Private Equity and Financial Stability:
Evidence from Failed Bank Resolution in the Crisis

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Abstract

Using proprietary failed bank acquisition data from the FDIC combined with data on private equity (PE) investors, we investigate PEs' role in the resolution of failed banks during the crisis. We show PE acquisitions were economically important with PEs acquiring underperforming and riskier failed banks. Our evidence suggests that PEs helped channel capital to failed banks at a time when local banks, the "natural" potential bank acquirers, were themselves distressed. These acquisitions accounted for a quarter of all failed bank assets acquired. Using a quasi-random empirical design to examine ex-post performance and real effects, we find that PE-acquired banks performed better subsequent to the acquisition, and that this, in turn, benefited local economic recovery. Our results suggest that PEs had a positive role in stabilizing the financial system in the crisis through their involvement in failed bank resolution.

1. Introduction

Private equity (PE) has become an important component in the financial system. An extensive literature explores the effects of PEs on firm-level outcomes, such as employment, productivity, product quality, and innovation, with some papers arguing that PEs positively affect the operations of target companies.[1] At the same time, the private equity industry generates much controversy. Critics of the PE industry often argue that PE transactions involve heavy financial engineering schemes, which introduce a substantial debt burden on the target companies and default risks to the banking sector (Andrade and Kaplan, 1998; Kaplan and Stromberg, 2009). This concern could be exacerbated during the economic downturn due to the cyclicality of PE investment (Bernstein, Lerner, and Mezzanotti, 2019).

Understanding the role of PE in the economy is clearly important. Yet there has been relatively little research on how the PE industry interacts with and affects the stability of the financial system, especially during periods of crisis. We examine PEs' engagement in one of the most crucial steps in stabilizing the financial system in the crisis—the failed bank resolution process (Granja, Matvos, and Seru, 2017). This is important from a variety of perspectives. Non-bank involvement in banks generates a lot of controversy and is distinct from engagement in other industries. Banks are central to the functioning of financial markets and have important externalities. Further, banks are subject to much more stringent regulation compared to industrial firms in which PEs often intervene.

Bank failure and its resolution are at the heart of crises when financial stability is most at risk, and an important but unexplored issue is the role of PE in this process. How economically important were PEs in failed bank acquisitions in stabilizing the economy during the crisis? In this paper we take a first stab at addressing this issue by asking the following interrelated questions. First, what was the size and nature of PE investment in failed bank resolution? How actively did PE firms engage in failed bank acquisitions? The second question we ask relates to both bidding and acquisition behavior. What kind of banks did PEs target and why? Were PEs complements or substitutes to traditional failed bank acquirers in this market? A concern is that PE firms may lack expertise in banking and not be able to turn these failed banks around or, even worse, exploit the system to take advantage of government intervention and inbuilt subsidies in the crisis, leaving the

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[1] See, for example, Kaplan (1989), Lichtenberg and Siegel (1990), John, Lang, and Netter (1992), Davis et al. (2014), Bernstein et al. (2016), Bernstein and Sheen (2016).

banking system even weaker than before. Hence, we next ask: post-acquisition, how did PE-acquired failed banks perform? Last, but not least, banks have significant externalities for the broader economy. What was the real effect of PE failed bank acquisitions on the local economy?

The role of PE in failed bank resolution is a priori unclear. There are concerns, as described above, that PEs could exert negative forces on financial stability. PEs may take advantage of the fragile banking sector and target high-quality assets under fire-sales. Banks have safety nets and backstops that may also be exploited by PE investors. Further, PE acquisitions may be value-destroying if PEs are not well-prepared to operate a bank. However, on the other hand, PEs could have a unique advantage in stabilizing the financial system through acquiring failed banks. First, PEs have a higher risk appetite, and this may allow them to target failed banks that are riskier and of lower quality and thus are less appealing to more traditional bank acquirers. Under this line of economic reasoning, PEs could complement the bank acquirers through the "selection" of failed banks. Second, during those financial downturns, PEs may have relatively more stable funding (Bernstein, Lerner, and Mezzanotti, 2019) bringing in capital in times of capital scarcity. Third, PEs have the expertise to turn around distressed firms in adverse economic situations (Jiang, Li, Wang, 2012; Hotchkiss, Smith, and Strömberg, 2011) which they may be able to deploy in turning around failed banks.

This paper exploits detailed, proprietary failed bank acquisition data at the FDIC. In this data we can observe information on failed banks, bidding, and acquisition activities. We identify PE investors who participated in failed bank resolutions, both as bidders of the failed bank's assets in failed bank auctions, as well as acquirers of the failed bank's assets when awarded the winning bid. We further augment the data with bank operation data extracted from the Consolidated Reports of Condition and Income "Call Reports," the FDIC Summary of Deposits (SOD) and the FDIC Reports of Structure Change. We also supplement our data using PE level information from Preqin.

Our analysis starts by examining the characteristics of failed banks that PEs choose to acquire. PE acquisitions are significant, totaling about a quarter of all failed bank assets acquired in the period 2009-2014. We find that PEs bid for, and eventually acquire, failed banks that are of poorer quality and higher risk compared to those that were acquired by banks. PE-acquired banks on average are larger and more undercapitalized, evidenced in their lower tier 1 risk-based capital ratio (measuring a bank's core equity capital). They tend to have a lower ratio of core deposits

(which measures a stable source of funds for the bank). PE-acquired failed banks also have lower profitability prior to failure, captured by the net interest margin. Besides being more undercapitalized and having lower profitability, PE-acquired banks also hold larger proportions of riskier loans. For example, in the crisis, construction and development (C&D) loans were particularly risky. PE-acquired banks on average hold 27 percent more C&D loans, relative to the 17.9 percent C&D loans to total loans in bank-acquired institutions.

PEs also focus on banks that are less likely to immediately synergize with healthier existing banks. Granja, Matvos, and Seru (2017) show that bank acquirers are more interested in purchasing failed banks that are geographically close to themselves to realize informational benefits and economies of scale. Hence the natural acquirers are healthy local banks. We show that failed banks whose neighboring banks are in worse health are more likely to be acquired by PEs—when neighboring banks have lower tier 1 capital, higher proportions of C&D loans and higher proportions of other real estate owned (OREO), which can reflect larger amounts of distressed real estate properties held by the bank due to foreclosure.

This evidence together points to a sorting pattern of failed banks with their plausible acquirers: PE acquirers complement banks in this market by bidding and ultimately acquiring lower-quality and higher-risk failed banks. In doing so, PEs help channel capital that can fill the gap created by a weak, undercapitalized banking sector and help meet the huge needs for new capital. The PE presence allows more failed banks to avoid being liquidated and the local financial system to be preserved. Comparing our data with a simple counterfactual world without PE acquiring any banks, 25 (5.5 percent) more of the banks that failed during this time would have been liquidated, and another 37 (8.1 percent) would have gone to a higher-cost bidder. In total, we estimate that PE acquisitions allowed the FDIC to reduce resolution costs by $3.63 billion.

The next question that naturally arises is: how do PE-acquired banks perform post-acquisition? One concern about introducing PEs into the banking sector is that PEs are less specialized in operating a bank. Indeed, if the PE interventions introduce excessive risks into the financial system, the ex-ante complementary selection would have to be viewed with caution. The empirical challenge to isolate the effect of PE on post-acquisition performance of banks is the very acquisition selection pattern that we present above. Banks and PEs target a different segment of

the failed bank market, making any post-acquisition pattern a combination of treatment and selection.

To better identify the effect of PE acquirers, an ideal experiment would compare the post-acquisition performance of two otherwise similar banks of which one is quasi-randomly allocated to a PE and one to a bank. Our empirical strategy leverages the proprietary FDIC failed bank bidding data to generate a quasi-random sample. We proxy the ideal experiment by focusing on a set of banks that were bid on by both PEs and by banks (i.e., selectable to both PEs and banks), and for which their bidding values were close, below five percent to be more specific. Essentially, the exercise compares banks that were (marginally) won by the banks and those (marginally) won by the PEs. This comparison allows us to significantly mitigate the confounding selection problem and more cleanly isolate the direct effect of PE intervention. Reassuringly, in this quasi-random sample, PE-acquired banks and bank-acquired banks look statistically identical along dozens of characteristics, and the winning probability of PEs and banks in those auctions are nearly identical (52 percent vs. 48 percent).

Armed with this empirical strategy, we explore several different performance metrics. First, we track branch closures of acquired failed banks. PE-acquired bank branches are less likely to close compared to bank-acquired failed bank branches. This result is robust to our tightest specification, in which we compare two bank branches that belong to two banks that failed in the same year and the same state. For these branches, the only difference is whether it was quasi-randomly won by another bank or PE. It is important to note that the lower branch closing rate of PE-acquired banks is not due to the fact that bank mergers often lead to consolidation of local branches, which would make the higher closing rate in bank acquisitions mechanical. In fact, we also find a higher probability of exiting a county altogether in bank-acquired banks, which cannot be explained merely by consolidating local branches. Next, we find that PE-acquired banks experience a significantly higher increase, roughly 35 percent higher growth across different specifications, in branch-level deposits compared to other failed banks. Given deposits are the base for profits, lending capacity, and market power, we interpret this as a positive indicator for PE-acquired banks.

The ability to maintain the scale of operation and a robust deposit base is an important indicator of bank health and performance. More importantly, providing stable access to credit by

operating a local branch has important consequences for local businesses and the recovery from the financial crisis (Nguyen, 2019). The positive performance patterns of PE-acquired failed banks encourage us to hypothesize that those acquisitions facilitate the regional economic recovery from the crisis, and this is the basis of our next test.

We adapt the same quasi-random framework to a county-level analysis, in which we compare two counties, both with a failed bank branch, but one acquired by a PE investor and one acquired by a bank. During the post-acquisition period, those counties with PE acquisitions experience stronger recovery from the crisis—faster employment growth and increased total and per capita income. One potential channel for this is the sustained lending activities supported by the acquired bank branches. PE-intervened counties witnessed higher growth in small business lending, both in terms of the number and amount; simultaneously, those loans are made at a lower interest rate.

The documented positive performance may be partially attributable to the expertise of the management team that PEs bring into failed banks. Using hand-collected data on CEOs appointed at banks after the PE-acquisition, we find that PEs hire ex-bankers who on average have nearly 30 years of experience in the banking industry, and more than half of them were CEOs of other banks before being appointed at the failed banks. More than 60 percent of the CEOs had experience in the local area of the failed bank. Interestingly, more than a third of the hired CEOs specialized in turnaround management and troubled and distressed assets, and about a third had previously founded a bank that eventually merged with a larger buyer.

Taken together, our results suggest that the PEs play an important role in failed bank resolution in a time of crisis. PEs provide much needed capital in acquisitions that helps fill the gap of a weak banking sector at a time when the natural potential acquirers—local banks—are themselves under stress. PEs also help turn around the failed banks that they acquire, preserving their branch structure, helping deposit growth, and managing the loan portfolio losses, with positive effects for the real economy. While there are natural policy concerns in allowing non-banks into banking in general, our results suggest that, despite these concerns, private financial investors can play a positive role in resolving distressed banks in a crisis.

This paper connects to several strands of literature. It is related to an extensive literature that studies the role of PE in the economy. These studies mostly focus on firms and almost exclusively on normal times (e.g., Kaplan, 1989; Lichtenberg and Siegel, 1990; John Lang and Netter, 1992;

Boucly, Sraer, and Thesmar, 2011; Lerner et al., 2011; Cohn and Towery, 2013; Davis et al., 2014; Bernstein et al., 2016; Bernstein and Sheen, 2016; DeYoung et al., 2018; Eaton, Howell, and Yannelis, 2019; Kirti and Sarin, 2020), while our focus is on the distressed state of the world. The PE paper that is closest to ours is Bernstein, Lerner, and Mezzanotti (2019), who study PE investment in industrial firms in the crisis, and show that PEs did not exacerbate the negative shock to firms. However, the behavior of PEs in a highly regulated and sensitive industry such as banking is likely different from PE's behavior elsewhere. Our key contribution is to tackle the role of PE on financial stability by directly examining the interaction between PE and the central actors, banks, particularly failed banks that can result in significant costs to the financial system.

This paper also relates to an emerging body of work examining the behavior of financial institutions during the financial crisis (e.g., Ivashina and Scharfstein, 2010; Ben-David, Franzoni, and Moussawi, 2012; Berger and Bouwman, 2013) and the resolution of failed banks (James and Wier, 1987; James, 1991). The closest bank failure paper to our work is Granja, Matvos, and Seru (2017), who argue that poor capitalization of local banks, who are the natural buyers of failed banks, results in substantial costs to the FDIC's resolution efforts in failed banks. Our paper contributes to this new area of research by introducing PEs as financial buyers into the picture, a source that surprisingly buys 25 percent of the failed bank assets acquired in the resolution process during this period. We show PEs operate as a complementary source of funding in the resolution of bank failures at a time when the local bank buyers are themselves undercapitalized. Further, PE acquisitions do well and also benefit the real economy. From a policy perspective, our findings are supportive of the policy innovation of the OCC and the FDIC that allowed financial buyers to participate in the resolution of failed banks.

2. Institutional Background

In this section we introduce background knowledge of how the FDIC resolves bank failures, and more importantly, how PEs can become a qualified player in this process. Roughly five hundred banks failed during the financial crisis, putting a large strain on the financial system, in the course of a few years. This fact can be seen clearly in Figure 1, which plots the number of bank failures (Panel A) and the total assets at failure (Panel B) from 2000 onward.

When a bank fails, the FDIC is appointed receiver by the failing institution's chartering authority. To address bank failures, the FDIC used the Purchase and Assumption (P&A) resolution method in roughly 95 percent of the cases during 2009-2014, and these are the transactions studied in this paper.[2] In a P&A transaction, the FDIC uses a process that resembles a first-price sealed bid auction to sell some or all the assets and liabilities of the depository institution. Granja, Matvos, and Seru (2017) provide a detailed description on how the process of failed bank resolution works. We review relevant points here and refer interested readers to Granja et al. (2017) and to the FDIC's *Resolutions Handbook*,[3] for further details.

[Insert Figure 1 Here.]

To sell a failed bank, the FDIC first generates a broad list of potential bidders that have expressed interest in bidding for failed institutions and that satisfy a list of requirements, such as satisfactory capital and supervisory ratings. Upon signing a confidentiality agreement, interested parties may be granted access to a virtual data room for review of available information, which can include loan reviews, schedules representing the value of items on the failed bank's balance sheet, and operational information. Interested parties can place sealed bids for the failed bank based upon standard transaction terms, resembling a first-price sealed bid auction. Using its proprietary least cost test,[4] the FDIC selects the bid whose terms entail the least-estimated cost for the Deposit Insurance Fund (DIF) if those costs are below the reservation value set by the FDIC, which is unknown to bidders. The FDIC then closes the failed bank and transfers assets and deposits to the acquirer.[5]

In the past, private investors have generally been excluded from bidding on failed institutions because they themselves were not chartered banks. However, in 2008 the Office of the Comptroller of the Currency (OCC) began making it easier for PE investors to participate in failed bank

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[2] The remaining failures were resolved by the FDIC through depositor payouts and asset liquidation.

[3] Federal Deposit Insurance Corporation (FDIC). 2019. *Resolutions Handbook*, Revised January 15, 2019. https://www.fdic.gov/bank/historical/reshandbook/resolutions-handbook.pdf.

[4] The least cost test evaluates the liquidation cost of the failed institution against the cost of alternative resolution options. A few details are worth noting here: The Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 requires that the FDIC select the bid that results in the least costly resolution to the Deposit Insurance Fund (DIF). As a statutory requirement, this process for bid selection does not vary from bank to bank. Additionally, the FDIC's valuation of liquidation, the valuation of submitted bids, and the details of the least cost test itself are all unknown to bidders.

[5] Since failed banks are often smaller in size, concerns like "too big to fail" or antitrust issue generally do not come under consideration by the FDIC when managing the bidding process and picking the winner.

auctions by creating a "shelf" charter program. A shelf charter allows investors to bid on failed banks despite not being affiliated with an existing bank. The OCC also made available an "inflatable" charter, which allows PE investors to buy up a small non-failing bank with the intention of growing it quickly through subsequent failed bank acquisitions. There were twenty distinct charters, obtained by nineteen PE consortia (more on "consortia" below), used to acquire failed banks by PE in the crisis.

[Insert Figure 2 Here.]

In the charter approval process, PE acquisition plans are subject to a high degree of regulatory scrutiny. Potential PE investors must submit details such as the proposed bank management team qualifications, the sources and amount of capital available to the bank, and the business plan describing intended operations of the acquired bank. The information gathering, application, and approval process typically occur well in advance of any specific acquisition opportunities that may arise. In addition, because PE firms engage in non-banking activities, they must also apply to the Federal Reserve Board for preliminary approval to form a bank holding company (BHC).

Most PE investors apply for a bank charter and form a BHC as a consortium together with a number of other PE firms, often in the form of an LLC with PEs as shareholders. This can allow greater access to capital and help to leverage relevant expertise and connections. From a BHC regulatory perspective there are advantages as well—firms with less than a 25 percent share of voting securities or up to one-third of total equity (providing this includes less than 15 percent of voting securities) are not subject to BHC regulation by the Federal Reserve Board. Applying as a consortium can help limit the equity investments of individual PE firms below these regulatory thresholds. For example, a number of PE firms might form an LLC with equity shares of the individual PE firm participants below the threshold. The LLC is then used for the proposed BHC and serves as the actual acquiring entity. Thus, while the holding company formed by the PE firms is exposed to BHC regulation, the individual PE firms themselves are typically not.

PE acquirers did not have restrictions on what they could bid on, aside from the usual criteria applied to other bank bidders, such as available capital and financial health. However, PE acquirers did have additional requirements imposed by the FDIC for operating the bank. Notably, PE acquirers were required to maintain a tier 1 common equity to total assets ratio of at least 10 percent for at least three years after the time of acquisition. They also had to maintain continuity of

ownership for at least three years after the time of acquisition, absent FDIC approval. Further, they were not permitted to engage in any credit transactions with affiliates, meaning that they could not use the bank as a platform to lend to their affiliated companies or investments.[6] Additional PE requirements included: pledges of cross-support if investors own 80 percent or more of two or more banks; no ownership by entities in bank secrecy jurisdictions; no opaque ownership structures; no investors having 10 percent or more equity in the same bank before failure; and required disclosure about investors and ownership to the FDIC.[7]

[Insert Figure 3 and 4 Here.]

As shown in Figure 3, PEs acquired about 8.5 percent of the banks in 2009 (11 out of 129). That number is larger in money terms, with PEs acquiring 27.4 percent of the total failed bank assets that were acquired in the resolution process in that year.[8] PEs remained active in acquiring failed banks through 2014, and through all those years, they acquired 13 percent of all failed banks acquired, or 25 percent in terms of assets acquired in resolution. Figure 4 shows that bank failures were spread across the nation, and so were PE acquisitions. After 2014, PEs stopped acquiring failed banks. This might be due to two reasons. First, bank failures returned to pre-crisis levels (below 10 every year in number), leaving limited room for PEs to pursue these investments. Second, those PEs formed during the crisis to pursue the strategy of failed bank acquisitions reached the latter part of their typical 10- to 14-year life cycle, and thus started to focus more on operations and exit. Our main analytical sample covers the period of 2009-2014.[9]

3. Data and Sample Overview

3.1 Banking Data

3.1.1 Failed Bank Data

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[6] This explicitly prohibits lending to affiliates in which the PE firm has invested equity, ruling out the kind of cross-selling behavior documented in Fang, Ivashina, and Lerner (2013).

[7] For more details, see the *Final Statement of Policy on Qualifications for Failed Bank Acquisitions*, Federal Register, Vol. 74, No. 169, September 2, 2009.

[8] We removed liquidated banks in this analysis. Also, because the FDIC often retains a sizable portion of failed bank assets not purchased by the acquirer, the total assets acquired do not necessarily match to the total assets of the failed banks (as in Figure 1).

[9] It is worth noting that it is uncommon for troubled banks close to failure to restructure (e.g., be acquired by a healthy bank) outside of the FDIC resolution process. We do not find PEs participate in acquisitions of troubled banks outside the FDIC resolution process.

Between 2009 and 2014, there were a total of 482 bank failures resolved by the FDIC. Private equity acquirers purchased 62 of these failed banks, while existing banks purchased 393 failed banks.[10] There were 25 failed banks with no least cost bid that were liquidated by the FDIC; another two provided correspondent banking services to client banks only, and were temporarily run by the FDIC as bridge banks after failure. We exclude these 27 banks from our analysis following Granja et al. (2017). Details on bank failures and their resolution come from the FDIC. These include public information including the timing of failure and acquisition, the location and size of the institution at failure, the amount of assets passed to the acquirer, the terms of the failed bank transaction (transaction type, loss share coverage, and so on). We also have proprietary FDIC information on the identity of the acquirer and all the bidders and details of their bids.

We also use proprietary FDIC cost estimates used in evaluating failed bank bids. This includes the FDIC's estimated liquidation cost for the failed bank, as well as the valuation of the winning and cover bids from the internal least cost analysis. We use these estimations to identify close bids of the same failed bank, which will be useful for creating a quasi-random empirical design to isolate the effect of PE intervention. These data are also useful for making back-of-the envelope calculations of the difference in cost savings had PE been excluded from the auction process.

Finally, we use confidential FDIC data containing details on loan performance in loss share portfolios. Loss share participants are required to submit regular reports to the FDIC on the performance of loans covered by shared loss agreements, as well as details on any losses incurred. Because acquired banks are typically absorbed into healthy existing banks, it is difficult to track the performance of failed bank assets once they have been acquired. However, the loss share performance data allows us to observe the performance of those assets over time, even after acquisition. This provides us with a unique and important window into the management of failed bank assets by PE and bank acquirers.

3.1.2 Bank Characteristics

We obtain data on the operational financial characteristics of failed banks and their acquirers from the FDIC's quarterly Consolidated Reports of Condition and Income (Call Reports) and from Thrift Financial Reports for institutions regulated by the Office of Thrift Supervision (OTS) prior

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[10] One bank was split between two acquirers but was technically a single failed bank.

to 2012. These reports contain details of the income and balance sheet characteristics for all the banks in our sample.

The Summary of Deposits (SOD) database provided by the FDIC allows us to obtain bank branch location data for each commercial and savings bank and the level of deposits. The SOD database contains information on the geographical coordinates, location, and deposits of each branch of every commercial and savings bank operating in the United States. We also complement this data using the FDIC's Reports of Structure Changes. These reports provide information on branch office openings and closings. Together, we use these sources to analyze the closing of failed bank branches, and to track changes in deposits at the county level within the footprint of the failed bank.

This geographic information on bank branches also allows us to capture the characteristics of the neighboring banks of each failed institution. Granja, Matvos, and Seru (2017) show that neighboring banks' financial health is an important determinant of the failed bank resolution process. Following Granja, Matvos, and Seru (2017), local banks are primarily defined as banks whose branch network overlaps in at least one zip code with the branch network of the focal failed bank.

3.2 Private Equity Data

Our classification of PE-acquisitions comes from the charter used to bid on failed banks—namely, acquisitions that were made by non-bank bidders that obtained a shelf or inflatable charter for the purpose of failed bank bidding. While most of the funds raised by those non-bank acquirers are from PE firms, they sometimes include non-PE sources such as asset management companies, institutional investors, and family offices. However, PE is the key participant in this process. For example, based upon information in SEC registration statements and FDIC depository insurance applications, we estimate that PE sources account for more than 70 percent of the ownership for each consortium on average, based upon major consortia participants identified with five percent holdings or more. Additionally, the vast majority of acquisitions conducted by those private investor consortia were led by private equity firms.[11] In the Online Appendix, we show alternative

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[11] A few exceptions include two small failed banks in our sample that were single acquisitions primarily acquired through family offices, and a community development bank largely acquired by institutional investors. We group these failures with PE acquisitions rather than those acquired by banks because they were non-bank investors that

definitions of PE-acquired banks based on the ownership of PE (e.g., PE shares being larger or equal to 75 percent), and our results are not affected by the definitions.

We collect additional information about those private equity funds from several different sources. First, we hand match those PEs with information from Preqin. Preqin collects the quarterly aggregated investments, distributions, and net asset values (NAVs) of PE funds as recorded by U.S. pension funds and obtained via routine Freedom of Information Act requests. For funds covered by the Preqin data, we collect information on the size of the fund, the vintage year, and the background of the PE firm. We also supplement this by searching additional information from PitchBook, Crunchbase, and a general internet search.

3.3 Real Economic Effects

To obtain local employment and startup creation information, we use data from the U.S. Census Quarterly Workforce Indicators (QWI) to compute total employment by firm age and by county. The QWI is derived from the Longitudinal Employer-Household Dynamics (LEHD) program at the Census Bureau and it provides total employment in the private sector in each county, and employment tabulated for different firm age categories. Income data at the county level comes from the Internal Revenue Service (IRS) Statistics of Income and is measured in calendar years (i.e., January to December of each year).

For local access to small business credit, we use the small business lending data obtained from the Small Business Administration (SBA). We use contract-level information on 7(a) loans, one of the largest SBA programs, delivered through various methods (e.g., Certified Lenders Program, Preferred Lenders Program, SBA Express, etc.). We focus on both the quantity and pricing of SBA loans made in each region-year.

3.4 Summary Statistics

Table 1 provides summary statistics from the PE side. In the upper panel, we provide statistics at the consortium-level, which is the relevant unit for failed bank purchases. As described above, typically multiple PEs form a consortium and obtain a bank charter at the consortium level. On average, each bank acquisition consortium consists of around 3.4 PE investors, counting only those

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made the acquisitions through the same shelf charter process used by PE. All analysis results are similar if we do not include those cases.

having five percent or more shares. They, on average, bid on 5.2 failed banks,[12] and "win" 3.26 of them. Their bidding strategies are quite focused, and most of these consortia purchase banks within one state. Interestingly, 58 percent of the PE consortia include at least one PE firm that has actively participated in the distressed investment space as identified in Jiang, Li, Wang (2012) and Hotchkiss, Smith, and Strömberg (2011), suggesting that these PE firms have some experience in distressed investments and turnarounds.

[Insert Table 1 Here.]

In the bottom panel, we provide summary statistics at the individual PE level, conditioning on data availability from Preqin. On average, each PE joins 1.13 consortia. In other words, only around 10 PEs joined more than one consortium. Those PEs are traditional independent PEs and are not affiliated with other banks. Importantly, most of those PE funds are of recent vintages. The median fund vintage is 2007, and more than 25 percent of the PE funds are formed in or after 2009. This suggests that those funds were likely raised for the purpose of participating in failed bank resolutions, and they had relatively adequate funding for such actions. Most of these funds are not first-time funds, so they have accumulated networks and human capital from prior activity in the PE markets.

[Insert Table 2 Here.]

Table 2 reports summary statistics of failed banks as of the last quarter prior to failure. Most failed banks in the crisis were small community banks. The median bank size was just above $200 million, but with a very long right tail in the size distribution. Unsurprisingly for banks that failed, the tier1 risk-based capital ratios just prior to failure were very low—far below the average for other neighboring banks that did not fail. Liquid assets were just under 17 percent of total assets on average, and core deposits comprised almost 84 percent of total deposits. These banks tended to be heavily involved in CRE lending, making up almost 39 percent of the total loans on their balance sheets. They also held a large amount of C&D loans, comprising almost 19 percent of their total loans on average. The ratio of C&I loans to total loans was smaller at 10 percent, and the ratio of consumer loans to total loans was just over 2 percent. Residential lending averaged 25.9 percent of total loans. In addition, both the noncurrent loans to total loans and the OREO assets to total

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[12] These are PE bids above the liquidation value. The average is only slightly higher at 5.7 when also including PE bids below the liquidation value.

assets at the failed banks are much higher than at other neighboring banks, indicating portfolios that are in distress. Two-thirds of the banks were resolved using loss sharing agreements with the FDIC.

4. PEs in Failed Bank Resolution

We first investigate which segment of the failed bank market was targeted by PEs, and which was targeted by banks. The result of this analysis would indicate whether PEs are complementary failed bank buyers to incumbent banks.

4.1 PE-Acquired and Bank-Acquired Failed Banks

We start by performing the analysis using a logit regression framework:

$$Pr(PE = 1) = \Phi(\alpha + \beta \cdot X_i + \gamma \cdot Control_i + \theta_t + \varepsilon_i). \tag{1}$$

The analysis uses the cross-sectional sample of all failed banks that were eventually acquired by a bank or a PE investor. The dependent variable is a dummy that takes a value of one if the failed bank was eventually acquired by PE, and zero otherwise (acquired by a bank). We control for the size of the bank using the logarithm of the total assets at failure. Year-quarter fixed effects are included to account for the time varying economic, market, and regulatory environments that could affect the failed bank resolution process.

[Insert Table 3 Here.]

Table 3 Panel A presents the results, reporting marginal effects calculated at the sample mean. Column (1) concerns the tier 1 risk-based capital ratio. Tier 1 capital includes the most loss-absorbing forms of capital, and therefore is an important representation of bank financial strength. The marginal effect of -0.013 suggests that, for a one standard deviation decrease in the tier 1 risk-based capital ratio, there is a 3.5 percentage point increase in the probability that the bank is purchased by PE. This is a 25.8 percent increase from the base rate of 13.6 percent. Bank size positively and significantly correlates with the probability that the bank is acquired by PE, indicating that PEs may have had an advantage over existing banks in raising larger amounts of capital for these purchases.

In column (2) we switch to another measure of the stability of banks' sources of funding, namely the core deposits to total deposits ratio. Core deposits are made in a bank's natural demographic market and offer advantages to banks, such as predictable costs, low sensitivity to short-term interest rate changes, and lower run risks. The core deposits to total deposits ratio is negatively associated with PE acquisition. For a one standard deviation decrease in the core deposits to total deposits, the coefficient of -0.220 translates to a 23.4 percent increase from the base rate of PE acquisition.

Column (3) shows that low-profitability failed banks are more likely to be acquired by PEs. We use the net interest margin, which measures how much a bank earns in interest compared to how much it pays out as a ratio of interest-earning assets, as an indicator of bank profitability. This helps to mitigate the potential measurement noise for failing banks in other possible profitability measures like ROA or ROE. For example, interest-earning assets should be less wildly variable than total assets used in ROA calculations in the face of large, discrete charge-offs in nonperforming assets; it is also not uncommon for average equity to reach negative values in banks that are failing, in which case ROE is not reported. In addition, the net interest income should be less variable than the total net income used for calculating ROA and ROE, due to the provisioning behavior for loan and lease losses (which are treated as an expense to net income on the bank's income statement) at failing banks.

Columns (4) and (5) examine the loan composition of banks. Banks with riskier asset portfolios—captured by a higher proportion of C&D loans and OREO assets to total assets—were more likely to be acquired by PEs. C&D loans are risky for several reasons. For example, projects may experience a lack of timely progress or budget overruns, market conditions can change drastically in the intervening time between loan approval and project completion, and lenders may have greater difficulties extracting collateral value from an incomplete construction project in default. In the crisis, C&D loans turned out to be particularly risky. As the FDIC describes in its history of the crisis (FDIC, 2017), "Most banks that failed or became problem banks did so because of large concentrations, relative to their capital, of poorly underwritten and administered commercial real estate loans and (especially) ADC [acquisition, development & construction] loans," (p.179). Similarly, a higher proportion of OREO assets is often a sign of a loan portfolio in distress.

Overall, Panel A suggests that PEs capture a set of banks that tend to be riskier in terms of asset composition, more under-capitalized, less profitable, and may require larger capital injections due to their size. Moreover, these banks have lower profitability as indicated by their net interest margin. Those are all likely undesirable features in the eyes of incumbent banks. In this sense, PEs target banks that other banks may be less willing or less able to take over.

4.2 Local Banking Market Conditions

Next, we further strengthen the argument that PEs acquire a segment of banks that are unlikely to be taken over and operated by other incumbent banks. In recent work studying failed bank resolution in the crisis, Granja, Matvos, and Seru (2017) show that healthier banks are more willing to bid and pay higher amounts for failed banks that could potentially create synergies with themselves. A primary source of synergistic benefit is in the form of geographic clustering: a large literature shows that the transmission of soft information depreciates with geographic distance (Petersen and Rajan, 2002; Stein, 2002). Moreover, geographically closer banks may be better able to harvest the economies of scale to achieve operational efficiencies. The implication of this work is that failed banks without a set of healthier banks in nearby geographic regions face greater challenges in the resolution process. This is particularly true when, as shown in Table 3, Panel A, certain failed banks had worse-than-average performance and held riskier asset portfolios that other banks may not have desired.

Is PE participation particularly important for those banks without a potential bank acquirer? We explore this question in a similar setting as in Eq. (1), except that the key explanatory variables are the conditions of the local banks. We create a set of measures to capture different dimensions of local bank conditions. Following Granja, Matvos, and Seru (2017), local banks are defined as banks whose branch network overlaps in at least one zip code with the branch network of the focal failed bank.

Table 3 Panel B presents the results. In column (1), we focus on the neighboring banks' tier 1 risk-based capital ratio, which is calculated as the mean of this ratio for all the banks local to the failed banks. We find a negative and significant coefficient, which means that when a failed bank's neighboring banks, which are often considered the most likely acquirers, are in worse financial health, the failed bank is more likely to be acquired by private equity. The economic magnitude is in fact quite large. A one standard deviation decrease in the average neighboring bank tier 1 risk-

based capital ratio is associated with a 2.92 percentage point increase in PE acquisition probability, which is a 21 percent increase from the base rate. This is consistent using other bank health measures like nonperforming loans (column (2)) and OREO (column (3)).

In column (4) we consider another factor that could affect the capability of acquisition by local banks—the size of these banks. Even if a neighboring bank remains healthy, it is unlikely for it to obtain enough capital to purchase anything that is at their size or larger than their size. In other words, banks that are considerably larger than the failed bank may be more likely to make the purchase. We show this using a variable No. of Local Banks (>3xSize), which is the number of local banks that are at least three times or more in terms of total assets than the failed bank. The larger this number is, the more likely that the bank will be sold to another bank and less likely to a PE acquirer.

In column (5) we examine the number of failed banks in the region. If a failed bank is in a region where a lot of other banks failed at the same time, they are more likely to be acquired by PE. This could be due to other local banks being on average less healthy and less capable of making the purchase, and also that it is hard for any acquirer to purchase a large number of banks if too many fail in the same region. We show that the total number of failed banks in a state is associated with a higher probability that the bank is acquired by PE. In other words, PEs inject new capital in regions where banks on average are in deeper distress. In the Online Appendix, we show that both the failed banks' own characteristics and their neighboring banks' characteristics matter when they enter the analysis simultaneously.

Overall, this evidence provides additional support that PEs are complementary to existing players in the banking sector in acquiring failed banks. PEs target a segment of the failed banks that many traditional banks are unlikely to be interested in or capable of acquiring. Specifically, they acquire underperforming banks that are riskier, particularly when the failed bank is in a region where neighboring banks experience deeper distress and thus are unlikely to be able bid.

4.3 Further Evidence on Failed Bank Acquirer Sorting and Matching

Results so far are based on the final bidding outcomes. But is there evidence that PEs are actively pursuing this strategy, or are PEs just passively bidding on all banks and only winning the low-quality ones?

Table 4 presents evidence that is consistent with the PEs actively pursuing such a strategy. The way we do this is by examining not only the winning PE-acquisitions, but also the bidding histories of each PE. To do so, we leverage proprietary data on all bidding histories in FDIC failed bank auctions. We create a variable, *PE Bid*, which indicates whether there was any PE bidding on the specific failed bank, whether it achieved the winning bid or not. The indicator captures PE bids that are above the liquidation value as well as non-public details on those that fall below, so it reflects all bidding activity by PE acquirers. This *PE Bid* variable is then analyzed using the same framework as in Eq. (1) as the dependent variable.

[Insert Table 4 Here.]

All the variables that are associated with the final acquisition outcomes, as shown in Table 3, also have similar effects in explaining the bidding activities of PEs. Clearly, both the decision to bid and the outcome of winning are equilibrium outcomes accounting for the value and costs of the failed banks to different potential buyers and to the FDIC. Nevertheless, the evidence quite clearly suggests that PEs actively, not passively, participated in the process.

In Figure 5, we push the argument further by visualizing the sorting and matching between acquirer types and bank characteristics. The graph compares the characteristics of failed banks and their neighboring banks across banks that are targeted by different acquirers—those bid and acquired by PEs, those bid by PEs but may eventually be won by a PE or an incumbent bank, and those that are only bid on and eventually acquired by other incumbent banks. For each of the characteristics, we separately show the mean across the three groups.

[Insert Figure 5 Here.]

Figure 5 shows a clear pattern of sorting. Panel A shows sorting on failed bank characteristics. PEs bid and successfully acquire the weakest banks (left bars) whether measured by tier 1 capital ratio, core deposits, net interest margin, or real estate owned. PEs also target some slightly stronger failed banks in which they compete with other banks, and they may win or lose in such cases (middle bars). Banks, on the other hand, focus on average on the healthier banks in the failed bank set (right bars)—and PEs are not even bidding in this segment. Panel B shows sorting on neighboring bank characteristics. Again both PE bids and PE acquisitions are more likely when the neighboring banks are weak (whether measured by tier 1 capital ratios, non-performing loans, real estate owned or the number of failed banks in the state). This again confirms that PEs

complement bank acquirers in the market. This result also suggests that even though neighboring banks are likely the best potential buyers for failed banks operation-wise, they may be hesitant to bid and/or purchase when the bank is particularly risky or in deeper distress. PEs have an edge in such cases due to their higher risk appetite and more abundant funding.

4.4 The Value of PE Participation: A World Without PE Bidding?

Evidence so far suggests that the value of PEs in the financial crisis first comes from their participation and their unique focus in the failed bank market which is complementary to incumbent banks. In a world without PEs selecting those lower-quality and riskier failed banks, they would either be acquired through lower-valued bids or go into liquidation.

How economically important is this PE participation? We perform a simple back-of-the-envelope calculation using proprietary FDIC cost estimates used for evaluating auction bids from all failed bank deals. The FDIC estimates its cost for each submitted bid in determining the least cost resolution strategy. Starting with the total gross assets at the failed bank and taking details of each submitted bid into account, it subtracts the expected losses on assets and expected expenses from the receivership, as well as any claims on the receivership. The bidder's proposed premium on deposits or discount on assets are included as well. We use these proprietary estimates in our calculation to build on the counter-factual world in which no PE acquisitions occurred.

For all PE-acquired cases, we suppose one of the following two cases happen: (1) if there is at least one non-PE bidder, the best bidder wins, where the "best" means the lowest FDIC-estimated cost of resolution; (2) if there is no other bank bidder, the bank goes into liquidation in which case the FDIC as receiver must pay off insured depositors and dispose of the assets. The additional cost incurred to the FDIC without PE-acquirer participation thus can be roughly estimated by calculating the gap for PE acquirers and the counter-factual world outcomes. For case (1), there are 29 failed banks for which we calculate the difference in estimated FDIC resolution costs for the winning bid compared to the runner-up. In addition, we observe 8 cases in which the runner-up bid in a PE acquisition was also from a PE bidder. For these, we measure the gap in cost between the winning bid and the next best non-PE bid. The aggregate savings are estimated to be around $2.34 billion. For case (2), we observe 25 failed banks which had no other non-PE bids above the liquidation cost and would have had to be liquidated by the FDIC. The total savings to the FDIC of the PE acquisition over liquidation costs is estimated to be $1.29 billion.

How big is the economic magnitude of the $3.63 billion ($2.34 billion+$1.29 million) estimated? The FDIC estimated that the total cost to the Deposit Insurance Fund (DIF) of bank failures during the crisis was about $73 billion.[13] This means that PE participation helped the FDIC reduce the cost of failed bank resolution in the crisis by nearly five percent.

One caveat here is, in this simple back-of-the-envelope, we implicitly assume that bank bidding behaviors remain the same in a world without PE. Given the failed bank bidding process is a sealed-bid auction without even disclosing the potential bidders, removing PEs from the bidder set should, arguably, have at best a mild impact. Additionally, this assumption likely leads us to underestimate the benefit of PE existence—without PE competition, banks will likely bid with even lower prices, expanding the wedge with PE bidding price.

5. Bank Performance Post PE Acquisitions

The natural next question is: are PEs able to successfully turn around the failed banks? In this section, we examine the post-acquisition performance of failed banks that are acquired by PE and by other banks. We also study the real effects by examining the economic recovery of regions in which the failed banks are acquired by PEs. The performance of PE-acquisitions compared to bank-acquisitions is a priori unclear. On the one hand, PEs do not have bank-specific operational experience or sources of synergies, which may lead to poorer performance. On the other hand, PEs' experience in distressed investment and turnaround operations (Hotchkiss, Smith, and Strömberg, 2011), together with the steadier financing source (Bernstein, Lerner, and Mezzanotti, 2019), may be well-suited for the turnaround of failed banks in crisis.

5.1 Quasi-Random Empirical Design

To study failed banks' performance changes post acquisition by different buyers, a basic regression would simply compare the performance proxies in PE-acquired and bank-acquired banks post the acquisition event. This specification would be informative but masks the combination of i) the sorting of acquirer-target, as documented in the previous section, and ii) the treatment effect of PEs on the acquired banks.

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[13] Federal Deposit Insurance Corporation (FDIC). 2017. Crisis and Response: An FDIC History, 2008-2013. Washington, DC: FDIC. p.xiii-xiv.

An ideal experiment to isolate the effect of PEs on post-acquisition performance would focus on a set of banks that are of interest to both PEs and banks, and for which the allocation to a PE or a bank is nearly random. We approximate this ideal experiment by exploiting a small set of banks where acquirer allocation can be viewed as quasi-random. We start from the sample of banks that were bid on by both PEs and banks. We narrow down this sample to two sets of banks—those won by PE and at least one bank bid, and those won by a bank and at least one PE bid. We further require that in the auction the margin of victory of the winning PE/bank bidder over the closest losing bank/PE bid is small, within five percent to be precise.[14] Our empirical strategy compares failed banks that were just won by the PEs and those that were just won by the banks in this quasi-random sample.

In our main specification, we use a local linear regression approach (Gelman and Imbens, 2019):

$$Performance_{b,i,t,z} = \alpha + \beta \cdot PE_i + \gamma \cdot Control_i + \theta_{t\times z} + \varepsilon_i. \tag{2}$$

$Performance$ is the performance of a branch b, located in region z, of bank i, that failed in year t. PE is an indicator variable that equals one if the PE won the auction and acquired the failed bank. $\theta_{t\times z}$ are region-by-time fixed effects controlling for the local time trends and are captured at the state-failed year level. Finer regional geographic delineation, say county-year, renders a very limited number of observations per group (on average 2.3 in each county-year unit), challenging the ability to correctly estimate the model. The analysis will later be adapted to other analytical units (like bank-level, or region-level) by implementing the same logic, and aggregation details will be provided in subsections as we introduce the analysis.

[Insert Table 5 Here.]

The key identification assumption is that, for the specific subset of competitive auctions that we consider, whether a PE wins or loses the bidding is "as good as" random. At first glance, out of the 48 acquisition deals that fall into our quasi-random sample, 25 were eventually acquired by a PE and 23 were eventually acquired by a bank—which suggests a fairly random pattern. Table 5 presents a balance test. We first examine whether bank-level characteristics differ between the bank-acquired and the PE-acquired samples. Among those characteristics shown to matter in

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[14] This approach is standard in the literature (Lee and Lemieux, 2010; Fisman et al., 2014; Colonnelli, Prem, and Teso, 2020).

broader selection, none seem to matter in this quasi-random sample. We also compare the variables that later will be used as performance proxies—these include branch, bank, or regional level information. Again, we do not find any significant differences across bank-acquired and PE-acquired samples.

In our quasi-random sample approach, our empirical strategy improves upon common approaches in the PE literature that tackle the identification challenge through building counterfactual cases using matching methods.[15] Instead of assuming a matched firm that is equally selectable by PEs, we leverage on the bidding setting in which PE-bids and bank-bids reveal their interests in selecting a publicly known target. Focusing on the sample of banks that are selectable and tightly bid on by both PE and banks further controls the selection effect.

One caveat is that even though this approach exploits a very tight control group, it is not a fully-specified regression discontinuity design in which we would better control for the micro-level variations in the bidding gaps (i.e., the running variable), which is unobserved to us. In our sample, the continuous bidding gap is coded to three categories by the FDIC—*below five percent, five to ten percent,* and *above ten percent*, while the underlying continuous variable is kept proprietary.

5.2 Banks: Branch Closure and Deposits

We first study bank performance post-acquisition. The analysis focuses on branch-level for data observability reasons. Failed banks acquired by other banks are integrated into the acquiring institution, and it is thus difficult to observe standalone performance measures from standard sources such as the call reports. To overcome this problem, the approach in this section focuses on the performance of bank branches that can be tracked prior to and after the acquisitions.

Our first performance analysis concerns the closing of bank branches. Bank branch closure has important consequences for the access to credit in the local economy and thus for financial stability. Nguyen (2019) shows that access to credit is very local, and bank branch closings lead to a persistent decline in local small business lending. This effect is particularly strong during the financial crisis.

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[15] See, for example, Boucly, Sraer, and Thesmar (2011); Davis et al. (2014); Bernstein, Lerner, and Mezzanotti (2018); Fracassi, Previtero, and Sheen (2020).

Our sample includes all bank branches owned by a failed bank at the time of failure. For the key outcome variable, we code whether the bank branch is closed within three years post-acquisition using the FDIC Reports of Structure Changes.[16] Control variables include those that have strong power in explaining PEs' selection of acquisition—tier 1 risk-based capital ratio, core deposits to total deposits, C&D loans to total loans, and OREO to total assets. Fixed effects are included at the failed year by state level. Standard errors are clustered at the level of failed bank acquirers, who make strategic decisions for bank operations.

[Insert Table 6 Here.]

Table 6 reports the results. Columns (1) and (2) are our preferred specifications using the quasi-random sample. In column (1), we consider a thought experiment in which two bank branches are located in the same geographic region (at the level of state) and whose parent banks failed in the same year. In this way, we take out the potential impact of timing, i.e., banks may have a different operational strategy during different periods in the crisis. We also take out the potential impact of the branch location, since branches located in regions hit harder by the crisis may be more likely to close. The -0.148 coefficient in column (1) means that bank branches acquired by PEs are 14.8 percentage points less likely to be closed. This is a 73.6 percent decrease from the base branch closing rate of 20.1 percent across the full sample.

This result is particularly important for us to understand the role of PE acquisitions in stabilizing the local financial system, considering our earlier findings that PE-acquired banks tend to be located in regions with an unhealthy financial sector, as shown in Table 4. To better articulate this point, in column (2) we explore a new dependent variable to capture the cases of closing and exit from a county. This variable is coded as one if a PE-acquired bank branch closes and there is no other branch of the bank serving the county, OR if a bank-acquired bank branch closes and there is no other branch of the bank nor an acquirer branch serving the county. The -0.070 coefficient suggests that PE acquired banks are less likely to close and exit a county they serve.

Column (2) also provides an opportunity to assess another potential force that could drive PE-acquired banks' lower closing probability, which is that bank-acquired failed banks are more likely to close to retain limited branches in a region. In other words, bank acquirers may shut down an

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[16] The results are robust to coding the closure variable over alternative time horizons. Most closures happen during the first three years.

acquired branch because they already own one in the local area (i.e., consolidation of branches). The result in column (2) suggests that branches of bank-acquired failed banks have a higher frequency of closing, even for cases when the closure means a complete exit from the county.

In columns (3) and (4) we also report the regression with all bank branches as robustness. The results are similar. The point estimates for the PE effects are smaller in magnitude, which is consistent with the fact that PEs on average acquire lower quality failed banks. Failing to account for this would under-estimate the value-added by PEs.

Next, we examine bank performance using the growth of deposits in local branches. Deposits are an important measure of bank performance, as it is related to the ability to lend and ultimately the ability to generate profit. Conceptually, the analysis appears to be simple to design—we would just compare the deposit growth of branches acquired by PEs with those acquired by other banks. The challenge, however, is the active closing and consolidation of the bank-acquired branches. For example, assume there are two failed bank branches A and B in Durham County, NC, and they are acquired by PE and another bank, respectively. Assume this acquiring bank has its own branch, labeled as C, in Durham. Branch B and C could have complex interactions post-acquisition that make it inaccurate to simply track deposit levels at B or C. For example, branch C could completely absorb B, which would make us underestimate the level of deposits that B attracts.

Our first approach is to perform the analysis at the local county level and consider B and C jointly when evaluating the deposit growth. Specifically, our unit is at the bank-county level. The dependent variable is a failed bank's deposit change in the county region following the acquisition. For PE-acquired banks through shelf charters, this deposit change is for all branches in the local region; for bank-acquired banks and for PE acquisitions through inflatable charters, the deposit change is calculated using both the failed bank branches and the branches originally owned by the acquirer bank in order to account for the measurement issues that may arise from reorganization.[17]

[Insert Table 7 Here.]

Table 7 presents the results. In columns (1) and (2), using the quasi-random sample, we show that within one year, there was little difference in the deposit level changes—this makes sense

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[17] Note, we only keep counties where the failed bank did not completely exit, in which case the deposits would be –100 percent, and which we have studied separately in Table 6.

given that changing failed bank operations takes time. This also provides additional assurance for our quasi-random experiment, since there are not observable differences between PE- and bank-acquired branches ex ante. As time goes by, the effect becomes stronger. In column (2), the comparisons are made by two failed banks' operations in the same county through the same period. PE-acquired banks have a higher three-year deposit growth by a magnitude of 35.6 percentage points. This economic magnitude is quite striking if we compare the three-year changes to the unconditional mean. Depending on the sample that we focus on, the averages of the deposit growth variables are negative as a national trend or only mildly positive.

In columns (3) and (4) we report results estimated using the full non-quasi-random sample. The results are qualitatively similar with milder quantitative magnitude. As discussed in the branch closure analysis above, this is likely due to the fact that PE's acquisition strategy focuses on weaker banks to begin with, making it harder to detect a performance difference if such selection is not controlled for.

Of course, for most of the failed banks, the operations of the failed banks are combined with the acquirer's pre-existing bank operations (i.e., using the example, B and C are jointly considered). An alternative approach we take is to focus on a smaller sample of bank-county combinations in which case the acquirer bank does not own an existing branch in the acquired failed bank's region. In other words, following the example, we study cases in which there is not a branch C. We report the results in Table 7 columns (5) and (6). After isolating the performance of the failed bank branches themselves, the PE-acquired banks still have higher deposit growth.

5.3 Bank Lending and Local Recovery

The banking sector plays an important role in the local economy. PE's ability to maintain branch operations and attract deposits thus leads to a natural hypothesis on whether the positive changes in bank branch operations also lead to better local economic recovery. We perform analysis at the county-level using a model adapted from Eq. (2) but aggregated to the county-level.

Essentially, we compare two counties with a failed bank branch in the same year—and both banks were bid on by PEs and banks—yet one was quasi-randomly allocated to an incumbent bank acquirer and one to a PE. The quasi-random design in this setting helps alleviate concerns about better performance arising mechanically because PEs made purchases in worse-hit areas, and so a return to more "normal" conditions would look more dramatic for them. To cleanly identify the

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results, we also focus our sample on only counties that have one pure treatment, i.e., if a county has both bank-acquisitions and PE-acquisitions we leave them outside the sample for empirical purposes.

[Insert Table 8 Here.]

Our first set of measures is about small business lending. Small business lending is an important function of local banks and creates important spillover effects for local economic growth. The analysis exploits both the extensive margin of small business lending and its intensive margin. Table 8 presents the results. In Panel A we use our preferred quasi-random sample. In column (1) we show that within the three years after a PE entity acquires a local bank, the number of small business lending deals experience 32 percent faster growth compared to other counties. In column (2), we show that the increase in the total amount of small business lending is also higher in counties where the failed bank was acquired by a PE.

The increase in the amount of small business lending could be partially related to the pricing of the loans. In column (3), we show that on average, the SBA loans are priced lower when the banks are intervened by PEs. The economic magnitude is roughly 32 basis points, which is five percent lower compared to the non-conditional mean of 6.4 percent as reported in Table 5. In column (4) we show that the average deal size increases only mildly, suggesting that the effect is more through the extension of credit to a larger number of small businesses rather than giving larger loans to a small set of small businesses. In Panel B, we report results using the full sample.

[Insert Table 9 Here.]

In Table 9 we present another set of regional variables that focus more on the recovery of local economic conditions. The analysis uses the same regression framework as in Table 8, and we also report analysis using both the quasi-random sample and the full sample. In columns (1) and (2) the outcome variables are job creation rates. We find that both the total number of jobs created and job creation in the startup sector are significantly higher in regions where the failed banks are acquired by PEs. In columns (3) and (4) we move to examine the level of personal income. We find that the change in personal income is higher, both in terms of total personal income and the level of per capita income.

5.4 Aggregate Loss Share Claims to the FDIC

Another angle to examine the value of PE acquisition is by studying the cost of failed bank resolution incurred to the FDIC. Specifically, we are interested in whether PE-acquired banks claim more losses to the FDIC. The loss sharing agreements with the FDIC typically grant the failed bank acquirers a time window to claim a portion of losses from loan portfolios of the failed banks. Commercial loan portfolios have five years of loss share coverage, with an additional three years of reporting to share any recoveries. Single family loan portfolios have 10 years of loss share coverage.

If PE-acquired banks perform more poorly in managing the loans in their covered portfolios, we would expect these banks to claim more losses to the FDIC. To test this, we use proprietary data from the FDIC on the total losses claimed by each acquirer with a loss sharing agreement on the failed bank portfolio. We aggregate the claim amounts made and paid out during the coverage period of the loss share agreement. This aggregated amount is then scaled by the total assets covered by the agreement to give us a measure of total claimed loss rates comparable across different banks.

[Insert Table 10 Here.]

Table 10 presents the results. After controlling for the fact that PEs acquired less healthy banks using the selection variables, the estimated differences in claimed losses are virtually zero. In other words, PEs do not appear to be costlier than other acquirers for the FDIC. We include results for both the total reported losses on the portfolio, as well as the amount of losses incurred by the acquirer net of loss sharing payments made to the acquirer by the FDIC. Note that when using our quasi-random sample for the analysis (columns 3 and 6), the number of observations drops to 38 banks that fall into our criterion and have loss coverage on their loan portfolios. As a result, the analysis has low power, but it is reassuring that the economic magnitudes confirm prior results using the full sample.

5.5 Exit of PE-acquired Failed Banks

PEs, as financial investors, are not in the business of permanently running a bank even though they were able to stabilize the acquired failed banks during the crisis period. How do they exit these investments and how do these PE-acquired banks re-integrate into the banking sector? We hand collect information on the exit of PE-acquired banks from FDIC structure reports on bank

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merger activity. We obtain details on merger deal values, IPO activity, as well as any additional rounds of acquirer funding from S&P Global Market Intelligence. Note this analysis is more informative at the acquiring bank-level (consortium-level) because different failed banks are consolidated into one bank after being acquired by the same consortium under the same charter.

[Insert Table 11 Here.]

Out of 19 banks/consortia, 15 have been acquired or consolidated by other commercial banks, two went IPO, one is still under PE-operations, and one was liquidated.[18] We also report the bank-level counts which reflect the number of acquired failed banks in the acquiring consortia. Out of the 17 banks that were acquired or went IPO, PEs held failed banks for 6.5 years on average. Interestingly, of the 15 acquisitions, 60 percent were acquired by a local bank—that is, a bank that overlaps with the footprint of the acquired bank at the zip code level. The number is even higher if we consider the banks to overlap at the county or state level.

This finding is consistent with the overall interpretation of what PEs help achieve in this process. PEs acquire failed banks that are too risky to acquire for incumbent banks who themselves may be in distress. Thus, PEs fill the funding gap and turn around those banks with their hired expertise. These banks are later more suitable for a bank acquisition and return to a traditional bank ownership. Slightly more than half of them are acquired by local banks, who were the natural buyers but were not necessarily in a good position at that time to make these acquisitions themselves.

We calculate the return by comparing consortium funds raised with exit prices. Ideally, we would hope to use the total cash disbursement, which is unobservable in some cases of our data. When these data are not available, we instead rely on the total committed capital to proxy for that cash disbursement component in IRR calculation. Given capital disbursement is lower than committed capital, our IRR calculation provides a lower bound of return calculation. We also supplement this with data on reported additional private placements or offerings from SNL Financial, particularly when additional funds were raised to contribute to additional failed bank purchases. Merger announced deal values are obtained from SNL Financial as well. We find that the deal multiple is 2.11 on average and 2 at the median. We also calculate a rough IRR of 12%

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[18] One bank was liquidated by the acquirer after deposit insurance was terminated, due to unsound banking practices.

after accounting for the holding period, with adjustment for the interim additional funding. This is a good PE return: based on recent estimates from Brown et al. (2015), PE funds of similar vintages earned an IRR below 8%.

5.6 Management of PE-Acquired Failed Banks

Taken together, evidence thus far paints a positive role of PEs in stabilizing the financial system through participating in the process of failed bank resolution. A final question that we ask is: PEs are not bankers, so how can PE intervention bring about those positive changes to the acquired failed banks? We attempt to answer this question by exploring the management human capital of the PE-acquired failed banks. We collect CEO backgrounds of the PE-acquired failed banks by hand from publicly available information on the internet, such as company bios, professional profiles, and featured articles.

[Insert Table 12 Here.]

PEs hire ex-bankers to manage the acquired failed banks. Those bankers on average have nearly 30 years of experience in the banking industry, and more than half of them were CEOs of other banks before being appointed at the failed banks. More than 60 percent of the CEOs had experience in the local area of the failed bank, and nearly 70 percent of the hired bankers had experience working in a community bank. Interestingly, more than a third of the hired CEOs specialized in turnaround management and troubled and distressed assets.

6. Conclusion

This paper studies the role of private equity in stabilizing the financial system in the crisis through failed bank resolution. Using detailed and proprietary failed bank data from the FDIC combined with information on private equity investors, we provide the first empirical investigation of PEs' role in failed bank resolution – an economically important but potentially controversial role.

An extensive literature explores the effects of private equity on firm-level outcomes, such as employment, productivity, product quality, and innovation. However, whether PE should be allowed in banking, which is unique by virtue of its large externalities and safety nets generally not available elsewhere, has been a relatively unexplored area. Our paper suggests that

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understanding the role of PE in the economy should take into broader account how the industry interacts with and affects the stability of the financial system. Further, our paper sheds light on the policy debate on whether to introduce private investors into the process of failed bank resolution.

We find that PE investors acquired failed banks that were generally underperforming and riskier than bank-acquired banks. They also acquired failed banks where the neighboring banks were also in distress and therefore had a lower ability to make failed bank acquisitions. Thus, our findings suggest that PEs fill the capital gap in scenarios when the natural local bank buyers are themselves distressed or capital constrained. Using a quasi-random empirical design, we find that PE-acquired failed banks recovered as well as those acquired by banks despite being underperforming ex ante, and we show some evidence of them outperforming other distressed banks in various dimensions. Our quasi-random empirical design further shows positive real effects on the local economy of PE failed bank acquisitions. Overall, our results suggest a positive role for PE in helping stabilize the financial system in the crisis through their participation in failed bank resolution.

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Appendix 1. Variable Definition and Description

Variable	Definition and Description
Asset size (in $Million)	Total assets. Sum of all assets owned by the institution including cash, loans, securities, bank premises and other assets.
Tier 1 risk-based capital ratio	Tier 1 capital divided by adjusted average assets. Tier 1 capital includes common equity plus noncumulative preferred stock plus minority interests in consolidated subsidiaries less goodwill and other ineligible intangible assets. Adjusted average assets are average total assets minus disallowed intangibles.
Liquidity ratio	Sum of cash, fed funds sold and securities, excluding mortgage-backed securities, divided by total assets.
Core deposits to total deposits	Total domestic deposits minus time deposits of more than $250,000 and brokered deposits of $250,000 or less, divided by total deposits.
Net interest margin	Quarterly net interest income as a percent of a two-period average earning assets.
CRE loans to total loans	Ratio of commercial real estate loans (CRE) loans to total loan and lease financing receivables. Includes all nonfarm nonresidential properties secured by real estate and multifamily (5 or more) residential properties secured by real estate held in domestic offices.
C&D loans to total loans	Ratio of construction and development loans (C&D) to total loans and lease financing receivables. Includes all construction and land development loans secured by real estate held in domestic offices.
C&I loans to total loans	Ratio of commercial and industrial (C&I) loans to total loans and lease financing receivables.
Residential loans to total loans	Ratio of total loans secured by 1-4 family residential properties held in domestic offices to total loans and lease financing receivables.
Consumer loans to total loans	Ratio of loans to individuals for household, family and other personal expenditures to total loans and lease financing receivables.
Noncurrent loans to total loans	Ratio of noncurrent loans and leases to gross loans and leases. Includes total loan and lease financing receivables 90 days or more past due and in nonaccrual status.
OREO to total assets	Ratio of other real estate owned to total assets. Includes real estate acquired, as well as direct and indirect investments in real estate.
Loss-sharing agreement	Agreement between the FDIC and a failed bank acquirer in which the FDIC absorbs a portion of the losses on a specified pool of assets.
Neighbor tier 1 risk-based capital ratio	Mean tier 1 risk-based capital ratio for banks that share at least one branch zip code with the focal bank.

Neighbor nonperforming loans to total loans	Mean nonperforming loans to total loans for banks that share at least one branch zip code with the focal bank.
Neighbor OREO to total assets	Mean other real estate owned to total assets for banks that share at least one branch zip code with the focal bank.
No of local banks (>3xSize)	Number of local banks at least three times the size and sharing at least one branch zip code with the focal bank.
No of failed banks in state	Number of failed banks in state where focal bank headquarters is located.

Appendix 2. Institutional Details—The General Process of Failed Bank Resolution

Bank resolution activities are initiated by a failing bank letter to the FDIC from federal and state banking regulators who monitor the financial condition of banks. Such initiation is triggered when a banking institution becomes critically undercapitalized or insolvent.[19]

The FDIC then contacts the management of the failing depository institution. The FDIC also engages a third-party financial advisor to conduct a review of the assets and compile initial information. Importantly, in this review process, the financial advisor estimates a loss factor for each asset category using an identified sample of assets. This information is further used by the FDIC to set the reservation value on the subsequent resolution of the depository institution.

During the financial crisis, the FDIC used the Purchase and Assumption (P&A) resolution method in roughly 95 percent of the cases, and these are the transactions studied in this paper. In a P&A transaction, the FDIC uses a process that resembles a first-price sealed bid auction to sell some or all of the assets and liabilities of the depository institution. Only in cases when the auction does not generate any bidding or when the highest bid is below the FDIC's reservation value, the FDIC will use an alternative resolution method. The resolution process can be categorized into four steps: marketing and identifying the bidder pool, providing information, bidding, and resolution.

The first step of selling failed banks is to identify a pool of potential buyers that have expressed interest in bidding for failed institutions and that satisfy a list of requirements. To be approved to bid in a P&A transaction, the potential bidder must be a chartered financial institution or an investor group that has received a conditional charter or is in the process of obtaining a "de novo" charter. PE investors fall into the latter category of "investor group" as bidders. Moreover, the bidding financial institution must be well capitalized and possess a CAMELS[20] rating of 1 or 2, a satisfactory Community Reinvestment Act (CRA) rating, and a satisfactory anti-money-laundering record.

In the second step, eligible bidders receive notification of an acquisition opportunity, and those who are interested in pursuing the opportunity must sign a confidentiality agreement. The FDIC then provides eligible bidders with an information package on the failed institution. The information contains loan reviews, schedules representing the value of the items on the failed bank's balance sheet, and operational

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[19] A bank is deemed by regulators to be critically undercapitalized when the ratio of tangible equity to total assets is at or below 2 percent. Tangible equity is the amount of tier 1 capital plus outstanding non-Tier 1 perpetual preferred stock.

[20] CAMELS is short for (C)apital Adequacy, (A)sset quality, (M)anagement, (E)arnings, (L)iquidity, and (S)ensitivity to market risk. CAMELS ratings are assigned by bank supervisors after an on-site examination at each bank.

information. As part of their onsite due diligence, potential bidders can request to review the individual loan documents.

In the third step, the formal bidding, the process generally starts 12 to 15 days before the scheduled closing of the failed bank. Bidders can place one or more sealed bids for the failed bank. The FDIC then chooses the bid that is least costly to the Deposit Insurance Fund (DIF),[21] after evaluating all submitted bids using its proprietary least-cost test model. The FDIC selects the bid whose terms entail the least-estimated cost for the DIF if those costs are below the reservation value set by the FDIC, which is unknown to bidders. Bids are not submitted as a single "price", but rather they frequently vary along multiple dimensions for each bid. For example, these pricing dimensions can include the amount of discount applied to the assets, the premium paid for deposits, the amount and types of assets acquired, the type of transaction for purchase (whole bank, loss share, etc.), the extent of any coverage for shared losses, and so on. The least cost test must take all of these factors into account when estimating the resolution cost associated with each bid for comparison.

In the final step, i.e., when a failing depository institution enters receivership, the FDIC takes custody of the failed bank's premises, records, loans and other assets. The priority for paying allowed claims is given to depositors, including the FDIC as subrogee, over other general and unsecured creditors. The DIF took a loss on most bank failures that occurred during the recent financial crisis, suggesting that the receivership proceeds do not cover the FDIC's subrogated claim and that the FDIC is the residual claimant in most receiverships (Hynes and Walt (2010)). Between 2008 and 2013, the DIF lost approximately $73 billion due to depository institution failures.[22] The fund reached a negative balance during the third quarter of 2009 but has since recovered and stood at $100 billion at the end of 2018, resulting in a reserve ratio of 1.36 percent.[23] The FDIC responded to the large losses on its DIF by collecting a special assessment of 5bps on all depository institutions and requiring prepaid assessments to boost the fund's liquidity. In addition, the FDIC updated its risk-based pricing for deposit insurance.[24]

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[21] This is mandated by The Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991.

[22] Federal Deposit Insurance Corporation (FDIC). 2017. *Crisis and Response: An FDIC History, 2008-2013*. Washington, DC: FDIC. p.xiii.

[23] *Quarterly Banking Profile, Third Quarter 2018.* https://www.fdic.gov/bank/analytical/qbp/2018sep/qbp.pdf.

[24] Federal Deposit Insurance Corporation (FDIC). 2017. *Crisis and Response: An FDIC History, 2008-2013*. Washington, DC: FDIC. Chapter 5.

Figure 1. Bank Failures over Time

This figure plots the time series of bank failures irrespective of resolution method and the acquirer type during the period 2000 to 2018. Data are from the Federal Deposit Insurance Corporation and are available at https://www.fdic.gov/bank/individual/failed/banklist.html. The time series includes the failed banks whose resolution process was a P&A transaction or a deposit payoff but does not include open bank assistance. In Panel (A) we plot the total number of bank failures, and in Panel (B) we plot the total assets (in Billion USD) at failure.
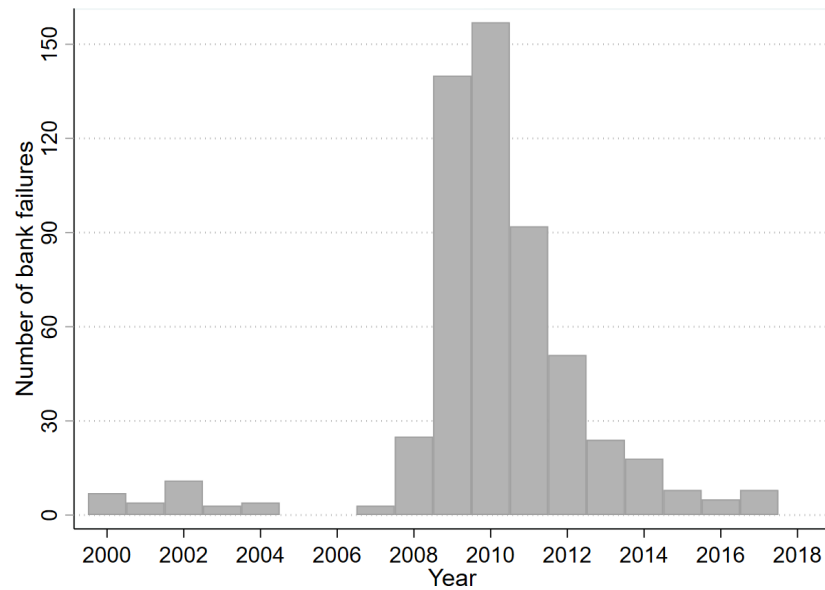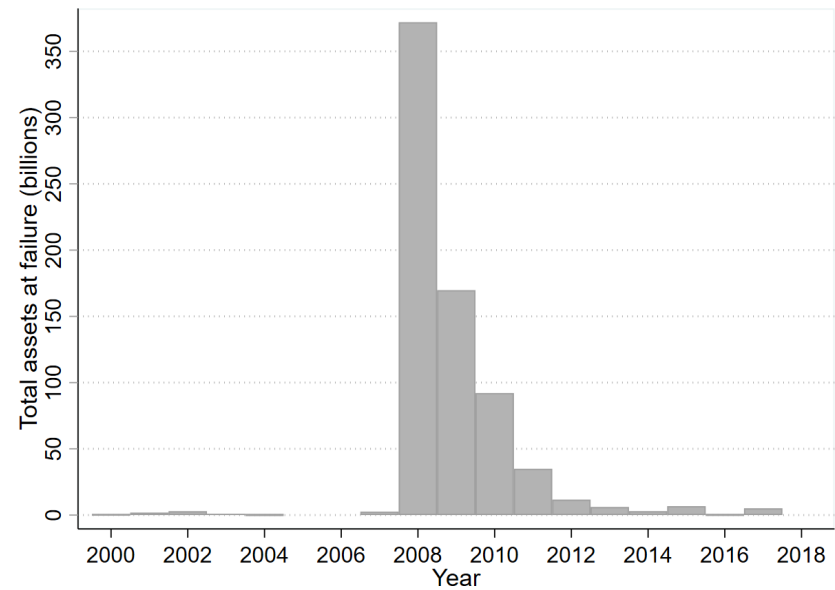
Panel (A)   Panel (B)

Figure 2. Illustrative Flow Chart of Failed Bank Resolution and PE Participation

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┌─────────────────────────┐      ┌─────────────────────────┐
│ **Private Equity** apply to │      │ **Private Equity** apply to │
│ regulator to obtain bank │  →   │ FDIC to be added to     │
│ charter, apply to Federal│      │ eligible bidder list    │
│ Reserve to form BHC      │      │                         │
└─────────────────────────┘      └─────────────────────────┘
                                              │
                                              ▼
┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐  ┌──────────────────────┐
│ Bank deemed      │  │ FDIC bid list    │  │ Virtual data room│  │ Least cost resolution│
│ critically       │→ │ generation,      │→ │ and due          │→ │ determined by FDIC;  │
│ undercapitalized │  │ notify acquisition│  │ diligence, sealed│  │ FDIC closes bank,    │
│ or insolvent     │  │ opportunity      │  │ bid submissions  │  │ assets and deposits  │
│                  │  │                  │  │                  │  │ transferred to       │
│                  │  │                  │  │                  │  │ acquirer             │
└──────────────────┘  └──────────────────┘  └──────────────────┘  └──────────────────────┘
                               ▲
                               │
                      ┌──────────────────┐
                      │ **Banks** satisfying │
                      │ qualification tests│
                      │ and showing interest│
                      │ are added        │
                      └──────────────────┘
```

Figure 3. PE Participation in Failed Bank Acquisitions

This figure shows the number of failed banks acquired by other banks and by PE during 2009-2014. Panel (A) is plotted based on the number of failed bank acquisitions. Panel (B) is based on the total assets acquired. Years 2009-2014 are active years for PE acquisitions during the crisis. Prior to 2008, PE acquirers were not yet allowed to participate in failed bank auctions, and 2009 was the first successful PE acquisition. After 2014, they were allowed to participate but no PE acquisitions of failed banks were made.
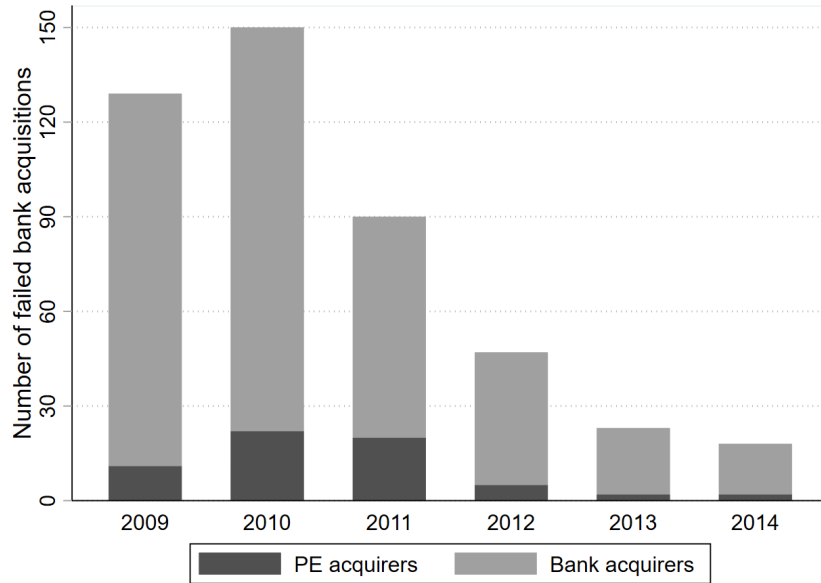
Panel (A)
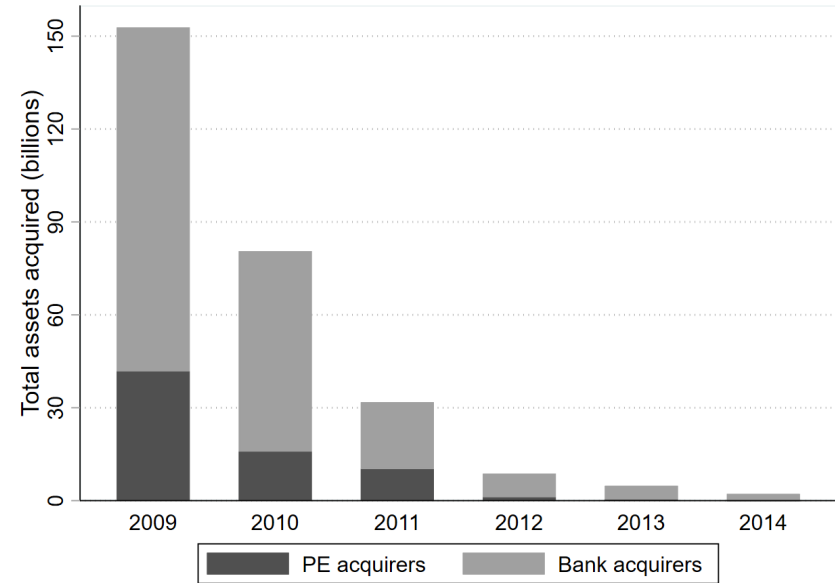
Panel (B)

Figure 4. Geographic Distribution of PE in Failed Bank Resolution

This figure shows the geographic distribution of failed banks acquired by other banks and by PE during 2009-2014. Panel (A) visualizes the distribution of failed bank headquarters: a red dot represents a bank acquisition by PEs, a blue dot represents a bank acquisition by other incumbent banks, and a green dot represents a bank that failed but was not acquired (i.e., was liquidated). Panel (B) presents the frequencies of bank acquisitions and PE acquisitions of failed banks in different states.
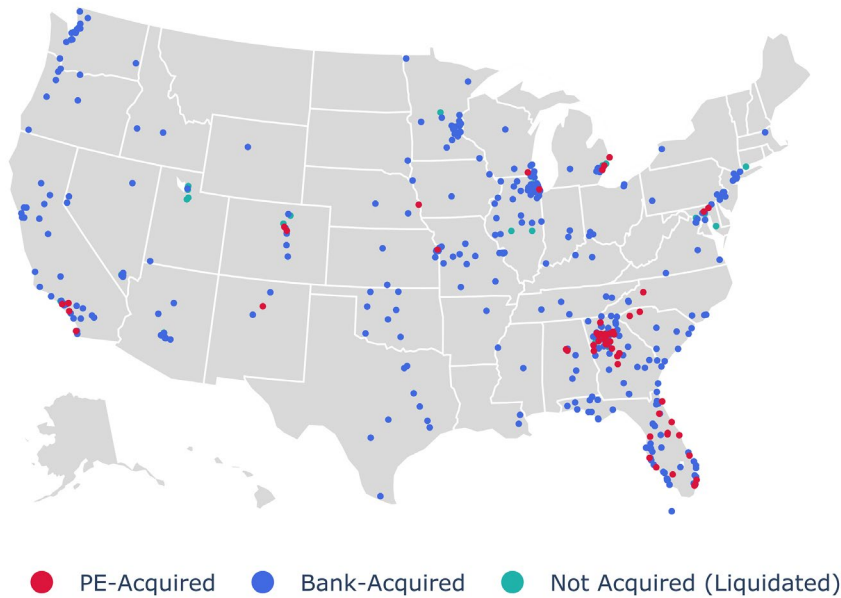
Panel (A)
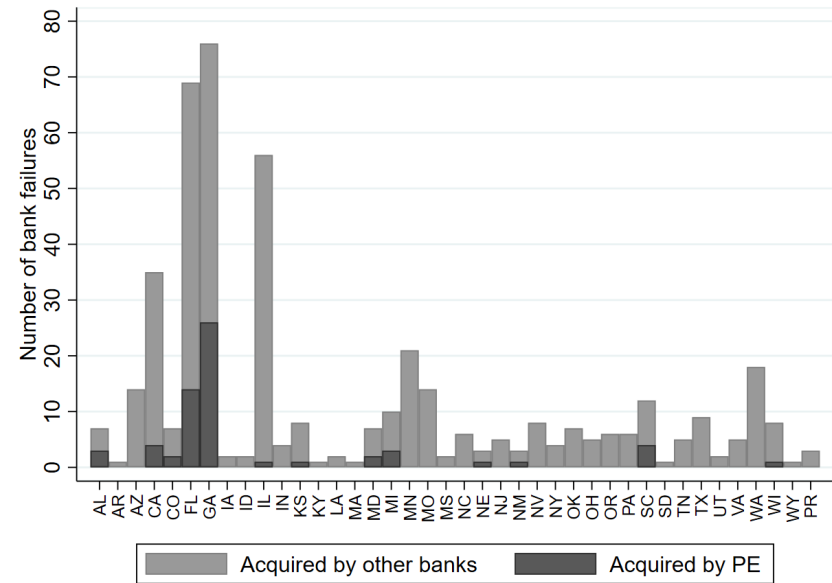
Panel (B)

Figure 5. Comparing Banks in Different Acquisition Groups

This figure presents the characteristics of failed banks (and those of their neighboring banks) targeted by different pools of acquirers: those that were bid on and eventually acquired by PEs, those bid on by PEs but may eventually be won by a PE or an incumbent bank, and those that are only bid on and eventually acquired by other incumbent banks. For each characteristic, we present the sample mean across the three groups.

Panel (A): Sorting on Failed Banks' Own Characteristics
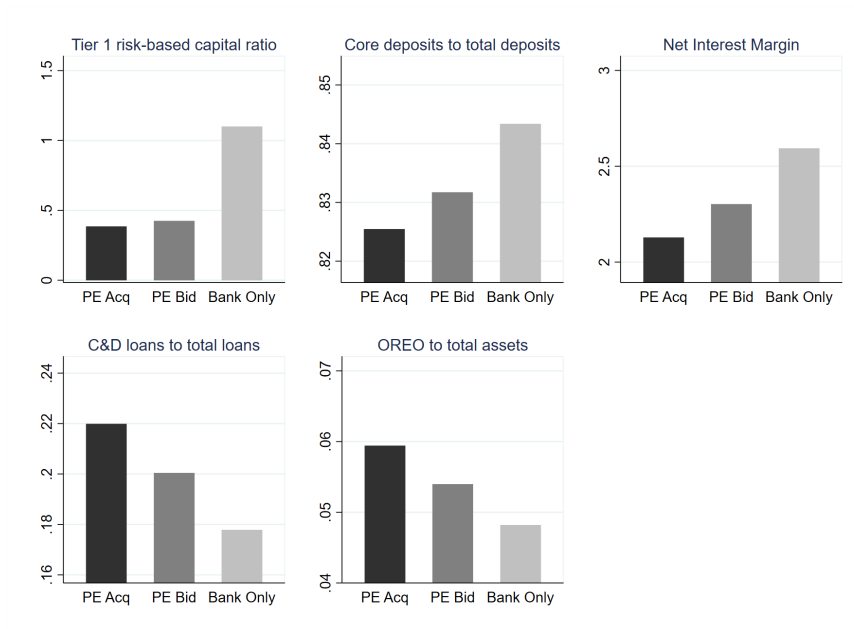
Panel (B): Sorting on Neighboring Banks' Characteristics
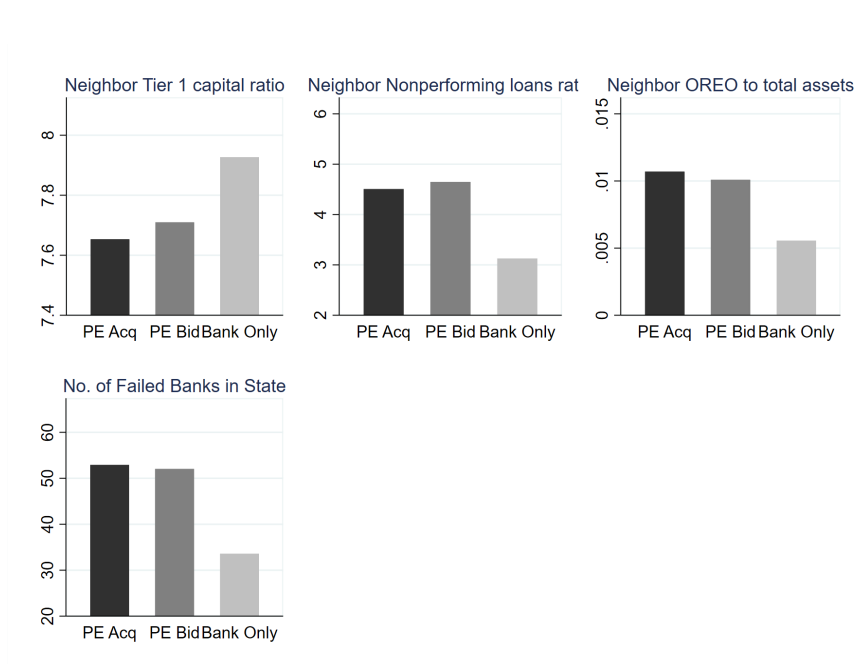
Table 1. Summary Statistics for the Private Equity Buyers

This table presents summary statistics of the PE buyers in failed bank acquisitions. We report the summary statistics at the consortia-level and PE fund level. Consortia are the group of PEs that collaborate in acquiring failed banks, and consortia-level information is collected from the FDIC. Of the 20 distinct PE charters, one acquirer purchased failed banks under two separate charters that were then consolidated and is counted as a single consortium in the data below. PE-level information is collected from Preqin. For each variable, we report mean, standard deviation, and 25th, 50th, and 75th percentiles.

	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Consortium-Level (N=19)					
Number of PEs per consortium	3.37	2.29	2	4	4.5
Share of PE ownership in consortium[25]	68.9	35.5	62	76	100
Total number of failed banks bid on	5.2	4.18	1.75	3	8
Number of states (bids)	1.32	0.82	1	1	1
Number of acquisitions (Bid and "Win")	3.26	3.07	1	2	4
Number of states (acquisitions)	1.26	0.56	1	1	1
Prior experience in financial distress	0.58	0.51	0	1	1
Private Equity Level (N=42, available on Preqin)					
Number of consortia joined	1.13	0.335	1	1	1
Fund vintage	2007.52	2.95	2006	2007	2009
Fund size (million USD)	2724.21	4075.23	654.05	1393.15	3100.00
First-time fund (0 or 1)	0.18	0.39	0	0	0

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[25] PE ownership shares include 3 acquisitions that occurred through non-bank charters but are exceptions in their funding structure. Of these, 2 were small banks acquired by single investors, and 1 was a community development bank with funding provided by large institutional investors. We count those PE ownership shares as zero in the above table. Excluding these banks results in a mean PE ownership share of 82 percent and a median of 85 percent.

Table 2. Summary Statistics of the Failed Banks

This table presents summary statistics for failed banks between 2009 and 2014. Variables are obtained from the call report submitted by the failed bank in the quarter prior to failure. *Asset size* is the amount of assets at the failed bank in millions. *Tier 1 risk-based capital* is the Tier 1 risk-based capital divided by adjusted average assets. *Liquidity ratio* is the sum of cash, fed funds sold and securities, excluding mortgage-backed securities, divided by total assets. *Core deposits to total deposits* is total domestic deposits minus time deposits of more than $250,000 and brokered deposits of $250,000 or less, divided by total deposits. *Net interest margin* is the quarterly net interest income as a percent of a two-period average earning assets. *CRE loans to total loans* is non-farm non-residential properties secured by real estate and multifamily (5 or more) residential properties secured by real estate, divided by total loans. *C&D loans to total loans* is construction and land development loans secured by real estate divided by total loans. *C&I loans to total loans* is commercial and industrial loans, divided by total loans. *Consumer loans to total loans* is loans to individuals for household, family, and other personal expenditures, divided by total loans. *Residential loans to total loans* is loans secured by 1-4 family residential properties, divided by total loans. *Non-current loans to total loans* is the ratio of non-current loans to total loans. *OREO to total assets* is the ratio of other real estate owned to total assets. *Loss sharing agreement* is an indicator variable that is equal to 1 if the P&A in resolution included an agreement for the FDIC to partially indemnify losses incurred on covered assets. Neighboring and local bank variables are constructed as the mean of banks that share at least one branch zip code with the focal bank. *No of failed banks in state* is defined as the number of failed banks located in the same state as the headquarters of the failed bank.

N = 456	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Failed bank characteristics					
Asset size ($ millions)	727.0	2,352	101.7	207.4	461.2
Tier 1 risk based capital to total assets	0.925	2.698	0.155	1.105	1.995
Liquidity ratio	0.168	0.082	0.110	0.156	0.211
Core deposits to total deposits	0.837	0.145	0.742	0.878	0.958
Net interest margin	2.550	1.248	1.850	2.560	3.285
CRE loans to total loans	0.387	0.170	0.272	0.379	0.491
Construction and development loans to total loans	0.186	0.137	0.0842	0.158	0.261
C&I loans to total loans	0.107	0.089	0.044	0.083	0.143
Consumer loans to total loans	0.023	0.040	0.004	0.012	0.027
Residential loans to total loans	0.259	0.184	0.127	0.231	0.326
Noncurrent loans to total loans	16.36	9.537	9.745	15.040	20.340
OREO to total assets	0.052	0.049	0.017	0.039	0.071
Loss-sharing agreement (Yes/No)	0.662	0.473	0	1	1
Neighboring bank conditions					
Neighbor tier 1 risk-based capital ratio	7.930	1.340	7.133	7.945	8.650
Neighbor nonperforming loans to total loans	3.582	3.455	0.885	2.373	5.277
Neighbor OREO to total assets	0.007	0.010	0.001	0.003	0.009
No of local banks (>3xSize)	2.877	2.259	1	2	4
No of failed banks in state	37.41	28.75	8	35	69

Table 3. Characteristics of PE-Acquired Failed Banks

This table presents the estimation results from a logit regression framework in the following form:

$$Pr(PE\ Acquired = 1) = \Phi(\alpha + \beta \cdot X_i + \gamma \cdot Control_i + \theta_t + \varepsilon_i).$$

The analysis is performed on the cross-sectional sample of all failed banks that were eventually acquired by a bank or a private equity consortium. The dependent variable is a dummy that takes value 1 if the failed bank was eventually acquired by PE, and 0 otherwise (i.e., acquired by a bank). Panel A investigates characteristics of the failed banks themselves. Panel B investigates characteristics of the neighboring banks of the focal failed bank. All variables are defined in Table 2 and in the appendix of variable definition. We control for the size of the bank using the logarithm of the total assets of the bank. Failed Year-Quarter fixed effects are included to account for the time varying economic and regulatory environments that could affect the failed bank resolution process. Robust standard errors are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Characteristics of Failed Banks and PE Acquisitions

	(1)	(2)	(3)	(4)	(5)
			I(PE Acquired)		
Tier 1 risk-based capital ratio	-0.013***				
	(0.005)				
Core deposits to total deposits		-0.220**			
		(0.103)			
Net interest margin			-0.054***		
			(0.012)		
C&D loans to total loans				0.229*	
				(0.123)	
OREO to total assets					0.626**
					(0.253)
Log(Asset in $000)	0.057***	0.052***	0.044***	0.052***	0.058***
	(0.011)	(0.011)	(0.009)	(0.012)	(0.011)
Observations	456	456	456	456	456
Failed Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.181	0.170	0.218	0.172	0.175

Panel B: Financial Health of Neighbor Banks and PE Acquisition

	(1)	(2)	(3)	(4)	(5)
			I(PE Acquired)		
Neighbor tier 1 risk-based capital ratio	-0.020*				
	(0.012)				
Neighbor nonperforming loans to total loans		0.009**			
		(0.004)			
Neighbor OREO to total assets			3.905***		
			(1.435)		
No of local banks (>3xsize)				-0.011*	
				(0.006)	
No. of failed banks in state					0.002***
					(0.000)
Log(Asset in $000)	0.062***	0.056***	0.058***	0.060***	0.055***
	(0.012)	(0.012)	(0.012)	(0.011)	(0.010)
Observations	456	456	456	456	456
Failed Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.167	0.174	0.188	0.167	0.217

Table 4. Private Equity Bidding Activities

This table presents the estimation results from a logit regression framework in the following form:

$$Pr(PE\ Bidding = 1) = \Phi(\alpha + \beta \cdot X_i + \gamma \cdot Control_i + \theta_t + \varepsilon_i).$$

The analysis is performed on the cross-sectional sample of all failed banks in 2008-2015. Observation numbers are higher than in previous tables because additional failures in years 2008 and 2015 are added, in which a few PE bids were made on failed banks but did not win. The dependent variable is a dummy that takes value 1 if at least one PE bid on the failed bank, and 0 otherwise (i.e., only bid on by banks). Panel A investigates characteristics of the failed banks themselves. Panel B investigates characteristics of the neighboring banks of the focal failed bank. All variables are defined in Table 2 and in Appendix 1. We control for the size of the bank measured using the logarithm of the total assets of the bank. Failed Year-Quarter fixed effects are included to account for the time varying economic and regulatory environments that could affect the failed bank resolution process. Robust standard errors are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Characteristics of Failed Banks and PE Bidding

	(1)	(2)	(3)	(4)	(5)
			I(PE Bidding)		
Tier 1 risk-based capital ratio	-0.025***				
	(0.006)				
Core deposits to total deposits		-0.162			
		(0.158)			
Net interest margin			-0.056***		
			(0.019)		
C&D loans to total loans				0.152	
				(0.389)	
OREO to total assets					0.656*
					(0.389)
Log(Asset in $000)	0.088***	0.080***	0.075***	0.080***	0.085***
	(0.015)	(0.015)	(0.015)	(0.016)	(0.015)
Observations	487	487	487	487	487
Failed Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.144	0.118	0.136	0.118	0.122

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Panel B: Financial Health of Neighbor Banks and the PE Bidders

	(1)	(2)	(3)	(4)	(5)
			I(PE Bidding)		
Neighbor tier 1 risk-based capital ratio	-0.034**				
	(0.016)				
Neighbor nonperforming loans to total loans		0.017***			
		(0.005)			
Neighbor OREO to total assets			6.718***		
			(2.043)		
No of local banks (>3xSize)				-0.005	
				(0.008)	
No. of failed banks in state					0.003***
					(0.001)
Log(Asset in $000)	0.097***	0.088***	0.091***	0.090***	0.090***
	(0.018)	(0.017)	(0.018)	(0.016)	(0.014)
Observations	456	456	456	456	456
Failed Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.137	0.149	0.158	0.129	0.204

Table 5. Balance Test of the Quasi-Random Bank Allocation to PEs and Banks

This table provides the balance test for the quasi-random acquisition sample, by comparing characteristics prior to bank failures. The sample consists of failed bank auctions in which (1) PEs and banks both bid, (2) one is the winning bidder (acquirer) and one is the cover bid; and (3) the bidder value difference is smaller than five percent of total bank assets. The balance test compares the banks that were marginally won by a bank and those that were marginally won by a PE, and reports mean, standard deviation, and the *t*-test of the two samples. Variables are defined in prior tables or used in tables to follow.

	PE-acquired		Bank-acquired		
	Mean	Standard Deviation	Mean	Standard Deviation	*t*-stat
Failed bank characteristics					
Asset size (in $Million)	12.758	0.829	13.073	1.464	0.921
Tier 1 risk-based capital ratio	0.139	1.769	0.497	2.384	0.358
Core deposits to total deposits	0.870	0.134	0.822	0.152	-1.153
Net interest margin	2.367	0.865	2.415	0.788	0.197
CRE loans to total loans	0.444	0.148	0.482	0.168	0.834
C&D loans to total loans	0.208	0.100	0.190	0.119	-0.571
OREO to total assets	0.077	0.068	0.051	0.071	-1.198
Neighboring bank conditions					
Neighbor tier 1 risk-based capital ratio	7.735	1.475	7.188	2.445	-0.940
Neighbor nonperforming loans to total loans	5.888	4.866	4.477	3.900	-1.411
Neighbor OREO to total assets	0.015	0.015	-0.037	0.215	-1.200
Branch-level Conditions					
Branch closure rate (2005-2007)	4.082%	1.267%	6.667%	2.644%	0.982
Branch deposits ($000 USD)	51,777.11	91,362.15	57,660.35	100,444.4	0.513
County-level Condition					
Log(SBA loan amount)	15.463	1.881	15.900	2.075	1.304
Log(SBA loan number)	2.672	1.541	3.136	1.925	1.640
SBA loan interest rate	6.412	0.590	6.352	0.589	-0.588
Log(SBA loan average loan size)	12.791	0.841	12.764	0.839	-0.187
Log(startup employment)	8.197	1.755	8.337	2.235	0.430
Log(employment)	8.565	1.834	8.654	2.310	0.264
ΔLog(total personal income)	0.023	0.127	0.047	0.122	0.977
ΔLog(per capital income)	-0.032	0.052	-0.034	0.034	-0.256

Table 6. Branch Closing Post Failed Bank Acquisitions—Branch-level Regression

This table studies failed bank branch closings after being acquired by a PE or by another bank. The analysis uses the following specification at the branch b level (located in region z), of bank i, that failed in year t):

$$Pr(Closing = 1)_{b,i,t,z} = \Phi(\alpha + \beta \cdot PE_i + \gamma \cdot Control_i + \theta_{t \times z} + \varepsilon_i).$$

The key explanatory variable is the dummy variable indicating whether the bank is acquired by a PE acquirer or by another bank. The dependent variable in columns (1) and (3) is a dummy variable indicating whether the branch closes within the three-year window post acquisition. Columns (2) and (4) use a dependent variable indicating whether the branch closes and simultaneously makes the bank exit the county. Control variables include those that have strong power in explaining PEs' selection of acquisition—Tier 1 risk-based capital ratio, core deposits to total deposits, C&D loans to total loans, OREO to total assets, and total assets.

Fixed effects are included at the failed year by branch state level. Standard errors are double clustered at the state and failed year levels and are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Quasi-Random Sample		Full Sample	
	(1)	(2)	(3)	(4)
	Closing	Close and Exit from County	Closing	Close and Exit from County
I(PE Acquired)	-0.148***	-0.070**	-0.072***	-0.027**
	(0.037)	(0.029)	(0.028)	(0.013)
Tier 1 risk-based capital ratio	-0.006	-0.008	0.002	0.003
	(0.004)	(0.006)	(0.003)	(0.002)
Core deposits to total deposits	-0.929***	-0.657***	-0.537***	-0.224***
	(0.233)	(0.161)	(0.107)	(0.066)
C&D loans to total loans	-0.282**	-0.286***	0.039	0.027
	(0.135)	(0.107)	(0.080)	(0.053)
OREO to total assets	0.645	-0.137	0.158	-0.210
	(0.691)	(0.358)	(0.333)	(0.194)
Observations	617	617	4,476	4,476
R-squared	0.345	0.234	0.236	0.143
State x Fail Year FE	Yes	Yes	Yes	Yes
Mean of Dependent Var	0.201	0.117	0.241	0.0449

Table 7. Post-Acquisition Performance in Deposits Growth

This table shows the deposit changes of bank- and PE-acquired failed bank branches post acquisition. The analysis is at the county-bank level, using the following specification,

$$\Delta Deposit_{i,t,z} = \alpha + \beta \cdot PE_i + \gamma \cdot Control_i + \theta_{t \times z} + \varepsilon_i.$$

The dependent variable is failed bank i's (in region z,) one-year or three-year deposit change since i's year of failure t. For PE-acquired banks using shelf charters, this deposit change is for all branches in the local region; for bank-acquired banks or PE-acquired banks using inflatable charters, the deposit is calculated using both the failed bank branches and the branches originally owned by the acquirer bank in order to account for the measurement issues that may arise from reorganization. We only keep counties where the failed bank did not completely exit. The analysis incorporates a combination of state and failure year fixed effects. Standard errors are double clustered at the level of state and failed year, and they are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Quasi-Random Sample		Full Sample		Quasi-Random + No-overlap Sample	
	(1)	(2)	(3)	(4)	(5)	(6)
	1-Yr ΔDeposit	3-Yr ΔDeposit	1-Yr ΔDeposit	3-Yr ΔDeposit	1-Yr ΔDeposit	3-Yr ΔDeposit
I(PE Acquired)	-0.018	0.356***	0.067	0.214***	-0.014	0.351**
	(0.141)	(0.111)	(0.056)	(0.037)	(0.135)	(0.115)
Observations	431	431	1,685	1,685	417	417
R-squared	0.594	0.611	0.459	0.505	0.162	0.248
State x Fail Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Var	0.0627	-0.0288	-0.0605	-0.173	0.0408	-0.0401

Table 8. Real Economic Outcomes: Small Business Lending

This table studies the regional economic activities after failed banks were acquired by a PE versus an incumbent bank. The analysis is at the county level, exploiting the quasi-random allocation of banks, and focuses on counties with only one type of acquirer. The analysis studies small business lending activities. The dependent variables are three-year growth of SBA lending activities in terms of quantity, total amount, interest rate, and average loan size. Panel A and B use the quasi-random and the full sample, respectively. The analysis incorporates a combination of state and failure year fixed effects. Standard errors are double clustered at the level of the state and failed year and are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Small business lending activities-Quasi-random sample

	(1)	(2)	(3)	(4)
		ΔSBA	ΔSBA Interest	ΔSBA Average Loan
	ΔSBA Number	Amount	Rate	Size
I(PE Acquired)	0.320**	0.154**	-0.323*	0.165
	(0.112)	(0.049)	(0.147)	(0.107)
Observations	276	276	276	276
R-squared	0.797	0.901	0.777	0.479
State x Fail Year FE	Yes	Yes	Yes	Yes

Panel B: Small business lending activities—Full sample

	(1)	(2)	(3)	(4)
		ΔSBA	ΔSBA Interest	ΔSBA Average Loan
	ΔSBA Number	Amount	Rate	Size
I(PE Acquired)	0.125*	0.077*	-0.065*	-0.012
	(0.071)	(0.042)	(0.035)	(0.084)
Observations	2,181	2,181	2,181	2,181
R-squared	0.863	0.936	0.816	0.612
State x Fail Year FE	Yes	Yes	Yes	Yes

Table 9. Real Economic Outcomes: Regional Recovery

This table studies the regional economic activities after failed banks were acquired by a PE versus an incumbent bank. The analysis is at the county level, exploiting the quasi-random allocation of banks, and focuses on counties with only one type of acquirer. The analysis studies regional economic indicators, and the dependent variables are three-year growth in startup employment, total employment, total personal income, and per capita income. Panel A and B use the quasi-random and the full sample, respectively. The analysis incorporates a combination of state and failure year fixed effects. Standard errors are double clustered at the level of the state and failed year and are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Regional economic recovery—Quasi-random sample

	(1) ΔStartup Employment	(2) ΔEmployment	(3) ΔTotal Income	(4) ΔPer Capita Income
I(PE Acquired)	0.042*	0.065**	0.015***	0.007*
	(0.023)	(0.029)	(0.006)	(0.004)
Observations	276	276	276	276
R-squared	0.957	0.949	0.600	0.412
State x Fail Year FE	Yes	Yes	Yes	Yes

Panel B: Regional economic recovery—Full sample

	(1) ΔStartup Employment	(2) ΔEmployment	(3) ΔTotal Income	(4) ΔPer Capita Income
I(PE Acquired)	0.026**	0.039**	0.011*	0.002
	(0.012)	(0.015)	(0.006)	(0.002)
Observations	2,181	2,181	2,181	2,181
R-squared	0.976	0.964	0.671	0.408
State x Fail Year FE	Yes	Yes	Yes	Yes

Table 10. Loss Share Claims for Failed Banks

This table studies loss share claims submitted by failed bank acquirers and examines the difference in whether the bank is acquired by a PE or by another bank. There were a total of 304 failed bank purchase agreements during the crisis that included loss share coverage. The analysis uses the following specification at the bank i, failure year-quarter t, and bank state s level:

$$Loss\ Share_{i,t,s} = \alpha + \beta \cdot PE_i + \gamma \cdot Control_i + \theta_{t \times s} + \varepsilon_i.$$

The key explanatory variable is the dummy variable indicating whether the bank is acquired by a PE or by another bank. The dependent variable is the aggregate loss rate by the bank during the period of loss share coverage. We aggregate all the loss claims during the coverage period that could last for several years. This aggregated amount is then scaled by the total assets covered by the FDIC loss sharing agreement to give us a measure of total claimed losses comparable across different banks. Total loss rate is the total losses on the acquired portfolio, and the incurred loss rate is the losses incurred by the acquirer after netting out any payments received from the FDIC according to the terms of the loss share agreement. Control variables include those that have strong power in explaining PEs' selection of acquisition—Tier 1 risk-based capital ratio, core deposits to total deposits, C&D loans to total loans, and OREO to total assets. Fixed effects are included at the state-by-fail year level. Standard errors are clustered at the level of failed bank acquirers are displayed in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
			Total Loss Rate			
	Total Loss Rate			Incurred Loss Rate		
I(PE Acquired)	-0.015	-0.013	0.044	0.007	0.003	-0.007
	(-0.544)	(-0.406)	(0.690)	(0.648)	(0.207)	(-0.263)
Tier 1 risk-based capital ratio	-0.005**	-0.007**	-0.024	0.000	0.001	-0.002
	(-2.578)	(-2.368)	(-0.769)	(0.268)	(0.510)	(-0.330)
Core deposits to total deposits	-0.028	0.042	-0.049	0.015	0.023	0.070
	(-0.486)	(0.736)	(-0.164)	(0.801)	(0.930)	(0.863)
C&D loans to total loans	0.307***	0.334***	-0.300	0.055**	0.063*	-0.094
	(5.688)	(3.933)	(-0.463)	(2.340)	(1.921)	(-0.681)
OREO to total assets	0.339*	0.560***	2.426	0.054	0.106	0.329
	(1.694)	(3.206)	(1.208)	(0.851)	(1.320)	(0.754)
Observations	304	304	38	304	304	38
R-squared	0.836	0.939	0.266	0.650	0.815	0.124
Quasi-random Sample	No	No	Yes	No	No	Yes
State FE	Yes	No	No	Yes	No	No
Failed Year FE	Yes	No	No	Yes	No	No
State x Failed Year FE	No	Yes	No	No	Yes	No

Table 11. Exit of PE-Acquired Banks

This table presents the exit outcomes of PE-acquired failed banks as of 2020 Q1. We hand collect information on the exit of PE-acquired banks from FDIC structure reports on bank merger activity. We obtain details on IPO activity from S&P Global Market Intelligence. The analysis is primarily performed at the acquiring bank-level (consortium-level) because different failed banks are lumped into one bank after being acquired by the same consortium under the same charter. We also report the bank-level counts which reflect the number of acquired failed banks in the acquiring consortia. The exit outcomes include still active, merger and acquisitions (acquired) or consolidated, IPO, and closed and liquidated. For acquired banks, we also code the acquirer identity. For the purpose of this table, *Local bank buyer* is identified here as a bank that has a branch network that overlaps with the acquired bank's branch network in at least one zip code. *Non-local bank buyer* is identified here as a bank that does not overlap with the acquired bank's branch network in at least one zip code.

Outcomes	PE-Acquired Failed Banks		Bank-Acquired Failed Banks	
	Acquirer-level	Bank-level	Acquirer-level	Bank-level
Still active under acquirer ownership	1	1	158	273
Acquired or Merged	15	52	54	95
Local bank buyer	9	30	24	47
Non-local bank buyer	6	22	30	48
IPO	2	4	11	24
Closed and liquidated	1	5	2	3

Table 12. Characteristics of Management in PE-acquired Banks

This table presents the background information of the CEO executives appointed by PEs after acquiring failed banks. CEO background information is hand-collected from publicly available information on the internet, such as company bios, professional profiles, and featured articles. *Prior experience in banking* is an indicator variable for whether the new CEO appointed at the PE-acquired failed bank had a history of employment in commercial banking. *Years of prior experience in banking* is the number of years the individual was employed in commercial banking prior to joining the PE-acquired failed bank. *Formerly at failed bank* is an indicator variable for whether the CEO was at the failed bank prior to failure. (In most cases, the FDIC does not allow existing management to stay on at failed banks.) *From PE firm* is an indicator variable for whether the new CEO came directly from the PE firm. In all instances, CEOs came from the commercial banking industry. *Local banking experience* is an indicator variable for whether the CEOs had prior banking experience in the state where the PE acquisition was located. *Community banking experience* is an indicator variable for whether the CEO's prior experience was at a bank with a footprint within a single state (as opposed to regional or national footprints). *Prior CEO of bank* is an indicator variable for whether the CEO held a previous CEO position at a bank. While a little over half had prior CEO experience, all CEOs at PE-acquired banks had prior experience in upper banking management. *Prior founding of bank* is an indicator variable for whether the CEO had previously founded a bank. Almost a third of these CEOs had experience in starting up a new bank and later selling it. *Prior experience in turnaround management, troubled debt, distressed assets* is an indicator variable for whether the CEO had experience rehabilitating troubled institutions or products.

$N = 19$	Mean	Standard Deviation	Median	25th percentile	75th percentile
Prior experience in banking	1	0	1	1	1
Years of prior experience in banking	29.3	7.6	30	25	37
Formerly at failed bank	0	0	0	0	0
From PE firm	0	0	0	0	0
Externally hired	1	0	1	1	1
Local banking experience	0.63	0.51	1	0	1
Community banking experience	0.68	0.48	1	0	1
Prior CEO of bank	0.53	0.51	1	0	1
Prior founding of bank	0.32	0.48	0	0	1
Prior experience in turnaround management, troubled debt, distressed assets	0.37	0.5	0	0	1

Online Appendix for

Private Equity and Financial Stability:

Evidence from Failed Bank Resolution in the Crisis

Emily Johnston-Ross	Song Ma	Manju Puri
FDIC	*Yale University*	*Duke University, NBER, and FDIC*

Online Appendix 1. Sample of Failed Bank Acquisitions and PE Participation

In this appendix, we provide details on the sample construction of failed banks in our main analysis, which focuses on 456 failed banks. None of the data processing steps described below changes the results of the paper in any meaningful way, either qualitatively or quantitatively.

Figure 1, Panel A, of the paper shows the number of failures over time, which includes banks that were liquidated as well as those that were acquired by banks or PE. Between 2009-2014 (the main dates of our sample, because these are the years in which PE acquired failed banks), this cumulative number in the table is 483. This includes 394 bank failures acquired by banks, 61 bank failures acquired by PE, 25 failures during this time that received no winning bid and were thus liquidated by the FDIC, and 3 conservatorship/bridge banks that were temporarily run by the FDIC. So, formally, the decomposition is $394 + 61 + 25 + 3 = 483$. However, the $394 + 61 (= 455)$ banks that failed between 2009-2014 and were acquired are slightly different than the $394 + 62 (=456)$ in our estimation sample. This is because one bank failed in 2008 but was run as a conservatorship, and later acquired by PE in 2009, so it is outside the 2009-2014 failure sample but within the 2009-2014 acquisition sample. So that is $394 + 62 = 456$, which gets to our 456 observations in the estimation sample for most of our regressions. We believe this sample better captures the question under investigation.

The amount of assets at the failed banks in Figure 1, Panel B, show total assets held at failed banks in the quarter before failure. The sample includes assets at banks that were acquired, liquidated, or temporarily run as a conservatorship or bridge bank. These numbers differ from the total assets *acquired*, depicted in Figure 3, Panel B. Figure 3 only includes assets from banks that were acquired, so it excludes any assets from banks that were liquidated as well as two banker's banks that failed and were temporarily run as bridge banks by the FDIC. In addition, acquirers rarely purchase 100 percent of the assets at the failed bank, so the FDIC retains a large portion overall. Any assets retained by the FDIC in the resolution process are excluded from the measure of assets acquired. This is why the amount of assets at failure and the amount of assets acquired are different between Figure 1 Panel B and Figure 3 Panel B in the paper, capturing details of bank failures vs. acquisitions.

Online Appendix 2. Additional Results

Table A1. Bank Failures and PE Participation in Resolutions

This table shows the number and size of failed bank acquisitions by year. Column (1) is the year in which the acquisition occurred. Column (2) is the total number of failed bank acquisitions in a given year. Column (3) is the total amount of failed bank assets in millions acquired in a given year, from internal resolution data at the FDIC. Column (4) is the number of failed banks acquired by PE in a given year. Column (5) is the percentage of failed bank acquisitions by PE in a given year, relative to the total failed bank acquisitions that year. Column (6) is the total assets in millions passed to the acquiring banks in a given year, from internal FDIC resolutions data. Column (7) is the percentage of assets acquired by PE in a given year, relative to total assets acquired in that year. Column (8) is the number of failed banks acquired by banks in a given year. Column (9) is the percentage of failed bank acquisitions by banks in a given year, relative to the total failed bank acquisitions that year. Column (10) is the total assets passed to the bank acquirers in a given year, from internal FDIC resolutions data. Column (11) is the percentage of assets acquired by banks in a given year, relative to total assets acquired in that year (including those acquired by banks).

Year	Total failed bank acquisitions		Failed banks acquired by PE				Failed banks acquired by other banks			
	Number	Total assets ($Million)	Number	%	Total assets ($Million)	%	Number	%	Total assets ($Million)	%
2009	129	152,799	11	8.53%	41,798	27.35%	118	91.47%	111,001	72.65%
2010	149	80,569	22	14.67%	15,847	19.67%	127	85.33%	64,722	80.33%
2011	90	31,799	20	22.22%	10,240	32.20%	70	77.78%	21,559	67.80%
2012	47	8,717	5	10.64%	1,149	13.18%	42	89.36%	7,568	86.82%
2013	23	4,794	2	8.70%	363	7.57%	21	91.30%	4,431	93.43%
2014	18	2,173	2	11.11%	210	9.68%	16	88.89%	1,963	90.32%
Overall	456	280,851	62	13%	69,607	25 %	394	87%	211,244	75 %

Table A2. Summary Statistics of the Failed Banks

This table presents summary statistics for failed bank acquisitions by PE and other banks between 2009 and 2014. Asset size is the amount of assets at the failed bank in millions. Tier 1 risk-based capital is the Tier 1 risk-based capital divided by adjusted average assets. Liquidity ratio is the sum of cash, fed funds sold and securities, excluding mortgage-backed securities, divided by total assets. Core deposits to total deposits is total domestic deposits minus time deposits of more than $250,000 and brokered deposits of $250,000 or less, divided by total deposits. CRE loans to total loans is non-farm non-residential properties secured by real estate and multifamily (5 or more) residential properties secured by real estate, divided by total loans. C&D loans to total loans is construction and land development loans secured by real estate divided by total loans. C&I loans to total loans is commercial and industrial loans, divided by total loans. Consumer loans to total loans is loans to individuals for household, family, and other personal expenditures, divided by total loans. Non-current loans to total loans is the ratio of non-current loans to total loans. OREO to total assets is the ratio of other real estate owned to total assets. Loss-sharing agreement is an indicator variable that equals 1 if the transaction included an agreement with the FDIC to share in a portion of the losses on covered assets, and 0 if no loss-sharing agreement was included. Neighboring bank variables are constructed as the mean of banks that share at least one branch zip code with the focal bank. Variables are obtained from the call report submitted by the failed bank in the quarter prior to failure, and branch zip code information for calculating neighboring bank variables is obtained from the FDIC Summary of Deposits (SOD).

	PE Acquisitions				Bank Acquisitions				T-test	
	N	Mean	Standard Deviation	Median	N	Mean	Standard Deviation	Median	t-stat	p-val
Failed bank characteristics										
Asset size (in $Million)	62	1,354	4,216	341	394	628	1,890	193	-2.267**	0.024
Tier 1 risk-based capital ratio	62	0.165	2.418	0.615	394	1.045	2.722	1.190	2.402**	0.017
Liquidity ratio	62	0.168	0.085	0.156	394	0.168	0.081	0.156	0.030	0.976
Core deposits to total deposits	62	0.824	0.148	0.889	394	0.839	0.144	0.874	0.753	0.452
CRE loans to total loans	62	0.400	0.165	0.394	394	0.385	0.171	0.378	-0.649	0.516
C&D loans to total loans	62	0.227	0.149	0.199	394	0.179	0.135	0.152	-2.571**	0.011
C&I loans to total loans	62	0.083	0.080	0.065	394	0.111	0.090	0.085	2.284**	0.023
Consumer loans to total loans	62	0.014	0.013	0.010	394	0.024	0.042	0.012	1.842*	0.066
Non-current loans to total loans	62	0.183	0.088	0.162	394	0.161	0.096	0.143	-1.716*	0.087
OREO to total assets	62	0.065	0.057	0.051	394	0.050	0.047	0.037	-2.386**	0.017
Loss-sharing agreement	62	0.839	0.371	1	394	0.632	0.483	1	-3.224***	0.001
Neighboring bank conditions										
Neighbor Tier 1 risk-based capital ratio	62	7.692	1.274	7.713	394	7.972	1.345	7.956	-1.479	0.140
Neighbor Nonperforming loans to total loans	62	4.763	4.133	3.765	394	3.377	3.276	2.192	2.870***	0.004
Neighbor OREO to total assets	62	0.012	0.013	0.006	394	0.006	0.009	0.003	4.106***	0.000
No of Local Banks (>3xSize)	62	2.949	1.682	2.000	394	3.337	2.178	3.000	-1.300	0.194

Table A3. Robustness: Comparing PE-Acquired and Bank-Acquired Failed Banks

This table presents the estimation results from a logit regression framework in the following form:

$$Pr(PE = 1) = \Phi(\alpha + \beta \cdot X_i + \gamma \cdot Control_i + \theta_t + \varepsilon_i).$$

The analysis is performed on the cross-sectional sample of all failed banks that eventually got acquired by a bank or a private equity investor. The dependent variable is a dummy that takes value 1 if the failed bank was eventually acquired by a PE, and 0 otherwise (i.e., acquired by a bank). This table differs from Table 3 of the paper by using alternative definition of PE acquisitions. We required PE holding to be above 75% or 66% respectively.

	(1)	(2)	(3)	(4)	(5)
	Pr(PE Acquired); PE defined as PE Ownership > 75%				
Tier 1 risk-based capital ratio	-0.011**				
	(-2.183)				
Core deposits to total deposits		-0.268**			
		(-2.073)			
Net Interest Margin			-0.075***		
			(-4.657)		
C&D loans to total loans				0.347**	
				(2.480)	
OREO to total assets					0.728***
					(2.654)
Log(Asset in $000)	0.052***	0.048***	0.043***	0.043***	0.054***
	(4.099)	(3.931)	(3.587)	(2.807)	(4.260)
Observations	408	408	408	408	408
Failed Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.131	0.132	0.204	0.148	0.138

	(1)	(2)	(3)	(4)	(5)
	Pr(PE Acquired); PE defined as PE Ownership > 66%				
Tier 1 risk-based capital ratio	-0.012**				
	(-2.300)				
Core deposits to total deposits		-0.248*			
		(-1.858)			
Net Interest Margin			-0.082***		
			(-4.849)		
C&D loans to total loans				0.365**	
				(2.512)	
OREO to total assets					0.866***
					(3.262)
Log(Asset in $000)	0.060***	0.056***	0.050***	0.050***	0.061***
	(4.554)	(4.391)	(4.090)	(3.271)	(4.770)
Observations	428	428	428	428	428
Failed Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.156	0.152	0.229	0.171	0.169

A.7

Table A4. Robustness: Comparing PE-Acquired and Bank-Acquired Failed Banks

This table presents the estimation results from a logit regression framework in the following form:

$$Pr(PE = 1) = \Phi(\alpha + \beta \cdot X_i + \gamma \cdot Control_i + \theta_t + \varepsilon_i).$$

The analysis is performed on the cross-sectional sample of all failed banks that eventually got acquired by a bank or a private equity investor. The dependent variable is a dummy that takes value 1 if the failed bank was eventually acquired by a PE, and 0 otherwise (i.e., acquired by a bank). This table differs from Table 3 of the paper by simultaneously incorporating bank characteristics of the failed banks and their neighboring banks, as defined in the paper.

	(1)	(2)	(3)	(4)	(5)
			I(PE Acquired)		
Tier 1 risk-based capital ratio	-0.017***				
	(0.005)				
Neighbor Tier 1 risk-based capital ratio	-0.018*				
	(0.011)				
Core deposits to total deposits		-0.591**			
		(0.254)			
Neighbor Core deposits to total deposits		-0.401*			
		(0.217)			
Net Interest Margin			-0.073***		
			(0.021)		
Neighbor Net Interest Margin			-0.012		
			(0.041)		
C&D loans to total loans				0.309***	
				(0.101)	
Neighbor C&D loans to total loans				0.324**	
				(0.147)	
OREO to total assets					0.492**
					(0.234)
Neighbor OREO to total assets					3.397**
					(1.444)
Log(Asset in $000)	0.064***	0.029*	0.027**	0.025**	0.060***
	(0.012)	(0.018)	(0.011)	(0.010)	(0.012)
Observations	456	456	456	456	456
Failed Year-Quarter FE	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.198	0.118	0.141	0.0951	0.196