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Banking market reaction to auctions of failed banks

Philip Molyneux¹ | Tim Mi Zhou²

¹College of Business Administration,
University of Sharjah, Sharjah, United
Arab Emirates

²School of Management, Swansea
University, Swansea, Wales, UK

Correspondence

Tim Mi Zhou, School of Management,
Swansea University, Swansea, Wales SA1
8EN, UK

Email: t.zhou@swansea.ac.uk

Abstract

In this study, we find that non-merger rival banks of failed banks from 2008 to 2013 experience substantial negative abnormal stock returns in the United States when failed banks are auctioned. Negative abnormal returns are related to contagion effects associated with an increased probability of their own failure and the information of these rival banks' opaque assets. We also find evidence that FDIC resolutions of these failed banks, similar to previous regulatory interventions, distort the market competition.

KEYWORDS

auction, banks, FDIC, resolution

The global financial crisis witnessed a large number of commercial and saving bank failures in the United States. In total, 489 banks failed between 2008 and 2013 before the upward trend finally decelerated. Nearly 95% of these failed banks were auctioned successfully to healthy banks by the Federal Deposit Insurance Corporation (FDIC). These auctions are also known as purchase and assumption transactions (P&As) as the acquirer is required to purchase a failed-bank assets and assume its deposits. Despite the importance of these failed-bank resolutions during the recent financial crisis, little is known about their intra-industry effects.

This paper examines the effects of failed-bank acquisition announcements on the stock prices of non-merger rival banks that operate in the same banking markets. The results show that stockholders lose significant negative value from the acquisitions, with a -0.45% average two-day cumulative abnormal return (CAR). We find evidence of contagion effects that the negative revaluations are higher when rival banks are located in the markets with a higher occurrence of bank failures. This likely reflects an increased probability of their own failure. Further analyses show that the contagion effects could also be attributed to information about rival banks' exposure

to real estate lending, which was under greater market scrutiny after the outbreak of housing market crash in 2007. Our tests also show that the losses to rival banks' stockholders are driven by significant wealth transfers from the FDIC to the acquirers as well as pre-merger regulatory interventions such as Troubled Assets Relief Program (TARP). These measures may place the rival banks at a competitive disadvantage and therefore cause the market value of rival banks to decline.

Our paper is related to several strands of literature. First, it is most directly related to the bank failure literature. Many of the early United States studies focus on the failures of large banks to examine whether the adverse effects spread to other banks (Pettway, 1976; Lamy and Thompson, 1986; Swary, 1986; Aharony and Swary, 1996). This sampling approach, however, ignores a greater number of other publicized bank failures during the same period and are unable to examine whether negative intra-industry effects may vary across failed-bank announcements (Akhigbe and Madura, 2001). Another strand of literature mainly focuses on the effects of P&A announcements on FDIC auction winners' stockholder value. These studies tend to find a positive average bidder stock-price reaction to acquisition announcements

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associated with wealth transfers from the government agency resolving the failure (James and Wier, 1987; Bertin et al., 1989; Baibirer et al., 1992; Cochran et al., 1995; Zhang, 1997; Cowan and Salotti, 2015). A few other empirical studies, however, use different approaches to examine the FDIC auction process. For example, James (1991) focuses on losses realized in bank failures in the 1980s. The author finds that these losses appear to vary with the resolution methods used by the FDIC. More specifically, there is a significant going-concern value that is preserved when a failed bank is auctioned but that is lost if the bank is liquidated. Granja (2013), on the other hand, finds that when failed banks are subject to more comprehensive disclosure requirements, regulators incur lower costs of closing the bank and retain a lower portion of its assets. Granja et al., (2017) examine the allocation process of failed-bank sales between 2007 and 2013. They find that failed banks tend to be sold to bidders within the same market and with similar business lines, when these bidders are well capitalized. With the liquidity/budget constraint experienced by most banks in a systemic financial crisis, the allocation process of failed-bank assets, nevertheless, may be inefficient, which partially explains the FDIC losses from failed-bank sales in recent years. To our knowledge, our paper is the first to analyse the U.S. banking market reactions to FDIC auctions of failed banks over the global financial crisis.

Our paper is also related to the literature that looks at impact of government interventions on banking competition (Berger and Roman, 2015, Berger et al., 2016) as the FDIC acts as the receiver of the failed banks and tends to subsidize the acquiring banks to complete the transactions by discounting failed bank assets (Cowan and Salotti, 2015). Moreover, our paper contributes to the literature on horizontal mergers. The literature typically finds that rivals of acquisition targets earn positive abnormal returns. Various hypotheses are tested to explain positive intra-industry revaluations. The acquisition probability hypothesis predicts a spill-over associated with an increased probability of takeover (Akhigbe and Madura, 1999; Song and Walkling, 2000). The studies testing the collusion hypothesis, however, fail to find the evidence that horizontal mergers eliminate competitors and facilitate collusion among the remaining firms (Eckbo, 1983, 1985, 1992; Eckbo and Wier, 1985; Stillman, 1983; Mitchell and Mulherin, 1996). Jones et al., (2012), on the other hand, find evidence that opacity is an alternative explanation for positive intra-industry effects surrounding bank merger announcements. Our study contributes to this strand of literature by examining horizontal mergers in a different economic setting when the allocation of banking assets is inefficient during a systemic crisis (Acharya and Yorulmazer, 2007).

The remaining sections of the paper are organized as follows. Section 2 provides the research background and develops the research hypotheses. Section 3 discusses the data and methodology used in the study. Empirical results for intra-industry effects of FDIC auctions are reported in Section 4. Section 5 concludes.

1 | INSTITUTIONAL BACKGROUND AND RESEARCH HYPOTHESES

1.1 | Institutional background

When a deposit-taking institution in the United States is on the verge of failing, its primary regulator will contact the FDIC to gather its financial information and review the performance of its asset portfolio. In doing so, the FDIC estimates the losses in each asset category and sets the reservation value for the following sale of the assets of the failing institution. During the recent financial crisis, the FDIC typically chose the purchase and assumption transaction (P&A) as the resolution method. Only a handful of failed banks were unable to be auctioned to a healthy acquirer, in which case, these banks were closed down and the FDIC subsequently paid all of the failed institution's depositors up to the limit of insurance coverage.

After the FDIC has all the information for resolution and the failing bank is still critically undercapitalized, the primary regulator sets a confidential scheduled closing date and appoints the FDIC as the receiver to formally start the resolution process by contacting qualified potential bidders.¹ Approved bidders then sign confidentiality agreements prior to obtaining an information package, which includes valuations of loans and other items on the balance sheet and operational information. Bidders are also granted access to conduct on-site inspections as a part of the due diligence. P&A transactions are sealed bid first price auction. All approved bidders simultaneously submit one or more sealed bids to the FDIC 12–15 days before the scheduled closure. Each bid comprise three parts: the price for the deposits, the bid on assets and whether the bidder intends to bid on all deposits or only insured deposits. Bidders sometimes also indicate whether the FDIC needs to enter into a loss-share agreement (LSA). The LSA was introduced in 1991 and rarely used before 2008. Such agreement requires the FDIC to absorb a portion of the loss on a specified pool of assets. The FDIC evaluates all submitted bids and awards the failed bank to the highest bidder if the total amount of the FDIC's expected expenditures is the least costly to the deposit insurance fund of all possible methods for

resolving the failed institution. The FDIC then issues a press release about the closure of the institution and the details of the P&A transaction, usually on a Friday.² The winning bidder reopens the bank on the next business day, and the customers of the failed institution automatically become customers of the acquiring bank with access to their insured funds.

1.2 | Research hypotheses

Negative bank-specific events such as bank failures can give rise to industry contagion (Kaufman, 1994; Aharony and Swary, 1983). As announcements of FDIC P&A auctions in the midst of a financial crisis indicate a deteriorating economic condition, surviving banks may perceive that each failure in their market increases their own overall probability of insolvency. As a result, rival banks' shareholders will react negatively to these announcements. We first hypothesize this as follows:

H1: Failure Probability Hypothesis: Rival banks lose stockholder value as a result of an increased probability of bank failure.

Second, banking literature states that, in general, contagion arises from the propagation of asymmetric information when investors cannot distinguish between bank-specific and systematic events (Diamond and Dybvig, 1983). Bank-specific contagion occurs when information about one or more banks affects other banks that share common characteristics with the failing institution(s), for instance, their size, location and markets served. This type of contagion is sometimes referred to as information-based contagion and is viewed as a rational response (Gorton, 1985; Chari and Jagannathan, 1988). A number of empirical studies measure the adverse effects on equity returns of other banks associated with the failure of the initially affected bank(s) and find consistent evidence that return contagion occurs only for banks in the same market or product area, and shocks do not spill-over to other banks randomly (Aharony and Swary, 1996; Bessler and Nohel, 2000; Akhigbe and Madura, 2001; Goldsmith-Pinkham and Yorulmazer, 2010; Halstead et al., 2004). A more benign view of information-based contagion in banking is that opacity fosters conditions that also lead to price contagion. This is because banks are relatively more opaque than industrial firms (Morgan, 2002). There is also evidence that banks became more opaque during the global financial crisis, and so opaque assets were more difficult to revalue—market participants found it challenging to ascertain their true intrinsic value (Flannery et al., 2013). Jones et al., (2012) further point out that opacity makes it more likely that even informed investors will use bank-

specific information to influence the valuations of other banks. They find evidence that banks with larger investments in opaque assets benefited more from intra-industry revaluations associated with announcements of mergers in the period 2000–2006. These non-merger banks, however, also experienced the largest price declines during the subsequent 2007–2008 financial crisis. Based on their findings, all else being equal, one would expect that the contagion effects to be more important for banks that are more opaque. We, therefore, formulate our second hypothesis as follows:

H2: Opacity Hypothesis: Non-merger banks experience adverse stockholder value changes due to the revaluation of their opaque assets during the crisis.

Third, P&A transactions may have an impact on market competition, which then explains rivals' abnormal stock performance. Studies find that P&A acquirers generally tend to be better performing and hence potentially more competitive than other non-merger banks during the crisis (Granja et al., 2017). Evidence also shows that regulatory interventions have unintended effects on banking competition. For example, Gropp et al. (2011) find that competitors of bailed out banks in OECD countries become more risk-taking. Calderon and Schaeck (2012) use a dataset from 124 countries and find that government interventions (blanket guarantees, liquidity support, recapitalizations, and nationalizations) increase competition in the banking systems. Moreover, Berger and Roman (2015) find that TARP recipient banks received competitive advantages. Extant studies on FDIC auctions tend to suggest that significant wealth is transferred from the FDIC to the acquirers in P&As (James and Wier, 1987; Bertin et al., 1989; Baibirer et al., 1992; Cochran et al., 1995; Zhang, 1997; Cowan and Salotti, 2015). Such wealth transfers may therefore place rival banks at a competitive disadvantage and lead to a decrease of their market value.

A contrasting view would suggest, however, that bank failures and subsequent acquisitions reduce the number of competitors in the market, which may lead to higher market concentration and generate monopoly rents according to the traditional collusion argument (Stigler, 1964). P&A transactions are indeed subject to the same regulation as regular takeovers due to potential anti-competitive effects.³ All market participants, acquirers and their rivals, consequently, may boost their profits from a P&A due to a lessening of competition and increased market prices (Prager and Hannan, 1998; Degryse and Ongena, 2008; Hankir et al., 2011). We summarize our next hypotheses as follows:

H3a: Competition Distortion Hypothesis: Negative abnormal returns for rival banks are the consequence of competitive effects.

H3b: Competition Distortion Hypothesis: Positive abnormal returns for rival banks are the consequence of anti-competitive effects.

2 | DATA AND METHODOLOGY

2.1 | Data

We obtain data with the terms and characteristics of each FDIC P&A transaction from the FDIC. From 2008 to 2013, the FDIC acted as receiver for 489 commercial and saving banks and successfully auctioned 463 institutions in total. We exclude the remaining 26 transactions where the FDIC was unable to find a buyer and liquidated the bank. The FDIC Summary of Deposits (SOD) database provides information on the geographic distribution of failed banks' branch networks to identify their banking markets. In this study, we define the relevant banking market at the level of Metropolitan Statistical Area (MSA). MSA is a geographic unit defined by the U.S. Census Bureau that consists of a large population nucleus, together with adjacent communities, that comprises one or more counties. This banking market definition is supported by the bulk of the empirical banking literature (Amel and Starr-McCluer, 2002; Kwast et al., 1997; Dick, 2006, 2007, 2008; Berger et al., 2014; Dagher and Kazimov, 2015; Goetz et al., 2016) as well as by U.S. regulators.⁴ Overall, in our sample, 9,111 branches of failed banks located in 221 MSAs were taken over as a part of the FDIC P&A transactions between 2008 and 2013.⁵ Stock market data for publically listed rival banks are obtained from the Center for Research in Security Prices (CRSP) database to calculate abnormal returns around P&A announcements. Data on bank financial characteristics are derived from Call Reports of the Federal Financial Institutions Examination Council (FFIEC) and S&P Global Market Intelligence.

2.2 | Event study

Computing the CARs of the non-merger rival banks captures the intra-industry effects associated with P&A announcements. We estimate the expected returns using the market model where the market index is the daily value-weighted CRSP index. The estimation period for the market model coefficients and standard errors is 255 trading days long. The estimation period ends 91 trading days before the P&A announcement to avoid contaminating the estimates with stock-price reactions to earlier events. Abnormal returns are prediction errors from the market model and CARs are sums of abnormal returns

across selected consecutive trading days (event windows). We follow Cowan and Salotti (2015) and define the event window in this study as the announcement date plus one, and two trading days after the announcement (CAR [0,+1] and CAR[0,+2]), since it can be reasonably assumed that the market cannot make an ex ante predictions about the bidding outcomes owing to the FDIC's strict confidentiality policy agreed by all FDIC approved bidders (Cowan and Salotti, 2015).⁶ It is also worth noting that using a relatively short event window avoids the possibility of overlapping event windows since bank failures took place frequently during our sample period. To test whether a mean CAR is different from zero, we use the standardized cross-sectional test of Boehmer et al. (1991) as well as substitute a cross-sectional *SD* for the default time series *SD* in non-standardized t-statistic computations.

2.3 | Cross-sectional analysis

For the second stage of our analysis, to examine the determinants of the rivals' abnormal returns, we run ordinary least squares (OLS) regressions using cross-sectional data (incorporating a vector of bank-level and deal-specific characteristics). The model we use is as follows:

$$CAR_i = \alpha + \beta_1 PROB_i + \beta_2 OPAC_i + \beta_3 COMP_i + \beta_3 CONT_i + \varepsilon_i \quad (1)$$

The dependent variable of Equation (1)—CAR, denotes the non-merger bank's abnormal returns. *PROB* tests our **Failure Probability Hypothesis**, that is, on average, every P&A announcement is an indication and perceived by rival banks that overall banking market health deteriorates and the probability of their own failures increases. We construct the variable *Occurrence* that measures the scale of bank failures in terms of branch closures inside one specific MSA where the failed bank operates within a 12-month period (including the failed bank branches). This measure uses the number of branches auctioned or closed due to bank failures to indicate the economic condition and is then weighted by the non-merger rival's deposits inside the MSA. We expect a positive relationship between negative value contagion and adverse market conditions faced by rival banks.

OPAC, on the other hand, tests the **Opacity Hypothesis**, namely, whether the contagion effects are driven by the revaluation of banks' opaque assets. We follow Jones et al., (2012) to measure rival banks' opacity. We introduce three proxies to indicate rival's opacity. Variable

Real estate loans indicates the amount of commercial and residential real estate loans and leases a rival bank holds. *Other loans* measures a rival's total loans except its real estate loans, whereas variable *Other opaque assets* includes all other opaque assets such as trading assets, fixed assets, intangible assets. These variables are quarter end prior to the P&A announcements and weighted by total assets. We then interact a dummy variable *Crisis* with these three proxies for opacity to test whether rival banks lose shareholder value owing to the corrections in opaque asset valuations over the crisis period (Jones et al., 2012). The dummy variable *Crisis* equals 1 if the year the P&A transaction is announced by the FDIC is 2008 or 2009, and 0 if the year is during 2010 and 2013.⁷

COMP tests the **Competition Distortion Hypothesis**, namely that P&A transactions may alter market competitive conditions in opposite directions (**H3a** vs **H3b**). To test the competitive effects (**H3a**), we first directly measure the acquiring bank's competitiveness prior to the P&A auction using the *Boone indicator*, which considers that competition improves the performance of efficient firms and weakens the performance of inefficient ones (Boone, 2008). We follow Boone et al. (2005) and Schaeck and Čihák (2010) to regress a bank's profitability on marginal costs approximated by the ratio of average variable costs to total income to calculate the *Boone indicator*. This indicator is used because it has superior features compared to other commonly used proxies for competitiveness. For example, it does not require restrictive assumptions, made by the H-Statistic, about the market existing in long-run equilibrium, nor does it suffer from the product substitutability problem of the Lerner index (Schaeck and Čihák, 2014). Overall, we hypothesize that the possibility of increased competition due to the acquirer's competitiveness can adversely impact its rivals. We next use a proxy to measure the possible effect of government interventions on competition, namely, the FDIC subsidies transferred to the acquirers as a result of P&A transactions. We collect data on *FDIC cost*, which is based on the FDIC's own estimates of immediate and discounted future costs to the deposit insurance fund (DIF) due to the bank failure, and is published in P&A press releases (the failed-bank announcement). A higher *FDIC cost* suggests that more wealth is transferred to the acquiring bank (Cowan and Salotti, 2015). A similar proxy of pre-merger regulatory interventions, a dummy variable *aTARP*, is used to capture whether the acquiring bank received TARP support prior to the P&As. We obtain TARP transaction information for the period October 2008 to December 2010 from the Treasury's website.⁸ As these interventions may have given the recipients (from FDIC subsidies as well as TARP support) competitive advantages, we presume a negative

relationship between these benefits received by the acquirer and rival's shareholder value.

To test whether FDIC auctions of failed banks to healthy banks result in anti-competitive behaviour in the market (**H3b**), we first obtain the FDIC's own estimates of the increased deposit market concentration (Herfindahl–Hirschman index, HHI) at the MSA level where the failed bank has a branch network for each P&A transaction.⁹ It is assumed that deposit concentration is the proxy for local market competition with a higher HHI indicating more potential collusion among market participants and less competition (Scott and Dunkelberg, 2010). We calculate the percentage change in the HHI ($\% \Delta HHI$) in our analysis (whether due to fewer banks or an acquiring bank increasing market share after each P&A transaction) representing a change in local market competition. Thus, the $\% \Delta HHI$ should relate positively to non-merger banks' abnormal returns. Moreover, we use two variables to measure whether the acquirer pursues value-enhancing geographical and product-focused acquisition strategies. Focused mergers may increase local/product market concentration significantly and have a positive measured effect on the profits of the other firms in the affected markets (Berger and Humphrey, 1993). *Geographic focus* is a dummy variable to show whether the acquirer's headquarter is in the same state as the failed bank. *Product focus* is a Herfindahl–Hirschman index that is determined by differences in asset composition between winner and target (namely, the sum of the squared differences in asset composition between bidder and target) as proposed by Jones et al. (2012).

We then include a plethora of variables (*CONT*) in our multivariate analysis to control for deal and bidder specific characteristics. *Assets sold* and *Deposits assumed* indicate how much assets and deposits of the failed bank (weighted by the failed bank's total assets) are transferred to the acquiring bank and these serve as proxies for risk of the failed bank's asset portfolio and its franchise value, respectively (Cowan and Salotti, 2015). During the financial crisis, the FDIC often entered a LSA with the acquiring bank to share losses from selected commercial loans, residential mortgages and consumer loans. The inclusion of an LSA is intended to encourage bidders to bid for failed banks, so as to allay concerns regarding the potential future losses from the acquired assets. *LSA assets* are a failed bank's assets covered by LSA weighted by its total assets at the time of P&A. *Bid amount*, on the other hand, is the ratio between the dollar bid to deposits assumed, which indicates an acquiring bank's willingness to win the P&A auction. We also control for acquiring banks' *Size*, *Tier 1 capital ratio*, *Liquidity ratio* as well as whether it is a bank holding company (*BHC*) and whether rival

banks received TARP support prior to the P&As (*rTARP*) following Granja et al. (2017), Berger and Roman (2015) and Berger et al. (2019).

Finally, to ensure that our results are not driven by various sample subgroups we conduct a further three subsample analyses. The size of an acquiring bank can impact the competition within a market. First we follow Berger and Roman (2015) and split the acquiring banks according to their size (*aSize*) into three different classes: small banks (*aSize* \$1 billion), medium banks (\$1 billion < *aSize* < \$3 billion) and large banks (*aSize* \$3 billion) and re-run our regression analysis. Next, we regroup our sample according to deposit market concentration, measured via HHI at the MSA level, as markets with different concentration levels may experience varying competition effects. We follow the Department of Justice guidelines on market concentration for the breakdown: un-concentrated (HHI 1,000), moderately concentrated (1,000 < HHI 1,800), and highly concentrated (HHI > 1,800). Finally, to examine whether our results are more significant during the crisis period, we drop the dummy variable *Crisis* used to interact with three variables for opacity in our main estimation and run the estimation based on two time periods: crisis period (2008–2009) and post-crisis period (2010–2013).

All explanatory variables are defined in Appendix II. Table 1 reports descriptive statistics. On average,

around a half of acquirers take over a failed bank that is located in the same state and also receive TARP support from the U.S. government prior to the P&A transactions. As noted in the literature, acquirers appear to be good performing and competitive. Non-merger rival banks, on the other hand, tend to hold the majority of their opaque assets in the form of real estate loans during our sample period.

3 | EMPIRICAL RESULTS

Table 2 shows the event study results for the full sample and six sub-samples between 2008 and 2013. In total, we observe 4,455 stock valuations for non-merger rival banks upon the P&A announcements. Around the announcement date, rival banks experience a mean -0.45% two-day CAR (-0.33% three-day CAR), which is statistically significant at conventional levels. The negative CAR seems to be driven mainly by the P&A transactions between 2008 and 2009. Even though 2010 witnessed the highest number of bank failures since the 1990s in the United States, the sub-sample for 2010 does not appear to observe significant CAR, which may be because banks that failed during this year were much smaller than those that failed previously during the crisis (FDIC, 2011).¹⁰ While our event study results are consistent with extant

Explanatory variable	N	Mean	Median	SD	Min.	Max.
<i>Occurrence</i>	9,050	0.010	0.001	0.027	0	0.218
<i>Real estate loans</i>	9,012	0.411	0.402	0.146	0.034	0.856
<i>Other loans</i>	9,012	0.222	0.102	0.102	0	0.752
<i>Other opaque assets</i>	9,012	0.139	0.110	0.107	0	0.597
<i>Boone indicator</i>	8,402	-0.024	-0.007	0.304	-4.839	0.803
<i>FDIC cost</i>	9,059	0.210	0.168	0.336	0	3.700
<i>aTARP</i>	9,059	0.403	0	0.490	0	1
<i>%ΔHHI</i>	9,059	0.379%	0	0.021	0	48.331%
<i>Geographic focus</i>	9,059	0.606	1	0.488	0	1
<i>Product focus</i>	6,767	0.073	0.046	0.080	0.001	0.643
<i>aTier 1 capital ratio</i>	8,402	0.145	0.120	0.092	0.067	1.002
<i>aSize</i>	8,402	15.661	15.014	2.505	9.564	21.044
<i>aLiquidity ratio</i>	8,402	0.235	0.216	0.113	0.008	0.685
<i>aBHC</i>	9,059	0.858	1	0.349	0	1
<i>rTARP</i>	9,059	0.725	1	0.447	0	1
<i>Assets sold</i>	9,059	0.889	1	0.242	0.025	1
<i>Deposits assumed</i>	9,059	0.999	1	0.029	0.500	1.528
<i>LSA assets</i>	9,059	0.457	0.642	0.359	0	1
<i>Bid amount</i>	9,059	0.013	0	0.085	0	1.140

TABLE 1 Descriptive statistics

TABLE 2 Market reactions to FDIC auctions of failed banks, 2008–2013: An event study

	No. of P&A transactions	No. of CAR	Event window	Mean CAR	Positive : Negative	Std Csect Z	CsectErr t
Total sample	397	4,455	[0, +1]	−0.45%	2,041:2,414	−6.242***	−5.832***
			[0, +2]	−0.33%	2,127:2,328	−2.187***	−2.060***
Sub samples							
Jan 2008 to Dec 2008	55	810	[0, +1]	−1.05%	369:441	−2.582***	−3.224***
			[0, +2]	−0.74%	381:429	−0.487	−1.878**
Jan 2009 to Dec 2009	79	903	[0, +1]	−0.58%	565:753	−2.613***	−2.694***
			[0, +2]	−0.93%	558:760	−3.499***	−3.246***
Jan 2010 to Dec 2010	121	1,090	[0, +1]	−0.16%	566:524	−0.322	−1.122
			[0, +2]	0.05%	577:513	1.459*	0.332
Jan 2011 to Dec 2011	76	869	[0, +1]	−0.54%	351:518	−6.975***	−6.351***
			[0, +2]	−0.28%	398:471	−2.515***	−2.457***
Jan 2012 to Dec 2012	44	501	[0, +1]	0.08%	256:245	0.745	1.098
			[0, +2]	0.28%	277:224	1.951**	2.904***
Jan 2013 to Dec 2013	22	282	[0, +1]	−0.42%	114:168	−2.261***	−3.194***
			[0, +2]	−0.52%	128:154	−2.487***	−3.284***

Note: This table summarizes the cumulative abnormal returns (CAR) of banking firms, excluding the acquirers, in the same banking markets as the failed banks surrounding the announcements of FDIC purchase and assumption auction results between 2008 and 2013. The return generating model used to compute abnormal returns utilizes the market model. The value-weighted CRSP index is used as the market proxy. The standardized cross-sectional statistic (StdCsect) is adjusted for cross-sectional correlation (Boehmer et al., 1991). CsectErr, on the other hand, substitutes a cross-sectional *SD* for the default time series *SD* in non-standardized t-statistic computations. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels.

bank failure literature (e.g., Swary, 1986; Aharony and Swary, 1996; Akhigbe and Madura, 2001) which finds negative stock reactions in general for the surviving rivals of the failed banks, the bank industry effects of failures during the last financial crisis seem to be reduced compared to the size of the effects obtained in previous studies.¹¹

Table 3 shows a further analysis of the rival banks' CAR: based on rivals' opaque assets, acquirers' competitiveness, FDIC subsidies, merger strategies and market concentration as well as market economic condition, the rivals are classified into a number of categories. In Panel A of Table 3, rival banks' CAR are ranked into quartiles based on the percentage of opaque assets (real estate loans, other loans and other opaque assets) held by these banks. Then the mean and *SD* of the rivals' CAR are computed for each quartile. We find that while the mean CAR differences between the most opaque rivals and the least ones appear significant for all three proxies of opacity, only the amount of real estate loans is negatively related to the level of value changes as we expect. This shows that the stock market casts doubts about the true value of rival banks' real estate loans, but continues to positively revalue their other opaque assets. In Panel B, we examine whether acquirer's pre-merger competitiveness measured by the

Boone indicator affects the CAR of rival banks. Both quartiles of the most competitive and least acquirers are negatively associated with stock value reaction, but P&A transactions with the least competitive acquirers tend to generate more significantly negative CAR. This result suggests evidence that rival bank shareholders tend to react more negatively when an uncompetitive bank increases its market share. Next, we rank the rivals based on how much FDIC subsidies (*FDIC cost* as proxy) are transferred to the acquiring banks. We find that there are significant differences of mean CAR at the 1% level between the highest FDIC estimated cost quartile and the lowest cost quartile. In other words, rival banks experience negative stock value effects when the FDIC claims higher costs to its DIF, potentially resulting from subsidizing the winners of the P&A auctions. We then divide rivals' CAR in Panel D based on whether the P&A transaction is geographically focused or diversified and how product-focused the transaction is. The results show that negative CAR are more likely to be associated with geographic-focused and product diversified transactions. Finally, we rank the rival banks' CAR into quartiles based on how likely the banking market experiences bank failures in Panel E. The results show that rival banks in the MSAs with the worst economic

TABLE 3 Analysis of cumulative abnormal returns of non-merger banks 2008–2013

	Quartile	Number of valuations	Mean CAR	SD
Panel A: Rival banks' opaque assets				
Most real estate loans	1	2,168	−0.008	0.081
	2	2,217	−0.005	0.050
	3	2,124	0.002	0.049
Least real estate loans	4	2,248	0.005	0.063
			−0.013***	
Most other loans	1	2,226	0.001	0.054
	2	2,135	−0.004	0.039
	3	2,238	0.003	0.067
Least other loans	4	2,158	−0.008	0.080
			0.009***	
Most other opaque assets	1	2,124	0.008	0.070
	2	2,238	−0.002	0.058
	3	2,191	−0.004	0.056
Least other opaque assets	4	2,204	−0.008	0.064
			0.015***	
Panel B: Acquirers' competitiveness				
Most competitive acquiring banks—Boone indicator	1	2,098	−0.005	0.046
	2	2,232	0.018	0.075
	3	1,816	−0.011	0.060
Least competitive acquiring banks - Boone indicator	4	2036	−0.011	0.060
			0.006***	
Panel C: FDIC subsidies to the acquirers				
Highest FDIC estimated bank failure costs	1	2,131	−0.011	0.074
	2	2,200	−0.009	0.063
	3	2,203	0.002	0.061
Lowest FDIC estimated bank failure costs	4	2,246	0.011	0.046
			−0.021***	
Panel D: Focused vs diversified transactions				
Geographically focused		5,378	−0.007	0.059
Geographically diversified		3,402	0.006	0.067
			−0.013***	
Most product focused	1	1,874	−0.003	0.055
	2	1,453	−0.008	0.059
	3	1,630	0.000	0.061
Least product focused	4	1,677	−0.013	0.055
			0.010***	
Panel E: Occurrence of bank failures in the MSA				
Most likely to occur	1	2,142	−0.006	0.074
	2	2,246	−0.005	0.056
	3	2,219	−0.001	0.052

TABLE 3 (Continued)

	Quartile	Number of valuations	Mean CAR	SD
Least likely to occur	4	2,172	0.005 −0.011***	0.065

Note: This table examines the effects of various variables on the cumulative abnormal returns (CAR[0, +1]) of banking firms, excluding the acquirers, in the same banking markets as the failed banks surrounding the announcements of FDIC purchase and assumption (P&A) auction results between 2008 and 2013. Panel A shows summary statistics for the CAR sorted by quartiles based on the percentage of opaque assets (real estate loans, other loans and other opaque assets respectively) held by the non-merger banks and mean differences between the first and fourth quartiles of CAR. Panel B reports summary statistics for the CAR sorted by quartiles based on the competitiveness of the acquirers (measured by the Boone indicator) and mean differences between the first and fourth quartiles of CAR. Panel C displays summary statistics for the CAR sorted by quartiles based on the subsidies paid to the acquirers by the FDIC (measured by FDIC estimated bank failure costs to its deposit insurance fund) and mean differences between the first and fourth quartiles of CAR. Panel D shows summary statistics for the CAR sorted based on the geographic focus of the P&A transactions (measured by the dummy variable whether the acquirer's head-quarter is in the same state as the failed bank). Panel D also divides CAR into four quartiles based on the product focus of the transaction and mean difference between the first and fourth quartiles of CAR. Panel E reports summary statistics for the CAR sorted by quartiles at each auction announcement based on the number of branches auctioned or closed due to bank failures in the previous year in the MSA and mean-comparison test results between the first and fourth quartiles of CAR.

condition (namely, the highest number of bank failures) have a mean CAR of -0.6% compared to 0.5% respectively for the markets where bank failures are least likely to occur. The mean differences between these two quartiles of CAR of -1.1% are significant at the 1% level.

Table 4 reports the results of a more robust cross-sectional analysis where non-merger rival banks' two-day CAR are the dependent variable. First, we run the OLS regressions with all explanatory variables, then we drop *Product focus* to conduct the estimations again as we encounter a large number of missing value from this variable.

Overall, we find strong and consistent evidence to support the **Failure Probability Hypothesis**. The variable *Occurrence*, that captures market economic condition, has negative coefficients at the 1% level in all estimations, suggesting that each P&A announcement is perceived by shareholders of rival banks as having an increased probability of failure in the future. This result, therefore, confirms intra-industry contagion (Kaufman, 1994; Aharony and Swary, 1983). As demonstrated in Table 4, we again find that rival banks' opaque assets are priced differently by stockholders. While the coefficients of *Real estate loans***Crisis* are significantly negative in all six estimations, the variables *Other loans* and *Other opaque assets* are significantly and positively related to CAR during the crisis period in most of our estimations. This result, therefore, supports our **Opacity Hypothesis** to the extent that rival banks' shareholders continue to correct the value of the real estate loans after the housing market crash in 2007, and is consistent with Jones et al., (2012).

We also find some evidence to support the **Competition Distortion Hypothesis**. Both *FDIC cost*, a proxy for FDIC subsidies received by the acquirers, and *aTARP*, that indicates whether the acquiring bank receives TARP support prior to the P&As, have a negative and significant relationship with rival's shareholder value. This finding confirms competitive effects (**H3a**) brought out by the regulatory interventions prior to and during the failures of banking firms and is consistent with existing studies (Gropp et al., 2011; Calderon and Schaeck, 2012; Berger and Roman, 2015). The competitiveness of the acquiring bank (*Boone indicator*) is, on the other hand, not significantly related to the rival's CAR. The estimated increased deposit market concentration ($\% \Delta HHI$) at the MSA level where the failed bank operates does not appear to lead to more antitrust behaviour in our analysis. Acquirer' product focus/diversification strategy measured by *Product focus*, nevertheless, has consistent and negative coefficients and indicates anti-competitive effects in certain product markets that benefit rival banks (**H3b**). This finding is thus consistent with Jones et al. (2012) and Berger and Humphrey (1993).

Table 4 also shows that two variables that control for acquirer' total assets and target's sold assets (namely, *aSize* and *Asset sold* respectively) have inconsistent coefficients when the variable *Product focus* is included or not in the estimation. To alleviate the concern that certain subgroups of our sample might be spuriously responsible for our results, we conduct further subsample analyses by grouping banks and deals according to several characteristics. First we group acquiring banks according to their size (*aSize*), namely small banks (*aSize* \leq \$1 billion), medium banks ($\$1 \text{ billion} < aSize < \3 billion) and large

TABLE 4 Impact of FDIC auctions of failed banks 2008–2013: Cross-sectional analysis

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]
<i>Occurrence</i>	−0.0643** (0.0272)	−0.0918*** (0.0273)	−0.1438*** (0.0329)	−0.1018*** (0.0265)	−0.1166*** (0.0265)	−0.1209*** (0.0322)
<i>Real estate loans*crisis</i>	−0.0143*** (0.0045)	−0.0450*** (0.0138)	−0.0413*** (0.0138)	−0.0251*** (0.0039)	−0.0325*** (0.0115)	−0.0356*** (0.0118)
<i>Other loans*crisis</i>	0.0423*** (0.0082)	0.0071 (0.0162)	0.0161 (0.0163)	0.0361*** (0.0069)	0.0228* (0.0136)	0.0198 (0.0140)
<i>Other opaque assets*crisis</i>	0.0341*** (0.0083)	−0.0081 (0.0181)	−0.0117 (0.0181)	0.0831*** (0.0069)	0.0687*** (0.0148)	0.0609*** (0.0151)
<i>Boone indicator</i>	0.0013 (0.0020)	0.0004 (0.0020)	0.0018 (0.0020)	−0.0007 (0.0022)	−0.0006 (0.0022)	0.0003 (0.0022)
<i>FDIC cost</i>	−0.0324*** (0.0048)	−0.0502*** (0.0061)	−0.0481*** (0.0073)	−0.0159*** (0.0032)	−0.0157*** (0.0034)	−0.0182*** (0.0039)
<i>aTARP</i>	−0.0033** (0.0016)	−0.0026 (0.0016)	0.0021 (0.0018)	−0.0047*** (0.0015)	−0.0038*** (0.0015)	−0.0013 (0.0016)
<i>%ΔHHI</i>	−0.0382 (0.0398)	−0.0347 (0.0397)	−0.0962 (0.0634)	−0.0601* (0.0309)	−0.0679** (0.0308)	−0.0545 (0.0389)
<i>Geographic focus</i>	0.0003 (0.0017)	0.0004 (0.0017)	0.0025 (0.0020)	−0.0001 (0.0016)	−0.0013 (0.0017)	0.0005 (0.0019)
<i>Product focus</i>	−0.0486*** (0.0112)	−0.0420*** (0.0113)	−0.0377*** (0.0124)			
<i>aTier 1 capital ratio</i>	−0.0103 (0.0082)	−0.0044 (0.0082)	−0.0176* (0.0095)	0.0072 (0.0085)	0.0065 (0.0085)	−0.0089 (0.0099)
<i>aSize</i>	−0.0013*** (0.0004)	−0.0014*** (0.0005)	−0.0016*** (0.0005)	0.0019*** (0.0004)	0.0013*** (0.0004)	0.0011** (0.0004)
<i>aLiquidity ratio</i>	0.0318*** (0.0081)	0.0261*** (0.0082)	0.0365*** (0.0093)	−0.0008 (0.0066)	0.0041 (0.0066)	0.0134* (0.0075)
<i>aBHC</i>	0.0037 (0.0024)	0.0007 (0.0024)	0.0019 (0.0030)	0.0052** (0.0024)	0.0026 (0.0025)	0.0039 (0.0029)
<i>rTARP</i>	−0.0015 (0.0019)	0.0004 (0.0020)	0.0022 (0.0020)	−0.0053*** (0.0018)	−0.0010 (0.0018)	0.0011 (0.0019)
<i>Asset sold</i>	−0.0064* (0.0035)	−0.0011 (0.0037)	−0.0095** (0.0040)	0.0137*** (0.0033)	0.0160*** (0.0033)	0.0121*** (0.0036)
<i>Deposit assumed</i>	−0.0231 (0.0228)	−0.0039 (0.0229)	0.0325 (0.0246)	−0.0156 (0.0225)	0.0040 (0.0225)	0.0234 (0.0234)
<i>LSA assets</i>	0.0009 (0.0025)	0.0020 (0.0027)	−0.0017 (0.0031)	−0.0169*** (0.0023)	−0.0074*** (0.0026)	−0.0122*** (0.0029)
<i>Bid amount</i>	−0.0423* (0.0239)	−0.0668*** (0.0240)	−0.0459* (0.0250)	−0.0125 (0.0098)	−0.0205** (0.0098)	0.0029 (0.0131)
<i>Year dummy</i>	No	Yes	Yes	No	Yes	Yes
<i>MSA dummy</i>	No	No	Yes	No	No	Yes
Observations	6,445	6,445	6,445	8,119	8,119	8,119
R-squared	0.023	0.034	0.101	0.075	0.086	0.129

TABLE 4 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
F-value	8.11***	9.47***	3.46***	36.52***	33.04***	5.02***

Note: This table examines what determines the magnitude of non-merger banks' abnormal returns using ordinary least squares (OLS) regressions of banks' cumulative abnormal returns (CAR[0,+1]) surrounding auction outcome announcements between 2008 and 2013. All variables are defined in Appendix II. *, ** and *** show statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

TABLE 5 Effect of P&A auctions on rival banks: Subsample analysis

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
	Small acquirers		Medium acquirers		Large acquirers	
Variables	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]
<i>Occurrence</i>	-0.0208 (0.0751)	0.1219* (0.0727)	-0.0176 (0.0522)	-0.0146 (0.0499)	-0.2485*** (0.0474)	-0.2352*** (0.0454)
<i>Real estate loans*crisis</i>	-0.0449 (0.0274)	-0.0151 (0.0257)	-0.1042*** (0.0294)	-0.0758*** (0.0257)	-0.0242 (0.0190)	-0.0539*** (0.0151)
<i>Other loans*crisis</i>	0.0081 (0.0309)	0.0364 (0.0296)	-0.0891** (0.0348)	-0.0859*** (0.0309)	0.0415* (0.0228)	0.0049 (0.0180)
<i>Other opaque assets*crisis</i>	-0.0426 (0.0361)	-0.0018 (0.0335)	-0.1013*** (0.0390)	-0.1016*** (0.0342)	0.0132 (0.0247)	0.0649*** (0.0191)
<i>Boone indicator</i>	0.0052** (0.0021)	0.0048** (0.0022)	-0.1433** (0.0586)	-0.1039* (0.0547)	0.0460 (0.0607)	0.0833* (0.0482)
<i>FDIC cost</i>	-0.0118 (0.0120)	-0.0115 (0.0125)	-0.0776*** (0.0264)	-0.0135** (0.0054)	-0.0979*** (0.0134)	-0.1032*** (0.0113)
<i>aTARP</i>	0.0015 (0.0042)	0.0039 (0.0043)	0.0021 (0.0048)	-0.0036 (0.0045)	0.0071** (0.0034)	-0.0036 (0.0026)
<i>%ΔHHI</i>	0.2857 (0.2079)	0.3593* (0.2173)	-2.7931** (1.2531)	-2.6002** (1.1707)	-0.2360 (0.2112)	-0.0677 (0.0516)
<i>Geographic focus</i>	-0.0017 (0.0055)	-0.0104** (0.0050)	-0.0127** (0.0055)	-0.0133*** (0.0048)	0.0147*** (0.0041)	0.0098*** (0.0038)
<i>Product focus</i>	0.0318 (0.0321)		0.0089 (0.0224)		-0.0279 (0.0256)	
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year dummy</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>MSA dummy</i>	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,810	1,948	1,788	1,965	2,847	4,206
R-squared	0.123	0.129	0.145	0.132	0.220	0.252
F-value	2.39***	2.66***	2.99***	2.79***	5.19***	7.34***
Panel B	(1)	(2)	(3)	(4)	(5)	(6)
	HHI ≤ 1,000		1,000 < HHI ≤ 1,800		HHI > 1,800	
Variables	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]
<i>Occurrence</i>	-0.1794*** (0.0415)	-0.1463*** (0.0434)	-0.2938*** (0.0624)	-0.2752*** (0.0597)	0.1490** (0.0739)	0.1125 (0.0760)
<i>Real estate loans*crisis</i>	-0.0306 (0.0225)	-0.0324 (0.0215)	-0.0868*** (0.0214)	-0.0650*** (0.0168)	-0.0177 (0.0211)	-0.0330* (0.0184)

(Continues)

TABLE 5 (Continued)

Panel B	(1)	(2)	(3)	(4)	(5)	(6)
<i>Other loans*crisis</i>	−0.0262 (0.0269)	−0.0204 (0.0255)	0.0122 (0.0237)	0.0202 (0.0193)	0.0445 (0.0300)	0.0257 (0.0254)
<i>Other opaque assets*crisis</i>	−0.0551* (0.0299)	0.0158 (0.0278)	−0.0230 (0.0270)	0.0652*** (0.0209)	0.0082 (0.0304)	0.0154 (0.0257)
<i>Boone indicator</i>	0.0147 (0.0513)	−0.0145 (0.0552)	0.0014 (0.0022)	0.0002 (0.0022)	0.0431 (0.0703)	0.0141 (0.0617)
<i>FDIC cost</i>	−0.0240 (0.0170)	−0.0142** (0.0069)	−0.0444*** (0.0092)	−0.0257*** (0.0052)	−0.0580* (0.0343)	−0.0232** (0.0103)
<i>aTARP</i>	0.0037 (0.0031)	−0.0033 (0.0031)	0.0007 (0.0026)	0.0007 (0.0022)	−0.0001 (0.0050)	−0.0038 (0.0040)
<i>%ΔHHI</i>	−0.3409 (0.3560)	0.0533 (0.2517)	−0.1521** (0.0693)	−0.1064** (0.0414)	10.6013 (6.6621)	0.7794** (0.3137)
<i>Geographic focus</i>	−0.0040 (0.0041)	−0.0064 (0.0041)	0.0073** (0.0031)	0.0031 (0.0028)	0.0091** (0.0041)	0.0048 (0.0038)
<i>Product focus</i>	−0.0693*** (0.0217)		−0.0237 (0.0197)		−0.0466* (0.0277)	
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year dummy</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>MSA dummy</i>	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,246	2,710	3,457	4,491	742	918
R-squared	0.150	0.107	0.131	0.177	0.324	0.362
F-value	6.00***	4.45***	3.44***	5.51***	5.98***	7.97***
Panel C	(1)	(2)	(3)	(4)		
	Crisis 2008–09		Post-crisis 2010–13			
Variables	Car[0,+1]	Car[0,+1]	Car[0,+1]	Car[0,+1]		
<i>Occurrence</i>	−0.2204*** (0.0599)	−0.1556*** (0.0524)	−0.0799** (0.0343)	−0.0809** (0.0338)		
<i>Real estate loans</i>	−0.0344* (0.0192)	−0.0424*** (0.0153)	0.0261*** (0.0082)	0.0273*** (0.0079)		
<i>Other loans</i>	0.0223 (0.0229)	0.0073 (0.0183)	0.0175* (0.0092)	0.0178** (0.0089)		
<i>Other opaque assets</i>	−0.0129 (0.0256)	0.0423** (0.0198)	0.0112 (0.0111)	0.0132 (0.0108)		
<i>Boone indicator</i>	−0.0628*** (0.0234)	−0.0407* (0.0226)	0.0014 (0.0014)	0.0014 (0.0014)		
<i>FDIC cost</i>	−0.0837*** (0.0164)	−0.0162*** (0.0058)	0.0153 (0.0122)	0.0022 (0.0104)		
<i>aTARP</i>	−0.0028 (0.0046)	−0.0031 (0.0030)	0.0036** (0.0017)	0.0015 (0.0017)		
<i>%ΔHHI</i>	0.0577 (0.3137)	−0.0823 (0.0579)	−0.0758 (0.0617)	−0.0355 (0.0607)		
<i>Geographic focus</i>	−0.0005 (0.0050)	0.0097** (0.0039)	−0.0040* (0.0021)	−0.0049** (0.0021)		

TABLE 5 (Continued)

Panel C	(1)	(2)	(3)	(4)
<i>Product focus</i>	-0.1531*** (0.0384)		-0.0150 (0.0107)	
<i>Controls</i>	Yes	Yes	Yes	Yes
<i>Year dummy</i>	Yes	Yes	Yes	Yes
<i>MSA dummy</i>	Yes	Yes	Yes	Yes
Observations	2,444	3,921	3,989	4,185
R-squared	0.159	0.171	0.083	0.083
F-value	3.73***	4.47***	2.19***	2.21***

Note: This table shows additional subsample tests for analysing the impact of failed-bank auctions on non-merger rival banks in the market. Panel A reports OLS regression estimates for subsamples with different sizes of acquiring banks: small size ($aSize \leq \$1$ billion), medium size ($\$1$ billion $< aSize < \$3$ billion) and large size ($aSize \geq \$3$ billion). Panel B presents regression results for auctions taking place in markets with different local concentration: un-concentrated ($HHI \leq 1,000$), moderately concentrated ($1,000 < HHI \leq 1,800$), and highly concentrated ($HHI > 1,800$). Panel C show results for P&A transactions occurring in crisis period (2008–2009) and post-crisis period (2010–2013), respectively.

banks ($aSize \geq \$3$ billion), and re-run our analysis. Table 5, Panel A, shows regression estimates for these three subsamples. Overall, the results are stronger for the medium and large acquirers. The results for the large acquirers are qualitatively similar to our main findings, whereas the results for the medium-sized acquiring banks are somewhat mixed. Second, we split our sample according to deposit market concentration, measured via HHI at the MSA level: un-concentrated ($HHI \leq 1,000$), moderately concentrated ($1,000 < HHI \leq 1,800$), and highly concentrated ($HHI > 1,800$). Our results for the three subsamples (Table 5 Panel B) suggest that rival banks' shareholders tend to experience more value losses when bank failures take place in moderately concentrated markets. We also find some weak evidence that in the highly concentrated markets, further consolidation results in potential anti-competitive effects. Finally, we drop the dummy variable *Crisis* used to interact with three variables for opacity in our main estimation and run the estimation based on two categories: crisis period (2008–2009) and post-crisis period (2010–2013). Table 5 Panel C shows that main results continue to hold for the crisis subsample.

The findings of this study also appear generally robust. The results from our additional analysis of the rival banks' CAR (based on rivals' opaque assets, acquirers' competitiveness, FDIC subsidies, merger strategies and market concentration, as well as market economic conditions) show that each explanatory variable in its own right has significant explanatory power and is overall consistent with the results from our cross-sectional analyses. Moreover, the test results of joint significance of all explanatory variables (F-value) show that the estimated coefficients are jointly significantly

different from zero for all cross-sectional estimations suggesting our regression models are significant.

4 | CONCLUSIONS

During the recent global financial crisis, the U.S. banking regulator, the FDIC, carried out a large number of P&A transactions involving auctioning failed banks to healthy acquirers. We examine whether these transactions have any unintended effects on market competitors between 2008 and 2013. We find that non-merger rival banks of the failed banks experience significantly negative two-day stock returns of -0.45% when P&A auction results are announced. We next find strong evidence to support the **Failure Probability Hypothesis**. P&A announcements are perceived by shareholders of rival banks as an indicator of further deteriorating economic condition and therefore increased probability of their own failure. Further analyses also support our **Opacity Hypothesis** as these adverse stock returns are related to the opacity of rival banks and more specifically the value of their real estate loans during the crisis period. Moreover, we also find evidence to support our **Competition Distortion Hypothesis** that is the FDIC resolution approach, similar to previous regulatory interventions, distorts banking market competition. Acquirers as TARP participants as well as receiving FDIC subsidies allow them a competitive advantage over rival banks. Acquiring failed banks, on the other hand, may increase product market concentration, in which case anti-competitive effects can benefit all market participants including the rival non-merger banks. In the sub-sample analyses, we group P&A transactions according to several characteristics that could

further explain our results on competition. We find that rival banks' share price respond to the P&A announcements more when medium and large-sized acquirers are involved, in moderately concentrated markets and during the crisis period. Overall, our results suggest that P&A auctions of failed banks have an adverse impact on stockholders of rival banks and also they distort competition. From a policy perspective, further research is needed to examine whether the benefits of enhanced bank stability in local markets outweigh the costs linked to the less competitive environment. As we only focus on a sample of publicly listed rival banks, more work is also needed to scrutinize the in-market effects of these regulatory interventions on a broader sample of market participants.

ORCID

Tim Mi Zhou  <https://orcid.org/0000-0002-0830-2316>

ENDNOTES

¹ Insured depository institutions contact the FDIC to express interest in acquiring financial institutions and indicate the size range of institutions and geographic area(s) that interests them. The list of potential bidders is reviewed by the financial regulatory authorities concerned, including the Office of the Comptroller of the Currency, the Federal Reserve Board, the Office of Thrift Supervision, and the appropriate state banking authority.

² See Appendix I for a sample press release.

³ Section 18(c)(5) of the Federal Deposit Insurance Act prohibits the FDIC from approving any merger (including P&A transactions) whose effect in any section of the country may be to substantially lessen competition, or tend to create a monopoly, or in any manner restrain trade.

⁴ For example, antitrust analysis of bank mergers in the US has relied on the definition of market at the geographically local level, by assuming that this is representative of how most households and businesses behave when they purchase banking services (Dick, 2008)

⁵ In our study, only 293 out of total 9,404 branches of failed banks were located in non-MSA rural areas that are excluded from our sample.

⁶ This assumption is testable by examining whether significant CAR can be detected prior to the announcements, for example within an event window of two working days before the announcement date (namely [-2,-1]). Our tests suggest that there are no significant abnormal returns that can be detected before the announcement, the choice of the event windows in this study, therefore, is appropriate.

⁷ We follow Berger and Bouwman (2013), which define Q3:2007-Q4:2009 as the crisis period.

⁸ <https://www.treasury.gov/initiatives/financial-stability/Pages/default.aspx>

⁹ The estimates are obtained from the FDIC's The Pro Forma (HHI) Report

¹⁰ The banks that failed in 2010 had mean total assets of USD\$92.1 billion, a decrease of 45.7% from the USD\$169.7 billion in assets of the banks that failed in 2009.

¹¹ For example, Akhigbe and Madura (2001) find a significant mean -1.13% two-day CAR for a sample of rival banks headquartered in the state of the failing banks between 1980 and 1996.

DATA AVAILABILITY STATEMENT

Data Availability Statement The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Tim Mi Zhou  <https://orcid.org/0000-0002-0830-2316>

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APPENDIX A.

I: A sample press releases (PR-157-2009) issued by the FDIC regarding the closure of Affinity Bank, Ventura, California on August 28, 2009.

Press Release

Pacific Western Bank, San Diego, California, Assumes All of the Deposits of Affinity Bank, Ventura, California.

FOR IMMEDIATE
RELEASE August
28, 2009

Media contact: LaJuan
Williams-Dickerson
(office) 202-898-3,876
email: lwilliams-dickerson@fdic.gov

Affinity Bank, Ventura, California, was closed today by the California Department of Financial Institutions, which appointed the FDIC as receiver. To protect the depositors, the FDIC entered into a P&A agreement with Pacific Western Bank, San Diego, California, to assume all of the deposits of Affinity Bank.

Affinity Bank had 10 branches. The former Affinity Bank branches located in San Francisco and San Mateo will reopen starting tomorrow and the remaining branches will reopen on Monday as branches of Pacific Western Bank. Depositors of Affinity Bank will automatically become depositors of Pacific Western Bank. Depositors will continue to be insured by the FDIC, so there is no need for customers to change their banking relationship to retain their deposit insurance coverage. Customers should continue to use their existing branches until Pacific Western Bank can fully integrate the deposit records of Affinity Bank.

This evening and over the weekend, depositors of Affinity Bank can access their money by writing checks or using ATM or debit cards. Checks drawn on the bank

will continue to be processed. Loan customers should continue to make their payments as usual.

As of July 10, 2009, Affinity Bank had total assets of \$1 billion and total deposits of approximately \$922 million. In addition to assuming all of the deposits of the failed bank, Pacific Western Bank agreed to purchase essentially all of the assets.

The FDIC and Pacific Western Bank entered into a loss-share transaction on approximately \$934 million of Affinity Bank's assets. Pacific Western Bank will share in the losses on the asset pools covered under the LSA. The loss-sharing arrangement is projected to maximize returns on the assets covered by keeping them in the private sector. The agreement also is expected to minimize disruptions for loan customers.

Customers who have questions about today's transaction can call the FDIC toll-free at 1-800-640-2,631. The phone number will be operational this evening until 9:00 p.m., Pacific Daylight Time (PDT); on Saturday from 9:00 a.m. to 6:00 p.m., PDT; on Sunday from noon to 6:00 p.m., PDT; and thereafter from 8:00 a.m. to 8:00 p.m., PDT. Interested parties can also visit the FDIC's Web site at <http://www.fdic.gov/bank/individual/failed/affinity-ca.html>. The FDIC will make available Chinese-speaking representatives in the following branches: Sun-set and Richmond in San Francisco, and San Mateo.

The FDIC estimates that the cost to the DIF will be \$254 million. Pacific Western Bank's acquisition of all the deposits was the "least costly" resolution for the FDIC's DIF compared to alternatives. Affinity Bank is the 84th FDIC-insured institution to fail in the nation this year, and the ninth in California. The last FDIC-insured institution closed in the state was Vineyard Bank, National Association, Rancho Cucamonga, on July 17, 2009.

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Congress created the FDIC in 1933 to restore public confidence in the nation's banking system. The FDIC insures deposits at the nation's 8,195 banks and savings associations and it promotes the safety and soundness of these institutions by identifying, monitoring and addressing risks to which they are exposed. The FDIC receives no federal tax dollars – insured financial institutions fund its operations.

FDIC press releases and other information are available on the Internet at www.fdic.gov, by subscription electronically (go to www.fdic.gov/about/subscriptions/index.html) and may also be obtained through the FDIC's Public Information Center (877-275-3,342 or 703-562-2,200). **PR-157-2009.**

II: Definitions of explanatory variables

Explanatory variable	Source of data	Definition
<i>Occurrence</i>	FDIC—failed Bank list	Number of branches auctioned or closed due to bank failures in the previous year in the MSA weighted by non-merger bank's deposits inside the MSA
<i>Real estate loans</i>	Call reports	Non-merger bank's commercial and residential real estate loans and leases weighted by its total assets
<i>Other loans</i>	Call reports	Non-merger bank's all other loans weighted by its total assets
<i>Other opaque assets</i>	Call reports	Non-merger bank's all other opaque assets (trading assets, fixed assets, intangible assets, other assets, investment in unconsolidated subsidiary, other real estate owned, and available-for-sale and held-to maturity securities) weighted by its total assets
<i>Boone indicator</i>	Authors' own calculations	A measure of degree of acquirers' competitiveness calculated as the elasticity of profits to marginal costs
<i>FDIC cost</i>	FDIC—press releases	Ratio of the FDIC estimated failed bank resolution costs to the deposit insurance fund (DIF) to the failed bank total deposits
<i>αTARP/rTARP</i>	U.S. Department of the Treasury	Dummy variable whether acquirer/rival participated in the troubled asset relief program (TARP) prior to the P&A
<i>%ΔHHI</i>	FDIC—the pro forma (HHI) report	Percentage change of market concentration in the MSA
<i>Geographic focus</i>	FDIC—summary of deposits	Dummy variable whether the acquirer's headquarter is in the same state as the failed bank
<i>Product focus</i>	Authors' own calculations	Differences in asset composition between acquirer and target banks using a Herfindahl–Hirschman index (HHI) calculated as the sum of the squared differences across the four asset categories
<i>αTier 1 capital ratio</i>	Call reports	Ratio between acquirer's tier 1 capital and its total risk-weighted assets
<i>αSize</i>	Call reports	Acquirer's Total assets of the acquirer in natural logarithm
<i>αLiquidity ratio</i>	Call reports	Ratio between acquirer's liquid assets (cash, federal funds sold, securities [excluding MBS/ABS] and its total assets)
<i>αBHC</i>	S&P global market intelligence	Dummy variable whether the acquirer is a bank holding company
<i>Assets sold</i>	FDIC—press releases	Ratio between assets sold in the P&A and total assets of failed bank
<i>Deposits assumed</i>	FDIC—press releases	Ratio between deposits assumed in the P&A and total deposits of failed bank
<i>LSA assets</i>	FDIC—press releases	Ratio between failed bank's assets covered by the loss-sharing agreement (LSA) and total assets of failed bank
<i>Bid amount</i>	FDIC—press releases	Ratio between dollar bid to deposits assumed