The Relation Between Bank Resolutions and Information Environment: Evidence from the Auctions for Failed Banks

João Granja*

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Abstract

This study examines the impact of disclosure requirements on the resolution costs of failed banks. Consistent with the hypothesis that disclosure requirements mitigate information asymmetries in the auctions for failed banks, I find that when failed banks are subject to more comprehensive disclosure requirements, regulators incur lower costs of closing a bank and retain a lower portion of the failed bank's assets, while bidders that are geographically more distant are more likely to participate in the bidding for the failed bank. The paper provides new insights on the relation between disclosure and the reorganization of a banking system when the regulators' preferred plan of action is to promote the acquisition of undercapitalized banks by healthy ones. The results suggest that disclosure regulation policy influences the cost of resolution of a bank and, as a result, could be an important factor in the definition of the optimal resolution strategy during a banking crisis event.

Keywords: Banks, Failures, Disclosure Regulation, Financial crisis.

1 Introduction

This study examines the interaction between the information environment of financial institutions and the reorganization process of the US banking system in the aftermath of the 2008 financial crisis. From the beginning of 2008 until the end of 2010, the Federal Deposit Insurance Corporation (FDIC) acted as the receiver or liquidating agent for more than 300 closed banks. I investigate whether regulators incur smaller losses on the resolution of banks whose disclosure requirements were more comprehensive.

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The analysis of the relationship between accounting information and regulatory actions in response to a financial crisis is not new in the literature. Skinner (2008) examines the Japanese authorities' interpretation of bank accounting rules for deferred tax assets in the context of their regulatory forbearance policy. Bischof, Bruggemann, and Daske (2010) analyze the economic consequences of an amendment to IFRS that relaxed fair value accounting rules during the 2008–2010 financial crisis. Both studies focus on the role that accounting played as a tool of forbearance during financial crises. By contrast, I examine how the disclosure requirements of financial institutions influence the outcomes of the reorganizations conditional on regulatory authorities choosing to close the distressed financial institutions.

The financial crisis is an opportunity to study the relationship between the information environment and the reorganization of a financial system following a crisis. Banking regulators and the Federal Deposit Insurance Corporation (FDIC) closed and resolved a number of institutions that is only paralleled by the interventions of the Savings & Loans crisis of the 80s and early 90s. In 2008, they closed 25 commercial banks and savings institutions – including Washington Mutual, which is the largest retail bank failure ever – and in 2009 and 2010, the regulators closed 140 and 157 banks. In terms of total deposits – as of the fourth quarter of 2007 – failed banking organizations represented 5.5% of total deposits in the system.

The Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 mandated the FDIC to choose the least costly method for bank resolution. During the financial crisis of 2008–2010, the FDIC has almost invariably chosen the purchase and assumption (P&A) transaction method to resolve a troubled bank. In a P&A transaction, the FDIC solicits bids for a troubled bank from a set of potential bidders that had indicated interest in acquiring failed banks in the geographical area where the troubled bank is located. The choice of the P&A transaction as the preferred resolution method stems from the belief that the failed bank is more valuable as a going concern relative to the alternative of closing the bank and selling its assets piecemeal. The P&A transaction closely resembles a first-price sealed-bid auction, with the difference that a bid consists of several elements, namely (i) requesting an asset discount over the book value of the failed bank's assets, (ii) submitting a deposit premium indicating the amount that the bidder is willing to pay to assume the deposits of the failed bank, and (iii) setting the terms of a potential loss share agreement between the FDIC and the bidder over the subsequent losses on the assets transferred in the resolution process. After receiving the bids, the FDIC uses its proprietary least-cost test to select the bid whose terms entail the least expected cost for the Federal Deposit Insurance Fund.[1] Finally, the winning bidder takes over the failed bank and resumes operation on the next business day.

This form of bank resolution provides a setting in which to examine the relation between the information environment and the reorganization of a financial system because the participants in the bank resolution process, namely regulators, potential bidders, and outside investors, are likely to be asymmetrically informed about the financial

[1]During the financial crisis, all resolution processes carried out by the FDIC resulted in expected losses for the Deposit Insurance Fund. These losses suggest failed banks are insolvent at the time of resolution as the FDIC must pay the winning bidder in the form of asset discounts and insurance against asset losses for the bidders to be willing to assume the failed bank's operations.

condition of the failed banking organization. Thus, this is an opportunity to analyze if disclosure requirements attenuate the information asymmetries between participants in the P&A transaction and consequently reduce the costs that regulators must bear to complete the resolution.

My first two hypotheses predict that, when failed banks are subject to greater disclosure requirements, the regulator can close a bank with lower estimated costs as a percentage of the failed bank's deposits and retain a smaller percentage of the failed banks' assets. To motivate the empirical analysis, I rely on the analyses of important studies in auction theory, namely those of Milgrom and Weber (1982) and French and McCormick (1984). Milgrom and Weber (1982) demonstrate, in a broad setting, that the release of public information increases a seller's expected revenue in an auction, whereas French and McCormick (1984) find that, in equilibrium, the expected revenue for the seller is decreasing in the costs of preparing a bid, because the bidders in the auction will transfer the cost of preparing the bid to the seller in the form of lower expected bids. These models suggest that banks subject to stricter disclosure requirements should be less costly to resolve as greater transparency results in higher expected revenues in the auction. In my third hypothesis, I predict that additional disclosure requirements could raise the likelihood uninformed bidders participate in an auction. This prediction is motivated by the model in Engelbrecht-Wiggans et al. (1983) which suggests that, when failed banks are subject to stricter disclosure requirements, uninformed bidders are more likely to participate in the P&A transaction, because the information asymmetries between informed and uninformed bidders are less important.

The identification strategy exploits the cross-sectional variation in the US Securities and Exchange Commission (SEC) filing requirements of failed banks to capture differences in the level of mandatory disclosure requirements across the sample of failed banks. Notwithstanding the quarterly financial report that most commercial banks, savings banks, and bank holding companies must file with their respective regulators, I contend that registering with the SEC represents a sizable increase in financial transparency, given that it requires bank managers to submit a mandatory management discussion & analysis section and file 8-Ks notifying their shareholders of any unscheduled material events, among other disclosures. This crucial assumption is further discussed in the hypothesis development section, where I provide anecdotal evidence supporting its plausibility, and in the robustness section, where I conduct empirical tests that further examine this issue.

The empirical analysis finds evidence consistent with the theoretical framework. When failed banks are subject to greater disclosure requirements, the regulator can close a bank with lower estimated costs as a percentage of the failed bank's deposits and retain a smaller percentage of the failed banks' assets. In fact, I find that, if the failed bank is subject to the disclosure requirements mandated by the SEC, the average estimated cost to the banking regulators of failing the bank was on average 4.5 percentage points lower than the average estimated cost of closing a bank that did not file with the SEC. Moreover, the percentage of assets of the failed institution sold by the regulators in the auction was 7.75 percentage points greater when the failed bank was registered with the SEC. These results are arguably economically meaningful as they compare with an average estimated cost of resolution

of 28.75% of total deposits in the institution and an average percentage of assets sold in the P&A transaction of 81.80% during the sample period. Moreover, potential bidders that are not headquartered in the same state as the failed bank are significantly more likely to bid for failed banks that file with the SEC.

The main empirical analysis is subject to three major identification threats that must be addressed. First, a potential concern with the identification strategy is that banks registering with the SEC are more likely to be listed in a stock exchange and to be monitored both by banking supervisors and equity market participants. Academic studies such as Berger, Davies, and Flannery (2000) suggest that the monitoring role of market participants produces incremental information that improves financial institutions' governance. To the extent that bidders recognize that banks that file with the SEC are better governed institutions, the lower cost of resolution of these banks when they fail can also be interpreted as a manifestation of the improved monitoring function of these banks. Furthermore, such results could also be explained by the incentives that public firms have to supply higher quality accounting as documented in Ball, Robin, and Wu (2003) and Burgstahler, Hail, and Leuz (2006). To address this issue, I introduce in my analysis two additional categories: *Dark* are failed banks that were exchange listed but were not required to file with the SEC, i.e., banks that are monitored by equity market participants but are not subject to the enhanced disclosure requirements of the SEC, and *PrivateSEC* are banks that committed to the higher disclosure requirements of the SEC but whose equity is not listed in any exchange. The results suggest that *Dark* banks are not significantly less costly to close vis-à-vis other private failed banks, whereas *PrivateSEC* banks are not significantly more costly to resolve than other SEC-registered banks. Despite the small size of these sub-samples – 21 and 7 financial institutions, respectively –,I interpret these results as providing some support to the primary hypothesis that the SEC's stricter disclosure requirements are the driving force behind the main results.

Second, the research design assumes that the SEC disclosure requirements provide incremental information relative to the information released by the FDIC. It is difficult to directly test whether market participants use the additional information in these disclosure requirements. In the hypothesis development section, I present some anecdotes suggesting that the additional disclosure and enforcement requirements associated with SEC registration status are indeed material for banks and their investors. I also indirectly gauge the validity of this assumption by examining how *SEC* relates to the outcomes of the auction when the additional content of the SEC reporting requirements is less informative. I find that, when the information contained in the SEC reporting requirements is less useful, the impact of *SEC* is muted. This result suggests that the information contained in the SEC disclosure requirements is processed by auction participants.

Finally the SEC listing status can be associated with unobservable opportunities and risks that influence the outcomes and allocations in the auction. In the absence of a valid instrument for the adoption of SEC status, I try to support the validity of my approach by showing that the two categories do not substantially differ in terms of a comprehensive set of observable indicators such as the average interest rate paid on interest bearing liabilities or the average leverage ratios for each category of banks, by presenting evidence that the results remain significant

when I eliminate from the sample those banks that have selected to register with the SEC in recent years, and by implementing robustness tests indicating that the informativeness of SEC filings, which is plausibly unrelated to these unobservable risks and growth opportunities, influence the effect of the SEC variable in the predicted direction.

Nevertheless, I acknowledge that I will not be able to completely assuage all concerns regarding the identification strategy, and consequently the empirical results should be interpreted cautiously.

This paper offers several contributions to the literature. First, the current debate on the costs and benefits of disclosure regulation in the financial system emphasizes the trade-off between the benefits of greater monitoring and market discipline stemming from disclosure regulation and the potential costs that result from greater likelihood of contagion and the possibility of panic-based bank runs (Goldstein and Sapra, 2012). I contribute to this debate, by highlighting that disclosure regulation could have a positive effect on financial development and stability, even during a banking crisis, by facilitating the regulatory efforts to wind down a distressed banking system. Moreover, my paper also adds to the debate on how to efficiently restructure a distressed banking system (Acharya and Yorulmazer, 2008; Kocherlakota, 2009) by suggesting that bank transparency and stricter reporting requirements affect the information endowments of market participants during a financial crisis and, as a result, the costs and benefits associated with the alternatives for resolution of a crisis. Hence the optimal regulatory policy to deal with problem banks – e.g., regulatory forbearance, liquidity assistance, bank resolution – could depend on the disclosure regime in place at the time of the banking crisis. Second, these results uncover a potential externality associated with information production and disclosure in the banking sector. Assuming that information disclosure does indeed affect the cost of resolution for the regulators, as I argue in this paper, the private benefits to the bank from information disclosure are lower than the social benefits of that decision. Thus these results are informative for policymakers, who may wish to take these effects into consideration when setting the optimal level of reporting for financial institutions.

This paper also contributes to the empirical literature documenting the relation between information disclosure and auction outcomes. With the exception of a few studies that exploit changes in state legislation regarding the disclosure of information in procurement auctions (e.g., De Silva et al., 2008), empirical tests of the relation between information disclosure and auction outcomes have been to a great extent confined to laboratory experiments (e.g. Kagel and Levin, 1986) that take advantage of a controlled environment to administer information to the auction participants. The current study partially fills this void by exploiting a source of variation in information disclosure resulting from differences in banks' disclosure requirements prior to their failure.

2 Institutional Background: The Resolution of a Bank

Federal and state regulators regularly conduct on-site examinations of commercial and savings banks to assess the safety and soundness of these institutions.[2] After conducting an examination, the regulatory entity assigns a CAMELS rating to the supervised bank.[3] A rating of 1 or 2 represents few regulatory concerns, whereas a rating of 3, 4, or 5 indicates a high probability of bank failure. A poor CAMELS rating typically results in official regulatory actions, including cease-and-desist orders and management suspension, among other options. If the regulatory intervention is insufficient to curb these problems and the banking institution becomes critically undercapitalized, the primary regulator of the bank will send a failing bank letter to the FDIC, thereby officially initiating a resolution.[4]

Upon the receipt of the failing bank letter, the FDIC contacts the failing bank to coordinate efforts with the board of directors of the failing institution and to request its loan and deposit data. After receiving the data, a team of FDIC resolution specialists visits the institution's premises to directly inspect its financial condition and collect detailed information on the liquidation value of its assets. Given the demand for an expedited process, the FDIC resolution specialists use a statistical sampling procedure to estimate a loss factor for each category of loans on the failing institution's books. This loss factor is then used to estimate the bank's liquidation value, which will be crucial to set the reservation value on the sale of the failing institution's assets.

After collecting all the information, the FDIC decides which resolution structure to adopt. The most commonly used option is the purchase and assumption (P&A) agreement in which the FDIC auctions some or all of the bank's assets and liabilities in a procedure that closely resembles a first-price sealed-bid auction. (Giliberto and Varaiya, 1989). The other available options are to carry out a deposit payoff, in which all insured deposits are paid off and assets are liquidated piecemeal or to create a bridge bank to manage the failed institution's assets and liabilities before putting it back on the market. According to James (1991), there are at least two reasons to believe that a P&A transaction is more efficient than a deposit payoff. First, the bank can have a going-concern value that is higher than its liquidation value. Second, other banks are arguably better managers of the failed bank's operations. Nonetheless, Spiegel (2001) argues the process of disposition of the failed bank through a P&A transaction precludes intensive due diligence, which results in increased information asymmetry concerns. In practice, policymakers consider that the greater efficiency associated with P&A transactions trumps these asymmetric information concerns. Hence the FDIC always promotes a P&A transaction and only opts for a deposit payoff when there are no interested bidders in the purchase of the failed bank's net assets at a price above its reservation value.

Once the information has been gathered and the resolution process chosen, the FDIC starts marketing the failing

[2] See (Agarwal, Lucca, Seru, and Trebbi, 2012) for more details on the regulatory architecture of the U.S. banking system.

[3] The CAMELS rating is the regulatory rating of the bank's overall condition. CAMELS is an acronym for capital adequacy, asset quality, management, earnings, liquidity and sensitivity to market risk

[4] According to the FDIC regulation, a bank is deemed critically undercapitalized if the insured depository institution has a ratio of tangible equity to total assets that is equal to or less than 2.0 percent. See http://www.fdic.gov/regulations/laws/rules/2000-4500.html for more details.

institution to a list of potential bidders that satisfy a set of previously defined criteria. To be eligible to bid, the potential bidder must be a financial institution or be in the process of applying for a bank charter, have a CAMELS rating of 1 or 2, have a satisfactory anti-money laundering record and be well-capitalized (Total risk-based capital of 10%, Tier 1 capital ratio of 6%, and Tier 1 leverage ratio of 4%). On top of this, the bidder is required to be twice the size of the failing institution if it is located in its vicinity, and it must be even larger relative to the failing institution if it is geographically distant. The FDIC also accepts bids from private investors provided that they have the adequate funds and are engaged in the process of obtaining a charter to create a new institution.

All approved bidders are given access to the FDIC's IntraLinks portal, in which the supervisor places an information package containing detailed financial data and expected losses on the failed bank's loan portfolio. The bidders can also find information regarding the premises, IT systems, and bidding details in the IntraLinks systems. The potential bidders are not granted access to customer specific data, so it is reasonable to say that information asymmetry will persist among the parties in the transaction. The IntraLinks system also contains information regarding the types of P&A transaction that the FDIC selected for each particular deal.[5] Depending on the characteristics and financial condition of the failed bank, the FDIC proposes one or more types of P&A transaction such as a whole bank purchase (all deposits and assets of the bank), a whole bank purchase with loss-share agreement, a modified P&A agreement (the bank is modified to exclude the riskier asset tranches), a clean P&A (the failed bank is stripped of all risky assets for the purpose of the auction), or a combination that includes some of the above. For a given resolution, the FDIC may limit the types of feasible P&A transaction to just one of the above but can also allow bids for several of these types of P&A agreements. The FDIC's choice of P&A transaction type is also potentially related with the information asymmetry associated with the auction.

Potential bidders in an auction can also conduct their own due diligence at the failing institution's site, provided that the board of the failing institution grants its approval. However, potential bidders have a very short window to conduct their on-site assessment of the company, because it is limited to two or three days for a team of three to five specialists. This number compares with a reported average of 115 days of due diligence for traditional M&A acquisitions reported in Wangerin (2010). Hence it is implausible that this due diligence eliminates the information asymmetry among the participants in the auction.

The bidding generally starts 12 to 15 days before the scheduled closing of the target institution. The bidders can place one or more sealed bids for the failed bank. (Bidders can place one bid for each type of P&A transaction proposed by the FDIC.) A bid is typically composed of three main elements: (i) a deposit premium, which consists of the amount that the bidder is willing to pay to assume the institution's deposits; (ii) a discount on assets, which represents the discount that the bidder requests on the book value of the assets in the transaction; and (iii) a potential loss-share agreement under which the FDIC agrees to cover a portion of the losses on the assets

[5]Ideally, I would have access to the information set that is available to the participants in the auction so that I could test whether the main variable of interest explains the outcomes of the P&A transaction after controlling for all the information provided in the Intralinks portal. Unfortunately, it is not possible to obtain access to this data.

assumed by the winning bidder. The elements of the bid are potentially interrelated (e.g., the bidder may demand a lower discount on assets if the latter are covered by a loss-share agreement). Hence an empirical analysis that separately focuses on each element of the bidding could result in erroneous inferences. The FDIC is mandated by the Federal Deposit Insurance Company Improvement Act of 1991 to choose the least costly alternative to the deposit insurance. To meet this requirement the FDIC computes an estimate of the cost of each bid in the P&A transaction using its proprietary least cost test, and selects the bid whose terms entail the least estimated cost for the Deposit Insurance Fund. I use the estimated cost of bank resolution obtained from the FDIC's proprietary least cost test as a dependent variable because this measure converts the multiple interdependent bid terms into a meaningful estimate of the value of each bid for the regulator, thereby greatly facilitating the empirical analysis of the auction outcomes.

To finish the process, the FDIC staff issues a written recommendation to the FDIC board of directors. Once the board approves the transaction, the staff informs the interested parties, closes the bank, and concludes the transfer of the assets and deposits to the winning bidder. On the same day, the regulator issues a press release, whereby it announces the winning bidder and discloses an estimate of the cost of resolving the failed bank. It should be noted that the FDIC discloses an estimate rather than the effective cost of resolution of the failed bank because the latter is not known with certainty until the FDIC sells all assets of the failed institution that were not transferred in the P&A transaction and the assets that are covered by loss-share agreements mature. When a failed bank enters receivership, the claims of the insured depositors are transferred to the deposit insurer. The FDIC subrogated claim has a first lien on the proceeds of the receivership. Hence the FDIC's announcement of strictly positive estimated resolution costs in every bank resolution process since the beginning of the financial crisis means that the deposit insurer does not expect the dividends resulting from each bank receivership estate to cover its subrogated claim. In other words, uninsured depositors, subordinated debtholders, and stockholders are not expected to recover any losses because the FDIC claim has first priority – after administrative expenses – over the cash-flows produced by the receivership estate.[6]

According to the FDIC, the resolution process takes an average of 90 to 100 days to complete. However, this window may be significantly shortened if the institution fails before the end of the process (e.g., if the bank falls victim to a bank run).

3 Hypothesis Development

Information plays a key role in auctions. The equilibrium allocations and payoffs in an auction are determined to a great extent by what is known by whom about the value of the auction's object. I argue that the stricter reporting requirements that are associated with SEC registration have significant consequences on what information

[6]In addition, it should be noted that there was no uninsured depositor claim in the vast majority of bank resolutions as the transaction account guarantee program (TAGP) guaranteed in full all domestic noninterest-bearing transaction deposits, low-interest NOW accounts, and interest on lawyers trust accounts (IOLTAs).

is available for the participants in P&A transactions. In particular, I claim that the extended mandatory reporting and enforcement by the SEC provides additional public information about the financial condition of the firm. It is well-known that every commercial bank, bank holding company, and savings institution is required to file comprehensive regulatory reports with their respective regulators. These reports require financial institutions to disclose comprehensive data that in many cases are more detailed than that of financial statements filed by firms that register with the SEC.[7] Despite the richness of the regulatory information that is publicly available from various sources, I contend that the disclosure requirements associated with SEC registration increase the level of bank transparency. First, 10-Ks include a mandatory management discussion and analysis section, that provides a narrative of how an entity has performed in the past, its financial condition, and its future prospects, whereas the regulatory reports only include an optional commentaries section, which is seldom used. Second, SEC filers must release 8-Ks notifying their shareholders of unscheduled material events such as a director election, a material impairment, the creation of a direct financial obligation, or an obligation under an off-balance sheet arrangement of a registrant, among other events. These timely disclosures have no parallel in any other source of public data. Additionally, SEC banks must file proxy statements (schedule DEF14A) in advance of annual shareholder meetings. This schedule contains a great amount of information such as the qualifications of the directors and some details of the compensation packages of the board of directors. Since 2006, the proxy statement must also include a compensation discussion and analysis (CD&A), which contains a detailed analysis of the elements of the compensation packages that will be voted in the shareholder meeting. This statement may be useful to evaluate the quality of the bank's executives and directors and thereby form an assessment of the quality of the bank's governance.

While it is difficult to directly assess whether the additional information in SEC filings is materially and incrementally informative to the participants in the P&A transactions, anecdotal evidence is consistent with this conjecture. The American Bankers Association has lobbied to update the thresholds above which a public company must report to the SEC, arguing that it is too costly for small banks to comply with the SEC disclosure and enforcement requirements.[8] Moreover, in the three months following the introduction of the JOBS Act more than 60 banks and bank holding companies have filed for SEC deregistration.[9] This number exceeds the number of banks that had deregistered in the prior four years. Thus it is plausible to argue that the decision to file with the SEC results in a material and incremental disclosure and enforcement burden for banks. Otherwise, the introduction of the JOBS Act would not have generated such a drastic and sudden reaction. Accordingly, I will use the banks' SEC registration status in my main specification to proxy for increased mandatory disclosures. Furthermore, in robustness tests, I test the validity of this assumption by implementing empirical tests exploiting the heterogeneity

[7] Additional sources of regulatory data that are publicly available are the FDIC's Summary of Deposits data containing information on branch locations by commercial banks and the mortgage-level disclosures mandated by the Home Mortgage Disclosure Act that are available on the website of the Federal Financial Institutions Examination Council.

[8] See http://www.aba.com/Issues/Issues_UpdatingSEC.htm

[9] The Jumpstart Our Business Act was signed into law on April 5, 2012. It increased the threshold under which a bank or bank holding company can deregister its securities from 300 to 1,200 holders of record

in the contents of the additional reporting requirements of SEC filers.

The seminal work of Milgrom and Weber (1982) studies how disclosure of public information regarding the value of the object affects auction outcomes when sellers are better informed than the potential bidders regarding its value. Milgrom and Weber (1982) show that, in a general setting, public information increases the linkage between a bidder's own information and how he perceives the others will bid.[10] Hence expected revenue in an auction increases with the release of public information because disclosure aligns the valuations of auction participants and reduces fears of adverse selection, thereby increasing bidding aggressiveness in the auction. The reporting requirements that stem from SEC registration potentially offer materially incremental public information to auction participants about the condition of the failed bank, and, as a result, they should increase expected revenues in the auction and reduce the costs of bank resolution for the regulator.[11] Thus under my first hypothesis:

H1: The estimated cost of bank resolution is likely to decrease with the level of disclosure requirements of failed banks.

Even if the FDIC could fully disclose individual-level information regarding the bank's asset portfolio, the potential bidders in the auction would have to assign a nontrivial amount of time and resources to process all information. French and McCormick (1984) show that, given free entry in a common values auction, bidders will enter the auction until their expected profits from entry equal the pre-contract sunk costs of acquiring and processing the necessary information to form an estimate of the value of the object. Thus these processing costs are likely to result in lower expected revenues in the auction. To alleviate this problem, French and McCormick (1984) suggest that the sellers retain a claim to the auctioned object. This mechanism – which resembles the costly signaling game introduced in Leland and Pyle (1977) – sends a credible signal concerning the quality of the object and, at the same time, reduces the bidder's demand for information, thus increasing the expected revenue from the sale of the failed bank. Yet this mechanism entails costs for regulators as it forces them to retain assets when they are not their most efficient users and raises the concentration of risky holdings in the regulator's portfolio.

As I mentioned in the previous section, the FDIC can choose to market the failed bank either as a whole bank purchase, in which case it disposes of all deposits and assets of the bank in the P&A transaction, or as a modified P&A agreement, in which case it modifies the failed bank by retaining the riskier asset tranches. Following French and McCormick (1984), I predict that the disclosure requirements of the failed bank will influence the FDIC's choice of resolution structure. The stricter reporting requirements and regulatory enforcement of SEC-registered banks make their financial information and business history more transparent to all potential participants in the

[10]The main assumption in Milgrom and Weber (1982) is that the valuation of bidders must be affiliated. In rough terms, affiliation means that high valuations by one participant make it more likely that other participants also have high valuations.

[11]Tadelis and Zettelmeyer (2011) propose an alternative mechanism through which information disclosure can affect auction outcomes. In their model, disclosure increases expected revenues by facilitating the optimal matching of heterogeneous buyers to the auctions in which they have a comparative valuation advantage. Disclosures raise expected revenues by ensuring that bidders with relative valuations of the object are present at the auction site. This model presents an example of how information could increase expected revenues even when the bidders can become perfectly informed about the quality of the object during the bidding stage. In this paper I cannot directly test the Tadelis and Zettelmeyer (2011) model because I cannot pinpoint what creates horizontal differentiation in the bidder's valuation of failed banks.

P&A transaction. Greater financial and business transparency reduces the asymmetric information problems among the participants in the auction and, as a result, reduces FDIC's incentives to use a costly signaling mechanism to assuage fears of adverse selection. Thus I hypothesize that the stricter reporting requirements associated with SEC registration increase the percentage of assets sold in the P&A transaction:

H2: The percentage of assets sold in the failed bank auction increases with the level of disclosure requirements of failed banks.

The models of Engelbrecht-Wiggans et al. (1983) and Hendricks and Porter (1988) provide a theoretical characterization of the equilibrium bids when a bidder possesses superior information relative to other bidders in the form of a private signal or more precise information regarding the value of the object. The results in these models show that, when bidders are asymmetrically informed, the uninformed bidder's equilibrium strategy is a mixed strategy in which it does not bid with some strictly positive probability. The intuition for this result is that, if uninformed bidders always participate in the auction, they will be plagued by a form of the winner's curse to the extent that they will only win if the informed bidder's estimate is low. On the other hand, no bid cannot be an equilibrium strategy for uninformed bidders because, in that case, informed bidders will just offer the seller's reservation price and take all the surplus. In such an extreme situation, uninformed bidders would have incentives to bid slightly above the reservation price and win the auction.

I rely on a strategy akin to that of Sufi (2007) and use the geographic proximity between the potential bidder and failed bank as a construct for the likelihood that a potential bidder is superiorly informed relative to other potential bidders. I predict that the stricter disclosure requirements associated with SEC registration mitigate information asymmetries among participants in an auction. Thus geographically distant bidders are more likely to participate in a failed bank auction when the failed bank registers with the SEC.

H3: The probability that geographically distant bidders participate in a failed bank auction increases with the level of disclosure requirements of the failed bank.

4 Data and Summary Statistics

4.1 Data and Sample Selection

I obtain my sample on the P&A transactions and failed bank characteristics from SNL Financial. Its database provides information on specific details of the deals such as the identification and financial characteristics of the target and buyer banks and characteristics of the government assisted deals contract. SNL Financial collects data from a variety of sources, namely the financial institutions call reports, SEC filings (when available), FDIC press releases announcing the mergers, merger applications, merger documents, and finally other documents subsequently released by the FDIC disclosing more details about the bidding process.

The FDIC closed 322 commercial banks and saving institutions from January 1, 2008, to December 31, 2010. I exclude 18 processes whose resolution method was the deposit payoff because there is no data on the estimated resolution cost of this type of process.[12] After excluding deposit payoffs, I am left with a sample 304 completed P&A transactions. I also exclude the resolution process of the Omni National Bank because in this process the FDIC implemented a simple transfer of insured deposits rather than a P&A transaction. I exclude six P&A deals involving 24 commercial banks and savings institutions. These deals had to be excluded from the sample because the FDIC marketed several subsidiaries of the same bank holding company in the same resolution. Given that there is no consolidated financial statement for each bundle of subsidiaries, it becomes difficult to integrate these deals in the analysis.[13] I also drop the Citizens Savings Bank and Pioneer Community Bank Inc. acquisition of Ameribank because the acquirers split the Ohio and West Virginia branches of the failed bank. I exclude two outlier banks whose dimensions required a specially negotiated type of bank resolution that does not fit into the P&A structure: Washington Mutual Bank and Indymac Federal Bank F.S.B. I further exclude the December 18, 2009, resolution of the Independent Bankers' Bank of Springfield, Illinois, because the latter was a commercial bank that provided correspondent banking services to its client banks, and therefore its financial characteristics are not comparable to those of banks in the main sample. I also had to exclude the resolutions of Progress Bank of Florida and BankUnited FSB because of insufficient financial information on these deals. In the case of the Progress Bank of Florida, the reason is the non-existence of data as of the fourth quarter of 2007. The commercial bank was created out of a merger agreement between a private equity group with Bay Financial Savings Bank FSB that was not completed until the first quarter of 2008. In the case of BankUnited FSB, I could not obtain financial information on the winning bidder of the P&A transaction. After implementing these sample restrictions, I am left with 273 resolution processes that will be the main sample under analysis in this empirical study. Finally, SNL Financial does not provide information on the percentage of assets sold in the P&A transactions of ShoreBank, Bank of Leeton, and Citizens Bank & Trust Company of Chicago. Hence the empirical tests using percentage of assets sold in the resolution use only 270 observations.

4.2 Summary Statistics

Table 1 provides information on the number of quarterly P&A transactions in the sample for the 2008 to 2010 period. The sample contains a total of 273 P&A transactions during this period. Most transactions came after the second quarter of 2009, perhaps due to improved economic conditions and an increasing interest from healthy

[12] It is worth noting that SEC-registered banks are less likely to be resolved through a deposit payoff relative to non-SEC banks (3.7% vs 7.1%). To the extent that the FDIC only proceeds to the deposit payoff after it failed to generate interest for the failed bank, these averages suggest that less information asymmetry raises the likelihood of a sale in a P&A transaction. Yet due to the small size of the deposit payoff sample, these differences are not statistically significant.

[13] These deals are (1) the Mutual Bank of Omaha acquisition of the First National Bank of Nevada and the First Heritage Bank N.A. on July 28, 2008; (2) the First Financial Bank acquisition of Irwin Union Bank FSB and Irwin Union Bank and Trust Company on September 18, 2009; (3) the U.S. Bancorp acquisition of FBOP Corp's nine bank subsidiaries on October 30, 2009; (4) Everbank Financial's acquisition of BOFC Corp's three bank subsidiaries on May th, 2010; State B&TC's acquisition of Security Bank Corporations' six bank subsidiaries on July 24, 2010; and (6) Centennial Bank's acquisition of Bayside Savings Bank and Coastal Community Bank on July 30, 2010.

banks in the auctions for distressed banks.

Table 2 provides some descriptive statistics regarding the characteristics and outcomes of these auctions. The estimated cost of closing a bank is a measure of the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test. During the sample period the estimated average cost as a percentage of the failing institution's deposits was 28.75%. Assets sold is calculated as the percentage of assets sold in the P&A transaction over total assets of the failed bank at the time of closure. On average, 81.80% of the failing institution's assets were transferred to the winning bidder in the auction, 72% of the P&A transactions included a loss share agreement and these loss share agreements covered on average 72% of the banks' assets at the time of closure.[14]

Figure 1 shows the average estimated cost of bank failures as a percentage of deposits of the failed bank per quarter. The graph shows that the average estimated cost of bank failures increases during the 2008 year when it reaches the 35%–40% level and subsequently shows a pattern of steady decline to 20%–25% of the failing bank's deposits. Figure 2 shows the evolution of the average percentage of assets that the failing bank sold in the bank resolution. During 2008, winning bidders chose to assume a smaller percentage of the failing bank's assets. Once again, with the improvement of the economic environment in the second half of 2009 and in 2010, the average percentage of assets sold in the resolution process increased to the 85%–90% range.

The statistics provided in table 3 present means and standard errors for banks grouped by the different categories in the main empirical tests (e.g. SEC, non-SEC, Dark and Private SEC). The great majority of failed banks (195 banks) do not file with the SEC prior to their resolution. Moreover, as previously mentioned, the Dark and Private SEC banks represent a small fraction of total failed institutions, 21 and 7 failed banks, respectively. This issue can create a statistical power problem for the empirical tests using these categories. Confirming the suspicions regarding the correlation between SEC filing status and size, SEC banks are larger than non-SEC banks. Figure 3 adds further insight into that relationship and suggests that the size distribution of SEC failed banks is to the right of the corresponding distribution for non-SEC banks. Nevertheless the figure also shows that there is still a considerable degree of overlap between both distributions of size. There are not major discrepancies between these two groups in terms of their average solvency, liquidity, and profitability ratios. The univariate means and standard errors of the P&A deal characteristics suggest that banks with more comprehensive disclosure requirements have lower costs of bank resolution and that the regulator retains a smaller portion of those failed banks' assets after the P&A transaction.

Finally, Table 4 presents summary characteristics for bidders in P&A transactions. The table indicates that the average size of the bidders for SEC failed banks is about three times that of the bidders for non-SEC institutions. To some extent this relation is purely mechanical, given that SEC failed banks are also larger than non-SEC banks

[14]In a loss share agreement, the FDIC absorbs a share of the losses on a specified pool of covered assets. Until September 2010, the FDIC typically covered 80% of the losses in a first tranche of assets and 95% of the losses on a second tranche. After September 2010, the FDIC changed to 80-20-95 coverage for each threshold of losses. The FDIC takes into account the estimated future loss on loss-share assets in the calculation of its estimated cost of resolution associated with a P&A transaction. Thus there is no reason to believe that the estimated cost of resolution is directly affected by the inclusion of a loss share agreement in the P&A transaction.

and the FDIC imposes a lower bound on the size of the potential bidder relative to the failed bank. An analysis of the relative size of the bidder-failed bank pair shows that on average bidders are much larger relative to failed banks in P&A transactions involving non-SEC banks than for P&A transactions involving SEC failed banks. However, this can partially result from the high subsample skewness (unreported) of the ratio for non-SEC P&A banks transactions. The remaining rows in the table preview the results of the following sections. They suggest that the percentage of banks from the same geographical area bidding for non-SEC failed banks is larger than the same percentage for the group of SEC failed banks, regardless of how geographical proximity is measured.

5 Empirical Design and Results

5.1 Empirical Design

In this section, I investigate how the estimated cost of bank resolution and the percentage of assets sold in the P&A transactions vary with the reporting requirements of the failed banks. The main regression has the following general specification:

$$P\&A_i = \alpha + \beta SEC_i + \gamma X_i + \eta_i + \nu_i + \varepsilon_i \tag{1}$$

The dependent variables are outcomes of the P&A transactions, namely the estimated cost of resolution as a percentage of deposits and the percentage of assets sold in the P&A transaction.[15] The independent variable of interest is SEC_i, which is an indicator variable taking the value of one if the bank files with the SEC. The vector of observed bank characteristics, X_i, includes several bank characteristics measured as of the fourth quarter of 2007, namely total assets of the bank, tier 1 capital ratio, liquidity ratio, return on assets, real estate loans as a percentage of total assets, nonperforming loans and loans 90 days or more past due over total equity plus Loan Loss Reserves, brokered deposits as a percentage of total deposits, total asset growth in the 2005–2007 period, and a house price shock index taken from the data provided by the Federal Housing Finance Agency that reflects the house price drop from the fourth quarter of 2007 to the fourth quarter of 2009 in the metropolitan statistical area where the failed bank is headquartered. These variables control for the underlying riskiness, profitability, liquidity, and solvency of the banks as these are factors that may be jointly related to the outcomes of bank resolution and to my main variable of interest. To control for a potential nonlinear relationship in size, I follow Sufi (2007) and implement three splines for size in the main empirical specification. Moreover, I include a set of indicator variables, ν_i, for

[15] In the spirit of French and McCormick (1984), the number of bidders in the P&A transaction could also be an interesting dependent variable. French and McCormick (1984) suggest that in equilibrium the number of bidders depends on the costs of preparing a bid, which on its turn depends on the information asymmetry between seller and potential bidders. Thus, according to the model, the number of bidders will be endogenously determined with the estimated costs of resolution. To the extent that the data on the number of bidders is less comprehensive and reliable than that on the estimated cost of resolution, I opted to not include "number of bidders" as a dependent variable in the analysis.

each quarter in the sample, hence controlling for changing conditions in the market for auctions of failed banks (e.g., shifts in the demand and supply for/of failed banks). To control for differences at the state-level banking regulations, supervisory practices, and also for state economic conditions, I include a set of indicator variables, η_i, for state fixed-effects. The introduction of quarter and state indicator variables implies that the main effects are identified out of the variation in auction outcomes that took place within the same state and quarter. Under my main hypotheses, I expect the main variable of interest, SEC_i, to be negatively related to the estimated cost of resolution and positively associated with the percentage of assets sold in the P&A transaction.

The empirical implementation entails some challenges that must be addressed. The SEC registration greatly overlaps with the public ownership. The fact that the great majority of SEC filers are publicly owned companies complicates the separation of the effects of additional reporting requirements of SEC registration from those of enhanced market monitoring by equity and debt market participants stemming from public ownership. To assess whether the coefficient associated with the variable *SEC* in equation (1) can be attributed to the stricter disclosure requirements of SEC-registered firms rather than to their enhanced market monitoring and visibility, I employ the following empirical specification:

$$P\&A_i = \alpha + \beta_1 PublicSEC_i + \beta_2 DARK_i + \beta_3 PrivateSEC_i + \gamma X_i + \eta_i + \nu_i + \varepsilon_i \tag{2}$$

In this specification, I introduce an indicator variable that takes the value of one if the bank is categorized as a $Dark_i$ bank, i.e., a bank listing in OTC markets but not filing with the Securities and Exchange Commission (SEC). These banks are listed on the Pink Sheets or the OTCBB markets but decided to not file with the SEC from their inception or decided to go dark as their optimal reporting strategy (Leuz, Triantis, and Wang, 2008).[16] Thus this group of banks is likely to be subject to market monitoring by equity market participants, but it is not subject to the stricter disclosure requirements of SEC-registered banks. I introduce another indicator variable, $PrivateSEC_i$, which examines the resolution costs of banks that are privately owned (and therefore not subject to the equity market monitoring forces) but decided to register with the SEC. The study of the resolution costs for these two classes of banks is likely to provide some insights regarding the relative importance of market monitoring and increased mandatory disclosure requirements in shaping the resolution costs of failed banks. Note that, in the above empirical specification, the omitted group is the set of banks whose ownership is private and are not SEC registered, and all other variables are defined as in equation (1). I predict that the estimated coefficients on the variable $Dark_i$ should not be statistically significant different from zero, because "dark" banks do not exhibit the improved disclosure requirements from SEC filing even though they benefit from the improved market monitoring associated with being listed in an exchange. On the other hand, the coefficient associated with $PrivateSEC_i$ should be significant and have the same direction as the coefficient associated with the variable $PublicSEC_i$. The rationale

[16]The eligibility rule of the OTCBB market does not require banks to file with the SEC provided that these banks are current in their mandatory regulatory filings with the corresponding regulatory bodies.

is that these banks are subject to the increased disclosure requirements of being registered with the SEC, even though their equity does not trade in an exchange list. As a result, if the results stem from stricter disclosure requirements, the results for this category of banks should be similar to those of the $PublicSEC_i$ banks.

To explore the relation between the potential bidder's decisions to participate in a P&A transaction and the disclosure requirements of failed banks, I examine how these requirements affect the propensity of potential bidders to place a bid in the P&A transaction. To implement this analysis, I start by defining the set of potential bidders that are likely to be invited by the FDIC to participate in the P&A process. According to the FDIC, the bid list for a given P&A transaction is composed of well-capitalized banks that contact the FDIC and notify it of their interest in that particular geographical area and are at least double the size of the failed bank. In practice, I cannot observe the bid list of invited potential bidders for the failed bank, but I can observe whether a potential bank has expressed interest in a particular geographical area by analyzing whether a bank has bid for banks in the same geographical area both in the past or in the future. Thus I construct the bid list of potential bidders for a given failed bank, by taking all banks that have bid or will bid for a bank in the same state in a one-year window. To conform with FDIC criteria, I also restrict the bid list to banks that are twice as large as the target bank. I also consider that very large potential bidder banks would not find bidding for small banks attractive, thus I restrict the bid list to pairs whose potential bidder's size relative to failed bank size is lower than 40.[17] The unit of observation in this analysis is a pair failed bank-potential bidder.[18]

To examine the relation between the type of bidders participating in a P&A transaction and the disclosure requirements of the failed bank, I employ a probit model with the following specification:

$$Prob(D_{ik} = 1) = \Phi\left(\alpha + \beta_1 SEC_i + \beta_2 DiffRegion_{ik} + \beta_3 DiffRegion_{ik} \times SEC_i + \gamma X_{ik} + \eta_i + \nu_i + \varepsilon_{ik}\right) \quad (3)$$

where ik denotes a failed-bank-potential bidder pair; i and k are indices for failed banks and potential bidders, respectively. D_{ik} is an indicator variable taking the value of one if the potential bidder k submits a bid in the P&A transaction for failed bank; i, SEC_i, is defined as above; and $DiffRegion_{ik}$ is an indicator variable taking the value of one if the potential bidder's headquarters is located in a different state than any of the failed bank's branches. The set of control variables, X_{ik}, includes the failed bank's total assets measured in the fourth quarter of 2007, three splines for size, as well as pair-specific variables such as the asset size ratio between failed bank and potential bidder. I also include a set of indicator variables for the failed banks' state headquarters and also quarter fixed-effects.

The critical parameters of interest in this regression are β_2 and β_3. These coefficients provide information on

[17] The results do not depend on this rather arbitrary research design option. In fact, they hold even in the absence of any upper threshold for this ratio.

[18] Naturally, the empirical implementation of this hypothesis would be more robust to measurement errors if I could have access to the real approved bid list for each P&A transaction. Yet the FDIC does not make these lists publicly available.

the likelihood that uninformed potential bidders – as measured by geographic distance to the failed bank's branches – participate in the auction for the failed bank when the latter is subject to stricter disclosure requirements prior to its failure.

The results from this empirical strategy should be interpreted cautiously. The most serious caveat is that P&A transactions for non-SEC banks are more likely to be independent private values auctions, perhaps due to their smaller size, and bidders' private valuations are positively related to geographical proximity. In this context, results supporting the empirical hypothesis can also be interpreted as a manifestation of the fact that neighboring banks of non-SEC failed banks are more likely to bid because they have higher valuations for the bank.

According to Sufi (2007), a critical component of this analysis is the correlation structure of the error terms within a choice set. In fact, French and McCormick (1984) present a model in which a shock that prompts potential bidder $k = 1$ to participate in the auction can affect negatively bidder's $k = 2$ choice to participate in the same auction. Therefore, following the suggestion in Sufi (2007), I cluster standard errors in this analysis at the P&A transaction level.

5.2 Results

Table 5 presents the results for the main regressions in the paper using non-SEC failed banks as the omitted group in regressions (1) and (3) and private non-SEC banks as the omitted group in specifications (2) and (4). The results of specifications (1) and (3) indicate that bank resolutions of SEC failed banks are less costly on average and their P&A transactions involve a greater percentage of assets sold, thus providing support to the hypothesis that stricter disclosure and enforcement requirements reduce the costs of resolution of failed banks. These results are statistically significant at the 5% level after clustering the standard errors at the state level.

The specifications (2) and (4) of Table 5 present the results from the alternative specification. The coefficient of the main variable – $PublicSEC$ – retains the same order of magnitude as the coefficient of the variable SEC in specifications (1) and (3) and remains statistically significant. The coefficient associated with the variable $DARK$ in specification (2) is also negative; however, its magnitude is lower than that of the $PublicSEC$ variable and not statistically significant. This result supports the hypothesis that SEC filers are less costly to resolve because of their stricter disclosure and enforcement requirements rather than their superior market monitoring. Nevertheless, these results should be interpreted very cautiously given that the non significance of the coefficient associated with $Dark$ can be the result of lack of statistical power resulting from the small sample of $Dark$ failed banks. In the same vein, the coefficient associated with $PrivateSEC$ variable is also not statistically significantly different from zero, a result that may also be due to the very small number of failed banks in that category. Nevertheless, the magnitude of the $PrivateSEC$ coefficient is very close to that of the variable $Public\ SEC$ and larger than that of the variable $Dark$. This ordering lines up with what would be predicted under the information disclosure story. Yet the results of specification (4) do not yield the same ordering, thereby casting doubt at the above interpretation

of these results. In general the results suggest that SEC filing status significantly affects the resolution outcomes. However, further empirical tests are necessary to show these effects are associated with disclosure requirements rather than other factors. In the robustness section, I conduct further statistical tests to address these concerns.

The main results suggest an economically important effect of SEC registration. SEC status is associated with a reduction in the estimated costs of bank resolution of approximately 4.5 percentage points and an increase in the percentage of assets sold in the P&A transaction process of 7.75 percentage points. Considering the sample average estimated cost of resolution to the FDIC and percentage of assets sold in the P&A transaction of approximately 28.75% and 81.80%, respectively, these results indicate a non trivial effect of SEC registration. In unreported results, I estimate the main empirical model using log-linear specification. The results from this analysis further suggest that the SEC registration is economically meaningful as it is associated with a reduction of the estimated cost of bank resolution by 20% and also with a 15% increase in the percentage of assets sold in the P&A transaction.

Table 6 presents coefficients and standard errors from the auction participants probit analysis. The coefficients of interacted variables in nonlinear models are notoriously difficult to interpret. I follow Norton, Wang, and Ai (2004) and calculate the average of the marginal effects of the interaction term at the individual level. Panel B of Table 6 presents results of this analysis. The results presented in table 6 suggest that being geographically distant to the failed bank does indeed reduce the likelihood of participation in the auction. Nevertheless, the effect of geographical distance is offset if the failed bank is registered with the SEC. These results are consistent with the empirical hypothesis that uninformed bidders are more likely to avoid participating in auctions in which the failed banks are relatively more opaque.

5.3 Robustness analysis

As previously discussed the identification strategy employed in this paper is subject to several caveats. An important concern is that the paper assumes that the reporting requirements associated with SEC registration are incrementally informative to participants in the P&A transaction. Anecdotal evidence suggests that the additional disclosure and enforcement requirements of SEC registration carry a significant incremental burden for small and medium financial institutions; however, it is not possible to discern whether the additional requirements reduce information asymmetries in the P&A transactions. While, it is difficult to directly test whether market participants use the additional information contained in the SEC reporting requirements in their valuation of the failed bank, it is possible to indirectly test whether the information is useful by examining how SEC relates to the outcomes of the auction when the additional information contained in the reporting requirements is likely to be less informative. Thus, in subsections 5.3.2 and 5.3.1, I present additional robustness tests exploiting heterogeneity in the informativeness of SEC disclosure requirements to examine if the SEC status is less influential in the outcomes of P&A transactions precisely when the information is less likely to be useful.

Another concern associated with using SEC registration status as the main variable of interest is its strong

correlation with size of the failed banks as measured by their total assets. It is possible that the coefficient of the *SEC* variable in the main analysis could capture a nonlinear relationship between size of the failed banks and the outcomes of the auction. While I control for nonlinearities in the main regression by introducing three splines for size, I further address this issue by conducting a battery of robustness tests designed to allay these suspicions. In subsection 5.3.3, I reestimate the specification in (1) in the subsample of banks within the common range of size for both categories of failed banks, and I employ propensity-score matching test to further address concerns regarding a nonlinear relationship of the dependent variables with asset size. It should also be noted that the results of subsection 5.3.1 suggest that the coefficient associated with the *SEC* variable in the main empirical tests is not driven by commercial banks whose assets are above $300 million dollars, thereby further addressing the concern that the results are driven by the low resolution costs of a few very large SEC-registered banks.

The main identification challenge is, however, to convince the reader that the main variable of interest is not capturing sources of value and risks in the loan portfolios of the failed banks that are identified and priced by regulators and market participants but unobservable to the econometrician. An instrument that influences registration with the SEC and is plausibly unrelated to these unobserved risks is not available. Thus I will try to support the validity of my approach by showing that the two categories of failed banks do not substantially differ in terms of a comprehensive set of observable indicators for the bank and that the results remain statistically significant when I implement the main empirical tests in the subsample of SEC-registered banks that has not selected to become SEC-registered to exploit growth opportunities in recent years. Finally, it should be noted that the results of subsection 5.3.2 also reduce these concerns by showing that the importance of the *SEC* coefficient varies with a measure of heterogeneity in the informativeness of SEC filings that is plausibly unrelated to these unobservable risks and growth opportunities. In what follows, I present these additional tests in further detail.[19]

5.3.1 Robustness: Exploring differences in the details of call reports

According to the FDIC's general instructions for preparation of the quarterly reports of condition and income,[20] commercial banks whose total assets exceed $300 million must provide finer information about the composition of several categories such as the loan and lease portfolio, the cash and balances due from other depository institutions, or credit card receivables by type of customer. I implement a robustness test that exploits the fact that the regulatory call reports filed by every bank are more extensive for those banks that possess more than $300 million in assets. The rationale of the test is that, below the $300 million threshold, the additional reporting requirements of SEC-registered banks should be more valuable as auction participants have less public information from the regulatory reports to form their assessment of the value of the firm. I explore this discontinuity in the amount of information disclosed by depository institutions in the call reports to assess whether the main empirical results are

[19] The results of unreported statistical analyses that further address some identification concerns are included in the accompanying online appendix to this paper.

[20] Available at http://www.fdic.gov/regulations/resources/call/crinst/301generalinst.pdf

likely to be generated by the greater disclosure requirements associated with SEC registration.

The ideal research design for this setting would entail having a sufficiently large number of observations around a small enough neighborhood of the $300 million threshold. Under these conditions, it would be possible to implement a regression discontinuity design and estimate the differential average impact of SEC registration on a set of observations that are in all aspects similar, except in that they randomly crossed the $300 million threshold. Unfortunately, the implementation of this empirical strategy is constrained by the small sample size around the size cutoff. Thus, to attain a sufficiently large sample size to take advantage of this institutional feature, I must also include observations whose size is significantly above or below $300 million, even though these observations are possibly systematically different in terms of other unobserved dimensions. As a result, the inference taken from this analysis is threatened by this potential bias. To address this concern, I implement two different empirical strategies akin to those suggested in Imbens and Lemieux (2008). First, I limit the sample to failed banks whose total assets are within a $250 million range of the size threshold.[21] Second, I implement a local linear regression with a similar bandwidth but using a triangular kernel to put more weight on observations that are closer to the size threshold of $300 million.[22]

Accordingly, I examine the differential impact of SEC registration above and below the size cutoff using the following empirical implementation:

$$P\&A_i = \alpha + \beta_1 SEC_i + \beta_2 Assets\ above\ \$300M_i + \beta_3 Assets\ above\ \$300M \times SEC_i + \gamma X_i + \eta_i + \nu_i + \varepsilon_i \qquad (4)$$

where $Assets\ above\ \$300M_i$ is an indicator variable that assumes the value of one if the failed bank had more $300 million in total assets as of the fourth quarter of 2007; $Assets\ above\ \$300M \times SEC_i$ is an interaction term between $Assets\ above\ \$300M$; and SEC and all other variables are defined as above, with the exception of η_i, which I now define as a region fixed effect due to the smaller sample size associated with this empirical test.

The empirical results are presented in table 8. The empirical results support the hypothesis that the estimated coefficients are the result of the greater information disclosure associated with SEC registration. In fact, above the $300 million cutoff, the *SEC* status is not statistically significant, whereas the estimated costs of resolution and the percentage of assets sold below that threshold are significantly affected in the predicted direction by the SEC registration. These results are consistent with the hypothesis that SEC registration influences the outcomes of the P&A transactions through an information channel.

[21] This is econometrically equivalent to implementing a local linear regression with a rectangular kernel that takes the value of one if total assets are between $50 million and $550 million and zero otherwise.

[22] The empirical results of this section are robust to the choice of broader and narrower bandwidths

5.3.2 Robustness: Informativeness of SEC filings

Another identification concern is that lower resolution costs of SEC-registered banks stem from other factors that are related to the SEC registration but not necessarily associated with the additional information available from SEC filings. In other robustness tests, I try to assuage concerns that unobserved omitted covariates drive the regression results. In this analysis I test if those SEC failed banks whose 10-Ks are likely to be more informative have lower resolution costs. To operationalize the concept of informativeness of the 10-Ks of SEC-registered banks at the time of the P&A transaction, I rely on two constructs: (i) the logarithm of the number of days passed since the filing of the last 10-K until the announcement of the P&A transaction conclusion and (ii) an indicator variable taking the value of one if the failed bank has filed a nontimely filing notice on its last 10-K (NT-10K). The first measure proxies for the staleness of the information contained in the last 10-K filing of the failed bank and therefore is a measure of the usefulness of the information contained in the 10-K for the potential bidders in the P&A transaction. The second construct proxies for the quality of the accounting and information control systems of the failed bank. A nontimely filing notice by the failed bank could flag the existence of significant problems in the preparation of the financial statements and notes to the consolidated statements and as a result could signal lower informativeness and credibility of the information contained in the 10-K filing.

The average elapsed time between the announcement date of the P&A transaction and the event date of the last 10-K filing is 424 days with a standard deviation of 285 days, whereas 60% of the failed bank have filed a nontimely 10-K filing notice on their last 10-K. I use the variation in these measures to test whether there is predictable heterogeneity in the effect of SEC registration on the costs of bank resolution. Specifically, I examine whether filing an NT-10K in the last year of operations or having a longer elapsed time since the time of the last 10-K filing are associated with greater resolution costs for the FDIC. To test the above hypothesis, I implement the following regression:

$$P\&A_i = \alpha + \beta_1 SEC_i + \beta_2 SEC_i \times INFO_i + \gamma X_i + \eta_i + \nu_i + \varepsilon_i \tag{5}$$

where $SEC \times INFO_i$ is an interaction term between SEC_i and each of the information variables mentioned above. All other variables are defined as in the main specification.

The empirical results are presented in table 9. The empirical results generally support the prediction that failed banks whose SEC filings are more informative are less costly to fail. In particular, specifications (1) and (3) of Table 9 show that the estimated cost of resolution of SEC banks is statistically significantly greater when these banks file a nontimely filing notice and when more time has elapsed since the event date of the last 10-K. The results are not as strong when the percentage of assets sold is used as the outcome variable. The last specification of Table 9 shows that the percentage of assets sold in SEC-registered banks decreases if the failed banks had filed a nontimely filing notice. However, this effect is not statistically significant at conventional levels. Finally, the coefficients associated

with specification (2) in the same table display an opposite sign to what would be predicted. Despite the large standard deviations associated with the coefficients in this specification, this result definitely raises some concerns on the interpretation of the results in this subsection. Yet the results generally support the hypothesis that the effects of SEC registration status stem from the richer information environment of SEC registered banks.

5.3.3 Nonlinearities in the main specification

As I mention in section 4, the SEC filing status of the financial institution is highly correlated with size. Insofar as the relationship between size and the FDIC's resolution costs is approximately linear, the coefficients in the main regression analysis should not be influenced by this issue. Yet, to avoid strong parametric assumptions, I implemented three splines for size in the main regressions. The results are not significantly affected by this research design choice, suggesting that the nonlinearity in size is not a great source of concern. Nevertheless, some questions remain about the extrapolation of the results outside the common support of size for non-SEC banks and SEC banks. To further address these issues, I estimate the main empirical specifications using the subsample of observations in common support of the total assets variable. Panel A of table 7 shows results do not materially change vis-à-vis the main specification, and the main variable of interest remains significant at the 10% level.

To further allay concerns about strong parametric assumptions, I implement a matching approach based on the propensity score. This method has the advantage of not imposing any functional form assumption on the relationship between the dependent variables and the other variables. Panel B of table 7 presents the results of matching on the propensity-score using a k-nearest-neighbors matching approach. I present the results for different levels of k. The results of this estimation procedure generally suggest that the average treatment effect of SEC registration on the estimated resolution costs is significantly negative. The average treatment effect of SEC registration status on the percentage of assets sold in the P&A transaction displays the predicted sign but is not statistically significant. This nonsignificant result stems not only from some attenuation of the main coefficient relative to the main empirical regression but also from an increase in the standard error of the treatment effect. Nevertheless, I in general the propensity score analysis strengthens the robustness of the results in the study. The signs of the estimated treatment effects go in the predicted direction, and the estimated cost of resolution result is statistically significant across most levels of k. The results focusing on the percentage of assets sold lose statistical significance but still display a sizable effect in the predicted direction.

5.3.4 Robustness: Selection into SEC filing status.

It is unlikely that banks select into SEC status to lower resolution costs, since in the event of bank resolution, equity holders are wiped out if regulators incur costs in the process – which was invariably the case during the sample period. However, it is plausible that failed banks have selected into SEC status to better access capital markets and finance their positive net present value growth opportunities. Under these circumstances, the main coefficient

of interest could be biased as SEC firms are more likely to have invested in positive NPV projects that would be taken into account by the auction participants and lower the resolution costs of the FDIC. To address this problem, I estimate the main regression, limiting the SEC sample to the banks whose initial filing with the SEC was prior to January 1, 2004. The main purpose of this robustness analysis is to limit the sample to SEC registered banks that accessed capital markets to finance growth opportunities that have arguably already matured. Results are displayed in table 10. These results show that the coefficients of the main variable of interest remain significant at the 5% level and that the magnitudes of the coefficients are similar to those of the main regression. These results further alleviate the concerns regarding the possibility that there is some heterogeneous factor jointly causing both selection into SEC registration and auction outcomes.

5.3.5 Robustness: SEC filing status proxies for unobserved risks associated with the loan portfolios

To further address the concern that the main variable of interest is capturing unobserved risks in the loan portfolios of the failed banks that are detected and priced by the participants in the P&A transactions but remain undetected by the econometrician, I analyze whether other market participants such as uninsured depositors or regular depositors are able to perceive these risks and act upon them by demanding higher interest compensation for these risks (e.g. Baer and Brewer, 1986) or rationing the amount of funds they supply to that particular type of banks (e.g. Goldberg and Hudgins (1996, 2002). Figure 5 displays the median costs of interest bearing liabilities split by SEC filing status. Figure 5 strongly indicates that there are no discernible differences through the sample period in the pricing of interest bearing liabilities across the two types of banks under analysis. This supports the argument that uninsured depositors, regular depositors, and other suppliers of funds did not perceive incremental risks associated with SEC filing status. While this is not enough evidence to disprove the existence of these risks, it does provide some comfort regarding the unobserved risks story, to the extent that it is not clear why the suppliers of funds were not able to perceive the unobserved risks associated with SEC filing status, but the participants in the auction were. Figure 6 shows the median wholesale funding (defined as total borrowings + brokered deposits) as a percentage of total funding by SEC filing category. Some studies (e.g., Goldberg and Hudgins, 1996, 2002; Jordan, 2000) show that uninsured depositors discipline their banks by withdrawing their deposits if they perceive that their performance and risk-taking levels are not satisfactory. Figure 6 shows that while SEC failed banks have a liability structure that uses wholesale funding more prominently, both types of banks register a decrease in their relative use of wholesale funding as failure approaches, indicating wholesale depositors run on SEC and non-SEC banks alike.

5.3.6 Robustness: Different closing rules depending on SEC filing status

Another concern with the main empirical strategy is the possibility that bank regulators have different closure rules depending on SEC filing status. Fries, Mella-Barral, and Perraudin (1997) develop a model of the optimal closure rule for financial institutions and suggest that it should depend on how easy it is to monitor the financial institution.

If the regulator systematically forbears against one of the categories of banks, the coefficients on the main empirical specification may reflect the fact that potential bidders in the auction perceive that these failed banks have more opportunities to engage into value destroying actions such as risk-shifting or tunneling. To address these concerns, Figure 4 shows a plot of the median capital ratios split by SEC filing status as the banks approach the resolution event. The plots of Figure 4 resemble each other, and therefore it seems that there are not significant differences in closure rules across SEC filing status. However, a close inspection of the figure shows that, in the bank resolution event period, the median leverage ratio of non-SEC banks is lower than the corresponding ratio for SEC failed banks by about one percentage point. This can be interpreted as evidence that regulators are quicker to act on SEC banks when they become critically undercapitalized. In unreported robustness tests, I include the leverage ratio measured at the time of bank resolution as an additional control in the main empirical specification. Results are not altered either in terms of the magnitude of coefficients associated with the main variable of interest or in terms of their statistical significance.

6 Conclusion

The financial crisis of 2008–2010 dealt a blow to the regulatory capital buffers of many commercial and savings banks. The near insolvency of a significant number of banks required government intervention to stop debt overhang problems or even contagious bank runs. The U.S. authorities have dealt with the financial crisis in a variety of ways. They have injected capital into ailing financial institutions, bought risky subprime assets in the market and also carried out the resolution, and subsequent auction of distressed financial institutions to healthier banks. Alas, all of these interventions are ultimately costly to the taxpayers, and as a result it is in the interest of society to understand how they can be efficiently organized.

This paper analyzes the structure of the auctions of failed financial institutions. More specifically, I explore the relationship between the reporting requirements of the failed bank and the outcomes of the auction. I find evidence that stricter disclosure requirements influence the outcomes of these auctions in a direction that is consistent with the predictions of the theoretical literature on auctions. My results show that mandatory disclosure corresponds to lower estimated costs of closing a bank and higher percentage of assets sold in the auctions. I also find evidence consistent with the hypothesis that uninformed bidders are less likely to participate in the auctions when the failed bank was subject to lower disclosure requirements. These findings offer an initial insight on how information disclosure rules affect the reorganization of a distressed financial system.

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Table 1: Purchase and Assumption Transactions per Quarter

This table presents the frequency of failed banks in the main sample by quarter, over the period January 2008 through December 2010.

Quarter	**Freq.**	**Percent**	**Cum.**
2008-Q1	2	0.73	0.73
2008-Q2	2	0.73	1.47
2008-Q3	4	1.47	2.93
2008-Q4	12	4.4	7.33
2009-Q1	18	6.59	13.92
2009-Q2	19	6.96	20.88
2009-Q3	40	14.65	35.53
2009-Q4	33	12.09	47.62
2010-Q1	37	13.55	61.17
2010-Q2	40	14.65	75.82
2010-Q3	38	13.92	89.74
2010-Q4	28	10.26	100
Total	273	100	

Table 2: Summary Statistics for the sample of P&A transactions

Estimated Cost to the Regulatory Agency (% Tot Deposits) is the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test as a percentage of the total deposits of the failed bank at the time of the closure. Estimated Cost to the Regulatory Agency (% Tot Assets) is the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test as a percentage of the total assets of the failed bank at the time of the closure. Assets Sold (% Total Assets) is calculated as the percentage of assets sold in the Purchase and Assumption transaction over the total assets of the failed bank at the time of the closure. % of transactions with loss share agreement is the percentage of P&A deals that include a loss share agreement between the FDIC and the winning bidder. Loss Share Assets (% Total Assets) is calculated as the total amount of assets covered by the loss share agreement over the total assets of the failed bank at the time of closure. Number of bidders is the number of different banking organizations that submitted bids in the auction for the failed bank.

	N	**Mean**	**p25**	**p50**	**p75**	**Skewness**
Estimated Cost to the Regulatory Agency (% Tot Deposits)	273	28.75	19.63	28.23	36.94	0.25
Estimated Cost to the Regulatory Agency (% Tot Assets)	273	25.67	17.12	25.54	33.18	0.39
Assets Sold (% Total Assets)	270	81.80	77.92	96.61	100.00	-1.63
% of Transactions with Loss Share Agreement	273	0.72	0.00	1.00	1.00	-0.99
Loss Share Assets (% Total Assets)	190	71.88	64.55	73.41	80.86	-0.58
Number of Bidders	169	2.35	1.00	2.00	3.00	0.95

Table 3: Means and Standard Errors of Failed Bank Characteristics by SEC Filing Category

SEC is an indicator variable taking the value of one if the bank or thrift is registered with the SEC. non-SEC is an indicator variable taking the value 1 if the bank is not registered with the SEC. Private SEC is an indicator variable taking the value of 1 if the bank or thrift is privately owned and files with the SEC. Dark is an indicator variable taking the value of one if the bank or thrift is publicly listed in an OTC market but does not file with the SEC. Percentage of failed banks is calculated as the number of failed in each category over total failed banks. Total Assets are the total assets of banks in the fourth quarter of 2007. Tier 1 Capital Ratio is calculated as Tier 1 Equity Capital over total risk-weighted assets. Liquidity ratio is (Cash Balances + Balances due from depository institutions + Securities + Fed Fund Repos + Trading Accounts – Pledged Securities)/ Total Liabilities. ROA is calculated as net income over average assets of the banks during the year. Real Estate Loans (% Total Loans) is the consolidated total Real Estate Loans as a percentage of total Loans. Nonperforming loans (% Total Loans) is total nonperforming loans over total assets. NPL and 90+due loans (% Tangible Equity + LLR) is also known as Texas ratio and is calculated as total nonperforming loans + loans 90 or more past due over Total Tangible Equity plus Loan Loss Reserves. Asset Growth 2005Q1:2007Q4 (%) is the percentage growth of total assets in the period ranging from the first quarter of 2005 to the fourth quarter of 2007. Brokered Deposits (% Total Deposits) is the percentage of total deposits of the bank that is composed by brokered deposits. House Price change (FHFA - 2007Q4-2009Q4) is calculated as the house price change from 2007:Q4 to 2009:Q4 in the MSA corresponding to the headquarters of the bank. When the bank is not headquartered in an MSA, I calculate the house price change as the house price change from 2007:Q4 to 2009:Q4 FHFA data on house prices for non-MSA areas by state. % of Commercial Bank is the percentage of banks in each category that are classified as commercial banks. Estimated Cost to the Regulatory Agency (% Tot Deposits) is the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test as a percentage of the total deposits of the failed bank at the time of the closure. Estimated Cost to the Regulatory Agency (% Tot Assets) is the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test as a percentage of the total assets of the failed bank at the time of the closure. Assets Sold (% Total Assets) is calculated as the percentage of assets sold in the Purchase and Assumption transaction over the total assets of the failed bank at the time of the closure. % of transactions with loss share agreement is the percentage of P&A deals that include a loss share agreement between the FDIC and the winning bidder.

	SEC	non-SEC	Private SEC	Dark
Target Institution characteristics				
Number of failed banks	78	195	7	21
Percentage of failed banks	0.29	0.71	0.03	0.08
Total Assets ($M)	2355.43	467.52	490.98	1029.561
	(4448.97)	(1327.51)	(411.05)	(3649.19)
Tier 1 Capital ratio (%)	11.01	11.55	10.85	11.30
	(3.53)	(4.37)	(4.07)	(3.37)
Liquidity ratio (%)	11.40	13.90	12.82	12.43
	(8.87)	(1.03)	(6.43)	(7.15)
ROA (%)	-0.83	-1.11	-0.86	-1.70
	(2.58)	(4.24)	(1.71)	(2.88)
Real Estate Loans (% Total Loans)	85.48	81.08	88.38	78.95
	(9.21)	(14.46)	(2.26)	(14.22)
NPL and 90+due loans (% Tangible Equity + LLR)	29.10	34.83	30.76	30.50
	(31.05)	(37.50)	(16.79)	(33.74)
Asset Growth 2005Q1:2007Q4 (%)	2286.83	3799.77	1812.11	7517.91
	(7337.78)	(11860.54)	(1980.92)	(16929.28)
Brokered Deposits (% Total Deposits)	14.15	14.75	9.18	14.92
	(14.90)	(17.31)	(8.28)	(14.93)
House Price Shock	-0.16	-0.13	-0.14	-0.16
	(0.13)	(0.11)	(0.11)	(0.08)
% of Commercial Bank	0.79	0.89	0.71	0.90
	(0.41)	(0.32)	(0.49)	(0.30)
Purchase & Assumption deal characteristics				
Estimated Cost to the Regulatory Agency (% Tot Deposits)	25.89	29.90	30.82	29.24
	(12.09)	(11.59)	(9.24)	(12.66)
Estimated Cost to the Regulatory Agency (% Tot Assets)	22.45	27.00	28.29	26.29
	(11.23)	(10.86)	(10.46)	(11.45)
Assets Sold (% Total Assets)	86.38	79.74	97.29	81.75
	(29.09)	(25.15)	(2.93)	(34.34)
Loss Share Agreement (Yes)	0.72	0.83	0.86	0.71
	(0.45)	(0.38)	(0.38)	(0.46)

Table 4: Characteristics of Bidders in P&A transactions by SEC Category

This table examines the characteristics of 380 bidders in P&A transactions in 173 P&A transactions. Size relative to failed bank is determined as the ratio of the assets of the bidder to the ratio of the assets of the failed bank both measured in the fourth quarter of 2007, and Capital relative to failed bank is the Tier 1 Capital ratio of the bidder over the Tier 1 capital ratio of the bank, both measured in the fourth quarter of 2007.

	SEC	non-SEC	Total
General Characteristics			
Total Assets ($M in 2007:Q4)	14,700	4,087	7,371
Size relative to failed bank (in 2007:Q4)	12.0	44.2	34.3
Capital relative to failed bank (in 2007:Q4)	1.7	1.3	1.4
Geographical Characteristics			
In same county as failed bank?	9.7%	18.0%	15.3%
In same MSA as failed bank?	13.7%	34.0%	27.4%
In same State as failed bank?	45.2%	68.0%	60.5%

Table 5: Main analysis - P&A Transaction Outcomes and SEC registration status of Failed Banks

Estimated Cost (% Tot Deposits) is the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test as a percentage of the total deposits of the failed bank at the time of the closure. Assets Sold (% Total Assets) is calculated as the percentage of assets sold in the Purchase and Assumption transaction over the total assets of the failed bank at the time of the closure. SEC is an indicator variable taking the value of one if the bank or thrift is registered with the SEC. Public SEC is an indicator variable taking the value one if the bank is registered with the SEC and exchanged listed in either a major exchange market (e.g. NYSE, AMEX, NASDAQ) or in the OTC market. Private SEC is an indicator variable taking the value of 1 if the bank or thrift is privately owned and files with the SEC. Dark is an indicator variable taking the value of one if the bank or thrift is publicly listed in an OTC market but does not file with the SEC. Ln Total Assets is calculated as the log of total assets of banks in the fourth quarter of 2007. Ln Total Assets*Medium is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is the second tercile of total assets. Ln Total Assets*Large is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is in the third tercile of total assets. Tier one Capital Ratio is calculated as Tier one Equity Capital over total risk-weighted assets in the fourth quarter of 2007. Liquidity ratio is (Cash Balances + Balances due from depository institutions + Securities + Fed Fund Repos + Trading Accounts − Pledged Securities)/ Total Liabilities as calculated in fourth quarter of 2007. ROA is calculated as net income over average assets of the banks during the year. Real Estate Loans (% Total Loans) is the consolidated total Real Estate Loans as a percentage of total Loans. NPL and 90+due loans (% Tangible Equity + LLR) is also known as Texas ratio and is calculated as total nonperforming loans + loans 90 or more past due over Total Tangible Equity plus Loan Loss Reserves. Ln Asset Growth 2005Q1:2007Q4 (%) is the log of the percentage growth of total assets in the period ranging from the first quarter of 2005 to the fourth quarter of 2007. Brokered Deposits (% Total Deposits) is the percentage of total deposits of the bank that is composed by brokered deposits. House Price change (FHFA - 2007Q4-2009Q4) is calculated as the house price change from 2007:Q4 to 2009:Q4 in the MSA corresponding to the headquarters of the bank. When the bank is not headquartered in a MSA, I calculate the house price change as the house price change from 2007:Q4 to 2009:Q4 FHFA data on house prices for non-MSA areas by state. Quarter and State fixed effects are included in all regressions. Standard errors are clustered at the level of the failed bank's state. Amounts represent coefficients from an OLS regression. (standard errors are presented in parenthesis)

	(1) Estimated Cost (% Deposits)	(2) Estimated Cost (% Deposits)	(3) Assets Sold (% Total Assets)	(4) Assets Sold (% Total Assets)
SEC	-4.6450**		7.7785**	
	(2.221)		(3.035)	
Public SEC		-4.9648**		7.6932**
		(2.339)		(3.736)
Dark		-2.7833		9.9543*
		(3.995)		(5.635)
Private SEC		-5.3568		18.3685***
		(4.561)		(3.393)
Ln Total Assets	-7.1782***	-6.9760***	1.4316	0.7444
	(2.429)	(2.396)	(5.380)	(5.093)
Ln Total Assets*Medium	1.4655	0.9791	-6.7488	-4.9176
	(6.536)	(6.617)	(9.941)	(9.549)
Ln Total Assets*Large	5.1760*	5.1063*	2.7339	3.1868
	(2.858)	(2.852)	(6.504)	(6.409)
Tier 1 Capital Ratio	-0.3217	-0.3264	-0.6317	-0.5932
	(0.289)	(0.289)	(0.666)	(0.645)
Liquidity Ratio	-0.0834	-0.0847	0.1413	0.1372
	(0.082)	(0.079)	(0.167)	(0.162)
ROA	0.0707	0.0612	0.4634	0.5006
	(0.314)	(0.312)	(0.812)	(0.802)
Real Estate Loans	0.1217**	0.1134**	0.1154	0.1428
	(0.055)	(0.054)	(0.152)	(0.156)
NPL	0.0229	0.0221	-0.0041	0.0032
	(0.036)	(0.036)	(0.074)	(0.074)
Ln Asset Growth	0.0001	0.0001	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)
Brokered Deposits (%)	0.0699	0.0737*	-0.0376	-0.0513
	(0.045)	(0.042)	(0.100)	(0.095)
House Price Shock	-11.5259	-11.3543	-9.6844	-9.9616
	(10.968)	(10.881)	(27.400)	(27.991)
Quarter Fixed Effects	Y	Y	Y	Y
State Fixed Effects	Y	Y	Y	Y
N	273	273	270	270
Adj.-R2	0.328	0.324	0.458	0.464

*, ** and, *** indicate statistical significance at the 10%, 5%, and 1%, respectively for a two-tailed test

Table 6: Auction Participation Probit Estimation

D_{ij} is an indicator variable taking the value of one if the potential bidder makes a bid in the auction for the failed bank. SEC_i is an indicator variable taking the value of one if the bank or thrift is registered with the SEC, and $DiffRegion_{ij}$ is an indicator variable taking the value of one if the potential bidder's headquarters is located in the same State as at least one of the failed bank's branches. $DiffRegion_{ij} * SEC_i$ is an interaction variable between $DiffRegion_{ij}$ and SEC_i. Ln Total Assets is calculated as the log of total assets of banks in the fourth quarter of 2007. Ln Total Assets*Medium is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is the second tercile of total assets. Ln Total Assets*Large is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is in the third tercile of total assets. Size Ratio is Failed bank's Total Assets in 2007:Q4 divided by Potential Bidder's Total Assets in 2007:Q4. Failed Bank's state fixed effects and quarter fixed effects are included in the regression. Standard Errors are clustered at the P&A transaction level.

Panel A: Probit Regression Coefficients and Standard Errors

	Pr(D_{ij}=1)
SEC	-0.0249
	(0.153)
DiffRegion	-0.4180***
	(0.119)
DiffRegion× SEC	0.5807***
	(0.213)
Ln Total Assets	0.2366**
	(0.118)
Ln Total Assets*Medium	0.0470
	(0.289)
Ln Total Assets*Large	-0.0944
	(0.164)
Size Ratio	-0.0104**
	(0.005)
Quarter Fixed Effects	Y
State Fixed Effects	Y
N	1598
Pseudo-R2	0.135

*, ** and, *** indicate statistical significance at the 10%, 5%, and 1%,

Panel B: Marginal Effects for the Interaction Term

Variable	Obs	Mean	Std. Dev.	Min	Max
Interaction Term (Mean)	1598	0.104	0.047	0.025	0.229
Interaction Term (Standard Error)	1598	1.057	1.360	0.083	4.734
Interaction Term (Z-Stat)	1598	0.239	0.303	0.022	2.754

Table 7: Robustness - Nonlinear specification

Panel A presents estimation results of the main empirical specification when the sample is restrained to be within the common support of size of the treatment and control group. The variables in the empirical specification are defined as follows. Estimated Cost (% Tot Deposits) is the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test as a percentage of the total deposits of the failed bank at the time of the closure. Assets Sold (% Total Assets) is calculated as the percentage of assets sold in the Purchase and Assumption transaction over the total assets of the failed bank at the time of the closure. SEC is an indicator variable taking the value of one if the bank or thrift is registered with the SEC. Ln Total Assets is calculated as the log of total assets of banks in the fourth quarter of 2007. Ln Total Assets*Medium is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is the second tercile of total assets. Ln Total Assets*Large is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is in the third tercile of total assets. Tier 1 Capital Ratio is calculated as Tier 1 Equity Capital over total risk-weighted assets in the fourth quarter of 2007. Liquidity ratio is (Cash Balances + Balances due from depository institutions + Securities + Fed Fund Repos + Trading Accounts – Pledged Securities)/ Total Liabilities as calculated in fourth quarter of 2007. ROA is calculated as net income over average assets of the banks during the year. Real Estate Loans (% Total Loans) is the consolidated total Real Estate Loans as a percentage of total Loans. NPL and 90+due loans (% Tangible Equity + LLR) is also known as Texas ratio and is calculated as total nonperforming loans + loans 90 or more past due over Total Tangible Equity plus Loan Loss Reserves. Ln Asset Growth 2005Q1:2007Q4 (%) is the percentage growth of total assets in the period ranging from the first quarter of 2005 to the fourth quarter of 2007. Brokered Deposits (% Total Deposits) is the percentage of total deposits of the bank that is composed by brokered deposits. House Price change (FHFA - 2007Q4-2009Q4) is calculated as the house price change from 2007:Q4 to 2009:Q4 in the MSA corresponding to the headquarters of the bank. When the bank is not headquartered in an MSA, I calculate the house price change as the house price change from 2007:Q4 to 2009:Q4 in FHFA data on house prices for non-MSA areas by state. Quarter and State fixed effects are included in all regressions. Standard errors are clustered at the level of the failed bank's state. Amounts represent coefficients from an OLS regression. (Standard errors are presented in parentheses.) Panel B presents results from propensity-score matching estimation method. Propensity scores are obtained from a probit regression of SEC registration variables on the remaining control variables of the main empirical specification, and the Average Treatment Effect on the Treated is obtained by matching on the nearest k-neighbours approach.

Panel A: OLS regressions of main empirical specification in the subsample of treatment and control variables within the common support of size

	(1)	(2)
	Estimated Cost (% Deposits)	Assets Sold (% Total Assets)
SEC	-4.4013*	8.4251***
	(2.306)	(2.993)
Tier1 Cap Ratio	0.0040	-0.7434
	(0.372)	(0.777)
Liquidity Ratio	-0.2393**	0.2765
	(0.098)	(0.261)
ROA	-0.0818	0.8540
	(0.274)	(0.727)
Real Estate Loans	0.1527**	0.0993
	(0.068)	(0.166)
NPL	0.0435	-0.0448
	(0.028)	(0.048)
Asset Growth	0.0001	0.0000
	(0.000)	(0.000)
Brokered Deposits	0.0885*	-0.0471
	(0.050)	(0.097)
House Price Shock	-1.5849	-1.2110
	(7.914)	(34.249)
Quarter Fixed Effects	Yes	Yes
State Fixed Effects	Yes	Yes
N	243	241
Adj.-R2	0.344	0.478

*, ** and, *** indicate statistical significance at the 10%, 5%, and 1%, respectively for a two-tailed test

Panel B: Average Treatment effects on the Treated using Propensity Score matching approach

Dep. Variable	n	k	ATT	St. Error	z	p-value
Estimated Cost (% Deposits)	272	1	-2.67	2.26	-1.18	0.238
Assets Sold (% Total Assets)	269	1	3.00	6.66	0.45	0.652
Estimated Cost (% Deposits)	272	3	-4.81	1.89	-2.55	0.011
Assets Sold (% Total Assets)	269	3	5.59	5.32	1.05	0.293
Estimated Cost (% Deposits)	272	10	-3.90	2.03	-1.92	0.055
Assets Sold (% Total Assets)	269	10	5.85	5.74	1.02	0.308

Table 8: Robustness - Discontinuity in regulatory reports requirements around the $300M size threshold

Estimated Cost (% Tot Deposits) is the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test as a percentage of the total deposits of the failed bank at the time of the closure. Assets Sold (% Total Assets) is calculated as the percentage of assets sold in the Purchase and Assumption transaction over the total assets of the failed bank at the time of the closure. SEC is an indicator variable taking the value of one if the bank or thrift is registered with the SEC. Assets above $300M is and indicator variable that takes the value of one if the failed bank holds more $300 million in total assets as of the fourth quarter of 2007. Assets above $300M×SEC is an interaction term between Assets above $300M and SEC. Tier 1 Capital Ratio is calculated as Tier 1 Equity Capital over total risk-weighted assets in the fourth quarter of 2007. Liquidity ratio is (Cash Balances + Balances due from depository institutions + Securities + Fed Fund Repos + Trading Accounts – Pledged Securities)/ Total Liabilities as calculated in fourth quarter of 2007. ROA is calculated as net income over average assets of the banks during the year. Real Estate Loans (% Total Loans) is the consolidated total Real Estate Loans as a percentage of total Loans. NPL and 90+due loans (% Tangible Equity + LLR) is also known as Texas ratio and is calculated as total nonperforming loans + loans 90 or more past due over Total Tangible Equity plus Loan Loss Reserves. Ln Asset Growth 2005Q1:2007Q4 (%) is the percentage growth of total assets in the period ranging from the first quarter of 2005 to the fourth quarter of 2007. Brokered Deposits (% Total Deposits) is the percentage of total deposits of the bank that is composed by brokered deposits. House Price change (FHFA - 2007Q4-2009Q4) is calculated as the house price change from 2007:Q4 to 2009:Q4 in the MSA corresponding to the headquarters of the bank. When the bank is not headquartered in an MSA, I calculate the house price change as the house price change from 2007:Q4 to 2009:Q4 in FHFA data on house prices for non-MSA areas by state. Quarter and Region fixed effects are included in all regressions. Standard errors are clustered at the level of the failed bank's state. Amounts represent coefficients from an OLS regression. (Standard errors are presented in parentheses.)

	(1)	(2)	(3)	(4)
	Est. Cost (% Dep.)	Assets Sold (% Assets)	Est. Cost (% Dep.)	Assets Sold (% Assets)
SEC	-6.2411**	14.8375***	-6.2384**	15.0256***
	(3.102)	(5.129)	(2.988)	(5.378)
Assets above $300M	-2.0535	-5.4272	-0.0953	2.2511
	(2.760)	(6.418)	(3.109)	(8.061)
Assets above $300M×SEC	6.4243	-13.8168	6.7463	-12.5422
	(4.493)	(11.404)	(4.433)	(9.822)
Ln Total Assets	-0.9339	5.7626**	-3.2243	-2.2016
	(0.913)	(2.483)	(2.010)	(6.171)
Tier1 Cap Ratio	0.0080	-0.2210	-0.1449	-0.6606
	(0.275)	(0.632)	(0.307)	(0.744)
Liquidity Ratio	-0.2620*	0.3371	-0.2691*	0.5110
	(0.144)	(0.293)	(0.156)	(0.312)
ROA	0.0025	-1.1155	0.1625	-0.9796
	(0.181)	(0.794)	(0.195)	(0.745)
Real Estate Loans	0.0870	0.0199	0.0826	0.1036
	(0.073)	(0.186)	(0.080)	(0.216)
NPL	0.0598*	-0.0211	0.0539*	-0.0835
	(0.030)	(0.086)	(0.031)	(0.097)
Asset Growth	0.0001*	0.0001	0.0001*	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)
Brokered Deposits	0.1086**	-0.2243	0.1434***	-0.2933*
	(0.053)	(0.144)	(0.052)	(0.154)
House Price Shock	-1.9888	6.0378	1.5237	-12.5698
	(8.250)	(24.447)	(8.929)	(26.658)
Observations	166	165	166	165
Adjusted R-squared	0.904	0.924	0.910	0.928
Quarter Fixed Effects?	Yes	Yes	Yes	Yes
State Fixed Effects?	No	No	No	No
Region Fixed Effects?	Yes	Yes	Yes	Yes
Kernel Type?	Rectangular	Rectangular	Triangular	Triangular

*, ** and, *** indicate statistical significance at the 10%, 5%, and 1%, respectively for a two-tailed test

Table 9: Robustness - Heterogeneity in the informativeness of SEC filings.

Estimated Cost (% Tot Deposits) is the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test as a percentage of the total deposits of the failed bank at the time of the closure. Assets Sold (% Total Assets) is calculated as the percentage of assets sold in the Purchase and Assumption transaction over the total assets of the failed bank at the time of the closure. SEC is an indicator variable taking the value of one if the bank or thrift is registered with the SEC. Ln (Time elapsed) is measured as the natural log of the number of days passed from the event date of the last 10-K filed by the failed bank and the announcement date of the P&A transaction. NT 10-K is an indicator variable taking the value of one if the failed bank has filed a nontimely filing notice in its last year of operation. Ln Total Assets is calculated as the log of total assets of banks in the fourth quarter of 2007. Ln Total Assets*Medium is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is the second tercile of total assets. Ln Total Assets*Large is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is in the third tercile of total assets. Tier 1 Capital Ratio is calculated as Tier 1 Equity Capital over total risk-weighted assets in the fourth quarter of 2007. Liquidity ratio is (Cash Balances + Balances due from depository institutions + Securities + Fed Fund Repos + Trading Accounts – Pledged Securities)/ Total Liabilities as calculated in fourth quarter of 2007. ROA is calculated as net income over average assets of the banks during the year. Real Estate Loans (% Total Loans) is the consolidated total Real Estate Loans as a percentage of total Loans. NPL and 90+due loans (% Tangible Equity + LLR) is also known as Texas ratio and is calculated as total nonperforming loans + loans 90 or more past due over Total Tangible Equity plus Loan Loss Reserves. Ln Asset Growth 2005Q1:2007Q4 (%) is the percentage growth of total assets in the period ranging from the first quarter of 2005 to the fourth quarter of 2007. Brokered Deposits (% Total Deposits) is the percentage of total deposits of the bank that is composed by brokered deposits. House Price change (FHFA - 2007Q4-2009Q4) is calculated as the house price change from 2007:Q4 to 2009:Q4 in the MSA corresponding to the headquarters of the bank. When the bank is not headquartered in an MSA, I calculate the house price change as the house price change from 2007:Q4 to 2009:Q4 in FHFA data on house prices for non-MSA areas by state. Quarter and State fixed effects are included in all regressions. Standard errors are clustered at the level of the failed bank's state. Amounts represent coefficients from an OLS regression. (Standard errors are presented in parentheses.)

	(1)	(2)	(3)	(4)
	Est. Cost (% Dep.)	Assets Sold (% Assets)	Est. Cost (% Dep.)	Assets Sold (% Assets)
SEC	-15.2395***	-6.4390	-6.5920***	9.2540**
	(5.323)	(17.192)	(2.228)	(4.428)
Ln (Time Elapsed)	1.8222**	2.4447		
	(0.721)	(2.992)		
NT 10-K			3.5084*	-2.6589
			(1.745)	(4.141)
Ln Total Assets	-7.0942***	1.5380	-7.2453***	1.5025
	(2.480)	(5.467)	(2.415)	(5.304)
Ln Total Assets*Medium	1.0578	-7.2906	1.3183	-6.6542
	(6.534)	(10.128)	(6.318)	(9.863)
Ln Total Assets*Large	4.9783*	2.4783	5.3014*	2.6146
	(2.906)	(6.609)	(2.856)	(6.459)
Tier1 Cap Ratio	-0.3419	-0.6594	-0.3463	-0.6125
	(0.293)	(0.685)	(0.290)	(0.662)
Liquidity Ratio	-0.0801	0.1457	-0.0869	0.1439
	(0.083)	(0.171)	(0.085)	(0.169)
ROA	0.0787	0.4744	0.0795	0.4561
	(0.306)	(0.814)	(0.308)	(0.814)
Real Estate Loans	0.1218**	0.1155	0.1171**	0.1192
	(0.058)	(0.153)	(0.055)	(0.152)
NPL	0.0219	-0.0053	0.0195	-0.0014
	(0.037)	(0.074)	(0.035)	(0.074)
Asset Growth	0.0001	0.0000	0.0001	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)
Brokered Deposits	0.0739*	-0.0322	0.0677	-0.0360
	(0.043)	(0.103)	(0.045)	(0.100)
House Price Shock	-11.6393	-9.8737	-10.0737	-10.7847
	(11.081)	(27.624)	(11.603)	(27.243)
Quarter Fixed Effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
N	273	270	273	270
Adj.-R2	0.899	0.939	0.899	0.939

*, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively for a two-tailed test

Table 10: Robustness - Subsample registering with the SEC prior to 2004.

Estimated Cost (% Tot Deposits) is the estimated cost of the bank resolution calculated by the FDIC using its proprietary least cost test as a percentage of the total deposits of the failed bank at the time of the closure. Assets Sold (% Total Assets) is calculated as the percentage of assets sold in the Purchase and Assumption transaction over the total assets of the failed bank at the time of the closure. SEC is an indicator variable taking the value of one if the bank or thrift is registered with the SEC. Ln Total Assets is calculated as the log of total assets of banks in the fourth quarter of 2007. Ln Total Assets*Medium is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is the second tercile of total assets. Ln Total Assets*Large is calculated as log of total assets of banks in the fourth quarter of 2007 times an indicator variable that assumes the value of one if the bank is in the third tercile of total assets. Tier 1 Capital Ratio is calculated as Tier 1 Equity Capital over total risk-weighted assets in the fourth quarter of 2007. Liquidity ratio is (Cash Balances + Balances due from depository institutions + Securities + Fed Fund Repos + Trading Accounts – Pledged Securities)/ Total Liabilities as calculated in fourth quarter of 2007. ROA is calculated as net income over average assets of the banks during the year. Real Estate Loans (% Total Loans) is the consolidated total Real Estate Loans as a percentage of total Loans. NPL and 90+due loans (% Tangible Equity + LLR) is also known as Texas ratio and is calculated as total nonperforming loans + loans 90 or more past due over Total Tangible Equity plus Loan Loss Reserves. Ln Asset Growth 2005Q1:2007Q4 (%) is the percentage growth of total assets in the period ranging from the first quarter of 2005 to the fourth quarter of 2007. Brokered Deposits (% Total Deposits) is the percentage of total deposits of the bank that is composed by brokered deposits. House Price change (FHFA - 2007Q4-2009Q4) is calculated as the house price change from 2007:Q4 to 2009:Q4 in the MSA corresponding to the headquarters of the bank. When the bank is not headquartered in an MSA, I calculate the house price change as the house price change from 2007:Q4 to 2009:Q4 in FHFA data on house prices for non-MSA areas by state. Quarter and State fixed effects are included in all regressions. Standard errors are clustered at the level of the failed bank's state. Amounts represent coefficients from an OLS regression. (Standard errors are presented in parentheses.)

	(1)	(2)
	Estimated Cost (% Deposits)	Assets Sold (% Total Assets)
SEC	-4.4228*	7.8077**
	(2.536)	(3.387)
Ln Total Assets	-6.5811**	-0.0635
	(2.472)	(5.615)
Ln Total Assets*Medium	0.5679	-4.9420
	(6.282)	(10.110)
Ln Total Assets*Large	4.3254	4.6738
	(3.070)	(6.613)
Tier1 Cap Ratio	-0.3352	-0.6831
	(0.278)	(0.745)
Liquidity Ratio	-0.1200	0.2669
	(0.079)	(0.177)
ROA	0.0134	0.6470
	(0.317)	(0.832)
Real Estate Loans	0.1379**	0.1491
	(0.060)	(0.150)
NPL	0.0146	-0.0021
	(0.035)	(0.073)
Asset Growth	0.0001**	0.0000
	(0.000)	(0.000)
Brokered Deposits	0.0776	-0.0381
	(0.048)	(0.103)
House Price Shock	-11.3107	-18.0481
	(12.141)	(30.212)
Quarter Fixed Effects	Yes	Yes
State Fixed Effects	Yes	Yes
N	256	253
Adj.-R2	0.348	0.434

*, ** and, *** indicate statistical significance at the 10%, 5%, and 1%, respectively for a two-tailed test

Figure 1: Estimated Cost of Bank Resolution per Quarter

This figure presents the average (orange dots), median (grey dots) and quartiles of the estimated costs of resolution as a % of total deposits, for each quarter in the 2008:Q1 to 2010:Q4 period.

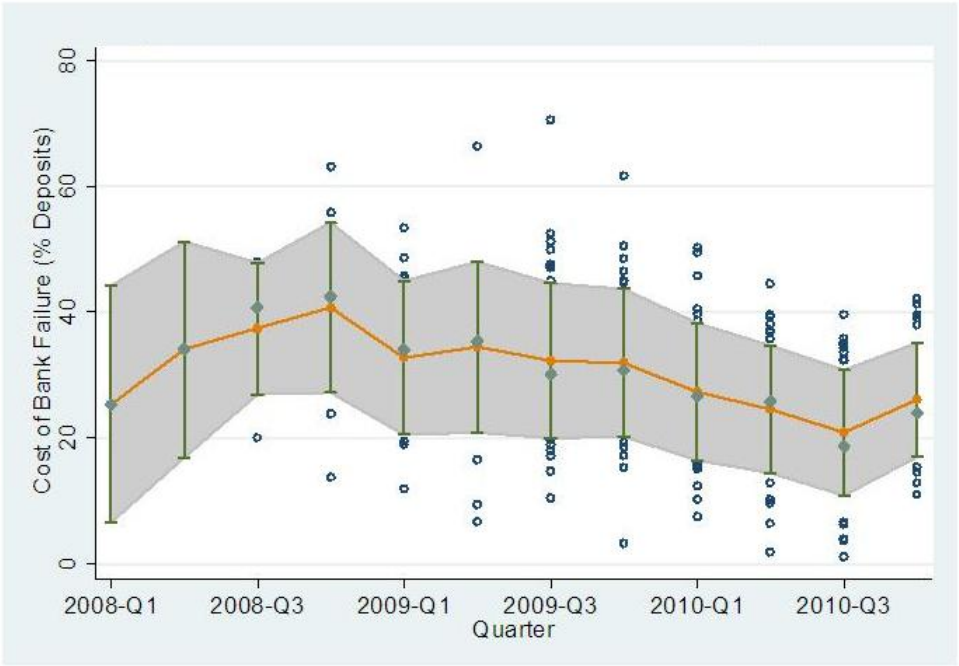

Figure 2: Percentage of Assets Sold in P&A agreements per Quarter

This figure presents the average (orange dots) and median (grey dots) of the assets sold in the P&A transaction as a % of the total assets of the failed institution, for each quarter in the 2008:Q1 to 2010:Q4 period.

Figure 3: Kernel Density of Total Assets by SEC Filing Category

This figure presents the kernel density of the logarithm of total assets measured as of 2007-Q4 for SEC vis-à-vis non-SEC filers. The kernel used to compute the density function is the Epachnikov kernel.

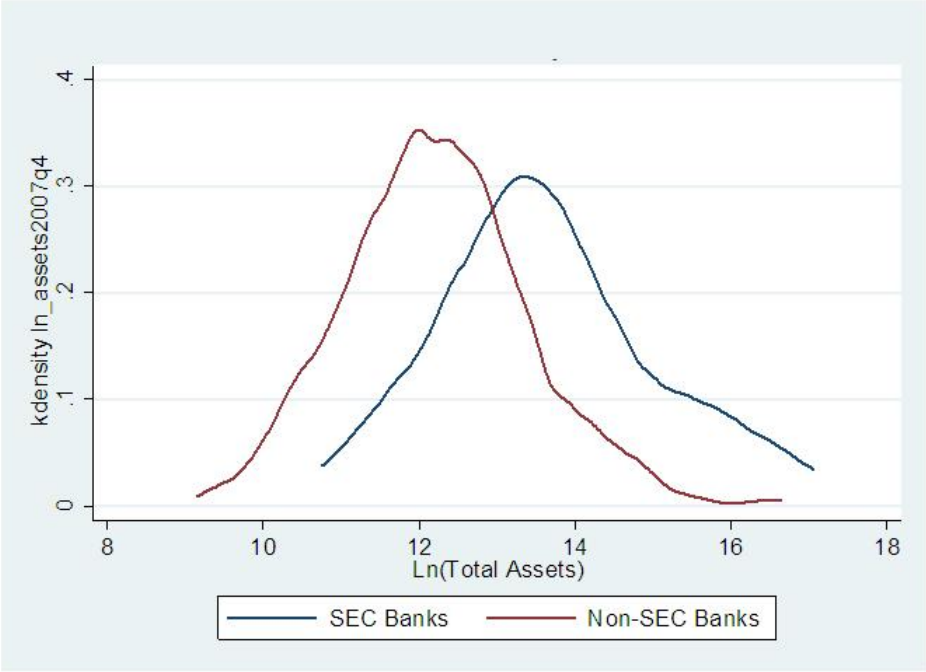

Figure 4: Leverage Ratio in Event Time by SEC Filing Category

This figure presents the median leverage ratio for SEC failed banks vis-a-vis non-SEC failed banks as the banks approach the bank failure quarter.

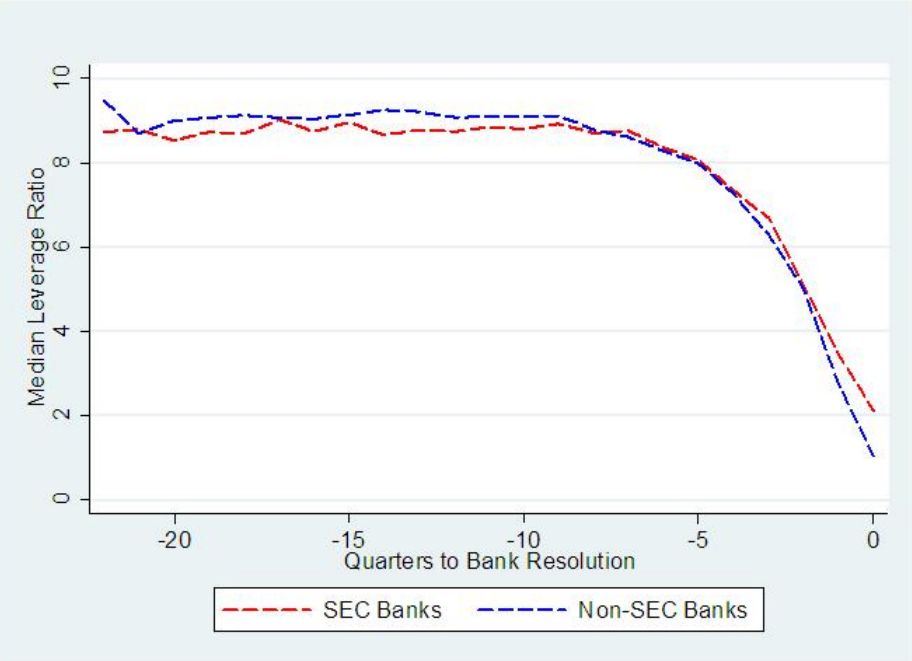

Figure 5: Interest costs of Interest Bearing Liabilities by SEC Filing Category

This figure presents the median interest cost (%) of interest bearing liabilities per quarter for SEC failed banks vis-a-vis non-SEC failed banks in the period 2005:Q1 to.2010:Q4

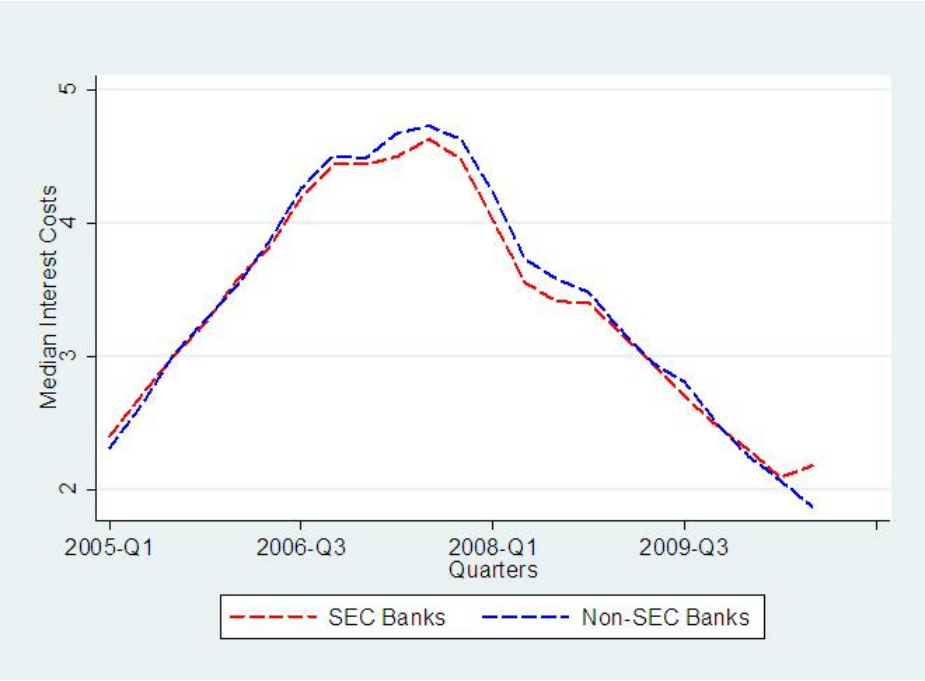

Figure 6: Median Wholesale Funding (% Total Funding) prior to Bank Resolution by SEC Filing Category

This figure presents the median wholesale funding (Total Borrowings + Total Brokered Deposits) as a percentage total funding for SEC failed banks vis-a-vis non-SEC failed banks.