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# The Sale of Failed Banks: The Importance of their Branch Networks and of the Acquirers' Financial Strength

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**Abstract.** This paper investigates the pricing of insolvent banks in the U.S. that are sold under the *purchase and assumption* resolution method of the Federal Deposit Insurance Corporation (FDIC). We consider quarterly data for 290 acquisitions of insolvent U.S. banks between 2009 and 2016. We find that acquirers not only pay higher prices for insolvent banks with larger core deposits, as has been highlighted by the literature (and is consistent with the FDIC's beliefs), but also for those with larger branch networks that are less dispersed geographically. Acquirers also pay more for banks with a national charter. The results also show that failed banks are most likely to be acquired by relatively large and highly capitalized banks whose organic growth is not affected in the years following the acquisition. Overall, our findings contribute to a better understanding of the implications of the *purchase and assumption* method for the banking industry.

*JEL Classifications:* G21, G28

*Keywords:* Bank failures, Resolution, FDIC.

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## 1. Introduction

In the U.S., the Federal Deposit Insurance Corporation (FDIC) mainly resolves failed federally insured depository institutions by selling their assets and deposits to healthy financial institutions – which are known as *assuming institutions* – under a *purchase and assumption* (P&A) transaction. Such treatment of failed banks takes place in an auction that is organized by the FDIC a few days before the failed bank is transferred to the winner of the auction. The primary benefits of this resolution method - compared to liquidation - is that it provides immediate liquidity to the insured depositors of failed banks and preserves the franchise value of the failing banks; it is thereby likely to reduce the resolution costs of the FDIC.

The main component of the franchise value of banks is associated with bank-client relationships (see Demsetz et al., 1996; Ergungor, 2005; Liang et al., 2013; Santikian, 2014; among others). Bank-client relationships can be represented by both branch networks and core deposits. Branches are the selling points where banks interact with their clients, and core deposits are a source of stable funds that are built up gradually over time. To establish a branch network, banks have the option of focusing on a particular area or expanding over a wider geographic area. However, it is unclear which strategy is more valuable. While portfolio theory would encourage broader geographic diversification, agency problems between headquarters and branches (Berger and DeYoung 2001; Deng and Elyasiani 2008; Goetz 2012; Goetz et al. 2013; Meslier et al. 2016) would call for focusing on the local level. This is because, with greater distance, such agency problems are exacerbated.

A key feature of the resolution of a failing bank is that the FDIC separates the core deposits from the bank's assets (including the branch network), and sells the deposits separately *as an option to purchase* at fair market value. The rest of the assets of failing banks, are sold at a

discount, whereas the FDIC expects a premium from the acquirers for the assumption of the core deposits.<sup>2</sup> The separation of the branches (and other assets) and the deposits provides the opportunity to study the determinants of the premiums that are paid by the acquirers for assuming deposits. Specifically, we aim at understanding whether the number of branches, the geographic breadth of the branch networks, the market share of the branches, and the economic conditions of the area where the branches are located drive the deposit premiums and asset discounts of failed banks in the auction.

We also study whether bidders offer a higher price for the failing banks that have national charters. This is worthwhile to explore because the U.S. has a dual system of regulation, and banks can choose between a state and a national charter. Banks with the latter charter, which is issued by the federal Office of the Comptroller of the Currency (OCC), are required to be members of the Federal Reserve System and are supervised by the OCC. State-chartered banks, however, are mainly supervised by state authorities and enjoy lower supervisory costs (Blair and Kushmeider, 2006).<sup>3</sup> Agarwal et al. (2014) show that federal supervisors are tougher than state supervisors.

This comparative laxity suggests that the financial data of a bank with a national charter is likely to be considered more reliable by the bidders for a failed bank, and this reduction in uncertainty can help to sell failing banks at a higher price. In addition, the OCC could be quicker

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<sup>2</sup> The FDIC invites eligible acquirers to attend the auction and to bid for the failing bank. The bidders are supposed to offer two bids: a discount for purchasing the assets, and a premium for assuming the deposits. In some cases, the FDIC commits to bear a proportion of future losses on certain assets under a loss-share agreement. The FDIC assesses the bids and chooses the one that is the least costly to the deposit insurance fund (Resolutions Handbook 2014, pp. 2, 5). Assets and deposits of the insolvent bank are then transferred to the winning bidder. The resolution process is fast and takes place a few days prior to the transfer to the winning bidder, with only a few weeks of prior planning by the FDIC staff. Please refer to Bennett and Unal (2015) for the review of the time profiles and resolution costs across different resolution methods.

<sup>3</sup> Costello et al. (2019) argue that state and national banks face different regulatory enforcement. The oversight of state-chartered banks depends on the characteristics of the respective state authorities, whereas national-chartered banks are subject to a single federal (OCC) regulator. State-chartered banks also have a back-up federal prudential regulator: For the state-chartered banks that are members of the Federal Reserve, this is their local (one of 12) Federal Reserve bank; for non-member banks, the FDIC is their federal prudential regulator.

than state authorities in placing a failing bank in receivership, and therefore, failing banks with a national charter might not be as badly in distress as are failing banks with state charters. This could be captured by studying whether failing banks with a national charter are sold at a higher price (i.e., with a lower asset discount).

Most previous studies show that the assuming institutions' share prices experience positive abnormal returns (James and Wier, 1987; Bertin et al., 1989; Cochran et al., 1995; Zhang, 1997; Loveland, 2012; Vij, 2020),<sup>4</sup> which implies that the assets and deposits of failed banks are underpriced. In this paper, we consider a different perspective and contribute to this literature by examining the driving factors of failed banks' auction prices: in particular, their branches and the type of charter that they hold. A better understanding of such factors is important to enable the FDIC possibly to improve the process of selling failed banks.

We model acquisition prices as a function of deposits, branch network characteristics, type of charter (state or national), and a broad set of control variables for the auctioned banks. We follow the auction theory literature (Giliberto and Varaiya 1989, among others) and consider the independent private values framework in our model, by including the factors that determine an acquirer's ability and willingness to pay as shown by Granja et al. (2017): capitalization;

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<sup>4</sup> James and Wier (1987), using a sample of nineteen P&A auctions for the 1973-1983 period, find positive abnormal returns for the acquirers and claim that winning bidders in P&A deals pay less than the true value of the failed banks. Bertin et al. (1989) study 33 P&A deals during the 1982-1987 period and report positive cumulative abnormal returns for winning bidders and argue that the winning bids are, on average, less than the value of the failed banks. Cochran et al. (1995) examine 58 P&A auctions during the 1982-1991 period and find that P&A acquirers experienced positive abnormal returns, especially when both acquirers and the failed banks are large; the acquirers of small failed banks did not earn a positive significant excess return. Zhang (1997) studies 128 FDIC-assisted acquisitions and 387 non-assisted acquisitions and reports that the repeated assisted acquirers have gained positive abnormal returns, while first-time acquirers have not exhibited positive excess returns. Finally, Loveland (2012) analyzes 225 P&A transactions during 1985-2010 and finds positive abnormal returns for the winning bidders. He finds that failed banks' auctions take place when the banking industry is in distress and is experiencing a lack of liquidity, which causes failed banks to be sold at a discount (fire-sale hypothesis). The information asymmetry hypothesis may also explain the underpricing of failed banks. In contrast, Pettway and Trifts (1985) report a negative average geometric abnormal return for a sample of eleven P&A transactions that occurred from 1975 through 1981. They conclude that acquirers overbid for failed banks.

geographic proximity; similarity in business lines between the winning bidders and the failed banks; and the market structure aftermath of the acquisition.

We use data on 290 FDIC assisted acquisitions of insolvent banks that took place between 2009:Q1 and 2016:Q3. The acquisition price in the insolvent bank deals is the premium that is paid to assume the deposits, minus: a) the discount that the acquirer receives for purchasing troubled assets; and b) the expected value of the FDIC's commitment, if any, to share some of the future losses under a loss-share agreement.<sup>5</sup> Our sample of failed bank acquisitions shows that acquirers pay on average a 0.28% premium to assume failed banks' core deposits and receive on average a 13.85% discount for purchasing the assets of failed banks. The value of a loss-share agreement is on average 2.57% of failed banks' total assets.

We first study the relationship between the features of branch networks and the acquisition value of insolvent banks that are sold under the P&A resolution method. We find that the assets of failed banks with more branches are sold, on average, at a higher price, which suggests that there is a premium that acquirers pay to benefit from a larger branch network. In our preferred specification, a one percent increase in the number of branches is associated with a 1.71 percentage point increase in the price of the assets of failed banks. Such results suggest that the franchise value of a failed bank is embedded not only in its core deposits but also in its branch network.

However, the deposits of banks with wider branch networks – branches that are located across a wider swath of counties – are sold with a *lower* premium. Our findings hence indicate that while there is a value for having a larger branch network, acquirers prefer such a network to be focused in fewer counties. Such findings are in line with those of Goetz (2012) and Meslier et al.

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<sup>5</sup> One may argue that acquirers effectively purchase the equity of failing banks, and hence that the book value of equity, when it is positive, should also be considered in the analysis. However, since we are interested in the determinants of the asset discounts and deposit premiums of failing banks, we do not include book value of equity in our analysis. In fact our method is similar to Bennet and Unal (2014).

(2016), among others, who show that by increasing the distance between headquarters and branches, geographic diversification is likely to reduce value. We therefore contribute to this literature by providing evidence from the auctions of failed banks.

We also show that failed banks with national charters are sold, on average, at 2.58 percentage points higher prices than are failed banks with state charters. Such a finding is likely to be driven by the relatively lower supervisory quality that has been highlighted for state-chartered banks (and their state regulators; see Blair and Kushmeider, 2006; Costello et al. 2019). The results also show that acquirers purchase failed banks at lower prices when the difference between their loan portfolio and that of failed banks is larger in terms of residential loans, which is in line with Granja et al. (2017). In addition, we find that the price of failed banks increases with the number of bidders, which supports the prediction of the auction theory put forward by Wilson (1977) and Kagel and Levin (1986).

Next, we study the financial strength of the acquirers of failed banks relative to the runner-ups. If the FDIC sells failed banks at “fire-sale” prices to a bank that is incapable of exploiting the full franchise value of the deposits, then there will be a deadweight loss of going-concern value. However, if the FDIC sells at fire-sale prices to a bank that is fully capable of exploiting the franchise value of failed banks, then there is no efficiency loss; it is merely a redistribution of wealth from the FDIC (and taxpayers) to the acquiring bank. Nevertheless, this redistribution violates the FDIC’s statutory “least cost resolution” responsibility.

Acquirers of failed banks are expected to be financially strong, and must meet certain criteria to be eligible for bidding. They must be well capitalized, possess an acceptable CAMELS<sup>6</sup> rating, and have a satisfactory compliance record (Granja et al. 2017). Nevertheless, Igan et al.

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<sup>6</sup> This is a supervisory rating system for assessing a bank’s financial condition. It consists of Capital adequacy, Asset quality, Management, Earnings, Liquidity, and market Sensitivity.

(2022) show that bidding banks that engage in lobbying activities have a higher probability of winning the auctions that are organized by the FDIC, which casts doubt on strict adherence to the criteria for selecting eligible acquirers.

Our results indicate that the odds of acquiring a failed bank through the FDIC-assisted auction are higher when the acquirer is larger and better capitalized. This result suggests that the allocation of failed banks to acquirers is in line with the principles that have been espoused by the FDIC. We also examine the financial strength of the acquirers that absorb multiple failed banks, so as to explore why they win the auctions repeatedly. We find that except from being larger they are not financially different from the acquirers of only a single failed bank over our entire sample period.

Last, the resolution of failed banks and specifically the way that they are handled have important implications for the local economy. Ivanov and Karoli (2023) show that the selling of failed banks is most likely to affect the local economy negatively. Vij (2021) highlights that, where they already had a branch themselves, acquirers usually close the branches of the failed bank, which might limit overall access to credit. In our work, we examine whether acquirers' future growth is adversely affected by the acquisition of failed banks, which would be the case if downsizing occurs after acquisition. Specifically, we compute the capital charge of acquiring failed banks for the acquirers and examine whether the acquirers' organic growth is adversely affected by the acquisition during the three years subsequent to the acquisition. We find that the average capital charge for the acquirer amounts to 1.4% of its total assets and that the average acquirer is sufficiently capitalized to ensure a steady growth pattern after the acquisition. Such a finding emphasizes the importance for the FDIC of inviting only well-capitalized banks to the auctions.



The paper is organized as follows: Section 2 presents the data and summary statistics. Section 3 examines the acquisition price of failed banks and the related metric of the FDIC's estimated costs of resolution of the failed banks. Section 4 studies the role played by the financial strength of acquirers and the implications of failed bank acquisition in terms of acquirers' organic growth post acquisition. Section 5 concludes.

## 2. Data and Summary Statistics

### 2.1. Data

We use a sample of 290 observations on the FDIC-assisted acquisitions between 2009:Q1 and 2016:Q3, wherein failed banks were sold by the FDIC under the P&A resolution method.<sup>7</sup> We collected the data from the FDIC website. The sample is restricted to the deals where acquirers purchase all assets and assume all deposits of failed banks (a “whole-bank” P&A deal).<sup>8</sup>

We also construct a database at the acquirer (winning bidder) and runner-up bidder level.<sup>9</sup> We use the summary of deposits (SOD) database for the branch location of banks. The measure of the geographic distance between the target and the acquirer is the average pairwise distance (in

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<sup>7</sup> We initially collected 523 FDIC-assisted transactions from the FDIC website for 2007:Q1-2016:Q3 period. We exclude payout (PO) transactions (26 cases) and purchase and assumption of only the insured deposits (PA) transactions (13 cases). From the 484 remaining deals, we removed one transaction with more than one acquirer and 25 transactions as removed by Granja (2013) and Granja et al. (2017). They excluded 24 transactions because the failing banks were several subsidiaries of the same BHC and there was no consolidated financial statement for each bundle of subsidiaries. There was also a deal for the acquisition of Washington Mutual Bank, which required a special resolution method and direct negotiation with the acquirers. The 458 remaining transactions include 165 non-whole bank P&As. In our sample, there are three failing banks that were sold to one acquirer. For these three acquisitions, the deposit premium and asset discount are zero, and the loss-share amount is collectively reported. Since we cannot specify the value of each of these failing banks, we remove them from our sample. Hence, our final sample of the FDIC-assisted P&As includes 290 transactions. These restrictions remove observations in the years 2007 and 2008. For some regressions there are fewer observations, because of missing data for some variables.

<sup>8</sup> The bidders can bid for a proportion of the assets and deposits of failed banks. The price of such bids depends on the assets and deposits that are excluded from the transaction. Since the price of such deals is not comparable with the price of whole-bank transactions, we exclude them from our sample. This exclusion criterion does not jeopardize heterogeneity in our final sample.

<sup>9</sup> According to the bid summary data, the number of bidders can be determined for 280 auctions. Among them, 217 auctions have more than one bid. For these auctions, runner-up data are available for 197 auctions.

100-mile increments) between all pairs of branches of the target and of the acquirer, as suggested by Granja et al. (2017). For cleaning the sample from outliers, we winsorize the variables up to 2.5% on each tail (totally 5%) depending on the degree that the observations lie outside three standard deviations of the mean.<sup>10</sup>

[TABLE I]

## 2.2. Summary Statistics

Table I lists the variables that we use in our study, along with their definitions, and Table II presents the summary statistics of our sample of observations on the FDIC-assisted deals over the 2009:Q1-2016:Q3 period. Panel A presents the descriptive statistics for the 290 targets (the failed banks) of the FDIC-assisted acquisitions.<sup>11</sup> The banks that were acquired through the FDIC-assisted deals have, on average, about \$380 million total assets (*Size*). Their core deposits represent 81% of their total liabilities (*Core Deposits*). They have about 6 branches on average (*Number Branch*). One out of four of them have a federal charter (*National Charter*). About 20% of their loans are non-performing (*Non-Performing Loans*). The other real estate owned accounts for 5.42% of their total assets (*OREO*). Commercial mortgages (*Commercial Mortgage*), commercial and industrial loans (*C&I Loans*), residential loans (*Residential Loans*), and consumer loans (*Consumer Loans*) represent respectively 36%, 10%, 31% and 2% of their total loan portfolios. 22% of their total assets are allocated to liquid assets (*Liquid Assets*). The ratio of non-interest

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<sup>10</sup> Winsorizing at the 1% level does not eliminate all of the outliers, so for variables with more dispersed observations, we go beyond 1% and winsorize up to 2.5%.

<sup>11</sup> All of the financial data for the target (failed) banks are drawn from their Call Reports for the end of the quarter immediately preceding their failure.

expense to total assets (*Non-Interest Expense*) is 2.82%.<sup>12</sup> They have, on average, a 7.42% share of the deposit market at the county level.<sup>13</sup> Their reported equity capital (as of the end of the quarter prior to their failure) was merely 1.08% of their total assets (*Equity Asset Ratio*). Their ratio of non-interest income to total assets (*Non-Interest Income*) is 0.08%. They are, on average, 38 years old.

There are, on average, 26.5 thousand establishments (*Establishments*) in the counties of bank operation with a growth over the last four years (*Establishment Growth*) of 5%. We follow Goetz (2012) and Meslier et al. (2016) to measure the geographic diversity of the branches of failed banks at the county level (*Geographic Diversity*) with the use of this formula:  $1 - \sum_j \left( \frac{Deposits_j}{Total\ Deposits} \right)^2$ , where j represents a county. The index is zero for banks with all of their

branches located in one county. The measure increases and converges to one when deposits are distributed across more counties. The index equals 0.25 on average, ranging from zero to 0.92. On average, 0.65 branches of failed banks are closed by acquirers after the acquisition, which is around 10% of the total branches of the failed banks.

The ratio of the acquisition price to total assets (*Price Asset Ratio*) is, on average, -15.36% for the FDIC-assisted deals. The figures show that the acquirers pay a 0.28% premium for assuming the failed banks' deposits (*Deposit Premium*); they receive, on average, a 13.85% discount on the purchase of the failed banks' (nominal) assets (*Asset Discount*);<sup>14</sup> and the value of

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<sup>12</sup> Since in our sample, 11 failed banks have negative total operating income, we divide non-interest income and non-interest expense of targets by their total assets. For acquirers, we do not have this problem, which allows us to scale their non-interest income and non-interest expense by total operating income.

<sup>13</sup> When the Federal Reserve analyzes local banking markets (e.g., in conjunction with the U.S. Department of Justice) to assess the potential anti-competitive effects of a proposed merger, it typically uses the deposits of the branches in a rural county for computing the market shares (and thus the county itself as the market); for urban areas, the metropolitan statistical areas (MSAs) are considered to be the market. See Adams (2012, p. 13). To the extent that a target's branch is in a metropolitan area, our measure overstates the likely market share.

<sup>14</sup> It is worth noting that the *Asset Discount* has a negative sign in our database.

a loss-share agreement is on average 2.57% of the total assets of the failed bank (*Loss Share Value*). The FDIC estimated cost of selling failed banks for the deposit insurance fund (*DIF Cost*) is on average 22.39% of the total assets of the sold failed banks. On average, nearly 3 bidders attended the auctions that were organized by the FDIC. The number of bidders in such auctions ranged between 1 and 8. The figures on *Same County* show that in 12% of acquisitions of failed banks, the headquarters of both the acquirer and the target were located in the same county.

The average geographical distance between target and acquirer branch networks (*Distance*) is about 237 miles. The difference between the share of residential loans in total loans of acquirers and targets (*Diff Res. Loans*) is 15.47 percentage points. However, the differences are relatively smaller for consumer loans and C&I loans (*Diff Cons. Loans* and *Diff C&I Loans*): 3.99 percentage points and 8.72 percentage points, respectively. Last, on average, the local deposit market concentration, measured by HHI (the Herfindahl-Hirschman index), increases by 29 after the acquisition of a failing bank.

Panel B reports the descriptive statistics of the acquirers and runner-up bidders of failed banks. On average, acquirers are 16.5 times larger than the targets in terms of total assets (*Relative Size*). This variable ranges between 0.75 and 139.<sup>15</sup> Their average *Tier 1 Ratio* and *Non-Performing Loans* are 17.71% and 4.77%, respectively. They have on average 60 branches. The share of residential, consumer and C&I loans in their loan portfolio (*Res. Loans, Cons. Loans and*

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<sup>15</sup> The minimum value of *Acquirer Relative Size* is related to three acquisitions: The acquisitions of Mid City Bank, Inc., Patriot Bank Minnesota, and R-G Premier Bank of Puerto Rico by Premier Bank, First Resource Bank, and Scotiabank de Puerto Rico, respectively. The acquisitions took place in November 2011, January 2012, and April 2010, respectively. However, Granja et al. (2017) state that the FDIC sets a threshold for size that depends on geographic proximity. The bidder's size must be at least twice that of the failed bank if they are located in the same state. The bidders from other states must be even larger: at least four times larger if they are located in contiguous states, and at least five times otherwise. The maximum value of *Acquirer Relative Size* is related to the acquisitions of North Milwaukee State Bank, Bank East and American First Bank, by First-Citizens Bank & Trust Company, U.S. Bank, and TD Bank, respectively. The transactions took place in March 2016, January 2012, and March 2010, respectively.

*C&I Loans*) are 29%, 4.4% and 15%, respectively. Core deposits account for about 80% of their total liabilities (*Core Deposits*). Their net interest margin (*Net Interest Margin*) is, on average, 4.10%, and non-interest income (*Non-Interest Income*) accounts for 25% of their total operating income. The number of takeovers (*Acquisition Number*) by an acquirer is on average 3 and ranges between 1 and 10.

Panel B also reports the summary statistics of the runner-ups and the mean equality t-test results that compare acquirers and runner-ups. Runner-up banks are significantly smaller than the acquirers. In addition, their average relative size (*Relative Size*) is 12.66, which is significantly lower than acquirer *Relative Size*. In addition, they are significantly less well-capitalized than are the acquirers, as is captured by the *Tier 1 Ratio*. *Non-Interest Income* is about 22% for runner-ups, which is slightly lower than the figure for acquirers. They have a higher *Net-Interest Margin* in comparison with acquirers. According to the difference in means tests, they are not significantly different in terms of *Number Branch*, *Non-Performing Loans*, *Res. Loans*, *Cons. Loans*, *C&I Loans*, *Non-Interest Expense*, *Core Deposits* and *Age*.

[TABLES I and II]

### **3. Which Branch Characteristics Capture Franchise Value?**

We consider a pooled cross-sectional regression model for our analysis. In this model, we define the value of targets as a function of the franchise value represented by *Core Deposits* and branch network characteristics. In addition, we include a dummy variable that takes the value one for banks with a national charter, and zero for banks with a state charter (*National Charter*), a set of control variables for characteristics of the target (*Target Controls*), capitalization of acquirers, the synergies between acquirers and targets, the logarithm of the number of bidders of the auctions, and year fixed effects.

$$\begin{aligned}
Price\ Asset\ Ratio_{it} = & \beta_0 + \beta_1 Core\ Deposits_{it} + \beta_2 Log\ Branch_{it} + \beta_3 Geographic\ Diversity_{it} + \\
& \beta_4 Market\ Share_{it} + \beta_5 Establishment + \beta_6 Establishment\ Growth_{it} + \\
& \beta_7 Non - Performing\ Loans_{it} + \beta_8 OREO_{it} + \\
& \beta_9 Commercial\ Mortgage_{it} + \beta_{10} Liquid\ Assets_{it} + \\
& \beta_{11} Acquirer\ Tier\ 1\ Ratio_{it} + \beta_{12} Synergies_{it} + \beta_{12} National\ Charter_{it} + \\
& \beta_{13} Log\ Number\ Bidders_{it} + \sum_{y=2010}^{2016} \eta_y \times YearDummy_{y,t} + \epsilon_{it} \quad (1)
\end{aligned}$$

where the individual bank and time dimension are represented by  $i$  and  $t$  subscripts, respectively.

The main variables are defined as follows:

*Price Asset Ratio* =  $100 \times [\text{value of acquired bank}] / [\text{total assets of acquired bank}]$ . The numerator is the summation of the discount received for the purchase of total assets and the premium paid for the assumption of the deposits. The discount takes a negative value, but the premium is a positive number.<sup>16</sup> For the deals with a loss-share agreement, we add the value of the loss-share agreement to the numerator with a negative sign. The value of the loss-share agreement is the product of the percentage of the loss-share agreement (tranche), the loss-share amount, and the probability of loss. The first two items are obtained from the FDIC website, and the last item is estimated by calculating the average ratio of the net charge-off on the gross loans of failed banks over their last four quarters of operation.

Branches are the main conduit for interacting with clients and attracting deposits and new business opportunities (Salop, 1979; Ramírez, 2003; Chu, 2010; Staikouras, 2006; LaPlante and Paradi, 2015). Branches create physical proximity and enable banks to enjoy lower transportation and monitoring costs, and execute spatial price discrimination over their clients (Petersen and Rajan, 1995; Hannan and Prager, 2004; Degryse and Ongena, 2005).

The literature also shows that expanded branches promote diversification in lending and funding sources (Darroch, 1994, p. 84, as quoted in Chu, 2010; Carlson, 2004), reduce contracting

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<sup>16</sup> For instance, imagine a winning bidder offers a \$10,000 discount to purchase the assets, and offers a \$2,000 premium to assume the deposits of an auctioned bank; assume also that there is no loss-share agreement. The price of acquiring such a failed bank is minus \$8,000.

frictions, enhance capital flows across local markets (Gilje et al., 2016), improve lending quality (Jayaratne and Strahan, 1996), and increase financial stability – in particular for larger banks (Hirtle and Stiroh, 2007). Indeed, bank-client relationships – as the main source of banks’ franchise value – can be represented by both branch networks and core deposits.<sup>17</sup> Therefore, holding *Core Deposits* constant, we expect that there is a positive relationship between *Log Branch* and the value of a bank.

We also follow the literature on geographical diversification (Goetz 2012; Meslier et al. 2016) and control for the breadth of the branch network across different counties (*Geographic Diversity*). We cannot predict that the acquirers attach positive value to the breadth of the branch network because the exacerbated agency cost and impediment of communication between branches and managers may cancel out the benefits of having a geographically diverse branch network.

The value of a bank depends also on its market share; hence we add to the model the market share of the target in the counties where it operates (*Market Share*). We follow Ivanov and Karoli (2023) and Bennet and Unal (2014), and control for economic conditions of the local economy where the branches of failed banks are located by including *Establishments* and *Establishment Growth* in our model.

Banks with a *National Charter* are subject to stricter scrutiny. As a result, their accounting data are likely to be considered more reliable by acquirers. Furthermore, the OCC is generally quicker than the state authorities in placing a failing bank in receivership. Hence, failing banks with a national charter might not be as badly stressed as failing banks with state charters. Therefore, we expect that a target bank with a *National Charter* will have a higher value.

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<sup>17</sup> It is worth noting that the pairwise correlation between *Core Deposits* and *Log Branch* for the sample of failed banks is -0.226.

We introduce three indicators for loan quality: 1) the ratio of non-performing loans to total loans (*Non-Performing Loans*); a higher value of non-performing loans represents a lower loan quality and a higher credit risk; 2) the share of other real estate owned to total assets (*OREO*), which reflects the distressed real estate properties that are held due to foreclosure (Johnston-Ross et al., 2021); 3) the ratio of commercial mortgages to total loans (*Commercial Mortgage*), because Cole and White (2012) show that banks with a higher *Commercial Mortgage* have a higher probability of failure.

We consider the share of liquid assets in total assets (*Liquid Assets*) in our model. Since liquid assets are more transparent and their valuation is less ambiguous, we expect that target banks with more *Liquid Assets* are taken over at a higher price, holding all other factors constant. This is in line with the prediction of optimal bidding strategies proposed by Wilson (1977) and Kagel and Levin (1986) that bidding price is negatively linked to the degree of uncertainty about the value of the auctioned item.

To investigate whether the prices of the assets and deposits of failed banks are influenced by the capitalization of the acquirers, we add the ratio of tier 1 capital to total risk-weighted assets of acquirer banks (*Acquirer Tier1 Ratio*) to our specifications. To capture the synergies between the target and the acquirer, we include five explanatory variables in our model following Granja et al. (2017). They control for geographical proximities of branches (*Distance*), similarities of loan portfolios (*Diff. Res. Loans*, *Diff. Cons. Loans*, *Diff. C&I Loans*), and the average (pro forma) increase in market concentration in the aftermath of the acquisition (*Delta HHI*), which we collectively call “*Synergies*”.

We also control for the logarithm of the number of bidders (*Log Number Bidders*) that were present in the auctions. We expect a positive relationship between *Log Number Bidders* and the



value of targets. Lastly, we control for time fixed effects by introducing seven annual dummy variables.<sup>18</sup>

Table III presents the results: In column (1), we estimate the model using *Deposit Premium* as the dependent variable. In this specification, we include *Core Deposits*, *Log Branch*, *Geographic Diversity*, *Market Share*, *Establishments*, and *Establishment Growth*, and we control for *National Charter*, *Log Number Bidders*, and year fixed effects. We find that an increase in *Geographic Diversity* of the failed bank is associated with a lower *Deposit Premium*. *Market Share* is positively correlated with *Deposit Premium*; however, its coefficient is significant only at the 10% level. The coefficient of *Log Number Bidders* is positive and significant, which implies that the acquirers of the failed bank pay a higher *Deposit Premium* in an auction where more bidders attend.<sup>19</sup>

Column (2) presents the results when we include the variables related to the asset quality of failed banks (*Non-Performing Loans*, *OREO*, *Commercial Mortgage* and *Liquid Assets*) in our model. The results remain qualitatively unchanged. In column (3) we add *Acquirer Tier 1 Ratio* and five variables to capture the synergies between the target and the acquirer, *Synergies*. The coefficients on *Geographic Diversity* and *Log Number Bidders* qualitatively remains the same in this specification. In this specification, the coefficient of *Market Share* loses its 10% significance.

In column (4) and (5) we use *Asset Discount* and *Price Asset Ratio* as the dependent variable, respectively. The results show that failed banks with more branches or national charter

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<sup>18</sup> The sample covers eight years: 2009-2016. We consider the year 2009 as the benchmark.

<sup>19</sup> We recognize that *Log Number Bidders* is potentially endogenous. To account for this endogeneity would require a model of the FDIC's beliefs as to which banks to invite to the auction and also a model of which banks decide to enter the auction, which is beyond the scope of this paper. However, a bank is more likely to bid when it believes that its expected gain (which is the probability of winning times the gain if it wins) exceeds its cost of preparing a bid. Since the gain if the bank wins would be (negatively) related to the size of the deposit premium, this implies that the positive coefficient that we find is likely an under-estimate of the true effect.

are sold with lower discounts on assets and higher prices. There is also positive relationship between *Liquid Assets* and the dependent variables: Failed banks with more liquid assets are sold with a lower discount and therefore at a higher price. *Acquirer Tier 1 Ratio* is significantly negative only at a ten percent confidence level in column (5). The result also shows that among the five variables that could capture potential synergies, the coefficient of *Diff. Res. Loans* is significantly negative in both columns (4) and (5). It indicates that when the difference between failed banks and acquirers increases in terms of the share of residential loans in each bank's total loan portfolio, the discounts on assets increase and therefore failed banks are sold at a lower price.

The coefficients for the year dummy variables are jointly significant. We find that the coefficients for the years 2012 and 2016 are significantly negative when the dependent variable is *Deposit Premium*. In *Asset Discount* and *Price Asset Ratio* regressions the coefficients for the years 2010 and 2014 are positive and significant. The *Price Asset Ratio* of failed banks is likely to depend on the number of failures in a year because when the number of failures increases, the investment opportunity set for acquiring banks becomes larger (Acharya and Yorulmazer, 2007). Yet, the intercept for the year 2010 - with the highest number of failures - is significantly larger than that of the base year, which is 2009.<sup>20</sup> The coefficients on these annual dummy variables reflect the change in the dependent variable for factors that are not captured by the explanatory variables. One plausible explanation is that the FDIC better managed the resolution of failed banks in 2010 and onward relative to the year 2009 when the agency faced a wave of failures in the immediate aftermath of the financial crisis 2007-08.

[TABLE III]

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<sup>20</sup> There are in total 109 and 144 bank failures in 2009 and 2010, respectively. There are fewer failures during the 2011-2016 timespan.

We do not include *Size* in our analysis, because of multicollinearity issues.<sup>21</sup> As a robustness check of our results, however, we include the orthogonalized value of *Size* in our models. The results remain unchanged qualitatively. The coefficient on the orthogonalized *Size* is also significantly positive.

It can be argued that the number of branches might represent fixed assets of failed banks; to ensure that our finding is not spurious – in an unreported regression – we include the ratio of fixed assets to total assets in our model. We find that the results on our variables of interest remain qualitatively unchanged.

Next, we use *DIF Cost* as the dependent variable instead of *Price Asset Ratio*, and re-estimate the specifications in columns (1), (2), and (5) of Table III. Since the *DIF Cost* should be approximately the opposite of the *Price Asset Ratio*, we expect the important RHS variables from column (5) of Table III to have the opposite signs.

We report the results in Table IV. And indeed we find that, as expected, the signs on the important RHS variables are generally reversed from the results in column (5) of Table III: Failed banks with more branches or a national charter have, on average, lower estimated costs for the Deposit Insurance Fund (DIF). A larger number of participants in the auction (*Log Number Bidders*) is associated with lower costs for DIF. In columns (2) and (3), the coefficient of *Core Deposits* is negative and significant, which means that higher *Core Deposits* is associated with lower estimated costs to DIF.

The results on other variables are as follows: The sale of failing banks with more *Non-Performing Loans* or *OREO* has, on average, higher costs for DIF. *Liquid Asset* is negatively associated with *DIF Cost*, which is similar to the findings of Granja (2013). The result also shows

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<sup>21</sup> *Size* is highly correlated with our variables of interest, i.e. *Core Deposit*, *Log Branch*, and *Geographic Diversity*. The pair-wise correlations are -39.2%, 79.3% and 51%, respectively.

that there is a positive relationship between *Market Share* and the *DIF Cost*, which is in contradiction with our expectation. The result in column (3) shows that with an increase in *Distance* the resolution cost for DIF increases, which is in line with the prediction of Granja et al. (2017). The coefficients on the year dummy variables are jointly significant and qualitatively similar to our findings in Table III.

[TABLE IV]

#### 4. The Acquirers: The Importance of Financial Strength

In this sub-section, we investigate whether the financial strength of bidders matters when bidding in a failed bank auction. We consider the runner-ups of the auctions organized by the FDIC as the benchmark. Specifically, we examine the relationship -- conditional on a bank's being an acquirer -- between a bidder's financial strength and the probability of winning a failed bank. We define a dummy variable (*Win*) that takes the value of one for the acquirers, and zero for runner-ups. We define *Win* as a function of *Relative Size*, *Bidder Financials*, *Bidder Controls*, and year fixed effects. We estimate our pooled cross-sectional regression model using logit regressions:

$$Win_{it} = \alpha + \beta \times Relative\_Size_{it} + Bidder\_Financials_{it} \times \Gamma + Bidder\_Controls_{it} \times \Delta + \sum_{y=2010}^{2016} \eta_y \times Year\_Dummy_{y,t} + \epsilon_{it} \quad (2)$$

where the individual bank and time dimensions are represented by *i* and *t* subscripts, respectively.

The explanatory variables are defined as follows:

*Relative Size* is the ratio of total assets of the bidder to total assets of the target. *Bidder Financials* includes *Tier1 Ratio* and *Non-Performing Loans*. We include the following four control variables, collectively called *Bidder Controls*, in our analysis: *Non-Interest Expense*; *Core Deposits*; *Net Interest Margin*; and *Non-Interest Income*; and we also include *Age*.

Table V reports the estimation results of Equation (2) using logit regressions. We estimate -- conditional on an auction having at least two bidders -- the probability of winning a failed bank auction versus losing the auction as a function of the financial strength of bidders and the control variables. We use 475 observations for our analysis.

The results show that having a larger *Relative Size* and *Tier 1 Ratio* is associated with a higher probability of winning an auction. In addition, the probability of winning an auction decreases with the age of the bidder. However, *Non-Performing Loans*, *Non-Interest Expense*, *Core Deposits*, *Net Interest Margin* and *Non-Interest Income* exhibit no significant relationship with the dependent variable.

Column (2) reports the marginal effects at the mean. According to the result in this column, a one percent increase in *Relative Size* from the mean is associated with a 0.3% increase in the probability of winning an auction. A one percent increase in *Tier 1 Ratio* from the mean predicts 0.8% increase in the probability of being an acquirer.

Overall, the findings imply that the acquirers of failed banks are more capitalized and larger than the runner-ups, which is in line with the objective of the FDIC to allocate failed banks to stronger acquirers.

[TABLE V]

#### *4.1. Financial Strength and the Probability of Multiple Acquisitions*

Our data show that there are acquirers that absorbed multiple targets during our study period. We expect that the acquirers of multiple failed banks must be stronger than other acquirers to win the auctions repeatedly. However, the claim of Igan et al. (2022) - that banks that engage in lobbying have a higher chance to win the FDIC auctions - casts doubt on this expectation.

In this sub-section, we examine whether such banks are financially stronger than those that acquire only one bank throughout our sample period. We define a dummy variable that takes the value one if an acquirer absorbs more than one target during our entire sample period, and zero otherwise. We use this dummy variable as the dependent variable in Equation (2) and estimate our model with logit regressions. In this analysis, the dataset is limited to the sample of acquirers.

Table VI illustrates the results. In column (1), the dependent variable is - conditional on a bank's being an acquirer - the probability of multiple takeovers during the study period: 2009:Q1-2016:Q3 (excluding multiple takeovers in the same quarter). The results show that having a larger *Relative Size* increases the probability of acquiring multiple failed banks. Marginal effects at the mean, reported in column (2), show that a one percent increase from the mean in *Acquirer Relative Size* is associated with a 0.68% increase in the probability of acquiring multiple failed banks. We find no significant relationship between *Acquirer Tier 1 Ratio*, *Acquirer Non-Performing Loans*, *Acquirer Non-Interest Expense*, *Acquirer Core Deposits*, and *Acquirer Net Interest Margin* and the dependent variable. However, we find that the probability of acquiring multiple failed banks increases with an increase in *Acquirer Non-Interest Income* or a decrease in *Acquirer Age*.

Overall, the result implies that the banks that acquire multiple failed banks are slightly larger but are not financially different from the acquirers of only a single bank during our study period.

[TABLE VI]

#### 4.2. *The Capital Charge of Acquisitions and the Future Growth of Acquirers*

Whether and how the local economy and banking system is affected by the resolution mechanism that is adopted by the FDIC is an important policy question. The literature shows that selling failed banks adversely affects the local economy (Ivanov and Karoli 2023). Vij (2021)

claims that the acquirer closes the branches where it has a branch itself, which may limit access to credit for the local economy and increase the market power of acquirers.

A key research question in this debate is the consequence of the acquisition for the operations of acquiring banks. Heitz (2023) shows that the acquirers who use loss-share agreements underperformed relative to those that acquire failed banks without a loss-share agreement, and also relative to those that do not acquire any failed banks. In this sub-section, we study whether an acquirer's organic growth is adversely affected as a result of acquiring failed banks.

The acquisition of a failed bank increases both the assets and deposits of the acquiring bank. For the increase in assets, the acquiring bank must consider the capital charge in compliance with Basel III; and for the increase in deposits, the acquiring banks should increase its reserves with the Federal Reserve.<sup>22</sup> We know that the FDIC invites well-capitalized banks to the auction. Such banks have some excess capital to accommodate the new assets that will be purchased in the auction. We first compute the capital charge for each takeover.<sup>23</sup> Then, we can examine whether and how acquirers rebalance their balance sheet, by calculating the growth rates of assets, deposits, and loans of acquirers over the three years after the acquisitions. We consider the runner-up banks as the benchmark. The results are reported in Table VII.

The excess capital of acquirers and runner-ups, prior to the acquisition, is on average 6.1% and 5.9%, respectively. The difference is statistically insignificant. The capital charge of the acquisition is on average about 1.4% of acquirer's total assets. We compute the excess capital of both acquirers and runner-ups in the quarter after the acquisitions. We perform a t-test for the mean

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<sup>22</sup> We presume that banks hold excess reserve at the Fed, and hence the reserve charge of deposit assumption is not expected to be binding.

<sup>23</sup> It is worth noting that the assets that are purchased under loss-share agreement are exempted from this requirement; therefore we exclude them for our analysis.

equality of the excess capital of acquirers before and after the acquisition. The t-test yields -5.6, which implies that the excess capital of acquirers significantly decreases.

Next, we examine whether the capital charge of the acquisition substantially reduces the excess capital of acquirers relatively to the runner-up banks. The results show that the excess capital after the acquisition is just slightly lower for the acquirers relatively to the runner-ups (5.7% vis-à-vis 5.9%), and the difference is not statistically significant.

[TABLE VII]

Next, we examine whether the organic growth of acquirers is slower than the runner-ups. To achieve our objective, we compute the quarterly growth rate of deposits, lending and total assets of acquirers over a 12 quarters period following the acquisition of failed banks and juxtapose them with the growth rates of runner-up banks as the benchmark/counterfactuals. To make sure that the pre-treatment parallel trend assumption holds, we compute the growth rates four quarters before the acquisition. The results are depicted in Figure 1.

[FIGURE 1]

The figures (1.a), (1.b) and (1.c) show that prior to the acquisition, the acquirers and runner-ups are following a similar pattern of growth. As expected, there is a significant (external) growth in the assets, deposits, and loans of the acquirers (relative to the runner-ups) in the first quarter after the acquisition. However, as of the second quarter following the acquisitions, the growth pattern of acquirers map on the growth pattern of runner-up banks, and they closely follow each other over the three years study period. This implies that the acquisition of failed banks does not adversely affect the organic growth of acquirers, which might be due to the fact that the FDIC invites only well-capitalized banks to the auctions of failed banks.



## 5. Concluding Remarks

In the U.S., the FDIC resolves failed banks by selling them to healthy financial institutions. The sale is conducted in the form of an auction that is open to eligible acquirers that are invited by the FDIC. There are three major concerns with regard to the resolution process: a) whether the acquirers value the features of the deposit physical structure: the structure of the branch network; b) whether the FDIC sells failed banks to appropriate acquirers; and c) what is the consequence of acquiring failed banks for the future growth of the merged entity?

In this paper, we seek to contribute to the literature on the sale of failed banks by addressing these three overarching concerns.

We build a sample of U.S. commercial banks that were acquired through the FDIC's P&A deals. Our sample consists of 290 banks that were acquired under P&A transactions between 2009:Q1 and 2016:Q3. The descriptive statistics show that on average, bidders paid a 0.28% premium for assuming the deposits of failed banks and received on average a 13.85% discount for the purchase of the assets of failed banks.

We find that the acquirers assign a higher value to the failed banks with more branches, in particular if the branch network is located in a smaller number of counties. The results also indicate that the failed banks with national charters are sold at higher prices relatively to the failed banks with state charters. We also show that the probability of winning an auction increases when the bidder is larger and better capitalized. In our dataset there are acquirers that absorb multiple failed banks. We examine the financial strength of such acquirers and find that – compared to the banks that acquire only one failed bank – they are not financially stronger; however, a larger size is associated with a higher probability of acquiring multiple failed banks. Last, the analysis reveals that the organic growth of acquirers is not adversely affected by the acquisition of failed banks,

which is plausibly due to their holding significant excess capital as mandated by the FDIC guidelines.

The findings of this study have important implications for policymakers, as the results show that the characteristics of the branch network of failed banks are important determinants of their value. While the FDIC expects a premium based on the volume of the core deposits, failed banks with more branches that are less dispersed geographically also have more value. In addition, the study re-emphasizes the importance of being highly capitalized for acquirers to win the auctions and maintain steady support to the local economy post-acquisition.

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Table I. Variable Description

This table presents description of variables used in this study.

<b>Variables</b>	<b>Description</b>
<b>Deal Characteristics</b>	
<i>Price Asset Ratio (%)</i>	$Price\ Asset\ Ratio = 100 \times [\text{value of acquired banks}] / [\text{total assets of acquired banks}]$ . The numerator is the summation of the discount received for the purchase of total assets and the premium paid for the assumption of deposits. The discount takes a negative value, but the premium is a positive number. For the deals with a loss-share agreement, we add the value of the loss-share agreement to the numerator with a negative sign. The value of a loss-share agreement is the product of the percentage of the loss share agreement (tranche), loss share amount, and probability of loss. The first two items are obtained from the FDIC website, and the last item is estimated by calculating the average net charge-off on gross loans ratio of failed banks over their last four quarters of operation.
<i>Deposit Premium (%)</i>	The premium paid by an acquirer for the assumption of a failed bank's core deposits divided by the core deposits of the failed bank.
<i>Asset Discount (%)</i>	The discount received by an acquirer for the purchase of a failed bank's total assets divided by the total assets of the failed bank.
<i>Loss Share Value Ratio (%)</i>	The expected value of the FDIC's commitment to share some of the future losses of the acquiring bank of a failed bank. The value of a loss-share agreement is the product of the percentage of the loss share agreement (tranche), loss share amount, and probability of loss. The first two items are obtained from the FDIC website, and the last item is estimated by calculating the average net charge-off on gross loans ratio of failed banks over their last four quarters of operation.
<i>DIF Cost (%)</i>	The FDIC's estimated cost to the Deposit Insurance Fund divided by total assets of the failed bank in the last operating quarter.
<i>Number Bidders</i>	The number of bidders who attend the auction for selling a failed bank.
<i>Same County</i>	A dummy variable that takes the value of one when both acquirer and target have their headquarters located in the same county, and zero otherwise.
<i>Distance</i>	The average pairwise distance (in 100-mile increments) between all pairs of branches of the target bank and of the acquirer.
<i>Diff C&amp;I Loans</i>	The absolute difference between the failed bank's and the acquirer's percentage of total loans held in commercial and industrial loans.
<i>Diff Res. Loans</i>	The absolute difference between the failed bank's and the acquirer's percentage of total loans held in residential loans.
<i>Diff Cons. Loans</i>	The absolute difference between the failed bank's and the acquirer's percentage of total loans held in consumer loans.
<i>Delta HHI</i>	The average increase in local deposit market concentration after the acquirer acquires the branch network of the failed bank.
<i>Branch Closure</i>	Number of closed branches of the failed bank by the acquirer
<i>Capital Charge</i>	Amount of regulatory capital that the acquirer should consider according to Basel III.
<b>Acquirer (Runner-up) Characteristics</b>	
<i>Relative Size</i>	The ratio of total assets of an acquirer(runner-up) to total assets of the target.
<i>Tier 1 Ratio (%)</i>	Tier 1 risk-based capital ratio of an acquirer(runner-up). The ratio equals tier 1 capital divided by total risk-weighted assets.
<i>Non-Performing Loans (%)</i>	The ratio of non-performing loans of an acquirer(runner-up) to its total loans. Non-performing loans consist of nonaccrual loans and loans which are past due for 90 days or more and still accruing.
<i>C&amp;I Loans (%)</i>	The ratio of commercial and industrial loans of an acquirer(runner-up) to total loans and leases.
<i>Residential Loans (%)</i>	The ratio of 1-4 family residential loans and multifamily residential real estate of an acquirer(runner-up) to total loans and leases.
<i>Consumer Loans (%)</i>	The ratio of loans to individuals of an acquirer(runner-up), to total loans and leases.
<i>Non-Interest Expense (%)</i>	The ratio of total non-interest expense of an acquirer(runner-up) to its total operating revenue. Total non-interest expense includes salary and benefits, occupancy and equipment, and other non-interest expense.

<i>Core Deposits (%)</i>	The share in total liabilities of core deposits of an acquirer (runner-up). Core deposits, in the Uniform Bank Performance Report (UBPR) and until March 31, 2011, are defined as the sum of demand deposits, all NOW and automatic transfer service (ATS) accounts, money market deposit accounts (MMDAs), other savings deposits, and time deposits under \$100,000.
<i>Net Interest Margin</i>	Interest income minus interest expense of an acquirer (runner-up) divided by its total earning assets.
<i>Non-Interest Income (%)</i>	The income from non-interest activities of an acquirer (runner-up) divided by its total operating income.
<i>Age</i>	The difference between the current year and the year of establishment of an acquirer (runner-up).
<i>Branch</i>	The number of branches of an acquirer (runner-up).
<i>Acquisition Number</i>	The number of acquisitions of failed banks by one acquirer during the study period.
<i>Excess Capital</i>	The difference between the regulatory capital and minimum required capital according to Basel III, divided by total assets.
<b>Target Characteristics</b>	
<i>Core Deposits (%)</i>	Share of core deposits of a target in its total liabilities.
<i>Number Branch</i>	The number of branches of a target.
<i>National Charter</i>	A dummy variable that takes the value of one when the target has a federal charter, otherwise zero.
<i>Non-Performing Loans (%)</i>	The ratio of non-performing loans of a target to its total loans.
<i>OREO (%)</i>	The ratio of other real estate owned of a target to its total assets.
<i>Commercial Mortgage (%)</i>	The share of commercial mortgages of a target in its total loans.
<i>C&amp;I Loans (%)</i>	The ratio of commercial and industrial loans to total loans and leases.
<i>Residential Loans (%)</i>	The ratio of residential loans to total loans and leases.
<i>Consumer Loans (%)</i>	The ratio of loans to individuals to total loans and leases.
<i>Liquid Assets (%)</i>	The ratio of liquid assets of a target to its total assets.
<i>Non-Interest Expense (%)</i>	The ratio of total non-interest expense to total assets.
<i>Market Share (%)</i>	The weighted-average market share of a target in the counties of target bank operation. The market share is calculated based on deposits. The weights are represented by the ratio of total deposits of a target in a given county.
<i>Geographic Diversity</i>	$1 - \sum_j \left( \frac{Deposits_j}{Total\ Deposits} \right)^2$ ; $Deposits_j$ equals deposits of bank $i$ in location $j$ at time $t$ ; and $Total\ Deposits$ equals total deposits of bank $i$ at time $t$ . We calculate this variable at county level.
<i>Equity Asset Ratio (%)</i>	The equity capital to assets ratio of a target.
<i>Non-Interest Income (%)</i>	The income from non-interest activities of a target divided by its total assets.
<i>Age</i>	The difference between the current year and the year of establishment of a target.
<i>Establishments</i>	The weighted-average number of local establishments in the counties of target bank operation five years prior to the current year and measured in thousands. The weights are represented by the ratio of a number of a bank's branches in a given county.
<i>Establishment Growth</i>	The weighted-average four year growth rate of local establishments in the counties of bank operation, lagged one year

Table II. Descriptive Statistics

Panel A. Targets

This panel presents general descriptive statistics and deal specifications for targets of the FDIC-assisted acquisitions over the 2009:Q1 and 2016:Q3 period.

Variable	N	Mean	SD	Min	Max
Total Assets (\$million)	290	379.89	565.89	21.45	2,824.74
Core Deposits	290	81.11	13.67	42.74	99.46
Number Branch	290	6.35	8.50	1	42
National Charter	290	0.25	0.43	0	1
Non-Performing Loans	290	19.54	9.17	2.93	44.97
OREO	290	5.42	4.40	0.19	18.67
Commercial Mortgage	290	36.36	16.78	1.75	78.83
C&I Loans	290	10.22	7.56	0.37	31.84
Residential Loans	290	30.76	17.88	3.92	82.23
Consumer Loans	290	1.92	2.02	0.04	8.18
Liquid Assets	290	22.06	8.62	7.16	46.87
Non-Interest Expense	290	2.82	1.62	0.65	7.37
Market Share	290	7.42	11.19	0.06	45.8
Equity Asset Ratio	290	1.08	1.82	-3.53	5.22
Non-Interest Income	290	0.08	0.59	-1.66	1.52
Age	290	37.73	37.62	3.21	147.84
Establishments	290	26.53	36.74	0.27	144.89
Establishments Growth (%)	274	5	8	-9	25
Geographic Diversity	290	0.25	0.27	0.00	0.92
Branch Closure	290	0.65	1.15	0	5
Price Asset Ratio	290	-15.36	8.47	-39.09	-1.94
Deposit Premium	290	0.28	0.5	0	2
Asset Discount	290	-13.85	8.88	-39.09	0
Loss Share Value	168	-2.57	1.53	-6.98	-0.39
Cost to FDIC	290	22.39	9.82	2.38	45.12
Number Bidders	280	2.91	1.72	1	8
Same County	290	0.12	0.33	0	1



Distance	273	2.37	3.13	0.1	13.35
Diff Res. Loans	278	15.47	13.28	0.56	54.16
Diff Cons. Loans	278	3.99	5.91	0.04	27.99
Diff C&I Loans	278	8.72	7.03	0.35	28.89
Delta HHI	290	28.71	84.46	0	415.18

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*Panel B. Acquirers and Runner-ups*

This panel presents general descriptive statistics for the acquirers and runner-ups of the FDIC-assisted auctions over the 2009:Q1 and 2016:Q3 period. There are 221 auctions with more than one bidder. The data is available for 197 runner-ups. See Table I for variable definitions.

Variable	Acquirers					Runner-ups					T-Stat <sup>†</sup>
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	
Total Assets	278	4,512.70	8,563.25	77.77	43,395.79	197	3,505.38	4,933.24	56.61	2,1270.04	2.369***
Relative Size	278	16.48	26.85	0.75	139.09	197	12.66	15.16	0.77	65.88	2.621***
Branch	278	60.39	98.82	1.00	444.00	197	55.33	69.99	1	301	0.938
Tier 1 Ratio	278	17.71	10.33	9.34	60.64	197	15.66	5.61	9.67	34.19	2.392***
Non-Performing Loans	278	4.77	4.79	0.10	28.01	197	4.29	3.18	0.39	14.25	0.598
Res. Loans	278	28.54	14.71	6.04	78.15	197	28.15	14.01	6.36	70.07	0.594
Cons. Loans	278	4.37	6.09	0.12	28.62	197	4.69	6.47	0.10	29.75	-0.457
C&I Loans	278	14.61	8.35	1.05	36.04	197	14.81	9.53	0.59	48.43	-0.281
Non-Interest Expense	278	65.28	18.51	27.02	128.85	197	66.63	20.97	21.14	151.82	-0.831
Core Deposits	278	79.79	11.29	43.29	97.53	197	80.14	10.42	51.55	95.56	-1.250
Net Interest Margin	278	4.10	1.09	1.94	7.36	197	4.17	1.04	2.52	7.43	-1.456**
Non-Interest Income	278	24.64	16.40	-3.63	70.69	197	21.96	14.27	-4.00	64.21	2.081**
Age	290	51.88	44.19	0.42	149.43	197	61.33	43.71	0.13	148.02	-2.596
Acquisition Number	290	2.99	2.48	1	10	-	-	-	-	-	-

<sup>†</sup> T-Stat. of mean equality test between the winning bidders (acquirers) and runner-up bidders. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% respectively.

Table III. Failed Banks Value Model.

This table reports estimation of our specification of Equation (1) using OLS techniques and our pooled cross-section samples of acquisitions during 2009:Q1-2016:Q3 period. In columns (1)-(3) *Deposit Premium* is the dependent variable. In column (1), the independent variables are deposits' characteristics of failed banks, including *Core Deposits*, *Log Branch*, *Geographic Diversity*, *Market Share*, *Establishments* and *Establishments Growth*, while controlling for *National Charter*, *Log Number Bidders* and time fixed effects. Column (2) presents estimation results, after inclusion of assets' characteristics of the targets, i.e. *Non-Performing Loans*, *OREO*, *Commercial Mortgage*, and *Liquid Assets*. In column (3), we add *Acquirer Tier 1 Ratio*, *Distance*, *Diff Res. Loans*, *Diff Cons. Loans*, *Diff C&I Loans*, and *Delta HHI*. In columns (4) and (5), we use *Asset Discount* and *Price Asset Ratio* as the dependent variable, respectively. See Table I for variable definitions. Robust standard errors in parentheses. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10%, respectively.

Variables	(1) DP	(2) DP	(3) DP	(4) AD	(5) PR
Core Deposits	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	-0.031 (0.041)	-0.019 (0.039)
Log Branch	0.030 (0.046)	0.033 (0.047)	0.036 (0.051)	1.455** (0.699)	1.406** (0.623)
Geographic Diversity	-0.356** (0.146)	-0.355** (0.148)	-0.366** (0.156)	2.645 (2.499)	1.334 (2.168)
Market Share	0.006* (0.003)	0.005* (0.003)	0.004 (0.003)	0.019 (0.036)	0.033 (0.034)
Establishments	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.008 (0.016)	0.009 (0.015)
Establishment Growth	0.620 (0.399)	0.648 (0.395)	0.485 (0.416)	6.958 (6.679)	6.443 (5.837)
Non-Performing Loans		-0.003 (0.003)	-0.002 (0.003)	-0.056 (0.059)	-0.065 (0.052)
OREO		0.003 (0.008)	0.002 (0.007)	-0.008 (0.110)	0.007 (0.105)
Commercial Mortgage		-0.001 (0.002)	-0.001 (0.002)	0.001 (0.042)	-0.001 (0.034)
Liquid Assets		-0.001 (0.003)	0.001 (0.004)	0.142** (0.068)	0.137** (0.063)
Acquirer Tier 1 Ratio			-0.000 (0.003)	-0.081 (0.051)	-0.072* (0.043)
Distance			0.012 (0.011)	-0.169 (0.161)	-0.133 (0.159)
Diff Res. Loans			0.001 (0.003)	-0.086* (0.045)	-0.100** (0.041)
Diff Cons. Loans			-0.002 (0.004)	0.002 (0.077)	0.034 (0.068)
Diff C&I Loans			-0.002 (0.004)	0.106 (0.073)	0.116* (0.068)
Delta HHI			0.000 (0.000)	0.001 (0.004)	0.002 (0.005)
National Charter	-0.029 (0.070)	-0.034 (0.071)	-0.039 (0.074)	3.287*** (1.101)	2.744*** (0.982)
Log Number Bidders	0.219*** (0.061)	0.218*** (0.061)	0.257*** (0.063)	3.086*** (0.909)	3.996*** (0.838)
Year 2010	0.137 (0.122)	0.140 (0.127)	0.147 (0.127)	7.786*** (2.155)	7.969*** (1.965)
Year 2011	-0.171 (0.138)	-0.161 (0.149)	-0.177 (0.150)	3.175 (2.585)	2.485 (2.343)
Year 2012	-0.339** (0.154)	-0.329* (0.168)	-0.377** (0.169)	2.096 (2.919)	1.780 (2.617)
Year 2013	-0.195 (0.212)	-0.181 (0.224)	-0.247 (0.223)	2.475 (3.472)	3.295 (3.271)
Year 2014	0.345 (0.252)	0.324 (0.271)	0.256 (0.270)	8.676*** (3.096)	10.431*** (2.978)
Year 2015	-0.273* (0.141)	-0.227 (0.190)	-0.355 (0.225)	1.856 (9.897)	3.705 (9.849)
Year 2016	-0.481*** (0.165)	-0.475** (0.195)	-0.559*** (0.207)	2.438 (2.816)	3.035 (2.746)
Constant	-0.101 (0.238)	-0.016 (0.282)	-0.092 (0.305)	-22.344*** (4.815)	-25.226*** (4.216)
Observations	264	264	249	249	249
R-squared	0.202	0.206	0.228	0.329	0.397

Table IV. DIF Cost Model.

This table reports estimation of our preferred specification of Equation (1) using OLS techniques and our pooled cross-section samples of acquisitions during 2009:Q1-2016:Q3 period. We use the cost to the Deposit Insurance Fund (*DIF Cost*) as the dependent variable. In column (1), the independent variables are deposits' characteristics of failed banks, including *Core Deposits*, *Log Branch*, *Geographic Diversity*, *Market Share*, *Establishments* and *Establishments Growth*, while controlling for *National Charter*, *Log Number Bidders* and time fixed effects. Column (2) presents estimation results, after inclusion of assets' characteristics of the targets, i.e. *Non-Performing Loans*, *OREO*, *Commercial Mortgage*, and *Liquid Assets*. In column (3), we add *Acquirer Tier 1 Ratio*, *Distance*, *Diff Res. Loans*, *Diff Cons. Loans*, *Diff C&I Loans*, and *Delta HHI*. See Table I for variable definitions. Robust standard errors in parentheses. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10%, respectively.

Variables	(1) DIF Cost	(2) DIF Cost	(3) DIF Cost
Core Deposits	-0.063 (0.042)	-0.091** (0.041)	-0.076* (0.044)
Log Branch	-2.153*** (0.687)	-2.152*** (0.639)	-2.443*** (0.656)
Geographic Diversity	2.566 (2.536)	2.453 (2.132)	1.725 (2.203)
Market Share	0.124** (0.048)	0.107*** (0.038)	0.117*** (0.040)
Establishments	-0.005 (0.014)	-0.011 (0.013)	-0.007 (0.013)
Establishment Growth	8.860 (6.575)	3.977 (6.174)	1.937 (6.306)
Non-Performing Loans		0.293*** (0.046)	0.293*** (0.047)
OREO		0.333*** (0.108)	0.281** (0.108)
Commercial Mortgage		-0.045 (0.032)	-0.038 (0.034)
Liquid Assets		-0.194*** (0.061)	-0.180*** (0.064)
Acquirer Tier 1 Ratio			0.058 (0.044)
Distance			0.347** (0.156)
Diff Res. Loans			0.068 (0.049)
Diff Cons. Loans			0.030 (0.074)
Diff C&I Loans			-0.044 (0.070)
Delta HHI			0.005 (0.005)
National Charter	-6.227*** (1.030)	-4.775*** (0.961)	-4.913*** (1.022)
Log Number Bidders	-5.954*** (0.905)	-4.935*** (0.836)	-4.656*** (0.834)
Year 2010	-4.818** (1.986)	-4.775*** (1.818)	-5.063*** (1.788)
Year 2011	-1.944 (2.251)	-2.056 (2.025)	-2.257 (1.973)
Year 2012	-1.855 (2.552)	-1.795 (2.250)	-2.733 (2.192)
Year 2013	1.568 (3.318)	2.037 (3.422)	0.911 (3.269)
Year 2014	-8.347** (3.687)	-3.285 (3.761)	-4.231 (4.118)
Year 2015	-0.428 (6.511)	6.055 (4.444)	2.537 (6.698)
Year 2016	-9.115*** (2.187)	-6.600** (2.847)	-6.968*** (2.425)
Constant	37.842*** (3.677)	37.451*** (3.796)	33.794*** (4.508)
Observations	264	264	249
R-squared	0.357	0.488	0.497

Table V. Financial Strength and Probability of Winning a Failed Bank

This table reports the estimation of Equation (2) using logit technique. We use 475 observations on the FDIC-assisted acquisitions over 2009:Q1-2016:Q3 timespan. The dependent variable is a dummy variable that takes the value of one for the acquirers, and zero for runner-ups (*Win*). We define *Win* as a function of *Relative Size*, *Bidder Financials*, *Bidder Controls*, and year fixed effects. *Bidder Financials* includes *Tier1 Ratio* and *Non-Performing Loans*. *Bidder Controls* includes *Non-Interest Expense*, *Core Deposits*, *Net Interest Margin*, *Non-Interest Income*, and *Age*. Column (1) present the regression results. Column (2) reports the marginal effects at the mean. Year fixed effects are controlled for in the model, and the F-test shows that the coefficients are jointly significant; nevertheless, for brevity, the coefficients are not reported in the table. See Table I for variable definitions. Robust standard errors in parentheses. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10%, respectively.

Variables	(1) Probability of Win	(2) Marginal Effects at the mean
Relative Size	0.012*** (0.004)	0.0029 (0.0010)
Tier 1 Ratio	0.037*** (0.014)	0.0087 (0.0033)
Non-Performing Loans Ratio	-0.012 (0.027)	-0.0027 (0.0061)
Non-Interest Expense	-0.008 (0.006)	-0.0018 (0.0014)
Core Deposits	-0.002 (0.010)	-0.0004 (0.0023)
Net Interest Margin	-0.125 (0.107)	-0.0290 (0.0250)
Non-Interest Income	0.005 (0.007)	0.0012 (0.0016)
Age	-0.005** (0.002)	-0.0012 (0.0006)
Constant	1.212 (0.974)	
Year Dummy Variables	Yes	
Pseudo R <sup>2</sup>	0.035	
Log-Likelihood	-310.94	
Observations	475	

*Table VI. Financial Strength and the Probability of Multiple Acquisitions.*

This table reports estimation of Equation (2), using logit technique. We use the sample of 257 observations on commercial banks that acquired failed banks through the FDIC-assisted acquisitions over 2009:Q1-2016:Q3 timespan. In column (1), we use the dummy variable for multiple takeovers during the study period as the dependent variable. Column (2) reports the marginal effects at the mean. We define the dependent variable as a function of *Relative Size*, *Bidder Financials*, *Bidder Controls*, and year fixed effects. *Bidder Financials* includes *Tier1 Ratio* and *Non-Performing Loans*. *Bidder Controls* includes *Non-Interest Expense*, *Core Deposits*, *Net Interest Margin*, *Non-Interest Income*, and *Age*. Year fixed effects are controlled for in the model, and the F-test shows that the coefficients are jointly significant; nevertheless, for brevity, the coefficients are not reported in the table. See Table I for variable definitions. Robust standard errors in parentheses. \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10%, respectively.

Variables	(1)	(2)
	Multiple takeovers during the study period	
	Coefficients	Marginal Effects at the Means
Acquirer Relative Size	0.037** (0.017)	0.0068
Acquirer Tier 1 Ratio	0.018 (0.021)	0.0032
Acquirer Non-Performing Loans	0.038 (0.052)	0.0070
Acquirer Non-Interest Expense	-0.016 (0.012)	-0.0030
Acquirer Core Deposits	0.006 (0.015)	0.0012
Acquirer Net Interest Margin	0.269 (0.209)	0.0494
Acquirer Non-Interest Income	0.031*** (0.012)	0.0058
Acquirer Age	-0.014*** (0.004)	-0.0026
Constant	-1.075 (1.571)	
Year Dummy Variables	Yes	
Observations	257	
Pseudo R <sup>2</sup>	0.1994	
Log-Likelihood	-138.85	

Table VII. Capital Charge and Excess Capital

This table reports the average capital charge of acquiring a failed bank, and excess capital of acquirers and runner-ups in the quarter of acquisition and the first quarter after the acquisition, both expressed as a percentage of total assets of acquirers/runner-ups. The difference between the number of observations in the Q0 and Q1 is due to the missing values of the variable “Total Risk Weighted Assets Adjusted” in the dataset.

Panel A. Summary of Capital Charge and Excess Capital											
Variable	Acquirers					Runner-ups					T-Stat†
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	
Excess Capital Q0	278	0.061	0.032	0.021	0.157	157	0.059	0.030	0.026	0.150	0.70
Capital Charge Ratio	278	0.014	0.017	0.000	0.081	-	-	-	-	-	-
Excess Capital Ratio, Q1	290	0.057	0.026	0.021	0.130	162	0.059	0.029	0.023	0.144	-0.45

  

Panel B. T-test for mean equality of excess capital before and after the acquisition											
T-Stat	Acquirers					Runner-ups					
		-5.600***									

Figure I. Growth Rate Pattern.

These figures depict the average growth rates of winning and runner-up bidders from four quarters prior to the acquisition to 12 quarters after the acquisition. Quarter 0 is the quarter of the acquisition. The growth rates are calculated relative to the previous quarter. Figures (1.a), (1.b) and (1.c) illustrate asset growth, loan growth and deposit growth, respectively.

