<sup>7</sup> We sort acquirers based on their experience with the FDIC failed bank auction (between 2007 and 2013), including both successful and unsuccessful bidding experiences. For example, an acquirer would be classified as a senior participant as long as it participated in an earlier auction; even it was not chosen by the FDIC as a winner at the end.

## 2. *What Happens If an Insured Bank Fails*<sup>8</sup>

Federal or state banking regulatory agencies will consider an insured bank to be in financial distress if the bank is critically undercapitalized (having a ratio of tangible equity to total assets equal to or less than 2 percent) without a feasible plan to restore capital to the required level or the bank cannot keep up with deposit outflows. Facing the impending failure of an insured bank the chartering authority of the failing bank will notify the FDIC through a “failing bank letter”. The FDIC then, required by law, will prepare an arrangement to dissolve the failing institution so that it would minimize the total cost to the Deposit Insurance Fund (DIF).

In general, the FDIC has three basic ways of dissolving a failing bank, known as open bank assistance, deposit payoff, and close bank assistance. Under the open bank assistance scenario, the FDIC will provide the failing bank with necessary assistance (make loans to, purchase the assets of, or place deposits in the troubled bank) to maintain its operation and expects to be compensated for the assistance provided whenever possible. However, this mechanism of resolving a failing bank has become less efficient as there are new policies passed<sup>9</sup> and it is often criticized for potentially creating Too-Big-To-Fail banks. Therefore, this method has rarely been used since 1992. Under the deposit payoff scenario, the FDIC will use the Deposit Insurance Fund to pay off insured deposits of the failing bank in full amounts and maintain its assets for later disposal. Depositors with remaining uninsured deposits and other creditors of the failing bank will be granted receivership certificates from the FDIC entitling them to proceeds from later liquidations of the failing bank’s assets.

The closed bank assistance strategy is often found to be more favorable by the FDIC in resolving failing banks. This strategy is done through the Purchasing & Assumption (P&A) Agreement in which a healthier bank agrees to purchase some, or all, of the failing bank’s assets while

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<sup>8</sup> Information presented in this section is primarily based on “*Managing the crisis: the FDIC and RTC experience 1980-1994*” published by Washington, D.C.: Federal Deposit Insurance Corporation in 1998 as well as the FDIC’s website at <https://www.fdic.gov/bank/individual/failed/>

<sup>9</sup> FDIC (1998) stated that “Passage of the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) in 1989 repealed many of the potential tax benefits associated with open bank assistance” and “The Competitive Equality Banking Act (CEBA) of 1987 authorized the FDIC to establish a bridge bank, which allowed the FDIC additional time to find a permanent solution for resolving a failing bank”.

assuming some, or all, of the failing bank's liabilities, including all insured deposits. After being notified for the impending failure of an insured bank and appointed as the receiver, the FDIC will start its resolution process by requesting business and financial information from the failing bank, and sending a team of specialists to perform further on-site analysis in order to prepare an information package to give to potential buyers of this failing bank. Concurrently, the FDIC will perform due diligence to estimate disposal value of all assets and potential costs associated with direct deposit payoff on a discounted future cash flow basis. With all this information, the FDIC will then decide on structures of a potential P&A agreement.

After all preparations, the FDIC will begin its confidential marketing of the failing bank to as many qualified potential buyers as possible and invite them to the following failed bank auction. An important aspect of this auction is that it is a closed form auction. The FDIC will take the initiative to screen for qualifications<sup>10</sup> and only banks with an invitation could participate in the auction. All approved potential buyers will be invited to an information session where the information package will be distributed and potential offers are discussed. Following this session, they are given some time to conduct their own due diligence, estimate the price they are willing to pay for the failed bank assets, and submit sealed bids. "A bid has two parts: One amount, called the premium, is for the franchise value of the failed institution's deposits; the second amount is what the bidder is willing to pay for the institution's assets to be acquired." The final cash settlement to or from the FDIC for each winning bid would be calculated as liabilities assumed minus assets purchase and then subtract agreed premiums on deposits acquired.

Once all bids are gathered, the FDIC will pool them together along with its own estimated cost of direct deposit payoff as the minimum bid level accepted and select the least cost<sup>11</sup> bid, regardless

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<sup>10</sup> The FDIC takes into account geographic location, competitive environment, minority owned status, overall financial condition, asset size, capital level, and regulatory ratings when screening for qualified buyers.

<sup>11</sup> "The least cost is terminology used by the FDIC to refer to the bid alternative for a failing institution in which the total amount of the FDIC's expenditures and obligations incurred is the least costly to the deposit insurance fund of all possible resolutions for that failed institution."

of other factors.<sup>12</sup> Once the winning bidder is selected and approved by the FDIC Board of Directors, the FDIC will close the failing bank, transfer all assumed liabilities and purchased assets to the acquirer while maintaining the remaining liabilities and assets if any. Upon completion of this process, the FDIC will make a public announcement regarding both the closure of the failing bank and the final resolution method adopted (which means the merger announcement date and the actual merger close date are essentially the same in failed bank mergers). The entire resolution process generally lasts 90 to 100 days and should be kept confidential by all parties until the FDIC officially makes the announcement itself.

On November 12<sup>th</sup>, 2009, the FDIC Board of Director determined that the FDIC would also disclose bid summary information to the public for all whole-bank transactions and assets sales taking place subsequent to May 2009 in addition to the announcement of the failed bank merger agreement. An example of a bid summary released is shown in Figure 1. Specifically, the FDIC will provide information regarding the names of bidders and bid amounts for both winning and losing bids, and the general methodology for determining the least costly bid. The disclosure of the losing bids usually takes the FDIC days or even weeks after the announcement of the winning bid, with the exception of the cover bid (the second highest bid received by the FDIC) which has one year moratorium to avoid impairment of the FDIC's statutory program for whole-bank resolutions and assets sales. Losing bids are disclosed but bidder names and bid amounts are delinked.<sup>13</sup>

[Insert Figure 1 About Here]

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<sup>12</sup> This requirement of selecting the “least cost” bid above direct deposit payoff cost level is in place since 1991. “Before 1991, the FDIC could effect any resolution transaction that was less costly than a deposit payoff.”

<sup>13</sup> Detailed discussion could be found from the Freedom of Information Act (FOIA) service center website at <https://www.fdic.gov/about/freedom/biddocs.html>

### 3. *Literature Review*

#### 3.1 Post-Merger Performance

##### 3.1.1 Market Performance

Studies focused on examining the post-merger performance of merger entities usually take two approaches, either separately or jointly: stock market performance tests and operating performance tests. With various measurement windows, many papers examine the abnormal stock return for both the bidder and the acquirer on a merger announcement. Almost unanimously, results on stock performance of targets in general show that target's shareholders experience positive abnormal returns on merger announcements (Campa and Hernando, 2006; Bendeck and Waller, 2007). However, the findings about the abnormal stock return of bidders/acquirers are less consistent. The majority report insignificant or negative abnormal returns for bidders and insignificant abnormal stock returns for the combined entities. Some other studies, however, suggest positive returns for acquirers, especially studies focusing on U.S. failed bank mergers (James and Wier, 1987; Loveland, 2012). Many studies also suggest that method of payment does matter and mergers with cash as the only method of payment do generate a more favorable response (Megginson, Morgan, and Nail, 2004).

With regards to sources of abnormal returns experienced by acquirer banks, there are mainly two dominating arguments: the synergy hypothesis and the wealth transfer (or over-subsidization) hypothesis. The synergy hypothesis argues that merger allows combined entities to benefit from aspects like cost reductions (Houston et al., 2001), increased market power (Hao, et al., 2012), and diversification opportunities through inter-state branching (Cochran et al., 1995), etc. On the other hand, papers with wealth transfer hypothesis argue that abnormal returns experienced by acquirer banks in failed bank mergers are mainly attributed to the estimated forecast of wealth expropriation from the FDIC to the acquirer bank. Cochran et al. (1995) failed to find support for the existence of scale or scope economics. James and Wier (1987) argued that the private auction with sealed bidding limits competition. Loveland (2012) and Christoffersen et al. (2012) suggested that price of failed banks are driven significantly lower during the period of industry distress as the FDIC has more pressure to liquidate assets of failed targets at fire-sale prices, allowing acquirer banks to benefit. It is difficult, however, to conclude that these two hypotheses

are mutually exclusive and either of these two is dominating the other, as it is quite possible that acquirer banks could benefit from both opportunities at the same time.

While widely used, market performance approach has several limitations. First, the value of equity investments is affected by forward-looking factors and therefore it may not reveal the actual changes in the operations of the business. Second, market measurement makes it hard to identify the sources of gains if there is any. Third, it is not possible to study private companies using stock market performance, as no market information is available. Fourth, there is the possibility of investor overreaction and other market inefficiencies that could invalidate or bias the conclusion to some degree. To address the above issues, a strand of studies have applied accounting-based measurements, as either a complementary or a substitution to stock market return measurement, to capture the realized economic gains resulted from M&A transactions. The results of these studies, however, are again mixed.

### 3.1.2 Operating Performance

Healy et al. (1992) first adopted pre-tax operating cash flow as a proxy for operating performance in studying non-financial firms. Their results suggested that post-merger operating performance of merged firms is significantly improved and is consistent with reactions in the equity market. Switzer (1996) revisited the questions and found consistent results with a larger sample. Ghosh and Jain (2000) found evidence that financial leverage of combined firms increase significantly following merger activities, and equity markets respond positively. Results also suggested that increase in financial leverage mainly comes from increased debt capacity and only part of the increment is from unused pre-merger debt capacity. Megginson et al. (2004) suggested that changes in post-merger operating performance are positively related to changes in corporate focus. Carline et al. (2009) found that operating performance improvement is in a bell-shape relationship with board size and the presence of outside block-holders contribute positively with monitoring effects suggested by previous literature (Shleifer and Vishny, 1986).

Apart from above studies, there is another stream of studies arguing a potential bias in Healy et al. (1992) methodology. These studies claimed that, with proper adjustments, improvement in post-merger operating performance found in earlier studies would no longer be at the same level, if not being removed completely. For example, Ghosh (2001) suggested that using industry



median as a benchmark loses its credibility, if merger companies are systematically outperforming the median level or if acquirers experienced superior performance right before the transaction, and using market value of assets as a deflator might introduce bias. Following Barber and Lyon (1996) and Loughran and Ritter (1997), Ghosh compared merged firms only with a peer group matched on pre-merger performance and size and scaled measurements by total sales instead. Significant improvements in operating performance documented in Healy et al. (1992) were found to be eliminated. Ghosh's adjustments are widely adopted by many subsequent studies (Fee and Thomas, 2004; Powell and Stark, 2005). Powell and Stark (2005), while still documented evidence of improvements in post-merger operating performance, suggested that results are sensitive to methodology, operating performance proxy, benchmark, and deflator choices, and Barber and Lyon (1996) argued that the better choice of an operating performance proxy should indeed depend on research questions.

Aside from general M&A studies, mergers with banks involved are often separately studied due to differences in regulation and operation. Many studies focusing on bank mergers found evidence of improved operating performance for combined entities with various adjustments applied to reflect differences between regular firms and banks (Cornett and Tehranian, 1992; Campa and Hernando, 2006; Knapp et al., 2006; DeLong and DeYoung, 2007). Specifically, Cornett and Tehranian (1992) included marketable securities in the performance calculation, both Campa and Hernando (2006) and DeLong and DeYoung (2007) adopted multiple bank-specific measurements as performance proxies, and Knapp et al. (2006) took mean reversion into consideration when forming proxies.

Examining the source of gains for bank M&As, Houston et al. (2001) found that merged banks benefit significantly more from cost reduction, from things like eliminating overlapping operations, than revenue enhancement. Al-Sharkas et al. (2008) suggested that merger banks enjoying improved productivity growth resulted from a higher technological efficiency. DeLong (2003), while finding evidence showing that the stock market tends to favor focus-driven mergers over diversification-driven mergers, suggested that long-term performance of merged banks is only advanced in earning-stream focus deals.

## 3.2 The FDIC-assisted Failed Bank Mergers

Within bank mergers, we further identify a unique sub-sample composed of government-assisted mergers. The focus of this study is on this sample. It is unique because not only is there a government agent called the FDIC involved, but targets in these M&As are officially failed banks as determined by federal or state banking regulatory agencies. A wide group of studies has been devoted to this area.

### 3.2.1 Failed Bank Auctions

James and Wier (1987) examined the possibility of wealth transfer in failed bank mergers. They argued that winning bidders in the FDIC-assisted mergers experience positively significant abnormal returns that are greater than abnormal returns experienced by acquirers in non-assisted mergers. However, the abnormal return decreases as the number of bidding participants increases, which are consistent with many other studies (Bertin et al., 1989; Loveland, 2012). They claimed that this is an evidence of wealth transfer, but did mention that total benefits to the FDIC might be underestimated. For example, with qualification screening and private invitation, the FDIC may actually lower the chance of future failure of acquirers, and quicker resolution of transaction could prevent potential public losses. Abnormal returns to bidders might just be the price that the FDIC pays temporarily to prevent further costs.

Bertin et al. (1989) found evidence of underbidding and confirmed a negative relationship between abnormally positive returns experienced by failed bank acquirers and bidding competition. Authors attributed positive market reactions to industry level factors like reduced overall purchase power from survivor banks, increased supply of failed banks as well as removal of restrictions on interstate and intrastate branching. Other papers supporting the underbidding hypothesis include Cochran et al. (1995), Loveland (2012), and Cowan and Salotti (2013). Specifically, Loveland (2012) claimed that positively abnormal return experienced by acquirers is higher in the recent crisis as compared to the crisis during the late 1980s and early 1990s.

Zhang (1997) studied bidder gains in the FDIC-assisted mergers and concluded that bidder firms learn through experiences. In particular, first time bidders did not seem to benefit from acquiring

a failed bank from the FDIC. However as banks continue to participate in future auctions, their chance of improved abnormal returns were enhanced.

While most previous studies report positive abnormal returns following bank merger announcements, there are studies that report the opposite finding, which is consistent with the general Winner's Curse hypothesis. For example, Pettway and Trifts (1985) and Giliberto and Varaiya (1989) reported that bidders in the FDIC-assisted auctions tend to overbid.

### 3.2.2 Cost of Resolving Failed Banks to the FDIC

Using the difference between the book value of assets and the realized value of assets as loss proxy, James (1991) studied losses associated with bank failures and concluded that financial firms experience more severe losses, equaling to about 10% of their assets, when going bankrupt, which is more significant than that of non-financial firms. Also his results suggested that the FDIC, if possible, should favor whole bank transactions and not retain any assets from failed banks as losses are much less if assets are assumed by the acquiring banks.

Bennett and Unal (2011) contrasted the liquidation option to the private-sector reorganization option that is available for the FDIC. The results suggested that the FDIC Improvement Act (1991) advanced cost-saving benefits that private-sector reorganization provides. In addition, they found that the FDIC involvement leads to lower cost of resolving failed banks. In addition to the resolving mechanism, Granja (2013) argued that information asymmetry affects overall cost of resolving a failed bank. In particular, this paper argued that uninformed bidders are less likely to participate in the FDIC failed bank auctions, unless they are geographically closer. Therefore, the author believed that further disclosure requirement could help to attract potential buyers and aim to lower the total cost of resolution.

Christoffersen et al. (2012) studied the FDIC's ability in solving failed banks and concluded that it is easier for acquirers to expropriate wealth from the FDIC during the financial crisis period. They attributed it to the fact that during an industry level crisis, the FDIC itself was financially distressed and therefore more than willing to sell a failed bank at a fire sale price. These fire sales allowed acquirers to enjoy wealth transfer from the FDIC, which is found to be long-term and even more significant if the acquirer is a public company.

### 3.2.3 Miscellaneous

Although US financial sector experienced major deregulation regarding interstate and intrastate branching since 1990s, many papers still report evidence of a higher chance of bank failure in certain areas. Using data from the most recent crisis, Aubuchon and Wheelock (2010) studied bank failures and its geographic distribution. They concluded that certain states and regions produced more failed bank cases than others, which is partially consistent with Bhuyan et al. (2010). Wheelock (2011a), however, found that although overall market concentration in U.S. financial sector has been increased substantially, local markets did not produce obvious sign for increased concentration, neither does the number of leading banks. This result is also found to be the case in Adams (2012). Wheelock (2011b) reinforced his findings saying that the recent financial crisis and dramatic increase in failed bank mergers had only little impact on the concentration level of U.S. banking industry, even after including large cases like the acquisition of Washington Mutual Bank by JPMorgan Chase.

Starting from December 2007, the FASB requires banks to report a Bargain Purchase Gain (BPG) in current earnings report at the completion of M&As. Dunn et al. (2011) examined the utilization of such an accounting method by bank managers and found evidence that bank managers tend to report BPG to avoid reporting lowered earnings or even losses, which is the initial intention of FASB.

Studying the relation between economic activity and bank liquidity, Acharya et al. (2011) found evidence of counter cyclical pattern. Specifically, banks preserve lower level of liquidity during economic boom and high level of liquidity during financial crisis. The argument is that banks maintain liquidity to benefit from fire-priced assets of failed or distressed banks during financial crisis, but such incentive is lower during healthy economic conditions.

#### ***4. Hypothesis Development***

As discussed earlier, we would like to analyze our merger sample from operating and market perspectives respectively. We believe that operating performance changes of acquirers resulting from a merger transaction is a topic of interest in general. First, there could be many reasons behind merger transactions like economic synergies, managerial incentives for personal interests, or simply empire building (Too-Big-Too-Fail). Second, a merger is the most important way of spending capital from a business point of view, so that to its shareholders, return on capital invested is the primary indication of success. Our main sample includes the FDIC-assisted failed bank mergers. For such a sample, this investigation becomes even more interesting. In addition, the FDIC is often questioned for the private handling of its organized resolution of failed financial institutions. Evidences should be provided to show if these private arrangements make economic sense.

Buying a failed peer is a high risky proposition especially during financial turmoil. Acquirer banks then should have pricing power over the FDIC (provides incentives) in negotiating deals, which could lead to wealth expropriation. Meanwhile, such negotiation power is likely to allow acquirers to get higher discounts on assets being acquired. Post-merger accounting ratios of acquiring banks then will be inflated when using book value of assets as the deflator.

Additionally, the FDIC should have privileged information regarding the financial strength of insured banks, information that is not known to the public. This advantage, along with its experience in resolving many failed banks over the past decades, should allow the FDIC to select ideal buyers that would generate real merger synergies. All the above reasons lead to our first hypothesis stated as follow:

**Hypothesis 1a:** Acquirers from regulatory mergers outperform their non-merger peers from an operating perspective

We also compare post-merger operating performance between acquirers from regulatory mergers and non-regulatory mergers. This is interesting because according to previous literature, overall purchase power of survivors would be impaired during a financial crisis and if this is the case, survivor banks in general would more likely have limited resources which would allow them to initiate few M&As if any. Thus making a choice between two merger approaches, assuming

underlying banks are invited to the FDIC's closed auction, would be a very critical decision for bank managers to make and knowing the differences in possible outcomes in general as a guideline would help to improve the decision making of managements and ultimately improve the capital utilization of these banks.

The reasons such differences between the two might exist are as follows: first of all, the resolution of failed banks by the FDIC has a fairly short time-window (a detailed discussion of the Timeline of the FDIC Resolution Process could be found in Federal Deposit Insurance Corporation, 1998), this means interested candidates only have limited time to perform basic due diligence. Even if time permits, a thorough due diligence of a large failed bank could also be quite expensive if a potential acquirer is not guaranteed to win. Second, as discussed by Loveland (2012), the information asymmetry hypothesis suggests that during distressed economic downturns the actual bankruptcy of targets imposes many uncertainties and challenges on assets valuations. Third, unlike regular mergers, acquirers in regulatory mergers negotiate with the FDIC directly instead of target's management and are provided with identical information, allowing no bidder to have any advantages. Fourth, because cash is the only accepted method of payment for all the FDIC assisted mergers, regulatory merger acquirers are dealing with more risks than acquirers in non-regulatory mergers who can bring shareholders from target banks on board to share risks through stock payments. Finally, the typical agreement between the FDIC and the selected acquirers usually has a contingent claim similar to a futures contract that caps the acquirers' downside losses as well as their upside gains. All these risks faced by potential acquirers make them more likely to underbid during a failed bank auction allowing them to benefit from wealth transfer, and this leads to our second hypothesis stated below:

**Hypothesis 1b:** Acquirers from regulatory mergers outperform their peers from non-regulatory mergers from an operating perspective

Building on Hypothesis 1a but from a market perspective, we believe that investors will expect such advancements in the post-merger operating performance of acquirers. In other words, we believe that the market is efficient and it will account for positive outcomes from regulatory

mergers. At the same time, general studies also show that cash acquisitions tend to result in better market reactions (Myers and Majluf, 1984). Therefore, we propose that:

**Hypothesis 2:** Acquirers from regulatory mergers would experience positive cumulative abnormal returns (CARs) around the merger announcement date

The failed bank auction of FDIC is a closed event as only qualified candidates selected by the FDIC can participate. One of the rules that the FDIC follows in selecting acquirer candidates is to lower the chance of future failure of merged entities. In other words, banks being selected by the FDIC should be healthier than majority of their peers in general, holding everything else equal. This information could be a very important signal for public investors. In fact, the FDIC started to release bid summary information regarding unsuccessful bidders and unsuccessful bids in early 2010 because of a high level of public interest.<sup>14</sup> We believe that general public, especially investors, are interested in this information because it could be treated as a signal, just like a dividend or stock repurchase announcement, to reduce information asymmetry.

During financial crisis, the capital market would be in such chaos that it would challenge investors to identify real investment opportunities. If investors know that there is a group of banks being “certified”, by a regulator as healthier, they could simply narrow down their screening pool, or at least pay more attention to this group of banks as safer investments which is critical during crisis time. This should be the case regarding not only actual auction winners, but also those who participated but did not win. Thus, investors would generally respond favorably when the names of these banks are revealed.<sup>15</sup> Meanwhile, we also believe that the market should only reward these banks once. The “Certification” information carried by the signal is only valuable for first time bidders. Second or multiple time bidders are not likely to experience

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<sup>14</sup> See the summary of the FDIC’s bid disclosure policy at <https://www.fdic.gov/about/freedom/biddocs.html>

<sup>15</sup> Release of bid summaries is lagging the release of merger details regarding the final winners and agreements between the FDIC and acquirers (Refer to section 2 for more details). In other words, date of releasing bid summaries (except the information regarding the cover bidder and its bid) is usually days or even weeks behind the actual closing date of a merger. Bid summaries are drafted, reviewed, and posted as soon as the FDIC’s workload allows, but without a strict time frame.

a “certification” effect because they already received this benefit from participating in an earlier action. Formalizing the above arguments, we propose the following two hypotheses:

**Hypothesis 3a:** Acquirers from regulatory mergers who are first time failed bank auction participants would experience higher positive CARs around the merger announcement date as compared to acquirers who have participated in the failed bank auction before

**Hypothesis 3b:** Unsuccessful bidders from regulatory mergers who are first time failed bank auction participants would experience positive CARs around the bid summary release date while unsuccessful bidders who have participated in the failed bank auction before would experience no significant CARs



## 5. *Data*

Data for this study consists of two parts. The first part contains all information required for operating performance tests. The M&As information during 2004 to 2013, including merge date and type, and names, IDs, locations and parents of targets and acquirers, is obtained from the Mergers and Acquisitions database of the Federal Reserve Bank of Chicago. All audited accounting information that are reported by insured U.S. commercial banks/depository institutions (mainly national banks, state member banks and insured non-member banks) to the FDIC on a quarterly frequency (Consolidated Reports of Condition and Income or simply Call Report hereafter) is obtained from the Federal Reserve Bank of Chicago as well as the Public Data Distribution site (PDD) of the Federal Financial Institutions Examination Council (FFIEC) Central Data Repository. The common identification used to merge these two datasets is the RSSD ID (named as SURV\_ID/NON\_ID in merger dataset and RSSD9001 in call reports).

Because Call Report data is on a quarterly frequency while our performance measures are using yearly frequency, the following treatments are taken to convert call report data before merging two datasets and forming variables. Regarding balance sheet items, the last quarter data of each calendar year is taken. If fourth quarter data is missing, we use Quarter 3 data instead. If Quarter 3 data is also missing, we drop that company-year observation. Regarding income statement items, the average is calculated first using four quarters' data with missing value(s) automatically excluded and then annual measures are calculated by multiplying each average by four. This approach should take care of any missing data points.

In addition, when dealing with Call Report data, there are two things worth noting. First, not all banks are filing the same report form. Domestic banks will report under form FFIEC 031 if they have foreign offices and under form FFIEC 041 if they do not, and general summary statistics of these two groups are presented in Table 1. Differences are presented in balance sheet item codes mainly. For example, cash and equivalence is item RCFD0010 in form FFIEC 031 but item RCON0010 in form FFIEC 041. The second issue is that these two forms are also evolving as regulations change. For example, before 2007, income from investment banking, advisory, brokerage, and underwriting fees and commissions is under one item named RIADB490 in both forms. However, since 2007, it is separated into three different items, RIADC886, RIADC888

and RIADC887. Full lists of all items involved in this study with detailed explanations are shown in Tables 2a, 2b and 2c.

[Insert Table 1 About Here]

[Insert Table 2a About Here]

[Insert Table 2b About Here]

[Insert Table 2c About Here]

Bank merger data obtained from the Chicago Fed contains a total of 3416 records (transactions with multiple acquirers are stored as separate records) during 2005 to 2013. The entire sample is kept for filtering purposes but only 2007 to 2011 transactions are studied closely. After deleting split cases with Merger Code equals to five (6 cases), and asset sales with Merger Code equals to seven (30 cases), we are left with 3380 records.<sup>16</sup> We further limit our sample by removing all transactions that took place between 2008 to 2011 which the acquirer had at least one other M&A transaction during its [-2Y, +2Y]<sup>17</sup> window, so that pre- and post-merger performance of banks will not be affected by any other M&A deals other than the one that we are studying. After the above filtering steps, we then remove all the remaining transactions that happened before 2008 or after 2011. In the end, we are left with a total of 470 M&As for the period of 2008-2011, among which 376 cases are non-regulatory M&As (Merger Codes 1 or 9) and 94 regulatory M&As (Merger Code 50).<sup>18</sup>

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<sup>16</sup> For Split cases with Merger Code 5, “non-survivor transfers between 40 and 94 percent of its assets to one or more *newly formed survivors*. Non-survivor and survivor continue to exist. Non-survivor has not failed; government assistance is not involved”. For Sale of Assets cases with Merger Code 7, “non-survivor transfers between 40 and 94 percent of its assets to one or more *existing survivors*. Non-survivor and survivor continue to exist. Non-survivor has not failed; government assistance is not involved”. More information could be found in the information file provided by the Federal Reserve Bank of Chicago along with the data file.

<sup>17</sup> This stands for period from 2 years before the merger transaction to 2 years after the merger transaction

<sup>18</sup> For Merger Code 1 (Charter Discontinued cases), “non-survivor transfers its assets to one or more survivors. Non-survivor ceases to exist as a head office. One charter has been discontinued, or will be discontinued in the near future. Non-survivor has not failed; government assistance is not involved”. For Merger Code 9 (Charter Retained cases), “non-survivor transfers 95 percent or more of its assets to one or more survivors. The charter that had been associated with non-

The second part of our data contains all information required for event studies. Along with merger data discussed above (which contains information about acquirers of regulatory mergers and their parent holding companies), we obtain a list of unsuccessful bidders<sup>19</sup> manually from the FDIC website.<sup>20</sup> Their RSSD ID and parent holding company information are also manually collected from the FDIC website<sup>21</sup> and confirmed with information from Competitive Analysis and Structure Source Instrument for Depository Institutions (CASSIDI) from the Federal Reserve Bank of St. Louis<sup>22</sup>. The PERMCO-RSSD links are retrieved from the Federal Reserve Bank of New York (2014)<sup>23</sup>, and the PERMCO-PERMNO links and all stock data (daily frequency) are retrieved from CRSP through Wharton Research Data Services (WRDS). Because the release date of bid summaries are lagging the actual merger announcement/closing date for regulatory mergers, we obtain a list of actual bid summary release dates for each failed bank case from the FDIC through a special FDIC FOIA request. The final sample is consolidated at the top holding company level. The merger sample contains only records with publicly traded acquirers but the targets can be publicly traded or privately held.

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survivor continues to exist and a new ID\_RSSD is assigned to it. Non-survivor has not failed; government assistance is not involved”. For Merger Code 50 (Failure: Government Assistance Provided cases), “non-survivor fails and ceases to exist. Disposition was arranged by the FDIC, RTC, NCUA, or other regulatory agency. Assets may be distributed to other entities as well as the regulatory agency”. More information could be found in the information file provided by the Federal Reserve Bank of Chicago along with the data file.

<sup>19</sup> Because the release of the cover bid (the second highest bid) and its bidder has a one-year moratorium, cover bidders are excluded from unsuccessful bidder sample.

<sup>20</sup> See <https://www.fdic.gov/bank/individual/failed/banklist.html>

<sup>21</sup> See <https://www2.fdic.gov/idasp/main.asp>

<sup>22</sup> See <http://cassidi.stlouisfed.org/institutions>. This database contains information about all historical activities for each individual bank and their parent holding companies and is used to retrieve parent holding company information for each individual bank back to a historical date in case of ownership changes which is not disclosed in the FDIC database (the FDIC database only shows up-to-date information regarding parent holding companies).

<sup>23</sup> See [http://www.newyorkfed.org/research/banking\\_research/datasets.html](http://www.newyorkfed.org/research/banking_research/datasets.html)

## 6. Methodology

### 6.1 Propensity Score Matching

To discover merger effects from operating perspective, we measure post-merger performance of banks for two years following the transaction, Years +1 and +2 respectively (Year 0 is the year during which the merger transaction took place), and compare them with pre-merger level to reveal any significant differences. Regarding the pre-merger performance, banks' performance in Year -1 is used in the main test, and as a robustness check, average of banks' performances in Years -1 and -2 is used. Since two banks involved in a merger transaction report individual financial conditions before Year 0 but joint results after Year 0, we follow the literature (Cornett and Tehranian, 1992; DeLong and DeYoung, 2007) to form joint characteristics for the pre-merger period with weighted average calculation, based on both acquirer's and target's total asset size. The main reason behind such treatment is that the targets are most likely to be in serious financial distress right before the merger, the targets in regulatory mergers are officially on the verge of bankruptcy or already bankrupted. Thus, the weak financial situations of the targets before the mergers will almost certainly bring down the absolute performance level for the combined entities, at least in the short to median term. Our proposed adjustment regarding the pre-merger benchmark will consider this factor and form pair-to-pair comparison. Thus, it should more accurately capture changes coming from the merger synergy instead of simply correcting the bad performance of the targets.

In this study, we adopt the Propensity Score Matching (PSM) method to conduct performance change comparison between different parties. Propensity Score Matching was first introduced by Rosenbaum and Rubin (1983) and is used in evaluating merger effects in many bank merger studies (Egger and Hahn, 2010; Behr and Heid, 2011). It allows us to compare a company with only comparable counterparties on an individual basis and such comparison made it possible to study just the treatment effect without worrying about group statistics being skewed by extreme samples or any other uncontrolled factors. The "treatment" refers to the merger activity and therefore treatment effect is the merger effect that acquirer banks would experience. In this study, we implement the Stata program developed by Becker and Ichino (2002) to perform the actual test and details will be discussed later.

The first step of PSM is to assign banks into two groups – the treated (merger) group (Merger Dummy=1) and the control group (Merger Dummy=0) – and then use a propensity score model to estimate the likelihood of a random bank being involved in a merger activity.<sup>24</sup> A PSM model is a logit/probit model with the merger dummy as the dependent variable and a set of  $Xs$  as independent variables, described as follows:

$$p(Xs) = \text{prob}(\text{Merger} = 1|Xs) = E(\text{Merger}|Xs) \quad (6.1)$$

Where  $Xs$  include seven different performance proxies as suggested by Behr and Heid (2011):

- **Size:** measured by logarithm of total current book value of assets;
- **ROA:** return on lagged assets measured as net income over lagged total book value of assets;
- **Cost-income Ratio (CI):** measured by sum of current interest and non-interest expenses over sum of current interest and noninterest incomes;
- **Interest Margin (IM):** measured by the difference between interest rate on interest bearing assets and interest rate on interest bearing liabilities;
- **Equity Ratio (EQR):** measured by total current book value of equity over lagged total book value of assets;
- **Non-performing Loans (NPL):** measured by total current non-performing loans (loans past due 90 days or more but still accruing plus nonaccrual loans) scaled by lagged total book value of assets;
- **Liquidity Ratio (LQR):** measured by total liquid assets (cash and cash equivalence, plus fed funds sold, plus securities available for sale plus securities held to maturity) scaled by lagged total book value of assets.

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<sup>24</sup>Treated group includes all banks remaining in the filtered merger sample. Control group includes only those that are not involved, either as an acquirer or as a target, in neither regulatory merger nor non-regulatory merger.

The propensity score is essentially the conditional probability of a bank getting involved in merger activity given pre-merger performances  $Xs$ . Another way of understanding the propensity score here is that two banks with similar propensity scores are considered similar across all  $X$  dimensions right before the merger activity. With each bank assigned a propensity score, we then find matching bank(s) from the control group for every bank in the merger group. The idea of PSM is to compare performance of a merger (acquiring) bank with performance of that same bank if it does not have a merger transaction. With close propensity scores, we can hypothetically treat matching bank(s) as the twin bank for its merger bank and its performance would be treated as the approximation of the performance of that merger bank without a merger transaction. Performance change of individual banks is calculated by subtracting pre-merger performance from its own post-merger level for all banks involved, and then a difference-in-difference measure (the merger effects) between each merger and matching bank pair is formed by subtracting the performance change of the matching bank from the performance change of its associated merger bank. The mathematical interpretation is as follow<sup>25</sup>:

$$Merger\ Effect = E(P_{1a} - P_{1b}|Xs, Merger = 1) - E(P_{0a} - P_{0b}|Xs, Merger = 1) \quad (6.2)$$

Where:

- P stands for an operating performance measure, either ROA or CI;
- Subscript  $a$  and  $b$  stand for post- and pre-merger period respectively;
- 1 and 0 stand for whether or not a bank has a merger transaction, or simply merger and matching banks respectively in this case.

After carefully investigating the discussion made by Becker and Ichino (2002) regarding propensity score matching and their Stata program, we apply the following methodologies. In order to avoid year effects on banks' performances and rather than include year dummies in our propensity score estimation model, matching banks are only selected from the same year in

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<sup>25</sup> This model expression is modified based on Propensity Score Matching introduction developed by Econometrics Academy available at <https://sites.google.com/site/econometricsacademy/econometrics-models/propensity-score-matching>

which the merger bank had its transaction. The matching method applied here is a hybrid that combines the one-on-one nearest neighbor and radius matching methods. The nearest neighbor matching method matches each merger bank with a single control bank that has the closest propensity score. In contrast, the radius matching method matches each merger bank with a set of control banks (equally weighted) whose propensity scores are within a pre-defined range (radius) of the propensity score of the merger bank. While the basic nearest neighbor matching strategy is very commonly used in the literature due to its simplicity (Egger and Hahn, 2010; Lemmon and Roberts, 2010; Petrova and Shafer, 2010), we employ the idea of radius matching to adjust our nearest neighbor matching to improve the quality of the matches. Specifically, it is likely that a matching bank obtained from the basic nearest neighboring match would be a poor approximation for the merger bank because of a closest yet very different propensity score. We impose a radius restriction (radius=0.0001) so that the matching bank has a propensity score that is not only closest to but also within  $\pm 0.0001$  of the propensity score of its associated merger bank. We allow replacement so that a control bank could be the matching bank for multiple merger banks, and employ common support option so that matching process would only be performed within the common range of propensity scores of merger and control banks. We perform the comparison on two performance indicators similar to Behr and Heid (2011): ROA as a profitability proxy and Cost-Income Ratio as a cost efficiency proxy (both are included as control characteristics  $X$ s in the propensity score estimation model).

Regarding our sub-test for Hypothesis 1b, the treatment group is banks with regulatory mergers, the control group should be banks with non-regulatory mergers and the treatment effect should be the difference in performance changes between the two merger types. However due to the fact that sample sizes of non-regulatory merger group for each year of 2008 to 2011 are not significantly larger than that of regulatory merger group for that same year, we cannot ensure the quality of matches as even the closest match selected from non-regulatory merger group might still be too different from its counterparty from regulatory merger group and thus treatment effects revealed, if any, would become meaningless.

To address this issue, we separate our entire sample into three groups: acquirer banks from regulatory mergers, acquirer banks from non-regulatory mergers, and all remaining banks, which were not involved in any type of merger transactions, neither as an acquirer nor as a target. All

three groups are filtered for the  $[-2Y,+2Y]$  window so that both acquirer groups consist of banks with only one merger that takes place in Year 0 and the control group consists of all banks with no merger transactions, neither as an acquirer or as a target, during the entire period. The former two groups are treated groups that will be used in two separate PSM tests respectively and the last group is the common control group, which is used in both PSM tests. Even though acquirers from both regulatory and non-regulatory mergers are only compared to their close matches instead of with each other directly, we believe it is still a fair comparison given the assumption that those close matches are proxies to the acquirer banks themselves without merger transaction. In other words, this is still a difference-in-difference comparison between two groups.

## 6.2 Regression

In addition to Propensity Score Matching, we also employ the basic multi-linear regression methodology to further analyze post-merger operating performance of involving banks and specifically the effect of underpricing on performance of those acquirer banks. Regression analyses are performed over two steps. In step 1, we employ equation (6.3) shown below to verify whether or not earlier results from PSM tests hold in a traditional approach. The sample here would include acquirer banks from regulatory and/or non-regulatory mergers and their matching banks obtained from earlier PSM tests.

$\Delta Performance =$

$$\alpha + \beta_1 * Reg\_Merger + \beta_2 * Nonreg\_Merger + \sum_{i=3}^8 \beta_i * Premerger\_Xs + Year\_Controls + \varepsilon \quad (6.3)$$

Where:

- $\Delta Performance$  stands for ROA or CI change of a bank between Year -1 and Year +1 (or +2);
- $Reg\_Merger$  is a dummy variable that takes 1 if a bank is a regulatory merger acquirer and 0 otherwise;
- $Nonreg\_Merger$  is a dummy variable that takes 1 if a bank is a non-regulatory merger acquirer and 0 otherwise;



- *Premerger\_Xs* are 6 dimensions (Size, IM, EQR, NPL, LQR and either ROA or CI depending on the dependent variable used) of a bank in Year -1;
- *Year\_Controls* are a set of year dummies.

In step 2, we employ equation (6.4) over the sample consisting all regulatory merger acquirer banks and their matching banks. We combine each acquirer bank observation with the observation of its matching bank to form measurements of differences and our dependent variable becomes a difference-in-difference measurement, the same as the merger effect from earlier PSM tests. We include two new variables named *Equity\_Discount* and *Competition* to estimate the degree of underpricing. Details of the equation and variables involved are discussed as follow:

$$\begin{aligned}
 & \text{Merger Effect} = \\
 & \alpha + \beta_1 * \text{Equity\_Discount} + \beta_2 * \text{Competition} + \sum_{i=3}^8 \beta_i * \text{Premerger\_Xs\_Diff} + \\
 & \text{Year\_Controls} + \varepsilon
 \end{aligned}
 \tag{6.4}$$

Where:

- *Merger Effect* stands for the difference in ROA or CI change from Year -1 to Year +1 (or +2) between an acquirer bank and its matching bank;
- *Equity\_Discount* is the difference between sale price of Equity and last reported book value of Equity of the target that underlying acquirer bank purchased scaled by last reported book value of Assets of the target;
- *Competition* is the average between number of bidders and number of bids in a failed bank auction;
- *Premerger\_Xs\_Diff* are differences between an acquirer bank and its matching bank in 6 dimensions (Size, IM, EQR, NPL, LQR and either ROA or CI depending on the dependent variable used) in Year -1;

- *Year\_Controls* are a set of year dummies.

### 6.3 Event Study

In order to test Hypotheses 2, 3a and 3b, we adopt the standard event study to estimate abnormal stock returns based on Brown and Warner (1985). We take the merger announcement (closing) date as Day 0 for a regulatory merger and the bid summary release date as Day 0 for an unsuccessful bidder. For each bank in our study sample, we estimate a standard OLS market model, shown below, using data for trading Days -270 to -21 inclusive, so that we have approximately included one year of market data.<sup>26</sup> We leave 20 trading days between the estimation window of the market model and Day 0 to avoid any abnormal market movements due to potential information leakage. We perform our market reaction test over five event windows: [-10,-3], [-2,-1], [0,+1], [0,+2], and [+3,+10].

$$R_{i_t} = \alpha_{i_t} + \beta_{i_t} * R_{M_t} + \varepsilon_{i_t} \quad (6.5)$$

We filter our sample to make sure that no merger bank in the sample will have a second merger (or no unsuccessful bidder will have any merger activity), either regulatory or non-regulatory, for the entire period from Trading Day -270 to Trading Day +10. However, we do allow an acquirer to have successive mergers as long as these following mergers are closed within half a year (125 trading days) of the first merger in the series. We still restrict these successive mergers to be at least 10 trading days apart so that the event window is clean. For these successive merger cases included, their estimation window takes the announcement date of the first case in the series as Day 0 (in other words, they are sharing the same estimated market model), and their event window takes the actual announcement date of their own as Day 0. Similar treatment is done for the unsuccessful bidder group as well.

In terms of actual calculation, we use the CRSP value-weighted return (including distributions) as our market index proxy to estimate market models for each bank in our sample. Once beta and alpha are estimated, we then use this market model to predict abnormal returns for each day over a specific event window (equation 6.6). For each event window, we sum all daily abnormal

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<sup>26</sup> We allow a minimum of 200 trading days as the estimation window for banks without enough public stock data available

returns for each bank to form the cumulative abnormal returns (CARs) (equation 6.7) and then we perform the statistical test with robust standard errors and bootstrapping.

$$\widehat{AR}_{i_t} = R_{i_t} - (\widehat{\alpha}_{i_t} + \widehat{\beta}_{i_t} * R_{M_t}) \quad (6.6)$$

$$CARs_i(t_1, t_2) = \sum_{t=t_1}^{t_2} \widehat{AR}_{i_t} \quad (6.7)$$

## 7. Results

### 7.1 Propensity Score Matching

We conduct summary statistics for banks included in the study regarding each variable used in PSM tests. Table 3a, 3b, and 3c present the results for regulatory merger group, non-regulatory merger group and unsuccessful bidder group from failed bank auctions respectively.

[Insert Table 3a About Here]

[Insert Table 3b About Here]

[Insert Table 3c About Here]

Several observations can be made from these tables. First, before having a merger, acquirers from both regulatory and non-regulatory merger groups were exhibiting similar characteristics (shown in Panel A and B in Table 3a and 3b respectively) with the exception that acquirers from non-regulatory merger group are almost 3 times larger than those from the regulatory merger group. However, a significantly larger size for acquirers from the non-regulatory merger group is likely to be skewed by mega banks within the sample (see median statistics). This is exactly why we prefer using Propensity Score Matching to traditional group-based comparison methods. Second, even though acquirers from the regulatory merger group are smaller than their counterparties, targets from the regulatory merger group are relatively bigger. Third, targets from the regulatory merger group are characterized by significantly lower profitability, lower cost efficiency, under capitalization, higher non-performing assets and lower liquidity.

Before Propensity Score Matching test, we perform a traditional Equality Test with filtering window  $[-2Y,+2Y]$  as a start. We compare average performance of control and merger groups and see whether or not they are statistically equal to each other at group level. Like what we do in PSM, we take Year -1 performance as well as the average of Year -1 and -2 performances as the pre-merger benchmarks. Results are shown in Table 4. Clearly, acquirers from regulatory mergers experienced significant improvements in both ROA and CI in both Year +1 and +2, and this is consistent when we change the pre-merger benchmark shown in Panel B. However, acquirers from non-regulatory mergers only experienced some degrees of improvement in cost

efficiency in random years, and results become insignificant when we change the pre-merger benchmark.

[Insert Table 4 About Here]

However, the Equality Test has its potential problem. Some papers suggest that using industry overall statistics as a benchmark loses its credibility if merger companies are systematically outperforming the mean/median level (Ghosh, 2001). Therefore, with above results documented, we then perform PSM tests with the hybrid matching strategy for the same filtering window and results for the combined sample are presented in Table 5. We perform two separate PSM tests (one for regulatory merger group and the other for non-regulatory merger group) for each of two performance proxies with performance from Year -1 as the benchmark first shown in Panel A, and then repeat the process with average performance from Year -1 and -2 as the benchmark shown in Panel B.

[Insert Table 5 About Here]

Results between two groups are distinct again. Regulatory merger acquirers seem to experience significant improvements in both profitability and cost efficiency and such merger gains last in both 1 and 2 years after the merger transaction. Non-regulatory merger acquirers, on the other hand, seem to enjoy no benefits from initiating a voluntary merger, at least in the immediate terms after a merger transaction. Results are consistent in both Panel A and Panel B. We also employ the pairwise test to assess the quality of the matches and results are presented in Table 6. The pairwise test results suggest that our merger banks and their matching banks share similar pre-merger firm characteristics in general and they should perform similarly if nothing else happened. Therefore, any differences detected in the PSM test should not be attributed to the difference in their pre-merger characteristics but to the merger event instead.

[Insert Table 6 About Here]

We then group mergers by year to discover post-merger operating performance of acquirers with mergers closed in different years. Results are presented in Table 7. From Panel A in Table 7, merger effects on profitability for deals done during 2009 and 2010 are found to be significantly positive in Year +1 and/or +2. These significant results indicate that acquirers of regulatory

mergers done during 2009 and 2010 were experiencing positively abnormal changes in ROA as compared to their close peers who did not have any mergers and such benefit from the merger was immediately realized after the merger transaction and lasted for at least 2 years. A closer look also indicates that acquirers having mergers done in later years appear to enjoy higher abnormal profitability improvements than those of earlier mergers, peaking at the year of 2010. In particular, abnormal ROA advancements are indifferent from 0 for deals done in 2008, increased to 3 percentage points (ppts) for deals done in 2010 and then backed to insignificant from 0 for deals done in 2011. The non-regulatory merger group, on the other hand, shows no significant merger effects and the signs are not always as expected (we are expecting the positive sign for ROA effects and the negative sign for CI effects).

[Insert Table 7 About Here]

On the cost side, results are very similar. For the regulatory merger group, acquirers having mergers done in 2010 and 2011 seem to enjoy consistent abnormal improvements in cost efficiency for all two years following the transaction. Acquirers in non-regulatory merger group, however, failed to achieve consistent abnormal improvements in cost-income efficiency, not to mention again that signs are not always as expected. For acquirers having regulatory mergers done in 2010, cost-income ratio is lowered by additional 32 ppts (35.1 ppts) in Year +1 (Year +2) due to the merger transaction. Same metrics for deals done in 2011 are 22 ppts and 25.7 ppts in Year +1 and +2 respectively. Again, we find that abnormal cost efficiency advancement is higher for mergers done in later years, peaking at the year of 2010.

The theme discussed above also holds when we apply average performance of Year -1 and -2 as the benchmark shown in Panel B of Table 7. Non-regulatory merger acquirers seem to have little to no benefit from acquiring a peer bank (except for abnormal cost efficiency improvement for deals done in 2011) while regulatory merger acquirers, who have their deals done in 2009, 2010 or 2011, were experiencing abnormal improvements in profitability, cost efficiency, or both.

In addition to the hybrid matching strategy, which produces one-on-one match pairs, we also repeat the PSM test with basic radius (radius=0.0001) matching approach and results are presented in Table 8. With basic radius matching, a merger bank now could have multiple matching banks as long as these matching banks have a propensity score within  $\pm 0.0001$  of the

propensity score of the merger bank. General theme again holds with even stronger significance. Acquirers from the regulatory merger group who acquired a peer bank in 2009, 2010 or 2011 were experiencing significant abnormal improvements in both profitability and cost efficiency right after their transactions and such gains lasted for at least two years following the merger event. Stronger results regarding regulatory merger group, however, suggest that evidence of abnormal advancement in profitability is sensitive to the matching strategy applied, which might be caused by the small sample size we have. Acquirers from the non-regulatory merger group, on the other hand, again failed to show any sign of benefits from buying a peer bank, with the exception of abnormal cost efficiency improvements in the second year following a merger event that takes place in 2008 or 2011.

[Insert Table 8 About Here]

When turning to unsuccessful bidders shown in Table 9, results are inconsistent between Equality test and PSM test. According to the theory, these banks are ones who participated in a failed bank auction but did not end up acquiring a peer bank. Therefore, they should not have any abnormal changes in their operating performances, either profitability or cost efficiency, in following years as compared to their peers who did not participate in an auction. The PSM test results shown in Panel B are consistent with our predictions while the Equality test results shown in Panel A are not. This provides favor to the PSM test over traditional group-based comparisons and suggests that the PSM test results might be preferred whenever there is an inconsistency in results between Equality and PSM tests.

[Insert Table 9 About Here]

In addition, we also re-examine the topic by extending the sample-filtering window. By replacing [-2Y, +2Y] window by [-3Y, +3Y] window, we are now limiting our samples so that underlying M&As, which happened during 2008 to 2010, are the only M&As transaction that associated acquirer has during the entire period of 3 years before the merger to 3 years after the merger. We also extend performance comparisons to the third year following the transaction and, by doing so; we have to drop Year 2011 in our test. We also change one of the pre-merger performance benchmark from an average of 2 years before the transaction to average of 3 years before the transaction. We made such adjustments for both Equality Test and Propensity Score

Matching test and the results are shown in Table 10 and Table 11. Overall themes remain consistent, especially under the PSM test.

[Insert Table 10 About Here]

[Insert Table 11 About Here]

## 7.2 Regression

With the sample from Panel A in Table 5, we take a step further and perform traditional regression analyses. Results for the regression with all acquirer banks from regulatory and non-regulatory mergers and their matching banks are shown in Table 12 and results for the regression with only regulatory merger acquirer banks and their matching banks are shown in Table 13. Consistent with earlier observations from PSM tests, the Reg\_Merger dummy is statistically significant with correct signs across all tests in both tables while the Nonreg\_Merger dummy in table 12 is not significant except when using CI change of a bank between Year -1 and +2 as the dependent variable. These results suggest that regulatory merger acquirer banks experienced additional profitability and cost efficiency improvements after the merger transaction while non-regulatory merger acquirer banks did not. In addition, results also suggest that smaller banks with less cost efficiency, higher interest margin, and higher liquidity in earlier years are in general more likely to experience additional profitability advancements in later years while banks with higher equity capital and less non-performing loans in earlier years are more likely to experience additional cost efficiency improvements in later years.

[Insert Table 12 About Here]

[Insert Table 13 About Here]

According to the literature, potential bidders are more likely to underbid in a FDIC failed bank auction, which will generate a wealth transfer from the FDIC to the final winner. In order to test the impact of underpricing on post-merger operating performance of a failed bank acquirer, we employ equation (6.4) stated in methodology section. We manually collect bid information for all regulatory mergers in our sample, namely the assets discount and deposit premium data, from the FDIC website. Along with the last reported quarterly data of targets, we form an Equity



discount proxy calculated as the difference between sale price and book value of total Equity of a target scaled by its total Assets.<sup>27</sup> We also obtain the number of bidders and number of bids to estimate the degree of competition in an auction and we drop 7 cases due to data availability issue in this step. A full list of mergers included with Equity discount and competition data is provided in Table 14. Results of the regression are shown in Table 15.

[Insert Table 14 About Here]

[Insert Table 15 About Here]

Coefficients of neither Equity\_Discount nor Competition variables in Table 15 are statistically significant in tests with abnormal performance changes, or the merger effect, as the dependent variable. This is inconsistent with the argument that synergies of regulatory mergers mainly come from the underpricing practice of failed bank acquirers. We realize, however, that the significance of those coefficients might be deteriorated by the fact that although it is our best approximation, our Equity\_Discount measurement does not take the P&A agreement between the FDIC and the acquirer into consideration. Therefore, we might underestimate the degree of underpricing and thus underestimate the impacts of underpricing on post-merger operating performances of acquirer banks. Turning onto other results, we find that smaller acquirer banks with less cost efficiency and less non-performing loans as compared to their close peers before their merger transactions are found to experience more abnormal improvements in profitability and larger acquirer banks with low profitability as compared to their close peers before their merger transactions are found to experience more abnormal improvements in cost efficiency. This is consistent with our expectation as smaller banks are more likely to benefit from mergers that lead to increase in market share and larger banks are more likely to benefit from mergers that help to improve operation and management efficiency.

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<sup>27</sup> We scale this measurement by total Assets because in many cases target banks reported negative book value of Equity in their last quarter and this makes percentage calculation based on total Equity meaningless. Meanwhile, we also think about using market value of Equity instead to estimate the equity discount; however only one target bank in this sample was publicly traded before being acquired and we are forced to drop the idea.

### 7.3 Event Study Results

The results of analyzing the abnormal stock return of regulatory merger acquirers are shown in Table 16. We find significantly positive abnormal market reactions responding to merger announcement for acquirers. Our observation is consistent with many earlier studies on failed bank mergers and supports the underbidding and wealth transfer hypotheses. Specifically for the 2-day window  $[0,+1]$  with full sample in Panel A, acquirers on average experienced 3.53% abnormal return with 66:28 positive-negative ratio. Before Day 0, however, no significant abnormal market movement is detected. This is not surprising given that the entire failed bank resolution process was kept confidential by all parties with signed agreements that prohibit information leakage to the public or insiders before the FDIC's official announcement. The positive CARs for  $[0,+1]$  window could be rationalized by our findings from the operating performance tests. With earlier tests, we showed that acquirers from regulatory mergers tended to experience abnormal advancements in both profitability and cost efficiency. Thus, positive results from event study indicate that public investors are indeed seeing such synergies and rewarding these mergers by bidding up the acquirers' share price.

[Insert Table 16 About Here]

When separating first time failed bank auction participants (shown in Panel B) out from senior auction participants (shown in Panel C), we find that abnormal stock reaction is much higher for first time auction participants as compared to senior auction participants, 4.33% versus 2.44% over  $[0,+1]$  window. This is quite interesting because according to Zhang (1997), acquirer firms learn through experience. In particular, the author found that first time acquirers did not seem to benefit from acquiring failed banks from the FDIC. However, as they continue to participate in future auctions, their chance of improved abnormal returns is enhanced. Our results show exactly the opposite and we attribute this to our method applied for grouping first-time versus senior participants. In Zhang (1997), a bank is determined as either a first-time or an experienced failed bank auction participant based on whether or not it has acquired a peer bank through the failed bank auction before. In our study, we group banks based on whether or not it has participated in the failed bank auction before. For example, an acquirer who is a second-time failed bank

auction participant but a first-time failed bank auction winner would be classified into first-time experience group in Zhang (1997) but into senior experience group in our study.

We propose that the Certification Effect could explain the difference between CARs in Panel B and C. For first time failed bank auction participants, investors rewarded the unsuccessful bidders for being invited by the FDIC to an auction, which signals their financial health. At the same time, investors rewarded the successful bidders first for being invited and second for having performance enhancing mergers. In other words, the first time unsuccessful bidders received the Certification Effect while the first time successful bidders received the Certification Effect plus the premium for a value-enhancing merger. In contrast, there is no Certification Effect for senior auction participants as this effect was received in an earlier auction. Thus, any abnormal improvements in performance are related to the merger effect and are felt only by the successful bidders.

We check the robustness of the Certification Effect by examining the performance of the unsuccessful bidders following the announcement of their participation in the auction. According to our results from the operating performance tests (Table 9), these unsuccessful bidders failed to deliver abnormal operating performance advancements as compared to non-merger peers. This is not surprising because they did not actually have a merger after all. Accordingly, if the merger effect is the only determinant for market reactions we should also expect no event-specific abnormal reactions from the market. With this expectation, we conduct an event study analysis of the performance of the unsuccessful bidders. The results are reported in Table 17. Contrary to our expectations, the table shows that the first time participants who were unsuccessful bidders do indeed experience positive and significant returns during the announcement day and the day after. We suggest that these unsuccessful bidders are experiencing positive CARs because of the Certification Effect.

[Insert Table 17 About Here]

Following Cowan & Salotti (2013), we also perform a robustness check by extending the windows. Particularly, we change our estimation window to trading days [-345,-91], leaving 90 trading days before the event date to avoid any abnormal market movements due to potential information leaks. Our event windows now are [-30,-1], [0,+1], [0,+2], and [+3,+30]. Results are

presented in Tables 18 and 19 respectively and they are generally consistent with the earlier tests. Sample sizes are slightly smaller due to a longer filtering window and the cases that are excluded are mainly from the group of senior failed bank auction participants. In regards to the winning bidders shown in Table 18, CARs are significantly positive, although a bit smaller than those in Table 16, over the window [0,+1] in all three panels and it is significantly higher for the group of first time failed bank auction participants compared to the senior group. Regarding unsuccessful bidders in Table 19, results are consistent except that now we have a positive reaction over [-30,-1] window for the senior participants group shown in Panel C. We attribute this to the possible information leakage captured over a longer pre-merger window (there are no restrictions preventing unsuccessful bidders from disclosing the fact that they have participated in an auction once the official merger announcement is made by the FDIC) or potential bias due to a smaller sample size.

[Insert Table 18 About Here]

[Insert Table 19 About Here]

## **8. Conclusion**

The recent Global Financial Crisis provides a great opportunity to study regulatory mergers as the number of failed banks increases dramatically during financially turbulent periods. Unlike previous literature that take a more traditional approach, we adopt a more sophisticated method, Propensity Score Matching, along with traditional regression and event study methodologies to examine regulatory mergers and seek answers for how failed bank auction participants benefit from their participations.

Results from both Propensity Score Matching and regression tests show that regulatory merger acquirers would experience real economic gains, or tangible benefits, in terms of both abnormal profitability and abnormal cost efficiency improvements while subsequent tests show that non-regulatory merger acquirers would not. That being said, benefits of taking non-regulatory mergers, however, could be intangible, in aspects like becoming Too Big To Fail or simply gaining entrance to new markets at costs. We fail to find evidences supporting the argument that underpricing is a driven factor for outperformance of regulatory merger acquirers. However, this might be due to an imperfect estimation of merger price that we employ. Results also show that merger gains for regulatory merger acquirers tend to be higher for mergers done in later years of our study period, peaking at year of 2010. Results with unsuccessful bidders show that these banks did not have any operating benefits because of no merger involved. Results from event studies show that public investors tend to respond favorably for regulatory merger announcements. Sub-sample tests also show that public investors not only reward acquirers for their performance enhancing mergers, but also for being invited to a failed bank auction which signals their financial health, namely the Certification Effect. We also find that investors reward such certification only once and this is supported by results from event study tests on unsuccessful bidders.

Our study contributes to the literature by providing additional knowledge on the FDIC failed bank mergers. We find a significant difference of post-merger operating performance of acquirers between regulatory mergers and non-regulatory mergers. We believe this is relevant and important information for bank managements. During a financial crisis, survivor banks are also in financial distress and in general would more likely have limited resources, which would

only allow them to initiate few M&As if any. Thus making a choice between two merger approaches, assuming underlying banks are invited to the FDIC's closed auction, would be a very critical decision for bank managers to make and knowing the differences in possible outcomes in general as a guideline would help to improve managements' decision making and ultimately improve banks' capital utilization. Our study is also of interest to policy makers. The FDIC has been questioned for their private arrangement of failed banks and policy makers are looking for more information to understand if the FDIC has done an appropriate job in fairly and efficiently resolving failed banks. Our results do provide some insights showing that these regulatory mergers might create economic synergies for the acquirers and thus are a better way for the FDIC to resolve a failed bank as compared to the direct liquidation.

Our findings from event studies also fill the gap of understanding the FDIC failed bank auctions and outcomes on different auction participants. We are the first to examine the Certification Effect and we believe that this would be very important knowledge for various parties, namely public investors, bank managements, and regulators and policy makers. Our findings could be served as an investment guideline for public investors in finding proper investment opportunities during financial turmoil. At the same time, knowing how public investors respond to the release of identifications of auction participants, bank management could use it as a financial tool just like a dividend or stock repurchase announcements to disseminate information about their financial health which lower the information asymmetry between insiders and outsiders. For example, bank management, if invited, could simply submit a bid, while aiming to actually win a case, to communicate with the public regarding their financial conditions. To regulators and policy makers, our study provides support for the Freedom of Information Act (FOIA) amendments, showing that reducing the information gap between insiders and outsiders would enhance market efficiency.

Our study in general also provides some other potential policy implications as well. For instance, countries including the U.S. are starting to implement the Basel III standard and two new financial instruments are introduced, namely the non-viability contingent capital and the bail-in debt. On one hand, applications of these two instruments will help to manage the capital adequacy and delay bank failures if not completely preventing it from happening. Therefore, it would reduce the chance of having the FDIC to step in and arrange for receivership, or at least

allow the FDIC more time to search for better options or deals that potentially lower the cost of resolving failed banks. However, on the other hand, the implementation of non-viability contingent capitals and bail-in debts could be very costly. The preferred share owners and bail-in debt creditors are asked to share significant amount of risks and in return will demand higher compensations. This will increase the cost of finance for banks in general and ultimately such costs will also be passed on to end customers. More importantly, such additional costs are inherent even when the economy is stable and sound. Therefore, questions like whether the cost of implementation of these financial tools will be lower than the cost of resolving failed banks through the current role of the FDIC have to be answered before we can conclude whether or not the FDIC should be discontinued from its current position. My study provides partial supports for the FDIC showing that private arrangement of failed banks through assistance of the FDIC seems to allow acquirer banks to achieve better operating performance by creating synergies. In other words, banking industry as a whole will benefit from the practice of allowing healthier peers to absorb failed banks in the long run and thus the role of the FDIC needs to be in place to facilitate and monitor the process.

Meanwhile, Canada also has its own version of the FDIC called the CDIC, which performs similar roles as the FDIC does in the United States. Although it seems that the Canadian banking industry was doing very well during the Global Financial Crisis without having a single financial institution failed, there were total of 43 failure cases handled by the CDIC since its inception. It is hard to comment on the role of the CDIC given the fact that there is no recent example to study with and no definite guideline of how the CDIC handles bank bankruptcy in Canada. However, our lesson from the FDIC might help the CDIC to improve its current system. For example, the implementation of auction in finding proper buyers and the application of the Purchase and Assumption (P&A) agreement might help the CDIC to reduce overall cost of resolving failed banks and save money from taxpayers.

Despite the new contributions, many interesting questions need to be answered by future studies. First, studies could be done to investigate sources of profitability and cost efficiency improvement for regulatory mergers. Secondly, factors that drive non-regulatory mergers during Global Financial Crisis need to be discovered and examined to rationalize such big corporate decisions being made. Thirdly, future studies could also include multi-merger acquirers to reveal

if merger gains are increasing with the number of mergers and that would be an examination of the theory of learning by observing/practicing. Fourth, it will be also helpful to learn if the Certification Effect remains valid during periods of non-financial crisis.



## References

- Acharya, V. V., Shin, H. S., & Yorulmazer, T. (2011). Crisis Resolution and Bank Liquidity. *The Review of Financial Studies*, 24(6), 2166-2205.
- Adams, R. M. (2012). Consolidation and Merger Activity in the United States Banking Industry from 2000 through 2010. *51*, 56-73.
- Al-Sharkas, A. A., Hassan, M. K., & Lawrence, S. (2008). The Impact of Mergers and Acquisitions on the Efficiency of the US Banking Industry: Further Evidence. *Journal of Business Finance & Accounting*, 35(1-2), 50-70.
- Aubuchon, C. P., & Wheelock, D. C. (2010). The Geographic Distribution and Characteristics of U.S. Bank Failures, 2007-2010: Do Bank Failures Still Reflect Local Economic Conditions? *Federal Reserve Bank of St. Louis Review*, 92(5), 395-415.
- Barber, B. M., & Lyon, J. D. (1996). Detecting abnormal operating performance: The empirical power and specification of test statistics. *Journal of Financial Economics*, 41(3), 359-399.
- Becker, S. O., & Ichino, A. (2002). Estimation of average treatment effects based. *The Stata Journal*, 2(4), 358-377.
- Behr, A., & Heid, F. (2011). The success of bank mergers revisited. An assessment based on a matching strategy. *Journal of Empirical Finance*, 18(1), 117-135.
- Bendeck, Y. M., & Waller, E. R. (2007). Bank Acquisition Announcements And Intra-Industry Effects. *Journal of Business & Economics Research*, 5(7), 15-21.
- Bennett, R. L., & Unal, H. (2011). The Cost Effectiveness of the Private-Sector Reorganization of Failed Banks.
- Bertin, W. J., Ghazanfari, F., & Torabzadeh, K. M. (1989). Failed Bank Acquisitions and Successful Bidders' Returns. *Financial Management*, 18(2), 93-100.
- Bhuyan, R., Ng, S. A.-L., & Vaziri, M. (2010). Do acquisitions create value? Evidence from the US and the European bank acquisitions during financial crisis. *Investment Management and Financial Innovations*, 7(4), 8-25.
- Brown, S. J., & Warner, J. B. (1985, March). Using Daily Stock Returns: the case of event studies. *Journal of Financial Economics*, 14(1), 3-31.
- Campa, J. M., & Hernando, I. (2006). M&As performance in the European financial industry. *Journal of Banking & Finance*, 30(12), 3367-3392.
- Carline, N. F., Linn, S. C., & Yadav, P. K. (2009). Operating performance changes associated with corporate mergers and the role of corporate governance. *Journal of Banking & Finance*, 33(10), 1829-1841.
- Christoffersen, S. E., Hynes, R. M., & Walt, S. D. (2012, July). Abnormal Returns to Public and Private Acquirers of Failed Banks: Evaluating the Effectiveness of the FDIC. *Rotman School of*

- Cochran, B., Rose, L. C., & Fraser, D. R. (1995). A market evaluation of FDIC assisted transactions. *Journal of Banking & Finance*, 19(2), 261-279.
- Cornett, M. M., & Tehranian, H. (1992). Changes in corporate performance associated with bank acquisitions. *Journal of Financial Economics*, 31(2), 211-234.
- Cowan, A. R., & Salotti, V. (2013). THE RESOLUTION OF FAILED BANKS DURING THE CRISIS: ACQUIRER PERFORMANCE AND FDIC GUARANTEES, 2008–2011. (Working Paper). Retrieved February 2014, from <http://ssrn.com/abstract=2117574>
- DeLong, G. (2003). Does Long-Term Performance of Mergers Match Market Expectations? Evidence from the US Banking Industry. *Financial Management*, 32(2), 5-25.
- DeLong, G., & DeYoung, R. (2007, February). Learning by Observing: Information Spillovers in the Execution and Valuation of Commercial Bank M&As. *The Journal of Finance*, LXII(1), 181-216.
- Dunn, K., Kohlbeck, M., & Smith, T. (2011). Bargain Purchase Gains and the Acquisitions of Failed Banks. Retrieved February 17, 2014, from <http://ssrn.com/abstract=1800883>
- Econometrics Academy. (n.d.). *Propensity Score Matching*. Retrieved from <https://sites.google.com/site/econometricsacademy/econometrics-models/propensity-score-matching>
- Egger, P., & Hahn, F. R. (2010). Endogenous bank mergers and their impact on banking performance. Some evidence from Austria. *International Journal of Industrial Organization*, 28(2), 155-166.
- Federal Deposit Insurance Corporation. (1998). *Managing the crisis: the FDIC and RTC experience 1980-1994*. Washington, D.C.: Federal Deposit Insurance Corporation.
- Federal Deposit Insurance Corporation. (n.d.). *Freedom of Information Act (FOIA) Service Center*. Retrieved Dec 2014, from Federal Deposit Insurance Corporation: <https://www.fdic.gov/about/freedom/biddocs.html>
- Federal Deposit Insurance Corporation. (n.d.). *Loss-Share Questions and Answers*. Retrieved Dec 2014, from Federal Deposit Insurance Corporation: <https://www.fdic.gov/bank/individual/failed/lossshare/>
- Federal Reserve Bank of New York. (2014). *CRSP-FRB Link*. Retrieved from [http://www.newyorkfed.org/research/banking\\_research/datasets.html](http://www.newyorkfed.org/research/banking_research/datasets.html)
- Fee, C. E., & Thomas, S. (2004). Sources of gains in horizontal mergers: evidence from customer, supplier, and rival firms. *Journal of Financial Economics*, 74(3), 423-460.
- Ghosh, A. (2001). Does operating performance really improve following corporate acquisitions? *Journal of Corporate Finance*, 7(2), 151-178.
- Ghosh, A., & Jain, P. C. (2000). Financial leverage changes associated with corporate mergers. *Journal of Corporate Finance*, 6(4), 377-402.

- Giliberto, M., & Varaiya, N. P. (1989). The Winner's Curse and Bidder Competition in Acquisitions: Evidence from Failed Bank Auctions. *The Journal of Finance*, 44(1), 59-75.
- Granja, J. (2013). The Relation Between Bank Resolutions and Information Environment: Evidence from the Auctions for Failed Banks. *Journal of Accounting Research*, 51(5), 1031-1070.
- Hao, L., Nandy, D. K., & Roberts, G. S. (2012, Dec). Effects of Bank Regulation and Lender Location on Loan Spreads. *JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS*, 47(6), 1247-1278.
- Healy, P. M., Palepu, K. G., & Ruback, R. S. (1992). Does corporate performance improve after mergers? *Journal of Financial Economics*, 31(2), 135-175.
- Houston, J. F., James, C. M., & Ryngaert, M. D. (2001). Where do merger gains come from? Bank mergers from the perspective of insiders and outsiders. *Journal of Financial Economics*, 60(2-3), 285-331.
- James, C. (1991). The Losses Realized in Bank Failures. *The Journal of Finance*, 46(4), 1223-1242.
- James, C., & Wier, P. (1987). An Analysis of FDIC Failed Bank Auctions. *Journal of Monetary Economics*, 20(1), 141-153.
- Knapp, M., Gart, A., & Chaudhry, M. (2006). The impact of mean reversion of bank profitability on post-merger performance in the banking industry. *Journal of Banking & Finance*, 30(12), 3503-3517.
- Lemmon, M., & Roberts, M. R. (2010, June). The Response of Corporate Financing and Investment to Changes in the Supply of Credit. *JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS*, 45(3), 555-587.
- Loughran, T., & Ritter, J. R. (1997). The Operating Performance of Firms Conducting Seasoned Equity Offerings. *The Journal of Finance*, 52(5), 1823-1850.
- Loveland, R. (2012). Does it Pay to Win an FDIC Auction? *2012 FMA Annual Meeting Program*.
- Meggison, W., Morgan, A., & Nail, L. (2004). The determinants of positive long-term performance in strategic mergers: Corporate focus and cash. *Journal of Banking & Finance*, 28(3), 523-552.
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221.
- Petrova, M., & Shafer, M. T. (2010, January). Post-Acquisition Performance: A Propensity Score Matching Approach. (Draft).
- Pettway, R. H., & Trifts, J. W. (1985). Do Banks Overbid When Acquiring Failed Banks? *Financial Management*, 14(2), 5-15.
- Powell, R. G., & Stark, A. W. (2005). Does operating performance increase post-takeover for UK takeovers? A comparison of performance measures and benchmarks. *Journal of Corporate Finance*, 11(1-2), 293-317.
- Rosenbaum, P. R., & Rubin, D. B. (1983, April). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika*, 70(1), 41-55.

- Shleifer, A., & Vishny, R. W. (1986, June). Large Shareholders and Corporate Control. *The Journal of Political Economy*, 94(3), 461-488.
- Switzer, J. (1996). Evidence on real gains in corporate acquisitions. *Journal of Economics and Business*, 48(5), 443-460.
- Wheelock, D. C. (2011). Banking Industry Consolidation and Market Structure: Impact of the Financial Crisis and Recession. *Federal Reserve Bank of St. Louis Review*, 93(6), 419-438.
- Wheelock, D. C. (2011). Have Acquisitions of Failed Banks Increased the Concentration of U.S. Banking Markets? *Federal Reserve Bank of St. Louis Review*, 93(3), 155-168.
- Zhang, H. (1997). Repeated acquirers in FDIC assisted acquisitions. *Journal of Banking & Finance*, 21(10), 1419-1430.

**Table 1****Summary Statistics of All Banks Reported to the FDIC during 2003-2013**

<b>Total Asset &amp; Total Equity Summary Statistics</b>						
		N	Mean	Std Dev	Skewness	Kurtosis
Banks with foreign office	Total Assets	1,268	72,238	223,798	5.40	31.25
	Total Equity	1,268	7,529	21,483	5.31	31.16
Banks without foreign office	Total Assets	82,150	446	2,335	26.55	1049.95
	Total Equity	82,150	49	294	33.65	1753.85
<b>Extreme Observations for Total Assets</b>						
		With foreign office		Without foreign office		
	Lowest	Highest	Lowest	Highest		
	4.686	1,631,621	0.001	98,737		
	58.042	1,746,242	0.066	99,877		
	63.148	1,811,678	0.068	102,602		
	63.256	1,896,773	0.207	142,616		
	65.171	1,945,467	0.212	163,066		
<b>Extreme Observations for Total Equity</b>						
		With foreign office		Without foreign office		
	Lowest	Highest	Lowest	Highest		
	-0.775	169,077	-63.11	14,288		
	0.392	171,325	-40.551	14,916		
	6.413	177,458	-36.66	15,672		
	8.713	177,480	-23.388	23,327		
	8.997	178,693	-22.539	23,690		

1. Mean, standard deviation and extreme observations regarding total assets and total equities are stated in millions

2. Sample size is based on company-year observations. For example, if a bank has financial information for 5 years, those are account as 5 individual observations in this table

**Table 2a****Variable Definition with Associated Call Report Items, form FFIEC 031**

<b>Variable name</b>	<b>Definition</b>	<b>Call Report item, FFIEC 031</b>
RSSD ID	Bank RSSD ID	RSSD9001
Reporting Type	Filing Type	RCON9804
Date	Reporting Date	RSSD9999
Size	Log(total assets)	log(RCFD2170)
TA	Total assets	RCFD2170
ROA	Net income over lagged total assets	RIAD4340/lrcfd2170
CI	Interest and noninterest expense over interest and noninterest income	(RIAD4073+RIAD4093)/(RIAD4107+RIAD4079)
IM	Difference between interest rate on interest bearing assets and interest rate on interest bearing liabilities	RIAD4107/(RCFD2170-(RCFD0081+RCFDB639))-RIAD4073/(RCFD2950-(RCON6631+RCFN6631+RCFD2930))
EQR	Total equity over lagged total assets	RCFD3210/lrcfd2170
LQR	Liquidity assets over lagged total assets	(RCFD0010+RCONB987+RCFDB989+RCFD1754+RCFD1773)/lrcfd2170
NPL	Non-performing loans over lagged total assets	
	a. loans past due 90 days or more	
	before 2007	RCON2769+RCON3494+RCON5399+RCONC237+RCONC239+RCON3500+RCON3503+RCFNB573+RCFD5378+RCFD5381+RCFD1597+RCFD1252+RCFD1255+RCFDB576+RCFDB579+RCFD5390+RCFD5460+RCFD1258+RCFD1272
	between 2007 and 2010	RCON2769+RCON3494+RCON5399+RCONC237+RCONC239+RCON3500+RCON3503+RCFNB573+RCFD5378+RCFD5381+RCFD1597+RCFD1252+RCFD1255+RCFDB576+RCFDB579+RCFD5390+RCFD5460+RCFDF167+RCFDF170
	after 2011	RCONF174+RCONF175+RCON3494+RCON5399+RCONC237+RCONC239+RCON3500+RCONF180+RCONF181+RCFNB573+RCFD5378+RCFD5381+RCFD1597+RCFD1252+RCFD1255+RCFDB576+RCFDK214+RCFDK217+RCFD5390+RCFD5460+RCFDF167+RCFDF170

b. nonaccrual loans	
before 2007	RCON3492+RCON3495+RCON5400+RCONC229+RCONC230+RCON3501+RCON3504+RCFNB574+RCFD5379+RCFD5382+RCFD1583+RCFD1253+RCFD1256+RCFDB577+RCFDB580+RCFD5391+RCFD5461+RCFD1259+RCFD1791
between 2007 and 2010	RCON3492+RCON3495+RCON5400+RCONC229+RCONC230+RCON3501+RCON3504+RCFNB574+RCFD5379+RCFD5382+RCFD1583+RCFD1253+RCFD1256+RCFDB577+RCFDB580+RCFD5391+RCFD5461+RCFDF168+RCFDF171
after 2011	RCONF176+RCONF177+RCON3495+RCON5400+RCONC229+RCONC230+RCON3501+RCONF182+RCONF183+RCFNB574+RCFD5379+RCFD5382+RCFD1583+RCFD1253+RCFD1256+RCFDB577+RCFDK215+RCFDK218+RCFD5391+RCFD5461+RCFDF168+RCFDF171

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Call Report form can be downloaded from FFIEC website at [https://www.ffiec.gov/ffiec\\_report\\_forms.htm](https://www.ffiec.gov/ffiec_report_forms.htm). Some items including ID, Date, and Reporting Type are with different item name in Call Report form and in SAS Call Report data file. In those cases, SAS Call Report data file is the primary source for final determination. Lag Total Assets is a custom definition and "lrcfd2170" means RCFD2170 from previous year (same for lrcon2170).

**Table 2b****Variable Definition with Associated Call Report Items, form FFIEC 041**

<b>Variable name</b>	<b>Definition</b>	<b>Call Report item, FFIEC 041</b>
RSSD ID	Bank RSSD ID	RSSD9001
Reporting Type	Filing Type	RCON9804
Date	Reporting Date	RSSD9999
Size	Log(total assets)	log(RCON2170)
TA	Total assets	RCON2170
ROA	Net income over lagged total assets	RIAD4340/lrcon2170
CI	Interest and noninterest expense over interest and noninterest income	(RIAD4073+RIAD4093)/(RIAD4107+RIAD4079)
IM	Difference between interest rate on interest bearing assets and interest rate on interest bearing liabilities	RIAD4107/(RCON2170-(RCON0081+RCONB639))-RIAD4073/(RCON2950-(RCON6631+RCON2930))
EQR	Total equity over lagged total assets	RCON3210/lrcon2170
LQR	Liquidity assets over lagged total assets	(RCON0010+RCONB987+RCONB989+RCON1754+RCON1773)/lrcon2170
NPL	Non-performing loans over lagged total assets <ul style="list-style-type: none"> <li>a. loans past due 90 days or more <ul style="list-style-type: none"> <li>before 2007</li> <li>between 2007 and 2010</li> <li>after 2011</li> </ul> </li> <li>b. nonaccrual loans</li> </ul>	<ul style="list-style-type: none"> <li>RCON2769+RCON3494+RCON5399+RCONC237+RCONC239+RCON3500+RCON3503+RCONB835+RCON1607+RCONB576+RCONB579+RCON5390+RCON5460+RCON1227</li> <li>RCON2769+RCON3494+RCON5399+RCONC237+RCONC239+RCON3500+RCON3503+RCONB835+RCON1607+RCONB576+RCONB579+RCON5390+RCON5460+RCON1227</li> <li>RCONF174+RCONF175+RCON3494+RCON5399+RCONC237+RCONC239+RCON3500+RCONF180+RCONF181+RCONB835+RCON1607+RCONB576+RCONNK214+RCONK217+RCON5390+RCON5460+RCON1227</li> </ul>



before 2007	RCON3492+RCON3495+RCON5400+RCONC229+R CONC230+RCON3501+RCON3504+RCONB836+RC ON1608+RCONB577+RCONB580+RCON5391+RCO N5461+RCON1228
between 2007 and 2010	RCON3492+RCON3495+RCON5400+RCONC229+R CONC230+RCON3501+RCON3504+RCONB836+RC ON1608+RCONB577+RCONB580+RCON5391+RCO N5461+RCON1228
after 2011	RCONF176+RCONF177+RCON3495+RCON5400+R CONC229+RCONC230+RCON3501+RCONF182+RC ONF183+RCONB836+RCON1608+RCONB577+RCO NK215+RCONK218+RCON5391+RCON5461+RCO N1228

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Call Report form can be downloaded from FFIEC website at [https://www.ffiec.gov/ffiec\\_report\\_forms.htm](https://www.ffiec.gov/ffiec_report_forms.htm). Some items including ID, Date, and Reporting Type are with different item name in Call Report form and in SAS Call Report data file. In those cases, SAS Call Report data file is the primary source for final determination. Lag Total Assets is a custom definition and "lrcfd2170" means RCFD2170 from previous year (same for lrcon2170).

**Table 2c****Call Report Items Definition**

<b>Item</b>	<b>Definition</b>
RSSD9001	Bank RSSD ID
RSSD9999	Reporting Date
RCON9804	Financial Institution Filing Type
RCFD0010 or RCON0010	Total Cash and Balances Due from Depository Institutions
RCFD0081 or RCON0081	Noninterest-bearing balances due from depository institutions and currency and coin
RCFD1252	Commercial and industrial loans to U.S. addressees (domicile) (Past due 90 days or more and still accruing)
RCFD1253	Commercial and industrial loans to U.S. addressees (domicile) (Nonaccrual)
RCFD1255	Commercial and industrial loans to non-U.S. addressees (domicile) (Past due 90 days or more and still accruing)
RCFD1256	Commercial and industrial loans to non-U.S. addressees (domicile) (Nonaccrual)
RCFD1258	Lease financing receivables of U.S. addressees (domicile) (Past due 90 days or more and still accruing)
RCFD1259	Lease financing receivables of U.S. addressees (domicile) (Nonaccrual)
RCFD1272	Lease financing receivables of non-U.S. addressees (domicile) (Past due 90 days or more and still accruing)
RCFD1583	Loans to finance agricultural production and other loans to farmers (Nonaccrual)
RCFD1597	Loans to finance agricultural production and other loans to farmers (Past due 90 days or more and still accruing)
RCFD1754 or RCON1754	Held-to-maturity securities
RCFD1773 or RCON1773	Available-for-sale securities
RCFD1791	Lease financing receivables of non-U.S. addressees (domicile) (Nonaccrual)
RCFD2170 or RCON2170	Total Asset
RCFD2930 or RCON2930	Other liabilities
RCFD2950 or RCON2950	Total liabilities
RCFD3210 or RCON3210	Total bank equity capital
RCFD5378	Loans to U.S. banks and other U.S. depository institutions (Past due 90 days or more and still accruing)
RCFD5379	Loans to U.S. banks and other U.S. depository institutions (Nonaccrual)
RCFD5381	Loans to foreign banks (Past due 90 days or more and still accruing)

RCFD5382	Loans to foreign banks (Nonaccrual)
RCFD5390 or RCON5390	Loans to foreign governments and official institutions (Past due 90 days or more and still accruing)
RCFD5391 or RCON5391	Loans to foreign governments and official institutions (Nonaccrual)
RCFD5460 or RCON5460	All other loans (Past due 90 days or more and still accruing)
RCFD5461 or RCON5461	All other loans (Nonaccrual)
RCFDB576 or RCONB576	Loans to individuals for household, family, and other personal expenditures: Credit cards (Past due 90 days or more and still accruing)
RCFDB577 or RCONB577	Loans to individuals for household, family, and other personal expenditures: Credit cards (Nonaccrual)
RCFDB579 or RCONB579	Loans to individuals for household, family, and other personal expenditures: Other (includes single payment, installment, all student loans, and revolving credit plans other than credit cards) (Past due 90 days or more and still accruing)
RCFDB580 or RCONB580	Loans to individuals for household, family, and other personal expenditures: Other (includes single payment, installment, all student loans, and revolving credit plans other than credit cards) (Nonaccrual)
RCFDB639 or RCONB639	Total Trading assets
RCFDB989 or RCONB989	Securities purchased under agreements to resell
RCFDF167	Lease financing receivables to individuals for household, family, and other personal expenditures (Past due 90 days or more and still accruing)
RCFDF168	Lease financing receivables to individuals for household, family, and other personal expenditures (Nonaccrual)
RCFDF170	Lease financing receivables, all other leases (Past due 90 days or more and still accruing)
RCFDF171	Lease financing receivables, all other leases (Nonaccrual)
RCFDK214 or RCONK214	Loans to individuals for household, family, and other personal expenditures: Automobile loans (Past due 90 days or more and still accruing)
RCFDK215 or RCONK215	Loans to individuals for household, family, and other personal expenditures: Automobile loans (Nonaccrual)
RCFDK217 or RCONK217	Loans to individuals for household, family, and other personal expenditures: Other (revolving credit plans other than credit cards, and other consumer loans) (Past due 90 days or more and still accruing)
RCFDK218 or RCONK218	Loans to individuals for household, family, and other personal expenditures: Other (revolving credit plans other than credit cards, and other consumer loans) (Nonaccrual)
RCFN6631	Noninterest-bearing deposits in foreign offices, Edge and Agreement subsidiaries
RCFNB573	Loans secured by real estate in foreign offices (Past due 90 days or more and still accruing)

RCFNB574	Loans secured by real estate in foreign offices (Nonaccrual)
RCON1227	Lease financing receivables (Past due 90 days or more and still accruing)
RCON1228	Lease financing receivables (Nonaccrual)
RCON1607	Commercial and industrial loans (Past due 90 days or more and still accruing)
RCON1608	Commercial and industrial loans (Nonaccrual)
RCON2769	Loans secured by construction, land development, and other land loans in domestic offices (Past due 90 days or more and still accruing)
RCON3492	Loans secured construction, land development, and other land loans in domestic offices (Nonaccrual)
RCON3494	Loans secured by farmland in domestic offices (Past due 90 days or more and still accruing)
RCON3495	Loans secured by farmland in domestic offices (Nonaccrual)
RCON3500	Loans secured by multifamily (5 or more) residential properties in domestic offices (Past due 90 days or more and still accruing)
RCON3501	Loans secured by multifamily (5 or more) residential properties in domestic offices (Nonaccrual)
RCON3503	Loans secured by nonfarm nonresidential properties in domestic offices (Past due 90 days or more and still accruing)
RCON3504	Loans secured by nonfarm nonresidential properties in domestic offices (Nonaccrual)
RCON5399	Loans secured by 1– 4 family residential properties in domestic offices: (1) Revolving, open-end loans secured by 1– 4 family residential properties and extended under lines of credit (Past due 90 days or more and still accruing)
RCON5400	Loans secured by 1– 4 family residential properties in domestic offices: (1) Revolving, open-end loans secured by 1– 4 family residential properties and extended under lines of credit (Nonaccrual)
RCON6631	Noninterest-bearing deposits in domestic offices
RCONB835	Loans to depository institutions and acceptances of other banks (Past due 90 days or more and still accruing)
RCONB836	Loans to depository institutions and acceptances of other banks (Nonaccrual)
RCONB987	Federal funds sold in domestic offices
RCONC229	Loans secured by 1– 4 family residential properties in domestic offices: (2) Closed-end loans secured by 1– 4 family residential properties secured by first liens (Nonaccrual)
RCONC230	Loans secured by 1– 4 family residential properties in domestic offices: (2) Closed-end loans secured by 1– 4 family residential properties secured by junior liens (Nonaccrual)
RCONC237	Loans secured by 1– 4 family residential properties in domestic offices: (2) Closed-end loans secured by 1– 4 family residential properties secured by first liens (Past due 90 days or more and still accruing)

RCONC239	Loans secured by 1– 4 family residential properties in domestic offices: (2) Closed-end loans secured by 1– 4 family residential properties secured by junior liens (Past due 90 days or more and still accruing)
RCONF174	Loans secured by construction, land development, and other land loans in domestic offices: (1) 1–4 family residential construction loans (Past due 90 days or more and still accruing)
RCONF175	Loans secured by construction, land development, and other land loans in domestic offices: (2) Other construction loans and all land development and other land loans (Past due 90 days or more and still accruing)
RCONF176	Loans secured by construction, land development, and other land loans in domestic offices: (1) 1–4 family residential construction loans (Nonaccrual)
RCONF177	Loans secured by construction, land development, and other land loans in domestic offices: (1) Other construction loans and all land development and other land loans (Nonaccrual)
RCONF180	Loans secured by nonfarm nonresidential properties in domestic offices: (1) Loans secured by owner-occupied nonfarm nonresidential properties (Past due 90 days or more and still accruing)
RCONF181	Loans secured by nonfarm nonresidential properties in domestic offices: (2) Loans secured by other nonfarm nonresidential properties (Past due 90 days or more and still accruing)
RCONF182	Loans secured by nonfarm nonresidential properties in domestic offices: (1) Loans secured by owner-occupied nonfarm nonresidential properties (Nonaccrual)
RCONF183	Loans secured by nonfarm nonresidential properties in domestic offices: (2) Loans secured by other nonfarm nonresidential properties (Nonaccrual)
RIAD4073	Total interest expense
RIAD4079	Total noninterest income
RIAD4093	Total noninterest expense
RIAD4107	Total interest income
RIAD4340	Net income (loss)

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**Table 3a: Summary Statistics of Regulatory Merger Group in PSM Test****Panel A: Acquirers and Targets, Year -2**

Variable	Acquirers				Targets			
	N	Mean	Median	StdDev	N	Mean	Median	StdDev
Size	67	527,893	260,139	718,566	67	273,599	98,286	859,509
ROA	67	0.0263	0.0291	0.0318	65	-0.0254	-0.0174	0.0547
CI	67	0.7763	0.7496	0.1306	67	1.0102	0.9557	0.4282
IM	67	0.0859	0.0847	0.0231	67	0.0823	0.0823	0.0258
EQR	67	0.1218	0.1103	0.0510	65	0.0998	0.0919	0.0422
NPL	67	0.0124	0.0078	0.0162	65	0.0506	0.0416	0.0424
LQR	67	0.2644	0.2393	0.1176	65	0.2237	0.1883	0.1690

**Panel B: Acquirers and Targets, Year -1**

Size	67	567,120	309,173	766,405	67	244,808	96,535	746,424
ROA	67	0.0225	0.0268	0.0289	67	-0.1012	-0.0925	0.0993
CI	67	0.7674	0.7344	0.1541	67	0.7156	1.1361	4.8415
IM	67	0.0911	0.0880	0.0308	67	0.0814	0.0789	0.0309
EQR	67	0.1166	0.1053	0.0408	67	0.0437	0.0331	0.0368
NPL	67	0.0143	0.0104	0.0160	67	0.0845	0.0738	0.0637
LQR	67	0.2857	0.2814	0.1274	67	0.1955	0.1618	0.1125

**Panel C: Acquirers, Year +1**

Size	67	746,443	425,708	1,050,832
ROA	67	0.0264	0.0268	0.0264
CI	67	0.6974	0.6882	0.1329
IM	67	0.1019	0.0972	0.0211
EQR	67	0.1080	0.1046	0.0238
NPL	67	0.0251	0.0181	0.0226
LQR	67	0.3152	0.3001	0.1305

**Panel D: Acquirers, Year +2**

Size	67	753,974	421,297	995,660
ROAL	67	0.0262	0.0269	0.0238
CI	67	0.6897	0.6898	0.1176
IM	67	0.0956	0.0928	0.0187
EQR	67	0.1116	0.1046	0.0236
NPL	67	0.0187	0.0138	0.0219
LQR	67	0.3311	0.3315	0.1298

1. This table includes the M&As sample filtered for Propensity Score Matching. All cases remained are the ones such that this underlying merger transaction is associated acquirer's only transaction during the [-2Y,+2Y] window. All merger cases are aligned with merger year as Year 0. All mergers with missing value(s) for any of the variables listed will be excluded.

2. Size here represents the absolute value of total assets in Thousands, even though natural logarithm of that value is used in Propensity Score Matching model

**Table 3b: Summary Statistics of Non-regulatory Merger Group in PSM Test****Panel A: Acquirers and Targets, Year -2**

Variable	Acquirers				Targets			
	N	Mean	Median	StdDev	N	Mean	Median	StdDev
Size	353	1,580,325	268,718	10,511,853	353	202,641	74,010	757,193
ROA	351	0.0291	0.0280	0.0381	349	0.0292	0.0193	0.2850
CI	353	0.7684	0.7551	0.1600	353	0.8641	0.8112	0.2697
IM	353	0.0858	0.0852	0.0208	353	0.0849	0.0832	0.0235
EQR	351	0.1146	0.1036	0.0499	349	0.1262	0.1020	0.0918
NPL	351	0.0070	0.0044	0.0084	349	0.0101	0.0037	0.0166
LQR	351	0.3106	0.2743	0.1831	349	0.3589	0.3300	0.1904

**Panel B: Acquirers and Targets, Year -1**

Size	353	1,700,904	298,289	11,493,103	353	205,988	75,567	738,078
ROA	353	0.0262	0.0261	0.0329	353	0.0344	0.0157	0.4727
CI	353	0.7722	0.7656	0.1048	353	0.8771	0.8308	0.2232
IM	353	0.0838	0.0838	0.0212	353	0.0754	0.0800	0.1359
EQR	353	0.1151	0.1038	0.0461	353	0.1234	0.1041	0.0745
NPL	353	0.0087	0.0054	0.0110	353	0.0118	0.0045	0.0181
LQR	353	0.3066	0.2758	0.1658	353	0.3498	0.3207	0.1809

**Panel C: Acquirers, Year +1**

Size	353	2,108,940	450,256	13,218,283
ROA	353	0.0163	0.0217	0.0361
CI	353	0.7834	0.7528	0.1738
IM	353	0.0885	0.0865	0.0312
EQR	353	0.1115	0.1061	0.0305
NPL	353	0.0167	0.0105	0.0187
LQR	353	0.3008	0.2722	0.1655

**Panel D: Acquirers, Year +2**

Size	353	2,106,243	456,273	13,127,927
ROAL	353	0.0127	0.0197	0.0389
CI	353	0.7804	0.7439	0.2049
IM	353	0.0896	0.0885	0.0312
EQR	353	0.1085	0.1054	0.0286
NPL	353	0.0174	0.0106	0.0219
LQR	353	0.3140	0.2778	0.1627

1. This table includes the M&As sample filtered for Propensity Score Matching. All cases remained are the ones such that this underlying merger transaction is associated acquirer's only transaction during the [-2Y,+2Y] window. All merger cases are aligned with merger year as Year 0. All mergers with missing value(s) for any of the variables listed will be excluded.

2. Size here represents the absolute value of total assets in Thousands, even though natural logarithm of that value is used in Propensity Score Matching model

**Table 3c: Summary Statistics of Unsuccessful Bidders in PSM Test****Panel A: Unsuccessful Bidders, Year -2**

Variable	N	Mean	Median	StdDev
Size	57	497,720	294,507	516,163
ROA	57	0.0257	0.0271	0.0214
CI	57	0.7780	0.7746	0.0958
IM	57	0.0846	0.0839	0.0204
EQR	57	0.1140	0.1044	0.0370
NPL	57	0.0102	0.0058	0.0137
LQR	57	0.2968	0.2818	0.1551

**Panel B: Unsuccessful Bidders, Year -1**

Size	57	530,726	322,527	546,217
ROA	57	0.0233	0.0228	0.0165
CI	57	0.7596	0.7436	0.0878
IM	57	0.0854	0.0835	0.0182
EQR	57	0.1106	0.1048	0.0263
NPL	57	0.0110	0.0059	0.0133
LQR	57	0.3254	0.2994	0.1539

**Panel C: Unsuccessful Bidders, Year +1**

Size	57	599,520	381,836	611,704
ROA	57	0.0202	0.0223	0.0214
CI	57	0.7340	0.7132	0.1101
IM	57	0.0884	0.0872	0.0184
EQR	57	0.1130	0.1081	0.0279
NPL	57	0.0142	0.0079	0.0174
LQR	57	0.3632	0.3504	0.1635

**Panel D: Unsuccessful Bidders, Year +2**

Size	57	616,605	395,101	617,753
ROAL	57	0.0221	0.0235	0.0221
CI	57	0.7294	0.7146	0.1252
IM	57	0.0876	0.0848	0.0186
EQR	57	0.1115	0.1036	0.0274
NPL	57	0.0165	0.0072	0.0272
LQR	57	0.3621	0.3344	0.1549

1. This table includes all unsuccessful bidders filtered for Propensity Score Matching. All bidders remained are the ones with no merger transaction done within the [-2Y,+2Y] window. All bidders are aligned with bidding year as Year 0. All bidders with missing value(s) for any of the variables listed will be excluded.



**Table 4**  
**Results from Equality Test with [-2Y,+2Y] Window**

**Panel A: Equality Tests using pre-merger performance in Year -1 as benchmark**

# of years post-merger	Merger year	Regulatory Merger Sample				Non-regulatory Merger Sample						
		ROA		Cost-Income Ratio		ROA		Cost-Income Ratio				
		Merger effects	t value	Merger effects	t value	Merger effects	t value	Merger effects	t value			
1 yr	2008	0.0001	0.01		0.0040	0.04		-0.0043	-0.95	0.0156	0.67	
	2009	<b>0.0288</b>	<b>2.69</b>	***	<b>-0.0903</b>	<b>-3.60</b>	***	0.0002	0.03	<b>-0.0337</b>	<b>-1.74</b>	*
	2010	<b>0.0369</b>	<b>5.13</b>	***	-0.0798	-0.30		0.0040	0.77	-0.0266	-0.90	
	2011	<b>0.0455</b>	<b>2.72</b>	**	<b>-0.2507</b>	<b>-2.65</b>	***	0.0023	0.79	<b>-0.0238</b>	<b>-1.81</b>	*
2 yr	2008	0.0014	0.05		0.0135	0.14		0.0012	0.39	<b>-0.0308</b>	<b>-3.06</b>	***
	2009	<b>0.0187</b>	<b>1.66</b>	*	<b>-0.0803</b>	<b>-2.28</b>	**	-0.0030	-0.44	-0.0317	-1.00	
	2010	<b>0.0348</b>	<b>5.22</b>	***	-0.0682	-0.32		0.0006	0.10	-0.0058	-0.21	
	2011	<b>0.0494</b>	<b>3.56</b>	***	<b>-0.2763</b>	<b>-3.68</b>	***	0.0025	0.84	-0.0146	-1.07	

**Panel B: Equality Tests using average of pre-merger performance in Year -1 & -2 as benchmark**

# of years post-merger	Merger year	Regulatory Merger Sample				Non-regulatory Merger Sample						
		ROA		Cost-Income Ratio		ROA		Cost-Income Ratio				
		Merger effects	t value	Merger effects	t value	Merger effects	t value	Merger effects	t value			
1 yr	2008	0.0007	0.03		0.0372	0.40		-0.0058	-1.26	<b>0.0604</b>	<b>2.32</b>	***
	2009	<b>0.0172</b>	<b>2.55</b>	**	<b>-0.0454</b>	<b>-1.99</b>	*	-0.0036	-0.46	-0.0079	-0.32	
	2010	<b>0.0277</b>	<b>4.80</b>	***	-0.0593	-0.45		0.0034	0.71	-0.0145	-0.42	
	2011	<b>0.0354</b>	<b>2.88</b>	***	<b>-0.1557</b>	<b>-2.12</b>	**	0.0017	0.68	0.0132	0.43	
2 yr	2008	0.0019	0.08		0.0466	0.56		-0.0003	-0.09	0.0140	0.98	
	2009	0.0071	0.65		-0.0354	-1.05		-0.0069	-0.77	-0.0058	-0.16	
	2010	<b>0.0257</b>	<b>4.82</b>	***	-0.0477	-0.38		0.0000	0.01	0.0063	0.18	
	2011	<b>0.0393</b>	<b>3.10</b>	***	<b>-0.1813</b>	<b>-3.44</b>	***	0.0019	0.75	0.0224	0.73	

1. This table includes the M&As sample filtered for Propensity Score Matching. All cases remained are the ones such that this underlying merger transaction is associated acquirer's only transaction during the [-2Y,+2Y] window. Merger effects are calculated by subtracting non-merger group's statistics from merger group's statistics.

2. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Table 5**

**Results from PSM with [-2Y,+2Y] Window, Nearest Neighbor plus Radius (0.0001) Matching**

**Panel A: Propensity Score Matching using pre-merger performance in Year -1 as benchmark**

# of years post-merger	Regulatory merger						Non-regulatory merger				
	N	ROA		Cost-Income Ratio		N	ROA		Cost-Income Ratio		
		Merger effects	t value	Merger effects	t value		Merger effects	t value	Merger effects	t value	
1yr	51	<b>0.0220</b>	<b>2.97</b> ***	<b>-0.2147</b>	<b>-3.54</b> ***	216	0.0012	0.43	-0.0012	-0.09	
2yr	51	<b>0.0244</b>	<b>3.36</b> ***	<b>-0.2359</b>	<b>-4.00</b> ***	216	0.0016	0.56	-0.0134	-1.07	

**Panel B: Propensity Score Matching using average of pre-merger performance in Year -1 & -2 as benchmark**

# of years post-merger	Regulatory merger						Non-regulatory merger				
	N	ROA		Cost-Income Ratio		N	ROA		Cost-Income Ratio		
		Merger effects	t value	Merger effects	t value		Merger effects	t value	Merger effects	t value	
1yr	56	<b>0.0152</b>	<b>2.05</b> **	<b>-0.1987</b>	<b>-4.30</b> ***	211	0.0007	0.24	-0.0119	-0.67	
2yr	56	0.0105	1.44	<b>-0.1715</b>	<b>-3.89</b> ***	211	0.0009	0.30	<b>-0.0281</b>	<b>-1.66</b> *	

1. This table includes the M&As sample filtered for Propensity Score Matching. All cases remained are the ones such that this underlying merger transaction is associated acquirer's only transaction during the [-2Y,+2Y] window. Merger effects are calculated by subtracting non-merger group's statistics from merger group's statistics. This is performed with nearest neighbor plus radius (0.0001) matching strategies.

2. Propensity Score Matching performed here are using Stata program "pscore" patch 2 developed by Sascha O. Becker and Andrea Ichino. More information can be found at <http://www.sobecker.de/>

3. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Table 6**

**Pairwise Test for PSM with [-2Y,+2Y] Window, Nearest Neighbor plus Radius (0.0001) Matching**

**Panel A: PSM test using pre-merger performance in Year -1 as benchmark**

Variables	Regulatory Merger				Non-regulatory Merger			
	N	Treated	Match	Difference	N	Treated	Match	Difference
Size	51	12.7150	12.7634	-0.0483 -0.33	216	12.5801	12.5834	-0.0033 -0.12
ROA	51	-0.0038	0.0026	-0.0064 -0.88	216	0.0206	0.0178	0.0027 0.77
CI	51	0.9243	0.8040	<b>0.1204</b> <b>1.90*</b>	216	0.8025	0.8068	-0.0043 -0.35
IM	51	0.0880	0.0949	-0.0069 -0.74	216	0.0837	0.0787	0.0050 1.46
EQR	51	0.0966	0.0983	-0.0018 -0.32	216	0.1155	0.1200	-0.0045 -0.85
NPL	51	0.0288	0.0294	-0.0006 -0.15	216	0.0115	0.0105	0.0010 0.89
LQR	51	0.2787	0.2671	0.0116 0.44	216	0.3232	0.3065	0.0167 0.85

**Panel B: PSM test using average of pre-merger performance in Year -1 & -2 as benchmark**

Variables	Regulatory Merger				Non-regulatory Merger			
	N	Treated	Match	Difference	N	Treated	Match	Difference
Size	56	12.8196	12.5274	<b>0.2922</b> <b>2.19**</b>	211	12.5179	12.4916	0.0263 0.99
ROA	56	0.0050	-0.0067	<b>0.0118</b> <b>2.11**</b>	211	0.0203	0.0175	0.0027 1.24
CI	56	0.8635	0.8766	-0.0131 -0.35	211	0.8051	0.8109	-0.0058 -0.43
IM	56	0.0898	0.0847	0.0051 0.88	211	0.0838	0.0849	-0.0011 -0.31
EQR	56	0.1031	0.0954	0.0077 1.67	211	0.1153	0.1123	0.0029 0.73
NPL	56	0.0266	0.0301	-0.0036 -1.16	211	0.0104	0.0104	0.0000 0.01
LQR	56	0.2635	0.2446	0.0190 0.77	211	0.3210	0.3137	0.0073 0.48

1. We perform the pairwise test on all pairs determined using PSM with nearest neighbor matching plus radius (0.0001) matching strategies. Propensity Score Matching is performed on the sample filtered in the way that all cases remained are the ones such that this underlying merger transaction is associated acquirer's only transaction during the [-2Y,+2Y] window. Each pair in this sample consists one merger bank and its matching bank and both banks are from the same year. Thus, we combine all the pairs from individual PSM tests for year 2008, 2009, 2010, and 2011 into one master list.

2. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Table 7**  
**Results from PSM with [-2Y,+2Y] Window, Nearest Neighbor plus Radius (0.0001) Matching**

**Panel A: Propensity Score Matching using pre-merger performance in Year -1 as benchmark**

# of years post-merger	Merger year	Regulatory merger						Non-regulatory merger					
		N	ROA		Cost-Income Ratio		N	ROA		Cost-Income Ratio			
			Merger effects	t value	Merger effects	t value		Merger effects	t value	Merger effects	t value		
1 yr	2008	4	0.0110	0.50	-0.0350	-0.28	79	0.0050	0.98	0.0140	0.53		
	2009	13	<b>0.0260</b>	<b>2.32 **</b>	-0.0730	-1.72	52	0.0060	0.74	-0.0350	-1.18		
	2010	22	<b>0.0300</b>	<b>2.58 **</b>	<b>-0.3200</b>	<b>-2.39 **</b>	31	-0.0090	-1.21	0.0220	0.56		
	2011	12	0.0120	0.63	<b>-0.2200</b>	<b>-2.84 **</b>	54	0.0000	-0.09	-0.0040	-0.21		
2 yr	2008	4	0.0390	1.24	-0.0040	-0.04	79	0.0060	1.50	-0.0200	-1.10		
	2009	13	0.0230	1.36	-0.0780	-1.31	52	0.0030	0.33	-0.0240	-0.76		
	2010	22	<b>0.0300</b>	<b>2.53 **</b>	<b>-0.3510</b>	<b>-2.65 **</b>	31	-0.0110	-1.27	-0.0090	-0.19		
	2011	12	0.0130	0.81	<b>-0.2570</b>	<b>-4.65 ***</b>	54	0.0030	0.59	0.0000	-0.02		

**Panel B: Propensity Score Matching using average of pre-merger performance in Year -1 & -2 as benchmark**

# of years post-merger	Merger year	Regulatory merger						Non-regulatory merger					
		N	ROA		Cost-Income Ratio		N	ROA		Cost-Income Ratio			
			Merger effects	t value	Merger effects	t value		Merger effects	t value	Merger effects	t value		
1 yr	2008	4	-0.0010	-0.05	0.0750	0.69	80	-0.0070	-1.16	0.0400	1.32		
	2009	17	<b>0.0150</b>	<b>2.00 *</b>	<b>-0.1930</b>	<b>-2.40 **</b>	50	0.0050	0.86	-0.0360	-0.72		
	2010	21	0.0170	1.06	<b>-0.2080</b>	<b>-2.59 **</b>	30	-0.0010	-0.09	-0.0170	-0.35		
	2011	14	0.0230	1.29	<b>-0.2620</b>	<b>-2.52 **</b>	51	0.0070	1.74	<b>-0.0640</b>	<b>-2.36 **</b>		
2 yr	2008	4	-0.0040	-0.28	0.0520	0.63	80	-0.0020	-0.50	-0.0100	-0.58		
	2009	17	0.0000	0.03	-0.1030	-1.64	50	0.0080	0.97	-0.0310	-0.60		
	2010	21	0.0090	0.61	<b>-0.1910</b>	<b>-2.50 **</b>	30	-0.0090	-0.93	0.0130	0.24		
	2011	14	<b>0.0330</b>	<b>1.83 *</b>	<b>-0.2760</b>	<b>-2.85 **</b>	51	0.0080	1.56	<b>-0.0850</b>	<b>-2.35 **</b>		

1. This table includes the M&As sample filtered for Propensity Score Matching. All cases remained are the ones such that this underlying merger transaction is associated acquirer's only transaction during the [-2Y,+2Y] window. Merger effects are calculated by subtracting non-merger group's statistics from merger group's statistics. This is performed with nearest neighbor plus radius (0.0001) matching strategies.

2. Propensity Score Matching performed here are using Stata program "pscore" patch 2 developed by Sascha O. Becker and Andrea Ichino. More information can be found at <http://www.sobecker.de/>

3. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Table 8**

**Results from Propensity Score Matching with [-2Y,+2Y] Window, Radius Matching (0.0001)**

**Panel A: Propensity Score Matching using pre-merger performance in Year -1 as benchmark**

# of years post-merger	Merger year	Regulatory Merger Sample						Non-regulatory Merger Sample					
		N	ROA		Cost-Income Ratio		N	ROA		Cost-Income Ratio			
			Merger effects	t value	Merger effects	t value		Merger effects	t value	Merger effects	t value		
1 yr	2008	4	0.0010	0.04	0.0090	0.09	79	0.0000	0.12	0.0100	0.42		
	2009	13	<b>0.0260</b>	<b>3.43 ***</b>	<b>-0.1170</b>	<b>-3.41 ***</b>	52	0.0030	0.48	-0.0290	-1.40		
	2010	22	<b>0.0380</b>	<b>4.68 ***</b>	<b>-0.2760</b>	<b>-2.13 **</b>	31	-0.0020	-0.58	-0.0600	-0.64		
	2011	12	<b>0.0300</b>	<b>2.36 **</b>	<b>-0.1640</b>	<b>-2.36 **</b>	54	0.0030	0.90	-0.0210	-1.56		
2 yr	2008	4	0.0040	0.27	0.0190	0.22	79	<b>0.0050</b>	<b>1.80 *</b>	<b>-0.0330</b>	<b>-2.78 ***</b>		
	2009	13	0.0150	1.47	<b>-0.0810</b>	<b>-2.02 *</b>	52	0.0000	-0.05	-0.0190	-0.76		
	2010	22	<b>0.0380</b>	<b>4.52 ***</b>	<b>-0.3110</b>	<b>-2.44 **</b>	31	-0.0060	-1.07	-0.0120	-0.31		
	2011	12	<b>0.0370</b>	<b>3.95 ***</b>	<b>-0.2160</b>	<b>-4.41 ***</b>	54	0.0040	1.25	<b>-0.0260</b>	<b>-1.94 *</b>		

**Panel B: Propensity Score Matching using average of pre-merger performance in Year -1 & -2 as benchmark**

# of years post-merger	Merger year	Regulatory Merger Sample						Non-regulatory Merger Sample					
		N	ROA		Cost-Income Ratio		N	ROA		Cost-Income Ratio			
			Merger effects	t value	Merger effects	t value		Merger effects	t value	Merger effects	t value		
1 yr	2008	4	0.0030	0.19	-0.0030	-0.03	80	-0.0040	-0.77	0.0300	1.09		
	2009	17	<b>0.0200</b>	<b>3.47 ***</b>	<b>-0.1050</b>	<b>-3.90 ***</b>	50	0.0050	1.22	-0.0080	-0.29		
	2010	21	<b>0.0250</b>	<b>3.83 ***</b>	<b>-0.1790</b>	<b>-2.46 **</b>	30	-0.0030	-0.59	0.0030	0.11		
	2011	14	<b>0.0340</b>	<b>2.71 **</b>	<b>-0.1860</b>	<b>-2.70 **</b>	51	0.0030	0.96	-0.0240	-1.44		
2 yr	2008	4	0.0050	0.36	0.0020	0.03	80	0.0010	0.27	<b>-0.0270</b>	<b>-2.31 **</b>		
	2009	17	0.0060	0.67	<b>-0.0630</b>	<b>-1.91 *</b>	50	0.0040	1.03	-0.0540	-0.77		
	2010	21	<b>0.0230</b>	<b>3.67 ***</b>	<b>-0.2560</b>	<b>-3.30 ***</b>	30	-0.0070	-1.19	0.0170	0.45		
	2011	14	<b>0.0380</b>	<b>4.19 ***</b>	<b>-0.2190</b>	<b>-4.75 ***</b>	51	0.0040	1.43	<b>-0.0290</b>	<b>-1.81 *</b>		

1. This table includes the M&As sample filtered for Propensity Score Matching. All cases remained are the ones such that this underlying merger transaction is associated acquirer's only transaction during the [-2Y,+2Y] window. Merger effects are calculated by subtracting non-merger group's statistics from merger group's statistics. This is performed with radius matching strategy with 0.0001 radius set.

2. Propensity Score Matching performed here are using Stata program "pscore" patch 2 developed by Sascha O. Becker and Andrea Ichino. More information can be found at <http://www.sobecker.de/>

3. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Table 9**  
**Results with [-2Y,+2Y] Window for Unsuccessful Bidders, Radius Matching (0.0001)**

**Panel A: Equality Test Results**

# of years post-merger	Merger year	with Year -1 as Benchmark				with Average of Year -1 and -2 as Benchmark			
		ROA		Cost-Income Ratio		ROA		Cost-Income Ratio	
		Merger effects	t value	Merger effects	t value	Merger effects	t value	Merger effects	t value
1 yr	2009	<b>-0.0113</b>	<b>-2.26</b> **	0.0211	1.08	<b>-0.0118</b>	<b>-2.27</b> **	<b>0.0496</b>	<b>2.38</b> **
	2010	<b>-0.0069</b>	<b>-1.96</b> *	-0.0151	-0.55	<b>-0.0075</b>	<b>-1.93</b> *	0.0041	0.15
	2011	-0.0035	-1.47	0.0137	0.80	-0.0002	-0.05	0.0342	0.98
2yr	2009	<b>-0.0140</b>	<b>-2.10</b> **	0.0060	0.16	<b>-0.0145</b>	<b>-2.09</b> **	0.0345	0.90
	2010	<b>-0.0052</b>	<b>-1.89</b> *	-0.0001	-0.01	<b>-0.0058</b>	<b>-2.23</b> **	0.0191	0.99
	2011	<b>-0.0060</b>	<b>-1.98</b> *	0.0278	1.48	-0.0027	-0.63	0.0483	1.33

**Panel B: Propensity Score Matching Results**

# of years post-merger	Merger year	with Year -1 as Benchmark					with Average of Year -1 and -2 as Benchmark				
		N	ROA		Cost-Income Ratio		N	ROA		Cost-Income Ratio	
			Merger effects	t value	Merger effects	t value		Merger effects	t value	Merger effects	t value
1 yr	2009	20	-0.0070	-1.34	0.0060	0.32	20	-0.0050	-0.96	-0.0010	-0.06
	2010	21	-0.0020	-0.66	-0.0050	-0.24	19	-0.0030	-0.72	-0.0030	-0.14
	2011	12	0.0000	-0.16	0.0140	0.65	13	0.0000	0.06	0.0040	0.15
2yr	2009	20	-0.0080	-1.19	-0.0560	-0.67	20	-0.0070	-1.03	-0.0050	-0.16
	2010	21	0.0010	0.18	-0.0140	-0.79	19	0.0010	0.43	-0.0150	-0.68
	2011	12	0.0000	-0.08	0.0280	1.25	13	-0.0010	-0.28	0.0080	0.28

1. This table includes the M&As sample filtered for Propensity Score Matching. All cases included here are with acquirers whose [-2Y,+2Y] window is clean from mergers. Merger effects are calculated by subtracting non-merger group's statistics from merger group's statistics. This is performed with radius matching strategy with 0.0001 radius set.

2. Propensity Score Matching performed here are using Stata program "pscore" patch 2 developed by Sascha O. Becker and Andrea Ichino. More information can be found at <http://www.sobecker.de/>

3. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Table 10**  
**Results from Equality Test with [-3Y,+3Y] Window**

**Panel A: Equality Tests using pre-merger performance in Year -1 as benchmark**

# of years post-merger	Merger year	Regulatory merger				Non-regulatory merger			
		ROA		Cost-Income Ratio		ROA		Cost-Income Ratio	
		Merger effects	t value	Merger effects	t value	Merger effects	t value	Merger effects	t value
1 yr	2008	0.0001	0.00	0.0039	0.04	-0.0018	-0.41	0.0052	0.25
	2009	<b>0.0281</b>	<b>2.35 **</b>	<b>-0.0781</b>	<b>-2.72 ***</b>	-0.0001	-0.01	<b>-0.0399</b>	<b>-1.87 *</b>
	2010	<b>0.0353</b>	<b>4.98 ***</b>	-0.0583	-0.20	0.0053	1.02	-0.0327	-1.12
2 yr	2008	0.0013	0.05	0.0133	0.13	0.0003	0.10	<b>-0.0318</b>	<b>-3.37 ***</b>
	2009	0.0170	1.37	-0.0586	-1.53	-0.0021	-0.23	-0.0439	-1.34
	2010	<b>0.0329</b>	<b>5.08 ***</b>	-0.0401	-0.17	0.0002	0.03	-0.0056	-0.20
3 yr	2008	-0.0081	-0.30	0.0844	0.67	0.0008	0.33	<b>-0.0526</b>	<b>-2.15 **</b>
	2009	0.0164	1.27	-0.0388	-1.20	0.0004	0.05	-0.0389	-1.44
	2010	<b>0.0304</b>	<b>4.08 ***</b>	-0.0162	-0.07	0.0072	0.87	-0.0195	-0.97

**Panel B: Equality Tests using average of pre-merger performance in Year -1, -2 & -3 as benchmark**

# of years post-merger	Merger year	Regulatory merger				Non-regulatory merger			
		ROA		Cost-Income Ratio		ROA		Cost-Income Ratio	
		Merger effects	t value	Merger effects	t value	Merger effects	t value	Merger effects	t value
1 yr	2008	-0.0007	-0.03	0.0709	0.87	-0.0035	-0.74	<b>0.0750</b>	<b>2.95 ***</b>
	2009	<b>0.0160</b>	<b>2.44 **</b>	-0.0255	-0.94	-0.0051	-0.52	0.0090	0.29
	2010	<b>0.0211</b>	<b>4.37 ***</b>	-0.0128	-0.10	0.0026	0.76	0.0108	0.30
2 yr	2008	0.0005	0.02	0.0801	1.16	-0.0014	-0.38	<b>0.0378</b>	<b>2.46 ***</b>
	2009	0.0049	0.41	-0.0060	-0.15	-0.0072	-0.67	0.0053	0.13
	2010	<b>0.0187</b>	<b>4.15 ***</b>	0.0055	0.05	-0.0025	-0.43	0.0380	1.02
3 yr	2008	-0.0089	-0.40	0.1513	1.32	-0.0010	-0.41	0.0172	0.64
	2009	0.0043	0.67	0.0137	0.41	-0.0047	-0.45	0.0097	0.27
	2010	<b>0.0162</b>	<b>3.08 ***</b>	0.0293	0.24	0.0045	0.86	0.0240	0.79

1. This table includes the M&As sample filtered for Propensity Score Matching. All cases remained are the ones such that this underlying merger transaction is associated acquirer's only transaction during the [-3Y,+3Y] window. Merger effects are calculated by subtracting non-merger group's statistics from merger group's statistics.

2. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Table 11**  
**Results from Propensity Score Matching with [-3Y,+3Y] Window, Radius Matching (0.0001)**

**Panel A: Propensity Score Matching using pre-merger performance in Year -1 as benchmark**

# of years post-merger	Merger year	N	Regulatory merger				Non-regulatory merger				
			ROA		Cost-Income Ratio		ROA		Cost-Income Ratio		
			Merger effects	t value	Merger effects	t value	Merger effects	t value	Merger effects	t value	
1 yr	2008	4	0.0010	0.04	0.0080	0.08	73	0.0020	0.67	-0.0060	-0.36
	2009	12	<b>0.0270</b>	<b>4.37 ***</b>	<b>-0.1150</b>	<b>-3.37 ***</b>	46	<b>0.0100</b>	<b>2.08 **</b>	<b>-0.0410</b>	<b>-1.82 *</b>
	2010	20	<b>0.0350</b>	<b>4.33 ***</b>	<b>-0.2640</b>	<b>-1.87 *</b>	26	-0.0010	-0.40	-0.0050	-0.22
2 yr	2008	4	0.0040	0.29	0.0180	0.21	73	0.0040	1.56	<b>-0.0460</b>	<b>-4.52 ***</b>
	2009	12	<b>0.0170</b>	<b>2.17 *</b>	-0.0670	-1.67	46	<b>0.0080</b>	<b>1.72 *</b>	<b>-0.1980</b>	<b>-2.47 **</b>
	2010	20	<b>0.0330</b>	<b>4.25 ***</b>	<b>-0.2700</b>	<b>-2.02 *</b>	26	-0.0070	-1.27	0.0090	0.30
3 yr	2008	4	-0.0040	-0.32	0.1080	0.87	73	0.0040	1.50	<b>-0.0380</b>	<b>-3.16 ***</b>
	2009	12	<b>0.0140</b>	<b>2.25 **</b>	-0.0650	-1.78	46	0.0080	1.43	-0.0430	-1.41
	2010	20	<b>0.0320</b>	<b>3.60 ***</b>	<b>-0.2580</b>	<b>-1.89 *</b>	26	-0.0020	-0.58	-0.0110	-0.49

**Panel B: Propensity Score Matching using average of pre-merger performance in Year -1, -2 & -3 as benchmark**

# of years post-merger	Merger year	N	Regulatory merger				Non-regulatory merger				
			ROA		Cost-Income Ratio		ROA		Cost-Income Ratio		
			Merger effects	t value	Merger effects	t value	Merger effects	t value	Merger effects	t value	
1 yr	2008	4	0.0010	0.10	0.0040	0.05	69	0.0000	-0.02	0.0120	0.46
	2009	16	<b>0.0200</b>	<b>3.58 ***</b>	<b>-0.1140</b>	<b>-4.13 ***</b>	47	0.0070	1.43	0.0130	0.38
	2010	19	<b>0.0230</b>	<b>4.16 ***</b>	<b>-0.1570</b>	<b>-2.78 **</b>	26	0.0030	0.69	-0.0160	-0.50
2 yr	2008	4	0.0050	0.46	0.0120	0.17	69	0.0040	0.86	<b>-0.0370</b>	<b>-3.14 ***</b>
	2009	16	0.0090	1.15	<b>-0.0840</b>	<b>-2.39 **</b>	47	0.0050	1.01	0.0180	0.50
	2010	19	<b>0.0200</b>	<b>3.48 ***</b>	<b>-0.1800</b>	<b>-3.23 ***</b>	26	-0.0040	-0.64	0.0070	0.17
3 yr	2008	4	-0.0040	-0.30	0.1010	0.90	69	<b>0.0050</b>	<b>2.06 **</b>	<b>-0.0430</b>	<b>-3.40 ***</b>
	2009	16	0.0060	1.15	<b>-0.1100</b>	<b>-2.05 *</b>	47	0.0050	1.01	-0.0040	-0.10
	2010	19	<b>0.0160</b>	<b>2.40 **</b>	<b>-0.1520</b>	<b>-2.73 **</b>	26	0.0010	0.23	-0.0100	-0.29

1. This table includes the M&As sample filtered for Propensity Score Matching. All cases remained are the ones such that this underlying merger transaction is associated acquirer's only transaction during the [-3Y,+3Y] window. Merger effects are calculated by subtracting non-merger group's statistics from merger group's statistics. This is performed with radius matching strategy with 0.0001 radius set.

2. Propensity Score Matching performed here are using Stata program "pscore" patch 2 developed by Sascha O. Becker and Andrea Ichino. More information can be found at <http://www.sobecker.de/>

3. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.



**Table 12**  
**Regression (3) Results With All Acquirer Banks And Their Matching Banks**

	(1)	(2)	(3)	(4)
	$\Delta ROA_{+1Y}$	$\Delta ROA_{+2Y}$	$\Delta CI_{+1Y}$	$\Delta CI_{+2Y}$
Reg_Merger	<b>0.0153***</b> (3.20)	<b>0.0154***</b> (3.06)	<b>-0.1899***</b> (-3.58)	<b>-0.2132***</b> (-4.16)
Nonreg_Merger	-0.0005 (-0.18)	0.0013 (0.45)	-0.0134 (-0.98)	<b>-0.0285**</b> (-2.35)
Premerger_Size	<b>-0.0032*</b> (-1.83)	<b>-0.0036*</b> (-1.73)	0.0013 (0.20)	-0.0030 (-0.39)
Premerger_ROA			<b>1.6315**</b> (2.22)	<b>1.4631**</b> (2.02)
Premerger_CI	<b>0.0699***</b> (2.82)	<b>0.0627**</b> (2.44)		
Premerger_IM	0.1114 (0.97)	0.0082 (0.06)	-0.0883 (-0.31)	0.3705 (1.07)
Premerger_EQR	-0.0766 (-1.01)	-0.0668 (-0.74)	<b>-0.5197**</b> (-2.05)	<b>-0.7174***</b> (-3.69)
Premerger_NPL	0.1711 (1.32)	<b>0.2539*</b> (1.83)	<b>2.4882***</b> (3.01)	<b>2.3162***</b> (3.16)
Premerger_LQR	<b>0.0310**</b> (2.30)	0.0134 (0.86)	-0.0033 (-0.05)	0.0595 (1.04)
Constant	-0.0278 (-0.60)	-0.0041 (-0.08)	-0.0337 (-0.38)	-0.0167 (-0.16)
Year Effect	Yes	Yes	Yes	Yes
N	534	534	534	534
R-sq	0.3676	0.3028	0.1967	0.2037

Note: Sample consists all regulatory and non-regulatory merger acquirer banks and their matching banks from Panel A Table 5.  $\Delta ROA_{+1Y}$  ( $\Delta CI_{+1Y}$ ) stands for ROA (CI) change of a bank between Year -1 and Year +1,  $\Delta ROA_{+2Y}$  ( $\Delta CI_{+2Y}$ ) stands for ROA (CI) change of a bank between Year -1 and Year +2, Reg\_Merger is a dummy variable that takes 1 if a bank is a regulatory merger acquirer and 0 otherwise, Nonreg\_Merger is a dummy variable that takes 1 if a bank is a non-regulatory merger acquirer and 0 otherwise, Premerger\_Xs are 6 dimensions (Size, IM, EQR, NPL, LQR and either ROA or CI depending on the dependent variable used) of a bank in Year -1, and Year\_Controls are a set of year dummies. The number reported on the same line as the parameter name is the coefficient and the number reported below is the robust t statistics. \*, \*\*, \*\*\* denote statistical significance at the 10%, the 5%, and the 1% level, respectively, using a two-tail test.

**Table 13****Regression (3) Results With All Regulatory Merger Acquirer Banks And Their Matching Banks**

	(1)	(2)	(3)	(4)
	$\Delta ROA_{+1Y}$	$\Delta ROA_{+2Y}$	$\Delta CI_{+1Y}$	$\Delta CI_{+2Y}$
Reg_Merger	<b>0.0175***</b> (2.98)	<b>0.0209***</b> (2.94)	<b>-0.1967***</b> (-3.60)	<b>-0.2202***</b> (-3.87)
Premerger_Size	<b>-0.0086**</b> (-2.29)	<b>-0.0069*</b> (-1.83)	-0.0281 (-0.81)	-0.0504 (-1.43)
Premerger_ROA			3.4259 (1.45)	3.0526 (1.23)
Premerger_CI	<b>0.0483**</b> (2.52)	<b>0.0384**</b> (2.06)		
Premerger_IM	<b>0.3537***</b> (4.32)	<b>0.2961***</b> (3.46)	0.1031 (0.19)	0.3927 (0.56)
Premerger_EQR	-0.2014 (-1.22)	-0.1610 (-0.98)	<b>-2.0056**</b> (-2.47)	<b>-2.3620***</b> (-2.78)
Premerger_NPL	0.2613 (1.19)	0.3157 (1.32)	<b>3.7781*</b> (1.87)	3.0222 (1.61)
Premerger_LQR	<b>0.0446*</b> (1.68)	0.0379 (1.05)	0.1611 (0.96)	0.1435 (0.86)
Constant	0.0480 (0.83)	0.0343 (0.62)	0.3807 (0.85)	0.7058 (1.55)
Year Effect	Yes	Yes	Yes	Yes
N	102	102	102	102
R-sq	0.4901	0.4311	0.2643	0.2679

Note: Sample consists all regulatory merger acquirer banks and their matching banks from Panel A Table 5.  $\Delta ROA_{+1Y}$  ( $\Delta CI_{+1Y}$ ) stands for ROA (CI) change of a bank between Year -1 and Year +1,  $\Delta ROA_{+2Y}$  ( $\Delta CI_{+2Y}$ ) stands for ROA (CI) change of a bank between Year -1 and Year +2, Reg\_Merger is a dummy variable that takes 1 if a bank is a regulatory merger acquirer and 0 otherwise, Nonreg\_Merger is a dummy variable that takes 1 if a bank is a non-regulatory merger acquirer and 0 otherwise, Premerger\_Xs are 6 dimensions (Size, IM, EQR, NPL, LQR and either ROA or CI depending on the dependent variable used) of a bank in Year -1, and Year\_Controls are a set of year dummies. The number reported on the same line as the parameter name is the coefficient and the number reported below is the robust t statistics. \*, \*\*, \*\*\* denote statistical significance at the 10%, the 5%, and the 1% level, respectively, using a two-tail test.

**Table 14****List of All Merger Transactions Included In Equation 6.4 with Equity Discount and Competition Information**

Merger date	Acquirer ID	Target ID	Assets Discount	Deposit Premium	# of bidders	# of bids	BV of Equity -1Q	Sale Price of Equity	Equity Discount	Equity Discount %
20090703	368933	152048	-1620	2.00%	5	5	-848	-3084	-2236	-7.44%
20090703	490535	223238	-2965	4.10%	6	6	1389	-4248	-5637	-8.10%
20090703	552732	542537	-2495	1.00%	3	3	864	-2112	-2976	-5.41%
20090703	800134	732945	-4327	2.00%	1	1	-392	-6217	-5825	-7.79%
20090703	1157415	3194179	-49000	0.00%	1	2	742	-48258	-49000	-41.31%
20090711	903950	558257	0	0.00%	1	1	3101	3101	0	0.00%
20090724	292908	3380066	-800	0.00%	5	5	-685	-1485	-800	-1.44%
20090801	2686211	2538842	-17783	0.00%	3	6	1675	-16108	-17783	-10.89%
20090905	698957	880659	-6600	0.00%	3	3	309	-6291	-6600	-41.98%
20091107	751852	182157	-9975	0.00%	1	1	-875	-10850	-9975	-37.11%
20100116	746157	197357	-3490	0.00%	3	3	-1219	-4709	-3490	-15.24%
20100123	474759	740258	0	0.59%	1	1	-272	-392	-120	-0.59%
20100130	922559	978051	-140	7.35%	4	4	2269	-1962	-4231	-7.23%
20100220	643452	749550	0	0.51%	6	8	4229	3978	-251	-0.47%
20100227	2349301	3437081	-2571	0.00%	1	1	889	-1683	-2572	-5.03%
20100320	625757	143653	-2015	0.50%	1	2	325	-1829	-2154	-7.65%
20100320	541231	314033	-14000	0.00%	1	1	2824	-11176	-14000	-10.21%
20100320	436131	3426245	-14000	0.00%	2	2	2282	-11718	-14000	-14.50%
20100501	756848	222053	-7.78%	0.00%	1	1	814	-3249	-4063	-7.78%
20100508	787459	730754	-6150	0.02%	6	12	-100	-6256	-6156	-19.24%
20100508	3131400	3257047	-18.40%	0.30%	1	1	479	-21985	-22464	-18.68%
20100515	2390929	2902041	-10.50%	0.00%	2	2	117	-11558	-11675	-10.50%
20100522	457752	3234598	-11625	1.33%	3	5	-446	-12846	-12400	-20.26%
20100605	703039	85043	-12.99%	0.00%	1	1	-3178	-11030	-7852	-12.99%
20100626	771458	2799803	-15.16%	0.00%	2	2	-735	-12915	-12180	-15.16%
20100724	1016259	2451	-5900	0.00%	2	2	167	-5733	-5900	-20.89%
20100724	906063	20866	-17500	1.05%	2	2	7954	-11939	-19893	-7.94%
20100724	3400928	3023701	-14000	0.00%	1	1	1538	-12462	-14000	-6.87%
20101002	972769	2847900	-10800	0.25%	1	1	1131	-9896	-11027	-11.86%
20101023	423739	219138	0	0.05%	1	1	310	297	-13	-0.05%
20101023	2805441	761178	-12426	0.00%	1	1	473	-11953	-12426	-13.10%
20101120	678717	2830135	-5931	0.50%	2	3	1474	-4917	-6391	-6.00%
20110129	18854	54357	-22995	0.00%	1	1	3261	-19734	-22995	-51.62%
20110129	663647	117841	-30794	0.00%	3	8	265	-30529	-30794	-12.78%
20110212	532042	216445	-21499	0.00%	1	1	1770	-19729	-21499	-25.65%

20110312	454658	949257	0.00%	7.50%	9	9	7305	2180	-5125	-5.68%
20110326	2970657	2568120	-23400	0.10%	1	1	695	-22866	-23561	-14.45%
20110709	444556	3264782	-24440	0.00%	2	3	1550	-22890	-24440	-39.09%
20110730	3153288	3390702	-23756	0.00%	3	3	499	-23257	-23756	-28.45%
20110820	189745	3020193	-38303	0.00%	1	1	3143	-35161	-38304	-27.16%
20111015	890742	2869180	-21500	0.00%	1	1	-6583	-28083	-21500	-11.02%
20111111	2921211	3350779	-8492	0.00%	1	1	1364	-7128	-8492	-13.61%
20111119	783246	106546	-15500	0.00%	6	7	1507	-13993	-15500	-16.93%
20111217	3696936	3469448	-12100	0.00%	3	5	-1079	-13179	-12100	-9.61%
<b>Average</b>			<b>-10429</b>	<b>0.66%</b>	<b>2</b>	<b>3</b>	<b>916</b>	<b>-11269</b>	<b>-12185</b>	<b>-14.77%</b>

**Table 15**  
**Regression (4) Results With All Regulatory Merger Acquirer Banks And Their Matching Banks**

	(1)	(2)	(3)	(4)
	Outperform_ROA_+1Y	Outperform_ROA_+2Y	Outperform_CI_+1Y	Outperform_CI_+2Y
Equity_Discount	-0.0299 (-0.44)	0.0559 (0.90)	0.6486 (0.98)	0.4561 (0.70)
Competition	0.0028 (1.11)	0.0040 (1.38)	0.0266 (1.38)	0.0117 (0.58)
Size_Diff	<b>-0.0416***</b> <b>(-3.79)</b>	<b>-0.0288***</b> <b>(-3.46)</b>	-0.3361 (-1.49)	<b>-0.3820*</b> <b>(-1.81)</b>
ROA_Diff			<b>7.0720*</b> <b>(1.97)</b>	<b>5.8391*</b> <b>(1.70)</b>
CI_Diff	<b>0.0443***</b> <b>(5.39)</b>	<b>0.0281***</b> <b>(3.58)</b>		
IM_Diff	0.1090 (0.72)	0.0972 (0.65)	-2.8560 (-1.32)	-2.3226 (-1.15)
EQR_Diff	0.3096 (1.21)	0.3346 (1.27)	2.5544 (0.79)	1.7132 (0.57)
NPL_Diff	<b>-0.7869**</b> <b>(-2.06)</b>	<b>-0.5424**</b> <b>(-2.07)</b>	-4.0601 (-0.80)	-5.4415 (-1.15)
LQR_Diff	0.0245 (0.52)	0.0033 (0.07)	-0.1893 (-0.38)	-0.1012 (-0.22)
Constant	0.0025 (0.20)	0.0148 (1.03)	<b>-0.2124*</b> <b>(-2.02)</b>	<b>-0.2352**</b> <b>(-2.39)</b>
Year Effect	Yes	Yes	Yes	Yes
N	44	44	44	44
R-sq	0.5574	0.4148	0.4770	0.4798

Note: Sample consists all regulatory merger acquirer banks and their matching banks from Panel A Table 5, except 7 cases which we fail to obtain auction bid summary information to form Competition variable. We combine each acquirer bank observation with the observation of its matching bank to form measurements of differences and our dependent variable becomes a difference-in-difference measurement, the same as the merger effect from earlier PSM tests. Outperform\_ROA\_+1Y (Outperform\_CI\_+1Y) stands for the difference in ROA (CI) change from Year -1 to Year +1 between an acquirer bank and its matching bank, Outperform\_ROA\_+2Y (Outperform\_CI\_+2Y) stands for the difference in ROA (CI) change from Year -1 to Year +2 between an acquirer bank and its matching bank, Equity\_Discount is the difference between sale price of Equity and last reported book value of Equity of the target that underlying acquirer bank purchased scaled by last reported book value of Assets of the target, Competition is the average between number of bidders and number of bids in a failed bank auction, Xs\_Diff are differences between an acquirer bank and its matching bank in 6 dimensions (Size, IM, EQR, NPL, LQR and either ROA or CI depending on the dependent variable used) in Year -1, and Year\_Controls are a set of year dummies. The number reported on the same line as the parameter name is the coefficient and the number reported below is the robust t statistics. \*, \*\*, \*\*\* denote statistical significance at the 10%, the 5%, and the 1% level, respectively, using a two-tail test.

**Table 16**

**FDIC failed-bank auctions: winning bidders' abnormal returns**

**Event Date: merger announcement date**

Window	N	Mean CAR	Median CAR	Positive: Negative	Z test, bootstrapped
<b>Panel A: Full sample</b>					
[-10,-3]	94	-1.25%	-1.55%	35:59	-1.92
[-2,-1]	94	-0.08%	-0.10%	45:49	-0.25
[0,+1]	94	<b>3.53%</b>	1.80%	66:28	<b>4.37***</b>
[0,+2]	94	<b>3.88%</b>	2.40%	65:29	<b>4.15***</b>
[+3,+10]	94	0.01%	-0.34%	46:48	0.01
<b>Panel B: First time failed bank auction participants</b>					
[-10,-3]	54	-1.50%	-1.68%	20:34	-1.51
[-2,-1]	54	0.21%	0.40%	30:24	0.37
[0,+1]	54	<b>4.33%</b>	2.74%	37:17	<b>4.97***</b>
[0,+2]	54	<b>4.38%</b>	3.60%	38:16	<b>3.89***</b>
[+3,+10]	54	-0.49%	-1.68%	22:32	-0.47
<b>Panel C: Senior failed bank auction participants</b>					
[-10,-3]	40	-0.92%	-1.41%	15:25	-1.18
[-2,-1]	40	-0.46%	-0.35%	15:25	-0.72
[0,+1]	40	<b>2.44%</b>	0.92%	29:11	<b>4.18***</b>
[0,+2]	40	<b>3.19%</b>	1.41%	27:13	<b>2.75***</b>
[+3,+10]	40	0.68%	0.51%	24:16	1.01

1. We took the merger announcement (close) date from regulatory merger as day 0. For each bank in our sample, we estimated a standard OLS market model using data of period from -270th trading day to -21st trading day so that we have approximately included one year of market data. We left 20 trading days between the estimation window of the market model and day 0 to avoid any abnormal market movements due to potential information leak. We performed our market reaction test over five event windows: [-10,-3], [-2,-1], [0,+1], [0,+2], and [+3,+10]. We cleaned our sample based on the rule that underlying merger bank will not have a second merger activity, neither regulatory nor non-regulatory merger, for the entire period from -270th trading day to +10th trading day. We, however, did include merger cases from same acquirer as long as these following mergers were closed within half a year (roughly 125 trading days) of the first merger but at least 10 trading days apart from earlier transaction. For these successive merger cases included, their estimation window took the announcement date of the first case in the series as day 0 (in other words, they were sharing the same estimated market model), and their event window took the actual announcement date of their own as day 0.

2. Statistical test is with robust standard errors control and bootstrapping. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Table 17**  
**FDIC failed-bank auctions: Unsuccessful bidders' abnormal returns**  
**Event Date: bid summary release date**

Window	N	Mean CAR	Median CAR	Positive: Negative	Z test, bootstrapped
<b>Panel A: full sample</b>					
[-10,-3]	80	-0.72%	-0.79%	36:44	-0.73
[-2,-1]	80	0.32%	-0.04%	40:40	1.09
[0,+1]	80	0.27%	0.08%	41:39	0.73
[0,+2]	80	0.16%	-0.04%	39:41	0.38
[+3,+10]	79	-0.32%	0.31%	42:37	-0.57
<b>Panel B: First time failed bank auction participants</b>					
[-10,-3]	19	-2.03%	-0.44%	9:10	-0.89
[-2,-1]	19	-0.46%	-0.49%	7:12	-0.94
[0,+1]	19	<b>1.41%</b>	0.29%	12:7	<b>1.72*</b>
[0,+2]	19	0.88%	0.43%	10:9	0.92
[+3,+10]	19	1.11%	0.31%	10:9	1.1
<b>Panel C: Senior failed bank auction participants</b>					
[-10,-3]	61	-0.31%	-1.08%	27:34	-0.37
[-2,-1]	61	0.56%	0.13%	33:28	1.59
[0,+1]	61	-0.08%	-0.14%	29:32	-0.26
[0,+2]	61	-0.07%	-0.09%	29:32	-0.18
[+3,+10]	60	-0.77%	0.36%	32:28	-1.00

1. We took the bid summary release date from regulatory merger as day 0. For each bank in our sample, we estimated a standard OLS market model using data of period from -270th trading day to -21st trading day so that we have approximately included one year of market data. We left 20 trading days between the estimation window of the market model and day 0 to avoid any abnormal market movements due to potential information leak. We performed our market reaction test over five event windows: [-10,-3], [-2,-1], [0,+1], [0,+2], and [+3,+10]. We cleaned our sample based on the rule that underlying unsuccessful bidder bank will not have any merger activity, neither regulatory nor non-regulatory merger, for the entire period from -270th trading day to +10th trading day. We, however, did include bidding disclosure from same bank as long as these following bids were disclosed within half a year (roughly 125 trading days) of the first bid disclosure or merger activities but at least 10 trading days apart from earlier one. For these successive bidding disclosures included, their estimation window took the announcement date of the first case in the series as day 0 (in other words, they were sharing the same estimated market model), and their event window took the actual announcement date of their own as day 0.

2. Statistical test is with robust standard errors control and bootstrapping. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Table 18**

**FDIC failed-bank auctions: winning bidders' abnormal returns**

**Event Date: merger announcement date**

Window	N	Mean CAR	Median CAR	Positive: Negative	Z test, bootstrapped
<b>Panel A: Full sample</b>					
[-30,-1]	87	-1.73%	0.44%	48:39	-1.34
[0,+1]	87	<b>2.92%</b>	1.52%	59:28	<b>3.83***</b>
[0,+2]	87	<b>3.13%</b>	1.54%	57:30	<b>3.55***</b>
[+3,+30]	87	-0.25%	1.33%	51:36	-0.19
<b>Panel B: First time failed bank auction participants</b>					
[-30,-1]	53	-1.66%	1.41%	33:20	-1.08
[0,+1]	53	<b>3.95%</b>	1.84%	38:15	<b>3.34***</b>
[0,+2]	53	<b>3.71%</b>	2.42%	37:16	<b>3.34***</b>
[+3,+30]	53	-0.96%	0.70%	30:23	-0.44
<b>Panel C: Senior failed bank auction participants</b>					
[-30,-1]	34	-1.83%	-1.33%	15:19	-1.26
[0,+1]	34	<b>1.32%</b>	0.30%	21:13	<b>1.81*</b>
[0,+2]	34	<b>2.23%</b>	0.38%	20:14	<b>2.04**</b>
[+3,+30]	34	0.86%	1.86%	21:13	0.59

1. We took the merger announcement (close) date from regulatory merger as day 0. For each bank in our sample, we estimated a standard OLS market model using data of period from -345th trading day to -91st trading day so that we have approximately included one year of market data. We left 90 trading days between the estimation window of the market model and day 0 to avoid any abnormal market movements due to potential information leak. We performed our market reaction test over four event windows: [-30,-1], [0,+1], [0,+2], and [+3,+30]. We cleaned our sample based on the rule that underlying merger bank will not have a second merger activity, neither regulatory nor non-regulatory merger, for the entire period from -345th trading day to +30th trading day.

2. Statistical test is with robust standard errors control and bootstrapping. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.



**Table 19**  
**FDIC failed-bank auctions: Unsuccessful bidders' abnormal returns**  
**Event Date: bid summary release date**

Window	N	Mean CAR	Median CAR	Positive: Negative	Z test, bootstrapped
<b>Panel A: Full sample</b>					
[-30,-1]	49	0.52%	1.84%	27:22	0.51
[0,+1]	49	0.57%	0.21%	27:22	1.28
[0,+2]	49	-0.01%	0.15%	26:23	-0.02
[+3,+30]	49	0.58%	-0.63%	22:27	0.5
<b>Panel B: First time failed bank auction participants</b>					
[-30,-1]	20	-0.96%	2.59%	13:7	-0.47
[0,+1]	20	<b>1.69%</b>	0.97%	13:7	<b>1.74*</b>
[0,+2]	20	1.00%	0.40%	11:9	0.79
[+3,+30]	20	3.35%	2.83%	13:7	1.45
<b>Panel C: Senior failed bank auction participants</b>					
[-30,-1]	29	<b>1.91%</b>	2.40%	15:14	<b>1.8*</b>
[0,+1]	29	-0.09%	-0.01%	14:15	(-0.20)
[0,+2]	29	-0.38%	0.20%	16:13	(-0.57)
[+3,+30]	29	-1.04%	-1.05%	10:19	(-1.08)

1. We took the bid summary release date from regulatory merger as day 0. For each bank in our sample, we estimated a standard OLS market model using data of period from -345th trading day to -91st trading day so that we have approximately included one year of market data. We left 90 trading days between the estimation window of the market model and day 0 to avoid any abnormal market movements due to potential information leak. We performed our market reaction test over four event windows: [-30,-1], [0,+1], [0,+2], and [+3,+30]. We cleaned our sample based on the rule that underlying unsuccessful bidder bank will not have any merger activity, neither regulatory nor non-regulatory merger, for the entire period from -345th trading day to +30th trading day.

2. Statistical test is with robust standard errors control and bootstrapping. Significance level is determined by comparing above t values to 2-tail critical t values. \*\*\*, \*\*, and \* denote respectively significance at the 1%, 5%, and 10% levels.

**Figure 1**

**An Example of A Failed Bank Auction Bid Summary**

**Marshall Bank, N.A., Hallock, MN**  
**Closing Date: January 29, 2010**

Bidder	Type of Transaction	Deposit Premium/(Discount) %	Asset Premium/(Discount) \$(000) / %	SF Loss Share Tranche 1	SF Loss Share Tranche 2	SF Loss Share Tranche 3	Commercial Loss Share Tranche 1	Commercial Loss Share Tranche 2	Commercial Loss Share Tranche 3
<b>Winning bid and bidder:</b> United Valley Bank, Cavalier, ND	All deposit modified whole bank with loss share	7.35%	(\$140)	80%	95%	N/A	80%	95%	N/A
<b>Cover (second place):</b> Frandsen Bank and Trust, Lonsdale, MN	All deposit modified whole bank with loss share	1.32%	(\$267)	80%	95%	N/A	80%	95%	N/A
<b>Other Bid</b>	All deposit modified whole bank with loss share	1.05%	(\$690)	80%	95%	N/A	80%	95%	N/A
<b>Other Bid</b>	All deposit modified whole bank with loss share	0.00%	(\$4,500)	80%	95%	N/A	80%	95%	N/A

**Other Bidder Names:**

Citizens State Bank of Roseau, Roseau, MN  
 Crookston National Bank, Crookston, MN

**Notes:**

- The winning bidder's acquisition of all the deposits was the least costly resolution compared to a liquidation alternative. The liquidation alternative was valued using valuation models to estimate the market value of the assets. Bids for loss share, if any, were valued using a discounted cash flow analysis for the loss share portfolio over the life of the loss share agreement. If any bids were received that would have been more costly than liquidation they have been excluded from this summary.
- The Other Bidder Names and the Other Bids are in random order. There is no linkage between bidder names and bids, except in the case of the winning bid.